

**TRANSPORTATION IMPACT STUDY**

**HAWK RIDGE  
LIV (Hawk Ridge) LP**

**TOWNSHIP OF SEVERN  
CITY OF ORILLIA**

**PREPARED BY:**

**C.F. CROZIER & ASSOCIATES INC.  
70 HURON STREET, SUITE 100  
COLLINGWOOD, ON L9Y 4L4**

**SEPTEMBER 2024**

**CFCA FILE NO. 1935-6135**

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REVISION NUMBER	DATE	COMMENTS
Rev. 0	September 2024	First Submission



## 1.0 Executive Summary

C.F. Crozier & Associates Inc. (Crozier) has been retained by LIV (Hawk Ridge) LP (LIV Communities) to complete a Transportation Impact Study in support of an Official Plan Amendment (OPA), Zoning By-Law Amendment (ZBA) and Draft Plan of Subdivision Application for the proposed development located at 1151 Hurlwood Lane in the Township of Severn (Township), County of Simcoe (County). The proposed development will herein be referred to as the Subject Development/Subject Lands.

A Conceptual Draft Plan for the Subject Development was prepared by Biglieri Group (August 2024). The elements envisioned within the Draft Plan include a mix of low density single detached units (290) and medium density townhouse units (560) for a total of 850 units. The Draft Plan also includes two (2) stormwater management blocks, a series of municipal infrastructure blocks to support sanitary and water servicing, and 20 m right-of-way allowances and parkland/natural heritage area.

### Existing Conditions

The following key intersections within the study area have been analysed under existing conditions:

- Hurlwood Lane/Brodie Drive and Burnside Line
- Burnside Line/West Street N and the Highway 11 northbound ramps
- Burnside Line/West Street N and the Highway 11 southbound ramps
- Murphy Road and Uthhoff Line
- Highway 12 and Murphy Road/West Ridge Boulevard
- Division Road W and Uthhoff Line
- Division Road W and Burnside Line

Based on existing traffic conditions the study intersections operate with a LOS "C" or better in the weekday a.m. and p.m. peak hours. A maximum control delay of 32.2 s and maximum volume-to-capacity ratio of 0.94 (SBTR) is experienced at the intersection of Murphy Road/West Ridge Boulevard and Highway 12. This indicates that the boundary road network is operating acceptably.

### Future Background Conditions

In accordance with the agreed upon Terms of Reference, growth rate of 2% was utilized to forecast background growth on the boundary road network. The Inch Farm, the North Orillia Employment Lands, and Area 3 Residential and Industrial subdivisions were assessed as background developments, generating 693 a.m. and 713 p.m. peak hour two-way trips.

Severn Township has planned intersection improvements, including signalization, for the intersection of Burnside Line and Division Road West prior to the 2031 horizon year.

A new Industrial (Arterial) Road is planned to connect Burnside Line to Uthhoff Line. The road will run parallel to Highway 11. The western end of the roadway is planned to connect at a T-intersection with Uthhoff Line approximately 185 m north of Murphy Road. Construction drawings for the intersection were prepared by Tatham Engineering for the City of Orillia, dated December 2020. The intersection has been assessed as a minor stop control intersection with a single inbound and two outbound lanes. A northbound right-taper should be considered for the intersection as the percentage of future background northbound right-turning volumes are under, but approaching 200 vehicles in both peak hours, and are a considerable portion of the advancing volumes, which increase with the addition of the Subject Development.

The eastern end of the roadway is proposed to connect to Burnside Line at Brodie Drive. Planmac Engineering Inc. prepared a conceptual intersection design, dated January 30, 2022, which illustrates the conceptual configuration, including turn lanes. Crozier has prepared a first submission of detailed design, dated July 19, 2024, for the industrial road portion of the intersection. The design of the intersection is still subject to updates and revisions, including the recommended addition of an eastbound right turn lane with 75 m of storage. External improvements to the intersection should be implemented at the time of construction of the Industrial Road.

The existing Hurlwood Lane is planned to intersect Industrial Road at a T-intersection, approximately 75 m from the intersection with Burnside Line. The Industrial Road does not connect directly to the Subject Development and is being constructed as part of adjacent development.

Under the 2045 future background conditions modelled, the study intersections are expected to operate with a LOS 'C' or better, with the exception of Highway 12 and Murphy Road West/West Ridge Blvd as well as West Street N and Highway 11 Eastbound.

The Highway 11 Eastbound ramp at West Steet N is forecasted to operate with a LOS 'D' in the p.m. peak hour with 41.3 s of delay and a maximum v/c ratio of 1.08 for the southbound through volumes. The ramp is anticipated to operate with a v/c ratio of 0.74, just below the MTO's critical capacity threshold of 0.75. The 95<sup>th</sup> percentile queue for the northbound left-turn movement is expected to exceed the available storage by approximately one car length in the p.m. peak hour. As the width of the road can accommodate two lanes and queued vehicles are not anticipated to impact through movements. Line painting adjustments can be made to extend the turn lane should these volumes and the 95<sup>th</sup> percentile queues be realized. Ongoing monitoring by the MTO is recommended.

The intersection of Highway 12 and Murphy Road West/West Ridge Blvd is forecast to operate with a LOS 'C' in the a.m. peak hour and a LOS 'F' with a maximum delay of 85.5 s and a maximum v/c ratio of 1.14 (SBT) in the p.m. peak hour. LOS 'F' in the p.m. peak hour with a maximum delay of 85.5 s and a maximum v/c ratio of 1.14 (SBT) in the p.m. peak hour.

The 95<sup>th</sup> percentile queue for the east and westbound left-turn movements at Highway 12 and West Ridge Boulevard/Murphy Road are expected to exceed the provided storage. The 95<sup>th</sup> percentile queue of the southbound right turn movement will be contained within the available taper. These operations are not uncommon for high demand intersections during peak times. The intersection should be continually monitored as development in the area proceeds.

The p.m. peak hour was assessed under mitigated geometric conditions, with dual left-turn lanes on each approach. The mitigation reduces the intersection control delay by approximately 40 s and all 95<sup>th</sup> percentile queue are forecasted to be contained in the dual turn lane storage. It is noted that the feasibility of duality or extension of the eastbound and westbound left-turn lanes will need to be reviewed within the available spacing and right-of-way. The available spacing may restrict the use of this mitigation measure.

It is noted that these operations are forecasted for 21 years into the future with sustained growth on the boundary road network. Several assumptions have been made regarding trip generation of the industrial lands. Traffic Studies should be updated as Site Plan Applications for the Orillia Employment Lands as well as the Area 3 residential and industrial lands proceed to capture the planned size and use. As previously noted, ongoing monitoring is recommended as development phases proceed.

### Future Total Conditions

The proposed Hawk Ridge development is forecasted to generate 452 a.m. and 580 p.m. peak hour, two-way trips.

An assessment of alternative road networks was undertaken to evaluate the best location to cross Silver Creek and provide connectivity between the development lands. An east-west crossing between the south parcel and the Golf Villa's on Uthhoff Line was established as the preferred alternative, along with two accesses to the north parcel. There is adequate sight distance and intersection spacing along Uthhoff Line to support the three proposed site accesses.

Signals were not found to be warranted at the existing unsignalized intersections and the proposed intersections, based on future total traffic volumes. Auxiliary turn lanes were not found to be warranted on Uthhoff Line at the proposed site accesses or the Industrial Road. A northbound right-taper should be considered for the intersection of Uthhoff Line and Industrial Road, based on the forecasted volumes. A northbound right-turn taper should be considered for the intersection of Uthhoff Line and Industrial Road based on the forecasted volume of northbound left and northbound through volumes.

Under the 2045 future total conditions modelled, the study intersections are forecast to continue operating with a LOS 'C' or better, with the exception of Highway 12 and Murphy Road West/West Ridge Blvd as well as West Street N and Highway 11 Eastbound.

The intersection of West Ridge Boulevard/Murphy Road and Highway 12 is expected to operate with a maximum control delay of 84.6 m and maximum volume-to-capacity ratio of 1.14 (WBTR) in the p.m. peak hour. The 95<sup>th</sup> percentile queue for the eastbound and westbound left-turn movements at the intersection is expected to exceed the available storage in the p.m. peak hour.

In comparison to the future background operations the intersection control delay is forecasted to be reduced by 0.9 sections while the maximum volume-to-capacity ration remains at 1.14.

The p.m. peak hour was assessed under mitigated geometric conditions, with dual left-turn lanes on each approach. The mitigation reduces the intersection control delay by approximately 30 s and the left-turn movements are contained in the dual storage lanes. The optimization does impact the northbound right turn queuing. It is noted that the feasibility of duality or extension of the eastbound and westbound left-turn lanes will need to be reviewed.

The Highway 11 Eastbound ramp to West Street N is forecast to operate with a Level of Service 'D' in the a.m. and p.m. peak hours. In the a.m. peak hour, the eastbound left-turn movement is anticipated to exceed the MTO's critical capacity ration of 0.75, however the volume-to-capacity ratio forecasted to be less than 0.90 and 95<sup>th</sup> percentile queues are not anticipated to impact the function of the highway off-ramp.

In the p.m. peak hour, the 95<sup>th</sup> percentile queue for the northbound left-turn movement if forecast to exceed the available storage by approximately 2 vehicles. This is an increase in 5 m from the future background condition. As previous noted, line painting adjustments can be made to extend the turn lanes should these volumes and the 95<sup>th</sup> percentile queues be realized. As development volumes are not forecasted to contribute to the northbound left movement, ongoing monitoring of network growth by the MTO is recommended.

The intersection of Industrial Road/Brodie Drive and Burnside Line is expected to operate with a Level of Service 'C' and acceptable delays. In the p.m. peak hour, the westbound left movement is

forecasted to operate with a critical capacity (0.91) and 95<sup>th</sup> percentile volumes exceeding the proposed storage length. The westbound left turn movement does not increase compared to future background conditions.

The intersection of Murphy Road and Uthhoff Line presents a difference in results when modelled as HCM2000 and HCM2010, with the prior noting a 52 s delay for the eastbound movements. A reorientation of the stop signs to have the east and west legs as free flowing would improve the delay for the increased eastbound left-turn movement, however this would increase the delay for the northbound approach.

Recommendations

The recommended improvements outlined in **Table E1** are based on both future background and future total conditions and are in support of surrounding development and projected traffic growth.

**Table E1: Recommended Network Improvements**

Location	Improvement	Timeline	Intention	Responsibility
West Street N & Hwy 11 Eastbound	<ul style="list-style-type: none"> <li>Optimization of signal timings at a cycle length of 90 s in the a.m. peak hour and 95 s in the p.m. peak hour.</li> </ul>	Monitoring to Determine	In support of development	MTO
Murphy Road/West Ridge Boulevard and Highway 12	<ul style="list-style-type: none"> <li>Optimization of signal timings and increase of cycle length (Future background: 110 in the a.m. and 150 s in the p.m./ Future total 130 s in the p.m. peak hour)</li> </ul>		In support of development	MTO
	<ul style="list-style-type: none"> <li>Southbound right-turn lane with 50 m of storage (Highway 12)</li> </ul>		In support of existing operations	MTO
Murphy Road and Uthhoff Line	<ul style="list-style-type: none"> <li>Consideration for reorientation of two-way stop control</li> </ul>		In support of development	City of Orillia
Industrial Road	<ul style="list-style-type: none"> <li>Construction of Industrial Road (arterial)</li> <li>Creation of T-intersection at Industrial Road and Hurlwood Lane</li> <li>Creation of T-intersection at Industrial Road and Uthhoff Line with northbound right taper</li> </ul>	2027	Background Improvement	LIV Communities
Industrial Road/Brodie Drive and Burnside Line	<ul style="list-style-type: none"> <li>Reconfiguration of the intersection including a 25 m eastbound left-turn lane, 75 m eastbound right-turn lane and a westbound right-turn lane.</li> <li>Extension of westbound left-turn lane to 100 m and northbound left-turn lane to 75 m</li> </ul>	2027	Background Improvement	LIV Communities
	<ul style="list-style-type: none"> <li>Optimization of signal timings and increase of cycle length to 90 s with protected-permissive left-turn phases on each approach.</li> <li>Independent optimization of signal timing splits in the a.m. and p.m. peak hour.</li> </ul>	Monitoring to Determine	In support of development	LIV Communities
	<ul style="list-style-type: none"> <li>Industrial Road transit stops</li> </ul>	To Be Determined	In support of development	Orillia Transit
Division Road	<ul style="list-style-type: none"> <li>Clearing of vegetation within sight lines of intersections</li> </ul>	Immediate	To reduce collisions	Severn Township

The timeline for improvements is subject to the timeline of construction of the Inch Farm and Area 3 subdivisions as well as the results of monitoring the boundary road network as development phasing proceeds. Signal timings should be continually monitored by the MTO and municipalities to confirm when optimizations are required.

As the boundary road network is forecast to receive a high number of volumes from the industrial lands, the study intersections should continue to be reviewed under applications by the background developments as Site Plans are established. The Industrial lands are currently assessed under general industrial with the maximum lot coverage, which may not be achieved. If required, future updates to this report would account for up-to-date information on background developments

The 2045 operations indicate that the majority of the boundary road network should continue operating acceptably with the addition of site generated traffic. The background developments and the subject development will be constructed in phases, therefore the study intersections can continue to be monitored as Draft Plans and Site Plans are finalized, as typical with Secondary Plan areas. Monitoring will determine if and when a volume threshold for a poor Level of Service as well as mitigation measures are met.

The analysis within this report was prepared based on the Concept Draft Plan, prepared by Biglieri Group (August 2024). Any minor changes to the Plan will not materially impact the conclusions of this report.

It is concluded that the subject development can be supported from a traffic operations perspective with the noted recommendations and ongoing monitoring.

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## 2.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) has been retained by LIV (Hawk Ridge) LP (LIV Communities) to complete a Transportation Impact Study in support of an Official Plan Amendment (OPA), Zoning By-Law Amendment (ZBA) and Draft Plan of Subdivision Application for the proposed development located at 1151 Hurlwood Lane in the Township of Severn (Township), County of Simcoe (County). The proposed development will herein be referred to as the Subject Development/Subject Lands.

The Subject Lands are approximately 126 ha and are bounded by agricultural lands and open space to the north, Burnside Line to the east, the proposed Inch Farm Development Lands and Highway 11 to the south, and Uthhoff Line to the west. The municipal boundary between the Township of Severn and City of Orillia is located west of the site, along Highway 11. Refer to **Figure 1** for the Site Location Plan.

The Draft Plan for the Subject Development was prepared by Biglieri Group (August 2024) and has been included as **Figure 2**. The elements envisioned within the Draft Plan include a mix of low density single detached units (290) and medium density townhouse units (560) for a total of 850 units. The Draft Plan also includes two (2) stormwater management blocks, a series of municipal infrastructure blocks to support sanitary and water servicing, and 20 m right-of-way allowances and parkland/natural heritage area.

Crozier is part of a team of consultants providing support for this development. Other members of the consulting team include:

- Biglieri Group (Planning)
- Azimuth Environmental Consulting Inc. (Azimuth) (Environmental)
- Green Geotechnical Ltd. (Geotechnical)
- Crozier (Civil, Transportation Engineering & Hydrogeological)
- Hutchinson Environmental Sciences (Assimilative Capacity Study)

These consultants have prepared studies/ plans to support the planning application. This report prepared by Crozier should be read in conjunction with the work of the other team members.

This Transportation Impact Study has been prepared to assess the impacts of the subject development on the boundary road network and to recommend warranted mitigation measures. The reader is directed to the Master Servicing Report, Functional Servicing Report, Flow Assessment Report and Preliminary Stormwater Management Report for additional details regarding the Subject Lands.

## 2.1 Background

The Subject Lands are currently designated as Open Space and Environmental Protection Area per Schedule D of the Township of Severn Official Plan (June 2024) and as Commercial per Schedule G4 of the Township of Severn Zoning By-Law 2010-65. The Subject Lands also fall within the South of Division Road Secondary Plan Area, which lies between Highway 11 (east), Highway 12 (south) and Division Road (west). Per Section 3.7.13 of the County of Simcoe Official Plan (2023), development within this area should follow the policies outlined in the Township of Severn's South of Division Road Secondary Plan. The purpose of the Secondary Plan is to outline major road systems and future land use patterns prior to the occurrence of major development. The Subject Lands are currently located outside of the Township of Severn's Settlement Boundary.

A Pre-Consultation Meeting with the Township of Severn was held on June 21, 2024. It was identified during the meeting that the preferred method to bring the Subject Lands into the Township's settlement boundary is via an Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBA) Application. As the Subject Lands are located within the Secondary Plan, there is an increased priority to develop as this area has been selected for targeted growth. With that being said, growth within the Subject Lands must not impede the future development of other currently zoned areas within the Secondary Plan.

## **2.2 Purpose & Scope**

This study reviews aspects of the subject development from a transportation engineering perspective including the forecasted trip generation of the development and the existing, future background, and future total traffic operations at the study intersections.

At this time the Transportation Impact Study has reviewed the development at a similar level to a Secondary Plan assessment, as the Master Servicing Plan is ongoing. Updated assumptions and analysis can be completed as further details are confirmed, and phases proceed.

This Transportation Impact Study was conducted in accordance with the Terms of Reference circulated and based on comments provided by the Township of Severn and the City of Orillia. The Ministry of Transportation (MTO) was circulated on the Terms of Reference but did not provide comment. **Appendix A** contains the Terms of Reference correspondence.



**Legend**

- xx A.M. Peak Hour Traffic Volumes
- (xx) P.M. Peak Hour Traffic Volumes

**Hawk Ridge**

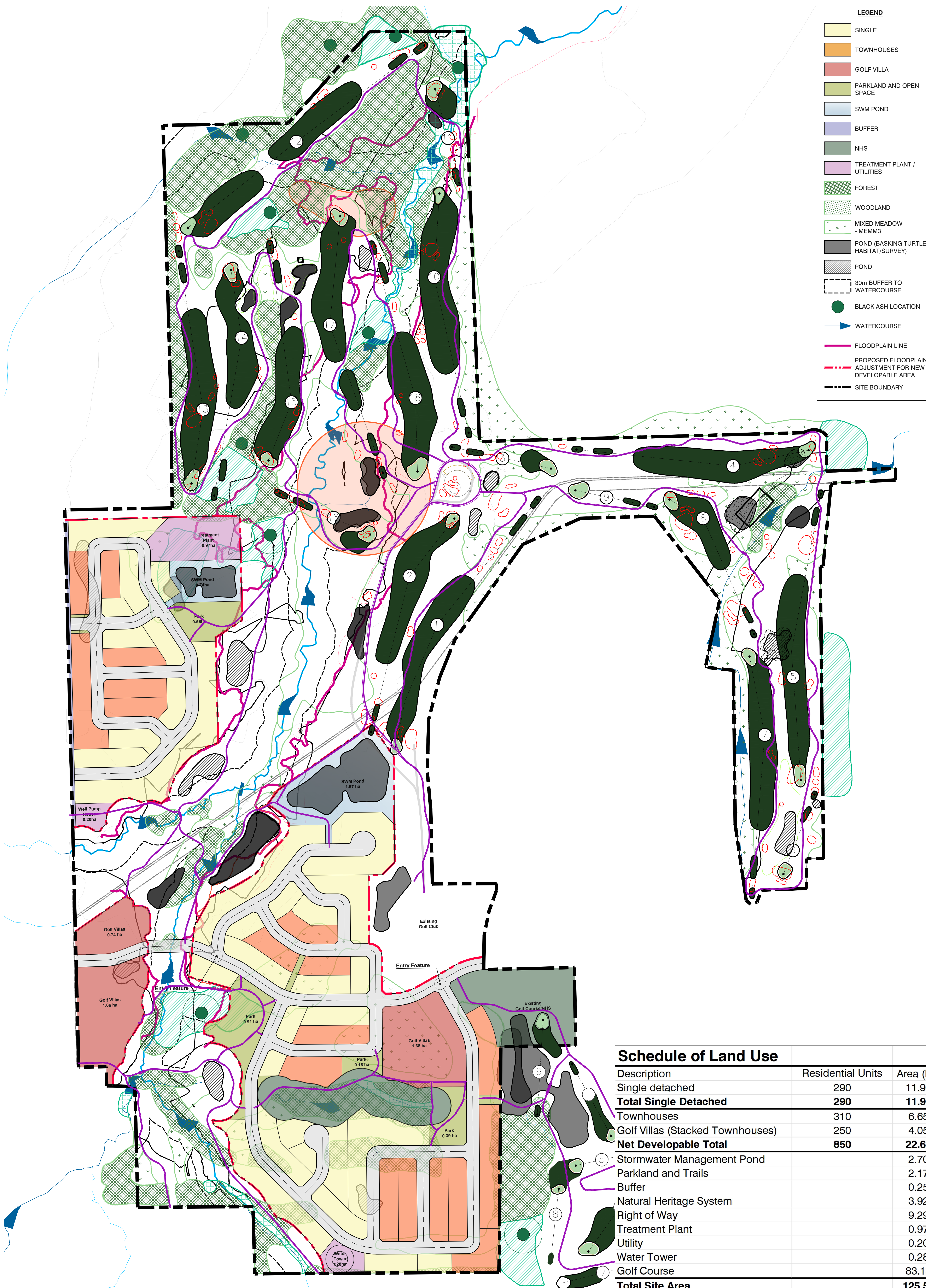
**Site Location**



**Figure 1**

Project No. 1935-6133  
 Date: Thursday July 11, 2024  
 Analyst: KH





**LEGEND**

- SINGLE
- TOWNHOUSES
- GOLF VILLA
- PARKLAND AND OPEN SPACE
- SWM POND
- BUFFER
- NHS
- TREATMENT PLANT / UTILITIES
- FOREST
- WOODLAND
- MIXED MEADOW - MEMM3
- POND (BASKING TURTLE HABITAT/SURVEY)
- POND
- 30m BUFFER TO WATERCOURSE
- BLACK ASH LOCATION
- WATERCOURSE
- FLOODPLAIN LINE
- PROPOSED FLOODPLAIN ADJUSTMENT FOR NEW DEVELOPABLE AREA
- SITE BOUNDARY

**Schedule of Land Use**

Description	Residential Units	Area (ha)
Single detached	290	11.95
<b>Total Single Detached</b>	<b>290</b>	<b>11.95</b>
Townhouses	310	6.65
Golf Villas (Stacked Townhouses)	250	4.05
<b>Net Developable Total</b>	<b>850</b>	<b>22.65</b>
Stormwater Management Pond		2.70
Parkland and Trails		2.17
Buffer		0.25
Natural Heritage System		3.92
Right of Way		9.29
Treatment Plant		0.97
Utility		0.20
Water Tower		0.28
Golf Course		83.15
<b>Total Site Area</b>		<b>125.58</b>

C:\Users\mpetigrew\The Biglieri Group\TBG\_Project - 2020-2024\2023\23979\2 - TBG Design\1 - TBG Working Drawings\1 - AutoCAD\2024-08\23979\_DP\_24.08.22



### 3.0 Existing Conditions

This section outlines the current conditions of the transportation network in the vicinity of the site. Details of the study road network, including traffic controls, lane configurations, speed limits, transit routes and stops, active transportation infrastructure and other relevant transportation elements are identified. The existing traffic operations are also summarized.

#### 3.1 Key Intersections

The following key intersections within the study area have been analysed. **Figure 3** illustrates the existing traffic controls and lane configurations at each intersection.

- Hurlwood Lane/Brodie Drive and Burnside Line
- Burnside Line/West Street N and the Highway 11 northbound ramps
- Burnside Line/West Street N and the Highway 11 southbound ramps
- Murphy Road and Uthhoff Line
- Highway 12 and Murphy Road/West Ridge Boulevard
- Division Road W and Uthhoff Line
- Division Road W and Burnside Line

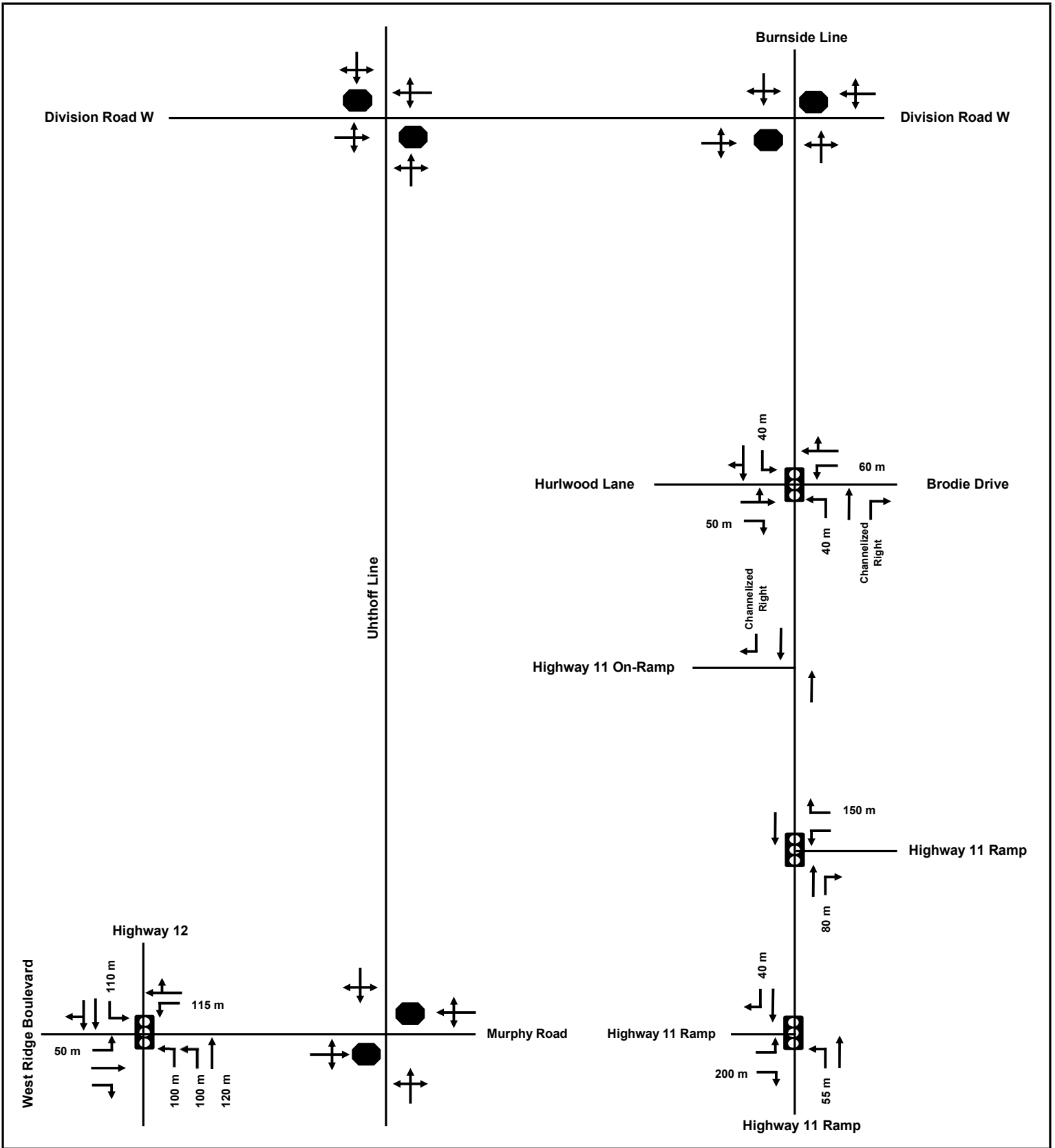
#### 3.2 Boundary Road Network

The boundary road network is described in **Table 1**. The information included below was obtained from the Township of Severn's Official Plan Schedules. Due to the skewed nature of the roadways, the directional orientation of the boundary road network is ambiguous. Accordingly, to provide clarity throughout the report, Highway 12, Uthhoff Line and Burnside Line have been given a north-south orientation and the remaining roadways have been given an east-west orientation.

**Table 1: Boundary Road Network**

Roadway	Direction	Classification	Jurisdiction	Posted Speed Limit	Lanes per Direction
<b>Highway 11</b>	East-West	Provincial Highway	MTO	100 km/h (50 km/h rec. off-ramp)	2
<b>Burnside Line</b>	North-South	Local	Township	60 km/h	1
<b>Hurlwood Lane</b>	East-West	Local	Township	50 km/h	1
<b>Brodie Drive</b>	East-West	Local	Township	60 km/h	1
<b>Uthhoff Line</b>	North-South	Local	Township/City <sup>1</sup>	60 km/h	1
<b>Murphy Road</b>	East-West	Local	Township/City <sup>1</sup>	50 km/h	1
<b>West Ridge Boulevard</b>	East-West	Arterial	Township	50 km/h	2
<b>Division Road W</b>	East-West	Local	Township	80 km/h (60 km/h east of Burnside & west of Uthhoff Line)	1
<b>Highway 12</b>	North-South	Provincial Highway	MTO	80 km/h (60 km/h within city limits)	2

Note<sup>1</sup>: A portion of Uthhoff Line and Murphy Road are the municipal border between the Township of Severn and the City of Orillia.



### 3.3 Multi-Modal Network

The recent improvements to Burnside Line provided a sidewalk and bike lane on the east side of the roadway south of Hurlwood Lane/Brodie Drive. Multi-Use Pathways are present on the south side of West Ridge Boulevard and both sides of Highway 12, south of West Ridge Boulevard. Cyclist signages are provided at the south approach of the Highway 12 intersection. Pedestrian or cycling facilities do not exist on any other existing roadway within the study area.

The City of Orillia has two existing transit routes within the study area. The North Route loops from the central terminal to Orillia Square Mall via Burnside Line and Brodie Drive, with the stop closest to the subject development located next to The Brick. The West Ridge via Coldwater Road Route loops along Murphy Road back to the central terminal, with the stop closest to the subject development located next to the Walmart Supercentre at Murphy Road and Uhthoff Line. The buses operate every 30 minutes. **Appendix B** contains Orillia Transit's current schedule.

### 3.4 Traffic Data

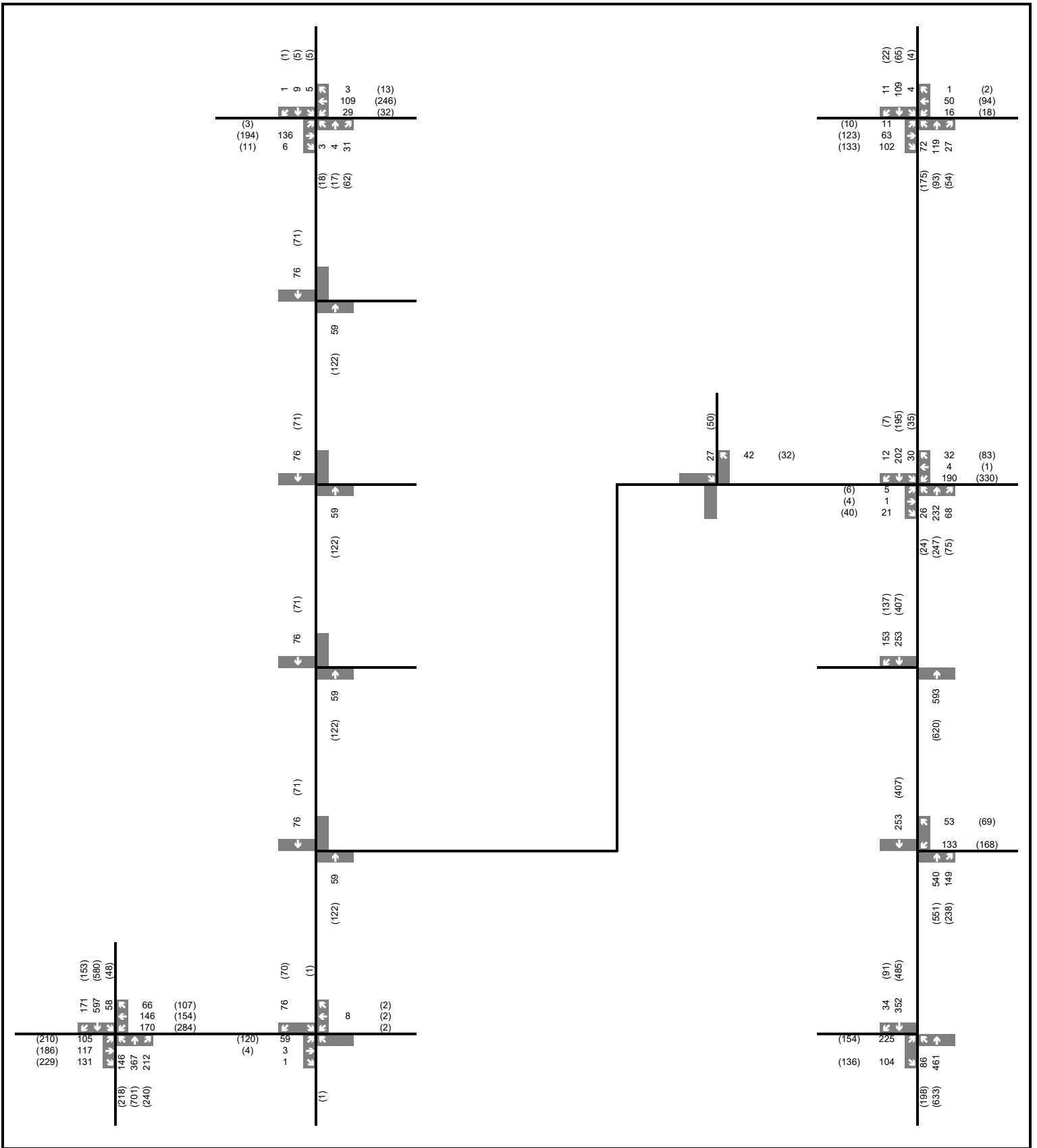
Turning movement counts at the study intersections were undertaken by Spectrum Traffic Data Inc. from 6:00 a.m. to 10:00 a.m. and from 3:00 p.m. to 7:00 p.m. on Thursday August 1, 2024. **Appendix C** contains the collected traffic data for reference. **Figure 4** illustrates the 2024 existing traffic volumes. When compared to April 2022 data collected for previous traffic studies in the area, the August 2024 data was more conservative. As such, no seasonal factor was applied to the 2024 summer counts.

**Table 2** contains the calculated peak hour factors under a.m. and p.m. conditions at the study intersections.

**Table 2: Peak Hour Factors**

Intersection	Peak Hour	Factor
Hurlwood Lane/Brodie Drive & Burnside Line	9:00-10:00	0.91
	16:15-17:15	0.94
Burnside Line & Highway 11 Westbound Ramp	9:00-10:00	0.95
	16:30-17:30	0.98
West Street N & Highway 11 Eastbound Ramp	9:00-10:00	0.95
	16:30-17:30	0.95
Highway 12 & Murphy Road/West Ridge Boulevard	9:00-10:00	0.88
	16:30-17:30	0.97
Murphy Road & Uhthoff Line	8:45-9:45	0.92
	15:00-16:00	0.90
Division Road W & Uhthoff Line	8:45-9:45	0.96
	16:15-17:15	0.93
Division Road W & Burnside Line	9:00-10:00	0.92
	16:15-17:15	0.94

A recent site visit was undertaken on Sunday August 18<sup>th</sup>, 2024, and included a review of the study intersections and completed interchange improvements. Per communications with Township Staff, a site visit was conducted in April 2022 and signal timings were collected in the field for the intersection of Burnside Line and Hurlwood Lane/Brodie Drive. Signal timing plans for the Highway 11 ramps were provided by the MTO in August 2024. The signal timing plan for the Highway 12 intersection was provided by the Township of Severn through the Ainley Group. **Appendix D** includes the signal timing plans for reference.



**Legend**

- xx A.M. Peak Hour Traffic Volumes
- (xx) P.M. Peak Hour Traffic Volumes

**Hawk Ridge**

**Existing Traffic Volumes**



**Figure 4**

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 Analyst: KH



### 3.5 Intersection Modelling

Unless otherwise noted, the existing traffic conditions on the study road network were modelled in Synchro 11 based on Highway Capacity Manual (HCM 2010) methodology and using the default Synchro parameters. A yield sign is present for vehicles using the channelized right turn lane from Burnside Line onto Brodie Drive. Southbound volumes of Burnside Line are not required to stop as they enter the westbound on-ramp for Highway 11. Synchro does not calculate delays associated with these free flow conditions. **Appendix E** contains the Level of Service (LOS) definitions for signalized and unsignalized intersections.

### 3.6 Intersection Operations

**Table 3** outlines the 2024 existing levels of service at the study intersections. **Appendix F** contains the detailed capacity analyses worksheets.

**Table 3: 2024 Existing Levels of Service**

Intersection	Control	Peak Hour	Level of Service	Control Delay <sup>1</sup>	Maximum v/c Ratio <sup>2</sup>	95 <sup>TH</sup> Percentile Queue > Storage Length
Hurlwood Lane/Brodie Drive & Burnside Line	Signalized	A.M.	B	11.8 s	0.51 (WBL)	-
		P.M.	B	15.1 s	0.73 (WBL)	-
Burnside Line & Hwy 11 Westbound	Signalized	A.M.	B	10.1 s	0.57 (NBT)	-
		P.M.	A	9.3 s	0.51 (NBT)	-
West Street N & Hwy 11 Eastbound	Signalized	A.M.	B	16.8 s	0.66 (EBL)	-
		P.M.	B	14.2 s	0.69 (SBT)	-
Highway 12 & Murphy Road/West Ridge Boulevard	Signalized	A.M.	C	30.7 s	<b>0.92 (SBTR)</b>	-
		P.M.	C	32.2 s	<b>0.94 (SBTR)</b>	-
Murphy Road & Uhthoff Line	Two-Way Stop (Murphy Road)	A.M.	A	0.0 s	-	-
		P.M.	A	0.0 s	-	-
Division Road W & Uhthoff Line	Two-Way Stop (Uhthoff Line)	A.M.	B	11.3 s (SB)	0.05 (NB)	-
		P.M.	B	14.4 s (SB)	0.17 (SB)	-
Division Road W & Burnside Line	Two-Way Stop (Division Road)	A.M.	B	14.6 s (WB)	0.29 (EB)	-
		P.M.	C	23.4 s (WB)	0.56 (EB)	-

Note<sup>1</sup>: The Level of Service of a signalized intersection is based on the average control delay per vehicle. The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note<sup>2</sup>: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for movements are outlined and highlighted. Per MTO TIS Guidelines, all ramp movements with v/c ratios greater than 0.75 are outlined and highlighted.

As presented in **Table 3**, under the existing traffic volume conditions, the study intersections operate with a LOS "C" or better in the weekday a.m. and p.m. peak hours. A maximum control delay of 32.2 s and maximum volume-to-capacity ratio of 0.94 (SBTR) is experienced at the intersection of Murphy Road/West Ridge Boulevard and Highway 12. This indicates that the boundary road network is operating acceptably, however with the v/c ratios on Highway 12 approaching capacity, mitigation measures such as a southbound right-turn lane, extension to the eastbound left-turn lane and signal optimizations for the intersection should be considered. These improvements have been explored through future background and future total conditions.

## 4.0 Future Background Conditions

This section summarizes the future background conditions of the study road network and provides details relating to growth rates, future transportation network improvements, and background developments within the study area.

### 4.1 Horizon Years & Growth Rate

In accordance with the agreed upon Terms of Reference, full build-out is expected by the year 2035, with interim phases in 2031 and 2033. The 5 and 10-year horizons beyond build-out (2040 and 2045) were also assessed. A growth rate of 2% was utilized to forecast background growth on the boundary road network. This growth rate was established based on historic traffic volumes on Highway 11 and is consistent with previous studies in the area.

### 4.2 Future Roadway Improvements

#### 4.2.1. Division Road West

The Township of Severn's Transportation Master Plan (April 2023) outlines the signalization of Burnside Line at Division Road as a short term (0-5 years) improvement to the road network. Based on this timeline, the improvement will be completed by the first phase of build-out in 2031. This improvement has been modelled with optimized signal timings, based on 2045 volumes, under both the future total and future background scenarios.

#### 4.2.2. Industrial Road

A new Industrial (Arterial) Road is planned to connect Burnside Line to Uthhoff Line. The road will run parallel to Highway 11. The roadway was first proposed by the City of Orillia as part of their 2019 Multi-Modal Transportation Master Plan. The Township/City have noted that they will no longer be undertaking the design and construction of the roadway. The final roadway design and construction will be developer driven, in support of the surrounding subdivisions. Accordingly, we have assessed the roadway as a background improvement.

Appendix A of the Inch Farm Arterial Road & Industrial Employment Lane Environmental Study Report (ESR) (Tatham Engineering, December 2021) provides the expected roadway alignment. The ESR also outlines the redistribution of existing volumes with the opening of the roadway. The redistribution to Burnside Line and Highway 12 was re-evaluated for this study and differs slightly from the Area 3 TIS (Crozier, 2024). The 2020 Diverted Traffic Volumes were grown to 2031. **Figure 5** illustrates the redistributed trips. **Appendix G** contains relevant excerpts from the ESR.

The western end of the roadway is planned to connect at a T-intersection with Uthhoff Line approximately 185 m north of Murphy Road. Construction drawings for the intersection were prepared by Tatham Engineering for the City of Orillia, dated December 2020. The intersection has been assessed as a minor stop control intersection with a single inbound and two outbound lanes. A northbound right-taper should be considered for the intersection as the percentage of future background northbound right-turning volumes are under, but approaching 200 vehicles in both peak hours, and are a considerable portion of the advancing volumes, which increase with the addition of the Subject Development. **Appendix H** also included excerpts from Tatham's Intersection Design Package.

The eastern end of the roadway is proposed to connect to Burnside Line at Brodie Drive. **Appendix H** contains a conceptual intersection design prepared by Planmac Engineering Inc. dated January

30, 2022, which illustrates the conceptual configuration changes, including turn lanes. **Appendix H** also included excerpts from the first submission of detailed design for the Industrial Road from Burnside Line to west of Hurlwood Lane, prepared by Crozier, dated July 19, 2024. The design is still subject to updates and revisions, including the recommended addition of an eastbound right turn lane with 75 m of storage. It is noted that signal timings at the intersection of Burnside Line and Industrial Road/Brodie Drive will need to be updated/optimized to reflect the new configuration. Improvements to the intersection should be implemented at the time of construction of the Industrial Road.

The existing Hurlwood Lane is planned to intersect Industrial Road at a T-intersection, approximately 75 m from the intersection with Burnside Line. The Industrial Road does not connect directly to the Subject Development and is being constructed as part of adjacent development. **Appendix I** includes the proposed cross-section for the Industrial Road (Crozier, April 2022).

#### 4.2.3. Highway 12 and Murphy Road/West Ridge Boulevard

The Area 3 TIS (Crozier, July 2024) recommend several improvements for the intersection of Highway 12 and Murphy Road/West Ridge Boulevard including implementation of an auxiliary southbound right-turn lane (Highway 12) under the 2032 horizon. Based on existing conditions, a right-turn lane with 50 m of storage was modelled as a background improvement at the intersection under future horizons. Signal optimization was undertaken based on 2045 future background volumes.

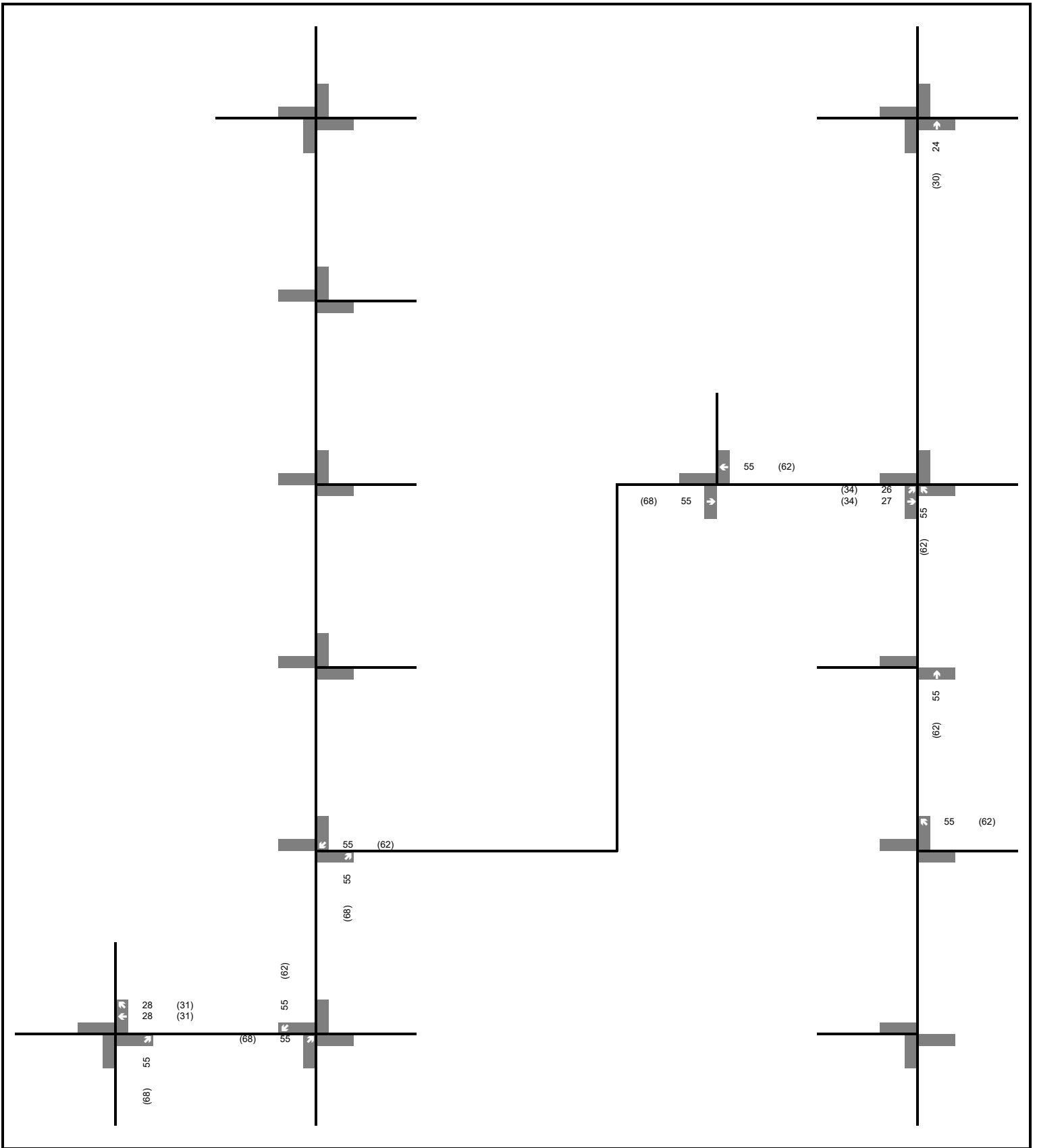
The Ministry of Transportation often advises the following capacity methodology for roadways:

- Dual left-turn lanes should be considered when the peak left turn volumes exceed 300 vehicles per hour per lane (vphpl).
- A separate right-turn lane should be considered when the right-turn volumes exceed 200 vphpl.
- Channelized right-turn should be considered when the peak right turn volumes exceed 500 vphpl.
- Additional through lanes should be considered when the through volumes exceed 800 vphpl.

It is important to note these thresholds are not a published requirement but rather a guideline previously provided by MTO staff for reviewing network improvements. Based on these thresholds a dual westbound left-turn lane at the intersection of Highway 12 and Murphy Road/ West Ridge Boulevard was considered.

The eastbound left turn lane at the intersection cannot be extended due to the adjacent turn lane for Bass Lake Side Road, a dual left-turn lane was also reviewed. As the northbound approach already provides dual left-turn lanes there is existing spacing for a dual southbound left-turn lane to be provided with pavement marking adjustments. All four approaches were considered for dual turn lanes as part of a mitigation measure review.

It is noted that the feasibility of duality or extension of the eastbound and westbound left-turn lanes will need to be reviewed within the available spacing and right-of-way. The available spacing may restrict the use of this mitigation measure. All geometric improvements recommended are subject to functional review and detailed design. The MTO should monitor the intersection to determine if and when such geometric improvements are required.



**Legend**

xx A.M. Peak Hour Traffic Volumes  
 (xx) P.M. Peak Hour Traffic Volumes

**Hawk Ridge**

**Redistributed Volumes**



**Figure 5**

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### 4.3 Background Developments

#### 4.3.1. Inch Farm Subdivision

South of the development lands is the adjacent Inch Farm Subdivision and the North Orillia Employment Lands. The Inch Farm Subdivision will consist of 351 units, 39 single-detached homes and 312 semi-detached units. The development will have access to both Uthhoff Line and the future Industrial Road. The North Orillia Employment Lands did not have a formalized Site Plan and have been assessed based on the trip generation presented in the Inch Farm Residential Traffic Impact Study, prepared by Tatham Engineering in January 2023. **Table 4** outlines the trip generation presented in the report.

**Table 4: Inch Farm Trip Generation**

Land Use	Peak Hour	Number of Trips		
		Inbound	Outbound	Total
Residential	Weekday A.M.	54	124	177
	Weekday P.M.	124	90	215
General Light Industrial	Weekday A.M.	51	7	58
	Weekday P.M.	7	45	52
<b>TOTAL</b>	<b>Weekday A.M.</b>	<b>105</b>	<b>131</b>	<b>235</b>
	<b>Weekday P.M.</b>	<b>131</b>	<b>135</b>	<b>267</b>

The trip distribution and assignment for the residential development was extracted from the residential TIS (Tatham 2023) and the distribution and assignment for the employment lands was summarized based on the ESR. The distribution to the Highway 11 intersections was not included in the ESR but has been assigned based on the distribution described in the Area 3 TIS (Crozier, 2024). **Figure 6** illustrates the background development trip assignment and **Appendix J** contains excerpts from the updated Traffic Impact Study (Tatham, 2023). The development is expected to be complete prior to the 2031 horizon.

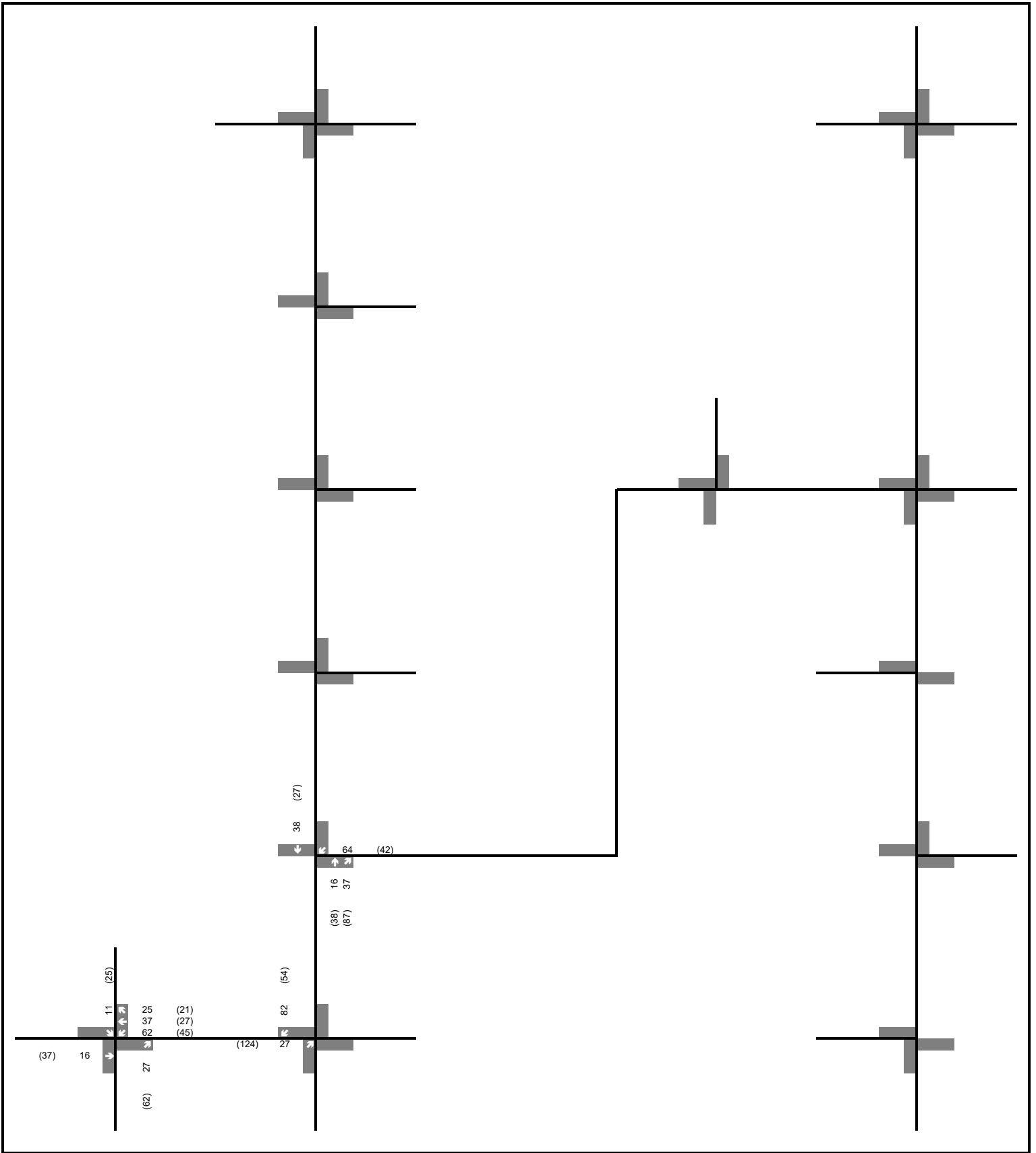
#### 4.3.2. Area 3 Subdivision

Southeast of the development lands is the Area 3 Subdivision and the Industrial Lands. The development proposes 297 townhouse units. Based on the permitted zoning, 60% lot coverage of the industrial lands have been assessed based on a gross floor area (GFA) of 38,820 m<sup>2</sup> (417,855 ft<sup>2</sup>).

**Table 5** summarizes the trip generation of the proposed development. The trips were assigned as distributed in the Area 3 TIS. **Figure 9** illustrates the background development trip assignment and **Appendix K** contains excerpts from updated Traffic Impact Study (Crozier, July 2024). The development is expected to be complete prior to the 2031 horizon.

**Table 5: Area 3 Trip Generation**

Land Use	Peak Hour	Number of Trips		
		Inbound	Outbound	Total
"Single-Family Attached Housing" (297 units)	Weekday A.M.	37	112	149
	Weekday P.M.	103	71	174
"General Light Industrial" (417,855 ft <sup>2</sup> )	Weekday A.M.	272	37	309
	Weekday P.M.	38	234	272
<b>TOTAL</b>	<b>Weekday A.M.</b>	<b>309</b>	<b>149</b>	<b>458</b>
	<b>Weekday P.M.</b>	<b>141</b>	<b>305</b>	<b>446</b>



**Legend**

xx A.M. Peak Hour Traffic Volumes  
 [xx] P.M. Peak Hour Traffic Volumes

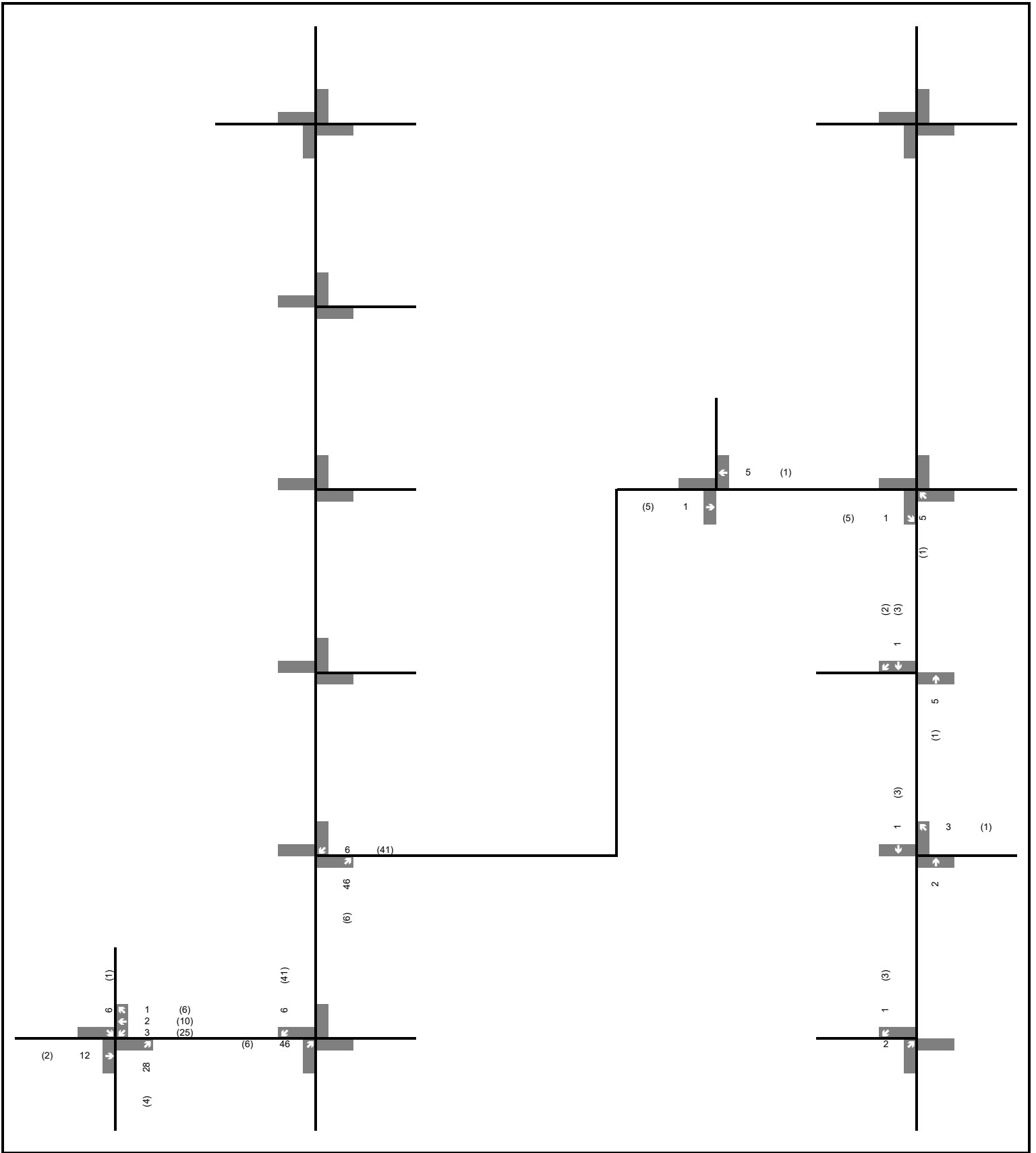
**Hawk Ridge**

**Inch Farm Residential Background Volumes**



**Figure 6**

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 Analyst, KH



**Legend**

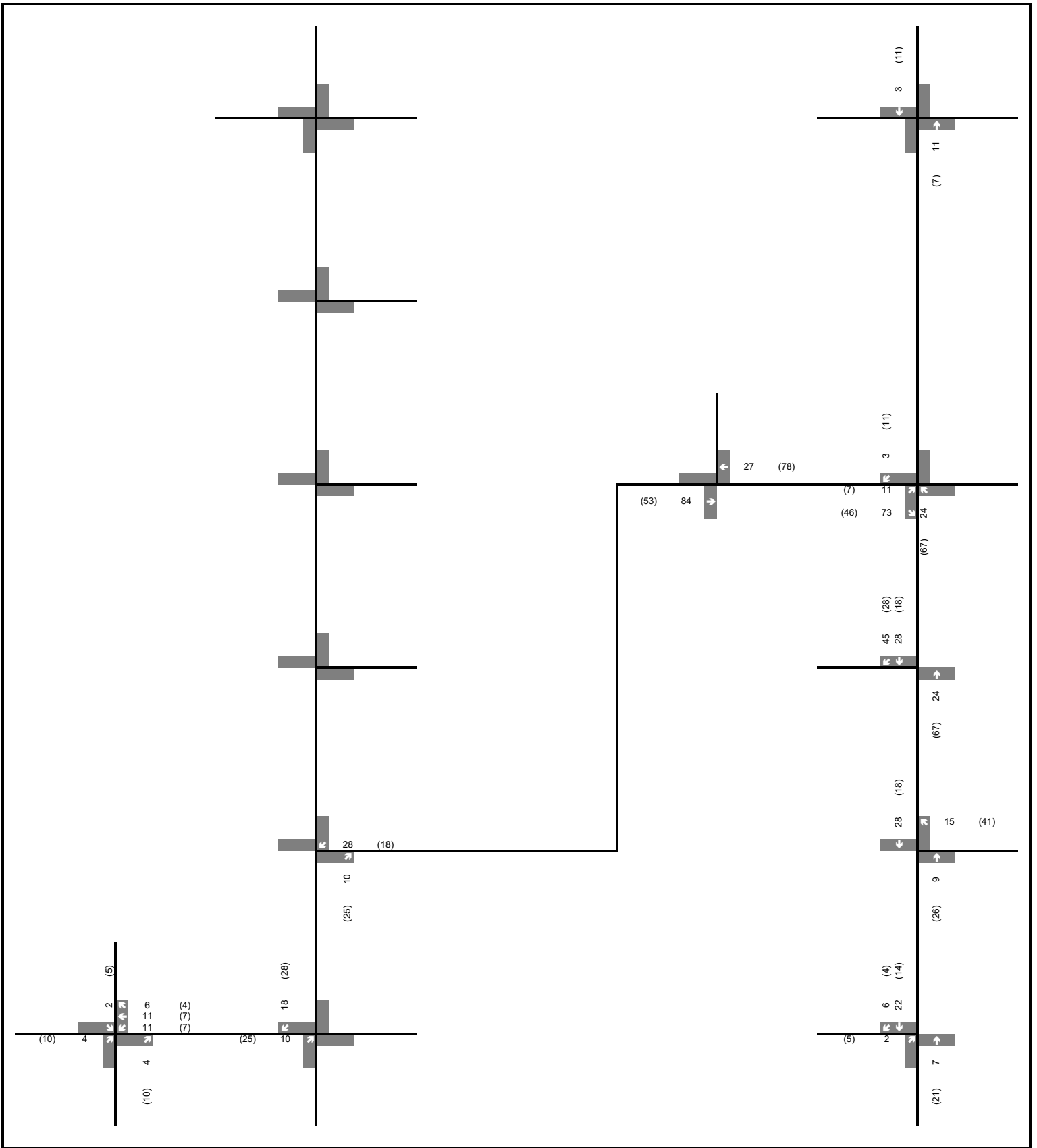
xx A.M. Peak Hour Traffic Volumes  
 (xx) P.M. Peak Hour Traffic Volumes

**Hawk Ridge**  
**Orillia Employment Lands Background**  
**Volumes**



**Figure 7**

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 Analyst, KH



**Legend**

xx A.M. Peak Hour Traffic Volumes  
 (xx) P.M. Peak Hour Traffic Volumes

**Hawk Ridge**

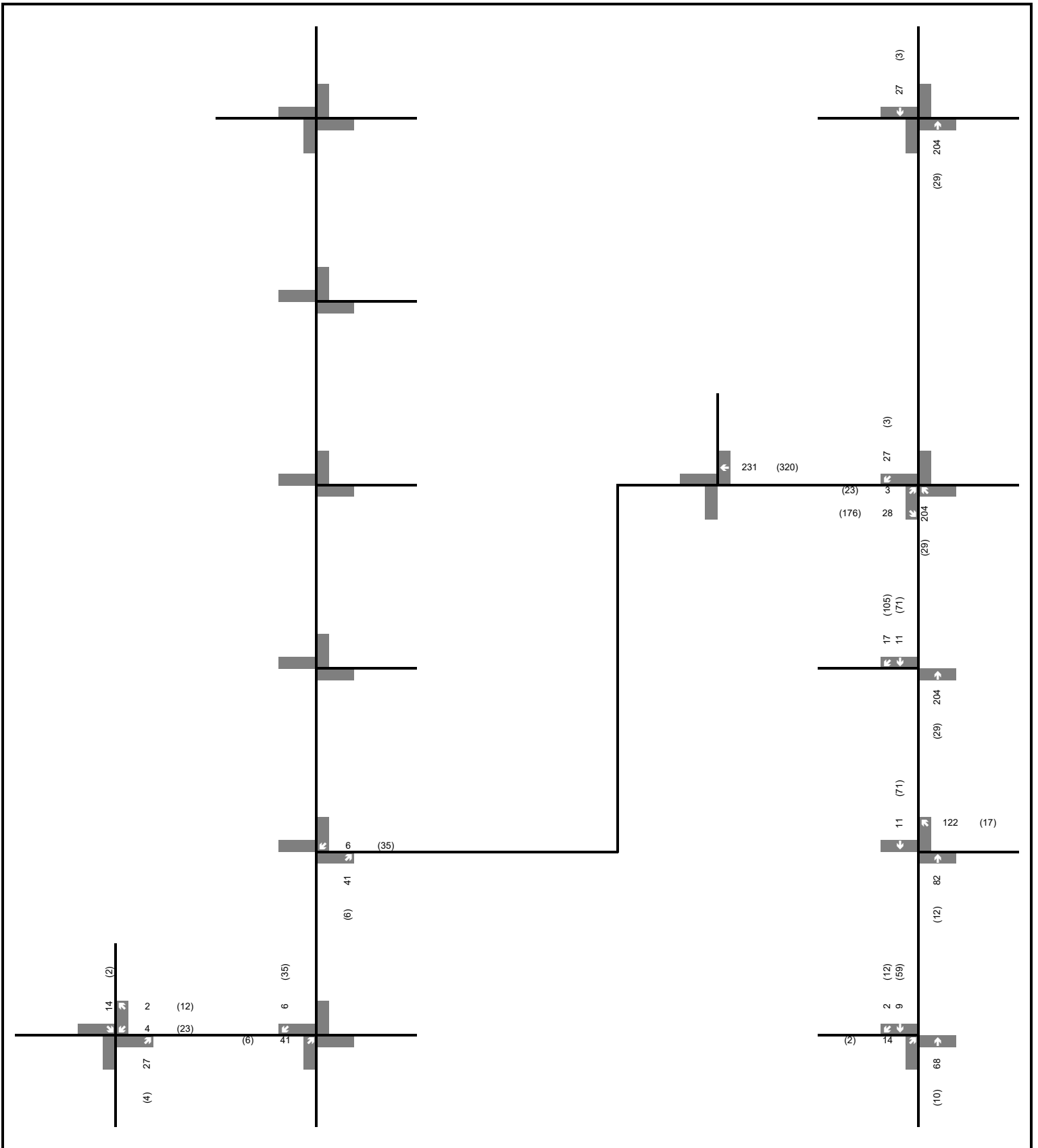
**Area 3 Residential Background Volumes**



**Figure 8**

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 Analyst: KH





**Legend**

xx A.M. Peak Hour Traffic Volumes  
 (xx) P.M. Peak Hour Traffic Volumes

**Hawk Ridge**

**Area 3 Industrial Background Volumes**



**Figure 9**

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 Analyst: KH

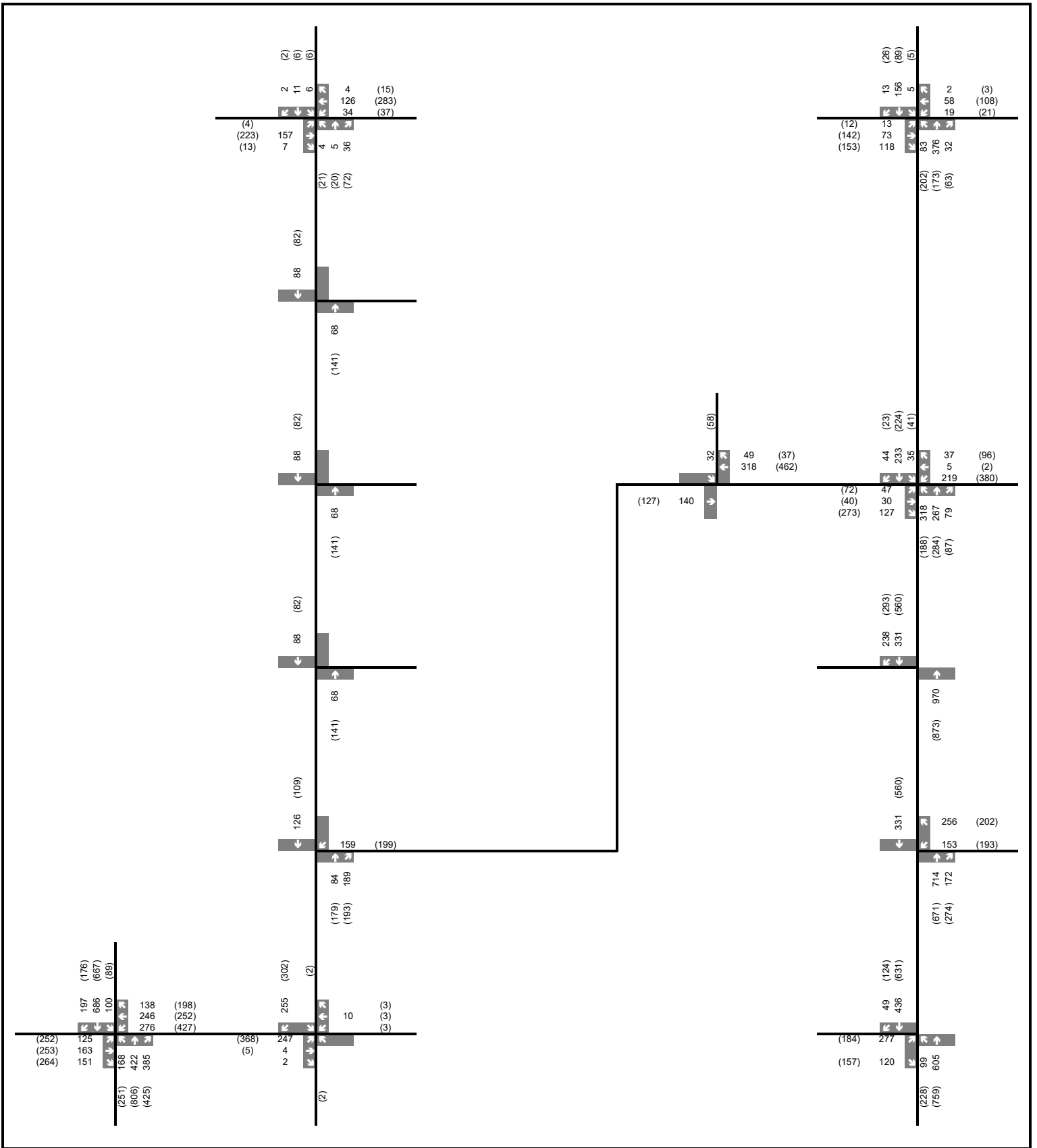
#### 4.4 Intersection Modelling

The 2031, 2033, 3035, 2040 and 2045 future background volumes are illustrated in **Figure 10**, **Figure 11**, **Figure 12**, **Figure 13** and **Figure 14**, respectively. These volumes were analysed in Synchro 11 with the updated roadway geometry.

**Table 6** summarizes the background road improvements modelled.

**Table 6: Background Improvements to Boundary Road Network**

Location	Improvement	Intention	Primary Responsibility
<b>Planned Background Improvement</b>			
Division Road W and Burnside Line	<ul style="list-style-type: none"> <li>Signalization</li> </ul>	Background Improvement	Township of Severn
<b>Recommended Background Improvement</b>			
West Street North and Highway 11 Eastbound	<ul style="list-style-type: none"> <li>Optimization of signal timings at a cycle length of 90 s in the a.m. peak hour and 95 s in the p.m. peak hour.</li> </ul>	In support of Future Background Operations	MTO
Industrial Road and Burnside Line	<ul style="list-style-type: none"> <li>Optimization of signal timings and increase of cycle length to 90 s with protected-permissive left-turn phases on each approach.</li> <li>Independent optimization of signal timing splits in the a.m. and p.m. peak hour.</li> <li>Reconfiguration of the intersection including a 25 m eastbound left-turn lane, 75 m eastbound right-turn lane and a westbound right-turn lane.</li> <li>Extension of westbound left-turn lane to 100 m and northbound left-turn lane to 75 m</li> </ul>	Background Improvement	LIV Communities
Industrial Road	<ul style="list-style-type: none"> <li>Construction of Industrial Road (arterial)</li> <li>Creation of T-intersection at Industrial Road and Hurlwood Lane</li> <li>Creation of T-intersection at Industrial Road and Uhthoff Line with northbound right taper</li> </ul>	In support of Development	LIV Communities
Highway 12 and Murphy Road/West Ridge Boulevard	<ul style="list-style-type: none"> <li>Southbound right-turn lane (Highway 12) with 50 m of storage</li> </ul>	In support of Existing Operations	MTO
	<ul style="list-style-type: none"> <li>Optimization of signal timings and increase of cycle length to 110 in the a.m. and 150 s in the p.m. peak hour</li> <li>Protected/permitted signal for the southbound left-turn movement.</li> </ul>	In support of Future Background Operations	
	<ul style="list-style-type: none"> <li>Duplication of the south, east and westbound left-turn lane at a cycle length of 120 s (reviewed as a mitigation only)</li> </ul>		



**Legend**

xx A.M. Peak Hour Traffic Volumes  
 (xx) P.M. Peak Hour Traffic Volumes

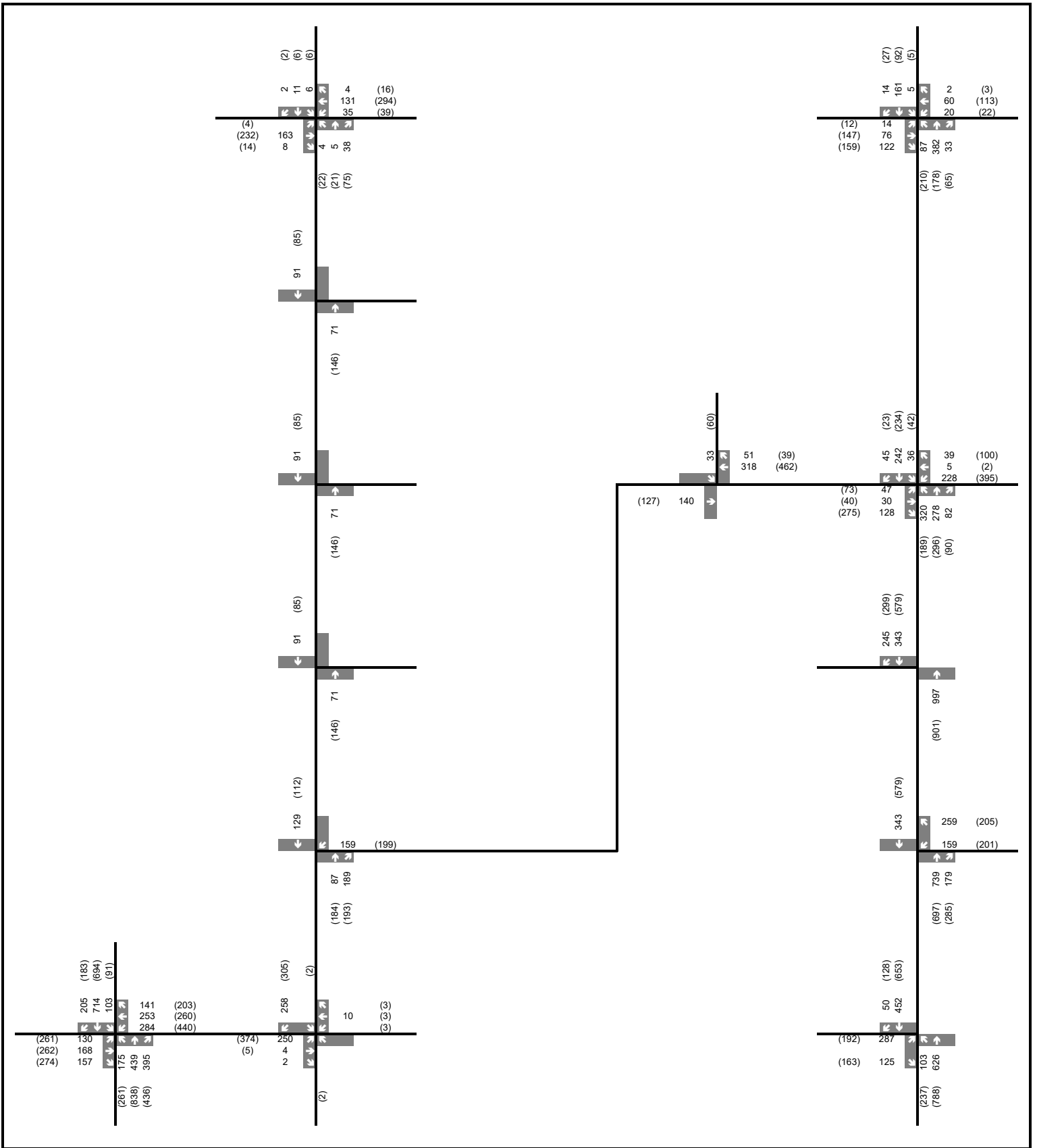
**Hawk Ridge**

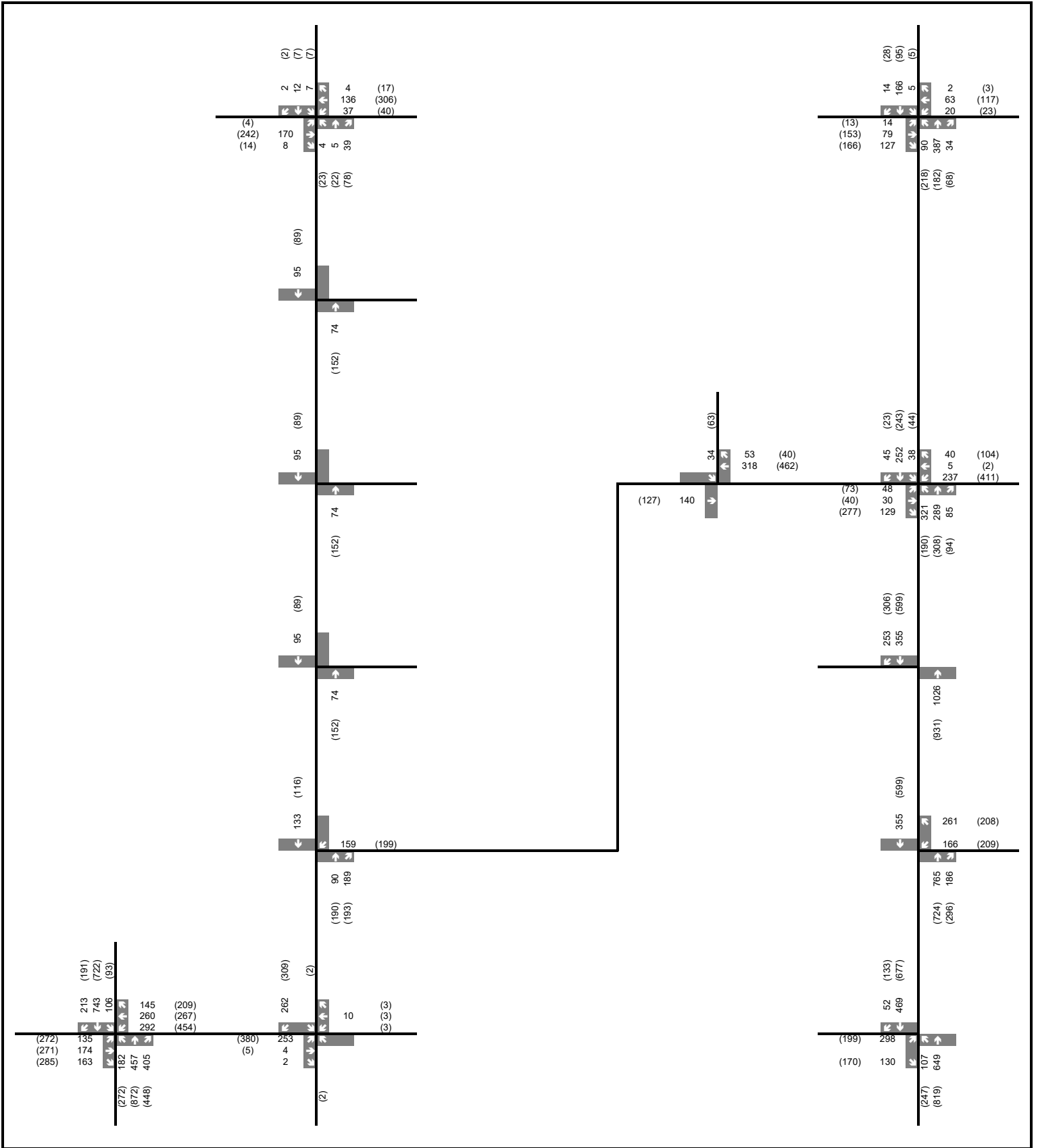
**2031 Future Background Traffic Volumes**



**Figure 10**

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 Analyst: KH





**Legend**

- xx A.M. Peak Hour Traffic Volumes
- xx) P.M. Peak Hour Traffic Volumes

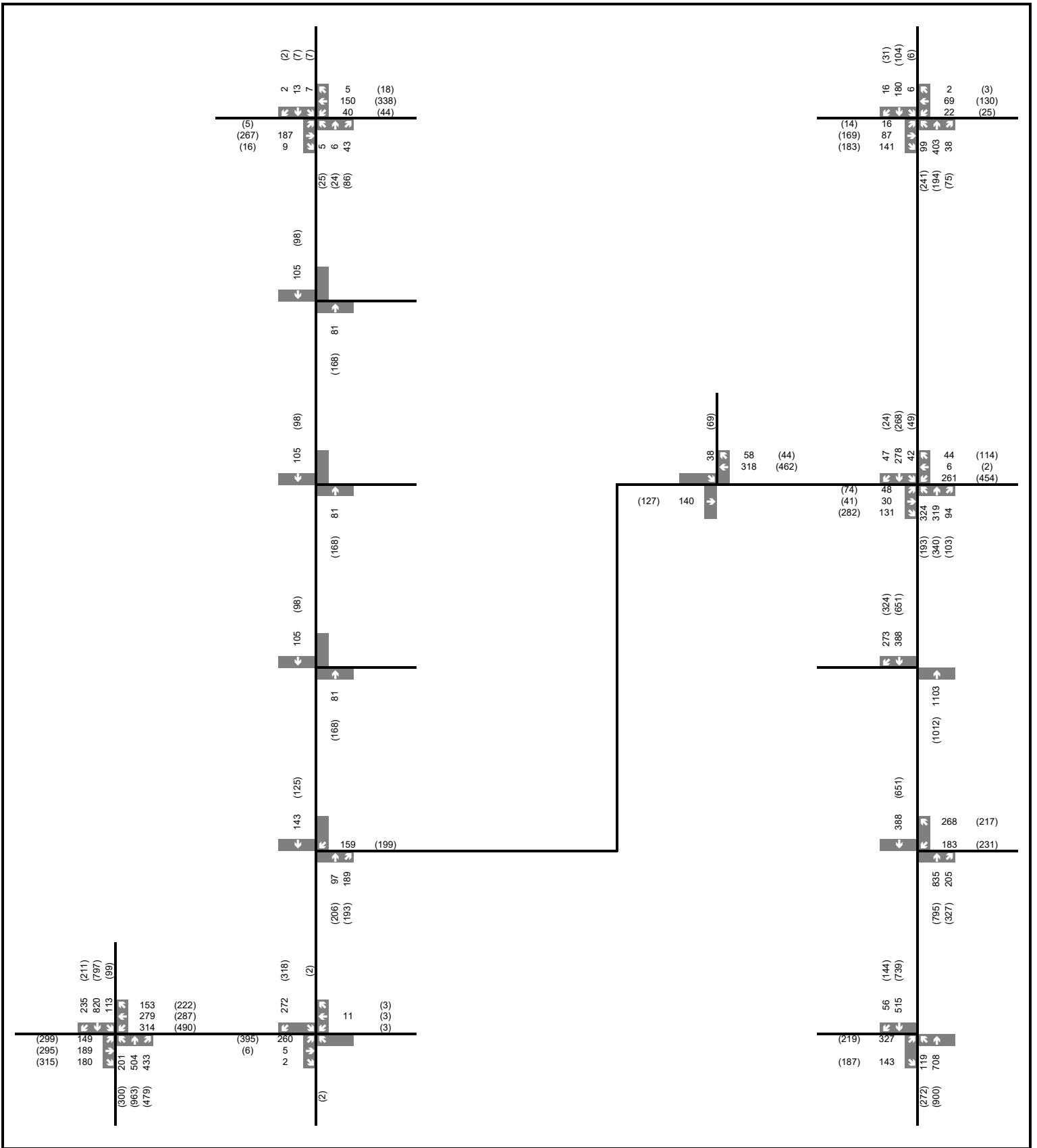
**Hawk Ridge**

**2035 Future Background Traffic Volumes**



**Figure 12**

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 Analyst: KH



**Legend**

xx A.M. Peak Hour Traffic Volumes  
 (xx) P.M. Peak Hour Traffic Volumes

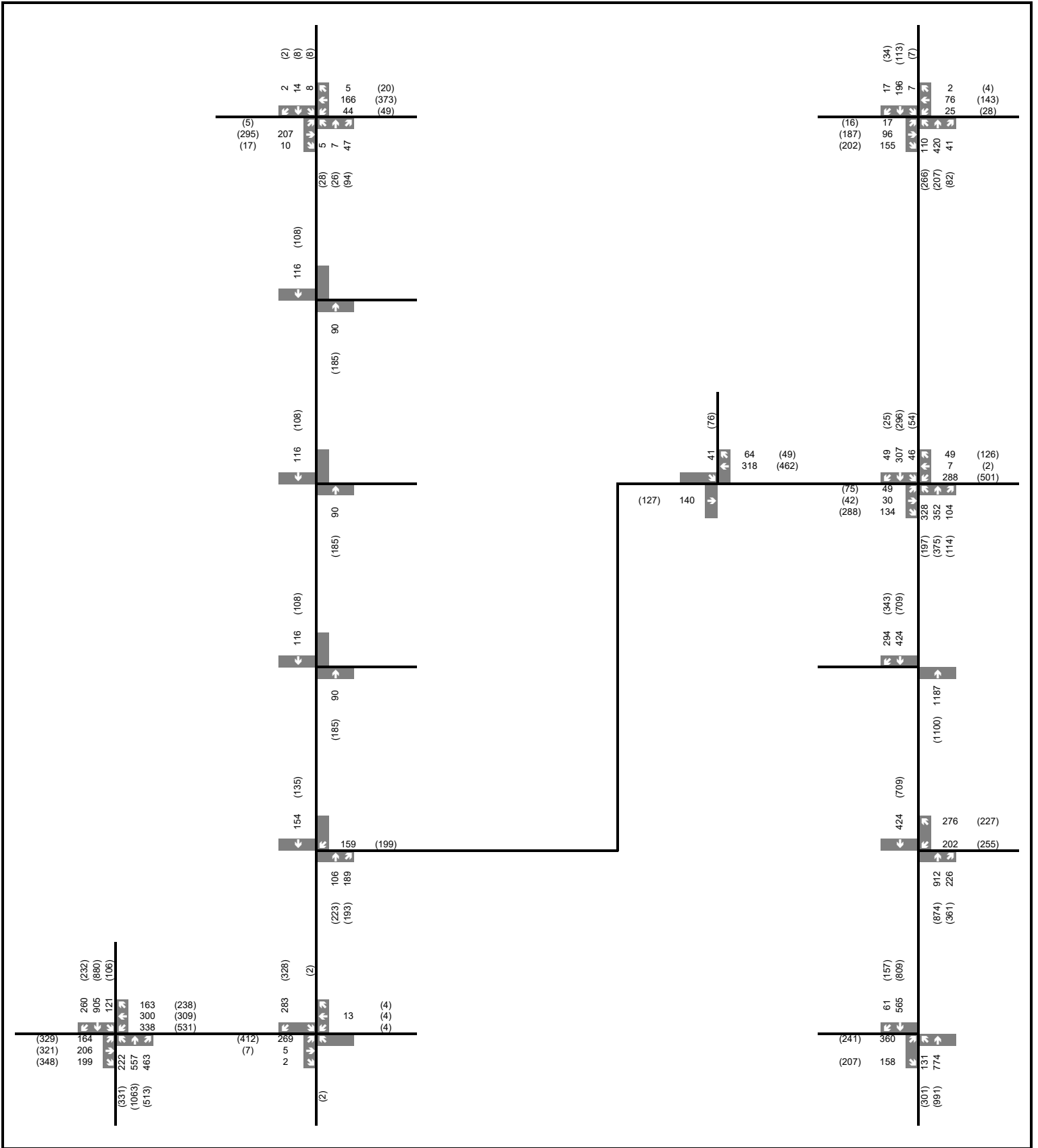
**Hawk Ridge**

**2040 Future Background Traffic Volumes**



**Figure 13**

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 Analyst, KH



**Legend**

- xx A.M. Peak Hour Traffic Volumes
- xx P.M. Peak Hour Traffic Volumes

**Hawk Ridge**

**2045 Future Background Traffic Volumes**



**Figure 14**

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 Analyst, KH

## 4.5 Intersection Operations

The 2031, 2033, 3035, 2040 and 2045 future background Levels of Service are outlined in **Table 7**, **Table 8**, **Table 9**, **Table 10**, and **Table 11**, respectively. **Appendix E** contains the Level of Service (LOS) definitions for signalized and unsignalized intersections. **Appendix F** contains the detailed capacity analyses worksheets.

**Table 7: 2031 Future Background Levels of Service**

Intersection	Control	Peak Hour	Level of Service	Control Delay <sup>1</sup>	Maximum v/c Ratio <sup>2</sup>	95 <sup>TH</sup> Percentile Queue > Storage Length
Industrial Road/Brodie Drive & Burnside Line	Signalized	A.M.	C	20.0 s	0.67 (SBT)	-
		P.M.	B	19.1 s	0.63 (WBL)	-
Burnside Line & Hwy 11 Westbound	Signalized	A.M.	B	14.9 s	0.83 (NBT)	-
		P.M.	B	12.5 s	0.72 (NBT)	-
West Street N & Hwy 11 Eastbound	Signalized	A.M.	C	21.4 s	0.74 (EBL)	-
		P.M.	B	18.8 s	0.80 (SBT)	-
Highway 12 & Murphy Road/West Ridge Boulevard	Signalized	A.M.	C	26.0 s	0.76 (SBT)	-
		P.M.	D	43.2 s	<b>0.92 (WBRT)</b>	83 m > 50 m (EBL) 119 m > 115 m (WBL)
Murphy Road & Uhthoff Line	Two-Way Stop (Murphy Road)	A.M.	A	0 s	0.0 (NB)	-
		P.M.	A	7.9 s	0.01 (NB)	-
Division Road W & Uhthoff Line	Two-Way Stop (Uhthoff Line)	A.M.	B	11.7 s (SB)	0.04 (SB)	-
		P.M.	C	15.7 s (SB)	0.04 (SB)	-
Division Road W & Burnside Line	Signalized	A.M.	B	13.1 s	0.72 (NBT)	-
		P.M.	B	13.1 s	0.67 (EBT)	-
Industrial Road & Hurlwood Lane	One-Way Stop (Hurlwood Ln)	A.M.	B	11.6 s	0.06 (SB)	-
		P.M.	B	13.2 s	0.13 (SB)	-
Industrial Road & Uhthoff Line	One-Way Stop (Industrial Rd)	A.M.	B	12.3 s	0.26 (WB)	-
		P.M.	B	14.6 s	0.37 (WB)	-

Note<sup>1</sup>: The Level of Service of a signalized intersection is based on the average control delay per vehicle.  
The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note<sup>2</sup>: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for movements are outlined and highlighted. Per MTO TIS Guidelines, all ramp movements with v/c ratios greater than 0.75 are outlined and highlighted.



**Table 8: 2033 Future Background Levels of Service**

Intersection	Control	Peak Hour	Level of Service	Control Delay <sup>1</sup>	Maximum v/c Ratio <sup>2</sup>	95 <sup>TH</sup> Percentile Queue > Storage Length
Industrial Road/Brodie Drive & Burnside Line	Signalized	A.M.	C	20.5 s	0.69 (SBT)	-
		P.M.	B	19.6 s	0.64 (WBL)	-
Burnside Line & Hwy 11 Westbound	Signalized	A.M.	B	15.8 s	0.85 (NBT)	-
		P.M.	B	12.8 s	0.74 (NBT)	-
West Street N & Hwy 11 Eastbound	Signalized	A.M.	C	22.3 s	0.75 (EBL)	-
		P.M.	C	20.0 s	0.82 (SBT)	-
Highway 12 & Murphy Road/West Ridge Boulevard	Signalized	A.M.	C	26.6 s	0.78 (SBT)	-
		P.M.	D	46.3 s	<b>0.96 (WBRT)</b>	92 m > 50 m (EBL) 127 m > 115 m (WBL)
Murphy Road & Uhthoff Line	Two-Way Stop (Murphy Road)	A.M.	A	0.0 s	0.0 (NB)	-
		P.M.	A	7.9 s	0.01 (NB)	-
Division Road W & Uhthoff Line	Two-Way Stop (Uhthoff Line)	A.M.	B	11.9 s (SB)	0.06 (NB)	-
		P.M.	C	16.3 s (SB)	0.23 (NB)	-
Division Road W & Burnside Line	Signalized	A.M.	B	13.8 s	0.74 (NB)	-
		P.M.	B	13.5 s	0.68 (EB)	-
Industrial Road & Hurlwood Lane	One-Way Stop (Hurlwood Ln)	A.M.	B	11.6 s	0.06 (SB)	-
		P.M.	B	13.2 s	0.13 (SB)	-
Industrial Road & Uhthoff Line	One-Way Stop (Industrial Rd)	A.M.	B	12.4 s	0.26 (WB)	-
		P.M.	B	14.7 s	0.37 (WB)	-

Note<sup>1</sup>: The Level of Service of a signalized intersection is based on the average control delay per vehicle.  
The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note<sup>2</sup>: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for movements are outlined and highlighted. Per MTO TIS Guidelines, all ramp movements with v/c ratios greater than 0.75 are outlined and highlighted.

**Table 9: 2035 Future Background Levels of Service**

Intersection	Control	Peak Hour	Level of Service	Control Delay <sup>1</sup>	Maximum v/c Ratio <sup>2</sup>	95 <sup>TH</sup> Percentile Queue > Storage Length
Industrial Road/Brodie Drive & Burnside Line	Signalized	A.M.	C	21.1 s	0.71 (SBT)	-
		P.M.	C	20.2 s	0.66 (WBL)	-
Burnside Line & Hwy 11 Westbound	Signalized	A.M.	B	16.7 s	<b>0.86 (NBT)</b>	-
		P.M.	B	13.2 s	0.76 (NBT)	-
West Street N & Hwy 11 Eastbound	Signalized	A.M.	C	23.5 s	<b>0.77 (EBL/NBT)</b>	-
		P.M.	C	21.8 s	<b>0.86 (SBT)</b>	-
Highway 12 & Murphy Road/West Ridge Boulevard	Signalized	A.M.	C	27.6 s	0.79 (SBT)	-
		P.M.	D	49.8 s	<b>0.99 (WBTR)</b>	97 m > 50 m (EBL) 140 m > 115 m (WBL)
Murphy Road & Uhthoff Line	Two-Way Stop (Murphy Rd)	A.M.	A	0.0 s	0.0 (NB)	-
		P.M.	A	7.9 s	0.01 (NB)	-
Division Road W & Uhthoff Line	Two-Way Stop (Uhthoff Line)	A.M.	B	12.2 s (SB)	0.07 (NB)	-
		P.M.	C	17.0 s (SB)	0.05 (SB)	-
Division Road W & Burnside Line	Signalized	A.M.	B	14.3 s	0.75 (NB)	-
		P.M.	B	14.1 s	0.69 (EB)	-
Industrial Road & Hurlwood Lane	One-Way Stop (Hurlwood Ln)	A.M.	B	11.6 s	0.06 (SB)	-
		P.M.	B	13.3 s	0.14 (SB)	-
Industrial Road & Uhthoff Line	One-Way Stop (Industrial Rd)	A.M.	B	12.5 s	0.27 (WB)	-
		P.M.	C	15.0 s	0.38 (WB)	-

Note<sup>1</sup>: The Level of Service of a signalized intersection is based on the average control delay per vehicle. The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note<sup>2</sup>: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for movements are outlined and highlighted. Per MTO TIS Guidelines, all ramp movements with v/c ratios greater than 0.75 are outlined and highlighted.

**Table 10: 2040 Future Background Levels of Service**

Intersection	Control	Peak Hour	Level of Service	Control Delay <sup>1</sup>	Maximum v/c Ratio <sup>2</sup>	95 <sup>TH</sup> Percentile Queue > Storage Length
Industrial Road/Brodie Drive & Burnside Line	Signalized	A.M.	C	22.9 s	0.78 (SBT)	-
		P.M.	C	21.7 s	0.72 (WBL)	-
Burnside Line & Hwy 11 Westbound	Signalized	A.M.	B	19.2 s	<b>0.89 (NBT)</b>	-
		P.M.	B	14.5 s	0.79 (NBT)	-
West Street N & Hwy 11 Eastbound	Signalized	A.M.	C	27.3 s	<b>0.85 (NBT)</b>	-
		P.M.	C	28.9 s	<b>0.96 (SBT)</b>	-
Highway 12 & Murphy Road/West Ridge Boulevard	Signalized	A.M.	C	29.7 s	0.83 (SBT)	-
		P.M.	E	62.0 s	<b>1.07 (WBTR)</b> <b>0.87 (EBT)</b> <b>0.93 (WBL)</b> <b>0.97 (NBT/SBT)</b>	106 m > 50 m (EBL) 192 m > 115 m (WBL)
Murphy Road & Uhthoff Line	Two-Way Stop (Murphy Rd)	A.M.	A	0.0 s	0.0 (NB)	-
		P.M.	A	8.0 s	0.01 (NB)	-
Division Road W & Uhthoff Line	Two-Way Stop (Uhthoff Line)	A.M.	B	12.6 s (SB)	0.08 (NB)	-
		P.M.	C	18.8 s (SB)	0.30 (NB)	-
Division Road W & Burnside Line	Signalized	A.M.	B	16.9 s	0.81 (NB)	-
		P.M.	B	16.1 s	0.73 (EB)	-
Industrial Road & Hurlwood Lane	One-Way Stop (Hurlwood Ln)	A.M.	B	11.7 s	0.07 (SB)	-
		P.M.	B	13.4 s	0.15 (SB)	-
Industrial Road & Uhthoff Line	One-Way Stop (Industrial Rd)	A.M.	B	12.8 s	0.27 (WB)	-
		P.M.	C	15.5 s	0.39 (WB)	-

Note<sup>1</sup>: The Level of Service of a signalized intersection is based on the average control delay per vehicle.  
The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note<sup>2</sup>: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for movements are outlined and highlighted. Per MTO TIS Guidelines, all ramp movements with v/c ratios greater than 0.75 are outlined and highlighted.

**Table 11: 2045 Future Background Levels of Service**

Intersection	Control	Peak Hour	Level of Service	Control Delay <sup>1</sup>	Maximum v/c Ratio <sup>2</sup>	95 <sup>TH</sup> Percentile Queue > Storage Length
Industrial Road/Brodie Drive & Burnside Line	Signalized	A.M.	C	25.6 s	0.85 (SBT)	-
		P.M.	C	24.5 s	0.78 (WBL)	-
Burnside Line& Hwy 11 Westbound	Signalized	A.M.	C	23.0 s	<b>0.93 (NBT)</b>	-
		P.M.	B	16.7 s	0.85 (NBT)	-
West Street N & Hwy 11 Eastbound	Signalized	A.M.	C	32.0 s	<b>0.91(NBT)</b>	-
		P.M.	D	41.3 s	<b>1.08 (SBT)</b> <b>0.87 (NBT)</b>	62 m > 55 m (NBL)
Highway 12 & Murphy Road/West Ridge Boulevard	Signalized	A.M.	C	32.9 s	<b>0.88 (SBT)</b>	-
		P.M.	F	85.5 s	<b>1.14 (SBT)</b> <b>0.86 (NBT)</b> <b>0.96 (EBT)</b> <b>0.98 (WBL)</b> <b>1.13 (WBTR)</b> <b>1.12 (NBT)</b>	119 m > 50 m (EBL) 238 m > 115 m (WBL) 52 m > 50 m (SBR)
	Mitigated	P.M.	D	47.1 s	<b>0.98 (WBTR)</b> <b>0.97 (NBT)</b> <b>0.90 (NBL)</b> <b>0.96 (SBT)</b>	-
Murphy Road & Uhthoff Line	Two-Way Stop (Murphy Rd)	A.M.	A	0.0 s	0.0 (NB)	-
		P.M.	A	8.0 s	0.01 (NB)	-
Division Road W & Uhthoff Line	Two-Way Stop (Uhthoff Line)	A.M.	B	13.3 s (SB)	0.09 (NB)	-
		P.M.	C	21.5 s (SB)	0.36 (NB)	-
Division Road W & Burnside Line	Signalized	A.M.	C	21.0 s	<b>0.89 (NB)</b>	-
		P.M.	B	18.7 s	0.78 (EB)	-
Industrial Road & Hurlwood Lane	One-Way Stop (Hurlwood Ln)	A.M.	B	11.8 s	0.08 (SB)	-
		P.M.	B	13.6 s	0.17 (SB)	-
Industrial Road & Uhthoff Line	One-Way Stop (Industrial Rd)	A.M.	B	13.1 s	0.28 (WB)	-
		P.M.	C	16.2 s	0.40 (WB)	-

Note<sup>1</sup>: The Level of Service of a signalized intersection is based on the average control delay per vehicle. The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note<sup>2</sup>: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for movements are outlined and highlighted. Per MTO TIS Guidelines, all ramp movements with v/c ratios greater than 0.75 are outlined and highlighted.

Under the 2045 future background conditions modelled, the study intersections are expected to operate with a LOS 'C' or better, with the exception of Highway 12 and Murphy Road West/West Ridge Blvd as well as West Street N and Highway 11 Eastbound.

The Highway 11 Eastbound ramp at West Steet N is forecasted to operate with a LOS 'D' in the p.m. peak hour with 41.3 s of delay and a maximum v/c ratio of 1.08 for the southbound through volumes. The ramp is anticipated to operate with a v/c ratio of 0.74, just below the MTO's critical capacity threshold of 0.75.

The 95<sup>th</sup> percentile queue for the northbound left-turn movement is expected to exceed the available storage by approximately one car length in the p.m. peak hour. As the width of the road can accommodate two lanes, queued vehicles are not anticipated to impact through movements.

Line painting adjustments can be made to extend the turn lane, should the forecasted traffic volumes be realized, and 95<sup>th</sup> percentile queues exceed the available storage. Ongoing monitoring of background growth by the MTO is recommended.

The intersection of Highway 12 and Murphy Road West/West Ridge Blvd is forecast to operate with a LOS 'C' in the a.m. peak hour and a LOS 'F' with a maximum delay of 85.5 s and a maximum v/c ratio of 1.14 (SBT) in the p.m. peak hour. LOS 'F' in the p.m. peak hour with a maximum delay of 85.5 s and a maximum v/c ratio of 1.14 (SBT) in the p.m. peak hour. The 95<sup>th</sup> percentile queue for the east and westbound left-turn movements at Highway 12 and West Ridge Boulevard/Murphy Road are expected to exceed the provided storage. The 95<sup>th</sup> percentile queue of the southbound right turn movement exceeds the proposed storage of 50 m but will be contained within the available taper and is not expected to impact the southbound through volumes. These operations are not uncommon for high demand intersections during peak times. The intersection should be continually monitored as development in the area proceeds.

The p.m. peak hour was assessed under mitigated geometric conditions, with dual left-turn lanes on each approach. The mitigation reduces the intersection control delay by approximately 40 s and all 95<sup>th</sup> percentile queue are forecasted to be contained in the dual turn lane storage.

It is noted that these operations are forecasted for 21 years into the future with sustained growth on the boundary road network. Several assumptions have been made regarding trip generation of the industrial lands. If required, future updates to this report would account for up-to-date information on background developments. As previously noted, ongoing monitoring is recommended as development phases proceed.

These results indicate that the majority of the boundary road network is forecast to continue operating acceptably with reserve capacity for additional traffic volumes, while additional mitigation measure may need to be considered at some intersections. Monitoring will determine if the volume threshold for a poor Level of Service as well as mitigation measures are met in the future.

## 5.0 Site Generated Traffic

The subject development will result in additional turning movements at the study intersections. Therefore, this section describes the trip forecasting methodology and results of this forecast for the development proposal.

The site generated traffic forecasting methodology for this study consists of two steps. The first step, Trip Generation, projects the number of trips that originate or are destined for the subject development, while the second step, Trip Distribution and Assignment, assigns trips to the study road network based on the expected distribution of trips to catchment areas and expected shortest paths for trips destined for particular locations.

### 5.1 Trip Generation

The trip generation of the development was forecast using the fitted curve equations provided in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11<sup>th</sup> Edition. Land Use Code (LUC) 210 "Single-Family Detached Housing", LUC 215 "Single-Family Attached Housing" and LUC 220 "Multifamily Housing" were used to forecast trips generated by the subject development.

**Table 12** summarizes the trip generation of the subject development. The subject development is forecasted to generate 452 a.m. and 580 p.m. peak hour trips.

**Table 12: Trip Generation**

Land Use	Peak Hour	Number of Trips		
		Inbound	Outbound	Total
<b>2031</b>				
LUC 210 "Single-Family Detached Housing" (115 units)	Weekday A.M.	21	64	85
	Weekday P.M.	71	42	113
LUC 215 "Single-Family Attached Housing" (125 units)	Weekday A.M.	15	44	59
	Weekday P.M.	42	29	71
<b>2033</b>				
LUC 210 "Single-Family Detached Housing" (290 units)	Weekday A.M.	49	147	196
	Weekday P.M.	170	100	270
LUC 215 "Single-Family Attached Housing" (310 units)	Weekday A.M.	39	117	156
	Weekday P.M.	107	75	182
<b>2035</b>				
LUC 210 "Single-Family Detached Housing" (290 units)	Weekday A.M.	49	147	196
	Weekday P.M.	170	100	270
LUC 215 "Single-Family Attached Housing" (310 units)	Weekday A.M.	39	117	156
	Weekday P.M.	107	75	182
LUC 220 "Multifamily Housing (Low-rise)" (250 units)	Weekday A.M.	24	76	100
	Weekday P.M.	81	47	128
<b>Full Build-Out Total</b>	<b>Weekday A.M.</b>	<b>112</b>	<b>340</b>	<b>452</b>
	<b>Weekday P.M.</b>	<b>358</b>	<b>222</b>	<b>580</b>

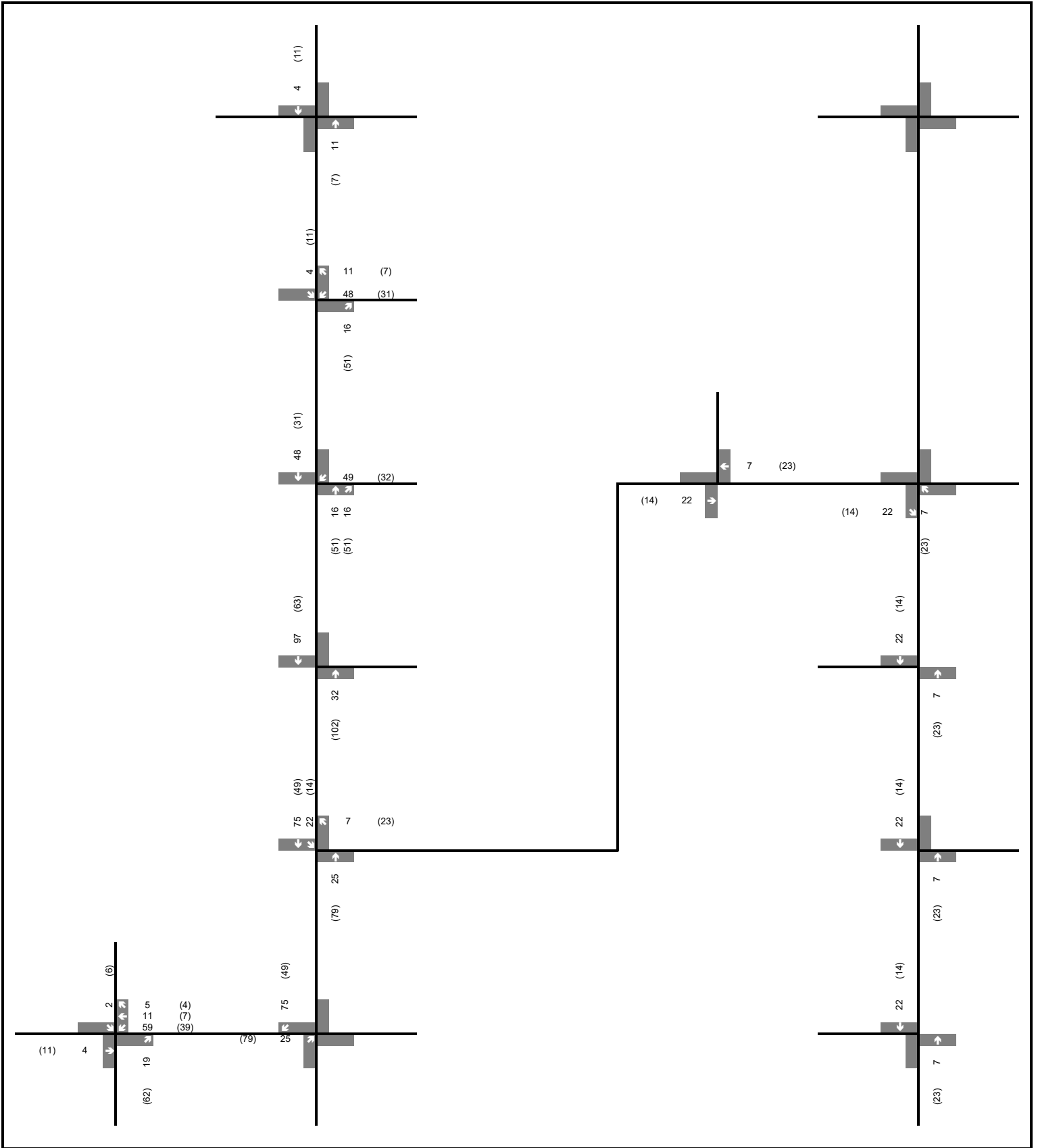
## 5.2 Trip Distribution & Assignment

The trips generated by the residential and industrial development were distributed to the boundary road network based on Transportation Tomorrow Survey (TTS) data. TTS data from Zone 8657 (Severn) and 8682 (Orillia) was utilized for the residential distribution. At full build-out trips were distributed to the boundary road network as follows:

- 10% north on Uthoff Line
- 20% south on Burnside Line/West Street N
- 5% east on Highway 11
- 50% west on Highway 11
  - 20% via Highway 12
  - 30% via Burnside Line
- 5% north on Highway 12
- 10% west on West Ridge Boulevard

As build-out occurs and internal connections are made the distribution at the site accesses change. It has been assumed that approximately 10% of new trips will utilize the proposed Industrial Road while the remaining trips to and from the east will utilize the extension to Hurlwood Lane.

The 2031 and 2033 residential trip assignments are illustrated in **Figure 15** and **Figure 16**, respectively. The full build-out (2035) trip distribution and trip assignment are illustrated in **Figure 17** and **Figure 18**, respectively.

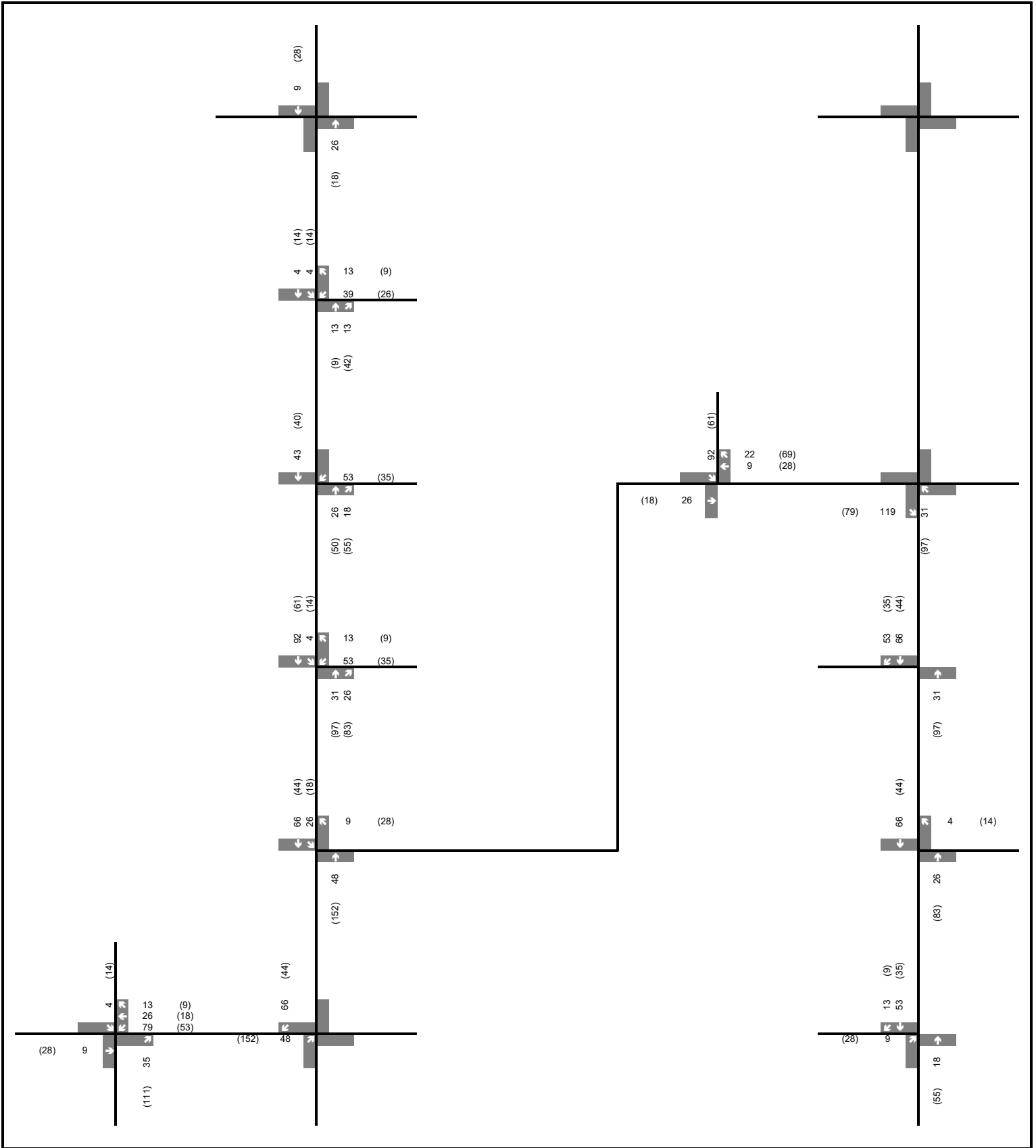


**Legend**  
 xx A.M. Peak Hour Traffic Volumes  
 (xx) P.M. Peak Hour Traffic Volumes

**Hawk Ridge**  
 2031 Trip Assignment



**Figure 15**  
 Project No. 1935-6133  
 Date: Thursday July 11, 2024  
 Analyst: KH



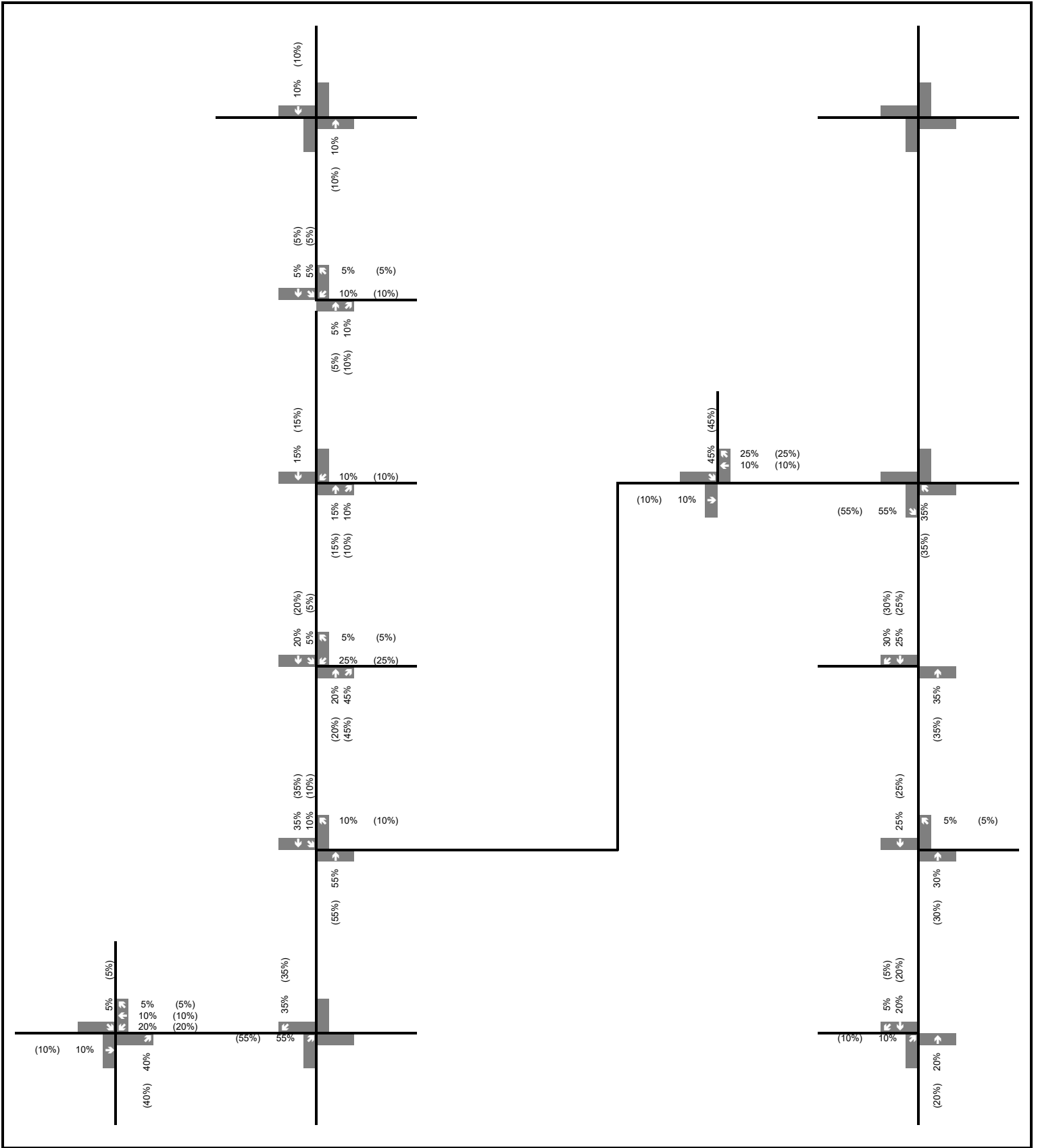
**Legend**  
 xx A.M. Peak Hour Traffic Volumes  
 (xx) P.M. Peak Hour Traffic Volumes

**Hawk Ridge**  
 2033 Trip Assignment



**Figure 16**  
 Project No. 1935-6133  
 Date, Thursday July 11, 2024  
 Analyst, KH





**Legend**

xx A.M. Peak Hour Traffic Volumes  
 (xx) P.M. Peak Hour Traffic Volumes

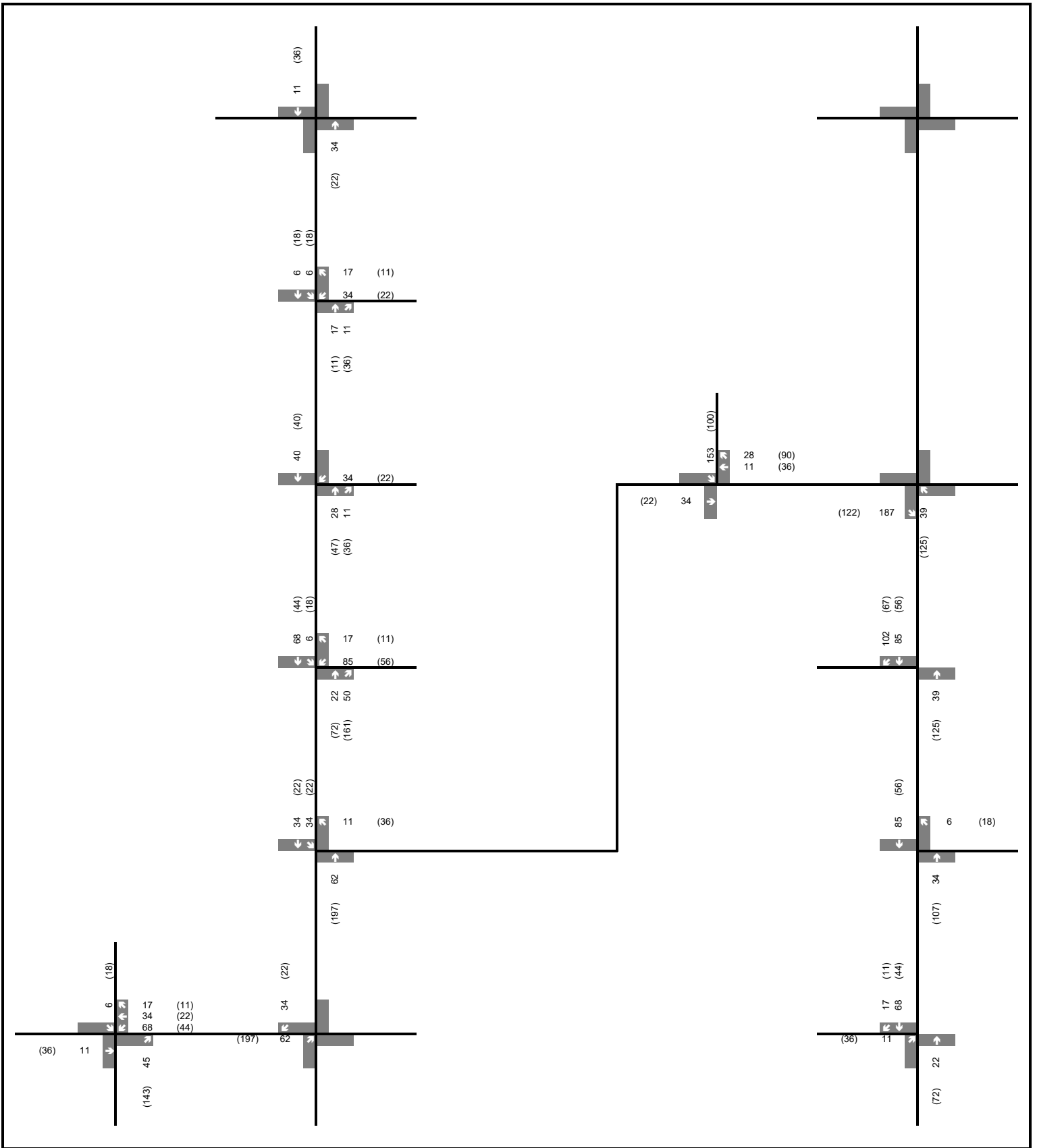
**Hawk Ridge**

**Full Build-Out Trip Distribution**



**Figure 17**

Project No. 1935-6133  
 Date, Thursday July 11, 2024  
 Analyst, KH



## 6.0 Total Future Conditions

This section will summarize the future total conditions of the study road network. The future total traffic volumes for the horizon years consist of the following components:

- Future background traffic volumes from the corresponding horizon year.
- Forecasted development generated traffic volumes.

The resulting total volumes in the horizon years 2031, 2033, 2035, 2040 and 2045 are presented in **Figure 19**, **Figure 20**, **Figure 21**, **Figure 22**, and **Figure 23**, respectively.

### 6.1 Signal Warrants

Signal warrants were evaluated for the existing unsignalized and proposed intersections. The analysis followed the procedures specified in Chapter 4 of the "Ontario Traffic Manual – Book 12", March 2012. Justification 7 was used to evaluate the peak hour projected volumes. **Table 13** outlines the results of the signal warrants.

**Table 13: Signal Warrant Justification**

Intersection	Percent Justified		Signal Warranted?
	Justification 1	Justification 2	
Uhthoff Line & Division Road	52%	41%	No
Uhthoff Line & Industrial Road	40%	48%	No
Uhthoff Line & Murphy Road	58%	24%	No
Hurlwood Lane & Industrial Road	36%	29%	No

Signal warrants results indicate that signals are not warranted at the study intersections. **Appendix L** contains the signal warrants for reference.

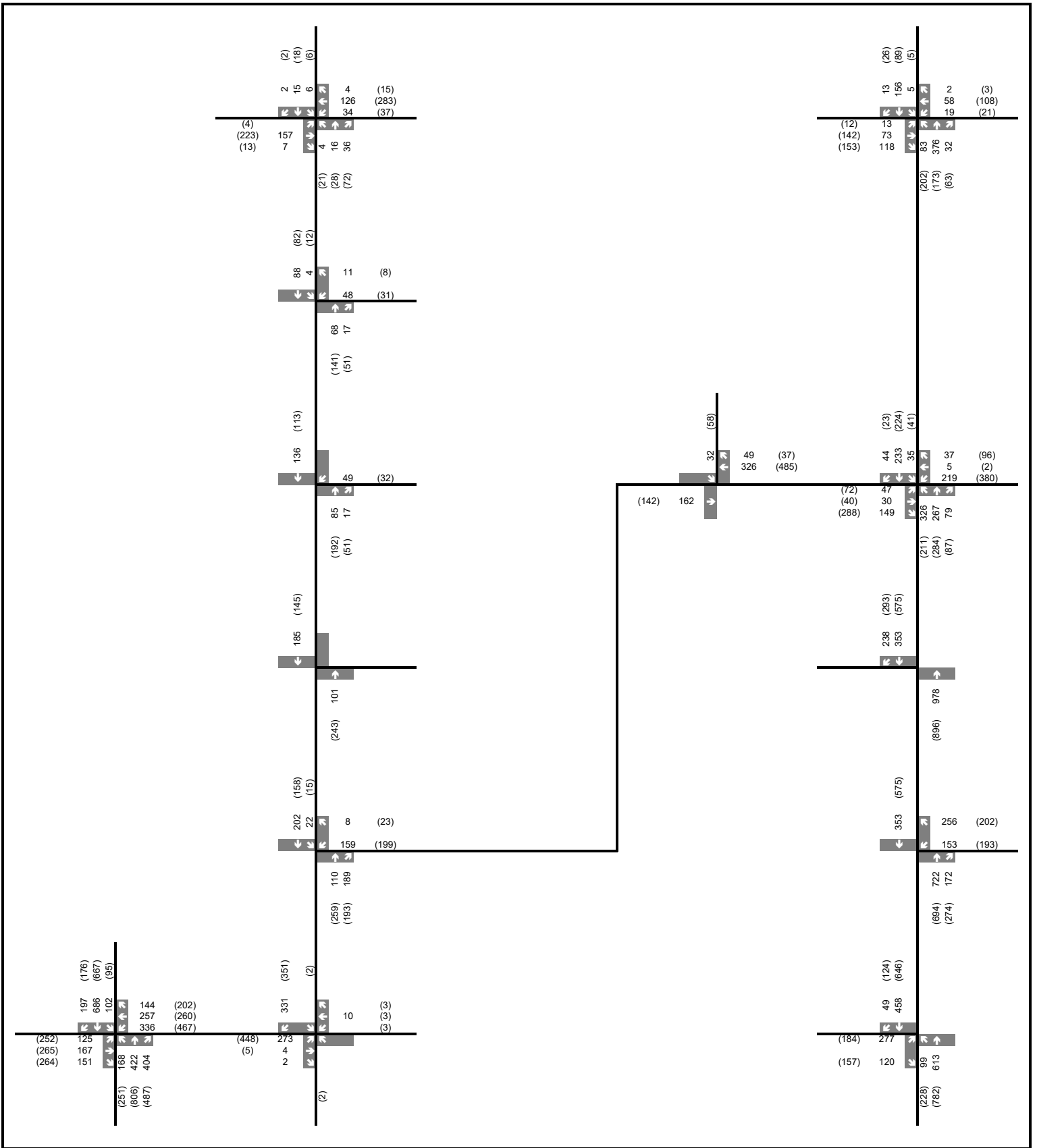
### 6.2 Auxiliary Turn Lane Warrants

An auxiliary left-turn lane analysis was undertaken based on the volumes forecasted for the proposed site accesses and Industrial Road connection to Uhthoff Line. The warrant charts included in the MTO Design Supplement for Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR) were used to determine if auxiliary lanes were required. **Table 14** outlines the signal warrant results. **Appendix M** includes the warrant analysis.

**Table 14: Auxiliary Lane Warrants**

Intersection	Design Speed	Peak Hour	Percentage of Left Turns	Volume Advancing	Volume Opposing	Turn Lane Justified
Uhthoff Line & North Site Access 1	70 km/h	AM	5%	128	119	No
		PM	13%	144	233	No
Uhthoff Line & North Site Access 2	70 km/h	AM	0%	156	131	No
		PM	0%	148	268	No
Uhthoff Line & South Site Access	70 km/h	AM	3%	190	164	No
		PM	11%	170	419	No
Uhthoff Line & Industrial Road	70 km/h	AM	15%	222	357	No
		PM	13%	180	613	No

As noted under background improvements, a northbound right-turn taper should be considered for the intersection of Uhthoff Line and Industrial Road given the increase in northbound through trips generated by proposed development.



**Legend**

- xx A.M. Peak Hour Traffic Volumes
- xx P.M. Peak Hour Traffic Volumes

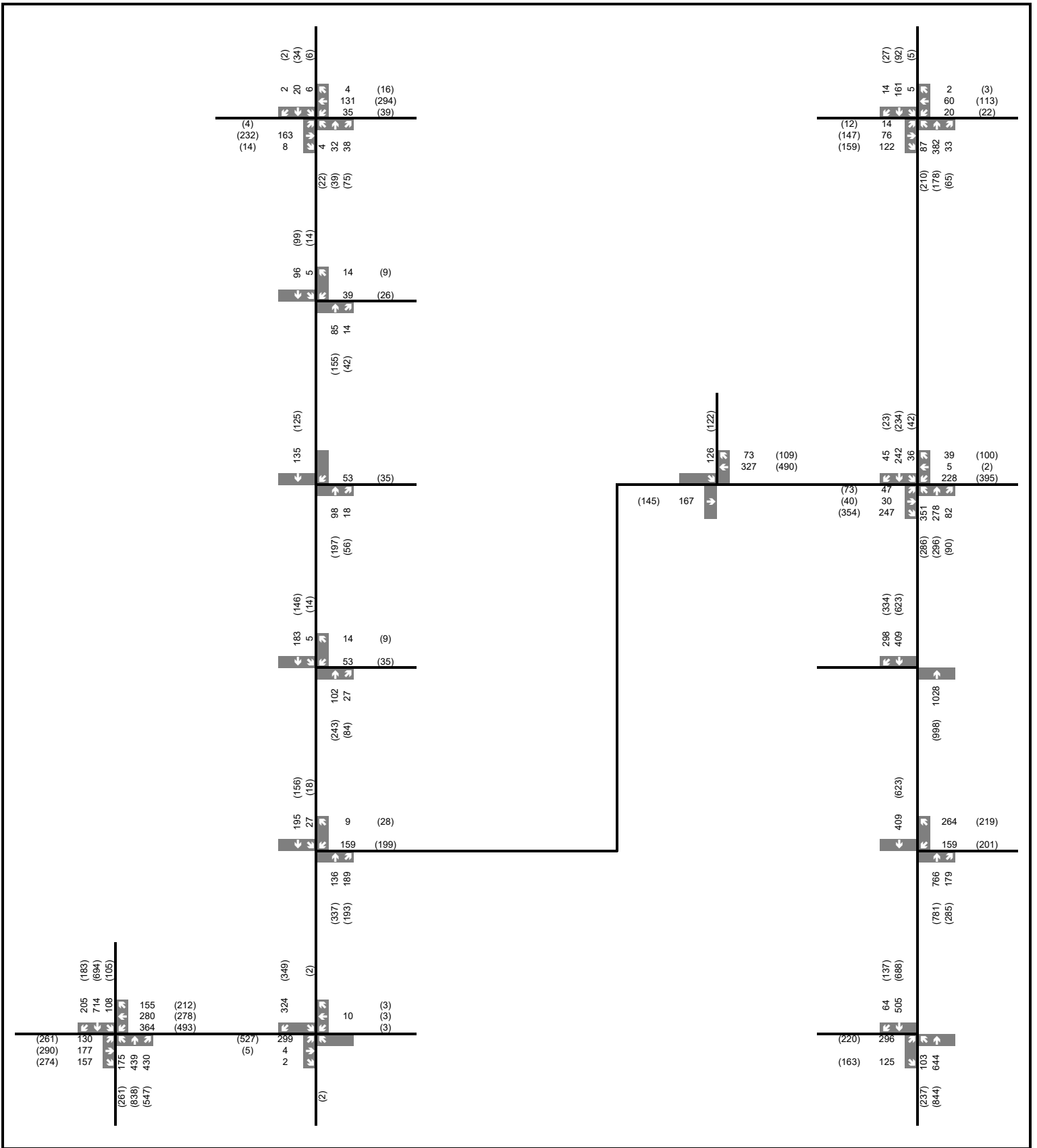
**Hawk Ridge**

**2031 Future Total Traffic Volumes**



**Figure 19**

Project No. 1935-6133  
 Date: Thursday July 11, 2024  
 Analyst: KH

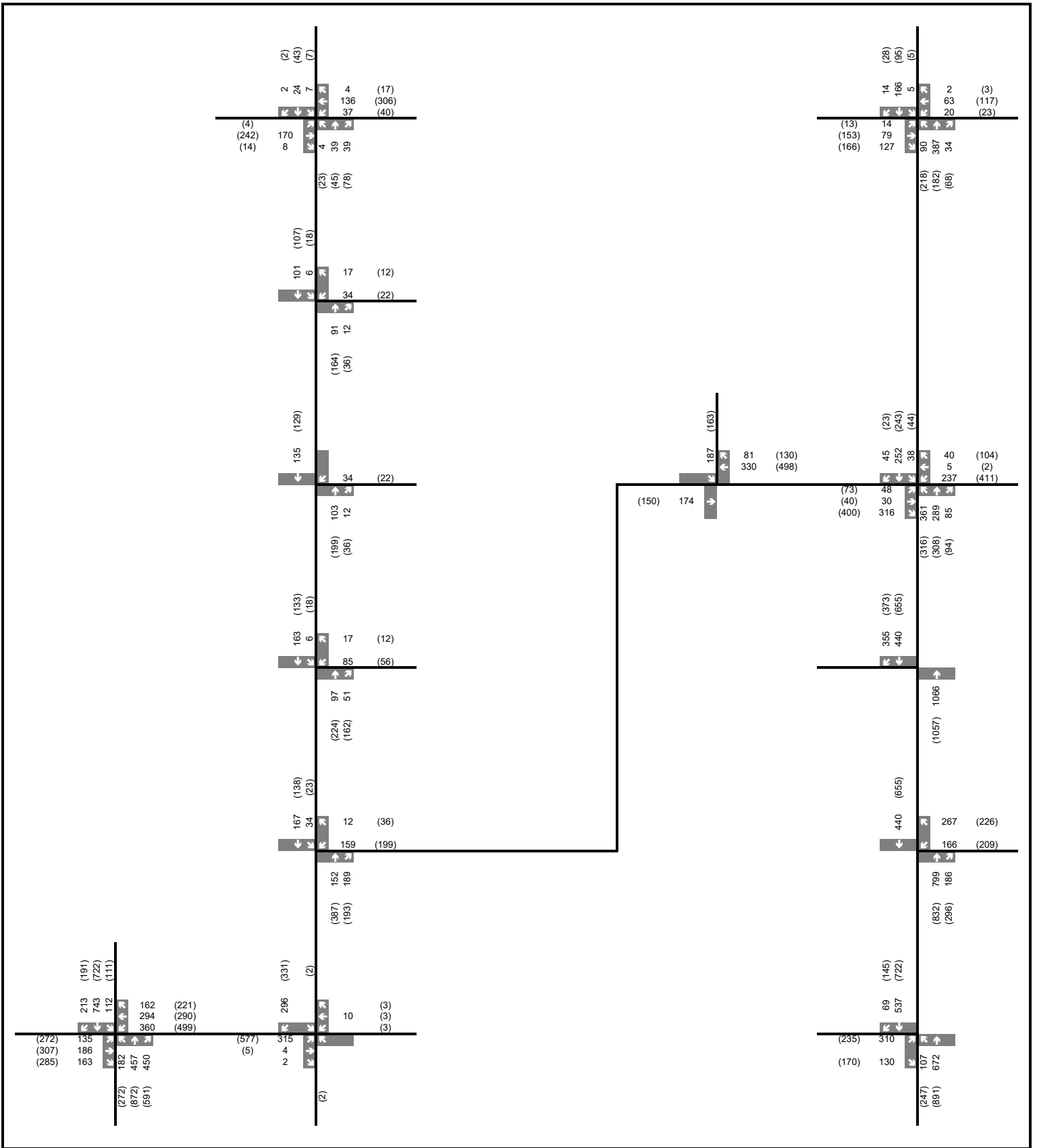


**Legend**  
 xx A.M. Peak Hour Traffic Volumes  
 (xx) P.M. Peak Hour Traffic Volumes

**Hawk Ridge**  
 2033 Future Total Traffic Volumes



**Figure 20**  
 Project No. 1935-6133  
 Date: Thursday July 11, 2024  
 Analyst: KH



**Legend**

xx A.M. Peak Hour Traffic Volumes  
 (xx) P.M. Peak Hour Traffic Volumes

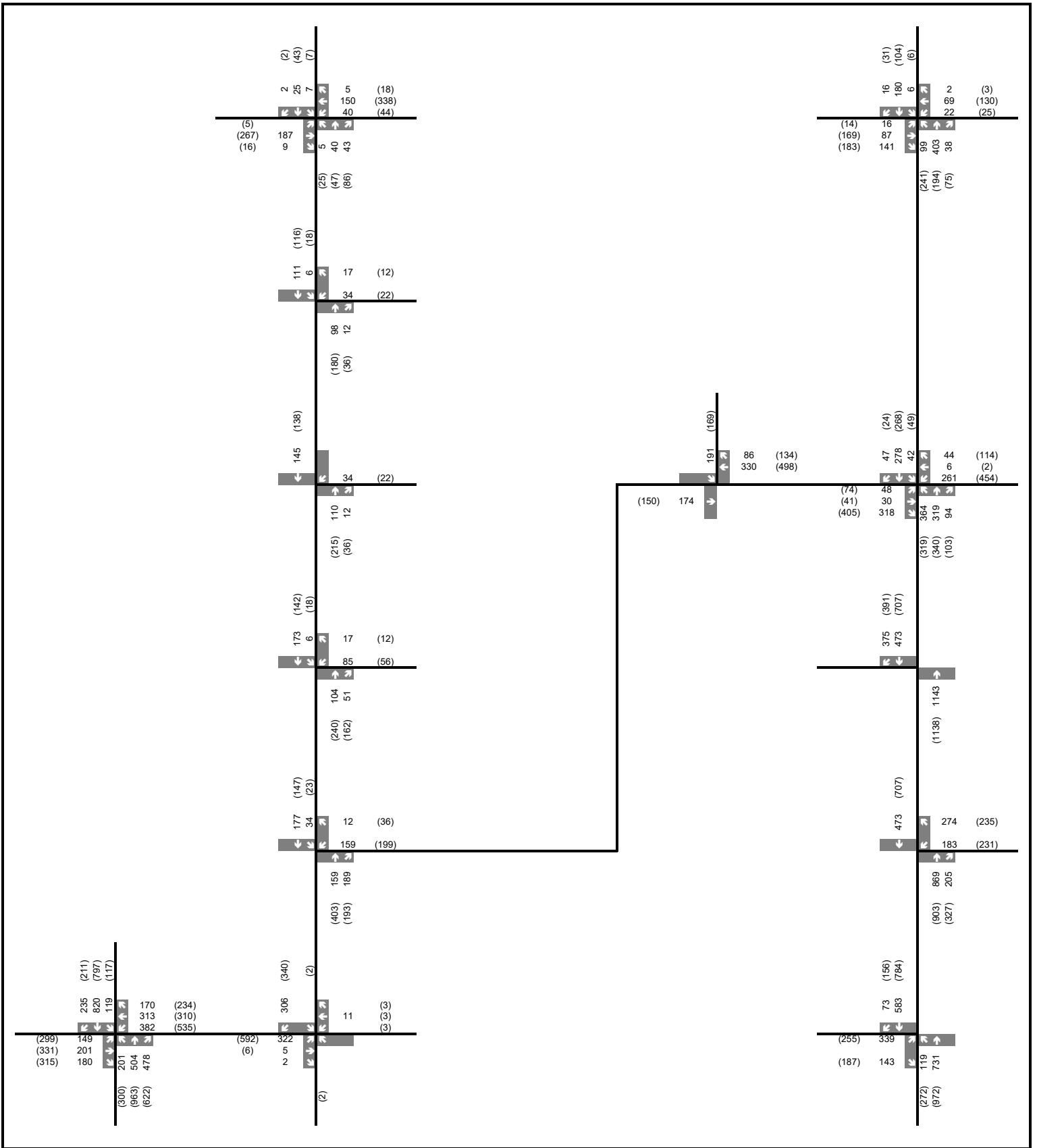
**Hawk Ridge**

**2035 Future Total Traffic Volumes**



**Figure 81**

Project No. 1935-6133  
 Date: Thursday July 11, 2024  
 Analyst: KH

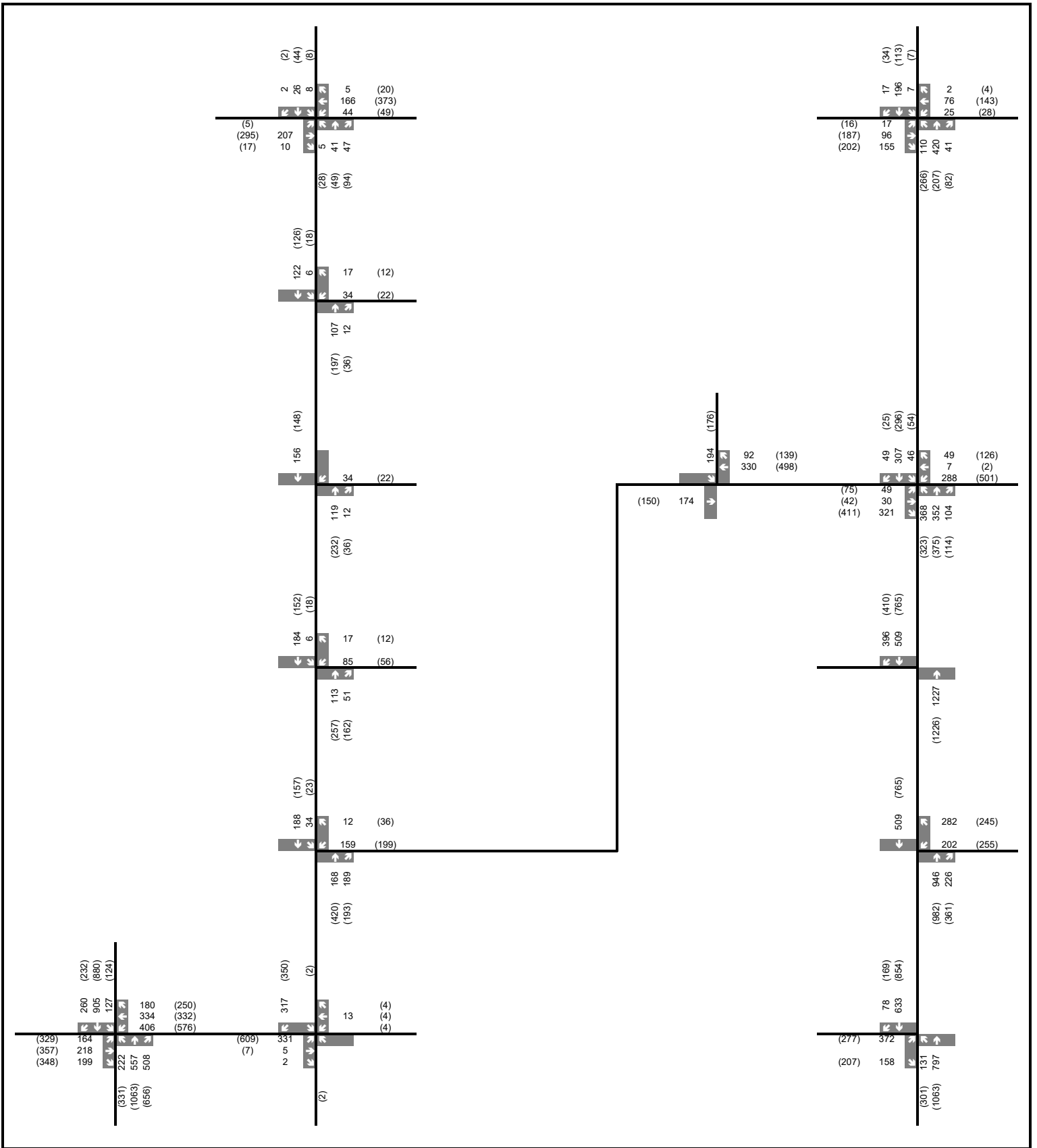


**Legend**  
 xx A.M. Peak Hour Traffic Volumes  
 (xx) P.M. Peak Hour Traffic Volumes

**Hawk Ridge**  
 2040 Future Total Traffic Volumes



**Figure 22**  
 Project No. 1935-6133  
 Date: Thursday July 11, 2024  
 Analyst: KH



**Legend**

- xx A.M. Peak Hour Traffic Volumes
- xx P.M. Peak Hour Traffic Volumes

**Hawk Ridge**

**2045 Future Total Traffic Volumes**



**Figure 23**

Project No. 1935-6133  
 Date: Thursday July 11, 2024  
 Analyst: KH



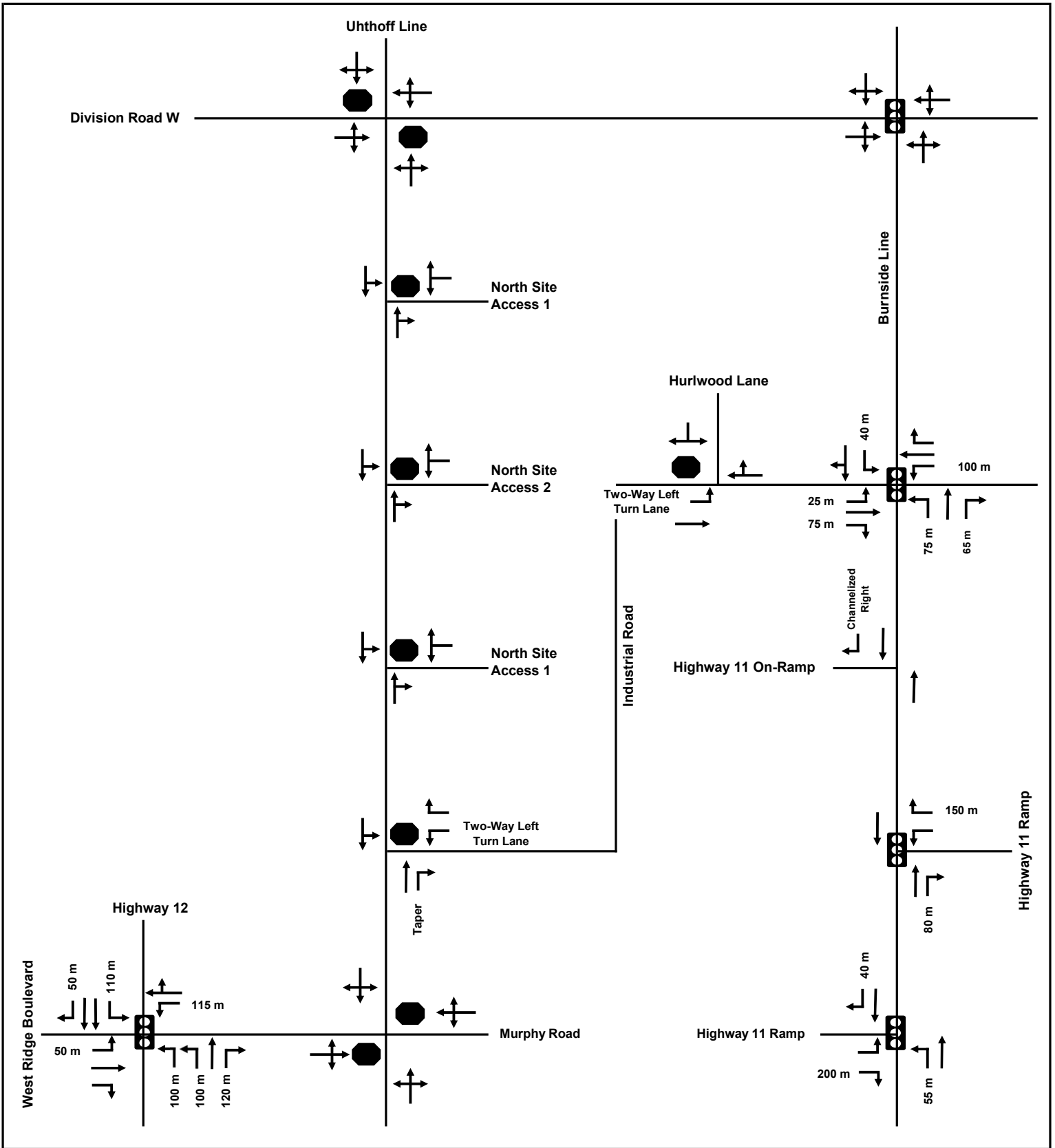
### 6.3 Intersection Modelling

The 2031, 2033, 3035, 2040 and 2045 future total volumes are illustrated in **Figure 19**, **Figure 20**, **Figure 21**, **Figure 22**, and **Figure 23**, respectively. These volumes were analysed in Synchro 11 with the updated roadway geometry. Signal timing optimization was undertaken under the 2045 future total conditions and carried back through the horizon years.

**Table 15** summarizes the road improvements and optimizations, in addition to the future background improvements identified, required to support the subject development .

**Table 15: Recommended Future Total Improvements to Boundary Road Network**

Location	Improvement	Intention	Responsibility
Industrial Road/Brodie Drive & Burnside Line	<ul style="list-style-type: none"> <li>Independent optimization of signal timing splits in the a.m. and p.m. peak hour.</li> </ul>	In support of Future Operations	Severn Township
West Street N & Hwy 11 Eastbound	<ul style="list-style-type: none"> <li>No improvements in the a.m. peak hour</li> <li>Signal optimization at a 95 s cycle length in the p.m. peak hour.</li> </ul>	In support of Future Operations	MTO
Murphy Road/West Ridge Boulevard & Highway 12	<ul style="list-style-type: none"> <li>Signal timing optimization at a cycle length of 130 s in the p.m. peak hour.</li> </ul>	In support of Future Operations	MTO
	<ul style="list-style-type: none"> <li>Duplication of the south, east and westbound left-turn lane at a cycle length of 120 s (reviewed as a mitigation only)</li> </ul>		



**Legend**

- xx Storage Length
- ↔ Movements per Lane
- 🚦 Signalized
- Stop Controlled

Hawk Ridge  
 Future Total Road Network



**Figure 24**

Project No. 1935-6133  
 Date: Thursday July 11, 2024  
 Analyst: KH

## 6.4 Intersection Operations

**Table 16, Table 17, Table 18, Table 19, and Table 20** outline the future total traffic operations for the 2031, 2033, 2035, 2040 and 2045 horizon years, respectively. **Appendix E** contains Level of Service definitions, and **Appendix F** contains detailed capacity analysis worksheets.

**Table 16: 2031 Future Total Levels of Service**

Intersection	Control	Peak Hour	Level of Service	Control Delay <sup>1</sup>	Maximum v/c Ratio <sup>2</sup>	95 <sup>TH</sup> Percentile Queue > Storage Length
Industrial Road/Brodie Drive & Burnside Line	Signalized	A.M.	B	19.5 s	0.66 (SBTR)	-
		P.M.	B	19.2 s	0.70 (WBL)	-
Burnside Line& Hwy 11 Westbound	Signalized	A.M.	B	15.1 s	0.83 (NBT)	-
		P.M.	B	12.7 s	0.74 (NBT)	-
West Street N & Hwy 11 Eastbound	Signalized	A.M.	C	21.9 s	0.74 (EBL)	-
		P.M.	B	19.7 s	0.84 (SBT)	-
Murphy Road/West Ridge Boulevard & Highway 12	Signalized	A.M.	C	26.4 s	0.76 (SBT)	-
		P.M.	D	41.8 s	<b>0.90 (WBTR)</b> <b>0.87 (WBL)</b>	71 m>50 m (EBL) 135 m > 115 m (WBL)
Murphy Road & Uhthoff Line	Two-Way Stop (Murphy Road)	A.M.	A	0.0 s	0.0 (NB)	-
		P.M.	A	8.1s	0.01 (NB)	-
Division Road W & Uhthoff Line	Two-Way Stop (Uhthoff Line)	A.M.	B	11.9 s (SB)	0.08 (NB)	-
		P.M.	C	16.3 s (SB)	0.24 (NB)	-
Division Road W & Burnside Line	Signalized	A.M.	B	13.1 s	0.72 (NB)	-
		P.M.	B	13.1 s	0.67 (EB)	-
Industrial Road & Hurlwood Lane	One-Way Stop (Hurlwood Lane)	A.M.	B	11.8 s	0.06 (SB)	-
		P.M.	B	13.5 s	0.13 (SB)	-
Industrial Road & Uhthoff Line	One-Way Stop (Industrial Road)	A.M.	C	15.2 s	0.34 (NB)	-
		P.M.	C	19.5 s	0.47 (NB)	-
Uhthoff Line & North 1 Site Access	One-Way Stop (Site Access)	A.M.	A	9.7 s	0.08 (NB)	-
		P.M.	B	10.3 s	0.06 (NB)	-
Uhthoff Line & North 2 Site Access	One-Way Stop (Site Access)	A.M.	B	10.2 s	0.07 (NB)	-
		P.M.	B	11.0 s	0.05 (NB)	-
Uhthoff Line & South Site Access	One-Way Stop (Site Access)	A.M.	A	0.0 s	0.0 (SB)	-
		P.M.	A	0.0 s	0.0 (SB)	-

Note<sup>1</sup>: The Level of Service of a signalized intersection is based on the average control delay per vehicle.  
The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note<sup>2</sup>: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for movements are outlined and highlighted. The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for movements are outlined and highlighted. Per MTO TIS Guidelines, all ramp movements with v/c ratios greater than 0.75 are outlined and highlighted.

**Table 17: 2033 Future Total Levels of Service**

Intersection	Control	Peak Hour	Level of Service	Control Delay <sup>1</sup>	Maximum v/c Ratio <sup>2</sup>	95 <sup>TH</sup> Percentile Queue > Storage Length
Industrial Road/Brodie Drive & Burnside Line	Signalized	A.M.	C	20.3 s	0.70 (NBL)	-
		P.M.	C	20.0 s	0.72 (WBL)	-
Burnside Line& Hwy 11 Westbound	Signalized	A.M.	B	16.6 s	<b>0.86 (NBT)</b>	-
		P.M.	B	13.7 s	0.78 (NBT)	-
West Street N & Hwy 11 Eastbound	Signalized	A.M.	C	23.9 s	0.76 (EBL/NBT)	-
		P.M.	C	22.7 s	<b>0.87 (SBT)</b>	-
Murphy Road/West Ridge Boulevard & Highway 12	Signalized	A.M.	C	28.0 s	0.79 (WBTR)	-
		P.M.	D	47.2 s	<b>0.94 (WBTR)</b> <b>0.86 (EBT)</b> <b>0.93 (WBL)</b> <b>0.87 (NBT/SBT)</b>	85 m > 50 m (EBL) 174 m > 115 m (WBL)
Murphy Road & Uhthoff Line	Two-Way Stop (Murphy Road)	A.M.	A	0.0 s	0.0 (NB)	-
		P.M.	A	8.1 s	0.01 (NB)	-
Division Road W & Uhthoff Line	Two-Way Stop (Uhthoff Line)	A.M.	B	12.2 s (SB)	0.12 (NB)	-
		P.M.	C	17.5 s (SB)	0.29 (NB)	-
Division Road W & Burnside Line	Signalized	A.M.	B	13.8 s	0.74 (NB)	-
		P.M.	B	13.5 s	0.68 (EB)	-
Industrial Road & Hurlwood Lane	One-Way Stop (Hurlwood Lane)	A.M.	B	13.6 s	0.25 (SB)	-
		P.M.	C	15.9 s	0.29 (SB)	-
Industrial Road & Uhthoff Line	One-Way Stop (Industrial Road)	A.M.	C	15.9 s	0.34 (NB)	-
		P.M.	C	23.4 s	0.53 (NB)	-
Uhthoff Line & North 1 Site Access	One-Way Stop (Site Access)	A.M.	A	9.8 s	0.07 (NB)	-
		P.M.	B	10.5 s	0.06 (NB)	-
Uhthoff Line & North 2 Site Access	One-Way Stop (Site Access)	A.M.	B	10.4 s	0.08 (NB)	-
		P.M.	B	11.2 s	0.06 (NB)	-
Uhthoff Line & South Site Access	One-Way Stop (Site Access)	A.M.	B	10.7 s	0.10 (NB)	-
		P.M.	B	12.1 s	0.09 (NB)	-

Note<sup>1</sup>: The Level of Service of a signalized intersection is based on the average control delay per vehicle. The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note<sup>2</sup>: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for movements are outlined and highlighted. The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for movements are outlined and highlighted. Per MTO TIS Guidelines, all ramp movements with v/c ratios greater than 0.75 are outlined and highlighted.

**Table 18: 2035 Future Total Levels of Service**

Intersection	Control	Peak Hour	Level of Service	Control Delay <sup>1</sup>	Maximum v/c Ratio <sup>2</sup>	95 <sup>TH</sup> Percentile Queue > Storage Length
Industrial Road/Brodie Drive & Burnside Line	Signalized	A.M.	C	20.6 s	0.73 (NBL)	-
		P.M.	C	21.2 s	0.75 (WBL)	-
Burnside Line& Hwy 11 Westbound	Signalized	A.M.	B	17.5 s	<b>0.87 (NBT)</b>	-
		P.M.	B	14.9 s	0.82 (NBT)	-
West Street N & Hwy 11 Eastbound	Signalized	A.M.	C	25.6 s	0.79 (EBL/NBT)	-
		P.M.	C	24.8 s	<b>0.88 (SBT)</b>	-
Murphy Road/West Ridge Boulevard & Highway 12	Signalized	A.M.	C	29.0 s	0.82 (WBTR)	99 m > 50 m (EBL) 189 m > 115 m (WBL)
		P.M.	D	51.7 s	<b>0.97 (WBTR)</b> <b>0.85 (EBL)</b> <b>0.91 (EBT)</b> <b>0.95 (WBL)</b> <b>0.91 (NBT)</b> <b>0.90 (SBT)</b>	
Murphy Road & Uhthoff Line	Two-Way Stop (Murphy Road)	A.M.	A	0.0 s	0.0 (NB)	-
		P.M.	A	8.0 s	0.01 (NB)	-
Division Road W & Uhthoff Line	Two-Way Stop (Uhthoff Line)	A.M.	B	12.6 s (SB)	0.07 (SB)	-
		P.M.	C	18.7 s (SB)	0.18 (SB)	-
Division Road W & Burnside Line	Signalized	A.M.	B	14.3 s	0.75 (NB)	-
		P.M.	B	14.1 s	0.69 (EB)	-
Industrial Road & Hurlwood Lane	One-Way Stop (Hurlwood Lane)	A.M.	C	15.4 s	0.37 (SB)	-
		P.M.	C	18.0 s	0.39 (SB)	-
Industrial Road & Uhthoff Line	One-Way Stop (Industrial Road)	A.M.	C	16.1 s	0.35 (NB)	-
		P.M.	D	28.7 s	0.64 (NB)	-
Uhthoff Line & North 1 Site Access	One-Way Stop (Site Access)	A.M.	A	9.8 s	0.07 (NB)	-
		P.M.	B	10.5 s	0.05 (NB)	-
Uhthoff Line & North 2 Site Access	One-Way Stop (Site Access)	A.M.	B	10.2 s	0.05 (NB)	-
		P.M.	B	10.5 s	0.05 (NB)	-
Uhthoff Line & South Site Access	One-Way Stop (Site Access)	A.M.	B	11.1 s	0.16 (NB)	-
		P.M.	B	12.8 s	0.14 (NB)	-

Note<sup>1</sup>: The Level of Service of a signalized intersection is based on the average control delay per vehicle. The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note<sup>2</sup>: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for movements are outlined and highlighted. The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for movements are outlined and highlighted. Per MTO TIS Guidelines, all ramp movements with v/c ratios greater than 0.75 are outlined and highlighted.

**Table 19: 2040 Future Total Levels of Service**

Intersection	Control	Peak Hour	Level of Service	Control Delay <sup>1</sup>	Maximum v/c Ratio <sup>2</sup>	95 <sup>TH</sup> Percentile Queue > Storage Length
Industrial Road/Brodie Drive & Burnside Line	Signalized	A.M.	C	22.3 s	0.76 (NBL/SBTR)	-
		P.M.	C	24.0 s	0.82 (WBL)	119 m > 100 m (WBL)
Burnside Line & Hwy 11 Westbound	Signalized	A.M.	C	20.3 s	<b>0.91 (NBT)</b>	-
		P.M.	B	17.0 s	<b>0.86 (NBT)</b>	-
West Street N & Hwy 11 Eastbound	Signalized	A.M.	C	29.9 s	<b>0.86 (NBT)</b>	-
		P.M.	C	31.9 s	<b>0.97 (SBT)</b>	57 m > 55 m (NBL)
Murphy Road/West Ridge Boulevard & Highway 12	Signalized	A.M.	C	31.6 s	<b>0.86 (WBTR)</b>	-
		P.M.	<b>E</b>	64.6 s	<b>1.05 (WBTR)</b> <b>0.91 (EBL)</b> <b>1.00 (EBT)</b> <b>1.02 (WBL)</b> <b>0.86 (NBL)</b> <b>0.99 (NBT/SBT)</b>	118 m > 50 m (EBL) 218 m > 115 m (WBL)
Murphy Road & Uhthoff Line	Two-Way Stop (Murphy Road)	A.M.	A	0.0 s	0.0 (NB)	-
		P.M.	A	8.0 s	0.01 (NB)	-
Division Road W & Uhthoff Line	Two-Way Stop (Uhthoff Line)	A.M.	B	13.1 s (SB)	0.16 (NB)	-
		P.M.	C	20.9 s (SB)	0.39 (NB)	-
Division Road W & Burnside Line	Signalized	A.M.	B	16.9 s	0.81 (NB)	-
		P.M.	B	16.1 s	0.73 (EB)	-
Industrial Road & Hurlwood Lane	One-Way Stop (Hurlwood Lane)	A.M.	C	15.5 s	0.38 (SB)	-
		P.M.	C	18.3 s	0.41 (SB)	-
Industrial Road & Uhthoff Line	One-Way Stop (Industrial Road)	A.M.	C	16.5 s	0.36 (NB)	-
		P.M.	D	28.1 s	0.59 (NB)	-
Uhthoff Line & North 1 Site Access	One-Way Stop (Site Access)	A.M.	A	9.9 s	0.07 (NB)	-
		P.M.	B	10.7 s	0.06 (NB)	-
Uhthoff Line & North 2 Site Access	One-Way Stop (Site Access)	A.M.	B	10.4 s	0.05 (NB)	-
		P.M.	B	11.2 s	0.04 (NB)	-
Uhthoff Line & South Site Access	One-Way Stop (Site Access)	A.M.	B	11.3 s	0.16 (NB)	-
		P.M.	B	13.1 s	0.14 (NB)	-

Note<sup>1</sup>: The Level of Service of a signalized intersection is based on the average control delay per vehicle. The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note<sup>2</sup>: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for movements are outlined and highlighted. The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for movements are outlined and highlighted. Per MTO TIS Guidelines, all ramp movements with v/c ratios greater than 0.75 are outlined and highlighted.

**Table 20: 2045 Future Total Levels of Service**

Intersection	Control	Peak Hour	Level of Service	Control Delay <sup>1</sup>	Maximum v/c Ratio <sup>2</sup>	95 <sup>TH</sup> Percentile Queue > Storage Length
Industrial Road/Brodie Drive & Burnside Line	Signalized	A.M.	C	24.8 s	0.82 (NBL/SBTR)	-
		P.M.	C	28.8 s	<b>0.91 (WBL)</b>	155 m > 100 m (WBL)
Burnside Line & Hwy 11 Westbound	Signalized	A.M.	C	24.3 s	<b>0.95 (NBT)</b>	-
		P.M.	B	19.4 s	<b>0.89 (NBT)</b>	-
West Street N & Hwy 11 Eastbound	Signalized	A.M.	D	36.9 s	<b>0.93 (SBT)</b> <b>0.89 (EBL)</b> <b>0.91 (NBT)</b>	-
		P.M.	D	44.4 s	<b>1.08 (SBT)</b> <b>0.91 (NBT)</b>	67 m > 55 m (NBL)
Murphy Road/West Ridge Boulevard & Highway 12	Signalized	A.M.	D	35.9 s	<b>0.91 (WBTR)</b> <b>0.86 (NBL)</b> <b>0.89 (SBT)</b>	-
		P.M.	<b>F</b>	84.6 s	<b>1.14 (WBTR)</b> <b>0.96 (EBL)</b> <b>1.08 (EBT)</b> <b>1.10 (WBL)</b> <b>0.93 (NBL)</b> <b>1.09 (NBT)</b> <b>1.10 (SBT)</b>	139 m > 50 m (EBL) 244 m > 115 m (WBL)
	EB/WB Dual Turn Lane Mitigation	P.M.	D	52.6 s	<b>0.99 (WBTR)</b> <b>0.97 (EBL)</b> <b>0.87 (NBL)</b> <b>0.98 (NBT)</b> <b>0.92 (NBR)</b> <b>0.97 (SBT)</b>	176 m > 120 m (NBR)
Murphy Road & Uhthoff Line	Two-Way Stop (Murphy Road)	A.M.	A	0.0 s	0.0 (NB)	-
		P.M.	A	8.1 s	0.01 (NB)	-
Division Road W & Uhthoff Line	Two-Way Stop (Uhthoff Line)	A.M.	B	13.9 s (SB)	0.17 (NB)	-
		P.M.	C	24.2 s (SB)	0.47 (NB)	-
Division Road W & Burnside Line	Signalized	A.M.	C	21.0 s	<b>0.89 (NB)</b>	-
		P.M.	B	18.7 s	0.78 (EB)	-
Industrial Road & Hurlwood Lane	One-Way Stop (Hurlwood Lane)	A.M.	C	15.7 s	0.39 (SB)	-
		P.M.	C	18.8 s	0.43 (SB)	-
Industrial Road & Uhthoff Line	One-Way Stop (Industrial Road)	A.M.	C	17.1 s	0.37 (NB)	-
		P.M.	D	30.4 s	0.62 (NB)	-
Uhthoff Line & North 1 Site Access	One-Way Stop (Site Access)	A.M.	B	10.0 s	0.07 (NB)	-
		P.M.	B	10.9 s	0.06 (NB)	-
Uhthoff Line & North 2 Site Access	One-Way Stop (Site Access)	A.M.	B	10.5 s	0.05 (NB)	-
		P.M.	B	11.5 s	0.04 (NB)	-
Uhthoff Line & South Site Access	One-Way Stop (Site Access)	A.M.	B	11.5 s	0.17 (NB)	-
		P.M.	C	24.8 s	0.82 (NBL/SBTR)	-

Note<sup>1</sup>: The Level of Service of a signalized intersection is based on the average control delay per vehicle.

The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Note<sup>2</sup>: The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for movements are outlined and highlighted. The critical v/c ratio is considered to be the maximum v/c ratio for movements at the intersection. In addition, all v/c ratios greater than 0.85 for movements are outlined and highlighted. Per MTO TIS Guidelines, all ramp movements with v/c ratios greater than 0.75 are outlined and highlighted.

Under the 2045 future total conditions modelled, the study intersections are forecast to continue operating with a LOS 'C' or better, with the exception of Highway 12 and Murphy Road West/West Ridge Blvd as well as West Street N and Highway 11 Eastbound.

The intersection of West Ridge Boulevard/Murphy Road and Highway 12 is expected to operate with a maximum control delay of 84.6 m and maximum volume-to-capacity ratio of 1.14 (WBTR) in the p.m. peak hour. The 95th percentile queue for the eastbound and westbound left-turn movements at the intersection is expected to exceed the available storage in the p.m. peak hour.

In comparison to the future background operations the intersection control delay is forecasted to be reduced by 0.9 sections while the maximum volume-to-capacity ration remains at 1.14. The movement experiencing the critical capacity changes however, with the southbound through movement v/c ratio reduced by 0.04 while the westbound through-right movement's v/c ratio increases by 0.01 with optimization of the signal timing splits.

The p.m. peak hour was assessed under mitigated geometric conditions, with dual left-turn lanes on each approach. The mitigation reduces the intersection control delay by approximately 30 s and the left-turn movements are contained in the dual storage lanes. The optimization does impact the northbound right turn queuing. It is noted that the feasibility of duality or extension of the eastbound and westbound left-turn lanes will need to be reviewed within the available spacing and right-of-way. The available spacing may restrict the use of this mitigation measure.

While it is acknowledged that the intersection is forecast to operate over capacity, these operations are not uncommon for high demand intersections during peak times. Operations are forecasted for 21 years into the future with sustained growth on the boundary road network and assumptions regarding lot coverage and land use applied. The intersection should be continually monitored as development in the area proceeds to determine if poor operations are achieved and mitigations are required.

The Highway 11 Eastbound ramp to West Street N is forecasted to operate with a Level of Service D in the a.m. and p.m. peak hours. In the a.m. peak hour, the eastbound left turn movement is anticipated to exceed the MTO's critical capacity ration of 0.75, however the volume-to-capacity ratio is forecast to be less than 0.9 and 95th percentile queues are not anticipated to impact the function of the highway off-ramp. In the p.m. peak hour, the 95th percentile northbound left-turn movement is forecasted to exceed the available storage by approximately 2 vehicles. This is an increase in 5 m from the future background condition. As previously noted, line painting adjustments could be made should the forecasted traffic volumes be realized, and 95th percentile queues exceed the available storage. As development volumes are not forecasted to contribute to the northbound left movement, ongoing monitoring of network growth by the MTO is recommended.

The intersection of Industrial Road/Brodie Drive and Burnside Line is expected to operate with a Level of Service 'C' and acceptable delays. In the p.m. peak hour, the westbound left movement is forecasted to operate with a critical capacity (0.91) and 95th percentile volumes exceeding the proposed storage length. The westbound left turn movement, however, does not grow from future background conditions. The forecasted eastbound, northbound left and southbound right-turn volumes increase with the inclusion of the Hawk Ridge development, resulting in less time for westbound left turn movements to proceed.

As the intersection is forecast to receive a high number of volumes from the industrial lands, the intersection should continue to be reviewed under applications by the background developments as Site Plans are established. The Industrial lands are currently assessed under general industrial with the maximum lot coverage, which may not be achieved. If required, future updates to this report would account for up-to-date information on background developments



It is noted that the intersection of Murphy Road and Uthoff Line presents a difference in results when modelled as HCM2000 and HCM2010, with the prior noting a 52 s delay for the eastbound movements. A reorientation of the stop signs to have the east and west legs as free flowing would improve the delay for the increased eastbound left-turn movement, however this would increase the delay for the northbound approach. Given it is a cul-de-sac with low volumes, there may be a desire to prioritize the higher volume of left turns. It is recommended that the intersection be monitored as phases are constructed to determine if a level of service or delay warranting the reorientation of the intersection is reached.

These results indicate that most of the study intersections are forecast to continue operating acceptably with the addition of site generated traffic. The background developments and the proposed development will be constructed in phases; therefore the study intersections should continue to be monitored as Draft Plans and Site Plans are finalized. As noted previously, this is a high level study, comparable to a Secondary Plan level assessment and can continue to be refined as development is built-out and phases progressed. Monitoring will determine if the volume threshold for a poor Level of Service as well as mitigation measures are met in the future.

## **7.0 Proposed Road Network**

The subject development is divided into two separate areas with independent connections to Uthoff Line. The road network meanders through the residential area, a common layout for golf course communities. The curvature of the roadways is intended to encourage slower speeds and navigate natural heritage areas. It is recommended that a posted speed limit of 40 km/h be implemented on all internal roadways.

### **7.1 Evaluation of Alternatives**

For the creation of the Concept Draft Plan, several alternatives were considered and evaluated to determine the optimal location for the road network connections and natural heritage crossings. **Figure 25** illustrates the alternatives reviewed.

#### **7.1.1. Alternative 1 – No Crossing of Silver Creek**

This option does not allow for connectivity of roads within the subject development and has been eliminated from further analysis.

#### **7.1.2. Alternative 2 – Silver Creek Crossing (North-South)**

This option considers providing two access connections to Uthoff Line within the north parcel. Hurlwood Lane would continue through the south parcel to the northwest, connecting the two parcels by crossing Silver Creek.

Under this configuration the Golf Villas along Uthoff Line would have their own independent access, separate from the south parcel. This road network layout would send volumes to and from the south parcel along Hurlwood Lane and up into the north parcel, increasing the overall volume at its proposed accesses. Along Uthoff Line there is adequate spacing and sight distance available for three connections as outlined in **Section 7.2** and **Section 7.3**.

This road network layout would require a non-perpendicular crossing of the widest natural heritage area resulting in more environmental constraints. According to Azimuth Environmental Consulting Inc., the crossing would require two segments, Silver Creek and a tributary, as well as the removal of significantly more vegetation and the infill of an offline pod that contains turtles and amphibians.

Based on the impact to the natural heritage system and indirect layout for access to the external road network system this alternative was eliminated.

**7.1.3. Alternative 3 – Silver Creek Crossing (East-West)**

This option considers providing two access connections to Uthoff Line within the north parcel. Hurlwood Lane would continue through the south parcel and the Golf Villas, connecting directly to Uthoff Line. This road layout does not connect the north and south parcels, however both parcels will have two independent accesses.

The south parcel and the Golf Villas are connected by a perpendicular narrow natural heritage crossing of Silver Creek. According to Azimuth Environmental Consulting Inc., the east-west crossing location is preferred as the natural vegetation has already been removed due to the existing golf course landscaping.

Based on the crossing location, number of access points and direct connections between Hurlwood Lane and Uthoff Line this alternative was selected and carried forward. The Concept Draft Plan (**Figure 2**) illustrates the preferred orientation selected.

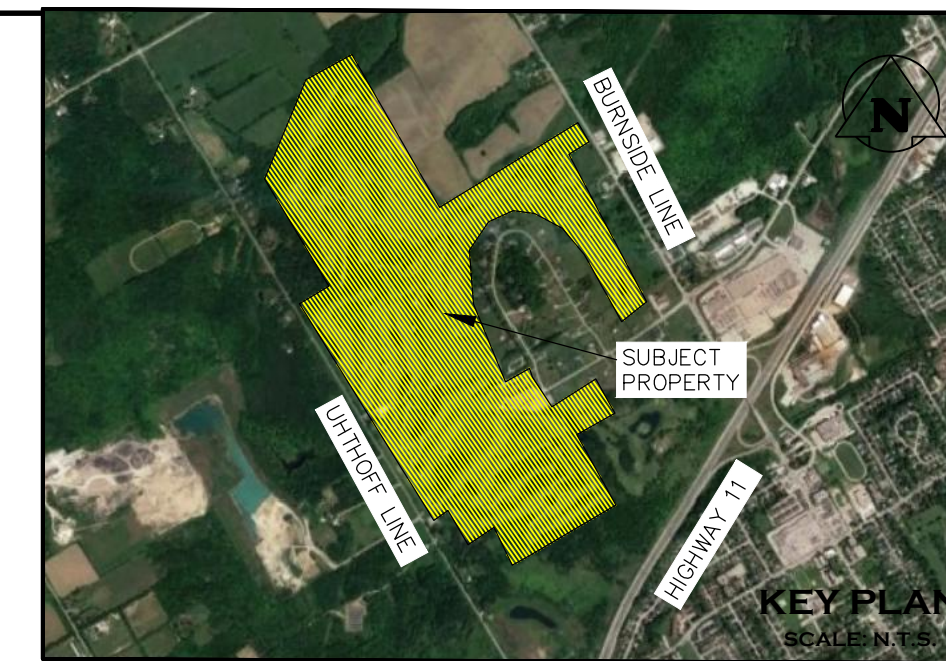
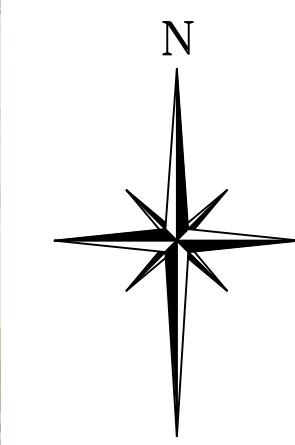
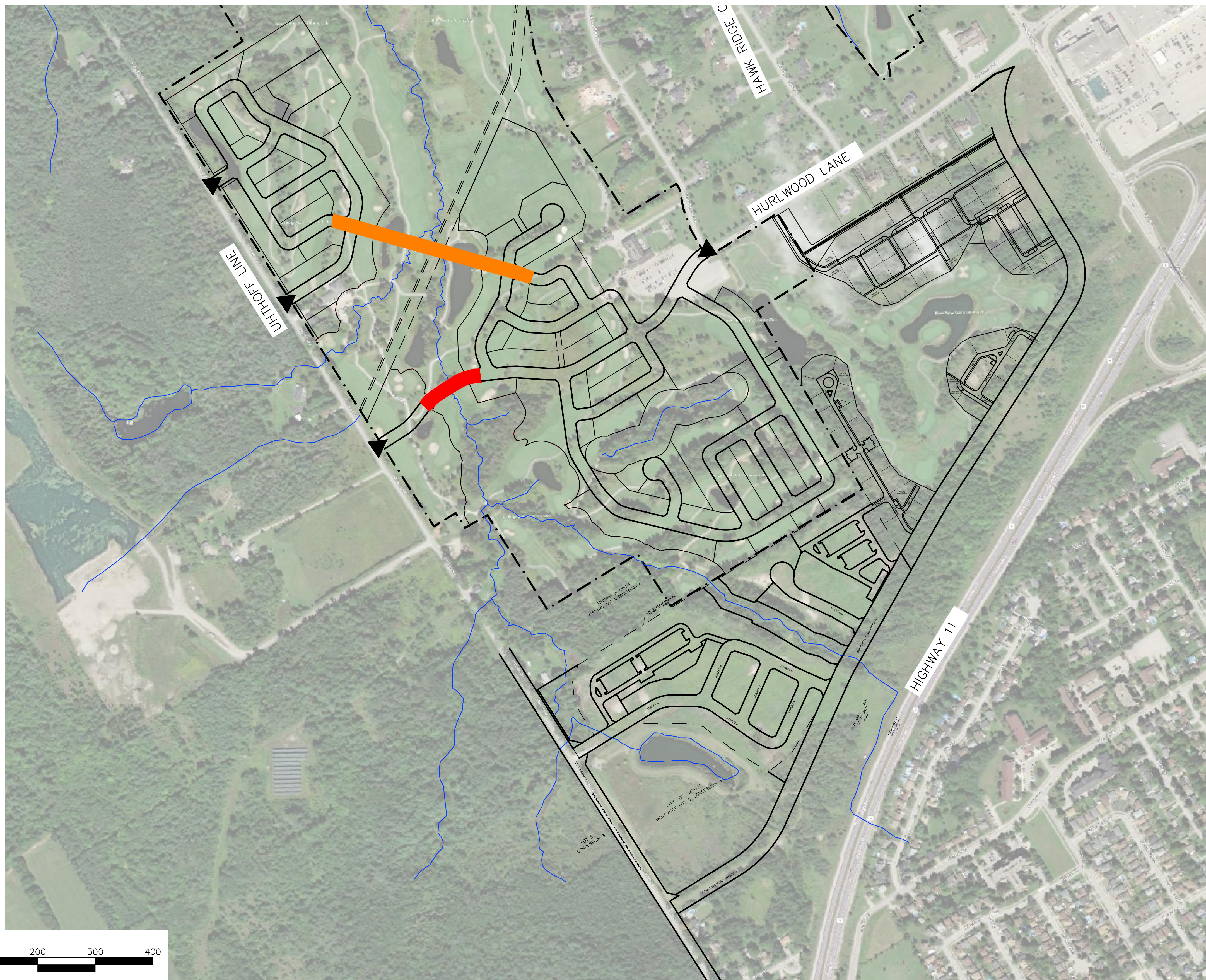
**7.1.4. Ranking Alternatives**

As part of the evaluation a rating out of five was given to each alternative for a variety of criteria. **Table 21** outlines the rankings and summarizes the final score for each alternative.

**Table 21: Evaluation of Alternatives**

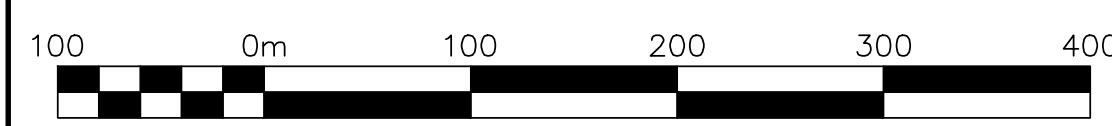
Criteria	Alternative 1	Alternative 3	Alternative 4
Supports Development Access	<b>0/5</b> Access not Supported	<b>3/5</b> Adequate Access Provided	<b>4/5</b> Adequate Direct Access Provided
Supports Function of Roadways	<b>0/5</b> Function not Supported	<b>5/5</b> Roadway Function Supported	<b>5/5</b> Roadway Function Supported
Ecological Impacts	<b>5/5</b> No Further Impacts	<b>1/5</b> Large Impact on Natural Vegetation and Animal Habitat	<b>4/5</b> Limited Impact on Existing Vegetation
Construction Impact	<b>5/5</b> No Crossing Required	<b>1/5</b> Two Segment, Wide, Angled, Natural Heritage Crossing Required	<b>3/5</b> Single Segment, Narrow, Perpendicular Natural Heritage Crossing Required
Score	<b>10/20</b>	<b>10/20</b>	<b>16/20</b>





LEGEND

- Silver Creek Crossing (North-South)
- Silver Creek Crossing (East-West)
- Site Access Locations



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No.	ISSUE	DATE: YYYY/MM/DD
0	ISSUED FOR CLIENT COORDINATION	2024/08/30

**PRELIMINARY**  
NOT TO BE USED FOR CONSTRUCTION

Project: HAWK RIDGE GOLF COURSE SEVERN, ONTARIO  
 Drawing: ROAD NETWORK ALTERNATIVES

**CROZIER**  
CONSULTING ENGINEERS

Drawn By	T.M./C.E.C.	Design By	T.M./C.E.C.	Project	<b>1935-6133</b>
Check By	B.N.W./D.L./B.H.	Check By	B.N.W./D.L./B.H.	Drawing	Fig. 25



## 7.2 Intersection Spacing

An assessment of the proposed site access spacing along Uththoff Line was undertaken. TAC GDGCR recommends an access spacing of 40 m along local roads and 60 m along collector roadways. **Table 22** outlines the approximate centerline spacing between accesses to Uththoff Line.

**Table 22: Access Spacing Assessment**

Intersection	Spacing (North)	Spacing (South)
North Site Access 1	1,400 m	215 m
North Site Access 2	215 m	280 m
South Site Access	280 m	615 m

The access spacing assessment concluded that adequate access spacing is provided along Uththoff Line.

## 7.3 Preliminary Horizontal Sight Distance Assessment

A preliminary sight distance assessment was prepared. Confirmation of the horizontal sight distance, as well as vertical sight distance should be undertaken during detailed design of the three site accesses to Uththoff Line.

For level roadways, the stopping sight distance requirements are tabulated in TAC GDGCR Table 2.5.2. Section 9.9 of the TAC GDGCR provides intersection sight distance for different intersection control types. The calculated and design sight distances are further summarized in TAC GDGCR Tables 9.9.4, 9.9.6 and 9.9.12 for vehicles turning left from stop, turning right from stop, or turning left from the major road, respectively. The applicable cases are as follows:

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

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

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

Where:

ISD = Intersection Sight Distance

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

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

Case B1 requires the furthest available sight distance. Per TAC GDGCR Table 9.9.4, the required intersection sight distance to the north was determined to be 150 m for a posted speed limit of 60 km/h (design speed of 70 km/h). **Table 23** outlines the results of the site distance assessment on Uththoff Line.

**Table 23: Sight Distance Assessment**

Intersection	Direction of Travel	Intersection Sight Distance (150 m Required)	Stopping Sight Distance (105 m Required)
North Site Access 1	Northbound	>200 m	> 200 m
	Southbound	>200 m	> 200 m
North Site Access 2	Northbound	>200 m	> 200 m
	Southbound	>200 m	> 200 m
South Site Access	Northbound	>200 m	> 200 m
	Southbound	>200 m	> 200 m

The sight distance assessment concluded that more than 200 m of sight distance is available at all proposed accesses to Uthoff Line. Therefore the access locations are appropriate and supportable from a sight distance perspective.

## 8.0 Active Transportation

The subject development is planned to be integrated into the surrounding golf course and is intended to provide a relaxed and connected neighbourhood. Trails and cart paths for the golf course are not reviewed as part of this TIS, however the Concept Draft Plan does illustrate connection of these pathways to the residential area, as well as additional pathways through the site including the parks, stormwater retention ponds and natural heritage area.

The trail connections also provide pedestrian connectivity between the internal roadways and the neighbouring subdivisions. It is recommended that 1.5 m sidewalks be provided along at least one side of the proposed roadways to allow for further connection through the neighbourhood. Roadway cross-sections and active transportation locations will be further refined through detailed design.

## 9.0 Division Road West Review

The Township of Severn highlighted existing concerns with the intersections of Burnside Line and Uthoff Line with Division Road West as part of the Terms of Reference discussion. The Township highlighted that these two intersections experience higher-than-average vehicle collisions as outlined in their Transportation Master Plan (TMP). As outlined in the TMP the most common impact type for collisions was 'Angle'. The OPP noted that these crashes were due to a number of drivers failing to yield.

A site visit conducted in August 2024 found that the sightlines for vehicles crossing/ turning from Uthoff Line onto Division Road West and for those crossing/ turning from Division Road West to Burnside Line were impacted by overgrowth of vegetation along the roadway. **Appendix N** includes photographs taken during the site visit of the Division Road West intersections.

Additionally, vehicles were witnessed passing each other in the section of Division Road West between the two intersections which is a posted 80 km/h area, reducing to 60 km/h to the east of Burnside Line and West of Uthoff Line. While speed data was not collected, vehicles were witnessed travelling at high speeds.

The subject development and reviewed background developments assumed approximately 10% of volumes generated would travel north along Uthoff Line and Burnside Line. The additional volumes are not anticipated to have a negative impact on the intersection operations. The intersection of Burnside Line and Division Road West is planned to be signalized in the near future. Signalization and clearing of foliage within the daylighting triangles is expected to have a positive impact on the risk

of collision at the intersection. Clearing of overgrowth in the daylighting triangles and sightlines at the intersection of Uthoff Line and Division Road West is recommended. The Township may also want to consider the reduction of speed limit between the two intersections to 60 km/h to discourage drivers from speeding between the existing 60 km/h zones.

## 10.0 Conclusion

Based on the analysis outlined within this report, the following key findings were concluded:

- Under the existing traffic volume conditions, the study intersections operate with a LOS "C" or better in the weekday a.m. and p.m. peak hours.
  - A maximum control delay of 32.2 s and maximum volume-to-capacity ratio of 0.94 (SBTR) is experienced at the intersection of Murphy Road/West Ridge Boulevard and Highway 12.
    - With the v/c ratios on Highway 12 approaching capacity, mitigation measures were explored through future background and future total conditions.
  - These operations indicate that the boundary road network is operating acceptably with reserve capacity for increases in traffic volumes.
- The future horizon years of 2031, 2033, 2035, 2040 and 2045 were assessed.
- A growth rate of 2% per year was utilized to assess background growth, consistent with previous studies in the area.
- Intersection improvements by the Township are planned for the intersection of Burnside Line and Division Road West prior to the 2031 horizon year.
- Intersection improvements to Brodie Drive and Burnside Line are expected with the construction of the Industrial Road.
- The Inch Farm, the North Orillia Employment Lands, and Area 3 Residential and Industrial subdivisions were assessed as background developments, generating 693 a.m. and 713 p.m. peak hour two-way trips.
- Under the 2045 future background conditions modelled, the study intersections are expected to operate with a LOS 'C' or better, with the exception of Highway 12 and Murphy Road West/West Ridge Blvd as well as West Street N and Highway 11 Eastbound.
  - The Highway 11 Eastbound ramp at West Street N is forecasted to operate with a LOS 'D' in the p.m. peak hour with 41.3 s of delay and a maximum v/c ratio of 1.08 for the southbound through volumes.
    - The ramp is anticipated to operate with a v/c ratio of 0.74, just below the MTO's critical capacity threshold. The 95<sup>th</sup> percentile queue for the northbound left turn movement is expected to exceed the available storage by approximately one car length in the p.m. peak hour.
  - Line painting adjustments could be made, should forecasted background growth and the 95<sup>th</sup> percentile queues be realized.
  - The intersection of Highway 12 and Murphy Road West/West Ridge Blvd is forecasted to operate with a LOS 'C' in the a.m. peak hour and a LOS 'F' with a maximum delay of 85.5 s and a maximum v/c ratio of 1.14 (SBT) in the p.m. peak hour.

- The 95th percentile queue for the east and westbound left-turn movements are expected to exceed the provided storage.
  - The 95th percentile queue of the southbound right-turn movement exceeds the proposed storage of 50 m but will be contained within the available taper and is not expected to impact the southbound through volumes.
  - The p.m. peak hour was assessed under mitigated geometric conditions, with dual left-turn lanes on each approach. The mitigation reduces the intersection control delay by approximately 40 s and all 95th percentile queue are forecasted to be contained in the dual turn lane storage.
- The proposed Hawk Ridge development is forecasted to generate 452 a.m. and 580 p.m. peak hour two-way trips.
  - An assessment of alternative road networks was undertaken to evaluate the best location to cross Silver Creek and provide connectivity between the development lands. An east-west crossing between the south parcel and the Golf Villa's on Uthhoff Line was established as the preferred alternative.
  - There is adequate sight distance and intersection spacing along Uthhoff Line to support the three proposed site accesses.
  - Signals were not found to be warranted at the existing unsignalized intersections and the proposed intersections, based on future total traffic volumes.
  - Auxiliary turn lanes were not found to be warranted on Uthhoff Line at the proposed site accesses or the Industrial Road. A northbound right-taper should be considered for the intersection of Uthhoff Line and Industrial Road, based on the forecasted volumes.
  - Under the 2045 future total conditions modelled, the study intersections are forecast to continue operating with a LOS 'C' or better, with the exception of Highway 12 and Murphy Road West/West Ridge Blvd as well as West Street N and Highway 11 Eastbound.
    - The intersection of West Ridge Boulevard/Murphy Road and Highway 12 is expected to operate with a maximum control delay of 84.6 m and maximum volume-to-capacity ratio of 1.14 (WBTR) in the p.m. peak hour.
      - The 95th percentile queue for the eastbound and westbound left-turn movements at the intersection is expected to exceed the available storage in the p.m. peak hour.
      - In comparison to the future background operations the intersection control delay is forecasted to be reduced by 0.9 sections while the maximum volume-to-capacity ration remains at 1.14.
    - The p.m. peak hour was assessed under mitigated geometric conditions, with dual left-turn lanes on each approach. The mitigation reduces the intersection control delay by approximately 30 s and the left-turn movements are contained in the dual storage lanes. The optimization does impact the northbound right turn queuing.
      - It is noted that the feasibility of duality or extension of the eastbound and westbound left-turn lanes will need to be reviewed within the available spacing and right-of-way. The available spacing may restrict the use of this mitigation measure.
    - The Highway 11 Eastbound ramp to West Street N is forecast to operate with a Level of Service 'D' in the a.m. and p.m. peak hours.

- In the a.m. peak hour, the eastbound left-turn movement is anticipated to exceed the MTO's critical capacity ration of 0.75, however the volume-to-capacity ratio forecasted to be less than 0.90 and 95<sup>th</sup> percentile queues are not anticipated to impact the function of the highway off-ramp.
  - In the p.m. peak hour, the 95<sup>th</sup> percentile queue for the northbound left-turn movement if forecast to exceed the available storage by approximately 2 vehicles. This is an increase in 5 m from the future background condition.
  - As previously noted, line painting adjustments can be made to accommodate queueing. Ongoing monitoring by the MTO is recommended.
- The intersection of Industrial Road/Brodie Drive and Burnside Line is expected to operate with a Level of Service 'C' and acceptable delays.
    - In the p.m. peak hour, the westbound left movement is forecasted to operate with a critical capacity (0.91) and 95<sup>th</sup> percentile volumes exceeding the proposed storage length.
    - The westbound left turn movement does not increase compared to future background conditions.
  - The intersection of Murphy Road and Uthoff Line presents a difference in results when modelled as HCM2000 and HCM2010, with the prior noting a 52 s delay for the eastbound movements.
    - A reorientation of the stop signs to have the east and west legs as free flowing would improve the delay for the increased eastbound left-turn movement, however this would increase the delay for the northbound approach.

## 11.0 Recommendations

The recommended improvements outlined in **Table 24** are based on both future background and future total conditions and are in support of surrounding development and projected traffic growth. The timeline for improvements is subject to the timeline of construction of the Inch Farm and Area 3 subdivisions as well as the results of monitoring the boundary road network as development phasing proceeds. Signal timings should be continually monitored by the MTO and municipalities to confirm when optimizations are required.



**Table 24: Recommended Network Improvements**

Location	Improvement	Timeline	Intention	Responsibility
West Street N & Hwy 11 Eastbound	<ul style="list-style-type: none"> <li>Optimization of signal timings at a cycle length of 90 s in the a.m. peak hour and 95 s in the p.m. peak hour.</li> </ul>	Monitoring to Determine	In support of development	MTO
Murphy Road/West Ridge Boulevard and Highway 12	<ul style="list-style-type: none"> <li>Optimization of signal timings and increase of cycle length (Future background: 110 in the a.m. and 150 s in the p.m./ Future total 130 s in the p.m. peak hour)</li> </ul>		In support of development	MTO
	<ul style="list-style-type: none"> <li>Southbound right-turn lane with 50 m of storage (Highway 12)</li> </ul>		Support operation of existing operations	MTO
Murphy Road and Uthoff Line	<ul style="list-style-type: none"> <li>Consideration for reorientation of two-way stop control</li> </ul>		In support of development	City of Orillia
Industrial Road	<ul style="list-style-type: none"> <li>Construction of Industrial Road (arterial)</li> <li>Creation of T-intersection at Industrial Road and Hurlwood Lane</li> <li>Creation of T-intersection at Industrial Road and Uthoff Line with northbound right taper</li> </ul>	2027	Background Improvement	LIV Communities
Industrial Road/Brodie Drive and Burnside Line	<ul style="list-style-type: none"> <li>Reconfiguration of the intersection including a 25 m eastbound left-turn lane, 75 m eastbound right-turn lane and a westbound right-turn lane.</li> <li>Extension of westbound left-turn lane to 100 m and northbound left-turn lane to 75 m</li> </ul>	2027	Background Improvement	LIV Communities
	<ul style="list-style-type: none"> <li>Optimization of signal timings and increase of cycle length to 90 s with protected-permissive left-turn phases on each approach.</li> <li>Independent optimization of signal timing splits in the a.m. and p.m. peak hour.</li> </ul>	Monitoring to Determine	In support of development	LIV Communities
	<ul style="list-style-type: none"> <li>Industrial Road transit stops</li> </ul>	To Be Determined	In support of development	Orillia Transit
Division Road	<ul style="list-style-type: none"> <li>Clearing of vegetation within sight lines of intersections</li> </ul>	Immediate	To reduce collisions	Severn Township

As the boundary road network is forecast to receive a high number of volumes from the industrial lands, the study intersections should continue to be reviewed under applications by the background developments as Site Plans are established. The Industrial lands are currently assessed under general industrial with the maximum lot coverage, which may not be achieved. . If required, future updates to this report would account for up-to-date information on background developments

The 2045 operations indicate that the majority of the boundary road network should continue operating acceptably with the addition of site generated traffic. The background developments and the subject development will be constructed in phases, therefore the study intersections can continue to be monitored as Draft Plans and Site Plans are finalized, as typical with Secondary Plan areas. Monitoring will determine if and when a volume threshold for a poor Level of Service as well as mitigation measures are met. Improvements to intersections along the industrial roadway and the proposed site accesses should be implemented at the time of construction.

The analysis within this report was prepared based on the Concept Draft Plan, prepared by Biglieri Group (August 2024). Any minor changes to the Plan will not materially impact the conclusions of this report.

It is concluded that the subject development can be supported from a traffic operations perspective with the noted recommendations and ongoing monitoring.

Prepared by,

**C.F. CROZIER & ASSOCIATES INC.**



Madeleine Ferguson, P.Eng.  
Manager (Planning), Transportation

MF/kh

**C.F. CROZIER & ASSOCIATES INC.**



Kerianne Hagan, EIT  
Engineering Intern, Transportation

J:\1900\1935- LIV Communities\6133- Hawk Ridge\Reports\1st Submission Draft Plan Approval\TIS\6135\_Transportation Impact Study (September 2024).docx

# APPENDIX A

## Terms of Reference Correspondence

## Kerianne Hagan

---

**From:** Andrea Woodrow <AWoodrow@severn.ca>  
**Sent:** July 25, 2024 9:02 AM  
**To:** Kerianne Hagan  
**Cc:** Madeleine Ferguson; leonard.borgdorff@ainleygroup.com; Lilly Chen; Natasha Birch; Derek Burke; Jamie Robinson  
**Subject:** RE: Terms of Reference -1151 Hurlwood Lane, Severn  
**Categories:** Filed to Sharepoint

Good morning Kerianne:

The Township, together with our consulting engineers from Ainley, offer the following comments on the Terms of Reference:

### 1. MTO Review

MTO review is key given the site location. As per MTO Highway Corridor Management Manual, permit control area is 800 m for the purpose of large traffic generators. The site is within 800 m control area and potentially is a large traffic generator. In addition, the intersection of Hurlwood Lane / Burnside Line is within 400 m of MTO interchange. It is recommended that the consultant contact MTO for confirmation.

### 2. Site Accesses

Additional site accesses will be challenging, but worth exploring. The south parcel of the site has only one site access which is unacceptable given the size of land and potentially the number of units. It is noted that any lands generated more than 100 trips during a peak hour need more than one access. In addition, Hurlwood Lane is currently serving the Township's office, a Golf & Country Club and a number of residential units already.

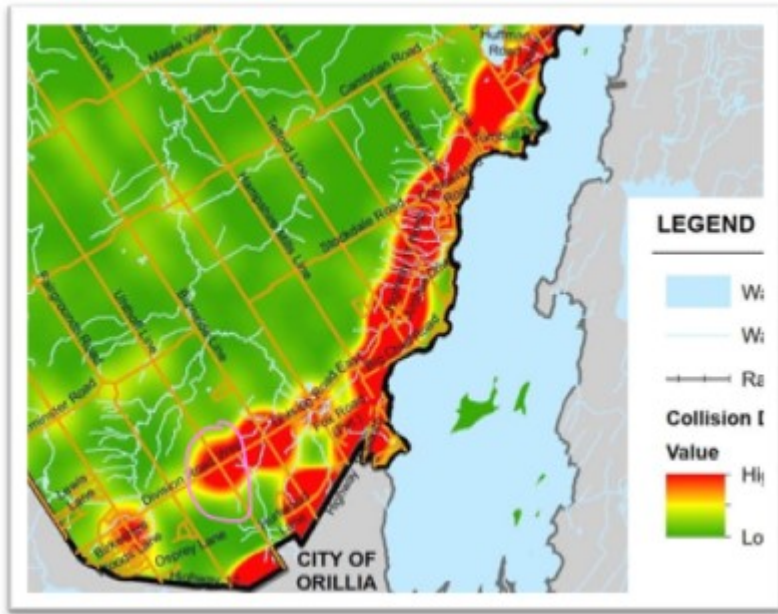
### 3. Study Area and Intersections

These are important to determine if any mitigation measures are required.

The following intersections should also be included:

- Division Road West / Uhthoff Line\*<sup>\*</sup>; and
- Division Road West / Burnside Line.

\*Uhthoff and Division Road was one of the intersections highlighted by the Township's Transportation Master Plan as having a slightly higher collision rate than comparable intersections.



Please advise if you have any questions.

Thank you,  
Andrea



**Andrea Woodrow**

*BSc (Hons), MES (PI), RPP, MCIP*

**Director of Planning and Development**

Email: [awoodrow@severn.ca](mailto:awoodrow@severn.ca)

Phone: 705-325-2315 x234

[severn.ca](http://severn.ca)



**From:** Kerianne Hagan <khagan@cfcrozier.ca>  
**Sent:** Wednesday, July 24, 2024 4:26 PM  
**To:** Andrea Woodrow <AWoodrow@severn.ca>; leonard.borgdorff@ainleygroup.com  
**Cc:** Madeleine Ferguson <mferguson@cfcrozier.ca>  
**Subject:** RE: Terms of Reference -1151 Hurlwood Lane, Severn

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good Afternoon,

I wanted to follow up on our Terms of Reference circulated July 3<sup>rd</sup>. Leonard and I spoke last week and I understand there was some discussion in the background regarding the TOR with the Township. We plan to collect traffic data on Tuesday and would like to confirm the study intersections prior. We understand if there is more discussion needed between Severn and Ainley but request any comments on the study intersections be provided at this time so we can proceed.

The City of Orillia has already responded and they have no comments on the TOR.

Thank you,  
Kerianne

**Kerianne Hagan, EIT**  
Engineering Intern, Transportation  
Office: 705.434.3407

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**From:** Kerianne Hagan <[khagan@cfcrozier.ca](mailto:khagan@cfcrozier.ca)>  
**Sent:** Friday, July 12, 2024 8:58 AM  
**To:** [leonard.borgdorff@ainleygroup.com](mailto:leonard.borgdorff@ainleygroup.com); [scrawford@orillia.ca](mailto:scrawford@orillia.ca)  
**Cc:** Andrea Woodrow <[AWoodrow@severn.ca](mailto:AWoodrow@severn.ca)>; Madeleine Ferguson <[mferguson@cfcrozier.ca](mailto:mferguson@cfcrozier.ca)>  
**Subject:** RE: Terms of Reference -1151 Hurlwood Lane, Severn

Good morning Leonard and Shawn,

I am looing to follow up on the Terms of Reference circulated last week. We are hoping to get data collected in the next week or son and would like confirmation on the study intersection before proceeding.

Please let us know if we are okay to proceed with the intersection listed.

Have a great weekend,  
Kerianne

**Kerianne Hagan, EIT**  
Engineering Intern, Transportation  
Office: 705.434.3407

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**From:** Kerianne Hagan <[khagan@cfcrozier.ca](mailto:khagan@cfcrozier.ca)>  
**Sent:** Wednesday, July 3, 2024 12:21 PM  
**To:** [leonard.borgdorff@ainleygroup.com](mailto:leonard.borgdorff@ainleygroup.com); Lisa Dobson <[LDobson@orillia.ca](mailto:LDobson@orillia.ca)>  
**Cc:** Andrea Woodrow <[AWoodrow@severn.ca](mailto:AWoodrow@severn.ca)>; Madeleine Ferguson <[mferguson@cfcrozier.ca](mailto:mferguson@cfcrozier.ca)>  
**Subject:** Terms of Reference -1151 Hurlwood Lane, Severn

Good afternoon Leonard and Lisa,

I hope this email finds you well. C.F. Crozier & Associates has been retained to prepare a Transportation Impact Study the site located at 1151 Hurlwood Lane in the Township of Severn, known as the Hawk Ridge development.

We kindly request if you could let us know if the Terms of Reference (ToR) outlined below will be acceptable to the Township of Severn, and City of Orillia. If we should also receive approval from the MTO please let us know. We note that the lands are outside of the MTO permit control area. If we should circulate the ToR to any additional staff at Ainley, the Town or the City please advise.

The Concept Draft Plan dated February 15, 2024 (attached) envisions the following elements:

- 755 Single-detached and townhome residential units.
- Possible Long-Term Care, Affordable Housing, School Site.
- An 18-hole Golf Course routed throughout the community

#### Study Area and Intersections

- Highway 12 and Murphy Road/West Ridge Boulevard.
- Murphy Road and Uthoff Line.
- The proposed Industrial Road and Uthoff Line.
- Hurlwood Lane and Burnside Line.
- Burnside Line/West Street North and the Highway 11 interchanges.
- The proposed Industrial Road and Hurlwood Lane.
- Proposed site accesses.

#### Analysis Periods and Scenarios

Based on the size of the development, it is expected to be built in phases. The a.m. and p.m. weekday peak hour existing conditions (2024), along with build-out phasing of 2031, 2033 and full build-out in 2035 and the five- and ten-year horizons beyond full build-out (2040 and 2045) will be reviewed under future background and future total conditions.

We will use the growth rate along Highway 11 (2%) for the study, consistent with the Area 3 TIS.

#### Background Developments

The adjacent Inch Farm and Area 3 will be reviewed as a background developments, as well as the redistribution of existing volumes onto the Industrial Road as outlined in the Inch Farm ESR. All are forecasted to be completed by the opening horizon of the Hawk Ridge development. Please provide any additional developments that you feel should be included in the analysis. We would appreciate if you could provide us with any background TIS reports we will be able to reference for our analysis.

#### Trip Generation

Trip generation for the development will be forecasted using the Institute of Traffic Engineers' (ITE) trip generation. Trips will be assigned to the boundary road network based on the Transportation Tomorrow Survey (TTS).

#### Analysis Procedures

Analysis will be conducted using the Synchro 11 analysis package and Highway Capacity Manual (HCM 2010) procedures. Per MTO TIS Guidelines, all ramp movements with v/c ratios greater than 0.75 will be considered critical.

We will use the latest signal timing plans on record for Burnside Line and Hurlwood Lane/Brodie Drive received on April 21, 2022.

Should you have any questions or concerns regarding the above, please feel free to contact me.

Thank you,  
Kerianne

## Kerianne Hagan

---

**From:** Kerianne Hagan  
**Sent:** July 25, 2024 9:28 AM  
**To:** Steven Murphy  
**Cc:** Shawn Crawford  
**Subject:** RE: Terms of Reference -1151 Hurlwood Lane, Severn

Good Morning Steven,

I wanted to give you an update on our Terms of Reference. The Township of Severn has requested that we include the following intersections as part of our study:

- Division Road West / Uthhoff Line; and
- Division Road West / Burnside Line.

No additional changes to the TOR were requested.

Thank you,  
Kerianne

**Kerianne Hagan, EIT**  
Engineering Intern, Transportation  
Office: 705.434.3407  
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**From:** Kerianne Hagan <khagan@cfcrozier.ca>  
**Sent:** Friday, July 12, 2024 2:59 PM  
**To:** Steven Murphy <smurphy@orillia.ca>  
**Cc:** Shawn Crawford <SCrawford@orillia.ca>  
**Subject:** RE: Terms of Reference -1151 Hurlwood Lane, Severn

Hi Steven,

Thank you for confirming. We are still waiting to hear back from Severn's peer reviewer. If they have any modifications I will reach out and let you know.

Have a wonderful weekend,  
Kerianne

**Kerianne Hagan, EIT**  
Engineering Intern, Transportation  
Office: 705.434.3407



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**From:** Steven Murphy <[smurphy@orillia.ca](mailto:smurphy@orillia.ca)>  
**Sent:** Friday, July 12, 2024 2:56 PM  
**To:** Kerianne Hagan <[khagan@cfcrozier.ca](mailto:khagan@cfcrozier.ca)>  
**Cc:** Shawn Crawford <[SCrawford@orillia.ca](mailto:SCrawford@orillia.ca)>  
**Subject:** FW: Terms of Reference -1151 Hurlwood Lane, Severn

Hello Kerianne,

Yes, the City of Orillia agrees with the ToR supplied below. Can you please confirm that the township of Severn and MTO agrees with, or have they suggested any modifications?

Going forward please reach out to me regarding traffic TIS, as Lisa is no longer with the corporation.

Thanks,



**Steven Murphy, P.Eng, P.M.P** | Project Engineer - Transportation  
Development Services and Engineering Department  
*Engineering Division*  
**T:** 705-418-3550  
[orillia.ca](http://orillia.ca)



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## Kerianne Hagan

---

**From:** Kerianne Hagan  
**Sent:** July 25, 2024 9:38 AM  
**To:** Peter Dorton  
**Subject:** Terms of Reference -1151 Hurlwood Lane, Severn  
**Attachments:** 23979\_DP\_24.02.15.pdf

Good afternoon Peter

I hope this email finds you well. C.F. Crozier & Associates has been retained to prepare a Transportation Impact Study the site located at 1151 Hurlwood Lane in the Township of Severn, known as the Hawk Ridge development.

The site sits outside the MTO permit control area based on the mapping system. The Township requested that the MTO be circulated and confirm if the MTO would like to be included as a reviewing agency for the project. We have received confirmation on our TOR from Severn and Orillia and will be collecting traffic counts next week. If you are not the correct contact for this correspondence please let me know I should reach out to.

The Concept Draft Plan dated February 15, 2024 (attached) is currently under refinement but envisions the following elements:

- 755 Single-detached and townhome residential units.
- Possible Long-Term Care, Affordable Housing, School Site.
- An 18-hole Golf Course routed throughout the community

### Study Area and Intersections

- Highway 12 and Murphy Road/West Ridge Boulevard.
- Murphy Road and Uhthoff Line.
- The proposed Industrial Road and Uhthoff Line.
- Hurlwood Lane and Burnside Line.
- Division Road West / Uhthoff Line.
- Division Road West / Burnside Line.
- Burnside Line/West Street North and the Highway 11 interchanges.
- The proposed Industrial Road and Hurlwood Lane.
- Proposed site accesses.

### Analysis Periods and Scenarios

Based on the size of the development, it is expected to be built in phases. The a.m. and p.m. weekday peak hour existing conditions (2024), along with build-out phasing of 2031, 2033 and full build-out in 2035 and the five- and ten-year horizons beyond full build-out (2040 and 2045) will be reviewed under future background and future total conditions. We will use the growth rate along Highway 11 (2%) for the study, consistent with the Area 3 TIS.

### Background Developments

The adjacent Inch Farm and Area 3 will be reviewed as background developments, as well as the redistribution of existing volumes onto the Industrial Road as outlined in the Inch Farm ESR. All are forecasted to be completed by the opening horizon of the Hawk Ridge development. Please provide any additional developments that you feel should be included in the analysis. We would appreciate if you could provide us with any background TIS reports we will be able to reference for our analysis.

### Trip Generation

Trip generation for the development will be forecasted using the Institute of Traffic Engineers' (ITE) trip generation. Trips will be assigned to the boundary road network based on the Transportation Tomorrow Survey (TTS).

## Analysis Procedures

Analysis will be conducted using the Synchro 11 analysis package and Highway Capacity Manual (HCM 2010) procedures. Per MTO TIS Guidelines, all ramp movements with v/c ratios greater than 0.75 will be considered critical.

We will use the latest signal timing plans on record for Burnside Line and Hurlwood Lane/Brodie Drive received on April 21, 2022.

Should you have any questions or concerns regarding the above, please feel free to contact me.

Thank you,  
Kerianne

**Kerianne Hagan, EIT**  
Engineering Intern, Transportation  
Office: 705.434.3407

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# APPENDIX B

## Orillia Transit Schedule Excerpts

# Orillia Transit

cOnnecting our community

- North Route South Route
- Laclic Route Georgian Route
- West Ridge via Coldwater Road
- West Ridge via Old Barrie Road

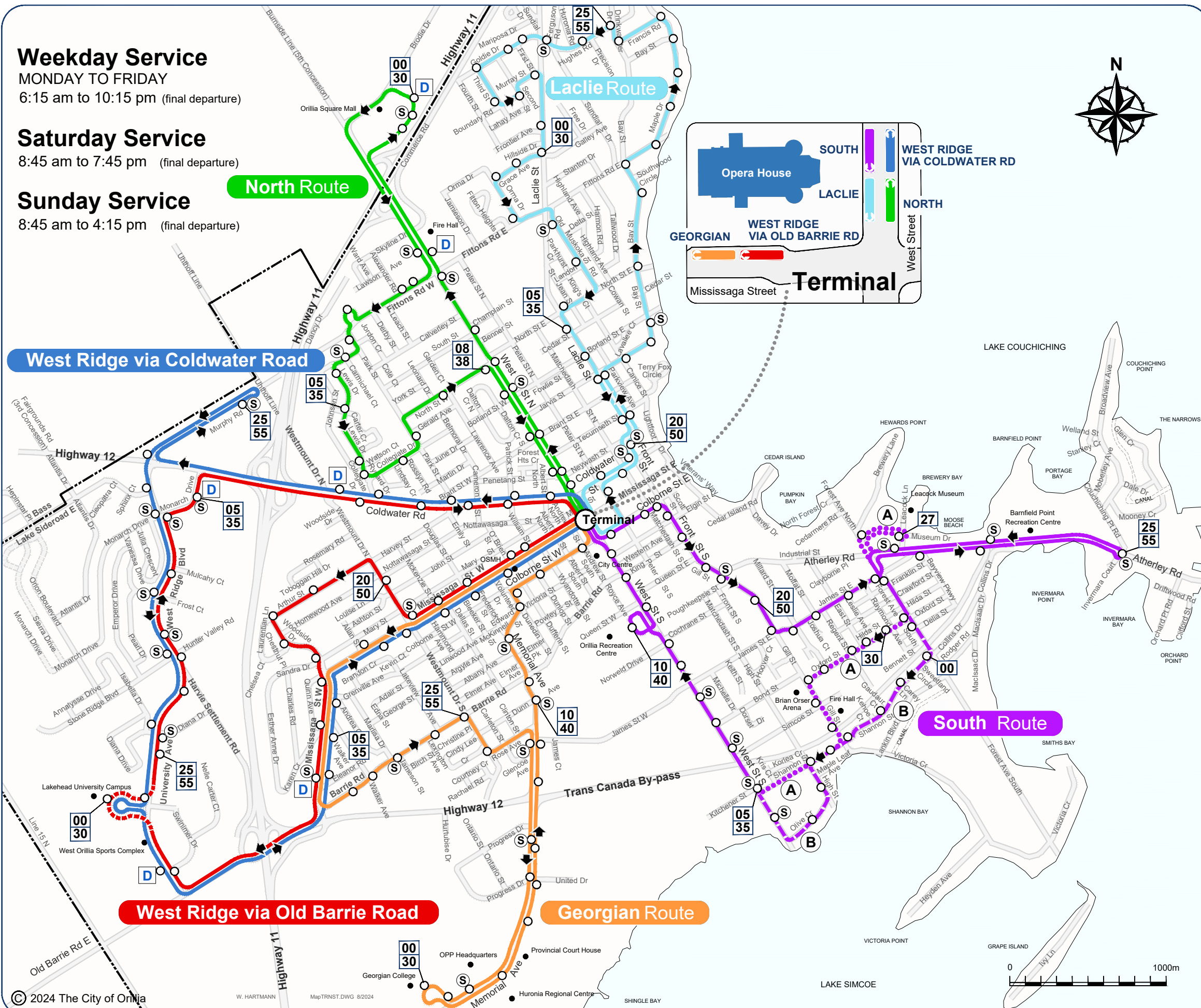
Each route departs the terminal at 15 and 45 minutes past the hour providing half hourly service to each stop on all routes. Except, hourly service is provided on the SOUTH route at **(A)** departing terminal at 15 minutes and **(B)** departing terminal at 45 minutes past the hour.

■ ■ ■ ■ West Ridge via Old Barrie Road stop at Lakehead University **only** for 5:45 pm and later departures from Terminal.

**● (A) ● Hourly Service** 35 05 Bus arrival times at stops noted in minutes after the hour.

**--- (B) --- Hourly Service** Terminal Transit Terminal  
Departs terminal 45 minutes after the hour. ● Bus Stop

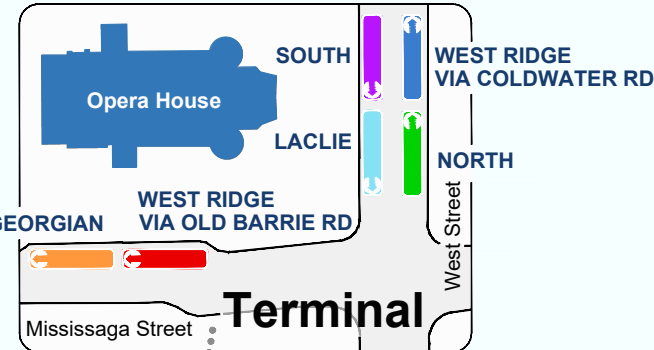
**— Half Hourly Service** S Bus Shelter D Dash Stop  
Departs terminal 15 and 45 minutes after the hour.



**Weekday Service**  
MONDAY TO FRIDAY  
6:15 am to 10:15 pm (final departure)

**Saturday Service**  
8:45 am to 7:45 pm (final departure)

**Sunday Service**  
8:45 am to 4:15 pm (final departure)



Orillia Transit  
**BUS ROUTES**  
and Schedule

Effective January 1, 2024

**ORILLIA** Information: (705) 326-8300




# Orillia Transit

## General Information

- Information: 705-326-8300
- Terminal located at West and Mississaga Streets
- Bus service operates all days except statutory holidays
- Transfers may only be made at the terminal
- Buses change routes at terminal
- Exact fare required at boarding

### Dash Bus Service:

- December 1 to March 31
- Free travel across bridges from  Dash stops.
- No transfers are provided from Dash stops unless the normal fare is paid.

### cOnnect Pass Cards are Available at:

- **Orillia City Centre** ..... 50 Andrew St. S. (1st floor)  
cOnnect Pass cards available from Monday to Friday (8:30 a.m. to 4:30 p.m.)
- **Orillia Public Library** ..... 36 Mississaga St. W.  
cOnnect Pass cards are available from Monday to Thursday (10 a.m. to 8 p.m.), Friday (10 a.m. to 6 p.m.), Saturday (9 a.m. to 5 p.m.) and Sunday (1 p.m. to 4 p.m.)
- **Laclic Guardian Pharmacy** ..... 400 Laclic St.
- **Memorial Pharmasave** ..... 200 Memorial Ave. Unit 1

(FARES ACCURATE AT TIME OF PRINTING, SUBJECT TO CHANGE WITHOUT NOTICE)

### Cash Fares..... \$3.00

(Please have exact change, as bus drivers are unable to make change)

Simcoe LINX Transfer Fare Discount ..... -\$1.00  
(Applicable to fares with valid Simcoe LINX Transfer)

### Monthly Pass..... \$66.80

**12 Rides** (for the price of 11).....\$33.00

**20 Rides** (for the price of 19).....\$57.00

**48 Rides** (for the price of 42).....\$126.00

### Lost Items on the bus?

Call 705-326-8300

If your card is lost or stolen, registered cards can be replaced for a fee of \$5 and your balance will be transferred to your new card.

## Special Group Pass

**Group 1** = 10-15 children + 3 adults...\$22.60

**Group 2** = 16-20 children + 4 adults...\$30.00

**Group 3** = 21-30 children + 5 adults.....\$36.80

Good for one-way on date specified between the hours of 9:45 a.m. and 2:45 p.m. on weekdays and all day Saturdays. For group rates, children must be 12 years and younger.

## Family Ride Program

Up to (2) two elementary aged children and/or preschoolers may ride **free** when accompanied by a paying guardian.

## C.N.I.B. (Canadian National Institute for the Blind)

Card holders ride for **free**.

## Effective March 1, 2024:

### Teen Pass

- Teens aged 13-19 can obtain a cOnnect Pass to access Orillia Transit vehicles for free.
- Teens are responsible for the cash fare price if a valid cOnnect Pass is not used while boarding transit.
- 12-month pilot program running from March 1, 2024 to Feb. 28, 2025.

### Senior Pass

- Seniors aged 65+ can ride any Orillia Transit vehicle for \$2 after obtaining a Seniors cOnnect Pass.
- Seniors are responsible for the full cash fare price if a valid cOnnect Pass is not used while boarding transit.

**Proof of identification is required for both teen passes and seniors passes when registering. These cOnnect Passes can be requested online, in-person at City Centre or at the Orillia Public Library in early 2024.**



## Orillia Wheelchair Limousine Service

- OWLS is a curb -to-curb service. The OWLS vehicle is unable to pull into private driveways and does not take custody of OWLS passengers. Please arrange for an attendant or companion if you will require personal care or assistance during the trip.
- Children under the age of 13 (riding without an attendant) must be met by an adult at their destination.
- Remember your attendant, friend, caregiver or companion is always welcome.

**Applications to use this service are available on [orillia.ca/transit](http://orillia.ca/transit) or at Orillia City Centre (first floor reception). For more information, call OWLS administration at 705-325-3975.**

### Bookings Line: 705-327-0411

- Cash fares are \$3.00 per person each way and cOnnect Pass cards can be purchased from the driver.
- All trips must be pre-booked through 705-327-0411 (minimum 24 hours notice required).
- Provide eligibility card number, date, address, time of pick-up and return and number of passengers.
- The OWLS bus provides service within the Orillia City limits plus Orillia Square Mall.
- Allow 30 minutes between pick-up and arrival times.
- Operating hours: Monday to Friday (6:30 a.m. to 10 p.m.), Saturday (9 a.m. to 7:30 p.m.), and Sunday (9 a.m. to 4 p.m.)
- No service on statutory holidays.

# APPENDIX C

## Traffic Data



Turning Movement Count (1 . HWY 12 & MURPHY RD / WEST RIDGE BLVD)

Start Time	N Approach MURPHY RD						E Approach HWY 12					S Approach W RIDGE BLVD					W Approach HWY 12					Int. Total (15 min)	Int. Total (1 hr)			
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N			UTurn W:W	Peds W:	Approach Total
06:00:00	7	5	6	0	0	18	3	30	8	0	0	41	6	3	10	0	0	19	8	58	5	0	0	71	149	
06:15:00	5	6	12	0	3	23	11	51	5	0	2	67	6	10	4	0	0	20	7	89	3	0	0	99	209	
06:30:00	5	7	16	0	0	28	15	57	13	0	0	85	8	6	4	0	0	18	10	118	9	0	0	137	268	
06:45:00	6	11	14	0	0	31	20	61	3	1	1	85	13	16	4	0	0	33	16	125	8	0	0	149	298	
07:00:00	8	11	33	0	0	52	26	65	10	0	0	101	9	15	14	0	0	38	20	104	7	0	0	131	322	
07:15:00	9	12	28	0	0	49	14	85	11	0	0	110	14	19	11	0	0	44	23	102	11	0	0	136	339	
07:30:00	8	15	32	0	0	55	31	85	10	0	0	126	13	17	13	0	0	43	21	141	7	0	0	169	393	
07:45:00	18	18	31	0	2	67	32	79	26	0	1	137	11	16	12	0	0	39	26	178	14	0	0	218	461	
08:00:00	9	14	33	0	0	56	23	60	24	0	0	107	19	19	15	0	0	53	19	140	13	0	0	172	388	
08:15:00	16	17	29	0	0	62	34	101	30	0	0	165	19	20	18	0	0	57	29	192	12	0	0	233	517	
08:30:00	14	18	31	0	0	63	27	80	18	0	0	125	21	26	11	0	0	58	35	157	6	0	0	198	444	
08:45:00	14	30	30	0	0	74	38	118	30	0	0	186	18	28	15	0	0	61	47	187	13	0	0	247	568	
09:00:00	18	36	36	0	0	90	42	86	36	0	0	164	23	24	16	0	0	63	42	122	18	0	0	182	499	
09:15:00	13	37	34	0	1	84	44	93	32	0	0	169	24	23	21	0	0	68	46	152	16	0	0	214	535	
09:30:00	16	35	58	0	1	109	68	85	42	0	2	195	40	35	35	0	0	110	39	138	14	0	0	191	605	
09:45:00	19	38	42	0	0	99	58	103	36	0	0	197	44	35	33	0	0	112	44	185	10	0	0	239	647	
***BREAK***																										
15:00:00	26	56	92	0	0	174	59	156	57	0	2	272	56	45	49	0	0	150	43	133	8	0	0	184	780	
15:15:00	24	39	72	0	3	135	55	172	62	0	1	289	52	50	33	0	1	135	38	125	15	0	0	178	737	
15:30:00	38	34	87	0	0	159	66	158	49	0	2	273	50	42	47	0	0	139	39	140	14	0	0	193	764	
15:45:00	24	27	66	0	1	117	69	168	52	0	4	289	44	47	42	0	0	133	47	150	17	0	0	214	753	
16:00:00	35	49	86	0	1	170	64	173	51	0	3	288	59	55	54	0	0	168	33	145	12	0	0	190	816	
16:15:00	28	34	69	0	1	131	71	185	59	0	0	315	45	34	47	0	0	126	38	136	18	0	0	192	764	
16:30:00	33	41	74	0	2	148	63	163	53	0	2	279	62	48	54	0	0	164	33	122	19	0	0	174	765	
16:45:00	22	32	69	0	1	123	51	195	41	0	1	287	49	43	49	0	0	141	43	153	9	0	0	205	756	
17:00:00	28	37	76	0	0	141	65	165	50	0	2	280	52	46	56	0	0	154	43	160	11	0	0	214	789	
17:15:00	24	44	65	0	0	133	61	178	74	1	2	314	66	49	51	0	0	166	34	145	9	0	0	188	801	
17:30:00	24	50	65	0	0	139	56	145	43	0	0	244	51	34	44	0	0	129	34	127	6	0	0	167	679	
17:45:00	23	29	56	0	0	108	60	152	39	0	1	251	28	43	33	0	0	104	33	108	17	0	0	158	621	
18:00:00	24	30	73	0	0	127	53	137	38	0	0	228	41	34	45	0	0	120	36	96	13	0	0	145	620	
18:15:00	20	29	52	0	0	101	45	138	48	0	0	231	36	38	32	0	0	106	43	141	18	0	0	202	640	
18:30:00	15	42	73	0	0	130	43	120	30	0	0	193	36	38	54	0	0	128	31	115	10	0	0	156	607	
18:45:00	17	29	59	0	0	105	55	132	35	0	0	222	45	37	34	0	0	116	37	109	16	0	0	162	605	
<b>Grand Total</b>	<b>590</b>	<b>912</b>	<b>1599</b>	<b>0</b>	<b>16</b>	<b>3101</b>	<b>1422</b>	<b>3776</b>	<b>1115</b>	<b>2</b>	<b>26</b>	<b>6315</b>	<b>1060</b>	<b>995</b>	<b>960</b>	<b>0</b>	<b>1</b>	<b>3015</b>	<b>1037</b>	<b>4293</b>	<b>378</b>	<b>0</b>	<b>0</b>	<b>5708</b>	<b>18139</b>	
<b>Approach%</b>	19%	29.4%	51.6%	0%	-	-	22.5%	59.8%	17.7%	0%	-	-	35.2%	33%	31.8%	0%	-	-	18.2%	75.2%	6.6%	0%	-	-	-	
<b>Totals %</b>	3.3%	5%	8.8%	0%	-	17.1%	7.8%	20.8%	6.1%	0%	-	34.8%	5.8%	5.5%	5.3%	0%	-	16.6%	5.7%	23.7%	2.1%	0%	-	31.5%	-	
<b>Heavy</b>	33	67	38	0	-	-	45	151	19	0	-	-	19	52	27	0	-	-	32	193	29	0	-	-	-	
<b>Heavy %</b>	5.6%	7.3%	2.4%	0%	-	-	3.2%	4%	1.7%	0%	-	-	1.8%	5.2%	2.8%	0%	-	-	3.1%	4.5%	7.7%	0%	-	-	-	
<b>Bicycles</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Bicycle %</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





Peak Hour: 09:00 AM - 10:00 AM Weather: Clear Sky (17.59 °C)

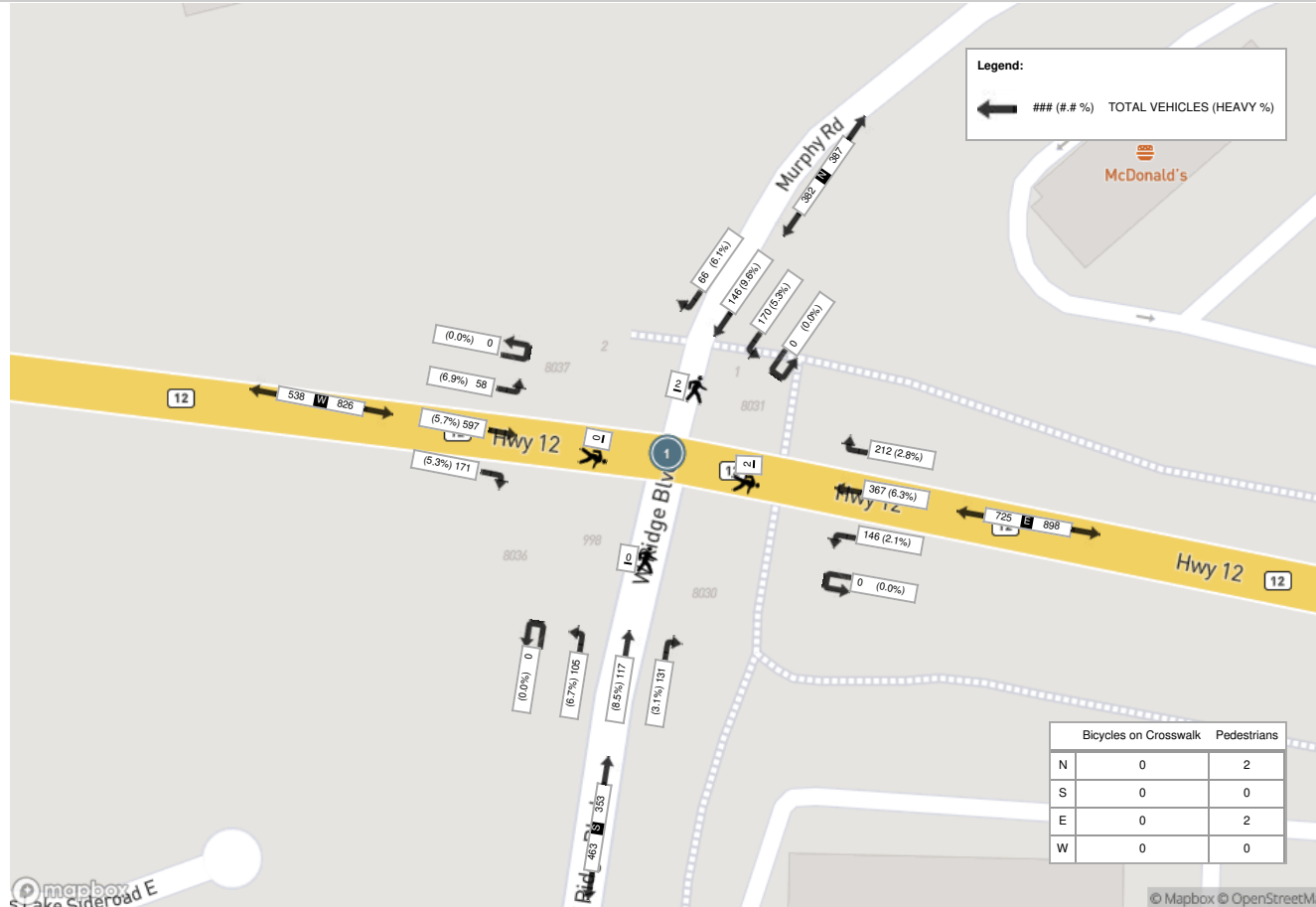
Start Time	N Approach MURPHY RD						E Approach HWY 12						S Approach W RIDGE BLVD						W Approach HWY 12						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
09:00:00	18	36	36	0	0	90	42	86	36	0	0	164	23	24	16	0	0	63	42	122	18	0	0	182	499
09:15:00	13	37	34	0	1	84	44	93	32	0	0	169	24	23	21	0	0	68	46	152	16	0	0	214	535
09:30:00	16	35	58	0	1	109	68	85	42	0	2	195	40	35	35	0	0	110	39	138	14	0	0	191	605
09:45:00	19	38	42	0	0	99	58	103	36	0	0	197	44	35	33	0	0	112	44	185	10	0	0	239	647
<b>Grand Total</b>	<b>66</b>	<b>146</b>	<b>170</b>	<b>0</b>	<b>2</b>	<b>382</b>	<b>212</b>	<b>367</b>	<b>146</b>	<b>0</b>	<b>2</b>	<b>725</b>	<b>131</b>	<b>117</b>	<b>105</b>	<b>0</b>	<b>0</b>	<b>353</b>	<b>171</b>	<b>597</b>	<b>58</b>	<b>0</b>	<b>0</b>	<b>826</b>	<b>2286</b>
<b>Approach%</b>	17.3%	38.2%	44.5%	0%	-	-	29.2%	50.6%	20.1%	0%	-	-	37.1%	33.1%	29.7%	0%	-	-	20.7%	72.3%	7%	0%	-	-	
<b>Totals %</b>	2.9%	6.4%	7.4%	0%	16.7%	9.3%	16.1%	6.4%	0%	31.7%	5.7%	5.1%	4.6%	0%	15.4%	7.5%	26.1%	2.5%	0%	36.1%	-	-	-	-	
<b>PHF</b>	0.87	0.96	0.73	0	0.88	0.78	0.89	0.87	0	0.92	0.74	0.84	0.75	0	0.79	0.93	0.81	0.81	0	0.86	-	-	-	-	
<b>Heavy</b>	4	14	9	0	27	6	23	3	0	32	4	10	7	0	21	9	34	4	0	47	-	-	-	-	
<b>Heavy %</b>	6.1%	9.6%	5.3%	0%	7.1%	2.8%	6.3%	2.1%	0%	4.4%	3.1%	8.5%	6.7%	0%	5.9%	5.3%	5.7%	6.9%	0%	5.7%	-	-	-	-	
<b>Lights</b>	62	132	161	0	355	206	344	142	0	692	127	107	97	0	331	162	563	54	0	779	-	-	-	-	
<b>Lights %</b>	93.9%	90.4%	94.7%	0%	92.9%	97.2%	93.7%	97.3%	0%	95.4%	96.9%	91.5%	92.4%	0%	93.8%	94.7%	94.3%	93.1%	0%	94.3%	-	-	-	-	
<b>Single-Unit Trucks</b>	4	10	7	0	21	3	14	1	0	18	3	10	3	0	16	5	16	4	0	25	-	-	-	-	
<b>Single-Unit Trucks %</b>	6.1%	6.8%	4.1%	0%	5.5%	1.4%	3.8%	0.7%	0%	2.5%	2.3%	8.5%	2.9%	0%	4.5%	2.9%	2.7%	6.9%	0%	3%	-	-	-	-	
<b>Buses</b>	0	2	1	0	3	3	0	0	0	3	1	0	1	0	2	1	0	0	0	1	-	-	-	-	
<b>Buses %</b>	0%	1.4%	0.6%	0%	0.8%	1.4%	0%	0%	0%	0.4%	0.8%	0%	1%	0%	0.6%	0.6%	0%	0%	0%	0.1%	-	-	-	-	
<b>Articulated Trucks</b>	0	2	1	0	3	0	9	2	0	11	0	0	3	0	3	3	18	0	0	21	-	-	-	-	
<b>Articulated Trucks %</b>	0%	1.4%	0.6%	0%	0.8%	0%	2.5%	1.4%	0%	1.5%	0%	0%	2.9%	0%	0.8%	1.8%	3%	0%	0%	2.5%	-	-	-	-	
<b>Bicycles on Road</b>	0	0	0	0	0	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	-	-	-	-	
<b>Bicycles on Road %</b>	0%	0%	0%	0%	0%	0%	0%	0.7%	0%	0.1%	0%	0%	1%	0%	0.3%	0%	0%	0%	0%	0%	-	-	-	-	
<b>Pedestrians</b>	-	-	-	-	2	-	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	-	-	-	
<b>Pedestrians%</b>	-	-	-	-	50%	-	-	-	-	50%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	
<b>Bicycles on Crosswalk</b>	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	
<b>Bicycles on Crosswalk%</b>	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	



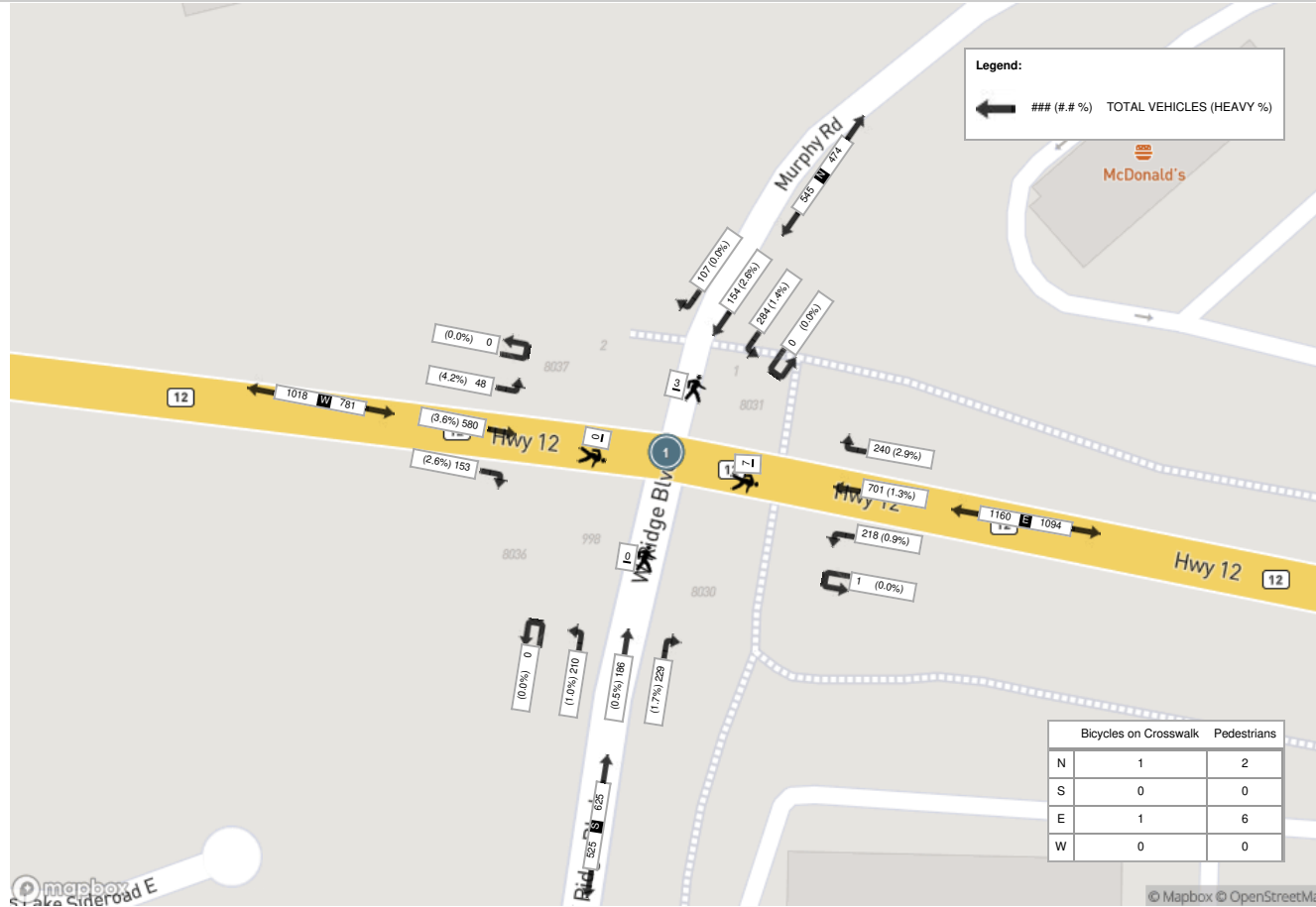
Peak Hour: 04:30 PM - 05:30 PM Weather: Clear Sky (30.07 °C)

Start Time	N Approach MURPHY RD						E Approach HWY 12						S Approach W RIDGE BLVD						W Approach HWY 12						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	33	41	74	0	2	148	63	163	53	0	2	279	62	48	54	0	0	164	33	122	19	0	0	174	765
16:45:00	22	32	69	0	1	123	51	195	41	0	1	287	49	43	49	0	0	141	43	153	9	0	0	205	756
17:00:00	28	37	76	0	0	141	65	165	50	0	2	280	52	46	56	0	0	154	43	160	11	0	0	214	789
17:15:00	24	44	65	0	0	133	61	178	74	1	2	314	66	49	51	0	0	166	34	145	9	0	0	188	801
<b>Grand Total</b>	107	154	284	0	3	545	240	701	218	1	7	1160	229	186	210	0	0	625	153	580	48	0	0	781	3111
<b>Approach%</b>	19.6%	28.3%	52.1%	0%	-	-	20.7%	60.4%	18.8%	0.1%	-	-	36.6%	29.8%	33.6%	0%	-	-	19.6%	74.3%	6.1%	0%	-	-	-
<b>Totals %</b>	3.4%	5%	9.1%	0%	17.5%	7.7%	22.5%	7%	0%	37.3%	7.4%	6%	6.8%	0%	20.1%	4.9%	18.6%	1.5%	0%	25.1%	-	-	-	-	-
<b>PHF</b>	0.81	0.88	0.93	0	0.92	0.92	0.9	0.74	0.25	0.92	0.87	0.95	0.94	0	0.94	0.89	0.91	0.63	0	0.91	-	-	-	-	-
<b>Heavy</b>	0	4	4	0	8	7	9	2	0	18	4	1	2	0	7	4	21	2	0	27	-	-	-	-	-
<b>Heavy %</b>	0%	2.6%	1.4%	0%	1.5%	2.9%	1.3%	0.9%	0%	1.6%	1.7%	0.5%	1%	0%	1.1%	2.6%	3.6%	4.2%	0%	3.5%	-	-	-	-	-
<b>Lights</b>	107	149	280	0	536	233	692	216	1	1142	225	185	208	0	618	149	559	46	0	754	-	-	-	-	-
<b>Lights %</b>	100%	96.8%	98.6%	0%	98.3%	97.1%	98.7%	99.1%	100%	98.4%	98.3%	99.5%	99%	0%	98.9%	97.4%	96.4%	95.8%	0%	96.5%	-	-	-	-	-
<b>Single-Unit Trucks</b>	0	1	4	0	5	3	8	1	0	12	3	1	1	0	5	2	12	2	0	16	-	-	-	-	-
<b>Single-Unit Trucks %</b>	0%	0.6%	1.4%	0%	0.9%	1.3%	1.1%	0.5%	0%	1%	1.3%	0.5%	0.5%	0%	0.8%	1.3%	2.1%	4.2%	0%	2%	-	-	-	-	-
<b>Buses</b>	0	3	0	0	3	2	0	0	0	2	0	0	1	0	1	1	1	0	0	2	-	-	-	-	-
<b>Buses %</b>	0%	1.9%	0%	0%	0.6%	0.8%	0%	0%	0%	0.2%	0%	0%	0.5%	0%	0.2%	0.7%	0.2%	0%	0%	0.3%	-	-	-	-	-
<b>Articulated Trucks</b>	0	0	0	0	0	2	1	1	0	4	1	0	0	0	1	1	8	0	0	9	-	-	-	-	-
<b>Articulated Trucks %</b>	0%	0%	0%	0%	0%	0.8%	0.1%	0.5%	0%	0.3%	0.4%	0%	0%	0%	0.2%	0.7%	1.4%	0%	0%	1.2%	-	-	-	-	-
<b>Bicycles on Road</b>	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
<b>Bicycles on Road %</b>	0%	0.6%	0%	0%	0.2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	-	-	-	-
<b>Pedestrians</b>	-	-	-	-	2	-	-	-	-	6	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-
<b>Pedestrians%</b>	-	-	-	-	20%	-	-	-	-	60%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-
<b>Bicycles on Crosswalk</b>	-	-	-	-	1	-	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-
<b>Bicycles on Crosswalk%</b>	-	-	-	-	10%	-	-	-	-	10%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-

Peak Hour: 09:00 AM - 10:00 AM Weather: Clear Sky (17.59 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Clear Sky (30.07 °C)





Turning Movement Count (2 . MURPHY RD & UHTHOFF LINE)

Start Time	N Approach UHTHOFF LINE						E Approach MURPHY RD						S Approach UHTHOFF LINE						W Approach MURPHY RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
06:00:00	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	5	
06:15:00	1	0	0	0	0	1	0	2	0	0	0	2	0	0	1	0	0	1	1	1	4	0	0	6	10	
06:30:00	7	0	0	0	0	7	0	1	0	0	0	1	0	0	0	0	0	0	0	1	7	0	0	8	16	
06:45:00	4	1	0	0	0	5	1	2	0	0	0	3	0	0	2	0	0	2	0	2	7	0	0	9	19	50
07:00:00	10	0	0	0	0	10	0	2	0	0	0	2	0	0	0	0	0	0	0	0	13	0	0	13	25	70
07:15:00	10	0	0	0	0	10	0	1	0	0	0	1	0	0	0	0	0	0	0	1	8	0	0	9	20	80
07:30:00	14	0	0	0	0	14	0	0	0	0	0	0	1	0	0	0	0	1	1	6	0	0	8	23	87	
07:45:00	7	0	0	0	0	7	0	4	0	0	0	4	0	0	0	0	0	0	0	2	19	0	0	21	32	100
08:00:00	15	0	0	0	0	15	1	1	0	0	0	2	0	0	0	0	0	0	0	2	14	0	0	16	33	108
08:15:00	10	0	0	0	0	10	0	2	0	0	0	2	0	0	0	0	0	0	0	2	15	0	0	17	29	117
08:30:00	8	0	0	0	0	8	0	1	0	0	0	1	1	0	0	0	0	1	1	0	8	0	0	9	19	113
08:45:00	20	0	0	0	0	20	0	4	0	0	0	4	0	0	0	0	0	0	0	2	14	0	0	16	40	121
09:00:00	20	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	17	37	125
09:15:00	18	0	0	0	0	18	0	2	0	0	0	2	0	0	0	0	0	0	0	1	9	0	0	10	30	126
09:30:00	18	0	0	0	0	18	0	2	0	0	0	2	0	0	0	0	0	0	1	0	19	0	0	20	40	147
09:45:00	16	0	0	0	0	16	0	1	0	0	0	1	0	0	0	0	0	0	0	1	18	0	0	19	36	143
***BREAK***																										
15:00:00	17	0	0	0	0	17	1	1	0	0	0	2	0	0	0	0	5	0	0	1	36	0	0	37	56	
15:15:00	14	0	0	0	0	14	0	1	2	0	0	3	0	0	0	0	0	0	0	2	21	0	0	23	40	
15:30:00	19	0	0	0	0	19	0	0	0	0	0	0	0	0	1	0	2	1	0	1	31	0	0	32	52	
15:45:00	20	0	1	0	0	21	1	0	0	0	0	1	0	0	0	0	1	0	0	0	32	0	0	32	54	202
16:00:00	14	0	0	0	0	14	0	2	0	0	0	2	0	0	1	0	0	1	0	2	32	0	0	34	51	197
16:15:00	13	0	0	0	0	13	0	2	0	0	0	2	0	0	0	0	0	0	0	2	17	0	0	19	34	191
16:30:00	18	0	0	0	0	18	0	3	0	0	0	3	0	1	1	0	0	2	2	4	23	0	0	29	52	191
16:45:00	14	0	0	0	0	14	1	1	0	0	0	2	0	0	0	0	0	0	0	4	20	0	0	24	40	177
17:00:00	14	0	0	0	0	14	1	0	0	0	0	1	0	0	0	0	0	0	0	1	31	0	0	32	47	173
17:15:00	13	0	0	0	0	13	0	3	0	0	0	3	0	0	1	0	1	1	1	1	31	0	0	33	50	189
17:30:00	9	0	0	0	0	9	0	1	0	0	0	1	0	0	0	0	0	0	0	0	19	1	0	20	30	167
17:45:00	12	0	0	0	0	12	0	1	0	0	0	1	0	0	0	0	0	0	1	1	17	0	0	19	32	159
18:00:00	10	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	1	19	0	0	20	30	142
18:15:00	17	0	0	0	0	17	0	1	0	0	0	1	0	0	0	1	0	0	1	1	15	0	0	17	35	127
18:30:00	11	0	1	0	0	12	0	1	0	0	0	1	0	0	0	0	0	0	0	0	14	0	0	14	27	124
18:45:00	8	0	0	0	0	8	0	1	0	0	0	1	0	0	1	0	0	1	1	1	13	0	0	15	25	117
<b>Grand Total</b>	<b>404</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>407</b>	<b>6</b>	<b>43</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>51</b>	<b>1</b>	<b>2</b>	<b>8</b>	<b>0</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>38</b>	<b>551</b>	<b>1</b>	<b>0</b>	<b>600</b>	<b>1069</b>	<b>-</b>
<b>Approach%</b>	99.3%	0.2%	0.5%	0%	-	-	11.8%	84.3%	3.9%	0%	-	-	9.1%	18.2%	72.7%	0%	-	-	1.7%	6.3%	91.8%	0.2%	-	-	-	-
<b>Totals %</b>	37.8%	0.1%	0.2%	0%	38.1%	38.1%	0.6%	4%	0.2%	0%	4.8%	4.8%	0.1%	0.2%	0.7%	0%	4.8%	1%	0.9%	3.6%	51.5%	0.1%	56.1%	-	-	
<b>Heavy</b>	90	0	0	0	-	-	0	18	0	0	-	-	1	0	0	0	-	-	1	16	89	0	-	-	-	-
<b>Heavy %</b>	22.3%	0%	0%	0%	-	-	0%	41.9%	0%	0%	-	-	100%	0%	0%	0%	-	-	10%	42.1%	16.2%	0%	-	-	-	-
<b>Bicycles</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Bicycle %</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 08:45 AM - 09:45 AM Weather: Clear Sky (17.59 °C)

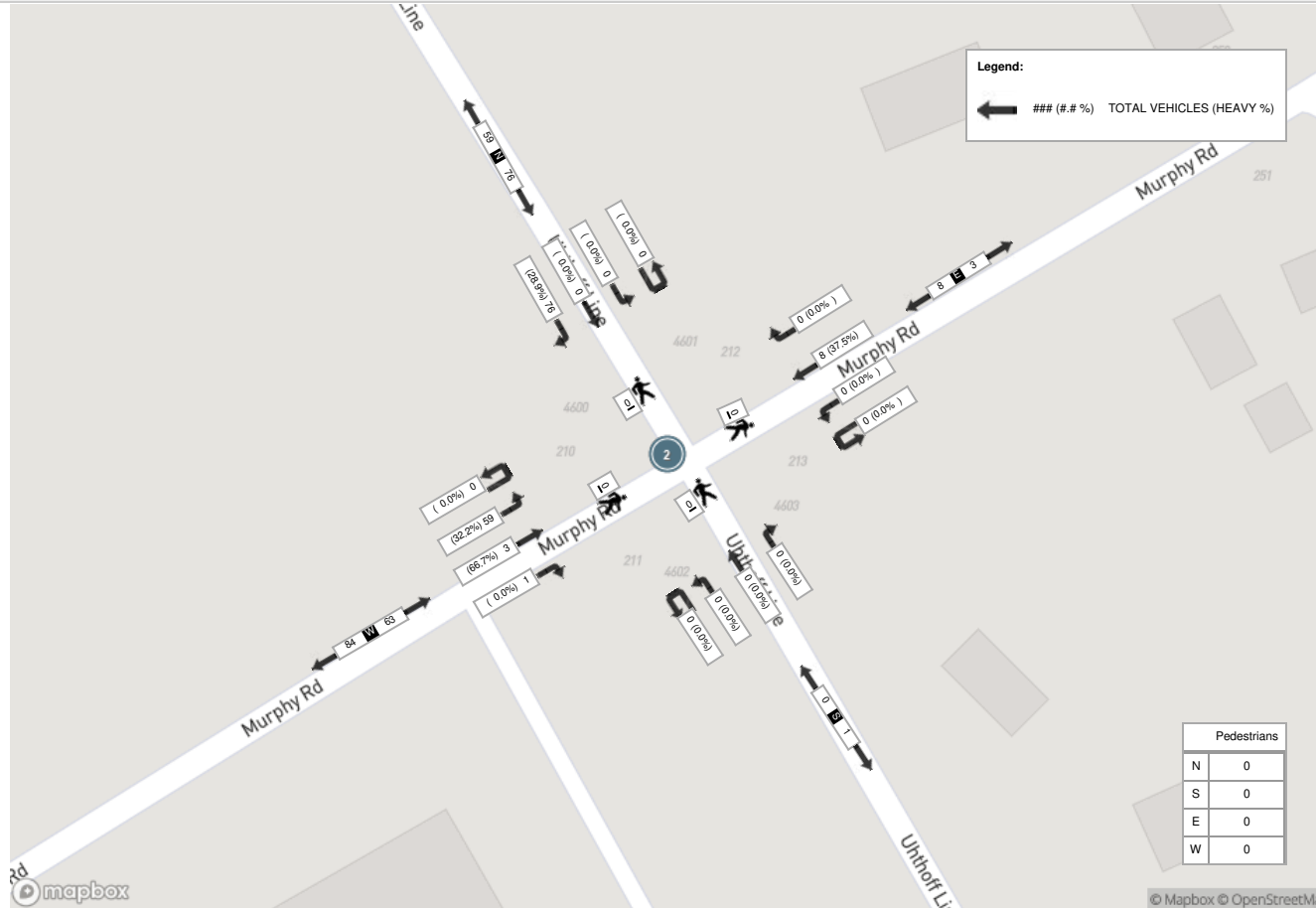
Start Time	N Approach UHTHOFF LINE						E Approach MURPHY RD						S Approach UHTHOFF LINE						W Approach MURPHY RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:45:00	20	0	0	0	0	20	0	4	0	0	0	4	0	0	0	0	0	0	0	2	14	0	0	16	40
09:00:00	20	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	17	37
09:15:00	18	0	0	0	0	18	0	2	0	0	0	2	0	0	0	0	0	0	0	1	9	0	0	10	30
09:30:00	18	0	0	0	0	18	0	2	0	0	0	2	0	0	0	0	0	0	1	0	19	0	0	20	40
<b>Grand Total</b>	<b>76</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>76</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>3</b>	<b>59</b>	<b>0</b>	<b>0</b>	<b>63</b>	<b>147</b>
<b>Approach%</b>	100%	0%	0%	0%		-	0%	100%	0%	0%		-	0%	0%	0%	0%		-	1.6%	4.8%	93.7%	0%		-	-
<b>Totals %</b>	51.7%	0%	0%	0%		51.7%	0%	5.4%	0%	0%		5.4%	0%	0%	0%	0%		0%	0.7%	2%	40.1%	0%		42.9%	-
<b>PHF</b>	0.95	0	0	0		0.95	0	0.5	0	0		0.5	0	0	0	0		0	0.25	0.38	0.78	0		0.79	-
<b>Heavy</b>	22	0	0	0		22	0	3	0	0		3	0	0	0	0		0	0	2	19	0		21	-
<b>Heavy %</b>	28.9%	0%	0%	0%		28.9%	0%	37.5%	0%	0%		37.5%	0%	0%	0%	0%		0%	0%	66.7%	32.2%	0%		33.3%	-
<b>Lights</b>	54	0	0	0		54	0	5	0	0		5	0	0	0	0		0	1	1	40	0		42	-
<b>Lights %</b>	71.1%	0%	0%	0%		71.1%	0%	62.5%	0%	0%		62.5%	0%	0%	0%	0%		0%	100%	33.3%	67.8%	0%		66.7%	-
<b>Single-Unit Trucks</b>	22	0	0	0		22	0	0	0	0		0	0	0	0	0		0	0	0	19	0		19	-
<b>Single-Unit Trucks %</b>	28.9%	0%	0%	0%		28.9%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	32.2%	0%		30.2%	-
<b>Buses</b>	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	0	2	0	0		2	-
<b>Buses %</b>	0%	0%	0%	0%		0%	0%	25%	0%	0%		25%	0%	0%	0%	0%		0%	0%	66.7%	0%	0%		3.2%	-
<b>Articulated Trucks</b>	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	-
<b>Articulated Trucks %</b>	0%	0%	0%	0%		0%	0%	12.5%	0%	0%		12.5%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
<b>Bicycles on Road</b>	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
<b>Bicycles on Road %</b>	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
<b>Pedestrians</b>	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-
<b>Pedestrians %</b>	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-



Peak Hour: 03:00 PM - 04:00 PM Weather: Clear Sky (30.07 °C)

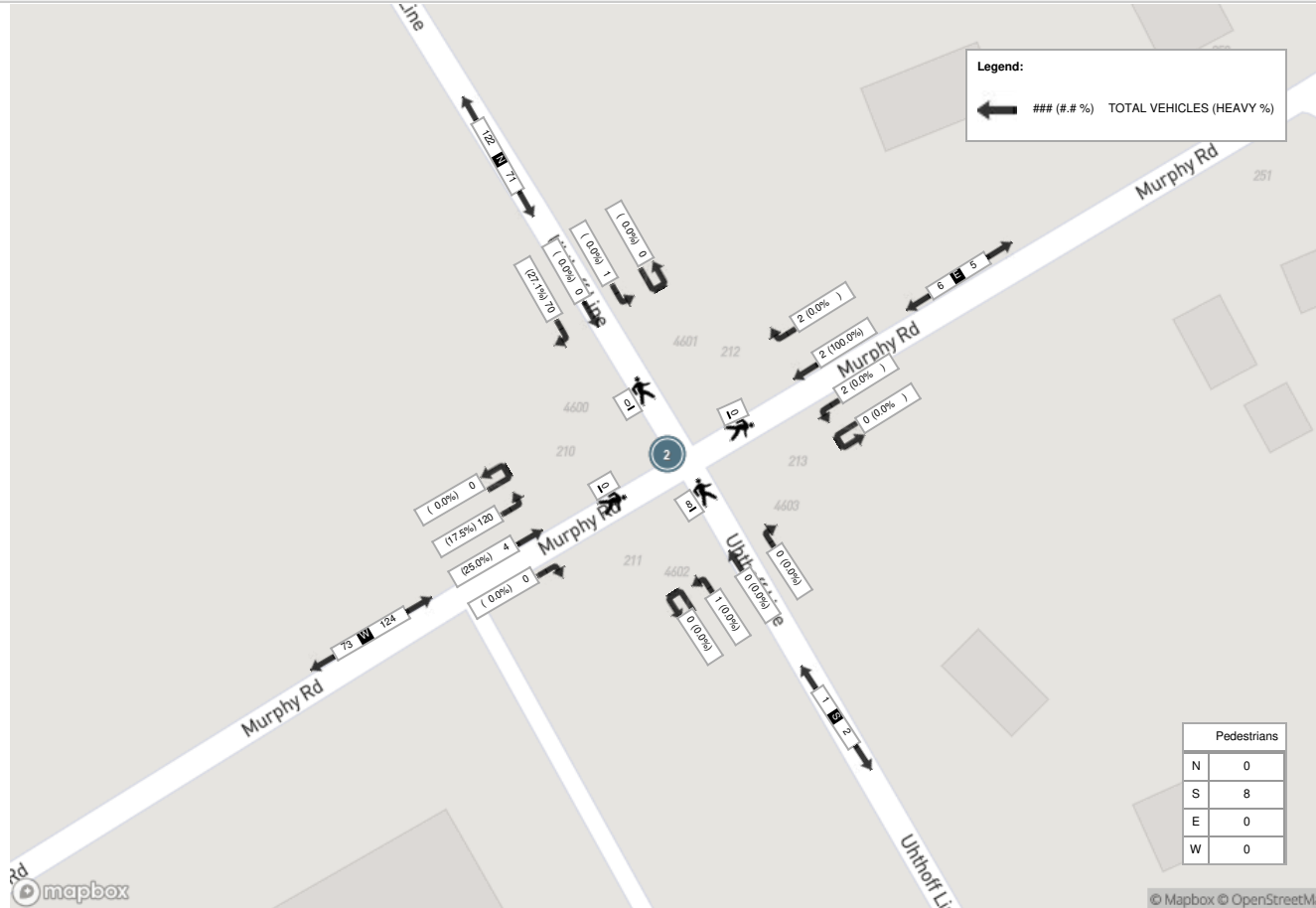
Start Time	N Approach UHTHOFF LINE						E Approach MURPHY RD						S Approach UHTHOFF LINE						W Approach MURPHY RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
15:00:00	17	0	0	0	0	17	1	1	0	0	0	2	0	0	0	0	5	0	0	1	36	0	0	37	56
15:15:00	14	0	0	0	0	14	0	1	2	0	0	3	0	0	0	0	0	0	0	2	21	0	0	23	40
15:30:00	19	0	0	0	0	19	0	0	0	0	0	0	0	0	1	0	2	1	0	1	31	0	0	32	52
15:45:00	20	0	1	0	0	21	1	0	0	0	0	1	0	0	0	0	1	0	0	0	32	0	0	32	54
<b>Grand Total</b>	<b>70</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>71</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>8</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>120</b>	<b>0</b>	<b>0</b>	<b>124</b>	<b>202</b>
<b>Approach%</b>	98.6%	0%	1.4%	0%		-	33.3%	33.3%	33.3%	0%	0%	-	0%	0%	100%	0%	-	0%	3.2%	96.8%	0%		-	-	
<b>Totals %</b>	34.7%	0%	0.5%	0%		35.1%	1%	1%	1%	0%	3%	0%	0%	0.5%	0%	0.5%	0%	2%	59.4%	0%		61.4%	-		
<b>PHF</b>	0.88	0	0.25	0		0.85	0.5	0.5	0.25	0	0.5	0	0	0.25	0	0.25	0	0.5	0.83	0		0.84	-		
<b>Heavy</b>	19	0	0	0		19	0	2	0	0	2	0	0	0	0	0	0	0	1	21	0		22	-	
<b>Heavy %</b>	27.1%	0%	0%	0%		26.8%	0%	100%	0%	0%	33.3%	0%	0%	0%	0%	0%	0%	0%	25%	17.5%	0%		17.7%	-	
<b>Lights</b>	51	0	1	0		52	2	0	2	0	4	0	0	1	0	1	0	3	99	0		102	-		
<b>Lights %</b>	72.9%	0%	100%	0%		73.2%	100%	0%	100%	0%	66.7%	0%	0%	100%	0%	100%	0%	75%	82.5%	0%		82.3%	-		
<b>Single-Unit Trucks</b>	18	0	0	0		18	0	0	0	0	0	0	0	0	0	0	0	0	21	0		21	-		
<b>Single-Unit Trucks %</b>	25.7%	0%	0%	0%		25.4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	17.5%	0%		16.9%	-		
<b>Buses</b>	0	0	0	0		0	0	2	0	0	2	0	0	0	0	0	0	1	0	0		1	-		
<b>Buses %</b>	0%	0%	0%	0%		0%	0%	100%	0%	0%	33.3%	0%	0%	0%	0%	0%	0%	25%	0%	0%		0.8%	-		
<b>Articulated Trucks</b>	1	0	0	0		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	-		
<b>Articulated Trucks %</b>	1.4%	0%	0%	0%		1.4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	-		
<b>Bicycles on Road</b>	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	-		
<b>Bicycles on Road %</b>	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	-		
<b>Pedestrians</b>	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	8	-	-	-	-	0	-	-		
<b>Pedestrians%</b>	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	100%	-	-	-	-	0%	-	-	-		

Peak Hour: 08:45 AM - 09:45 AM Weather: Clear Sky (17.59 °C)





Peak Hour: 03:00 PM - 04:00 PM Weather: Clear Sky (30.07 °C)





Turning Movement Count (3 . HURLWOOD LN & BURNSIDE LINE)

Start Time	N Approach BURNSIDE LINE						E Approach HURLWOOD LN						S Approach BURNSIDE LINE						W Approach HURLWOOD LN						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
06:00:00	0	23	3	0	0	26	0	0	2	0	0	2	8	25	4	0	0	37	0	0	0	0	0	0	65	
06:15:00	0	44	1	0	0	45	0	0	3	0	0	3	6	24	2	0	0	32	0	0	0	0	0	0	80	
06:30:00	2	31	7	0	0	40	0	0	5	0	0	5	9	30	2	0	0	41	2	0	0	0	0	2	88	
06:45:00	2	57	2	0	0	61	0	0	10	0	0	10	21	36	6	0	0	63	1	0	0	0	0	1	135	368
07:00:00	2	38	6	0	0	46	5	1	9	0	0	15	9	31	8	0	0	48	3	0	0	0	0	3	112	415
07:15:00	2	35	2	0	0	39	0	0	9	0	0	9	7	31	5	0	0	43	4	0	0	0	0	4	95	430
07:30:00	3	51	8	0	0	62	2	1	10	0	0	13	11	34	5	0	0	50	1	0	0	0	0	1	126	468
07:45:00	3	49	10	0	0	62	4	1	15	0	0	20	15	35	15	0	0	65	2	1	0	0	0	3	150	483
08:00:00	7	60	9	0	0	76	2	0	17	0	0	19	11	46	7	0	0	64	1	0	2	0	0	3	162	533
08:15:00	6	50	6	0	0	62	3	0	31	0	0	34	26	42	19	0	0	87	3	1	0	0	0	4	187	625
08:30:00	2	44	12	0	0	58	6	1	38	0	0	45	10	45	6	0	0	61	5	1	0	0	0	6	170	669
08:45:00	3	40	5	0	0	48	7	1	47	0	0	55	11	43	9	0	0	63	8	0	3	0	0	11	177	696
09:00:00	5	54	5	0	0	64	10	0	39	0	0	49	14	50	4	0	0	68	1	0	1	0	0	2	183	717
09:15:00	2	44	6	0	0	52	7	1	45	0	0	53	22	62	9	0	0	93	5	0	1	0	0	6	204	734
09:30:00	4	54	11	0	0	69	7	0	55	0	0	62	18	64	5	0	0	87	8	0	1	0	0	9	227	791
09:45:00	1	50	8	0	0	59	8	3	51	0	0	62	14	56	8	0	0	78	7	1	2	0	0	10	209	823
***BREAK***																										
15:00:00	1	73	16	0	0	90	19	1	86	0	0	106	16	62	5	0	0	83	7	0	4	0	1	11	290	
15:15:00	1	49	10	0	0	60	15	3	80	0	0	98	23	47	9	0	0	79	7	1	0	0	0	8	245	
15:30:00	4	45	7	0	0	56	23	3	88	0	0	114	12	52	10	0	0	74	10	0	0	0	0	10	254	
15:45:00	3	36	10	0	0	49	13	3	68	0	0	84	11	50	8	0	0	69	5	2	5	0	0	12	214	1003
16:00:00	2	49	10	0	0	61	19	2	73	0	0	94	14	44	11	0	0	69	11	2	4	0	0	17	241	954
16:15:00	4	52	9	0	0	65	18	0	76	0	0	94	21	61	7	0	0	89	9	1	1	0	0	11	259	968
16:30:00	1	46	9	0	0	56	23	1	94	0	0	118	14	59	5	0	0	78	19	2	4	0	0	25	277	991
16:45:00	0	44	9	0	0	53	23	0	77	0	0	100	17	70	5	0	0	92	7	0	1	0	0	8	253	1030
17:00:00	2	53	8	0	0	63	19	0	83	0	0	102	23	57	7	0	0	87	5	1	0	0	0	6	258	1047
17:15:00	3	34	10	0	0	47	18	1	81	0	0	100	20	56	9	0	0	85	4	1	7	0	0	12	244	1032
17:30:00	0	29	15	0	0	44	12	0	68	0	0	80	13	44	6	0	0	63	6	0	3	0	0	9	196	951
17:45:00	4	36	7	0	0	47	16	1	86	0	0	103	12	40	1	0	0	53	9	0	4	0	0	13	216	914
18:00:00	0	27	12	0	0	39	15	1	61	0	0	77	13	37	6	0	0	56	6	1	2	0	0	9	181	837
18:15:00	1	36	5	0	0	42	8	0	50	0	0	58	9	29	3	1	0	42	5	0	1	0	0	6	148	741
18:30:00	0	30	9	0	0	39	9	0	59	0	0	68	10	33	6	0	0	49	3	1	0	0	0	4	160	705
18:45:00	0	14	5	0	0	19	11	4	46	0	0	61	11	46	1	0	0	58	17	1	2	0	0	20	158	647
<b>Grand Total</b>	<b>70</b>	<b>1377</b>	<b>252</b>	<b>0</b>	<b>0</b>	<b>1699</b>	<b>322</b>	<b>29</b>	<b>1562</b>	<b>0</b>	<b>0</b>	<b>1913</b>	<b>451</b>	<b>1441</b>	<b>213</b>	<b>1</b>	<b>0</b>	<b>2106</b>	<b>181</b>	<b>17</b>	<b>48</b>	<b>0</b>	<b>1</b>	<b>246</b>	<b>5964</b>	<b>-</b>
<b>Approach%</b>	4.1%	81%	14.8%	0%	-	-	16.8%	1.5%	81.7%	0%	-	-	21.4%	68.4%	10.1%	0%	-	73.6%	6.9%	19.5%	0%	-	-	-	-	-
<b>Totals %</b>	1.2%	23.1%	4.2%	0%	-	28.5%	5.4%	0.5%	26.2%	0%	32.1%	7.6%	24.2%	3.6%	0%	-	35.3%	3%	0.3%	0.8%	0%	-	-	4.1%	-	-
<b>Heavy</b>	0	295	2	0	-	-	2	0	50	0	-	-	36	265	2	0	-	3	0	0	0	-	-	-	-	-
<b>Heavy %</b>	0%	21.4%	0.8%	0%	-	-	0.6%	0%	3.2%	0%	-	-	8%	18.4%	0.9%	0%	-	1.7%	0%	0%	0%	-	-	-	-	-
<b>Bicycles</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Bicycle %</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 09:00 AM - 10:00 AM Weather: Clear Sky (17.59 °C)

Start Time	N Approach BURNSIDE LINE						E Approach HURLWOOD LN						S Approach BURNSIDE LINE						W Approach HURLWOOD LN						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
09:00:00	5	54	5	0	0	64	10	0	39	0	0	49	14	50	4	0	0	68	1	0	1	0	0	2	183
09:15:00	2	44	6	0	0	52	7	1	45	0	0	53	22	62	9	0	0	93	5	0	1	0	0	6	204
09:30:00	4	54	11	0	0	69	7	0	55	0	0	62	18	64	5	0	0	87	8	0	1	0	0	9	227
09:45:00	1	50	8	0	0	59	8	3	51	0	0	62	14	56	8	0	0	78	7	1	2	0	0	10	209
<b>Grand Total</b>	<b>12</b>	<b>202</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>244</b>	<b>32</b>	<b>4</b>	<b>190</b>	<b>0</b>	<b>0</b>	<b>226</b>	<b>68</b>	<b>232</b>	<b>26</b>	<b>0</b>	<b>0</b>	<b>326</b>	<b>21</b>	<b>1</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>27</b>	<b>823</b>
<b>Approach%</b>	4.9%	82.8%	12.3%	0%		-	14.2%	1.8%	84.1%	0%		-	20.9%	71.2%	8%	0%		-	77.8%	3.7%	18.5%	0%		-	-
<b>Totals %</b>	1.5%	24.5%	3.6%	0%		29.6%	3.9%	0.5%	23.1%	0%		27.5%	8.3%	28.2%	3.2%	0%		39.6%	2.6%	0.1%	0.6%	0%		3.3%	-
<b>PHF</b>	0.6	0.94	0.68	0		0.88	0.8	0.33	0.86	0		0.91	0.77	0.91	0.72	0		0.88	0.66	0.25	0.63	0		0.68	-
<b>Heavy</b>	0	53	0	0		53	0	0	7	0		7	7	75	0	0		82	0	0	0	0		0	-
<b>Heavy %</b>	0%	26.2%	0%	0%		21.7%	0%	0%	3.7%	0%		3.1%	10.3%	32.3%	0%	0%		25.2%	0%	0%	0%	0%		0%	-
<b>Lights</b>	12	149	30	0		191	32	4	183	0		219	61	157	26	0		244	21	1	5	0		27	-
<b>Lights %</b>	100%	73.8%	100%	0%		78.3%	100%	100%	96.3%	0%		96.9%	89.7%	67.7%	100%	0%		74.8%	100%	100%	100%	0%		100%	-
<b>Single-Unit Trucks</b>	0	15	0	0		15	0	0	5	0		5	6	19	0	0		25	0	0	0	0		0	-
<b>Single-Unit Trucks %</b>	0%	7.4%	0%	0%		6.1%	0%	0%	2.6%	0%		2.2%	8.8%	8.2%	0%	0%		7.7%	0%	0%	0%	0%		0%	-
<b>Buses</b>	0	0	0	0		0	0	0	2	0		2	0	0	0	0		0	0	0	0	0		0	-
<b>Buses %</b>	0%	0%	0%	0%		0%	0%	0%	1.1%	0%		0.9%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
<b>Articulated Trucks</b>	0	38	0	0		38	0	0	0	0		0	1	56	0	0		57	0	0	0	0		0	-
<b>Articulated Trucks %</b>	0%	18.8%	0%	0%		15.6%	0%	0%	0%	0%		0%	1.5%	24.1%	0%	0%		17.5%	0%	0%	0%	0%		0%	-
<b>Bicycles on Road</b>	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
<b>Bicycles on Road %</b>	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
<b>Pedestrians</b>	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-
<b>Pedestrians%</b>	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-



Peak Hour: 04:15 PM - 05:15 PM Weather: Clear Sky (30.07 °C)

Start Time	N Approach BURNSIDE LINE						E Approach HURLWOOD LN						S Approach BURNSIDE LINE						W Approach HURLWOOD LN						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:15:00	4	52	9	0	0	65	18	0	76	0	0	94	21	61	7	0	0	89	9	1	1	0	0	11	259
16:30:00	1	46	9	0	0	56	23	1	94	0	0	118	14	59	5	0	0	78	19	2	4	0	0	25	277
16:45:00	0	44	9	0	0	53	23	0	77	0	0	100	17	70	5	0	0	92	7	0	1	0	0	8	253
17:00:00	2	53	8	0	0	63	19	0	83	0	0	102	23	57	7	0	0	87	5	1	0	0	0	6	258
<b>Grand Total</b>	<b>7</b>	<b>195</b>	<b>35</b>	<b>0</b>	<b>0</b>	<b>237</b>	<b>83</b>	<b>1</b>	<b>330</b>	<b>0</b>	<b>0</b>	<b>414</b>	<b>75</b>	<b>247</b>	<b>24</b>	<b>0</b>	<b>0</b>	<b>346</b>	<b>40</b>	<b>4</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>50</b>	<b>1047</b>
<b>Approach%</b>	3%	82.3%	14.8%	0%		-	20%	0.2%	79.7%	0%		-	21.7%	71.4%	6.9%	0%		-	80%	8%	12%	0%		-	-
<b>Totals %</b>	0.7%	18.6%	3.3%	0%		22.6%	7.9%	0.1%	31.5%	0%		39.5%	7.2%	23.6%	2.3%	0%		33%	3.8%	0.4%	0.6%	0%		4.8%	-
<b>PHF</b>	0.44	0.92	0.97	0		0.91	0.9	0.25	0.88	0		0.88	0.82	0.88	0.86	0		0.94	0.53	0.5	0.38	0		0.5	-
<b>Heavy</b>	0	16	0	0		16	0	0	5	0		5	10	4	0	0		14	1	0	0	0		1	-
<b>Heavy %</b>	0%	8.2%	0%	0%		6.8%	0%	0%	1.5%	0%		1.2%	13.3%	1.6%	0%	0%		4%	2.5%	0%	0%	0%		2%	-
<b>Lights</b>	7	179	35	0		221	83	1	325	0		409	65	243	24	0		332	39	4	6	0		49	-
<b>Lights %</b>	100%	91.8%	100%	0%		93.2%	100%	100%	98.5%	0%		98.8%	86.7%	98.4%	100%	0%		96%	97.5%	100%	100%	0%		98%	-
<b>Single-Unit Trucks</b>	0	1	0	0		1	0	0	3	0		3	7	2	0	0		9	1	0	0	0		1	-
<b>Single-Unit Trucks %</b>	0%	0.5%	0%	0%		0.4%	0%	0%	0.9%	0%		0.7%	9.3%	0.8%	0%	0%		2.6%	2.5%	0%	0%	0%		2%	-
<b>Buses</b>	0	0	0	0		0	0	0	2	0		2	0	0	0	0		0	0	0	0	0		0	-
<b>Buses %</b>	0%	0%	0%	0%		0%	0%	0%	0.6%	0%		0.5%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
<b>Articulated Trucks</b>	0	15	0	0		15	0	0	0	0		0	3	2	0	0		5	0	0	0	0		0	-
<b>Articulated Trucks %</b>	0%	7.7%	0%	0%		6.3%	0%	0%	0%	0%		0%	4%	0.8%	0%	0%		1.4%	0%	0%	0%	0%		0%	-
<b>Bicycles on Road</b>	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
<b>Bicycles on Road %</b>	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
<b>Pedestrians</b>	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-
<b>Pedestrians%</b>	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-

Peak Hour: 09:00 AM - 10:00 AM Weather: Clear Sky (17.59 °C)



Peak Hour: 04:15 PM - 05:15 PM Weather: Clear Sky (30.07 °C)





**Turning Movement Count (4 . BURNSIDE LINE / WEST ST N & HWY 11 INTERCHANGE (NORTH))**

Start Time	N Approach BURNSIDE LINE						E Approach HWY 11 INTERCHANGE (NORTH)						S Approach WEST ST N				W Approach			Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	UTurn S:S	Peds S:	Approach Total	UTurn W:W	Peds W:	Approach Total		
06:00:00	12	15	0	0	0	27	1	4	0	0	5	24	40	0	0	64	0	0	0	96	
06:15:00	26	18	0	0	0	44	0	11	0	0	11	40	36	0	0	76	0	0	0	131	
06:30:00	16	24	0	0	0	40	2	15	0	0	17	35	49	0	0	84	0	0	0	141	
06:45:00	28	35	0	0	0	63	5	24	0	0	29	28	68	0	0	96	0	0	0	188	556
07:00:00	21	33	0	0	0	54	8	14	0	0	22	38	62	0	0	100	0	0	0	176	636
07:15:00	18	30	0	0	0	48	10	24	0	1	34	39	50	0	0	89	0	0	0	171	676
07:30:00	26	36	0	0	0	62	9	32	0	1	41	33	60	0	0	93	0	0	0	196	731
07:45:00	27	38	0	0	0	65	14	52	0	0	66	40	91	0	0	131	0	0	0	262	805
08:00:00	30	48	0	0	0	78	10	42	0	0	52	54	77	0	0	131	0	0	0	261	890
08:15:00	26	59	0	0	0	85	18	35	0	0	53	46	109	0	0	155	0	0	0	293	1012
08:30:00	25	54	0	0	0	79	10	37	0	2	47	48	85	0	0	133	0	0	0	259	1075
08:45:00	33	70	0	0	0	103	12	51	0	2	63	44	106	0	0	150	0	0	0	316	1129
09:00:00	31	63	0	0	0	94	11	32	0	0	43	30	106	0	0	136	0	0	0	273	1141
09:15:00	34	56	0	0	0	90	14	41	0	0	55	39	149	0	0	188	0	0	0	333	1181
09:30:00	48	70	0	0	0	118	14	27	0	2	41	36	142	0	0	178	0	0	0	337	1259
09:45:00	40	64	0	0	0	104	14	33	0	0	47	44	143	0	0	187	0	0	0	338	1281
***BREAK***																					
15:00:00	65	106	0	0	0	171	6	25	0	0	31	62	151	0	0	213	0	0	0	415	
15:15:00	38	94	0	0	0	132	15	35	0	0	50	55	128	0	0	183	0	0	0	365	
15:30:00	47	91	0	0	0	138	12	35	0	0	47	52	130	0	0	182	0	0	0	367	
15:45:00	32	81	0	0	0	113	16	39	0	2	55	59	136	0	0	195	0	0	0	363	1510
16:00:00	43	89	0	0	0	132	10	28	0	1	38	55	127	0	0	182	0	0	0	352	1447
16:15:00	39	99	0	0	0	138	10	39	0	0	49	58	139	0	0	197	0	0	0	384	1466
16:30:00	44	109	0	0	0	153	12	37	0	0	49	55	138	0	0	193	0	0	0	395	1494
16:45:00	25	97	1	0	0	123	23	41	0	1	64	50	136	0	0	186	0	0	0	373	1504
17:00:00	32	110	0	0	0	142	17	41	0	1	58	70	132	0	0	202	0	0	0	402	1554
17:15:00	36	91	0	0	0	127	17	49	0	0	66	63	145	0	0	208	0	0	0	401	1571
17:30:00	27	78	0	0	0	105	20	39	0	1	59	45	91	0	0	136	0	0	0	300	1476
17:45:00	41	89	0	0	0	130	9	32	0	0	41	37	100	0	0	137	0	0	0	308	1411
18:00:00	21	72	1	0	0	94	6	20	0	0	26	24	87	0	0	111	0	0	0	231	1240
18:15:00	24	72	0	0	0	96	5	36	0	0	41	39	79	0	0	118	0	0	0	255	1094
18:30:00	24	70	0	0	0	94	12	28	0	1	40	36	79	0	0	115	0	0	0	249	1043
18:45:00	22	54	0	0	0	76	10	29	0	0	39	36	93	0	0	129	0	0	0	244	979
<b>Grand Total</b>	<b>1001</b>	<b>2115</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>3118</b>	<b>352</b>	<b>1027</b>	<b>0</b>	<b>15</b>	<b>1379</b>	<b>1414</b>	<b>3264</b>	<b>0</b>	<b>0</b>	<b>4678</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9175</b>	<b>-</b>
<b>Approach%</b>	32.1%	67.8%	0.1%	0%	-	-	25.5%	74.5%	0%	-	-	30.2%	69.8%	0%	-	-	0%	-	-	-	-
<b>Totals %</b>	10.9%	23.1%	0%	0%	-	34%	3.8%	11.2%	0%	-	15%	15.4%	35.6%	0%	-	51%	0%	0%	-	-	-
<b>Heavy</b>	302	50	0	0	-	-	23	19	0	-	-	41	311	0	-	-	0	-	-	-	-
<b>Heavy %</b>	30.2%	2.4%	0%	0%	-	-	6.5%	1.9%	0%	-	-	2.9%	9.5%	0%	-	-	0%	-	-	-	-
<b>Bicycles</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Bicycle %</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





**Peak Hour: 09:00 AM - 10:00 AM Weather: Clear Sky (17.59 °C)**

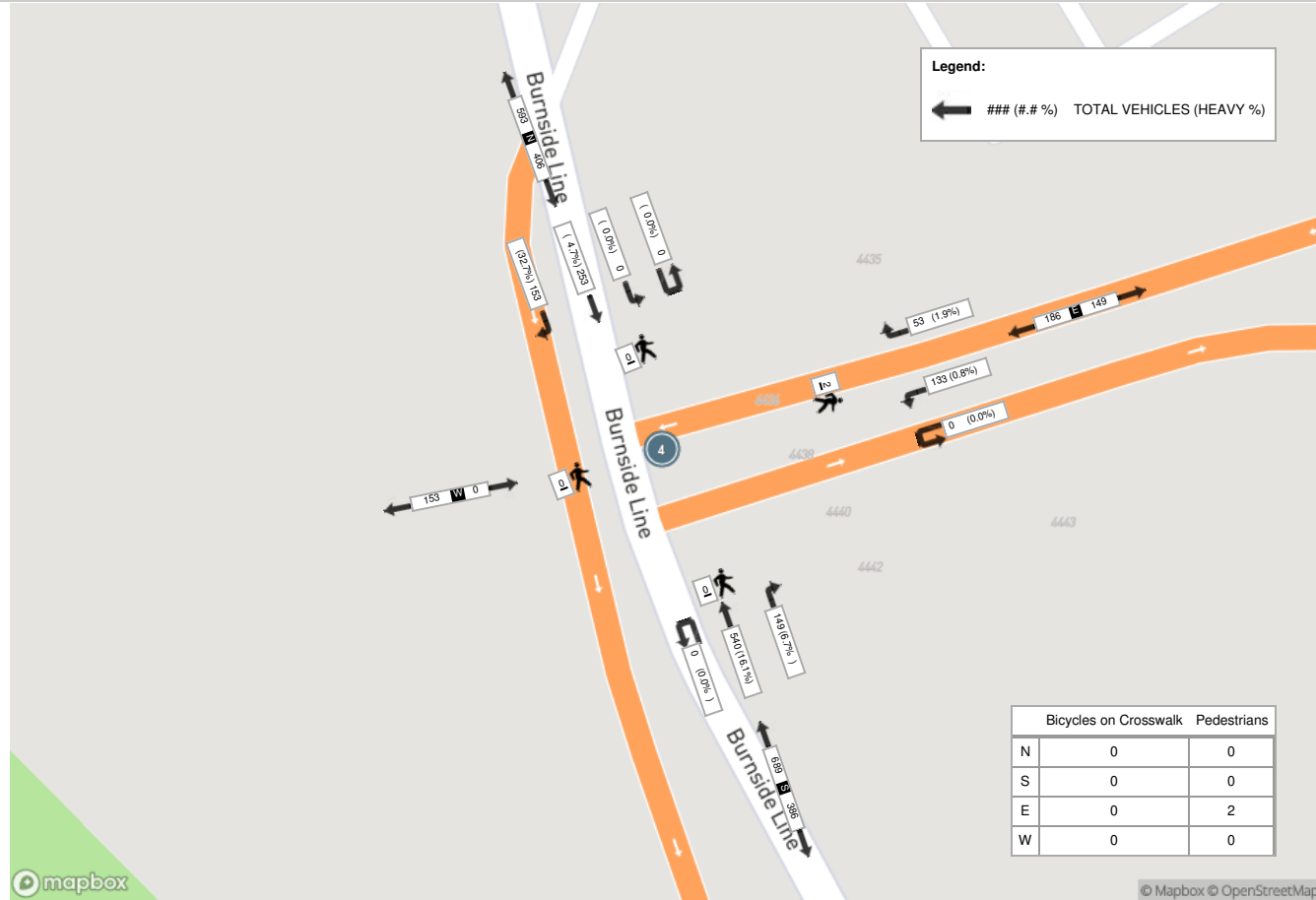
Start Time	N Approach BURNSIDE LINE						E Approach HWY 11 INTERCHANGE (NORTH)					S Approach WEST ST N					W Approach			Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	UTurn	Peds	Approach Total	
09:00:00	31	63	0	0	0	94	11	32	0	0	43	30	106	0	0	136	0	0	0	273
09:15:00	34	56	0	0	0	90	14	41	0	0	55	39	149	0	0	188	0	0	0	333
09:30:00	48	70	0	0	0	118	14	27	0	2	41	36	142	0	0	178	0	0	0	337
09:45:00	40	64	0	0	0	104	14	33	0	0	47	44	143	0	0	187	0	0	0	338
<b>Grand Total</b>	<b>153</b>	<b>253</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>406</b>	<b>53</b>	<b>133</b>	<b>0</b>	<b>2</b>	<b>186</b>	<b>149</b>	<b>540</b>	<b>0</b>	<b>0</b>	<b>689</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1281</b>
<b>Approach%</b>	37.7%	62.3%	0%	0%	-	-	28.5%	71.5%	0%	-	-	21.6%	78.4%	0%	-	-	0%	-	-	-
<b>Totals %</b>	11.9%	19.8%	0%	0%	-	31.7%	4.1%	10.4%	0%	-	14.5%	11.6%	42.2%	0%	-	53.8%	0%	-	0%	-
<b>PHF</b>	0.8	0.9	0	0	-	0.86	0.95	0.81	0	-	0.85	0.85	0.91	0	-	0.92	0	-	0	-
<b>Heavy</b>	50	12	0	0	-	62	1	1	0	-	2	10	87	0	-	97	0	-	0	-
<b>Heavy %</b>	32.7%	4.7%	0%	0%	-	15.3%	1.9%	0.8%	0%	-	1.1%	6.7%	16.1%	0%	-	14.1%	0%	-	0%	-
<b>Lights</b>	103	241	0	0	-	344	52	131	0	-	183	139	453	0	-	592	0	-	0	-
<b>Lights %</b>	67.3%	95.3%	0%	0%	-	84.7%	98.1%	98.5%	0%	-	98.4%	93.3%	83.9%	0%	-	85.9%	0%	-	0%	-
<b>Single-Unit Trucks</b>	16	6	0	0	-	22	1	1	0	-	2	9	27	0	-	36	0	-	0	-
<b>Single-Unit Trucks %</b>	10.5%	2.4%	0%	0%	-	5.4%	1.9%	0.8%	0%	-	1.1%	6%	5%	0%	-	5.2%	0%	-	0%	-
<b>Buses</b>	0	2	0	0	-	2	0	0	0	-	0	0	2	0	-	2	0	-	0	-
<b>Buses %</b>	0%	0.8%	0%	0%	-	0.5%	0%	0%	0%	-	0%	0%	0.4%	0%	-	0.3%	0%	-	0%	-
<b>Articulated Trucks</b>	34	4	0	0	-	38	0	0	0	-	0	1	58	0	-	59	0	-	0	-
<b>Articulated Trucks %</b>	22.2%	1.6%	0%	0%	-	9.4%	0%	0%	0%	-	0%	0.7%	10.7%	0%	-	8.6%	0%	-	0%	-
<b>Bicycles on Road</b>	0	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	0	-	0	-
<b>Bicycles on Road %</b>	0%	0%	0%	0%	-	0%	0%	0.8%	0%	-	0.5%	0%	0%	0%	-	0%	0%	-	0%	-
<b>Pedestrians</b>	-	-	-	-	0	-	-	-	-	2	-	-	-	-	0	-	-	0	-	-
<b>Pedestrians%</b>	-	-	-	-	0%	-	-	-	-	100%	-	-	-	-	0%	-	-	0%	-	-
<b>Bicycles on Crosswalk</b>	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	0	-	-
<b>Bicycles on Crosswalk%</b>	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	0%	-	-



**Peak Hour: 04:30 PM - 05:30 PM Weather: Clear Sky (30.07 °C)**

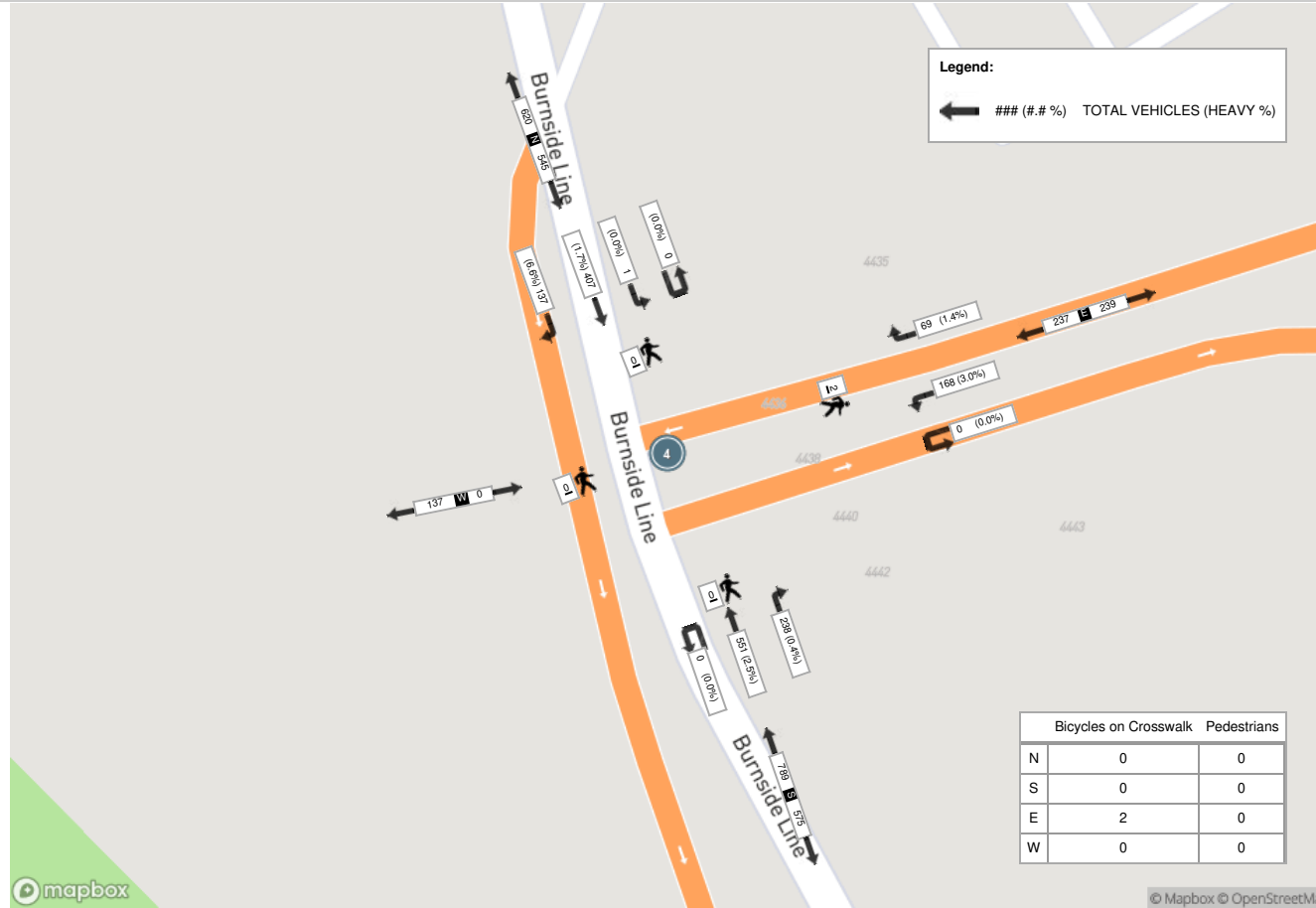
Start Time	N Approach BURNSIDE LINE						E Approach HWY 11 INTERCHANGE (NORTH)					S Approach WEST ST N					W Approach			Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	UTurn	Peds	Approach Total	
16:30:00	44	109	0	0	0	153	12	37	0	0	49	55	138	0	0	193	0	0	0	395
16:45:00	25	97	1	0	0	123	23	41	0	1	64	50	136	0	0	186	0	0	0	373
17:00:00	32	110	0	0	0	142	17	41	0	1	58	70	132	0	0	202	0	0	0	402
17:15:00	36	91	0	0	0	127	17	49	0	0	66	63	145	0	0	208	0	0	0	401
<b>Grand Total</b>	<b>137</b>	<b>407</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>545</b>	<b>69</b>	<b>168</b>	<b>0</b>	<b>2</b>	<b>237</b>	<b>238</b>	<b>551</b>	<b>0</b>	<b>0</b>	<b>789</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1571</b>
<b>Approach%</b>	25.1%	74.7%	0.2%	0%	-	-	29.1%	70.9%	0%	-	-	30.2%	69.8%	0%	-	-	0%	-	-	-
<b>Totals %</b>	8.7%	25.9%	0.1%	0%	-	34.7%	4.4%	10.7%	0%	-	15.1%	15.1%	35.1%	0%	-	50.2%	0%	-	0%	-
<b>PHF</b>	0.78	0.93	0.25	0	-	0.89	0.75	0.86	0	-	0.9	0.85	0.95	0	-	0.95	0	-	0	-
<b>Heavy</b>	9	7	0	0	-	16	1	5	0	-	6	1	14	0	-	15	0	-	0	-
<b>Heavy %</b>	6.6%	1.7%	0%	0%	-	2.9%	1.4%	3%	0%	-	2.5%	0.4%	2.5%	0%	-	1.9%	0%	-	0%	-
<b>Lights</b>	128	400	1	0	-	529	68	163	0	-	231	237	536	0	-	773	0	-	0	-
<b>Lights %</b>	93.4%	98.3%	100%	0%	-	97.1%	98.6%	97%	0%	-	97.5%	99.6%	97.3%	0%	-	98%	0%	-	0%	-
<b>Single-Unit Trucks</b>	2	3	0	0	-	5	0	4	0	-	4	1	8	0	-	9	0	-	0	-
<b>Single-Unit Trucks %</b>	1.5%	0.7%	0%	0%	-	0.9%	0%	2.4%	0%	-	1.7%	0.4%	1.5%	0%	-	1.1%	0%	-	0%	-
<b>Buses</b>	0	3	0	0	-	3	0	0	0	-	0	0	4	0	-	4	0	-	0	-
<b>Buses %</b>	0%	0.7%	0%	0%	-	0.6%	0%	0%	0%	-	0%	0%	0.7%	0%	-	0.5%	0%	-	0%	-
<b>Articulated Trucks</b>	7	1	0	0	-	8	1	1	0	-	2	0	2	0	-	2	0	-	0	-
<b>Articulated Trucks %</b>	5.1%	0.2%	0%	0%	-	1.5%	1.4%	0.6%	0%	-	0.8%	0%	0.4%	0%	-	0.3%	0%	-	0%	-
<b>Bicycles on Road</b>	0	0	0	0	-	0	0	0	0	-	0	0	1	0	-	1	0	-	0	-
<b>Bicycles on Road %</b>	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0.2%	0%	-	0.1%	0%	-	0%	-
<b>Pedestrians</b>	-	-	-	-	0	-	-	-	0	-	-	-	-	0	-	-	-	0	-	-
<b>Pedestrians%</b>	-	-	-	-	0%	-	-	-	0%	-	-	-	-	0%	-	-	-	0%	-	-
<b>Bicycles on Crosswalk</b>	-	-	-	-	0	-	-	-	2	-	-	-	-	0	-	-	-	0	-	-
<b>Bicycles on Crosswalk%</b>	-	-	-	-	0%	-	-	-	100%	-	-	-	-	0%	-	-	-	0%	-	-

Peak Hour: 09:00 AM - 10:00 AM Weather: Clear Sky (17.59 °C)



© Mapbox © OpenStreetMap

Peak Hour: 04:30 PM - 05:30 PM Weather: Clear Sky (30.07 °C)





**Turning Movement Count (5 . BURNSIDE LINE / WEST ST N & HWY 11 INTERCHANGE (SOUTH))**

Start Time	N Approach WEST ST N					S Approach WEST ST N					W Approach HWY 11 SB OFF RAMP					NW Approach HWY 11 NB ON RAMP			Int. Total (15 min)	Int. Total (1 hr)
	Hard Right N:NW	Thru N:S	UTurn N:N	Peds N:	Approach Total	Thru S:N	Bear Left S:NW	UTurn S:S	Peds S:	Approach Total	Right W:S	Left W:N	UTurn W:W	Peds W:	Approach Total	UTurn NW:NW	Peds NW:	Approach Total		
06:00:00	2	17	0	0	19	41	4	0	0	45	4	23	0	0	27	0	0	0	91	
06:15:00	3	26	0	0	29	57	15	0	0	72	15	22	0	0	37	0	0	0	138	
06:30:00	5	34	0	0	39	65	11	0	0	76	16	17	0	0	33	0	0	0	148	
06:45:00	9	52	0	0	61	67	16	0	0	83	22	33	0	0	55	0	0	0	199	576
07:00:00	9	36	0	0	45	70	20	0	0	90	15	28	0	0	43	0	0	0	178	663
07:15:00	16	39	0	0	55	70	34	0	0	104	19	20	0	0	39	0	0	0	198	723
07:30:00	4	65	0	0	69	72	24	0	0	96	20	22	0	0	42	0	0	0	207	782
07:45:00	6	80	0	0	86	95	17	0	0	112	26	35	0	0	61	0	0	0	259	842
08:00:00	4	86	0	0	90	103	29	0	0	132	23	39	0	0	62	0	0	0	284	948
08:15:00	3	90	0	0	93	102	26	0	0	128	26	45	0	0	71	0	0	0	292	1042
08:30:00	12	80	0	0	92	100	26	0	0	126	22	34	0	0	56	0	0	0	274	1109
08:45:00	12	107	0	0	119	111	27	0	0	138	35	37	0	0	72	0	0	0	329	1179
09:00:00	12	84	0	0	96	97	23	0	0	120	29	40	0	0	69	0	0	0	285	1180
09:15:00	9	87	0	0	96	128	23	0	0	151	26	58	0	0	84	0	0	0	331	1219
09:30:00	7	87	0	0	94	109	17	0	0	126	24	69	0	0	93	0	0	0	313	1258
09:45:00	6	94	0	0	100	127	23	0	0	150	25	58	0	0	83	0	2	0	333	1262
***BREAK***																				
15:00:00	29	103	0	0	132	175	36	0	0	211	29	45	0	0	74	0	0	0	417	
15:15:00	18	106	0	0	124	143	27	0	0	170	28	42	0	0	70	0	0	0	364	
15:30:00	22	110	0	0	132	138	43	0	0	181	34	37	0	0	71	0	0	0	384	
15:45:00	20	101	0	0	121	153	40	0	0	193	36	43	0	0	79	0	0	0	393	1558
16:00:00	21	96	0	0	117	143	38	0	0	181	40	40	0	0	80	0	0	0	378	1519
16:15:00	22	113	0	0	135	151	36	0	0	187	33	44	0	0	77	0	0	0	399	1554
16:30:00	28	113	0	0	141	150	45	0	0	195	36	45	0	0	81	0	0	0	417	1587
16:45:00	26	117	0	0	143	154	35	0	0	189	36	35	0	0	71	0	0	0	403	1597
17:00:00	22	130	0	0	152	161	65	0	0	226	32	36	0	0	68	0	0	0	446	1665
17:15:00	15	125	0	0	140	168	53	0	0	221	32	38	0	0	70	0	0	0	431	1697
17:30:00	28	87	0	0	115	108	34	0	0	142	27	31	0	0	58	0	0	0	315	1595
17:45:00	15	107	0	0	122	109	34	0	0	143	18	28	0	0	46	0	0	0	311	1503
18:00:00	18	74	0	0	92	86	39	0	0	125	21	23	0	0	44	0	0	0	261	1318
18:15:00	16	86	0	0	102	91	29	0	0	120	25	27	0	0	52	0	0	0	274	1161
18:30:00	15	85	0	0	100	95	28	0	0	123	25	21	0	0	46	0	0	0	269	1115
18:45:00	18	67	0	0	85	101	17	0	0	118	23	26	0	0	49	0	0	0	252	1056
<b>Grand Total</b>	<b>452</b>	<b>2684</b>	<b>0</b>	<b>0</b>	<b>3136</b>	<b>3540</b>	<b>934</b>	<b>0</b>	<b>0</b>	<b>4474</b>	<b>822</b>	<b>1141</b>	<b>0</b>	<b>0</b>	<b>1963</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>9573</b>	<b>-</b>
<b>Approach%</b>	14.4%	85.6%	0%		-	79.1%	20.9%	0%		-	41.9%	58.1%	0%		-	0%		-	-	-
<b>Totals %</b>	4.7%	28%	0%		32.8%	37%	9.8%	0%		46.7%	8.6%	11.9%	0%		20.5%	0%		0%	-	-



Turning Movement Count  
Location Name: BURNSIDE LINE / WEST ST N & HWY 11 INTERCHANGE (SOUTH)  
Date: Thu, Aug 01, 2024 Deployment Lead:

Crozier & Associates  
SUITE 200 1 FIRST STREET  
COLLINGWOOD ONTARIO, L9Y 1A1  
CANADA

Heavy	18	49	0	-	89	14	0	-	28	265	0	-	0	-	-	-
Heavy %	4%	1.8%	0%	-	2.5%	1.5%	0%	-	3.4%	23.2%	0%	-	0%	-	-	-
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



**Peak Hour: 09:00 AM - 10:00 AM Weather: Clear Sky (17.59 °C)**

Start Time	N Approach WEST ST N					S Approach WEST ST N					W Approach HWY 11 SB OFF RAMP					NW Approach HWY 11 NB ON RAMP			Int. Total (15 min)
	Hard Right	Thru	UTurn	Peds	Approach Total	Thru	Bear Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	UTurn	Peds	Approach Total	
09:00:00	12	84	0	0	96	97	23	0	0	120	29	40	0	0	69	0	0	0	285
09:15:00	9	87	0	0	96	128	23	0	0	151	26	58	0	0	84	0	0	0	331
09:30:00	7	87	0	0	94	109	17	0	0	126	24	69	0	0	93	0	0	0	313
09:45:00	6	94	0	0	100	127	23	0	0	150	25	58	0	0	83	0	2	0	333
<b>Grand Total</b>	<b>34</b>	<b>352</b>	<b>0</b>	<b>0</b>	<b>386</b>	<b>461</b>	<b>86</b>	<b>0</b>	<b>0</b>	<b>547</b>	<b>104</b>	<b>225</b>	<b>0</b>	<b>0</b>	<b>329</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>1262</b>
<b>Approach%</b>	8.8%	91.2%	0%	-	-	84.3%	15.7%	0%	-	-	31.6%	68.4%	0%	-	-	0%	-	-	-
<b>Totals %</b>	2.7%	27.9%	0%	30.6%	36.5%	6.8%	0%	43.3%	8.2%	17.8%	0%	26.1%	0%	0%	0%	-	-	-	-
<b>PHF</b>	0.71	0.94	0	0.97	0.9	0.93	0	0.91	0.9	0.82	0	0.88	0	0	0	-	-	-	-
<b>Heavy</b>	4	9	0	13	17	1	0	18	6	81	0	87	0	0	0	-	-	-	-
<b>Heavy %</b>	11.8%	2.6%	0%	3.4%	3.7%	1.2%	0%	3.3%	5.8%	36%	0%	26.4%	0%	0%	0%	-	-	-	-
<b>Lights</b>	30	342	0	372	444	85	0	529	98	144	0	242	0	0	0	-	-	-	-
<b>Lights %</b>	88.2%	97.2%	0%	96.4%	96.3%	98.8%	0%	96.7%	94.2%	64%	0%	73.6%	0%	0%	0%	-	-	-	-
<b>Single-Unit Trucks</b>	0	7	0	7	13	1	0	14	5	22	0	27	0	0	0	-	-	-	-
<b>Single-Unit Trucks %</b>	0%	2%	0%	1.8%	2.8%	1.2%	0%	2.6%	4.8%	9.8%	0%	8.2%	0%	0%	0%	-	-	-	-
<b>Buses</b>	0	2	0	2	2	0	0	2	0	0	0	0	0	0	0	-	-	-	-
<b>Buses %</b>	0%	0.6%	0%	0.5%	0.4%	0%	0%	0.4%	0%	0%	0%	0%	0%	0%	0%	-	-	-	-
<b>Articulated Trucks</b>	4	0	0	4	2	0	0	2	1	59	0	60	0	0	0	-	-	-	-
<b>Articulated Trucks %</b>	11.8%	0%	0%	1%	0.4%	0%	0%	0.4%	1%	26.2%	0%	18.2%	0%	0%	0%	-	-	-	-
<b>Bicycles on Road</b>	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-
<b>Bicycles on Road %</b>	0%	0.3%	0%	0.3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	-	-	-
<b>Pedestrians</b>	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-	2	-	-
<b>Pedestrians%</b>	-	-	-	0%	-	-	-	0%	-	-	-	0%	-	-	-	-	100%	-	-

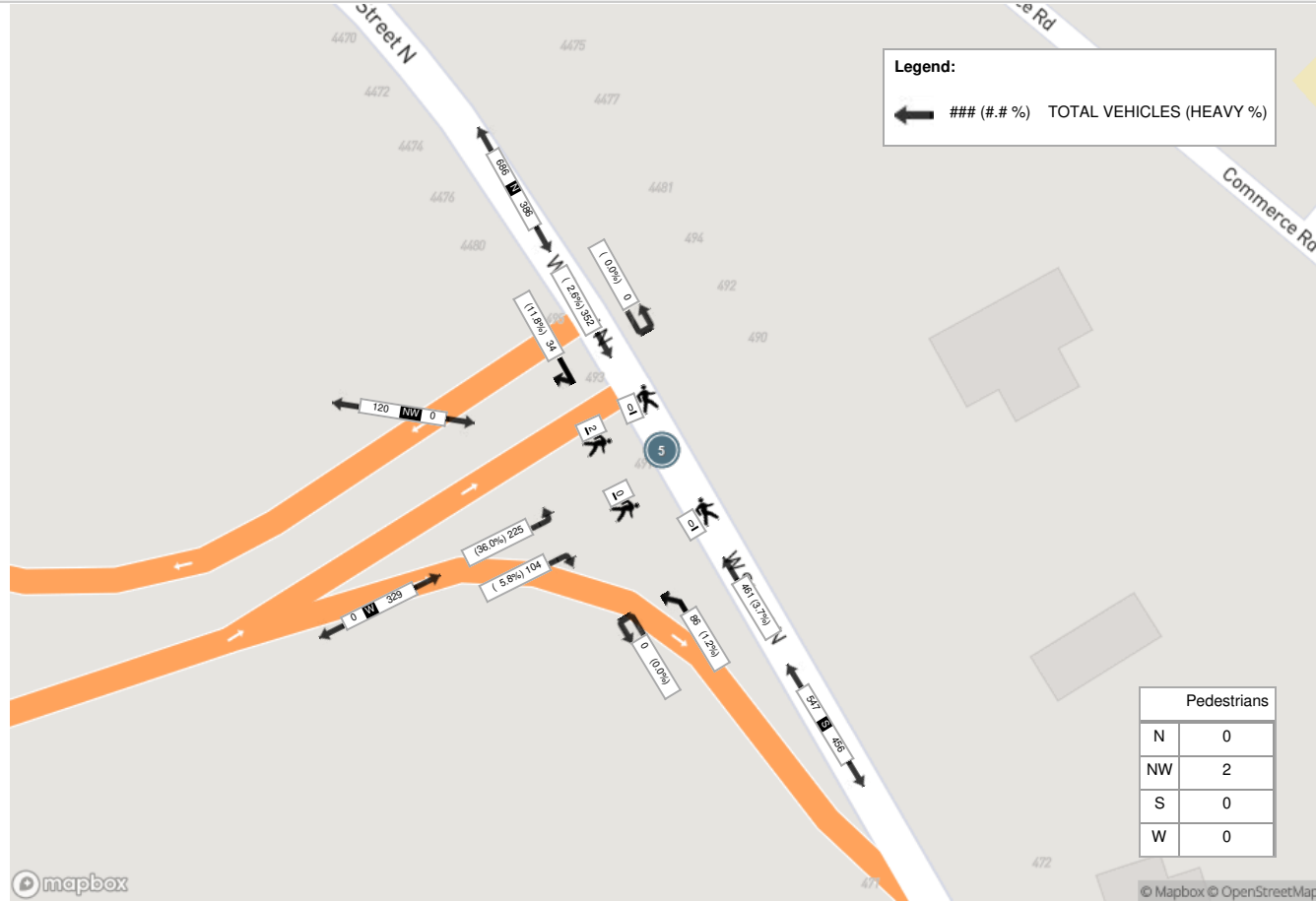




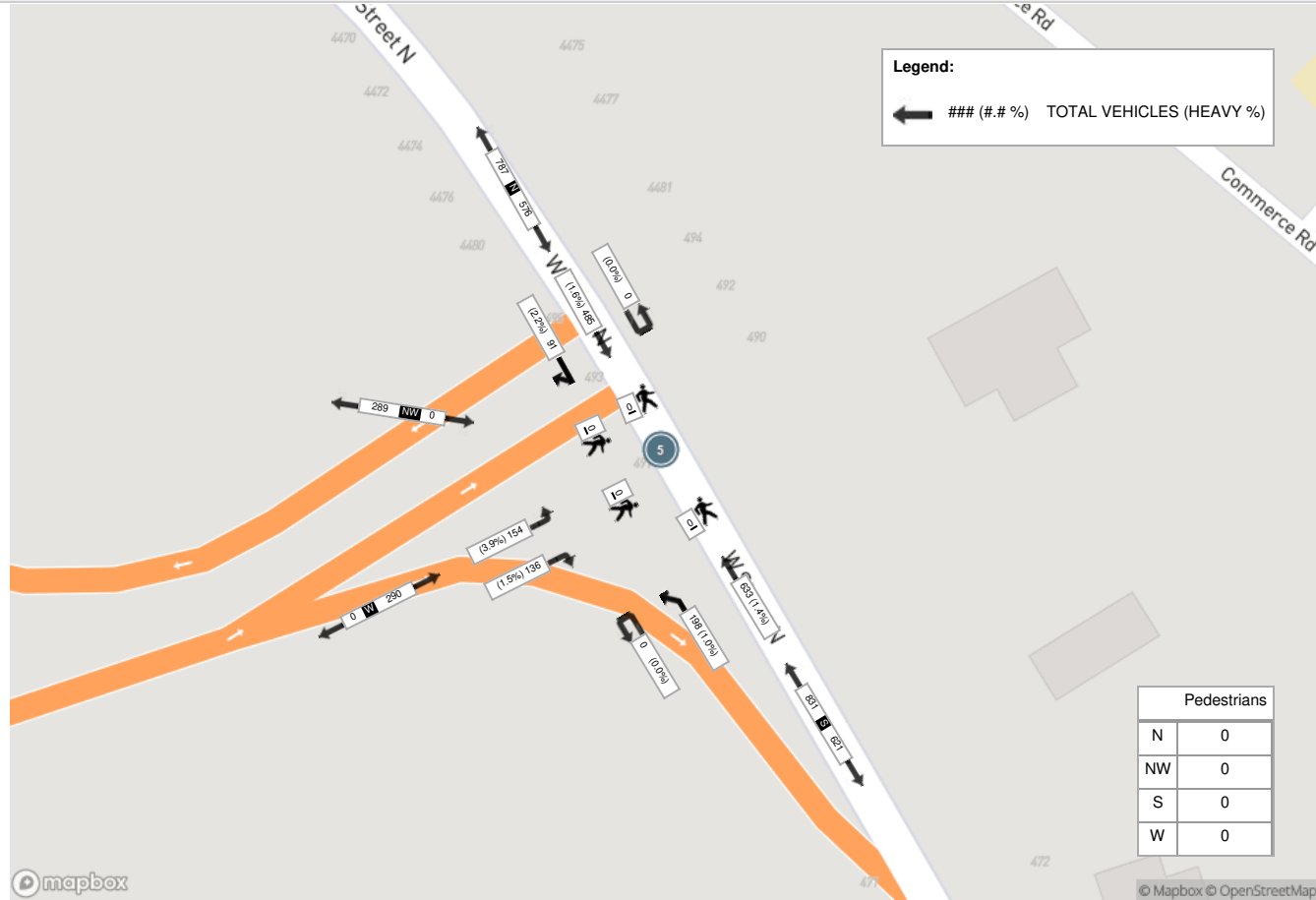
**Peak Hour: 04:30 PM - 05:30 PM Weather: Clear Sky (30.07 °C)**

Start Time	N Approach WEST ST N					S Approach WEST ST N					W Approach HWY 11 SB OFF RAMP					NW Approach HWY 11 NB ON RAMP			Int. Total (15 min)
	Hard Right	Thru	UTurn	Peds	Approach Total	Thru	Bear Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	UTurn	Peds	Approach Total	
16:30:00	28	113	0	0	141	150	45	0	0	195	36	45	0	0	81	0	0	0	417
16:45:00	26	117	0	0	143	154	35	0	0	189	36	35	0	0	71	0	0	0	403
17:00:00	22	130	0	0	152	161	65	0	0	226	32	36	0	0	68	0	0	0	446
17:15:00	15	125	0	0	140	168	53	0	0	221	32	38	0	0	70	0	0	0	431
<b>Grand Total</b>	<b>91</b>	<b>485</b>	<b>0</b>	<b>0</b>	<b>576</b>	<b>633</b>	<b>198</b>	<b>0</b>	<b>0</b>	<b>831</b>	<b>136</b>	<b>154</b>	<b>0</b>	<b>0</b>	<b>290</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1697</b>
<b>Approach%</b>	15.8%	84.2%	0%	-	-	76.2%	23.8%	0%	-	-	46.9%	53.1%	0%	-	-	0%	-	-	-
<b>Totals %</b>	5.4%	28.6%	0%	33.9%	37.3%	11.7%	0%	49%	8%	9.1%	0%	17.1%	0%	0%	0%	0%	0%	-	
<b>PHF</b>	0.81	0.93	0	0.95	0.94	0.76	0	0.92	0.94	0.86	0	0.9	0	0	0	0	0	-	
<b>Heavy</b>	2	8	0	10	9	2	0	11	2	6	0	8	0	0	0	0	0	-	
<b>Heavy %</b>	2.2%	1.6%	0%	1.7%	1.4%	1%	0%	1.3%	1.5%	3.9%	0%	2.8%	0%	0%	0%	0%	0%	-	
<b>Lights</b>	89	477	0	566	624	196	0	820	134	148	0	282	0	0	0	0	0	-	
<b>Lights %</b>	97.8%	98.4%	0%	98.3%	98.6%	99%	0%	98.7%	98.5%	96.1%	0%	97.2%	0%	0%	0%	0%	0%	-	
<b>Single-Unit Trucks</b>	2	3	0	5	5	2	0	7	2	4	0	6	0	0	0	0	0	-	
<b>Single-Unit Trucks %</b>	2.2%	0.6%	0%	0.9%	0.8%	1%	0%	0.8%	1.5%	2.6%	0%	2.1%	0%	0%	0%	0%	0%	-	
<b>Buses</b>	0	3	0	3	4	0	0	4	0	0	0	0	0	0	0	0	0	-	
<b>Buses %</b>	0%	0.6%	0%	0.5%	0.6%	0%	0%	0.5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	
<b>Articulated Trucks</b>	0	2	0	2	0	0	0	0	0	2	0	2	0	0	0	0	0	-	
<b>Articulated Trucks %</b>	0%	0.4%	0%	0.3%	0%	0%	0%	0%	0%	1.3%	0%	0.7%	0%	0%	0%	0%	0%	-	
<b>Bicycles on Road</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
<b>Bicycles on Road %</b>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	
<b>Pedestrians</b>	-	-	-	0	-	-	-	0	-	-	-	0	-	-	0	-	0	-	
<b>Pedestrians%</b>	-	-	-	0%	-	-	-	0%	-	-	-	0%	-	-	0%	-	0%	-	

Peak Hour: 09:00 AM - 10:00 AM Weather: Clear Sky (17.59 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Clear Sky (30.07 °C)





Turning Movement Count (6 . DIVISION RD W & UTHHOFF LINE)

Start Time	N Approach UTHHOFF LINE						E Approach DIVISION RD W						S Approach UTHHOFF LINE						W Approach DIVISION RD W						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total			
06:00:00	0	2	0	0	0	2	0	2	1	0	0	3	2	1	0	0	0	3	0	18	1	0	0	19	27		
06:15:00	0	0	2	0	0	2	1	9	1	0	0	11	1	1	0	0	0	2	0	22	0	0	0	22	37		
06:30:00	0	3	1	0	0	4	0	11	2	0	0	13	1	4	1	0	0	6	4	35	0	0	0	39	62		
06:45:00	0	1	3	0	0	4	1	7	3	0	0	11	1	0	1	0	0	2	1	38	0	0	0	39	56	182	
07:00:00	0	2	1	0	0	3	2	15	1	0	0	18	2	2	2	0	0	6	0	23	1	0	0	24	51	206	
07:15:00	1	4	3	0	0	8	1	19	1	0	0	21	2	2	1	0	0	5	1	26	0	0	0	27	61	230	
07:30:00	0	3	2	0	0	5	2	14	3	0	0	19	1	1	0	0	0	2	3	35	0	0	0	38	64	232	
07:45:00	0	0	3	0	0	3	0	21	0	0	0	21	4	4	0	0	0	8	1	41	0	0	0	42	74	250	
08:00:00	0	2	3	0	0	5	2	23	2	0	0	27	6	1	0	0	0	7	0	31	0	0	0	31	70	269	
08:15:00	0	4	2	0	0	6	0	21	1	0	0	22	8	0	0	0	0	8	1	35	0	0	0	36	72	280	
08:30:00	0	2	0	0	0	2	0	23	7	0	0	30	5	0	0	0	0	5	1	27	0	0	0	28	65	281	
08:45:00	0	1	3	0	0	4	2	34	7	0	0	43	3	2	0	0	0	5	1	31	0	1	0	33	85	292	
09:00:00	1	2	1	0	0	4	0	27	9	0	0	36	9	0	2	0	0	11	2	28	0	0	0	30	81	303	
09:15:00	0	3	1	0	0	4	1	27	7	0	0	35	11	1	0	0	0	12	1	36	0	0	0	37	88	319	
09:30:00	0	3	0	0	0	3	0	21	6	0	0	27	8	1	1	0	0	10	2	41	0	0	0	43	83	337	
09:45:00	0	4	0	0	0	4	1	24	7	0	0	32	8	2	2	0	0	12	3	30	0	0	0	33	81	333	
***BREAK***																											
15:00:00	0	2	0	0	0	2	2	46	9	0	0	57	18	4	4	0	0	26	1	44	0	0	0	45	130		
15:15:00	1	3	1	0	0	5	0	32	4	0	0	36	14	4	2	0	0	20	2	44	0	0	0	46	107		
15:30:00	0	3	3	0	0	6	0	51	8	0	0	59	17	4	1	0	0	22	4	48	0	0	0	52	139		
15:45:00	0	5	1	0	0	6	3	44	8	0	0	55	22	6	2	0	0	30	3	28	0	0	0	31	122	498	
16:00:00	0	2	2	0	0	4	3	56	3	0	0	62	20	4	4	0	0	28	2	49	0	0	0	51	145	513	
16:15:00	1	0	1	0	0	2	1	60	8	0	0	69	11	5	2	0	0	18	4	47	2	0	0	53	142	548	
16:30:00	0	1	1	0	0	2	8	65	9	0	0	82	11	4	4	0	0	19	2	57	0	0	0	59	162	571	
16:45:00	0	2	0	0	0	2	3	53	7	0	0	63	17	6	5	0	0	28	4	43	0	0	0	47	140	589	
17:00:00	0	2	3	0	0	5	1	68	8	0	0	77	23	2	7	0	0	32	1	47	1	0	0	49	163	607	
17:15:00	0	4	1	0	0	5	1	56	5	0	0	62	18	4	0	0	0	22	1	39	0	0	0	40	129	594	
17:30:00	0	1	0	0	0	1	1	51	7	0	0	59	16	4	5	0	0	25	2	44	1	0	0	47	132	564	
17:45:00	0	3	0	0	0	3	3	37	6	0	0	46	10	5	2	0	0	17	1	37	0	0	0	38	104	528	
18:00:00	0	4	1	0	0	5	2	35	10	0	0	47	11	3	0	0	0	14	4	20	0	0	0	24	90	455	
18:15:00	0	3	3	0	0	6	0	33	10	0	0	43	11	1	2	0	0	14	2	36	0	0	0	38	101	427	
18:30:00	0	1	1	0	0	2	0	25	6	1	0	32	12	1	3	0	0	16	2	20	0	0	0	22	72	367	
18:45:00	0	3	1	0	0	4	1	38	4	0	0	43	6	5	2	0	0	13	2	21	0	0	0	23	83	346	
<b>Grand Total</b>	<b>4</b>	<b>75</b>	<b>44</b>	<b>0</b>	<b>0</b>	<b>123</b>	<b>42</b>	<b>1048</b>	<b>170</b>	<b>1</b>	<b>0</b>	<b>1261</b>	<b>309</b>	<b>84</b>	<b>55</b>	<b>0</b>	<b>0</b>	<b>448</b>	<b>58</b>	<b>1121</b>	<b>6</b>	<b>1</b>	<b>0</b>	<b>1186</b>	<b>3018</b>	<b>-</b>	
<b>Approach%</b>	3.3%	61%	35.8%	0%	-	-	3.3%	83.1%	13.5%	0.1%	-	-	69%	18.8%	12.3%	0%	-	4.9%	94.5%	0.5%	0.1%	-	-	-	-	-	
<b>Totals %</b>	0.1%	2.5%	1.5%	0%	4.1%	4.1%	1.4%	34.7%	5.6%	0%	41.8%	10.2%	2.8%	1.8%	0%	14.8%	14.8%	1.9%	37.1%	0.2%	0%	39.3%	-	-	-	-	
<b>Heavy</b>	0	7	1	0	-	-	0	13	0	0	-	-	2	4	0	0	-	0	18	0	0	-	-	-	-	-	
<b>Heavy %</b>	0%	9.3%	2.3%	0%	-	-	0%	1.2%	0%	0%	-	-	0.6%	4.8%	0%	0%	-	0%	1.6%	0%	0%	-	-	-	-	-	
<b>Bicycles</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Bicycle %</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 08:45 AM - 09:45 AM Weather: Clear Sky (17.59 °C)

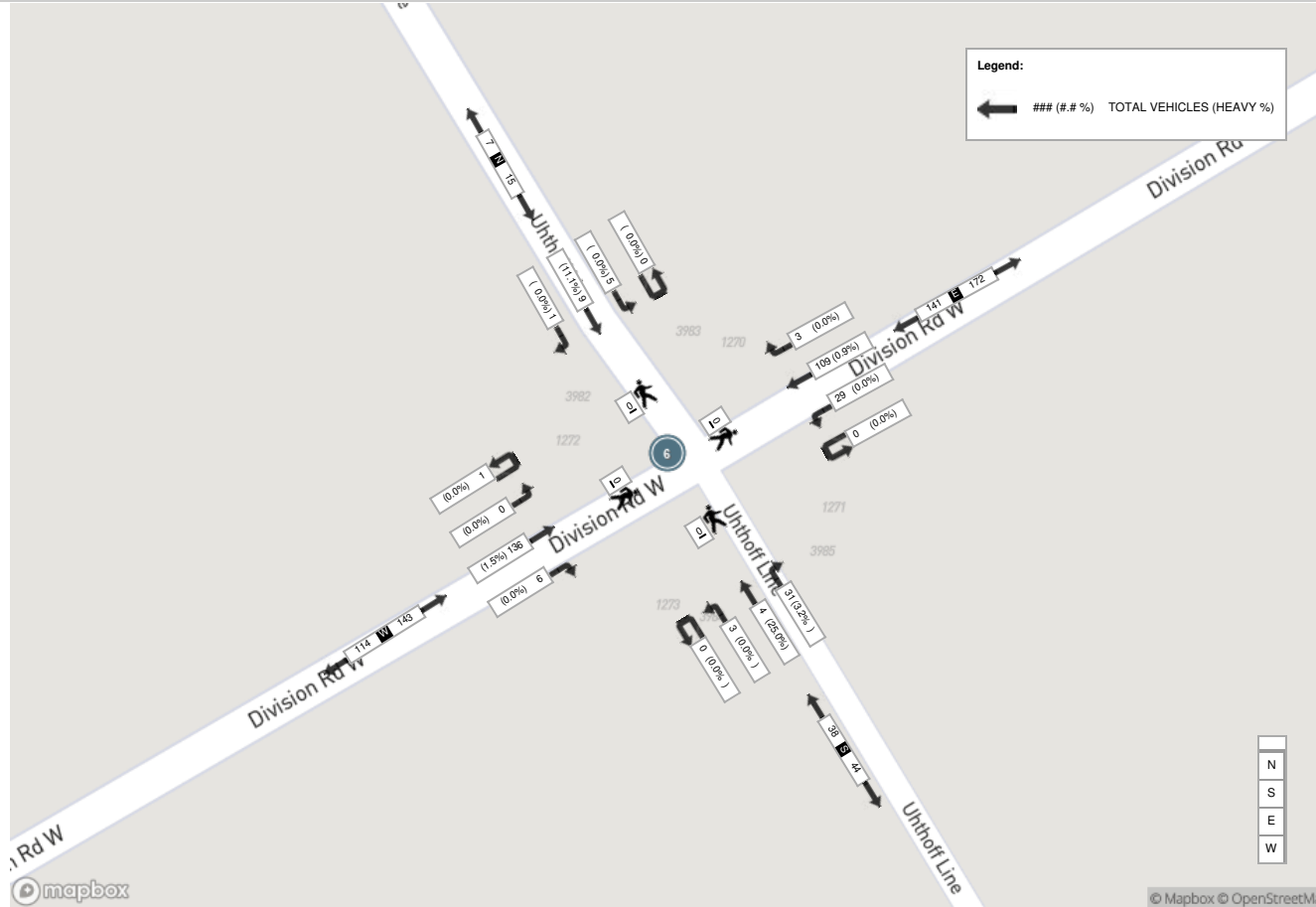
Start Time	N Approach UHTHOFF LINE						E Approach DIVISION RD W						S Approach UHTHOFF LINE						W Approach DIVISION RD W						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:45:00	0	1	3	0	0	4	2	34	7	0	0	43	3	2	0	0	0	5	1	31	0	1	0	33	85
09:00:00	1	2	1	0	0	4	0	27	9	0	0	36	9	0	2	0	0	11	2	28	0	0	0	30	81
09:15:00	0	3	1	0	0	4	1	27	7	0	0	35	11	1	0	0	0	12	1	36	0	0	0	37	88
09:30:00	0	3	0	0	0	3	0	21	6	0	0	27	8	1	1	0	0	10	2	41	0	0	0	43	83
<b>Grand Total</b>	<b>1</b>	<b>9</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>3</b>	<b>109</b>	<b>29</b>	<b>0</b>	<b>0</b>	<b>141</b>	<b>31</b>	<b>4</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>38</b>	<b>6</b>	<b>136</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>143</b>	<b>337</b>
<b>Approach%</b>	6.7%	60%	33.3%	0%		-	2.1%	77.3%	20.6%	0%		-	81.6%	10.5%	7.9%	0%		-	4.2%	95.1%	0%	0.7%		-	-
<b>Totals %</b>	0.3%	2.7%	1.5%	0%		4.5%	0.9%	32.3%	8.6%	0%		41.8%	9.2%	1.2%	0.9%	0%		11.3%	1.8%	40.4%	0%	0.3%		42.4%	-
<b>PHF</b>	0.25	0.75	0.42	0		0.94	0.38	0.8	0.81	0		0.82	0.7	0.5	0.38	0		0.79	0.75	0.83	0	0.25		0.83	-
<b>Heavy</b>	0	1	0	0		1	0	1	0	0		1	1	1	0	0		2	0	2	0	0		2	-
<b>Heavy %</b>	0%	11.1%	0%	0%		6.7%	0%	0.9%	0%	0%		0.7%	3.2%	25%	0%	0%		5.3%	0%	1.5%	0%	0%		1.4%	-
<b>Lights</b>	1	8	5	0		14	2	108	29	0		139	30	3	3	0		36	6	134	0	1		141	-
<b>Lights %</b>	100%	88.9%	100%	0%		93.3%	66.7%	99.1%	100%	0%		98.6%	96.8%	75%	100%	0%		94.7%	100%	98.5%	0%	100%		98.6%	-
<b>Single-Unit Trucks</b>	0	1	0	0		1	0	1	0	0		1	1	1	0	0		2	0	2	0	0		2	-
<b>Single-Unit Trucks %</b>	0%	11.1%	0%	0%		6.7%	0%	0.9%	0%	0%		0.7%	3.2%	25%	0%	0%		5.3%	0%	1.5%	0%	0%		1.4%	-
<b>Buses</b>	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
<b>Buses %</b>	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
<b>Articulated Trucks</b>	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
<b>Articulated Trucks %</b>	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
<b>Bicycles on Road</b>	0	0	0	0		0	1	0	0	0		1	0	0	0	0		0	0	0	0	0		0	-
<b>Bicycles on Road %</b>	0%	0%	0%	0%		0%	33.3%	0%	0%	0%		0.7%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-



**Peak Hour: 04:15 PM - 05:15 PM Weather: Clear Sky (30.07 °C)**

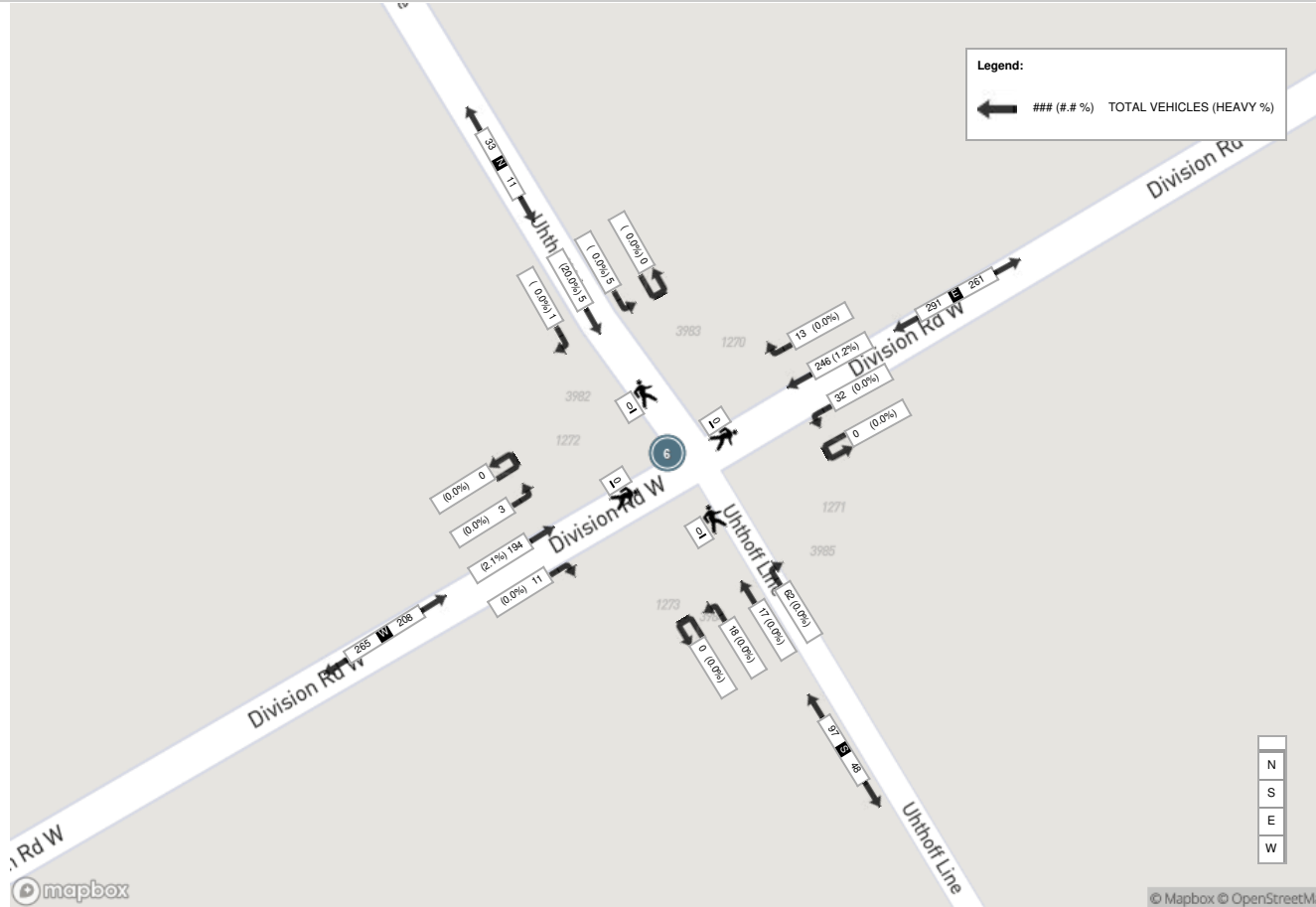
Start Time	N Approach UHTHOFF LINE						E Approach DIVISION RD W						S Approach UHTHOFF LINE						W Approach DIVISION RD W						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:15:00	1	0	1	0	0	2	1	60	8	0	0	69	11	5	2	0	0	18	4	47	2	0	0	53	142
16:30:00	0	1	1	0	0	2	8	65	9	0	0	82	11	4	4	0	0	19	2	57	0	0	0	59	162
16:45:00	0	2	0	0	0	2	3	53	7	0	0	63	17	6	5	0	0	28	4	43	0	0	0	47	140
17:00:00	0	2	3	0	0	5	1	68	8	0	0	77	23	2	7	0	0	32	1	47	1	0	0	49	163
<b>Grand Total</b>	<b>1</b>	<b>5</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>13</b>	<b>246</b>	<b>32</b>	<b>0</b>	<b>0</b>	<b>291</b>	<b>62</b>	<b>17</b>	<b>18</b>	<b>0</b>	<b>0</b>	<b>97</b>	<b>11</b>	<b>194</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>208</b>	<b>607</b>
<b>Approach%</b>	9.1%	45.5%	45.5%	0%		-	4.5%	84.5%	11%	0%		-	63.9%	17.5%	18.6%	0%		-	5.3%	93.3%	1.4%	0%		-	-
<b>Totals %</b>	0.2%	0.8%	0.8%	0%		1.8%	2.1%	40.5%	5.3%	0%		47.9%	10.2%	2.8%	3%	0%		16%	1.8%	32%	0.5%	0%		34.3%	-
<b>PHF</b>	0.25	0.63	0.42	0		0.55	0.41	0.9	0.89	0		0.89	0.67	0.71	0.64	0		0.76	0.69	0.85	0.38	0		0.88	-
<b>Heavy</b>	0	1	0	0		1	0	3	0	0		3	0	0	0	0		0	0	4	0	0		4	-
<b>Heavy %</b>	0%	20%	0%	0%		9.1%	0%	1.2%	0%	0%		1%	0%	0%	0%	0%		0%	0%	2.1%	0%	0%		1.9%	-
<b>Lights</b>	1	4	5	0		10	13	243	31	0		287	62	17	18	0		97	11	190	3	0		204	-
<b>Lights %</b>	100%	80%	100%	0%		90.9%	100%	98.8%	96.9%	0%		98.6%	100%	100%	100%	0%		100%	100%	97.9%	100%	0%		98.1%	-
<b>Single-Unit Trucks</b>	0	1	0	0		1	0	2	0	0		2	0	0	0	0		0	0	3	0	0		3	-
<b>Single-Unit Trucks %</b>	0%	20%	0%	0%		9.1%	0%	0.8%	0%	0%		0.7%	0%	0%	0%	0%		0%	0%	1.5%	0%	0%		1.4%	-
<b>Buses</b>	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	-
<b>Buses %</b>	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
<b>Articulated Trucks</b>	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	-
<b>Articulated Trucks %</b>	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.5%	-
<b>Bicycles on Road</b>	0	0	0	0		0	0	0	1	0		1	0	0	0	0		0	0	0	0	0		0	-
<b>Bicycles on Road %</b>	0%	0%	0%	0%		0%	0%	0%	3.1%	0%		0.3%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-

Peak Hour: 08:45 AM - 09:45 AM Weather: Clear Sky (17.59 °C)





Peak Hour: 04:15 PM - 05:15 PM Weather: Clear Sky (30.07 °C)





Turning Movement Count (7 . DIVISION RD W & BURNSIDE LINE)

Start Time	N Approach BURNSIDE LINE						E Approach DIVISION RD W						S Approach BURNSIDE LINE						W Approach DIVISION RD W						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total			
06:00:00	1	15	1	0	0	17	1	1	1	0	0	3	1	17	2	0	0	20	10	7	1	0	0	18	58		
06:15:00	0	30	0	0	0	30	0	9	1	0	0	10	1	20	2	0	0	23	12	15	0	0	0	27	90		
06:30:00	0	25	0	0	0	25	0	8	2	0	0	10	3	24	4	0	0	31	18	13	4	0	0	35	101		
06:45:00	1	29	1	0	0	31	1	5	2	0	0	8	8	20	5	0	0	33	23	18	1	0	0	42	114	363	
07:00:00	1	28	0	0	1	29	0	6	1	0	0	7	5	15	12	0	0	32	16	9	2	0	0	27	95	400	
07:15:00	1	25	3	0	0	29	1	9	2	0	0	12	5	16	10	0	0	31	13	14	0	0	0	27	99	409	
07:30:00	2	33	0	0	1	35	1	10	4	0	0	15	9	17	9	0	0	35	26	14	1	0	0	41	126	434	
07:45:00	0	36	1	0	0	37	1	14	2	0	0	17	2	24	11	0	0	37	28	13	3	0	0	44	135	455	
08:00:00	1	33	1	0	0	35	0	3	2	0	0	5	5	20	19	0	0	44	25	15	3	0	0	43	127	487	
08:15:00	4	26	0	0	0	30	1	13	3	0	0	17	7	29	7	0	0	43	31	11	3	0	0	45	135	523	
08:30:00	3	29	3	0	0	35	1	13	5	0	0	19	3	25	15	0	0	43	23	11	1	0	0	35	132	529	
08:45:00	2	24	1	0	1	27	0	20	6	0	0	26	3	23	18	0	0	44	20	12	2	0	0	34	131	525	
09:00:00	4	24	1	0	1	29	0	12	4	0	0	16	9	21	20	0	0	50	23	13	3	0	0	39	134	532	
09:15:00	4	26	2	0	0	32	1	12	1	0	0	14	7	32	22	0	0	61	23	20	3	0	0	46	153	550	
09:30:00	1	31	1	0	0	33	0	12	7	0	0	19	5	39	12	0	0	56	30	18	3	0	0	51	159	577	
09:45:00	2	28	0	0	0	30	0	14	4	0	0	18	6	27	18	0	0	51	26	12	2	0	0	40	139	585	
***BREAK***																											
15:00:00	3	42	1	0	0	46	0	16	5	0	0	21	11	29	37	0	0	77	37	29	4	0	0	70	214		
15:15:00	2	19	3	0	0	24	2	10	5	0	0	17	7	23	22	0	0	52	27	29	5	0	0	61	154		
15:30:00	1	21	1	0	0	23	5	23	3	0	0	31	8	29	40	0	0	77	34	28	3	0	0	65	196		
15:45:00	1	15	6	0	0	22	3	13	2	0	0	18	10	20	39	0	0	69	20	31	6	0	0	57	166	730	
16:00:00	2	29	2	0	0	33	2	26	8	0	0	36	8	16	33	0	0	57	23	35	1	0	0	59	185	701	
16:15:00	1	19	1	0	0	21	1	25	4	0	0	30	9	19	45	0	0	73	35	29	2	0	0	66	190	737	
16:30:00	7	20	1	0	0	28	1	25	5	0	0	31	14	24	45	0	0	83	32	33	4	0	0	69	211	752	
16:45:00	5	12	1	0	0	18	0	23	5	0	0	28	18	28	41	0	0	87	25	31	1	0	0	57	190	776	
17:00:00	9	14	1	0	0	24	0	21	4	0	0	25	13	22	44	0	0	79	41	30	3	0	0	74	202	793	
17:15:00	5	10	1	0	0	16	2	22	2	0	0	26	5	26	37	0	0	68	26	29	4	0	0	59	169	772	
17:30:00	2	12	1	0	0	15	1	22	2	0	0	25	7	21	33	0	0	61	28	29	4	0	0	61	162	723	
17:45:00	3	13	0	0	0	16	3	12	5	0	0	20	7	18	30	0	0	55	24	23	5	0	0	52	143	676	
18:00:00	2	9	0	0	0	11	2	16	3	0	0	21	8	13	33	0	0	54	20	9	3	0	0	32	118	592	
18:15:00	2	14	0	0	0	16	2	15	3	0	0	20	1	16	22	0	0	39	20	22	6	0	0	48	123	546	
18:30:00	1	12	0	0	0	13	3	16	4	0	0	23	4	19	18	0	0	41	16	16	3	0	0	35	112	496	
18:45:00	3	4	3	0	0	10	1	13	1	0	0	15	5	26	27	0	0	58	13	14	3	0	0	30	113	466	
<b>Grand Total</b>	<b>76</b>	<b>707</b>	<b>37</b>	<b>0</b>	<b>4</b>	<b>820</b>	<b>36</b>	<b>459</b>	<b>108</b>	<b>0</b>	<b>0</b>	<b>603</b>	<b>214</b>	<b>718</b>	<b>732</b>	<b>0</b>	<b>0</b>	<b>1664</b>	<b>768</b>	<b>632</b>	<b>89</b>	<b>0</b>	<b>0</b>	<b>1489</b>	<b>4576</b>	<b>-</b>	
<b>Approach%</b>	9.3%	86.2%	4.5%	0%	-	-	6%	76.1%	17.9%	0%	-	-	12.9%	43.1%	44%	0%	-	-	51.6%	42.4%	6%	0%	-	-	-	-	-
<b>Totals %</b>	1.7%	15.5%	0.8%	0%	17.9%	0.8%	10%	2.4%	0%	13.2%	4.7%	15.7%	16%	0%	36.4%	16.8%	13.8%	1.9%	0%	32.5%	-	-	-	-	-	-	-
<b>Heavy</b>	0	292	0	0	-	5	9	3	0	-	4	260	4	0	-	8	13	1	0	-	-	-	-	-	-	-	-
<b>Heavy %</b>	0%	41.3%	0%	0%	-	13.9%	2%	2.8%	0%	-	1.9%	36.2%	0.5%	0%	-	1%	2.1%	1.1%	0%	-	-	-	-	-	-	-	-
<b>Bicycles</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Bicycle %</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 09:00 AM - 10:00 AM Weather: Clear Sky (17.59 °C)

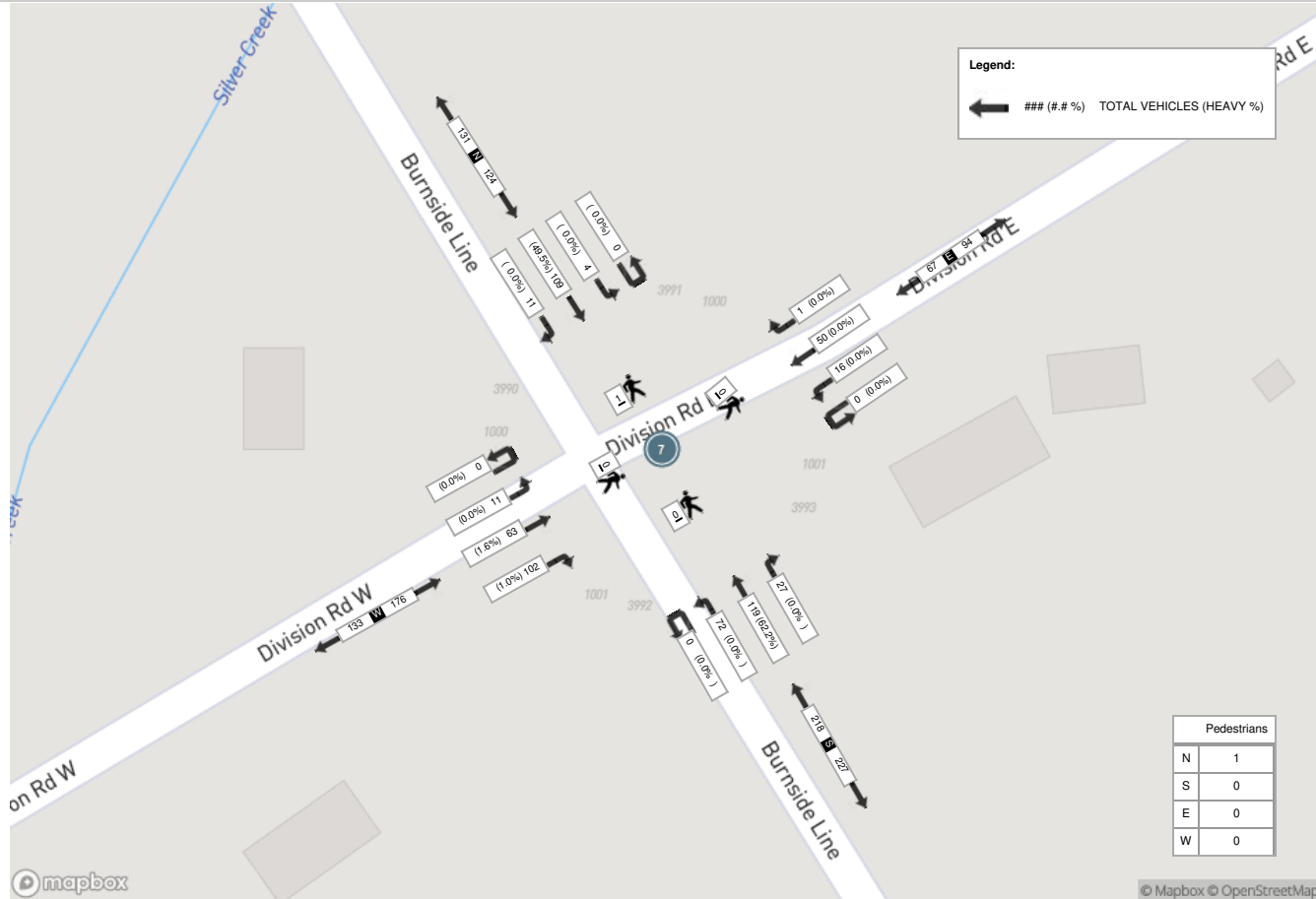
Start Time	N Approach BURNSIDE LINE						E Approach DIVISION RD W						S Approach BURNSIDE LINE						W Approach DIVISION RD W						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
09:00:00	4	24	1	0	1	29	0	12	4	0	0	16	9	21	20	0	0	50	23	13	3	0	0	39	134
09:15:00	4	26	2	0	0	32	1	12	1	0	0	14	7	32	22	0	0	61	23	20	3	0	0	46	153
09:30:00	1	31	1	0	0	33	0	12	7	0	0	19	5	39	12	0	0	56	30	18	3	0	0	51	159
09:45:00	2	28	0	0	0	30	0	14	4	0	0	18	6	27	18	0	0	51	26	12	2	0	0	40	139
<b>Grand Total</b>	<b>11</b>	<b>109</b>	<b>4</b>	<b>0</b>	<b>1</b>	<b>124</b>	<b>1</b>	<b>50</b>	<b>16</b>	<b>0</b>	<b>0</b>	<b>67</b>	<b>27</b>	<b>119</b>	<b>72</b>	<b>0</b>	<b>0</b>	<b>218</b>	<b>102</b>	<b>63</b>	<b>11</b>	<b>0</b>	<b>0</b>	<b>176</b>	<b>585</b>
<b>Approach%</b>	8.9%	87.9%	3.2%	0%	-	-	1.5%	74.6%	23.9%	0%	-	-	12.4%	54.6%	33%	0%	-	-	58%	35.8%	6.3%	0%	-	-	-
<b>Totals %</b>	1.9%	18.6%	0.7%	0%	21.2%	0.2%	8.5%	2.7%	0%	11.5%	4.6%	20.3%	12.3%	0%	37.3%	17.4%	10.8%	1.9%	0%	30.1%	-	-	-	-	-
<b>PHF</b>	0.69	0.88	0.5	0	0.94	0.25	0.89	0.57	0	0.88	0.75	0.76	0.82	0	0.89	0.85	0.79	0.92	0	0.86	-	-	-	-	-
<b>Heavy</b>	0	54	0	0	54	0	0	0	0	0	0	74	0	0	74	1	1	0	0	2	-	-	-	-	-
<b>Heavy %</b>	0%	49.5%	0%	0%	43.5%	0%	0%	0%	0%	0%	0%	62.2%	0%	0%	33.9%	1%	1.6%	0%	0%	1.1%	-	-	-	-	-
<b>Lights</b>	11	55	4	0	70	1	50	16	0	67	27	45	72	0	144	100	62	11	0	173	-	-	-	-	-
<b>Lights %</b>	100%	50.5%	100%	0%	56.5%	100%	100%	100%	0%	100%	100%	37.8%	100%	0%	66.1%	98%	98.4%	100%	0%	98.3%	-	-	-	-	-
<b>Single-Unit Trucks</b>	0	15	0	0	15	0	0	0	0	0	0	20	0	0	20	1	1	0	0	2	-	-	-	-	-
<b>Single-Unit Trucks %</b>	0%	13.8%	0%	0%	12.1%	0%	0%	0%	0%	0%	0%	16.8%	0%	0%	9.2%	1%	1.6%	0%	0%	1.1%	-	-	-	-	-
<b>Buses</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
<b>Buses %</b>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	-	-	-	-
<b>Articulated Trucks</b>	0	39	0	0	39	0	0	0	0	0	0	54	0	0	54	0	0	0	0	0	-	-	-	-	-
<b>Articulated Trucks %</b>	0%	35.8%	0%	0%	31.5%	0%	0%	0%	0%	0%	0%	45.4%	0%	0%	24.8%	0%	0%	0%	0%	0%	-	-	-	-	-
<b>Bicycles on Road</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	-	-	-	-	-
<b>Bicycles on Road %</b>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0.6%	-	-	-	-	-
<b>Pedestrians</b>	-	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-
<b>Pedestrians%</b>	-	-	-	-	100%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-



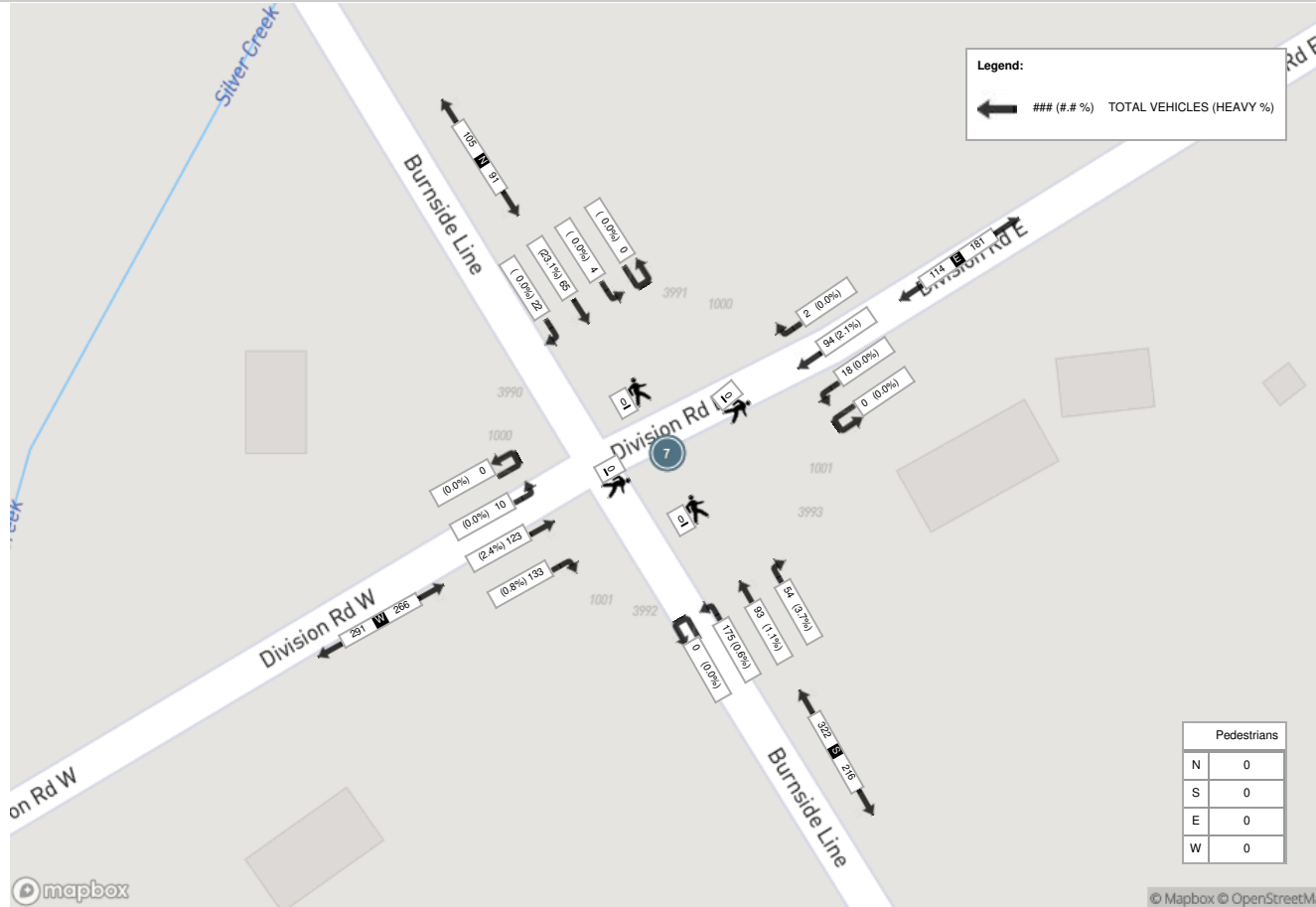
**Peak Hour: 04:15 PM - 05:15 PM Weather: Clear Sky (30.07 °C)**

Start Time	N Approach BURNSIDE LINE						E Approach DIVISION RD W						S Approach BURNSIDE LINE						W Approach DIVISION RD W						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:15:00	1	19	1	0	0	21	1	25	4	0	0	30	9	19	45	0	0	73	35	29	2	0	0	66	190
16:30:00	7	20	1	0	0	28	1	25	5	0	0	31	14	24	45	0	0	83	32	33	4	0	0	69	211
16:45:00	5	12	1	0	0	18	0	23	5	0	0	28	18	28	41	0	0	87	25	31	1	0	0	57	190
17:00:00	9	14	1	0	0	24	0	21	4	0	0	25	13	22	44	0	0	79	41	30	3	0	0	74	202
<b>Grand Total</b>	<b>22</b>	<b>65</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>91</b>	<b>2</b>	<b>94</b>	<b>18</b>	<b>0</b>	<b>0</b>	<b>114</b>	<b>54</b>	<b>93</b>	<b>175</b>	<b>0</b>	<b>0</b>	<b>322</b>	<b>133</b>	<b>123</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>266</b>	<b>793</b>
<b>Approach%</b>	24.2%	71.4%	4.4%	0%	-	-	1.8%	82.5%	15.8%	0%	-	-	16.8%	28.9%	54.3%	0%	-	-	50%	46.2%	3.8%	0%	-	-	-
<b>Totals %</b>	2.8%	8.2%	0.5%	0%	11.5%	0.3%	11.9%	2.3%	0%	14.4%	6.8%	11.7%	22.1%	0%	40.6%	16.8%	15.5%	1.3%	0%	33.5%	-	-	-	-	-
<b>PHF</b>	0.61	0.81	1	0	0.81	0.5	0.94	0.9	0	0.92	0.75	0.83	0.97	0	0.93	0.81	0.93	0.63	0	0.9	-	-	-	-	-
<b>Heavy</b>	0	15	0	0	15	0	2	0	0	2	2	1	1	0	4	1	3	0	0	4	-	-	-	-	-
<b>Heavy %</b>	0%	23.1%	0%	0%	16.5%	0%	2.1%	0%	0%	1.8%	3.7%	1.1%	0.6%	0%	1.2%	0.8%	2.4%	0%	0%	1.5%	-	-	-	-	-
<b>Lights</b>	22	50	4	0	76	2	91	18	0	111	52	92	174	0	318	132	120	10	0	262	-	-	-	-	-
<b>Lights %</b>	100%	76.9%	100%	0%	83.5%	100%	96.8%	100%	0%	97.4%	96.3%	98.9%	99.4%	0%	98.8%	99.2%	97.6%	100%	0%	98.5%	-	-	-	-	-
<b>Single-Unit Trucks</b>	0	1	0	0	1	0	1	0	0	1	1	0	1	0	2	0	2	0	0	2	-	-	-	-	-
<b>Single-Unit Trucks %</b>	0%	1.5%	0%	0%	1.1%	0%	1.1%	0%	0%	0.9%	1.9%	0%	0.6%	0%	0.6%	0%	1.6%	0%	0%	0.8%	-	-	-	-	-
<b>Buses</b>	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	-	-	-	-	-
<b>Buses %</b>	0%	0%	0%	0%	0%	0%	1.1%	0%	0%	0.9%	0%	0%	0%	0%	0%	0%	0.8%	0%	0%	0.4%	-	-	-	-	-
<b>Articulated Trucks</b>	0	14	0	0	14	0	0	0	0	0	1	1	0	0	2	1	0	0	0	1	-	-	-	-	-
<b>Articulated Trucks %</b>	0%	21.5%	0%	0%	15.4%	0%	0%	0%	0%	0%	1.9%	1.1%	0%	0%	0.6%	0.8%	0%	0%	0%	0.4%	-	-	-	-	-
<b>Bicycles on Road</b>	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
<b>Bicycles on Road %</b>	0%	0%	0%	0%	0%	0%	1.1%	0%	0%	0.9%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	-	-	-	-
<b>Pedestrians</b>	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-
<b>Pedestrians%</b>	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-

Peak Hour: 09:00 AM - 10:00 AM Weather: Clear Sky (17.59 °C)



Peak Hour: 04:15 PM - 05:15 PM Weather: Clear Sky (30.07 °C)



# APPENDIX D

## Signal Timing Plans



## 2070 CONTROLLER FIELD SHEETS



ACTUATED

PRE-TIMED       EMERGENCY TIMING

SIGNAL TO BE MAINTAINED BY: \_\_\_\_\_ MTO

SIGNAL TO BE OPERATED BY: \_\_\_\_\_ MTO

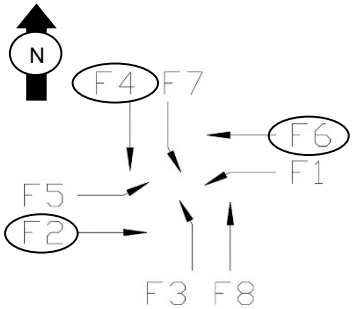
LOCATION: Hwy 11 & Burnside Line N-EW

CONFLICT FLASH: \_\_\_\_\_ F2/F6 AMBER

**GENERIC TIMING IDENTIFIED HERE SHALL BE TRANSCRIBED ONTO "OFFICIAL" TIMING SHEETS FOR THE TRAFFIC SIGNAL CONTROLLER BEING USED AT THIS SIGNALIZED INTERSECTION. A COPY OF THE "OFFICIAL" LOCAL TIMING SHEETS AND COORDINATION SHEETS IF USED, SHALL BE ATTACHED TO THIS FORM AND FILED IN THE MTO REGIONAL TRAFFIC OFFICE.**

**OPERATIONAL NOTES:**

- 1 All Prot/Perm left turn movements shall be followed by parent through movements without exception.
- 2 If serving F2 and F6 the signal must cycle to F4 and/or F8 prior to serving F1 and/or F5.
- 3 If serving F4 and F8, the signal must cycle to F2 and/or F6 prior to serving F3 and/or F7.
- 4 Through Movements shall lag left turn movements unless otherwise specified.



FUNCTION/OPERATION	FAZE							
	F1	F2	F3	F4	F5	F6	F7	F8
PERMITTED MOVEMENTS		X		X		X		
RED LOCK								
AMBER LOCK								
VEHICLE MIN RECALL		X				X		
VEHICLE MAX RECALL								
PEDESTRIAN RECALL	█		█		█		█	
PEDESTRIAN RECYCLE	█		█		█		█	
REST IN WALK	█		█		█		█	
DOUBLE ENTRY		X				X		
MOVEMENTS MUST GAP OUT SIMULTANEOUSLY		X				X		
EXCLUSIVE (SEPERATE) PHASING BY APPORACH	█		█		█		█	
PROT/PERM LEFT TURN ARROW		█		█		█		█
PROT/PERM FAST FLASH ADVANCE GREEN		█		█		█		█
FULLY PROTECTED LEFT TURN		█		█		█		█
OVERLAP A								
OVERLAP B								
DISPLAY AMBER ON STARTUP		X				X		
PLACE VEHICLE CALLS ON STARTUP		X		X		X		
PLACE PED CALLS ON STARTUP						X		
FIRST FAZE				X				

INTERVAL TIMES	FAZE							
	F1	F2	F3	F4	F5	F6	F7	F8
WALK						10		
FLASHING DON'T WALK						43		
MINIMUM GREEN		20		10		20		
VEHICLE EXTENSION (PASSAGE TIME)		3.2		3.0		3.2		
MAXIMUM GREEN (INCLUDES MIN GREEN)		53		17		53		
MAXIMUM GREEN 2 (ALTERNATE MAX GREEN)								
AMBER CLEARANCE		4.5		4.5		4.5		
ALL RED CLEARANCE		2.8		1.6		2.8		
MAX INITIAL GREEN TIME (VARIABLE INIT)								
TIME ADDED/VEHICLE (VARIABLE INIT)								

DETECTOR SETUP	FAZE							
	F1	F2	F3	F4	F5	F6	F7	F8
DELAY				10				
RIGHT TURN LANE DELAY, IF DIFFERENT THAN ABOVE				15				
DL1, EXT								
DL2, EXT + CARRY								

TIME OF DAY OPERATIONS	TIME OF DAY		DAY OF WEEK							FAZE							
	START	END	S	M	T	W	T	F	S	F1	F2	F3	F4	F5	F6	F7	F8
PHASE OMIT																	
RED LOCK																	
AMBER LOCK																	
MIN RECALL																	
MAX RECALL																	
MAX GREEN 2																	
PED RECALL																	
REST IN WALK																	

PRE-EMPTION	DETECTOR					
	D1	D2	D3	D4	D5	D6
	RR	RR	EVA	EVB	EVC	EVD
DWELL FAZE			F2, F6			
EXIT FAZES			F2, F6			
DELAY (SET IN THE FIELD)						
RED CLEARANCE			5.0			
MIN INITIAL			7.0			
WALK			4.0			
FDW			5.0			

ACTUATED TIMING

## 2070 CONTROLLER FIELD SHEETS



ACTUATED

PRE-TIMED        
EMERGENCY TIMING

SIGNAL TO BE MAINTAINED BY: \_\_\_\_\_ MTO

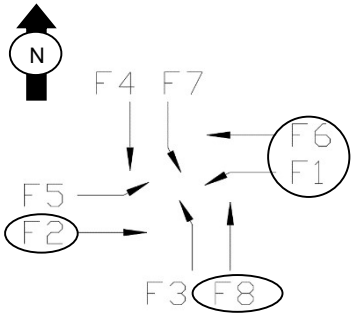
SIGNAL TO BE OPERATED BY: \_\_\_\_\_ MTO

LOCATION: Hwy 11 & West St, S-EW

CONFLICT FLASH: F2/F6 AMBER

**GENERIC TIMING IDENTIFIED HERE SHALL BE TRANSCRIBED ONTO "OFFICIAL" TIMING SHEETS FOR THE TRAFFIC SIGNAL CONTROLLER BEING USED AT THIS SIGNALIZED INTERSECTION. A COPY OF THE "OFFICIAL" LOCAL TIMING SHEETS AND COORDINATION SHEETS IF USED, SHALL BE ATTACHED TO THIS FORM AND FILED IN THE MTO REGIONAL TRAFFIC OFFICE.**

**OPERATIONAL NOTES:**



- 1 All Prot/Perm left turn movements shall be followed by parent through movements without exception.
- 2 If serving F2 and F6 the signal must cycle to F4 and/or F8 prior to serving F1 and/or F5.
- 3 If serving F4 and F8, the signal must cycle to F2 and/or F6 prior to serving F3 and/or F7.
- 4 Through Movements shall lag left turn movements unless otherwise specified.

FUNCTION/OPERATION	FAZE							
	F1	F2	F3	F4	F5	F6	F7	F8
PERMITTED MOVEMENTS	X	X				X		X
RED LOCK								
AMBER LOCK								
VEHICLE MIN RECALL		X				X		
VEHICLE MAX RECALL								
PEDESTRIAN RECALL								
PEDESTRIAN RECYCLE								
REST IN WALK								
DOUBLE ENTRY		X				X		
MOVEMENTS MUST GAP OUT SIMULTANEOUSLY		X				X		
EXCLUSIVE (SEPERATE) PHASING BY APPORACH								
PROT/PERM LEFT TURN ARROW	X							
PROT/PERM FAST FLASH ADVANCE GREEN								
FULLY PROTECTED LEFT TURN								
OVERLAP A								
OVERLAP B								
DISPLAY AMBER ON STARTUP		X				X		
PLACE VEHICLE CALLS ON STARTUP	X	X				X		X
PLACE PED CALLS ON STARTUP								
FIRST FAZE								X

**ACTUATED TIMING**

INTERVAL TIMES	FAZE							
	F1	F2	F3	F4	F5	F6	F7	F8
WALK								
FLASHING DON'T WALK								
MINIMUM GREEN	7	20				20		10
VEHICLE EXTENSION (PASSAGE TIME)	3.0	3.2				3.2		3.0
MAXIMUM GREEN (INCLUDES MIN GREEN)	7	49				49		18
MAXIMUM GREEN 2 (ALTERNATE MAX GREEN)		41				41		26
AMBER CLEARANCE	3.0	4.5				4.5		4.5
ALL RED CLEARANCE		2.6				2.6		1.7
MAX INITIAL GREEN TIME (VARIABLE INIT)								
TIME ADDED/VEHICLE (VARIABLE INIT)								

DETECTOR SETUP	FAZE							
	F1	F2	F3	F4	F5	F6	F7	F8
DELAY	5							10
RIGHT TURN LANE DELAY, IF DIFFERENT THAN ABOVE								15
DL1, EXT								
DL2, EXT + CARRY								

TIME OF DAY OPERATIONS	TIME OF DAY		DAY OF WEEK							FAZE							
	START	END	S	M	T	W	T	F	S	F1	F2	F3	F4	F5	F6	F7	F8
PHASE OMIT																	
RED LOCK																	
AMBER LOCK																	
MIN RECALL																	
MAX RECALL																	
MAX GREEN 2	7:00	10:00	X	X	X	X	X	X	X		X				X		X
PED RECALL																	
REST IN WALK																	

PRE-EMPTION	DETECTOR					
	D1	D2	D3	D4	D5	D6
	RR	RR	EVA	EVB	EVC	EVD
DWELL FAZE			F2, F6			
EXIT FAZES			F2, F6			
DELAY (SET IN THE FIELD)						
RED CLEARANCE			5.0			
MIN INITIAL			7.0			
WALK			4.0			
FDW			5.0			

ACTUATED TIMING

# ACTUATED INTERVAL TIMING AND FAZE FUNCTIONS

		PHASE							
		1	2	3	4	5	6	7	8
0	WALK	-	-	-	-	-	7	-	7
1	DON'T WALK	-	-	-	-	-	19	-	42
2	MIN INITIAL	7	20	7	10	7	20	7	10
3	TYPE 3 LIMIT	-	-	-	-	-	-	-	-
4	ADD PER VEH	-	-	-	-	-	-	-	-
5	VEH EXT	3.0	3.6	3.0	3.0	3.0	3.6	3.0	3.0
6	MAX GAP	3.0	3.6	3.0	3.0	3.0	3.6	3.0	3.0
7	MIN GAP	3.0	3.6	3.0	3.0	3.0	3.6	3.0	3.0
8	MAX LIMIT	16	50	18	29	16	50	26	21
9	MAXIMUM 2	-	-	-	-	-	-	-	-
A	ADV /DLY WALK	-	-	-	-	-	-	-	-
B	SEQUENCE TO	4	-	2	-	8	-	6	-
C	COND SRV MIN	-	-	-	-	-	-	-	-
D	REDUCE EVERY	-	-	-	-	-	-	-	-
E	YELLOW	3.0	5.0	3.0	4.5	3.0	5.0	3.0	4.5
F	RED CLEAR	2.0	2.2	1.0	3.5	2.0	2.2	1.0	3.5

		9	A	B	C	D	E
0							RR1 DLY
1	PHASE 1	-					RR1 CLR
2	PHASE 2	-					EVA DLY
3	PHASE 3	-					EVA CLR
4	PHASE 4	-					EVB DLY
5	PHASE 5	-					EVB CLR
6	PHASE 6	-					EVC DLY
7	PHASE 7	-					EVC CLR
8	PHASE 8	-					EVD DLY
							EVD CLR
							RR2 DLY
							RR2 CLR
							EV CLR
							EV DLY
							RR CLR
							RR DLY

ALL RED START  
( F/1 + C + O ) = **5.0**  
RED REVERT  
( F/1 + O + F ) = **5.0**

MAX ALT ALT ALT ALT  
INT WALK FLH INT EXT  
D/W

### COLUMN F PHASES

		1	2	3	4	5	6	7	8
0	PERMIT	X	X	X	X	X	X	X	X
1	RED LOCK								
2	YELLOW LOCK								
3	VEH MIN CALL		X				X		
4	PED RECALL								
5	PEDESTRIANS								
6	YIELD AT FLSH D/W								
7	RED REST								
8	DOUBLE ENTRY		X		X		X		X
9	VEH MAX CALL								
A	SOFT RECALL								
B	MAXIMUM 2								
C	COND SERVICE								
D	MAN CONT CALL								
E	YELLOW START		X				X		
F	FIRST PHASES			X				X	

< C + O + F = 1 >

Date: Jan 2019

### LOCATION

Hwy: 12 West  
At: Murphy / West Ridge

	A	B	C
PREEMPT	RR1-2	SP	EMER
MINIMUMS	SPEV1	EV2	VEH
A	WLK (DFLT)		4
B	FD WALK		5
C	INITIAL		7

< C + O + F = 1 >

### Column E Phases / Bits

		1	2	3	4	5	6	7	8
0	EXCLUSIVE								
1	RR1 CLEAR								
2	RR2 CLEAR								
3	RR2 LTD SRV								
4	PROT/PERM			X				X	
5	FLH TO PREMT								
6	FLASH ENTRY								
7	DISABL MIN YEL								
8	DISABL OVP YEL								
9	OVP FLH YEL								
A	EM VEH A		X			X			
B	EM VEH B				X				X
C	EM VEH C	X					X		
D	EM VEH D								
E	EXTRA 1	X		X		X			
F	IC SELECT		X						

< C + O + E = 125 >

### Column F Phases / Bits

		1	2	3	4	5	6	7	8
0									
1	EXT PERMIT 1								
2	EXT PERMIT 2								
3	EXCLU PED								
4									
5	PED 2P OUT								
6	PED 6P OUT		X						
7	PED 4P OUT								
8	PED 8P OUT								X
9	FLH YELLOW								
A									
B									
C									
D									
E	RESTRICTED								
F	EXTRA 2								

### Column F Phases / Bits

		1	2	3	4	5	6	7	8
0	ADV GRN FLH								
1	PHASE FLASH								
2	FLASH WALK								
3	GUAR PASS								
4	SIMUL GAP		X		X		X		X
5	SEQ TIMING								
6	ADV WALK								
7	DELAY WALK								
8	EXT RECALL								
9									
A	MAX EXTEN								
B	INH PED RSRV								
C	SEMI ACTUATED								
D									
E	STRT VEH CALL	X	X	X	X	X	X	X	X
F	STRT PED CALL						X		X

SPECIALS < C + O + F = 2 >

MANUAL PLAN	14
< C/O + A + 1 >	
MANUAL OFFSET	0
< C/O + B + 1 >	
MANUAL SELECTION	

### MANUAL PLAN

0 = Automatic (Master)  
9 = Control Plan 1 - 9  
14 (E) = Free ( Isolated )  
15 (F) = Software Flash

### MANUAL OFFSET

0 = Automatic (Master)  
1 = Offset A  
2 = Offset B  
3 = Offset C

### FLASH TO PREEMPT

1 = EVA      5 = RR1      1 = TBC TYPE 1  
2 = EVB      6 = RR2      2 = NEMA EXT. COORD.  
3 = EVC      7 = SE1      3 = DAYLIGHT SAVINGS  
4 = EVD      8 = SE2      4 =

### EXTRA 1

5 = EXPANDED STATUS REPORTING  
6 = INTERNATIONAL PED  
7 = CLEAR OUTPUTS DURING FLASH  
8 = SPLIT RING

### EXTRA 2

1 = AWR ON DURING PHASE INITIAL  
2 = LMU INSTALLED

### IC SELECT

2 = 2 WAY MODEM      5 = SIMPLEX MASTER  
3 = 7 WIRE SLAVE      7 = 7 WIRE MASTER  
4 = FLASH / FREE      8 = OFFSET INTURP

# Hurlwood Lane and Burnside Drive

NODE SETTINGS		TIMING SETTINGS												PED		HOLD
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Node #	2	Lanes and Sharing (#RL)														
ATMS.now Controller ID		3	1	20	126	1	19	21	157	76	26	172	3			
Import from ATMS.now:	Import	Future Volume (vph)														
Export to ATMS.now:	Export	Turn Type														
Zone:		Protected Phases														
X East (m):	1030	Permitted Phases														
Y North (m):	55	Permitted Flashing Yellow														
Z Elevation (m):		Detector Phases														
Description		Switch Phase														
Control Type	Semi Act-Un	Leading Detector (m)														
Cycle Length (s):	7	Trailing Detector (m)														
Lock Timings:	<input type="checkbox"/>	Minimum Initial (s)														
Optimize Cycle Length:	Optimize	Minimum Split (s)														
Optimize Splits:	Optimize	Total Split (s)														
Actuated Cycle(s):	5	Yellow Time (s)														
Natural Cycle(s):	5	All-Red Time (s)														
Max v/c Ratio:	0	Lost Time Adjust (s)														
Intersection Delay (s):		Lagging Phase?														
Intersection LOS:		Allow Lead/Lag Optimize?														
ICU:	0	Recall Mode														
ICU LOS:		Speed limit (km/h)														
Offset (s):		Actuated Effct. Green (s)														
Referenced to:		Actuated g/C Ratio														
Reference Phase:		Volume to Capacity Ratio														
Coordination Mode:		Control Delay (s)														
Master Intersection:		Queue Delay (s)														

43 s	34 s
43 s	34 s

# APPENDIX E

## Level of Service Definitions

## Level of Service Definitions

### Two-Way Stop Controlled Intersections

<b>Level of Service</b>	<b>Control Delay per Vehicle (seconds)</b>	<b>Interpretation</b>
A	$\leq 10$	EXCELLENT. Large and frequent gaps in traffic on the main roadway. Queuing on the minor street is rare.
B	$> 10$ and $\leq 15$	VERY GOOD. Many gaps exist in traffic on the main roadway. Queuing on the minor street is minimal.
C	$> 15$ and $\leq 25$	GOOD. Fewer gaps exist in traffic on the main roadway. Delay on minor approach becomes more noticeable.
D	$> 25$ and $\leq 35$	FAIR. Infrequent and shorter gaps in traffic on the main roadway. Queue lengths develop on the minor street.
E	$> 35$ and $\leq 50$	POOR. Very infrequent gaps in traffic on the main roadway. Queue lengths become noticeable.
F	$> 50$	UNSATISFACTORY. Very few gaps in traffic on the main roadway. Excessive delay with significant queue lengths on the minor street.

Adapted from Highway Capacity Manual 2000, Transportation Research Board



## Level of Service Definitions

### Signalized Intersections

<b>Level of Service</b>	<b>Control Delay per Vehicle (seconds)</b>	<b>Interpretation</b>
A	$\leq 10$	EXCELLENT. Extremely favourable progression with most vehicles arriving during the green phase. Most vehicles do not stop and short cycle lengths may contribute to low delay.
B	$> 10$ and $\leq 20$	VERY GOOD. Very good progression and/or short cycle lengths with slightly more vehicles stopping than LOS "A" causing slightly higher levels of average delay.
C	$> 20$ and $\leq 35$	GOOD. Fair progression and longer cycle lengths lead to a greater number of vehicles stopping than LOS "B".
D	$> 35$ and $\leq 55$	FAIR. Congestion becomes noticeable with higher average delays resulting from a combination of long cycle lengths, high volume-to-capacity ratios and unfavourable progression.
E	$> 55$ and $\leq 80$	POOR. Lengthy delays values are indicative of poor progression, long cycle lengths and high volume-to-capacity ratios. Individual cycle failures are common with individual movement failures also common.
F	$> 80$	UNSATISFACTORY. Indicative of oversaturated conditions with vehicular demand greater than the capacity of the intersection.

Adapted from Highway Capacity Manual 2000, Transportation Research Board

# APPENDIX F

## Detailed Capacity Analysis

Lanes, Volumes, Timings

2024 Existing Conditions A.M.

1: Burnside Line & Hurlwood Lane/Brodie Drive

09-06-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	5	1	21	190	4	32	26	232	68	30	202	12
Future Volume (vph)	5	1	21	190	4	32	26	232	68	30	202	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	60.0		0.0	40.0		0.0	40.0		0.0
Storage Lanes	0		1	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.865			0.850			0.992	
Flt Protected		0.960		0.950			0.950			0.950		
Satd. Flow (prot)	0	1824	1615	1736	1644	0	1805	1439	1468	1805	1513	0
Flt Permitted		0.857		0.754			0.612			0.601		
Satd. Flow (perm)	0	1628	1615	1377	1644	0	1163	1439	1468	1142	1513	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			43		35				75			5
Link Speed (k/h)		50			60			60			60	
Link Distance (m)		157.9			136.5			65.5			1953.3	
Travel Time (s)		11.4			8.2			3.9			117.2	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	4%	0%	0%	0%	32%	10%	0%	26%	0%
Adj. Flow (vph)	5	1	23	209	4	35	29	255	75	33	222	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	23	209	39	0	29	255	75	33	235	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	CH+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

2024 Existing Conditions A.M.

1: Burnside Line & Hurlwood Lane/Brodie Drive

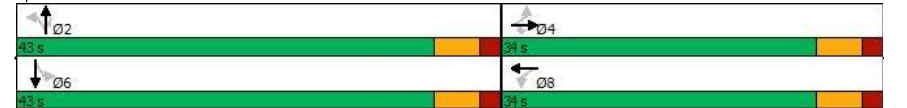
09-06-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2		2	6		
Detector Phase	4	4	4	8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0		25.0	25.0	25.0	25.0	25.0	
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0		31.0	31.0	31.0	31.0	31.0	
Total Split (s)	34.0	34.0	34.0	34.0	34.0		43.0	43.0	43.0	43.0	43.0	
Total Split (%)	44.2%	44.2%	44.2%	44.2%	44.2%		55.8%	55.8%	55.8%	55.8%	55.8%	
Maximum Green (s)	28.0	28.0	28.0	28.0	28.0		37.0	37.0	37.0	37.0	37.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min	Min	Min	Min		Min	Min	Min	Min	Min	
Act Effct Green (s)	15.6	15.6	15.6	15.6	15.6		25.0	25.0	25.0	25.0	25.0	
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30		0.48	0.48	0.48	0.48	0.48	
v/c Ratio	0.01	0.05	0.51	0.08	0.05		0.37	0.10	0.06	0.33	0.33	
Control Delay	13.0	2.9	20.5	6.5	8.2		11.1	3.0	8.3	10.2	10.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	13.0	2.9	20.5	6.5	8.2		11.1	3.0	8.3	10.2	10.2	
LOS	B	A	C	A	A		B	A	A	A	B	
Approach Delay		5.0			18.3			9.2			10.0	
Approach LOS		A			B			A			A	
Queue Length 50th (m)		0.4	0.0	17.0	0.3		1.4	14.5	0.0	1.6	12.7	
Queue Length 95th (m)		2.5	2.5	33.7	5.4		5.3	32.0	5.5	5.8	28.3	
Internal Link Dist (m)		133.9			112.5			41.5			1929.3	
Turn Bay Length (m)			50.0	60.0			40.0			40.0		
Base Capacity (vph)		866	879	732	891		817	1011	1054	803	1065	
Starvation Cap Reductn		0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0		0	0	0	0	0	
Storage Cap Reductn		0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio		0.01	0.03	0.29	0.04		0.04	0.25	0.07	0.04	0.22	

Intersection Summary

Area Type:	Other
Cycle Length: 77	
Actuated Cycle Length: 52.6	
Natural Cycle: 55	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 11.8	Intersection LOS: B
Intersection Capacity Utilization 69.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Burnside Line & Hurlwood Lane/Brodie Drive



Lanes, Volumes, Timings  
3: Burnside Line & Highway 11 Westbound

2024 Existing Conditions A.M.  
09-06-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	133	53	540	149	0	253
Future Volume (vph)	133	53	540	149	0	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1787	1583	1638	1509	0	1810
Flt Permitted	0.950					
Satd. Flow (perm)	1787	1583	1638	1509	0	1810
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		56		157		
Link Speed (k/h)	50		60			60
Link Distance (m)	104.8		160.3			51.5
Travel Time (s)	7.5		9.6			3.1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	16%	7%	0%	5%
Adj. Flow (vph)	140	56	568	157	0	266
Shared Lane Traffic (%)						
Lane Group Flow (vph)	140	56	568	157	0	266
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex		Ch+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Ch+Ex			Ch+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings  
3: Burnside Line & Highway 11 Westbound

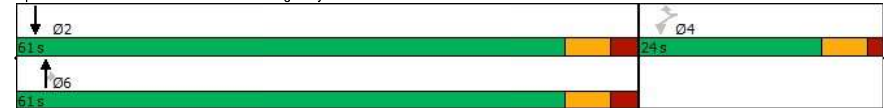
2024 Existing Conditions A.M.  
09-06-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.9	17.9	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.6	1.6	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.1	6.1	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	11.4	11.4	27.6	27.6		27.6
Actuated g/C Ratio	0.25	0.25	0.61	0.61		0.61
v/c Ratio	0.31	0.13	0.57	0.16		0.24
Control Delay	20.0	7.4	11.4	1.8		7.4
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	20.0	7.4	11.4	1.8		7.4
LOS	C	A	B	A		A
Approach Delay	16.4		9.3			7.4
Approach LOS	B		A			A
Queue Length 50th (m)	9.6	0.0	33.8	0.0		12.1
Queue Length 95th (m)	29.0	7.9	69.6	6.4		25.8
Internal Link Dist (m)	80.8		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	755	702	1590	1469		1756
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.19	0.08	0.36	0.11		0.15

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	45.6
Natural Cycle:	50
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.57
Intersection Signal Delay:	10.1
Intersection Capacity Utilization:	47.9%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	A

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2024 Existing Conditions A.M.

4: West Street North & Highway 11 Eastbound

09-06-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↖	↖	↖
Traffic Volume (vph)	225	104	86	461	352	34
Future Volume (vph)	225	104	86	461	352	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1327	1524	1787	1827	1845	1442
Flt Permitted	0.950		0.416			
Satd. Flow (perm)	1327	1524	783	1827	1845	1442
Right Turn on Red		Yes			Yes	
Satd. Flow (RTOR)		109				36
Link Speed (k/h)	50			60	60	
Link Distance (m)	154.2			160.8	176.6	
Travel Time (s)	11.1			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	36%	6%	1%	4%	3%	12%
Adj. Flow (vph)	237	109	91	485	371	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	237	109	91	485	371	36
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2024 Existing Conditions A.M.

4: West Street North & Highway 11 Eastbound

09-06-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	26.0	26.0	10.0	59.0	49.0	49.0
Total Split (%)	30.6%	30.6%	11.8%	69.4%	57.6%	57.6%
Maximum Green (s)	19.8	19.8	7.0	51.9	41.9	41.9
Yellow Time (s)	4.5	4.5	3.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	3.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	15.7	15.7	32.9	28.7	21.2	21.2
Actuated g/C Ratio	0.27	0.27	0.57	0.49	0.37	0.37
v/c Ratio	0.66	0.22	0.16	0.54	0.55	0.07
Control Delay	29.5	5.6	7.1	13.2	20.3	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	5.6	7.1	13.2	20.3	6.1
LOS	C	A	A	B	C	A
Approach Delay	21.9			12.3	19.0	
Approach LOS	C			B	B	
Queue Length 50th (m)	24.0	0.0	4.2	34.9	34.9	0.0
Queue Length 95th (m)	49.0	10.2	10.5	64.4	63.4	5.3
Internal Link Dist (m)	130.2			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	463	602	567	1598	1362	1074
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.18	0.16	0.30	0.27	0.03

Intersection Summary

Area Type: Other  
 Cycle Length: 85  
 Actuated Cycle Length: 58  
 Natural Cycle: 70  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.66  
 Intersection Signal Delay: 16.8  
 Intersection Capacity Utilization 51.2%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 4: West Street North & Highway 11 Eastbound



Lanes, Volumes, Timings

2024 Existing Conditions A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-06-2024

	↖	→	↘	↙	←	↖	↗	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↙	↘	↙	↖	↗	↘	↙	↖	↗
Traffic Volume (vph)	105	117	131	170	146	66	146	367	212	58	597	171
Future Volume (vph)	105	117	131	170	146	66	146	367	212	58	597	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		0.0
Storage Lanes	1		1	1		0	2		1	1		0
Taper Length (m)	70.0			65.0			80.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.95	0.95	0.95
Frt			0.850		0.953				0.850		0.967	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1583	1787	1774	0	3467	3574	1568	1736	3364	0
Flt Permitted	0.621			0.603			0.950			0.950		
Satd. Flow (perm)	1168	1881	1583	1134	1774	0	3467	3574	1568	1736	3364	0
Right Turn on Red			Yes			Yes		Yes			Yes	Yes
Satd. Flow (RTOR)			174		23			219			29	
Link Speed (k/h)	60			60			70			70		
Link Distance (m)	186.6			853.6			529.0			469.5		
Travel Time (s)	11.2			51.2			27.2			24.1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	2%	1%	3%	0%	1%	3%	4%	4%	3%	3%
Adj. Flow (vph)	108	121	135	175	151	68	151	378	219	60	615	176
Shared Lane Traffic (%)												
Lane Group Flow (vph)	108	121	135	175	219	0	151	378	219	60	791	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.6			3.6			7.2			7.2		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	100		15	25		15	25		100
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	

Lanes, Volumes, Timings

2024 Existing Conditions A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-06-2024

	↖	→	↘	↙	←	↖	↗	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6						8		
Detector Phase	5	2	2	1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	
Total Split (s)	16.0	50.0	50.0	16.0	50.0		18.0	21.0	21.0	26.0	29.0	
Total Split (%)	14.2%	44.2%	44.2%	14.2%	44.2%		15.9%	18.6%	18.6%	23.0%	25.7%	
Maximum Green (s)	11.0	42.8	42.8	11.0	42.8		14.0	13.0	13.0	22.0	21.0	
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	None	None	None	None	
Walk Time (s)					7.0					7.0		
Flash Dont Walk (s)					19.0					6.0		
Pedestrian Calls (#/hr)					0					0		
Act Effct Green (s)	31.2	20.2	20.2	34.4	23.9		9.0	23.8	23.8	8.6	21.0	
Actuated g/C Ratio	0.37	0.24	0.24	0.41	0.28		0.11	0.28	0.28	0.10	0.25	
v/c Ratio	0.22	0.27	0.26	0.33	0.42		0.41	0.38	0.37	0.34	0.92	
Control Delay	15.7	28.7	3.5	16.8	27.0		38.9	27.3	6.0	41.1	48.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	15.7	28.7	3.5	16.8	27.0		38.9	27.3	6.0	41.1	48.1	
LOS	B	C	A	B	C		D	C	A	D	D	
Approach Delay		15.5			22.4			23.4			47.6	
Approach LOS		B			C			C			D	
Queue Length 50th (m)	10.5	16.9	0.0	17.7	27.9		12.6	28.2	0.0	9.8	67.2	
Queue Length 95th (m)	21.1	32.7	8.1	32.4	52.7		22.1	44.1	17.5	21.8	#111.0	
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		
Base Capacity (vph)	543	955	889	553	912		575	1007	599	453	859	
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.20	0.13	0.15	0.32	0.24		0.26	0.38	0.37	0.13	0.92	
Intersection Summary												
Area Type:	Other											
Cycle Length:	113											
Actuated Cycle Length:	84.4											
Natural Cycle:	80											
Control Type:	Semi Act-Uncooord											
Maximum v/c Ratio:	0.92											
Intersection Signal Delay:	30.7						Intersection LOS: C					
Intersection Capacity Utilization:	74.0%						ICU Level of Service D					
Analysis Period (min)	15											
# 95th percentile volume exceeds capacity, queue may be longer.												

Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



Intersection

Int Delay, s/veh 0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Vol, veh/h	59	3	1	0	8	0	0	0	0	0	0	76
Future Vol, veh/h	59	3	1	0	8	0	0	0	0	0	0	76
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	32	67	0	0	30	100	50	0	100	0	50	30
Mvmt Flow	64	3	1	0	9	0	0	0	0	0	0	83

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	47	42	42	44
Stage 1	42	42	-	0
Stage 2	5	0	-	44
Critical Hdwy	7.42	7.17	6.2	7.1
Critical Hdwy Stg 1	6.42	6.17	-	6.1
Critical Hdwy Stg 2	6.42	6.17	-	6.1
Follow-up Hdwy	3.788	4.603	3.3	3.5
Pot Cap-1 Maneuver	884	739	1034	963
Stage 1	901	747	-	-
Stage 2	944	-	-	975
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	739	1034	959
Mov Cap-2 Maneuver	-	739	-	959
Stage 1	901	747	-	-
Stage 2	944	-	-	970

Approach	EB	WB	NB	SB
HCM Control Delay, s			0	0
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1259	-	-	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	-	0	-	-
HCM Lane LOS	A	-	-	-	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2024 Existing Conditions A.M.  
09-06-2024

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕		↕		
Traffic Vol, veh/h	0	136	6	29	109	3	3	4	31	5	9	1
Future Vol, veh/h	0	136	6	29	109	3	3	4	31	5	9	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	2	0	0	1	0	0	25	3	0	11	0
Mvmt Flow	0	142	6	30	114	3	3	4	32	5	9	1

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	117	0	0	148
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.1	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2
Pot Cap-1 Maneuver	1484	-	-	1446
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1484	-	-	1446
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	9.6	11.3
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	814	1484	-	-	1446	-	-	587
HCM Lane V/C Ratio	0.049	-	-	-	0.021	-	-	0.027
HCM Control Delay (s)	9.6	0	-	-	7.5	0	-	11.3
HCM Lane LOS	A	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.1

HCM 2010 TWSC  
8: Burnside Line & Division Road W

2024 Existing Conditions A.M.  
09-06-2024

Intersection												
Int Delay, s/veh	6.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕		↕		
Traffic Vol, veh/h	11	63	102	16	50	1	72	119	27	4	109	11
Future Vol, veh/h	11	63	102	16	50	1	72	119	27	4	109	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	2	1	0	0	0	0	62	0	0	50	0
Mvmt Flow	12	68	111	17	54	1	78	129	29	4	118	12

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	459	446	124	522
Stage 1	132	132	-	300
Stage 2	327	314	-	222
Critical Hdwy	7.1	6.52	6.21	7.1
Critical Hdwy Stg 1	6.1	5.52	-	6.1
Critical Hdwy Stg 2	6.1	5.52	-	6.1
Follow-up Hdwy	3.5	4.018	3.309	3.5
Pot Cap-1 Maneuver	516	507	929	468
Stage 1	876	787	-	713
Stage 2	690	656	-	785
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	449	476	929	350
Mov Cap-2 Maneuver	449	476	-	350
Stage 1	825	785	-	672
Stage 2	593	618	-	629

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.7	14.6	2.5	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1468	-	-	660	446	1434	-	-
HCM Lane V/C Ratio	0.053	-	-	0.29	0.163	0.003	-	-
HCM Control Delay (s)	7.6	0	-	12.7	14.6	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.2	0.6	0	-	-



Lanes, Volumes, Timings

2024 Existing Conditions P.M.

1: Burnside Line & Hurlwood Lane/Brodie Drive

09-06-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	6	4	40	330	1	83	24	247	75	35	195	7
Future Volume (vph)	6	4	40	330	1	83	24	247	75	35	195	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	60.0		0.0	40.0		0.0	40.0		0.0
Storage Lanes	0		1	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.852			0.850		0.995		
Flt Protected		0.971		0.950			0.950		0.950			
Satd. Flow (prot)	0	1845	1568	1770	1619	0	1805	1863	1429	1805	1755	0
Flt Permitted		0.887		0.751			0.624		0.597			
Satd. Flow (perm)	0	1685	1568	1399	1619	0	1186	1863	1429	1134	1755	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)			43		88			80			3	
Link Speed (k/h)		50			60			60			60	
Link Distance (m)		157.9			136.5			65.5			1953.3	
Travel Time (s)		11.4			8.2			3.9			117.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	3%	2%	0%	0%	0%	2%	13%	0%	8%	0%
Adj. Flow (vph)	6	4	43	351	1	88	26	263	80	37	207	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	10	43	351	89	0	26	263	80	37	214	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	CH+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CH+Ex	CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

2024 Existing Conditions P.M.

1: Burnside Line & Hurlwood Lane/Brodie Drive

09-06-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2		2	6		
Detector Phase	4	4	4	8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0		25.0	25.0	25.0	25.0	25.0	
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0		31.0	31.0	31.0	31.0	31.0	
Total Split (s)	34.0	34.0	34.0	34.0	34.0		43.0	43.0	43.0	43.0	43.0	
Total Split (%)	44.2%	44.2%	44.2%	44.2%	44.2%		55.8%	55.8%	55.8%	55.8%	55.8%	
Maximum Green (s)	28.0	28.0	28.0	28.0	28.0		37.0	37.0	37.0	37.0	37.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min	Min	Min	Min		Min	Min	Min	Min	Min	
Act Effct Green (s)	19.7	19.7	19.7	19.7	19.7		25.2	25.2	25.2	25.2	25.2	
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.35		0.44	0.44	0.44	0.44	0.44	
v/c Ratio	0.02	0.08	0.73	0.14	0.14		0.05	0.32	0.12	0.07	0.28	
Control Delay	11.3	4.5	25.6	3.9	3.9		11.5	12.9	4.1	11.7	12.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	11.3	4.5	25.6	3.9	3.9		11.5	12.9	4.1	11.7	12.5	
LOS	B	A	C	A	A		B	B	A	B	B	
Approach Delay		5.8			21.2			10.9			12.4	
Approach LOS		A			C			B			B	
Queue Length 50th (m)		0.7	0.0	32.3	0.1		1.5	16.9	0.0	2.1	13.3	
Queue Length 95th (m)		3.1	4.9	57.5	7.1		6.4	40.4	7.3	8.3	33.2	
Internal Link Dist (m)		133.9			112.5			41.5			1929.3	
Turn Bay Length (m)			50.0	60.0			40.0				40.0	
Base Capacity (vph)		833	797	692	845		775	1218	962	741	1148	
Starvation Cap Reductn		0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0		0	0	0	0	0	
Storage Cap Reductn		0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio		0.01	0.05	0.51	0.11		0.03	0.22	0.08	0.05	0.19	

Intersection Summary

Area Type:	Other
Cycle Length:	77
Actuated Cycle Length:	57
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	15.1
Intersection Capacity Utilization:	69.2%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	C

Splits and Phases: 1: Burnside Line & Hurlwood Lane/Brodie Drive



Lanes, Volumes, Timings

2024 Existing Conditions P.M.

3: Burnside Line & Highway 11 Westbound

09-06-2024

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑	↗		↘
Traffic Volume (vph)	168	69	551	238	0	407
Future Volume (vph)	168	69	551	238	0	407
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1752	1599	1863	1615	0	1863
Flt Permitted	0.950					
Satd. Flow (perm)	1752	1599	1863	1615	0	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		70		243		
Link Speed (k/h)	50		60			60
Link Distance (m)	104.8		160.3			51.5
Travel Time (s)	7.5		9.6			3.1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	1%	2%	0%	0%	2%
Adj. Flow (vph)	171	70	562	243	0	415
Shared Lane Traffic (%)						
Lane Group Flow (vph)	171	70	562	243	0	415
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex		Ch+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Ch+Ex			Ch+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2024 Existing Conditions P.M.

3: Burnside Line & Highway 11 Westbound

09-06-2024

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	18.3	18.3	53.7	53.7		53.7
Yellow Time (s)	4.1	4.1	4.5	4.5		4.5
All-Red Time (s)	1.6	1.6	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.7	5.7	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	11.5	11.5	26.1	26.1		26.1
Actuated g/C Ratio	0.26	0.26	0.59	0.59		0.59
v/c Ratio	0.37	0.15	0.51	0.23		0.38
Control Delay	19.1	6.3	10.3	1.8		8.8
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	19.1	6.3	10.3	1.8		8.8
LOS	B	A	B	A		A
Approach Delay	15.4		7.8			8.8
Approach LOS	B		A			A
Queue Length 50th (m)	11.4	0.0	30.4	0.0		20.2
Queue Length 95th (m)	31.8	8.1	64.0	8.3		43.2
Internal Link Dist (m)	80.8		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	774	745	1827	1589		1827
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.22	0.09	0.31	0.15		0.23

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	44.1
Natural Cycle:	45
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.51
Intersection Signal Delay:	9.3
Intersection Capacity Utilization:	49.1%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	A

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2024 Existing Conditions P.M.

4: West Street North & Highway 11 Eastbound

09-06-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↖	↖	↖
Traffic Volume (vph)	154	136	198	633	485	91
Future Volume (vph)	154	136	198	633	485	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1736	1583	1787	1881	1863	1583
Flt Permitted	0.950		0.299			
Satd. Flow (perm)	1736	1583	562	1881	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		143				94
Link Speed (k/h)	50			60	60	
Link Distance (m)	154.2			160.8	176.6	
Travel Time (s)	11.1			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	2%	1%	1%	2%	2%
Adj. Flow (vph)	162	143	208	666	511	96
Shared Lane Traffic (%)						
Lane Group Flow (vph)	162	143	208	666	511	96
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2024 Existing Conditions P.M.

4: West Street North & Highway 11 Eastbound

09-06-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	26.0	26.0	10.0	59.0	49.0	49.0
Total Split (%)	30.6%	30.6%	11.8%	69.4%	57.6%	57.6%
Maximum Green (s)	19.8	19.8	7.0	51.9	41.9	41.9
Yellow Time (s)	4.5	4.5	3.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	3.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	11.8	11.8	37.7	33.5	23.4	23.4
Actuated g/C Ratio	0.20	0.20	0.64	0.57	0.40	0.40
v/c Ratio	0.47	0.33	0.41	0.62	0.69	0.14
Control Delay	26.6	7.1	7.1	11.7	20.4	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.6	7.1	7.1	11.7	20.4	3.6
LOS	C	A	A	B	C	A
Approach Delay	17.5			10.6	17.8	
Approach LOS	B			B	B	
Queue Length 50th (m)	14.8	0.0	7.1	40.9	43.6	0.1
Queue Length 95th (m)	37.0	13.3	18.1	85.3	83.3	7.5
Internal Link Dist (m)	130.2			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	592	634	507	1683	1346	1169
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.23	0.41	0.40	0.38	0.08

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	58.8
Natural Cycle:	70
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.69
Intersection Signal Delay:	14.2
Intersection Capacity Utilization:	59.4%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	B

Splits and Phases: 4: West Street North & Highway 11 Eastbound



Lanes, Volumes, Timings

2024 Existing Conditions P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-06-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	186	229	284	154	107	218	701	240	48	580	153
Future Volume (vph)	210	186	229	284	154	107	218	701	240	48	580	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		0.0
Storage Lanes	1		1	1		0	2		1	1		0
Taper Length (m)	70.0			65.0			80.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor			0.99	1.00								
Frt			0.850		0.938				0.850		0.969	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1900	1599	1787	1772	0	3502	3539	1599	1805	3403	0
Flt Permitted	0.453			0.583			0.950			0.950		
Satd. Flow (perm)	852	1900	1577	1095	1772	0	3502	3539	1599	1805	3403	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			244		36				255			26
Link Speed (k/h)		50			70			50				50
Link Distance (m)		186.6			853.6			529.0				469.5
Travel Time (s)		13.4			43.9			38.1				33.8
Confl. Peds. (#/hr)			2	2								
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	0%	1%	1%	1%	0%	0%	2%	1%	0%	3%	2%
Adj. Flow (vph)	223	198	244	302	164	114	232	746	255	51	617	163
Shared Lane Traffic (%)												
Lane Group Flow (vph)	223	198	244	302	278	0	232	746	255	51	780	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2				7.2
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings

2024 Existing Conditions P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-06-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8			
Detector Phase	5	2	2	1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	
Total Split (s)	16.0	50.0	50.0	16.0	50.0		18.0	21.0	21.0	26.0	29.0	
Total Split (%)	14.2%	44.2%	44.2%	14.2%	44.2%		15.9%	18.6%	18.6%	23.0%	25.7%	
Maximum Green (s)	11.0	42.8	42.8	11.0	42.8		14.0	13.0	13.0	22.0	21.0	
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	None	None	None	None	
Walk Time (s)					7.0					7.0	7.0	
Flash Dont Walk (s)					19.0					6.0	6.0	
Pedestrian Calls (#/hr)					0					0	0	
Act Effct Green (s)	33.9	21.2	21.2	34.7	21.6		11.0	28.4	28.4	8.3	21.0	
Actuated g/C Ratio	0.38	0.24	0.24	0.39	0.24		0.12	0.32	0.32	0.09	0.24	
v/c Ratio	0.51	0.44	0.43	0.59	0.61		0.53	0.66	0.37	0.30	0.94	
Control Delay	20.7	32.4	6.5	22.8	32.4		41.2	31.1	5.5	43.0	53.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	20.7	32.4	6.5	22.8	32.4		41.2	31.1	5.5	43.0	53.4	
LOS	C	C	A	C	C		D	C	A	D	D	
Approach Delay		19.0			27.4					27.7		52.8
Approach LOS		B			C					C		D
Queue Length 50th (m)	24.4	30.1	0.0	34.7	38.5		20.0	63.1	0.0	8.6	68.6	
Queue Length 95th (m)	42.5	52.1	18.2	58.0	66.7		33.2	#97.6	18.6	20.7	#121.0	
Internal Link Dist (m)		162.6			829.6				505.0		445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		
Base Capacity (vph)	447	921	890	517	877		555	1136	686	450	829	
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.50	0.21	0.27	0.58	0.32		0.42	0.66	0.37	0.11	0.94	
Intersection Summary												
Area Type:	Other											
Cycle Length:	113											
Actuated Cycle Length:	88.4											
Natural Cycle:	80											
Control Type:	Semi Act-Uncooord											
Maximum v/c Ratio:	0.94											
Intersection Signal Delay:	32.2						Intersection LOS: C					
Intersection Capacity Utilization:	79.7%						ICU Level of Service D					

Lanes, Volumes, Timings  
5: Highway 12 & West Ridge Boulevard/Murphy Road

2024 Existing Conditions P.M.  
09-06-2024

Analysis Period (min) 15  
# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2024 Existing Conditions P.M.  
09-06-2024

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔											
Traffic Vol, veh/h	120	4	0	2	2	2	1	0	0	1	0	70
Future Vol, veh/h	120	4	0	2	2	2	1	0	0	1	0	70
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	18	25	0	0	100	0	0	0	0	0	0	27
Mvmt Flow	133	4	0	2	2	2	1	0	0	1	0	78

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	45	43	39	45
Stage 1	41	41	-	2
Stage 2	4	2	-	43
Critical Hdwy	7.28	6.75	6.2	7.1
Critical Hdwy Stg 1	6.28	5.75	-	6.1
Critical Hdwy Stg 2	6.28	5.75	-	6.1
Follow-up Hdwy	3.662	4.225	3.3	3.5
Pot Cap-1 Maneuver	918	806	1038	962
Stage 1	934	817	-	1026
Stage 2	978	850	-	976
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	805	1038	957
Mov Cap-2 Maneuver	-	805	-	957
Stage 1	933	817	-	1025
Stage 2	974	849	-	971

Approach	EB	WB	NB	SB
HCM Control Delay, s	-	-	7.3	-
HCM LOS	-	-	-	-

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1533	-	-	-	-	-	-	-
HCM Lane V/C Ratio	0.001	-	-	-	-	-	-	-
HCM Control Delay (s)	7.3	0	-	-	-	-	-	-
HCM Lane LOS	A	A	-	-	-	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2024 Existing Conditions P.M.  
09-06-2024

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕			↕			↕		
Traffic Vol, veh/h	3	194	11	32	246	13	18	17	62	5	5	1
Future Vol, veh/h	3	194	11	32	246	13	18	17	62	5	5	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	0	1	0	0	0	0	0	20	0
Mvmt Flow	3	209	12	34	265	14	19	18	67	5	5	1

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	279	0	0	221
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.1	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2
Pot Cap-1 Maneuver	1295	-	-	1360
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1295	-	-	1360
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.8	12	14.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	615	1295	-	-	1360	-	-	394
HCM Lane V/C Ratio	0.17	0.002	-	-	0.025	-	-	0.03
HCM Control Delay (s)	12	7.8	0	-	7.7	0	-	14.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.6	0	-	-	0.1	-	-	0.1

HCM 2010 TWSC  
8: Burnside Line & Division Road W

2024 Existing Conditions P.M.  
09-06-2024

Intersection												
Int Delay, s/veh	12											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕			↕			↕		
Traffic Vol, veh/h	10	123	133	18	94	2	175	93	54	4	65	22
Future Vol, veh/h	10	123	133	18	94	2	175	93	54	4	65	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	2	1	0	2	0	1	1	4	0	23	0
Mvmt Flow	11	131	141	19	100	2	186	99	57	4	69	23

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	640	617	81	725
Stage 1	89	89	-	500
Stage 2	551	528	-	225
Critical Hdwy	7.1	6.52	6.21	7.1
Critical Hdwy Stg 1	6.1	5.52	-	6.1
Critical Hdwy Stg 2	6.1	5.52	-	6.1
Follow-up Hdwy	3.5	4.018	3.309	3.5
Pot Cap-1 Maneuver	391	405	982	343
Stage 1	923	821	-	557
Stage 2	522	528	-	782
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	275	349	982	187
Mov Cap-2 Maneuver	275	349	-	187
Stage 1	797	819	-	481
Stage 2	354	456	-	561

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.7	23.4	4.2	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1509	-	-	507	315	1436	-	-
HCM Lane V/C Ratio	0.123	-	-	0.558	0.385	0.003	-	-
HCM Control Delay (s)	7.7	0	-	20.7	23.4	7.5	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.4	-	-	3.4	1.8	0	-	-

Lanes, Volumes, Timings

2031 Future Background A.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-25-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	30	127	219	5	37	318	267	79	35	233	44
Future Volume (vph)	47	30	127	219	5	37	318	267	79	35	233	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1615	1736	1900	1615	1805	1439	1468	1805	1521	0
Flt Permitted	0.754			0.581			0.371			0.581		
Satd. Flow (perm)	1433	1900	1615	1061	1900	1615	705	1439	1468	1104	1521	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			255			200			200			11
Link Speed (k/h)	50			60			60			60		60
Link Distance (m)	140.4			136.5			65.5			1953.3		
Travel Time (s)	10.1			8.2			3.9			117.2		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	4%	0%	0%	0%	32%	10%	0%	26%	0%
Adj. Flow (vph)	52	33	140	241	5	41	349	293	87	38	256	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	33	140	241	5	41	349	293	87	38	304	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width(m)	3.6			3.6			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane	Yes											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	0A	Perm	pm+pt	0A	Perm	pm+pt	0A	Perm	pm+pt	0A	
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2031 Future Background A.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-25-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	9.6	21.0	21.0	16.1	27.5	27.5	19.4	43.4	43.4	9.5	33.5	
Total Split (%)	10.7%	23.3%	23.3%	17.9%	30.6%	30.6%	21.6%	48.2%	48.2%	10.6%	37.2%	
Maximum Green (s)	5.1	15.0	15.0	11.6	21.5	21.5	14.9	37.4	37.4	5.0	27.5	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	21.6	15.0	15.0	31.8	24.7	24.7	45.9	38.8	38.8	32.0	25.5	
Actuated g/C Ratio	0.25	0.17	0.17	0.37	0.28	0.28	0.53	0.45	0.45	0.37	0.29	
v/c Ratio	0.14	0.10	0.29	0.51	0.01	0.07	0.63	0.46	0.11	0.08	0.67	
Control Delay	20.0	32.1	1.5	24.8	25.8	0.2	17.7	20.9	0.3	11.7	34.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.0	32.1	1.5	24.8	25.8	0.2	17.7	20.9	0.3	11.7	34.5	
LOS	B	C	A	C	C	A	B	C	A	B	C	
Approach Delay		10.2			21.3			16.9			32.0	
Approach LOS		B			C			B			C	
Queue Length 50th (m)	5.8	5.0	0.0	30.4	0.7	0.0	34.3	38.1	0.0	3.1	45.8	
Queue Length 95th (m)	13.9	13.5	0.0	52.5	3.5	0.0	53.2	62.2	0.0	7.7	74.9	
Internal Link Dist (m)			116.4			112.5		41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0		65.0	40.0		
Base Capacity (vph)	379	329	490	479	540	602	562	659	781	448	490	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.10	0.29	0.50	0.01	0.07	0.62	0.44	0.11	0.08	0.62	

Intersection Summary

Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 86.7	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 20.0	Intersection LOS: C
Intersection Capacity Utilization 71.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Burnside Line & Industrial Road/Brodie Drive





Lanes, Volumes, Timings

2031 Future Background A.M.

2: Burnside Line & Highway 11 Westbound On-Ramp

09-25-2024

	↖	↘	↙	↑	↓	↗
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑	↗
Traffic Volume (vph)	0	0	0	970	331	238
Future Volume (vph)	0	0	0	970	331	238
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1638	1810	1214
Flt Permitted						
Satd. Flow (perm)	0	0	0	1638	1810	1214
Link Speed (k/h)	50			70	60	
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			2.6	10.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	16%	5%	33%
Adj. Flow (vph)	0	0	0	1021	348	251
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1021	348	251
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.4%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings

2031 Future Background A.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024

	↖	↘	↑	↗	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑	↗		↑
Traffic Volume (vph)	153	256	714	172	0	331
Future Volume (vph)	153	256	714	172	0	331
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1787	1583	1638	1509	0	1810
Flt Permitted	0.950					
Satd. Flow (perm)	1787	1583	1638	1509	0	1810
Right Turn on Red			Yes	Yes		
Satd. Flow (RTOR)			231	181		
Link Speed (k/h)	50		60			60
Link Distance (m)	104.8		160.3			51.5
Travel Time (s)	7.5		9.6			3.1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	16%	7%	0%	5%
Adj. Flow (vph)	161	269	752	181	0	348
Shared Lane Traffic (%)						
Lane Group Flow (vph)	161	269	752	181	0	348
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2



Lanes, Volumes, Timings

2031 Future Background A.M.

3: Burnside Line & Highway 11 Westbound

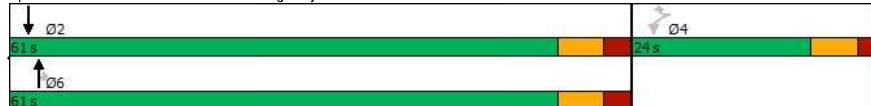
09-25-2024

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	9.7	9.7	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.6	17.6	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.9	1.9	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.4	6.4	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	12.2	12.2	33.3	33.3		33.3
Actuated g/C Ratio	0.20	0.20	0.56	0.56		0.56
v/c Ratio	0.44	0.53	0.83	0.20		0.35
Control Delay	28.6	10.6	19.7	1.7		8.1
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	28.6	10.6	19.7	1.7		8.1
LOS	C	B	B	A		A
Approach Delay	17.3		16.2			8.1
Approach LOS	B		B			A
Queue Length 50th (m)	15.6	3.4	56.7	0.0		17.5
Queue Length 95th (m)	42.9	26.9	124.3	6.8		38.2
Internal Link Dist (m)	80.8		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	555	651	1436	1345		1587
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.29	0.41	0.52	0.13		0.22

Intersection Summary

Area Type:	Other
Cycle Length: 85	
Actuated Cycle Length: 60	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 14.9	Intersection LOS: B
Intersection Capacity Utilization 64.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2031 Future Background A.M.

4: West Street North & Highway 11 Eastbound

09-25-2024

	↙	↖	↗	↑	↓	↘
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↖	↗	↑	↓	↘
Traffic Volume (vph)	277	120	99	605	436	49
Future Volume (vph)	277	120	99	605	436	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1327	1524	1787	1827	1845	1442
Flt Permitted	0.950		0.336			
Satd. Flow (perm)	1327	1524	632	1827	1845	1442
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		126				44
Link Speed (k/h)	50			60	60	
Link Distance (m)	154.2			160.8	176.6	
Travel Time (s)	11.1			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	36%	6%	1%	4%	3%	12%
Adj. Flow (vph)	292	126	104	637	459	52
Shared Lane Traffic (%)						
Lane Group Flow (vph)	292	126	104	637	459	52
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2031 Future Background A.M.

4: West Street North & Highway 11 Eastbound

09-25-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	38.0	38.0	10.0	52.0	42.0	42.0
Total Split (%)	42.2%	42.2%	11.1%	57.8%	46.7%	46.7%
Maximum Green (s)	31.8	31.8	8.0	44.9	34.9	34.9
Yellow Time (s)	4.5	4.5	2.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	2.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	19.7	19.7	37.6	32.2	25.0	25.0
Actuated g/C Ratio	0.30	0.30	0.57	0.49	0.38	0.38
v/c Ratio	0.74	0.23	0.21	0.72	0.66	0.09
Control Delay	34.1	5.3	8.9	19.7	24.6	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.1	5.3	8.9	19.7	24.6	7.3
LOS	C	A	A	B	C	A
Approach Delay	25.4			18.2	22.9	
Approach LOS	C			B	C	
Queue Length 50th (m)	31.8	0.0	5.4	58.7	49.4	0.7
Queue Length 95th (m)	72.1	11.5	16.0	126.6	100.5	8.0
Internal Link Dist (m)	130.2			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	678	840	508	1306	1035	828
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.15	0.20	0.49	0.44	0.06

Intersection Summary

Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 66.1	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 21.4	Intersection LOS: C
Intersection Capacity Utilization 58.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: West Street North & Highway 11 Eastbound



Lanes, Volumes, Timings

2031 Future Background A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	125	163	151	276	246	138	168	422	385	100	686	197
Future Volume (vph)	125	163	151	276	246	138	168	422	385	100	686	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.95	1.00	1.00
Frt			0.850		0.946				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1583	1787	1763	0	3467	3574	1568	1736	3471	1568
Flt Permitted	0.379			0.545			0.950			0.499		
Satd. Flow (perm)	713	1881	1583	1025	1763	0	3467	3574	1568	912	3471	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			156		27				397			187
Link Speed (k/h)		60			60			70				70
Link Distance (m)		186.6			853.6			529.0				469.5
Travel Time (s)		11.2			51.2			27.2				24.1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	2%	1%	3%	0%	1%	3%	4%	4%	4%	3%
Adj. Flow (vph)	129	168	156	285	254	142	173	435	397	103	707	203
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	168	156	285	396	0	173	435	397	103	707	203
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2				7.2
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	100		15	25		15	25		100
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	

Lanes, Volumes, Timings

2031 Future Background A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	12.0	39.0	39.0	17.0	44.0		12.0	42.0	42.0	12.0	42.0	42.0
Total Split (%)	10.9%	35.5%	35.5%	15.5%	40.0%		10.9%	38.2%	38.2%	10.9%	38.2%	38.2%
Maximum Green (s)	7.0	31.8	31.8	12.0	36.8		8.0	34.0	34.0	8.0	34.0	34.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0					7.0		7.0
Flash Dont Walk (s)					19.0					6.0		6.0
Pedestrian Calls (#/hr)					0					0		0
Act Effct Green (s)	32.5	23.1	23.1	41.6	27.7		7.9	27.3	27.3	36.5	24.6	24.6
Actuated g/C Ratio	0.35	0.25	0.25	0.45	0.30		0.09	0.30	0.30	0.40	0.27	0.27
v/c Ratio	0.39	0.36	0.30	0.51	0.72		0.58	0.41	0.53	0.24	0.76	0.37
Control Delay	20.1	31.7	6.6	20.7	35.7		51.1	28.4	5.8	17.3	37.1	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.1	31.7	6.6	20.7	35.7		51.1	28.4	5.8	17.3	37.1	7.3
LOS	C	C	A	C	D		D	C	A	B	D	A
Approach Delay		19.8			29.4			23.4			29.1	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	13.3	25.4	0.0	32.4	60.0		15.4	33.7	0.0	10.3	60.4	2.1
Queue Length 95th (m)	28.3	48.6	15.5	60.8	105.5		#34.2	55.3	22.5	23.9	93.6	19.5
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	334	659	656	570	732		306	1341	836	437	1302	705
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.25	0.24	0.50	0.54		0.57	0.32	0.47	0.24	0.54	0.29

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	91.9
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.76
Intersection Signal Delay:	26.0
Intersection LOS:	C
Intersection Capacity Utilization:	76.9%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	

Lanes, Volumes, Timings

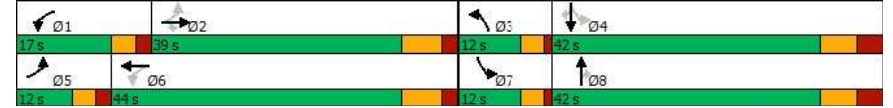
2031 Future Background A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024

Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2031 Future Background A.M.  
09-25-2024

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	247	4	2	0	10	0	0	0	0	0	0	255
Future Vol, veh/h	247	4	2	0	10	0	0	0	0	0	0	255
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	32	67	0	0	30	100	50	0	100	0	50	30
Mvmt Flow	268	4	2	0	11	0	0	0	0	0	0	277

Major/Minor	Minor2	Minor1	Major1	Major2								
Conflicting Flow All	145	139	139	142	277	0	277	0	0	0	0	0
Stage 1	139	139	-	0	0	-	-	-	-	-	-	-
Stage 2	6	0	-	142	277	-	-	-	-	-	-	-
Critical Hdwy	7.42	7.17	6.2	7.1	6.8	7.2	4.6	-	-	4.1	-	-
Critical Hdwy Stg 1	6.42	6.17	-	6.1	5.8	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.42	6.17	-	6.1	5.8	-	-	-	-	-	-	-
Follow-up Hdwy	3.788	4.603	3.3	3.5	4.27	4.2	2.65	-	-	2.2	-	-
Pot Cap-1 Maneuver	760	647	915	832	586	-	1054	-	-	-	-	-
Stage 1	797	673	-	-	-	-	-	-	-	-	-	-
Stage 2	943	-	-	866	633	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	647	915	826	586	-	1054	-	-	-	-	-
Mov Cap-2 Maneuver	-	647	-	826	586	-	-	-	-	-	-	-
Stage 1	797	673	-	-	-	-	-	-	-	-	-	-
Stage 2	943	-	-	858	633	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0	0
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1054	-	-	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	-	-	-
HCM Lane LOS	A	-	-	-	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2031 Future Background A.M.  
09-25-2024

Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	0	157	7	34	126	4	4	5	36	6	11	2
Future Vol, veh/h	0	157	7	34	126	4	4	5	36	6	11	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	0
Grade, %	-	0	-	-	0	-	-	0	-	-	-	0
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	2	0	0	1	0	0	25	3	0	11	0
Mvmt Flow	0	164	7	35	131	4	4	5	38	6	11	2

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	135	0	0	171	0	0	378	373	168	392	374	133
Stage 1	-	-	-	-	-	-	168	168	-	203	203	-
Stage 2	-	-	-	-	-	-	210	205	-	189	171	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.75	6.23	7.1	6.61	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.75	-	6.1	5.61	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.75	-	6.1	5.61	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.225	3.327	3.5	4.099	3.3
Pot Cap-1 Maneuver	1462	-	-	1418	-	-	583	523	874	571	543	922
Stage 1	-	-	-	-	-	-	839	718	-	804	717	-
Stage 2	-	-	-	-	-	-	797	691	-	817	740	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1462	-	-	1418	-	-	560	509	874	531	528	922
Mov Cap-2 Maneuver	-	-	-	-	-	-	560	509	-	531	528	-
Stage 1	-	-	-	-	-	-	839	718	-	804	698	-
Stage 2	-	-	-	-	-	-	761	672	-	776	740	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	10	11.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	774	1462	-	-	1418	-	-	554
HCM Lane V/C Ratio	0.061	-	-	-	0.025	-	-	0.036
HCM Control Delay (s)	10	0	-	-	7.6	0	-	11.7
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.1

Lanes, Volumes, Timings

2031 Future Background A.M.

8: Burnside Line & Division Road W

09-25-2024



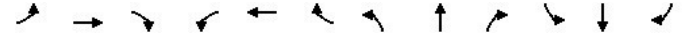
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	13	73	118	19	58	2	83	376	32	5	156	13
Future Volume (vph)	13	73	118	19	58	2	83	376	32	5	156	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.922			0.997			0.991			0.990	
Flt Protected		0.997			0.988			0.992			0.999	
Satd. Flow (prot)	0	1724	0	0	1872	0	0	1266	0	0	1296	0
Flt Permitted		0.976			0.881			0.921			0.990	
Satd. Flow (perm)	0	1688	0	0	1669	0	0	1176	0	0	1285	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		128			2			9			10	
Link Speed (k/h)		50			50			70			60	
Link Distance (m)		1346.1			271.7			1953.3			357.4	
Travel Time (s)		96.9			19.6			100.5			21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%	0%	62%	0%	0%	50%	0%
Adj. Flow (vph)	14	79	128	21	63	2	90	409	35	5	170	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	221	0	0	86	0	0	534	0	0	189	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases		4			8			2			6	
Detector Phase		4	4		8	8		2	2		6	6
Switch Phase												

Lanes, Volumes, Timings

2031 Future Background A.M.

8: Burnside Line & Division Road W

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		23.0	23.0		23.0	23.0	
Total Split (%)	41.8%	41.8%		41.8%	41.8%		58.2%	58.2%		58.2%	58.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5		27.5	27.5		27.5	27.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		8.6			8.6			30.3			30.3	
Actuated g/C Ratio		0.18			0.18			0.63			0.63	
v/c Ratio		0.54			0.29			0.72			0.23	
Control Delay		12.8			17.6			15.3			5.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.8			17.6			15.3			5.2	
LOS		B			B			B			A	
Approach Delay		12.8			17.6			15.3			5.2	
Approach LOS		B			B			B			A	
Queue Length 50th (m)		6.7			6.0			23.2			5.0	
Queue Length 95th (m)		20.8			14.7			#89.5			15.8	
Internal Link Dist (m)		1322.1			247.7			1929.3			333.4	
Turn Bay Length (m)												
Base Capacity (vph)		735			651			746			815	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.30			0.13			0.72			0.23	
Intersection Summary												
Area Type:	Other											
Cycle Length:	55											
Actuated Cycle Length:	48											
Natural Cycle:	60											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.72											
Intersection Signal Delay:	13.1						Intersection LOS: B					
Intersection Capacity Utilization:	59.4%						ICU Level of Service B					
Analysis Period (min):	15											
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

Lanes, Volumes, Timings  
8: Burnside Line & Division Road W

2031 Future Background A.M.  
09-25-2024

Splits and Phases: 8: Burnside Line & Division Road W



HCM 2010 TWSC  
9: Industrial Road & Hurlwood Lane

2031 Future Background A.M.  
09-25-2024

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔
Traffic Vol, veh/h	0	140	318	49	32	0
Future Vol, veh/h	0	140	318	49	32	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	152	346	53	35	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	399	0	-	0	525	373
Stage 1	-	-	-	-	373	-
Stage 2	-	-	-	-	152	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1160	-	-	-	513	673
Stage 1	-	-	-	-	696	-
Stage 2	-	-	-	-	876	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1160	-	-	-	513	673
Mov Cap-2 Maneuver	-	-	-	-	579	-
Stage 1	-	-	-	-	696	-
Stage 2	-	-	-	-	876	-
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	11.6			
HCM LOS			B			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1160	-	-	-	579	-
HCM Lane V/C Ratio	-	-	-	-	0.06	-
HCM Control Delay (s)	0	-	-	-	11.6	0
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2	-

HCM 2010 TWSC  
10: Uthoff Line & Industrial Road

2031 Future Background A.M.  
09-25-2024

Intersection						
Int Delay, s/veh	3.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	159	0	84	189	0	126
Future Vol, veh/h	159	0	84	189	0	126
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	0	91	205	0	137
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	331	194	0	0	296	0
Stage 1	194	-	-	-	-	-
Stage 2	137	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	664	847	-	-	1265	-
Stage 1	839	-	-	-	-	-
Stage 2	890	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	664	847	-	-	1265	-
Mov Cap-2 Maneuver	664	-	-	-	-	-
Stage 1	839	-	-	-	-	-
Stage 2	890	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.3	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	664	-	1265	-
HCM Lane V/C Ratio	-	-	0.26	-	-	-
HCM Control Delay (s)	-	-	12.3	0	0	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	1	-	0	-

Lanes, Volumes, Timings  
1: Burnside Line & Industrial Road/Brodie Drive

2031 Future Background P.M.  
09-25-2024

Lanes, Volumes, Timings												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↖	↗	↖	↖	↗	↖	↖	↗	↖
Traffic Volume (vph)	72	40	273	380	2	96	188	284	87	41	224	23
Future Volume (vph)	72	40	273	380	2	96	188	284	87	41	224	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1568	1770	1900	1615	1805	1863	1429	1805	1746	0
Flt Permitted	0.757			0.569			0.460			0.504		
Satd. Flow (perm)	1438	1900	1568	1060	1900	1615	874	1863	1429	958	1746	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			290			145			200			6
Link Speed (k/h)		50			60			60			60	
Link Distance (m)		140.4			136.5			65.5			1953.3	
Travel Time (s)		10.1			8.2			3.9			117.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	3%	2%	0%	0%	0%	2%	13%	0%	8%	0%
Adj. Flow (vph)	77	43	290	404	2	102	200	302	93	44	238	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	43	290	404	2	102	200	302	93	44	262	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	NA
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2031 Future Background P.M.

1: Burnside Line & Industrial Road/Brodie Drive

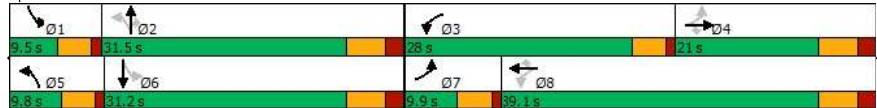
09-25-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	9.9	21.0	21.0	28.0	39.1	39.1	9.8	31.5	31.5	9.5	31.2	
Total Split (%)	11.0%	23.3%	23.3%	31.1%	43.4%	43.4%	10.9%	35.0%	35.0%	10.6%	34.7%	
Maximum Green (s)	5.4	15.0	15.0	23.5	33.1	33.1	5.3	25.5	25.5	5.0	25.2	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	21.9	15.0	15.0	39.5	30.2	30.2	34.0	29.4	29.4	31.6	25.1	
Actuated g/C Ratio	0.26	0.18	0.18	0.47	0.36	0.36	0.40	0.35	0.35	0.37	0.30	
v/c Ratio	0.19	0.13	0.56	0.63	0.00	0.15	0.49	0.47	0.15	0.11	0.50	
Control Delay	16.2	32.1	9.0	20.4	18.0	1.9	22.8	27.0	0.5	16.4	29.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	16.2	32.1	9.0	20.4	18.0	1.9	22.8	27.0	0.5	16.4	29.1	
LOS	B	C	A	C	B	A	C	C	A	B	C	
Approach Delay		12.8			16.7			21.4			27.3	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	7.0	6.3	0.0	45.7	0.3	0.0	21.4	43.1	0.0	4.3	36.1	
Queue Length 95th (m)	14.5	16.2	21.9	70.5	1.7	4.8	39.8	73.8	0.0	11.4	63.8	
Internal Link Dist (m)		116.4			112.5			41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0		65.0	40.0		
Base Capacity (vph)	395	336	516	689	742	719	407	646	626	406	523	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.19	0.13	0.56	0.59	0.00	0.14	0.49	0.47	0.15	0.11	0.50	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	84.9
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	19.1
Intersection LOS:	B
Intersection Capacity Utilization:	72.7%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 1: Burnside Line & Industrial Road/Brodie Drive



Lanes, Volumes, Timings

2031 Future Background P.M.

2: Burnside Line & Highway 11 Westbound On-Ramp

09-25-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑	↑
Traffic Volume (vph)	0	0	0	873	560	293
Future Volume (vph)	0	0	0	873	560	293
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1863	1863	1509
Flt Permitted						
Satd. Flow (perm)	0	0	0	1863	1863	1509
Link Speed (k/h)	50	50	50	50	50	50
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			3.7	12.5	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	2%	2%	7%
Adj. Flow (vph)	0	0	0	891	571	299
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	891	571	299
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Free			Free	Free	

Intersection Summary

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



Lanes, Volumes, Timings

2031 Future Background P.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑	↗		↘
Traffic Volume (vph)	193	202	671	274	0	560
Future Volume (vph)	193	202	671	274	0	560
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1752	1599	1863	1615	0	1863
Flt Permitted	0.950					
Satd. Flow (perm)	1752	1599	1863	1615	0	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		206		280		
Link Speed (k/h)	50		60			60
Link Distance (m)	104.8		160.3			51.5
Travel Time (s)	7.5		9.6			3.1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	1%	2%	0%	0%	2%
Adj. Flow (vph)	197	206	685	280	0	571
Shared Lane Traffic (%)						
Lane Group Flow (vph)	197	206	685	280	0	571
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex		Ch+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Ch+Ex			Ch+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2031 Future Background P.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.9	17.9	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.6	1.6	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.1	6.1	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	12.4	12.4	27.2	27.2		27.2
Actuated g/C Ratio	0.23	0.23	0.51	0.51		0.51
v/c Ratio	0.49	0.39	0.72	0.29		0.60
Control Delay	24.4	6.3	15.3	2.0		12.4
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	24.4	6.3	15.3	2.0		12.4
LOS	C	A	B	A		B
Approach Delay	15.1		11.4			12.4
Approach LOS	B		B			B
Queue Length 50th (m)	16.1	0.0	44.1	0.0		33.6
Queue Length 95th (m)	43.0	15.2	95.7	9.1		72.8
Internal Link Dist (m)	80.8		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	608	689	1734	1522		1734
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.32	0.30	0.40	0.18		0.33

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	53.5
Natural Cycle:	55
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.72
Intersection Signal Delay:	12.5
Intersection Capacity Utilization:	59.0%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	B

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2031 Future Background P.M.

4: West Street North & Highway 11 Eastbound

09-25-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↖	↖	↖
Traffic Volume (vph)	184	157	228	759	631	124
Future Volume (vph)	184	157	228	759	631	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1736	1583	1787	1881	1863	1583
Flt Permitted	0.950		0.188			
Satd. Flow (perm)	1736	1583	354	1881	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		165				70
Link Speed (k/h)	50			60	60	
Link Distance (m)	154.2			160.8	176.6	
Travel Time (s)	11.1			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	2%	1%	1%	2%	2%
Adj. Flow (vph)	194	165	240	799	664	131
Shared Lane Traffic (%)						
Lane Group Flow (vph)	194	165	240	799	664	131
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2031 Future Background P.M.

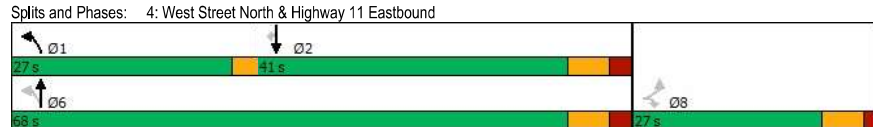
4: West Street North & Highway 11 Eastbound

09-25-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	27.0	27.0	27.0	68.0	41.0	41.0
Total Split (%)	28.4%	28.4%	28.4%	71.6%	43.2%	43.2%
Maximum Green (s)	20.8	20.8	24.0	60.9	33.9	33.9
Yellow Time (s)	4.5	4.5	3.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	3.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	14.0	14.0	51.9	47.7	33.7	33.7
Actuated g/C Ratio	0.19	0.19	0.69	0.63	0.45	0.45
v/c Ratio	0.60	0.38	0.53	0.67	0.80	0.18
Control Delay	37.1	7.8	9.4	12.7	28.8	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	7.8	9.4	12.7	28.8	8.6
LOS	D	A	A	B	C	A
Approach Delay	23.6			12.0	25.5	
Approach LOS	C			B	C	
Queue Length 50th (m)	26.5	0.0	10.3	64.4	78.3	4.8
Queue Length 95th (m)	51.3	15.5	25.0	127.9	#182.0	18.7
Internal Link Dist (m)	130.2			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	485	561	706	1540	849	759
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.29	0.34	0.52	0.78	0.17
Intersection Summary						
Area Type:	Other					
Cycle Length: 95						
Actuated Cycle Length: 75.2						
Natural Cycle: 70						
Control Type: Semi Act-Uncoord						
Maximum v/c Ratio: 0.80						
Intersection Signal Delay: 18.8				Intersection LOS: B		
Intersection Capacity Utilization 70.5%				ICU Level of Service C		
Analysis Period (min) 15						
# 95th percentile volume exceeds capacity, queue may be longer.						
Queue shown is maximum after two cycles.						

Lanes, Volumes, Timings  
4: West Street North & Highway 11 Eastbound

2031 Future Background P.M.  
09-25-2024



Lanes, Volumes, Timings  
5: Highway 12 & West Ridge Boulevard/Murphy Road

2031 Future Background P.M.  
09-25-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↖	↗	↖	↑	↗	↖	↑	↗
Traffic Volume (vph)	252	253	264	427	252	198	251	806	425	89	667	176
Future Volume (vph)	252	253	264	427	252	198	251	806	425	89	667	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.98	1.00								
Frt			0.850		0.934				0.850			0.850
Frt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1900	1599	1787	1765	0	3502	3539	1599	1805	3505	1583
Frt Permitted	0.187			0.321			0.950			0.147		
Satd. Flow (perm)	352	1900	1575	603	1765	0	3502	3539	1599	279	3505	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			281		25				452			161
Link Speed (k/h)		50			70			50			50	
Link Distance (m)		186.6			853.6			529.0			469.5	
Travel Time (s)		13.4			43.9			38.1			33.8	
Confl. Peds. (#/hr)			2	2								
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	0%	1%	1%	1%	0%	0%	2%	1%	0%	3%	2%
Adj. Flow (vph)	268	269	281	454	268	211	267	857	452	95	710	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	268	269	281	454	479	0	267	857	452	95	710	187
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2031 Future Background P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	42.0	35.0	35.0	49.0	42.0		23.0	50.0	50.0	16.0	43.0	43.0
Total Split (%)	28.0%	23.3%	23.3%	32.7%	28.0%		15.3%	33.3%	33.3%	10.7%	28.7%	28.7%
Maximum Green (s)	37.0	27.8	27.8	44.0	34.8		19.0	42.0	42.0	12.0	35.0	35.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0			7.0	7.0			
Flash Dont Walk (s)					19.0			6.0	6.0			
Pedestrian Calls (#/hr)					0			0	0			
Act Effct Green (s)	51.6	28.4	28.4	65.1	36.8		14.9	36.6	36.6	44.9	31.3	31.3
Actuated g/C Ratio	0.40	0.22	0.22	0.51	0.29		0.12	0.28	0.28	0.35	0.24	0.24
v/c Ratio	0.71	0.64	0.50	0.79	0.92		0.66	0.85	0.58	0.45	0.83	0.37
Control Delay	38.7	56.7	8.7	32.5	67.3		64.3	53.3	6.7	31.6	56.7	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.7	56.7	8.7	32.5	67.3		64.3	53.3	6.7	31.6	56.7	11.7
LOS	D	E	A	C	E		E	D	A	C	E	B
Approach Delay		34.3			50.4			41.8			45.8	
Approach LOS		C			D			D			D	
Queue Length 50th (m)	44.1	66.5	0.0	80.6	120.9		35.5	110.6	0.0	14.7	92.7	5.2
Queue Length 95th (m)	83.1	#120.0	26.6	118.8	#219.0		57.2	162.5	28.8	31.3	#144.8	28.3
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	590	422	568	716	522		525	1173	832	247	972	555
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.64	0.49	0.63	0.92		0.51	0.73	0.54	0.38	0.73	0.34

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	128.5
Natural Cycle:	90
Control Type:	Semi Act-Uncoordinated
Maximum v/c Ratio:	0.92
Intersection Signal Delay:	43.2
Intersection LOS:	D
Intersection Capacity Utilization:	88.6%
ICU Level of Service:	E

Lanes, Volumes, Timings

2031 Future Background P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024

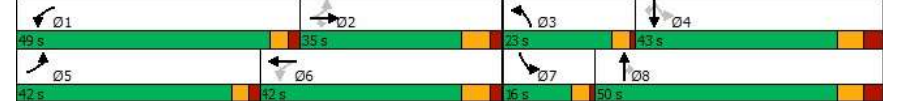


Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2031 Future Background P.M.  
09-25-2024

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	368	5	0	3	3	3	2	0	0	2	0	302
Future Vol, veh/h	368	5	0	3	3	3	2	0	0	2	0	302
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	18	25	0	0	100	0	0	0	0	0	0	27
Mvmt Flow	409	6	0	3	3	3	2	0	0	2	0	336

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	179	176	168	179	344	0	336	0	0	0	0	0
Stage 1	172	172	-	4	4	-	-	-	-	-	-	-
Stage 2	7	4	-	175	340	-	-	-	-	-	-	-
Critical Hdwy	7.28	6.75	6.2	7.1	7.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.28	5.75	-	6.1	6.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.28	5.75	-	6.1	6.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.662	4.225	3.3	3.5	4.9	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	749	678	881	787	449	-	1235	-	-	-	-	-
Stage 1	794	715	-	1024	731	-	-	-	-	-	-	-
Stage 2	975	849	-	832	497	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	677	881	781	448	-	1235	-	-	-	-	-
Mov Cap-2 Maneuver	-	677	-	781	448	-	-	-	-	-	-	-
Stage 1	792	715	-	1022	730	-	-	-	-	-	-	-
Stage 2	969	847	-	826	497	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	-		-		7.9		-	
HCM LOS	-		-		-		-	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1235	-	-	-	-	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-	-	-	-	-
HCM Control Delay (s)	7.9	0	-	-	-	-	-	-
HCM Lane LOS	A	A	-	-	-	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2031 Future Background P.M.  
09-25-2024

Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	4	223	13	37	283	15	21	20	72	6	6	2
Future Vol, veh/h	4	223	13	37	283	15	21	20	72	6	6	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	0	1	0	0	0	0	0	20	0
Mvmt Flow	4	240	14	40	304	16	23	22	77	6	6	2

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	320	0	0	254	0	0	651	655	247	697	654	312
Stage 1	-	-	-	-	-	-	255	255	-	392	392	-
Stage 2	-	-	-	-	-	-	396	400	-	305	262	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.7	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.7	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4.18	3.3
Pot Cap-1 Maneuver	1251	-	-	1323	-	-	384	388	797	358	364	733
Stage 1	-	-	-	-	-	-	754	700	-	637	576	-
Stage 2	-	-	-	-	-	-	633	605	-	709	660	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1251	-	-	1323	-	-	366	372	797	299	349	733
Mov Cap-2 Maneuver	-	-	-	-	-	-	366	372	-	299	349	-
Stage 1	-	-	-	-	-	-	751	697	-	634	555	-
Stage 2	-	-	-	-	-	-	601	583	-	618	657	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0.1		0.9		13.2		15.7	
HCM LOS	-		-		B		C	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	561	1251	-	-	1323	-	-	350
HCM Lane V/C Ratio	0.217	0.003	-	-	0.03	-	-	0.043
HCM Control Delay (s)	13.2	7.9	0	-	7.8	0	-	15.7
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.8	0	-	-	0.1	-	-	0.1

Lanes, Volumes, Timings

2031 Future Background P.M.

8: Burnside Line & Division Road W

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕				↕			↕	
Traffic Volume (vph)	12	142	153	21	108	3	202	173	63	5	89	26
Future Volume (vph)	12	142	153	21	108	3	202	173	63	5	89	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.933		0.997		0.981		0.970		0.998		0.970	
Flt Protected	0.998		0.992		0.977		0.998		0.998		0.998	
Satd. Flow (prot)	0	1744	0	0	1849	0	0	1795	0	0	1571	0
Flt Permitted	0.985		0.916		0.795		0.986		0.986		0.986	
Satd. Flow (perm)	0	1722	0	0	1707	0	0	1461	0	0	1552	0
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	98		2		22		28		28		28	
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	1346.1		271.7		1953.3		357.4		357.4		357.4	
Travel Time (s)	96.9		19.6		140.6		25.7		25.7		25.7	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	1%	0%	2%	0%	1%	4%	0%	23%	0%	0%
Adj. Flow (vph)	13	151	163	22	115	3	215	184	67	5	95	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	327	0	0	140	0	0	466	0	0	128	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0		0.0		3.6		3.6		3.6		3.6	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100		100		100		100		100		100	
Number of Detectors	1	2	1	2	1	2	1	2	1	2	1	2
Detector Template	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru
Leading Detector (m)	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		2		6		6		6	
Permitted Phases	4		8		2		6		6		6	
Detector Phase	4	4	8	8	2	2	6	6	6	6	6	6
Switch Phase												

Lanes, Volumes, Timings

2031 Future Background P.M.

8: Burnside Line & Division Road W

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%
Maximum Green (s)	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Total Lost Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	12.0		12.0		28.4		28.4		28.4		28.4	
Actuated g/C Ratio	0.24		0.24		0.57		0.57		0.57		0.57	
v/c Ratio	0.67		0.34		0.55		0.14		0.14		0.14	
Control Delay	18.2		16.6		10.5		5.6		5.6		5.6	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	18.2		16.6		10.5		5.6		5.6		5.6	
LOS	B		B		B		A		A		A	
Approach Delay	18.2		16.6		10.5		5.6		5.6		5.6	
Approach LOS	B		B		B		A		A		A	
Queue Length 50th (m)	17.9		10.2		21.0		3.5		3.5		3.5	
Queue Length 95th (m)	38.0		21.3		58.1		12.5		12.5		12.5	
Internal Link Dist (m)	1322.1		247.7		1929.3		333.4		333.4		333.4	
Turn Bay Length (m)												
Base Capacity (vph)	708		642		848		903		903		903	
Starvation Cap Reductn	0		0		0		0		0		0	
Spillback Cap Reductn	0		0		0		0		0		0	
Storage Cap Reductn	0		0		0		0		0		0	
Reduced v/c Ratio	0.46		0.22		0.55		0.14		0.14		0.14	

Intersection Summary

Area Type:	Other
Cycle Length:	55
Actuated Cycle Length:	49.4
Natural Cycle:	55
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.67
Intersection Signal Delay:	13.1
Intersection LOS:	B
Intersection Capacity Utilization:	57.0%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 8: Burnside Line & Division Road W



Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔		↔	↔
Traffic Vol, veh/h	0	127	462	37	58	0
Future Vol, veh/h	0	127	462	37	58	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	138	502	40	63	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	542	0	-	0	660	522
Stage 1	-	-	-	-	522	-
Stage 2	-	-	-	-	138	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1027	-	-	-	428	555
Stage 1	-	-	-	-	595	-
Stage 2	-	-	-	-	889	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1027	-	-	-	428	555
Mov Cap-2 Maneuver	-	-	-	-	503	-
Stage 1	-	-	-	-	595	-
Stage 2	-	-	-	-	889	-
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	13.2			
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1027	-	-	-	503	-
HCM Lane V/C Ratio	-	-	-	-	0.125	-
HCM Control Delay (s)	0	-	-	-	13.2	0
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.4	-

Intersection						
Int Delay, s/veh	4.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔		↔	↔
Traffic Vol, veh/h	199	0	179	193	0	109
Future Vol, veh/h	199	0	179	193	0	109
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	216	0	195	210	0	118
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	418	300	0	0	405	0
Stage 1	300	-	-	-	-	-
Stage 2	118	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	591	740	-	-	1154	-
Stage 1	752	-	-	-	-	-
Stage 2	907	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	591	740	-	-	1154	-
Mov Cap-2 Maneuver	591	-	-	-	-	-
Stage 1	752	-	-	-	-	-
Stage 2	907	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	14.6	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	591	-	1154	-
HCM Lane V/C Ratio	-	-	0.366	-	-	-
HCM Control Delay (s)	-	-	14.6	0	0	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	1.7	-	0	-

Lanes, Volumes, Timings

2033 Future Background A.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-25-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	30	128	228	5	39	320	278	82	36	242	45
Future Volume (vph)	47	30	128	228	5	39	320	278	82	36	242	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1615	1736	1900	1615	1805	1439	1468	1805	1522	0
Flt Permitted	0.754			0.581			0.358			0.574		
Satd. Flow (perm)	1433	1900	1615	1061	1900	1615	680	1439	1468	1091	1522	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			255			200			200			11
Link Speed (k/h)	50			60			60			60		60
Link Distance (m)	140.4			136.5			65.5			1953.3		
Travel Time (s)	10.1			8.2			3.9			117.2		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	4%	0%	0%	0%	32%	10%	0%	26%	0%
Adj. Flow (vph)	52	33	141	251	5	43	352	305	90	40	266	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	33	141	251	5	43	352	305	90	40	315	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.6			3.6			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane	Yes											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	0A	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2033 Future Background A.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-25-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	9.6	21.0	21.0	16.1	27.5	27.5	19.4	43.4	43.4	9.5	33.5	
Total Split (%)	10.7%	23.3%	23.3%	17.9%	30.6%	30.6%	21.6%	48.2%	48.2%	10.6%	37.2%	
Maximum Green (s)	5.1	15.0	15.0	11.6	21.5	21.5	14.9	37.4	37.4	5.0	27.5	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	21.6	15.0	15.0	31.9	24.8	24.8	46.1	39.0	39.0	32.2	25.7	
Actuated g/C Ratio	0.25	0.17	0.17	0.37	0.29	0.29	0.53	0.45	0.45	0.37	0.30	
v/c Ratio	0.14	0.10	0.29	0.53	0.01	0.07	0.65	0.47	0.12	0.09	0.69	
Control Delay	20.1	32.3	1.5	25.4	26.0	0.2	18.2	21.3	0.3	11.8	35.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.1	32.3	1.5	25.4	26.0	0.2	18.2	21.3	0.3	11.8	35.5	
LOS	C	C	A	C	C	A	B	C	A	B	D	
Approach Delay		10.3			21.8			17.3			32.8	
Approach LOS		B			C			B			C	
Queue Length 50th (m)	5.8	5.0	0.0	31.9	0.7	0.0	34.6	40.1	0.0	3.2	48.0	
Queue Length 95th (m)	13.9	13.5	0.0	54.5	3.5	0.0	53.5	65.3	0.0	8.0	78.0	
Internal Link Dist (m)		116.4			112.5			41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0			65.0	40.0	
Base Capacity (vph)	378	328	489	479	540	602	552	657	779	444	489	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.10	0.29	0.52	0.01	0.07	0.64	0.46	0.12	0.09	0.64	
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	87											
Natural Cycle:	75											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.69											
Intersection Signal Delay:	20.5						Intersection LOS: C					
Intersection Capacity Utilization:	71.6%						ICU Level of Service C					
Analysis Period (min):	15											
Splits and Phases:	1: Burnside Line & Industrial Road/Brodie Drive											



Lanes, Volumes, Timings

2033 Future Background A.M.

2: Burnside Line & Highway 11 Westbound On-Ramp

09-25-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑	↑
Traffic Volume (vph)	0	0	0	997	343	245
Future Volume (vph)	0	0	0	997	343	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1638	1810	1214
Flt Permitted						
Satd. Flow (perm)	0	0	0	1638	1810	1214
Link Speed (k/h)	50			70	60	
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			2.6	10.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	16%	5%	33%
Adj. Flow (vph)	0	0	0	1049	361	258
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1049	361	258
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.8%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings

2033 Future Background A.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↓	↑	↑	↑		↑
Traffic Volume (vph)	159	259	739	179	0	343
Future Volume (vph)	159	259	739	179	0	343
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1787	1583	1638	1509	0	1810
Flt Permitted	0.950					
Satd. Flow (perm)	1787	1583	1638	1509	0	1810
Right Turn on Red			Yes	Yes		
Satd. Flow (RTOR)			218	188		
Link Speed (k/h)	50		60			60
Link Distance (m)	104.8		160.3			51.5
Travel Time (s)	7.5		9.6			3.1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	16%	7%	0%	5%
Adj. Flow (vph)	167	273	778	188	0	361
Shared Lane Traffic (%)						
Lane Group Flow (vph)	167	273	778	188	0	361
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2033 Future Background A.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	9.7	9.7	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.6	17.6	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.9	1.9	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.4	6.4	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	12.4	12.4	34.4	34.4		34.4
Actuated g/C Ratio	0.20	0.20	0.56	0.56		0.56
v/c Ratio	0.46	0.55	0.85	0.20		0.36
Control Delay	29.6	12.1	21.0	1.6		8.1
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	29.6	12.1	21.0	1.6		8.1
LOS	C	B	C	A		A
Approach Delay	18.7		17.2			8.1
Approach LOS	B		B			A
Queue Length 50th (m)	17.0	5.3	62.0	0.0		18.8
Queue Length 95th (m)	44.4	30.4	133.6	6.9		39.8
Internal Link Dist (m)	80.8		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	543	632	1412	1326		1560
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.31	0.43	0.55	0.14		0.23

Intersection Summary

Area Type:	Other	
Cycle Length:	85	
Actuated Cycle Length:	61.3	
Natural Cycle:	60	
Control Type:	Semi Act-Uncoord	
Maximum v/c Ratio:	0.85	
Intersection Signal Delay:	15.8	Intersection LOS: B
Intersection Capacity Utilization:	66.3%	ICU Level of Service C
Analysis Period (min):	15	

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2033 Future Background A.M.

4: West Street North & Highway 11 Eastbound

09-25-2024

	↙	↖	↗	↑	↓	↘
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↖	↗	↑	↓	↘
Traffic Volume (vph)	287	125	103	626	452	50
Future Volume (vph)	287	125	103	626	452	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1327	1524	1787	1827	1845	1442
Flt Permitted	0.950		0.316			
Satd. Flow (perm)	1327	1524	594	1827	1845	1442
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		132				44
Link Speed (k/h)	50			60	60	
Link Distance (m)	154.2			160.8	176.6	
Travel Time (s)	11.1			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	36%	6%	1%	4%	3%	12%
Adj. Flow (vph)	302	132	108	659	476	53
Shared Lane Traffic (%)						
Lane Group Flow (vph)	302	132	108	659	476	53
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2033 Future Background A.M.

4: West Street North & Highway 11 Eastbound

09-25-2024

	↖	↘	↙	↑	↓	↗
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	38.0	38.0	10.0	52.0	42.0	42.0
Total Split (%)	42.2%	42.2%	11.1%	57.8%	46.7%	46.7%
Maximum Green (s)	31.8	31.8	8.0	44.9	34.9	34.9
Yellow Time (s)	4.5	4.5	2.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	2.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	20.4	20.4	38.1	32.7	25.5	25.5
Actuated g/C Ratio	0.30	0.30	0.57	0.49	0.38	0.38
v/c Ratio	0.75	0.24	0.23	0.74	0.68	0.09
Control Delay	35.0	5.2	9.3	20.9	25.6	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.0	5.2	9.3	20.9	25.6	7.4
LOS	C	A	A	C	C	A
Approach Delay	25.9			19.3	23.7	
Approach LOS	C			B	C	
Queue Length 50th (m)	34.4	0.0	5.8	64.1	53.3	0.8
Queue Length 95th (m)	75.1	11.8	16.4	133.2	105.2	8.3
Internal Link Dist (m)	130.2			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	666	831	487	1288	1017	815
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.16	0.22	0.51	0.47	0.07

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	67.2
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.75
Intersection Signal Delay:	22.3
Intersection Capacity Utilization:	59.9%
Analysis Period (min):	15
Intersection LOS:	C
ICU Level of Service:	B

Splits and Phases: 4: West Street North & Highway 11 Eastbound



Lanes, Volumes, Timings

2033 Future Background A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024

	↖	→	↘	↙	←	↗	↘	↙	↑	↗	↘	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↗	↘	↙	↘	↗	↖	↗	↘	↙	↘	↗	↖
Traffic Volume (vph)	130	168	157	284	253	141	175	439	395	103	714	205	
Future Volume (vph)	130	168	157	284	253	141	175	439	395	103	714	205	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0	
Storage Lanes	1		1	1		0	2		1	1		1	
Taper Length (m)	70.0			65.0			80.0		100.0				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.95	1.00	0.95	1.00
Frt			0.850		0.946				0.850				0.850
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1787	1881	1583	1787	1763	0	3467	3574	1568	1736	3471	1568	
Flt Permitted	0.360			0.536			0.950			0.487			
Satd. Flow (perm)	677	1881	1583	1008	1763	0	3467	3574	1568	890	3471	1568	
Right Turn on Red			Yes			Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)			162		27				407			187	
Link Speed (k/h)		60			60			70			70		
Link Distance (m)		186.6			853.6			529.0			469.5		
Travel Time (s)		11.2			51.2			27.2			24.1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	2%	1%	3%	0%	1%	3%	4%	4%	3%	3%	
Adj. Flow (vph)	134	173	162	293	261	145	180	453	407	106	736	211	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	134	173	162	293	406	0	180	453	407	106	736	211	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width(m)		3.6			3.6			7.2			7.2		
Link Offset(m)		0.0			0.0			0.0			0.0		
Crosswalk Width(m)		4.8			4.8			4.8			4.8		
Two way Left Turn Lane													
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	100		15	25		15	25		100	
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4		
Detector 2 Size(m)		0.6			0.6			0.6			0.6		
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm	
Protected Phases	5	2		1	6		3	8		7	4		

Lanes, Volumes, Timings

2033 Future Background A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	12.0	39.0	39.0	17.0	44.0		12.0	42.0	42.0	12.0	42.0	42.0
Total Split (%)	10.9%	35.5%	35.5%	15.5%	40.0%		10.9%	38.2%	38.2%	10.9%	38.2%	38.2%
Maximum Green (s)	7.0	31.8	31.8	12.0	36.8		8.0	34.0	34.0	8.0	34.0	34.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0					7.0		7.0
Flash Dont Walk (s)					19.0					6.0		6.0
Pedestrian Calls (#/hr)					0					0		0
Act Effct Green (s)	32.8	23.4	23.4	42.0	28.1		8.0	28.2	28.2	37.3	25.4	25.4
Actuated g/C Ratio	0.35	0.25	0.25	0.45	0.30		0.09	0.30	0.30	0.40	0.27	0.27
v/c Ratio	0.42	0.37	0.31	0.53	0.74		0.60	0.42	0.54	0.25	0.78	0.37
Control Delay	21.1	32.2	6.5	21.4	37.0		52.7	28.5	5.8	17.5	37.8	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.1	32.2	6.5	21.4	37.0		52.7	28.5	5.8	17.5	37.8	7.9
LOS	C	C	A	C	D		D	C	A	B	D	A
Approach Delay		20.1			30.4			23.8			29.7	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	14.2	26.8	0.0	34.3	63.2		16.4	35.5	0.0	10.7	64.0	3.2
Queue Length 95th (m)	29.4	49.9	15.7	62.5	108.7		#36.1	57.5	22.5	24.6	98.3	21.4
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	322	650	653	561	722		301	1322	836	432	1284	697
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.27	0.25	0.52	0.56		0.60	0.34	0.49	0.25	0.57	0.30

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	93.1
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	26.6
Intersection LOS:	C
Intersection Capacity Utilization:	78.1%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	

Lanes, Volumes, Timings

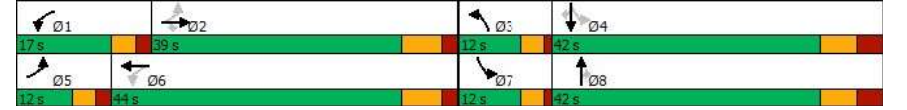
2033 Future Background A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024

Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2033 Future Background A.M.  
09-25-2024

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕		↕		↕		↕		↕		↕	
Traffic Vol, veh/h	250	4	2	0	10	0	0	0	0	0	0	258
Future Vol, veh/h	250	4	2	0	10	0	0	0	0	0	0	258
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	32	67	0	0	30	100	50	0	100	0	50	30
Mvmt Flow	272	4	2	0	11	0	0	0	0	0	0	280

Major/Minor	Minor2	Minor1	Major1	Major2									
Conflicting Flow All	146	140	140	143	280	0	280	0	0	0	0	0	0
Stage 1	140	140	-	0	0	-	-	-	-	-	-	-	-
Stage 2	6	0	-	143	280	-	-	-	-	-	-	-	-
Critical Hdwy	7.42	7.17	6.2	7.1	6.8	7.2	4.6	-	-	4.1	-	-	-
Critical Hdwy Stg 1	6.42	6.17	-	6.1	5.8	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.42	6.17	-	6.1	5.8	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.788	4.603	3.3	3.5	4.27	4.2	2.65	-	-	2.2	-	-	-
Pot Cap-1 Maneuver	759	646	913	831	584	-	1051	-	-	-	-	-	-
Stage 1	796	672	-	-	-	-	-	-	-	-	-	-	-
Stage 2	943	-	-	865	631	-	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	646	913	824	584	-	1051	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	646	-	824	584	-	-	-	-	-	-	-	-
Stage 1	796	672	-	-	-	-	-	-	-	-	-	-	-
Stage 2	943	-	-	857	631	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0	0
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1051	-	-	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	-	-	-
HCM Lane LOS	A	-	-	-	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2033 Future Background A.M.  
09-25-2024

Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕		↕		↕		↕		↕		↕	
Traffic Vol, veh/h	0	163	8	35	131	4	4	5	38	6	11	2
Future Vol, veh/h	0	163	8	35	131	4	4	5	38	6	11	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	2	0	0	1	0	0	25	3	0	11	0
Mvmt Flow	0	170	8	36	136	4	4	5	40	6	11	2

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	140	0	0	178	0	0	391	386	174	407	388	138
Stage 1	-	-	-	-	-	-	174	174	-	210	210	-
Stage 2	-	-	-	-	-	-	217	212	-	197	178	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.75	6.23	7.1	6.61	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.75	-	6.1	5.61	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.75	-	6.1	5.61	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.225	3.327	3.5	4.099	3.3
Pot Cap-1 Maneuver	1456	-	-	1410	-	-	572	514	867	558	533	916
Stage 1	-	-	-	-	-	-	833	713	-	797	712	-
Stage 2	-	-	-	-	-	-	790	686	-	809	735	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1456	-	-	1410	-	-	549	500	867	517	518	916
Mov Cap-2 Maneuver	-	-	-	-	-	-	549	500	-	517	518	-
Stage 1	-	-	-	-	-	-	833	713	-	797	692	-
Stage 2	-	-	-	-	-	-	753	667	-	766	735	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	10	11.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	769	1456	-	-	1410	-	-	542
HCM Lane V/C Ratio	0.064	-	-	-	0.026	-	-	0.037
HCM Control Delay (s)	10	0	-	-	7.6	0	-	11.9
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.1

Lanes, Volumes, Timings

2033 Future Background A.M.

8: Burnside Line & Division Road W

09-25-2024



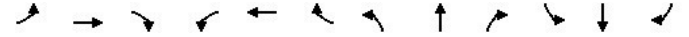
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕				↕			↕	
Traffic Volume (vph)	14	76	122	20	60	2	87	382	33	5	161	14
Future Volume (vph)	14	76	122	20	60	2	87	382	33	5	161	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.922		0.997		0.991		0.990		0.999		0.990	
Flt Protected	0.997		0.988		0.991		0.999		0.999		0.999	
Satd. Flow (prot)	0	1724	0	0	1872	0	0	1268	0	0	1297	0
Flt Permitted	0.975		0.868		0.916		0.990		0.990		0.990	
Satd. Flow (perm)	0	1686	0	0	1644	0	0	1172	0	0	1285	0
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	133		2		9		11		11		11	
Link Speed (k/h)	50		50		70		60		60		60	
Link Distance (m)	1346.1		271.7		1953.3		357.4		357.4		357.4	
Travel Time (s)	96.9		19.6		100.5		21.4		21.4		21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%	0%	62%	0%	0%	50%	0%
Adj. Flow (vph)	15	83	133	22	65	2	95	415	36	5	175	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	231	0	0	89	0	0	546	0	0	195	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0		0.0		3.6		3.6		3.6		3.6	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25	15	25	15	25	15	25	15	25	15
Number of Detectors	1	2	1	2	1	2	1	2	1	2	1	2
Detector Template	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru
Leading Detector (m)	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		2		6		6		6	
Permitted Phases	4		8		2		6		6		6	
Detector Phase	4	4	8	8	2	2	6	6	6	6	6	6
Switch Phase												

Lanes, Volumes, Timings

2033 Future Background A.M.

8: Burnside Line & Division Road W

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%	58.2%	58.2%	58.2%	58.2%	58.2%	58.2%
Maximum Green (s)	18.5	18.5	18.5	18.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Total Lost Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	8.7		8.7		30.3		30.3		30.3		30.3	
Actuated g/C Ratio	0.18		0.18		0.63		0.63		0.63		0.63	
v/c Ratio	0.56		0.30		0.74		0.24		0.24		0.24	
Control Delay	13.0		17.7		16.5		5.4		5.4		5.4	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	13.0		17.7		16.5		5.4		5.4		5.4	
LOS	B		B		B		A		A		A	
Approach Delay	13.0		17.7		16.5		5.4		5.4		5.4	
Approach LOS	B		B		B		A		A		A	
Queue Length 50th (m)	7.0		6.3		24.7		5.3		5.3		5.3	
Queue Length 95th (m)	21.5		15.2		#93.9		16.6		16.6		16.6	
Internal Link Dist (m)	1322.1		247.7		1929.3		333.4		333.4		333.4	
Turn Bay Length (m)												
Base Capacity (vph)	735		639		741		812		812		812	
Starvation Cap Reductn	0		0		0		0		0		0	
Spillback Cap Reductn	0		0		0		0		0		0	
Storage Cap Reductn	0		0		0		0		0		0	
Reduced v/c Ratio	0.31		0.14		0.74		0.24		0.24		0.24	
Intersection Summary												
Area Type:	Other											
Cycle Length:	55											
Actuated Cycle Length:	48.1											
Natural Cycle:	60											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.74											
Intersection Signal Delay:	13.8						Intersection LOS: B					
Intersection Capacity Utilization:	60.8%						ICU Level of Service B					
Analysis Period (min):	15											
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

Lanes, Volumes, Timings  
8: Burnside Line & Division Road W

2033 Future Background A.M.  
09-25-2024

Splits and Phases: 8: Burnside Line & Division Road W



HCM 2010 TWSC  
9: Industrial Road & Hurlwood Lane

2033 Future Background A.M.  
09-25-2024

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔
Traffic Vol, veh/h	0	140	318	51	33	0
Future Vol, veh/h	0	140	318	51	33	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	152	346	55	36	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	401	0	-	0	526	374
Stage 1	-	-	-	-	374	-
Stage 2	-	-	-	-	152	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1158	-	-	-	512	672
Stage 1	-	-	-	-	696	-
Stage 2	-	-	-	-	876	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1158	-	-	-	512	672
Mov Cap-2 Maneuver	-	-	-	-	579	-
Stage 1	-	-	-	-	696	-
Stage 2	-	-	-	-	876	-
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	11.6			
HCM LOS			B			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1158	-	-	-	579	-
HCM Lane V/C Ratio	-	-	-	-	0.062	-
HCM Control Delay (s)	0	-	-	-	11.6	0
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2	-

HCM 2010 TWSC  
10: Uthoff Line & Industrial Road

2033 Future Background A.M.  
09-25-2024

Intersection						
Int Delay, s/veh	3.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	159	0	87	189	0	129
Future Vol, veh/h	159	0	87	189	0	129
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	0	95	205	0	140
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	338	198	0	0	300	0
Stage 1	198	-	-	-	-	-
Stage 2	140	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	658	843	-	-	1261	-
Stage 1	835	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	658	843	-	-	1261	-
Mov Cap-2 Maneuver	658	-	-	-	-	-
Stage 1	835	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.4	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	658	-	1261	-
HCM Lane V/C Ratio	-	-	0.263	-	-	-
HCM Control Delay (s)	-	-	12.4	0	0	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	1.1	-	0	-

Lanes, Volumes, Timings  
1: Burnside Line & Industrial Road/Brodie Drive

2033 Future Background P.M.  
09-25-2024

Lane Group												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↖	↗	↗	↖	↗	↖	↖	↗	↖
Traffic Volume (vph)	73	40	275	395	2	100	189	296	90	42	234	23
Future Volume (vph)	73	40	275	395	2	100	189	296	90	42	234	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1568	1770	1900	1615	1805	1863	1429	1805	1748	0
Flt Permitted	0.757			0.569			0.444			0.483		
Satd. Flow (perm)	1438	1900	1568	1060	1900	1615	844	1863	1429	918	1748	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			293			145			200			5
Link Speed (k/h)		50			60			60				60
Link Distance (m)		140.4			136.5			65.5				1953.3
Travel Time (s)		10.1			8.2			3.9				117.2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	3%	2%	0%	0%	0%	2%	13%	0%	8%	0%
Adj. Flow (vph)	78	43	293	420	2	106	201	315	96	45	249	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	43	293	420	2	106	201	315	96	45	273	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	NA
Protected Phases	7	4		3	8		5	2		1	6	



Lanes, Volumes, Timings

2033 Future Background P.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	9.9	21.0	21.0	28.0	39.1	39.1	9.8	31.5	31.5	9.5	31.2	
Total Split (%)	11.0%	23.3%	23.3%	31.1%	43.4%	43.4%	10.9%	35.0%	35.0%	10.6%	34.7%	
Maximum Green (s)	5.4	15.0	15.0	23.5	33.1	33.1	5.3	25.5	25.5	5.0	25.2	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	21.9	15.0	15.0	40.0	30.7	30.7	34.0	29.4	29.4	31.6	25.1	
Actuated g/C Ratio	0.26	0.18	0.18	0.47	0.36	0.36	0.40	0.34	0.34	0.37	0.29	
v/c Ratio	0.20	0.13	0.57	0.64	0.00	0.16	0.51	0.49	0.15	0.12	0.53	
Control Delay	16.3	32.4	9.1	20.8	18.0	2.1	23.5	27.7	0.5	16.6	30.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	16.3	32.4	9.1	20.8	18.0	2.1	23.5	27.7	0.5	16.6	30.0	
LOS	B	C	A	C	B	A	C	C	A	B	C	
Approach Delay		12.8			17.1			22.1			28.1	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	7.1	6.3	0.0	48.1	0.3	0.0	21.9	46.0	0.0	4.5	38.6	
Queue Length 95th (m)	14.7	16.2	22.2	73.9	1.7	5.5	40.2	77.2	0.0	11.6	67.1	
Internal Link Dist (m)		116.4			112.5			41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0		65.0	40.0		
Base Capacity (vph)	392	334	517	691	737	715	395	642	624	391	520	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.20	0.13	0.57	0.61	0.00	0.15	0.51	0.49	0.15	0.12	0.53	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 85.4

Natural Cycle: 75

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 19.6

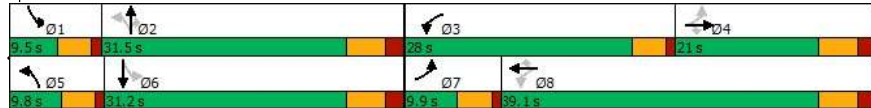
Intersection LOS: B

Intersection Capacity Utilization 73.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Burnside Line & Industrial Road/Brodie Drive



Lanes, Volumes, Timings

2033 Future Background P.M.

2: Burnside Line & Highway 11 Westbound On-Ramp

09-25-2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑	↑
Traffic Volume (vph)	0	0	0	901	579	299
Future Volume (vph)	0	0	0	901	579	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1863	1863	1509
Flt Permitted						
Satd. Flow (perm)	0	0	0	1863	1863	1509
Link Speed (k/h)	50	50	50	50	50	50
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			3.7	12.5	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	2%	2%	7%
Adj. Flow (vph)	0	0	0	919	591	305
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	919	591	305
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Free			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 50.8%

ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings

2033 Future Background P.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	201	205	697	285	0	579
Future Volume (vph)	201	205	697	285	0	579
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1752	1599	1863	1615	0	1863
Flt Permitted	0.950					
Satd. Flow (perm)	1752	1599	1863	1615	0	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		209		291		
Link Speed (k/h)	50		60			60
Link Distance (m)	104.8		160.3			51.5
Travel Time (s)	7.5		9.6			3.1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	1%	2%	0%	0%	2%
Adj. Flow (vph)	205	209	711	291	0	591
Shared Lane Traffic (%)						
Lane Group Flow (vph)	205	209	711	291	0	591
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex		Ch+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Ch+Ex			Ch+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2033 Future Background P.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.9	17.9	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.6	1.6	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.1	6.1	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	12.6	12.6	28.4	28.4		28.4
Actuated g/C Ratio	0.23	0.23	0.52	0.52		0.52
v/c Ratio	0.51	0.40	0.74	0.30		0.61
Control Delay	25.7	6.4	15.7	1.9		12.5
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	25.7	6.4	15.7	1.9		12.5
LOS	C	A	B	A		B
Approach Delay	16.0		11.7			12.5
Approach LOS	B		B			B
Queue Length 50th (m)	17.5	0.0	48.0	0.0		35.9
Queue Length 95th (m)	46.2	15.8	101.1	9.0		75.6
Internal Link Dist (m)	80.8		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	595	681	1757	1540		1757
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.34	0.31	0.40	0.19		0.34

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	54.9
Natural Cycle:	55
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.74
Intersection Signal Delay:	12.8
Intersection Capacity Utilization:	60.5%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	B

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2033 Future Background P.M.

4: West Street North & Highway 11 Eastbound

09-25-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↗	↗
Traffic Volume (vph)	192	163	237	788	653	128
Future Volume (vph)	192	163	237	788	653	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0		40.0	
Storage Lanes	1	1	1		1	
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1736	1583	1787	1881	1863	1583
Flt Permitted	0.950		0.168			
Satd. Flow (perm)	1736	1583	316	1881	1863	1583
Right Turn on Red		Yes			Yes	
Satd. Flow (RTOR)		172			69	
Link Speed (k/h)	50			60	60	
Link Distance (m)	154.2			160.8	176.6	
Travel Time (s)	11.1			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	2%	1%	1%	2%	2%
Adj. Flow (vph)	202	172	249	829	687	135
Shared Lane Traffic (%)						
Lane Group Flow (vph)	202	172	249	829	687	135
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2033 Future Background P.M.

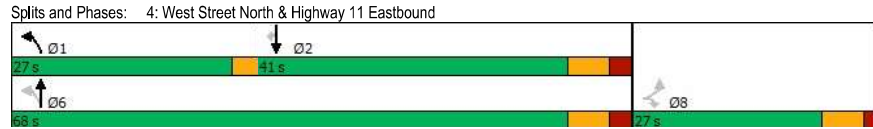
4: West Street North & Highway 11 Eastbound

09-25-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	27.0	27.0	27.0	68.0	41.0	41.0
Total Split (%)	28.4%	28.4%	28.4%	71.6%	43.2%	43.2%
Maximum Green (s)	20.8	20.8	24.0	60.9	33.9	33.9
Yellow Time (s)	4.5	4.5	3.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	3.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	14.4	14.4	52.8	48.7	34.3	34.3
Actuated g/C Ratio	0.19	0.19	0.69	0.64	0.45	0.45
v/c Ratio	0.62	0.39	0.57	0.69	0.82	0.18
Control Delay	38.1	7.7	11.5	13.5	31.0	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.1	7.7	11.5	13.5	31.0	9.1
LOS	D	A	B	B	C	A
Approach Delay	24.1			13.0	27.4	
Approach LOS	C			B	C	
Queue Length 50th (m)	28.0	0.0	11.0	69.9	84.7	5.4
Queue Length 95th (m)	53.8	15.9	31.5	138.1	#195.1	19.8
Internal Link Dist (m)	130.2			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	477	559	684	1513	834	747
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.31	0.36	0.55	0.82	0.18
Intersection Summary						
Area Type:	Other					
Cycle Length: 95						
Actuated Cycle Length: 76.5						
Natural Cycle: 70						
Control Type: Semi Act-Uncoord						
Maximum v/c Ratio: 0.82						
Intersection Signal Delay: 20.0	Intersection LOS: C					
Intersection Capacity Utilization 72.6%	ICU Level of Service C					
Analysis Period (min) 15						
# 95th percentile volume exceeds capacity, queue may be longer.						
Queue shown is maximum after two cycles.						

Lanes, Volumes, Timings  
4: West Street North & Highway 11 Eastbound

2033 Future Background P.M.  
09-25-2024



Lanes, Volumes, Timings  
5: Highway 12 & West Ridge Boulevard/Murphy Road

2033 Future Background P.M.  
09-25-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷	↷	↶	↷	↷	↶	↷	↷	↶	↷	↷
Traffic Volume (vph)	261	262	274	440	260	203	261	838	436	91	694	183
Future Volume (vph)	261	262	274	440	260	203	261	838	436	91	694	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.98	1.00								
Frt			0.850		0.934				0.850			0.850
Frt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1900	1599	1787	1765	0	3502	3539	1599	1805	3505	1583
Frt Permitted	0.150			0.290			0.950			0.132		
Satd. Flow (perm)	282	1900	1575	545	1765	0	3502	3539	1599	251	3505	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			278		24				464			161
Link Speed (k/h)		50			70			50			50	
Link Distance (m)		186.6			853.6			529.0			469.5	
Travel Time (s)		13.4			43.9			38.1			33.8	
Confl. Peds. (#/hr)			2	2								
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	0%	1%	1%	1%	0%	0%	2%	1%	0%	3%	2%
Adj. Flow (vph)	278	279	291	468	277	216	278	891	464	97	738	195
Shared Lane Traffic (%)												
Lane Group Flow (vph)	278	279	291	468	493	0	278	891	464	97	738	195
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2033 Future Background P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	42.0	35.0	35.0	49.0	42.0		23.0	50.0	50.0	16.0	43.0	43.0
Total Split (%)	28.0%	23.3%	23.3%	32.7%	28.0%		15.3%	33.3%	33.3%	10.7%	28.7%	28.7%
Maximum Green (s)	37.0	27.8	27.8	44.0	34.8		19.0	42.0	42.0	12.0	35.0	35.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0			7.0	7.0			
Flash Dont Walk (s)					19.0			6.0	6.0			
Pedestrian Calls (#/hr)					0			0	0			
Act Effct Green (s)	52.1	27.9	27.9	66.1	36.9		15.4	38.1	38.1	46.1	32.3	32.3
Actuated g/C Ratio	0.40	0.21	0.21	0.50	0.28		0.12	0.29	0.29	0.35	0.25	0.25
v/c Ratio	0.77	0.69	0.53	0.82	0.96		0.68	0.87	0.59	0.48	0.85	0.38
Control Delay	47.4	60.5	10.5	36.2	76.5		65.9	55.0	6.7	33.1	58.8	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.4	60.5	10.5	36.2	76.5		65.9	55.0	6.7	33.1	58.8	12.8
LOS	D	E	B	D	E		E	D	A	C	E	B
Approach Delay		39.0			56.9			43.1			47.7	
Approach LOS		D			E			D			D	
Queue Length 50th (m)	55.2	73.6	3.0	88.6	~139.4		38.4	118.4	0.0	15.3	99.5	7.0
Queue Length 95th (m)	92.0	#127.8	31.7	127.2	#232.9		59.4	#178.8	29.3	31.6	#154.4	31.5
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0	120.0	110.0			50.0
Base Capacity (vph)	566	411	558	697	513		514	1149	832	237	953	547
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.68	0.52	0.67	0.96		0.54	0.78	0.56	0.41	0.77	0.36

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	131.1
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.96
Intersection Signal Delay:	46.3
Intersection LOS:	D
Intersection Capacity Utilization:	90.2%
ICU Level of Service:	E

Lanes, Volumes, Timings

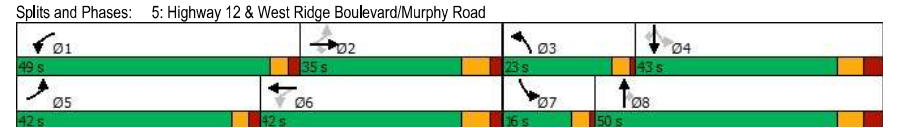
2033 Future Background P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024



Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road

HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2033 Future Background P.M.  
09-25-2024

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Vol, veh/h	374	5	0	3	3	3	2	0	0	2	0	305
Future Vol, veh/h	374	5	0	3	3	3	2	0	0	2	0	305
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	18	25	0	0	100	0	0	0	0	0	0	27
Mvmt Flow	416	6	0	3	3	3	2	0	0	2	0	339

Major/Minor	Minor2	Minor1	Major1	Major2							
Conflicting Flow All	181	178	170	181	347	0	339	0	0	0	0
Stage 1	174	174	-	4	4	-	-	-	-	-	-
Stage 2	7	4	-	177	343	-	-	-	-	-	-
Critical Hdwy	7.28	6.75	6.2	7.1	7.5	6.2	4.1	-	-	4.1	-
Critical Hdwy Stg 1	6.28	5.75	-	6.1	6.5	-	-	-	-	-	-
Critical Hdwy Stg 2	6.28	5.75	-	6.1	6.5	-	-	-	-	-	-
Follow-up Hdwy	3.662	4.225	3.3	3.5	4.9	3.3	2.2	-	-	2.2	-
Pot Cap-1 Maneuver	746	676	879	785	447	-	1231	-	-	-	-
Stage 1	792	713	-	1024	731	-	-	-	-	-	-
Stage 2	975	849	-	829	495	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	675	879	779	446	-	1231	-	-	-	-
Mov Cap-2 Maneuver	-	675	-	779	446	-	-	-	-	-	-
Stage 1	790	713	-	1022	730	-	-	-	-	-	-
Stage 2	969	847	-	823	495	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			7.9	
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1231	-	-	-	-	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-	-	-	-	-
HCM Control Delay (s)	7.9	0	-	-	-	-	-	-
HCM Lane LOS	A	A	-	-	-	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2033 Future Background P.M.  
09-25-2024

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Vol, veh/h	4	232	14	39	294	16	22	21	75	6	6	2
Future Vol, veh/h	4	232	14	39	294	16	22	21	75	6	6	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	0	1	0	0	0	0	0	20	0
Mvmt Flow	4	249	15	42	316	17	24	23	81	6	6	2

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	333	0	0	264	0	0	678	682	257	726	681	325
Stage 1	-	-	-	-	-	-	265	265	-	409	409	-
Stage 2	-	-	-	-	-	-	413	417	-	317	272	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.7	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.7	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4.18	3.3
Pot Cap-1 Maneuver	1238	-	-	1312	-	-	369	375	787	343	351	721
Stage 1	-	-	-	-	-	-	745	693	-	623	566	-
Stage 2	-	-	-	-	-	-	620	595	-	698	653	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1238	-	-	1312	-	-	351	359	787	284	336	721
Mov Cap-2 Maneuver	-	-	-	-	-	-	351	359	-	284	336	-
Stage 1	-	-	-	-	-	-	742	690	-	621	544	-
Stage 2	-	-	-	-	-	-	587	572	-	604	650	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.9	13.6	16.3
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	545	1238	-	-	1312	-	-	335
HCM Lane V/C Ratio	0.233	0.003	-	-	0.032	-	-	0.045
HCM Control Delay (s)	13.6	7.9	0	-	7.8	0	-	16.3
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.9	0	-	-	0.1	-	-	0.1

Lanes, Volumes, Timings

2033 Future Background P.M.

8: Burnside Line & Division Road W

09-25-2024



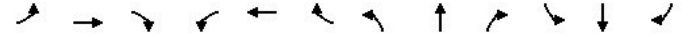
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕				↕			↕	
Traffic Volume (vph)	12	147	159	22	113	3	210	178	65	5	92	27
Future Volume (vph)	12	147	159	22	113	3	210	178	65	5	92	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932		0.997		0.981		0.970		0.998		0.970	
Flt Protected	0.998		0.992		0.977		0.998		0.998		0.998	
Satd. Flow (prot)	0	1742	0	0	1849	0	0	1795	0	0	1571	0
Flt Permitted	0.986		0.912		0.791		0.986		0.986		0.986	
Satd. Flow (perm)	0	1722	0	0	1700	0	0	1454	0	0	1552	0
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	99		2		22		29		29		29	
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	1346.1		271.7		1953.3		357.4		357.4		357.4	
Travel Time (s)	96.9		19.6		140.6		25.7		25.7		25.7	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	1%	0%	2%	0%	1%	1%	4%	0%	23%	0%
Adj. Flow (vph)	13	156	169	23	120	3	223	189	69	5	98	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	338	0	0	146	0	0	481	0	0	132	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0		0.0		3.6		3.6		3.6		3.6	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100		100		100		100		100		100	
Number of Detectors	1	2	1	2	1	2	1	2	1	2	1	2
Detector Template	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru
Leading Detector (m)	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Detector Phase	4	4	8	8	8	8	2	2	6	6	6	6
Switch Phase												

Lanes, Volumes, Timings

2033 Future Background P.M.

8: Burnside Line & Division Road W

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		23.0	23.0		23.0	23.0	
Total Split (%)	41.8%	41.8%		41.8%	41.8%		58.2%	58.2%		58.2%	58.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5		27.5	27.5		27.5	27.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Total Lost Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	12.2		12.2		28.2		28.2		28.2		28.2	
Actuated g/C Ratio	0.25		0.25		0.57		0.57		0.57		0.57	
v/c Ratio	0.88		0.35		0.57		0.15		0.15		0.15	
Control Delay	18.6		16.7		11.1		5.7		5.7		5.7	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	18.6		16.7		11.1		5.7		5.7		5.7	
LOS	B		B		B		A		A		A	
Approach Delay	18.6		16.7		11.1		5.7		5.7		5.7	
Approach LOS	B		B		B		A		A		A	
Queue Length 50th (m)	18.8		10.7		22.8		3.8		3.8		3.8	
Queue Length 95th (m)	39.6		22.2		61.4		12.8		12.8		12.8	
Internal Link Dist (m)	1322.1		247.7		1929.3		333.4		333.4		333.4	
Turn Bay Length (m)												
Base Capacity (vph)	709		641		838		897		897		897	
Starvation Cap Reductn	0		0		0		0		0		0	
Spillback Cap Reductn	0		0		0		0		0		0	
Storage Cap Reductn	0		0		0		0		0		0	
Reduced v/c Ratio	0.48		0.23		0.57		0.15		0.15		0.15	

Intersection Summary

Area Type:	Other
Cycle Length:	55
Actuated Cycle Length:	49.4
Natural Cycle:	55
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	13.5
Intersection LOS:	B
Intersection Capacity Utilization:	58.4%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 8: Burnside Line & Division Road W



HCM 2010 TWSC  
9: Industrial Road & Hurlwood Lane

2033 Future Background P.M.  
09-25-2024

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔		↔	↔
Traffic Vol, veh/h	0	127	462	39	60	0
Future Vol, veh/h	0	127	462	39	60	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	138	502	42	65	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	544	0	0	661	523
Stage 1	-	-	-	523	-
Stage 2	-	-	-	138	-
Critical Hdwy	4.12	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	1025	-	-	427	554
Stage 1	-	-	-	595	-
Stage 2	-	-	-	889	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1025	-	-	427	554
Mov Cap-2 Maneuver	-	-	-	502	-
Stage 1	-	-	-	595	-
Stage 2	-	-	-	889	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	13.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1025	-	-	-	502	-
HCM Lane V/C Ratio	-	-	-	-	0.13	-
HCM Control Delay (s)	0	-	-	-	13.2	0
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.4	-

HCM 2010 TWSC  
10: Uththoff Line & Industrial Road

2033 Future Background P.M.  
09-25-2024

Intersection						
Int Delay, s/veh	4.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔		↔	↔
Traffic Vol, veh/h	199	0	184	193	0	112
Future Vol, veh/h	199	0	184	193	0	112
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	216	0	200	210	0	122

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	427	305	0	0	410
Stage 1	305	-	-	-	-
Stage 2	122	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	584	735	-	-	1149
Stage 1	748	-	-	-	-
Stage 2	903	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	584	735	-	-	1149
Mov Cap-2 Maneuver	584	-	-	-	-
Stage 1	748	-	-	-	-
Stage 2	903	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	584	-	1149	-
HCM Lane V/C Ratio	-	-	0.37	-	-	-
HCM Control Delay (s)	-	-	14.7	0	0	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	1.7	-	0	-



Lanes, Volumes, Timings

2035 Future Background A.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-25-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	48	30	129	237	5	40	321	289	85	38	252	45
Future Volume (vph)	48	30	129	237	5	40	321	289	85	38	252	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1615	1736	1900	1615	1805	1439	1468	1805	1520	0
Flt Permitted	0.754			0.580			0.345			0.568		
Satd. Flow (perm)	1433	1900	1615	1060	1900	1615	656	1439	1468	1079	1520	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			255			200			200		10	
Link Speed (k/h)	50			60			60			60		
Link Distance (m)	140.4			136.5			65.5			1953.3		
Travel Time (s)		10.1			8.2			3.9			117.2	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	4%	0%	0%	0%	32%	10%	0%	26%	0%
Adj. Flow (vph)	53	33	142	260	5	44	353	318	93	42	277	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	33	142	260	5	44	353	318	93	42	326	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width(m)	3.6			3.6			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane	Yes											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Ch+Ex			Ch+Ex			Ch+Ex			Ch+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	0.0	Perm	pm+pt	0.0	Perm	pm+pt	0.0	Perm	pm+pt	0.0	NA
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2035 Future Background A.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-25-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	9.6	21.0	21.0	16.1	27.5	27.5	19.4	43.4	43.4	9.5	33.5	
Total Split (%)	10.7%	23.3%	23.3%	17.9%	30.6%	30.6%	21.6%	48.2%	48.2%	10.6%	37.2%	
Maximum Green (s)	5.1	15.0	15.0	11.6	21.5	21.5	14.9	37.4	37.4	5.0	27.5	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	21.6	15.0	15.0	32.0	24.9	24.9	46.3	39.2	39.2	32.4	25.9	
Actuated g/C Ratio	0.25	0.17	0.17	0.37	0.29	0.29	0.53	0.45	0.45	0.37	0.30	
v/c Ratio	0.14	0.10	0.29	0.55	0.01	0.07	0.66	0.49	0.12	0.10	0.71	
Control Delay	20.2	32.4	1.5	26.1	26.2	0.2	18.6	21.6	0.3	11.8	36.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.2	32.4	1.5	26.1	26.2	0.2	18.6	21.6	0.3	11.8	36.7	
LOS	C	C	A	C	C	A	B	C	A	B	D	
Approach Delay		10.3			22.4			17.6			33.8	
Approach LOS		B			C			B			C	
Queue Length 50th (m)	5.9	5.0	0.0	33.3	0.7	0.0	34.8	42.3	0.0	3.4	50.4	
Queue Length 95th (m)	14.2	13.5	0.0	56.5	3.5	0.0	53.8	68.8	0.0	8.2	81.6	
Internal Link Dist (m)			116.4			112.5			41.5		1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0		65.0	40.0		
Base Capacity (vph)	377	326	489	478	540	602	544	655	777	442	486	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.10	0.29	0.54	0.01	0.07	0.65	0.49	0.12	0.10	0.67	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	87.3
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	21.1
Intersection Capacity Utilization:	72.2%
Analysis Period (min):	15
Intersection LOS:	C
ICU Level of Service:	C

Splits and Phases: 1: Burnside Line & Industrial Road/Brodie Drive



Lanes, Volumes, Timings

2035 Future Background A.M.

2: Burnside Line & Highway 11 Westbound On-Ramp

09-25-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	1026	355	253
Future Volume (vph)	0	0	0	1026	355	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1638	1810	1214
Flt Permitted						
Satd. Flow (perm)	0	0	0	1638	1810	1214
Link Speed (k/h)	50			70	60	
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			2.6	10.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	16%	5%	33%
Adj. Flow (vph)	0	0	0	1080	374	266
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1080	374	266
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	57.3%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings

2035 Future Background A.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	166	261	765	186	0	355
Future Volume (vph)	166	261	765	186	0	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1787	1583	1638	1509	0	1810
Flt Permitted	0.950					
Satd. Flow (perm)	1787	1583	1638	1509	0	1810
Right Turn on Red			Yes	Yes		
Satd. Flow (RTOR)			206	196		
Link Speed (k/h)	50		60			60
Link Distance (m)	104.8		160.3			51.5
Travel Time (s)	7.5		9.6			3.1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	16%	7%	0%	5%
Adj. Flow (vph)	175	275	805	196	0	374
Shared Lane Traffic (%)						
Lane Group Flow (vph)	175	275	805	196	0	374
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15		25
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2035 Future Background A.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	9.7	9.7	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.6	17.6	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.9	1.9	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.4	6.4	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	12.7	12.7	36.0	36.0		36.0
Actuated g/C Ratio	0.20	0.20	0.57	0.57		0.57
v/c Ratio	0.49	0.57	0.86	0.21		0.36
Control Delay	31.0	13.6	22.3	1.6		8.2
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	31.0	13.6	22.3	1.6		8.2
LOS	C	B	C	A		A
Approach Delay	20.4		18.3			8.2
Approach LOS	C		B			A
Queue Length 50th (m)	18.9	7.0	68.1	0.0		20.3
Queue Length 95th (m)	46.3	33.5	143.8	7.0		41.4
Internal Link Dist (m)	80.8		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	527	612	1380	1302		1525
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.33	0.45	0.58	0.15		0.25

Intersection Summary

Area Type:	Other	
Cycle Length:	85	
Actuated Cycle Length:	63.3	
Natural Cycle:	60	
Control Type:	Semi Act-Uncoord	
Maximum v/c Ratio:	0.86	
Intersection Signal Delay:	16.7	Intersection LOS: B
Intersection Capacity Utilization:	67.8%	ICU Level of Service C
Analysis Period (min):	15	

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2035 Future Background A.M.

4: West Street North & Highway 11 Eastbound

09-25-2024

	↙	↖	↗	↑	↓	↘
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↖	↗	↑	↓	↘
Traffic Volume (vph)	298	130	107	649	469	52
Future Volume (vph)	298	130	107	649	469	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1327	1524	1787	1827	1845	1442
Flt Permitted	0.950		0.296			
Satd. Flow (perm)	1327	1524	557	1827	1845	1442
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		137				44
Link Speed (k/h)	50			60	60	
Link Distance (m)	154.2			160.8	176.6	
Travel Time (s)	11.1			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	36%	6%	1%	4%	3%	12%
Adj. Flow (vph)	314	137	113	683	494	55
Shared Lane Traffic (%)						
Lane Group Flow (vph)	314	137	113	683	494	55
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2035 Future Background A.M.

4: West Street North & Highway 11 Eastbound

09-25-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	38.0	38.0	10.0	52.0	42.0	42.0
Total Split (%)	42.2%	42.2%	11.1%	57.8%	46.7%	46.7%
Maximum Green (s)	31.8	31.8	8.0	44.9	34.9	34.9
Yellow Time (s)	4.5	4.5	2.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	2.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	21.2	21.2	38.7	33.3	26.0	26.0
Actuated g/C Ratio	0.31	0.31	0.56	0.49	0.38	0.38
v/c Ratio	0.77	0.24	0.25	0.77	0.71	0.10
Control Delay	36.2	5.2	9.7	22.5	26.7	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.2	5.2	9.7	22.5	26.7	7.7
LOS	D	A	A	C	C	A
Approach Delay	26.8			20.7	24.8	
Approach LOS	C			C	C	
Queue Length 50th (m)	37.4	0.0	6.4	70.4	57.9	1.0
Queue Length 95th (m)	78.5	11.9	17.2	141.3	110.4	8.6
Internal Link Dist (m)	130.2			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	654	820	466	1266	997	800
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.17	0.24	0.54	0.50	0.07

Intersection Summary

Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 68.6	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 23.5	Intersection LOS: C
Intersection Capacity Utilization 61.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: West Street North & Highway 11 Eastbound



Lanes, Volumes, Timings

2035 Future Background A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	135	174	163	292	260	145	182	457	405	106	743	213
Future Volume (vph)	135	174	163	292	260	145	182	457	405	106	743	213
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.95	1.00	1.00
Frt			0.850		0.946				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1583	1787	1763	0	3467	3574	1568	1736	3471	1568
Flt Permitted	0.346			0.525			0.950			0.436		
Satd. Flow (perm)	651	1881	1583	988	1763	0	3467	3574	1568	797	3471	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			168		27				418			187
Link Speed (k/h)		60			60			70				70
Link Distance (m)		186.6			853.6			529.0				469.5
Travel Time (s)		11.2			51.2			27.2				24.1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	2%	1%	3%	0%	1%	3%	4%	4%	4%	3%
Adj. Flow (vph)	139	179	168	301	268	149	188	471	418	109	766	220
Shared Lane Traffic (%)												
Lane Group Flow (vph)	139	179	168	301	417	0	188	471	418	109	766	220
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2				7.2
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	100		15	25		15	25		100
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	

Lanes, Volumes, Timings

2035 Future Background A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	12.0	39.0	39.0	17.0	44.0		12.0	42.0	42.0	12.0	42.0	42.0
Total Split (%)	10.9%	35.5%	35.5%	15.5%	40.0%		10.9%	38.2%	38.2%	10.9%	38.2%	38.2%
Maximum Green (s)	7.0	31.8	31.8	12.0	36.8		8.0	34.0	34.0	8.0	34.0	34.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0					7.0		7.0
Flash Dont Walk (s)					19.0					6.0		6.0
Pedestrian Calls (#/hr)					0					0		0
Act Effct Green (s)	33.3	23.9	23.9	42.6	28.6		8.0	26.7	26.7	38.3	26.4	26.4
Actuated g/C Ratio	0.35	0.25	0.25	0.45	0.30		0.08	0.28	0.28	0.40	0.28	0.28
v/c Ratio	0.44	0.38	0.32	0.55	0.76		0.64	0.47	0.56	0.27	0.79	0.38
Control Delay	22.2	32.7	6.4	22.3	38.3		55.0	30.1	6.1	17.9	38.5	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.2	32.7	6.4	22.3	38.3		55.0	30.1	6.1	17.9	38.5	8.5
LOS	C	C	A	C	D		E	C	A	B	D	A
Approach Delay		20.6			31.6			25.1			30.4	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	15.5	28.8	0.0	37.2	68.2		18.0	38.0	0.0	11.4	68.8	4.5
Queue Length 95th (m)	30.3	51.7	15.9	64.3	112.3		#38.6	60.0	22.8	25.0	103.0	23.8
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	313	639	649	551	709		296	1298	835	405	1261	688
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.28	0.26	0.55	0.59		0.64	0.36	0.50	0.27	0.61	0.32

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	94.7
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.79
Intersection Signal Delay:	27.6
Intersection LOS:	C
Intersection Capacity Utilization:	79.4%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	

Lanes, Volumes, Timings

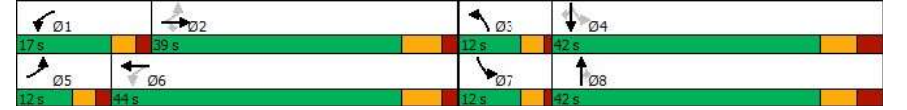
2035 Future Background A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024

Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2035 Future Background A.M.  
09-25-2024

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	253	4	2	0	10	0	0	0	0	0	0	262
Future Vol, veh/h	253	4	2	0	10	0	0	0	0	0	0	262
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	32	67	0	0	30	100	50	0	100	0	50	30
Mvmt Flow	275	4	2	0	11	0	0	0	0	0	0	285

Major/Minor	Minor2	Minor1	Major1	Major2							
Conflicting Flow All	149	143	143	146	285	0	285	0	0	0	0
Stage 1	143	143	-	0	0	-	-	-	-	-	-
Stage 2	6	0	-	146	285	-	-	-	-	-	-
Critical Hdwy	7.42	7.17	6.2	7.1	6.8	7.2	4.6	-	-	4.1	-
Critical Hdwy Stg 1	6.42	6.17	-	6.1	5.8	-	-	-	-	-	-
Critical Hdwy Stg 2	6.42	6.17	-	6.1	5.8	-	-	-	-	-	-
Follow-up Hdwy	3.788	4.603	3.3	3.5	4.27	4.2	2.65	-	-	2.2	-
Pot Cap-1 Maneuver	755	644	910	827	580	-	1046	-	-	-	-
Stage 1	793	670	-	-	-	-	-	-	-	-	-
Stage 2	943	-	-	861	628	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	644	910	820	580	-	1046	-	-	-	-
Mov Cap-2 Maneuver	-	644	-	820	580	-	-	-	-	-	-
Stage 1	793	670	-	-	-	-	-	-	-	-	-
Stage 2	943	-	-	853	628	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0	0
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1046	-	-	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	-	-	-
HCM Lane LOS	A	-	-	-	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2035 Future Background A.M.  
09-25-2024

Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	0	170	8	37	136	4	4	5	39	7	12	2
Future Vol, veh/h	0	170	8	37	136	4	4	5	39	7	12	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	2	0	0	1	0	0	25	3	0	11	0
Mvmt Flow	0	177	8	39	142	4	4	5	41	7	13	2

Major/Minor	Major1	Major2	Minor1	Minor2							
Conflicting Flow All	146	0	0	185	0	0	411	405	181	426	407
Stage 1	-	-	-	-	-	-	181	181	-	222	222
Stage 2	-	-	-	-	-	-	230	224	-	204	185
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.75	6.23	7.1	6.61
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.75	-	6.1	5.61
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.75	-	6.1	5.61
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.225	3.327	3.5	4.099
Pot Cap-1 Maneuver	1448	-	-	1402	-	-	555	501	859	542	520
Stage 1	-	-	-	-	-	-	825	708	-	785	703
Stage 2	-	-	-	-	-	-	777	678	-	803	730
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1448	-	-	1402	-	-	531	486	859	500	504
Mov Cap-2 Maneuver	-	-	-	-	-	-	531	486	-	500	504
Stage 1	-	-	-	-	-	-	825	708	-	785	682
Stage 2	-	-	-	-	-	-	738	658	-	759	730

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	10.1	12.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	759	1448	-	-	1402	-	-	525
HCM Lane V/C Ratio	0.066	-	-	-	0.027	-	-	0.042
HCM Control Delay (s)	10.1	0	-	-	7.6	0	-	12.2
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.1

Lanes, Volumes, Timings

2035 Future Background A.M.

8: Burnside Line & Division Road W

09-25-2024



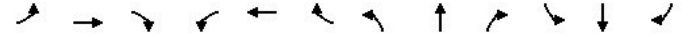
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↕			↕				↕			↕		
Traffic Volume (vph)	14	79	127	20	63	2	90	387	34	5	166	14	
Future Volume (vph)	14	79	127	20	63	2	90	387	34	5	166	14	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.922		0.997		0.991		0.990		0.999		0.990		
Flt Protected	0.997		0.988		0.991		0.999		0.999		0.999		
Satd. Flow (prot)	0	1724	0	0	1872	0	0	1270	0	0	1296	0	
Flt Permitted	0.976		0.869		0.914		0.990		0.990		0.990		
Satd. Flow (perm)	0	1688	0	0	1646	0	0	1171	0	0	1284	0	
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes		
Satd. Flow (RTOR)	135		2		9		11		11		11		
Link Speed (k/h)	50		50		70		60		60		60		
Link Distance (m)	1346.1		271.7		1953.3		357.4		357.4		357.4		
Travel Time (s)	96.9		19.6		100.5		21.4		21.4		21.4		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%	0%	62%	0%	0%	50%	0%	
Adj. Flow (vph)	15	86	138	22	68	2	98	421	37	5	180	15	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	239	0	0	92	0	0	556	0	0	200	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)	0.0		0.0		3.6		3.6		3.6		3.6		
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0		
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8		
Two way Left Turn Lane													
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (k/h)	25	15		25	15		25	15		25	15		
Number of Detectors	1	2	1		2	1		2	1		2	1	
Detector Template	Left	Thru	Left		Thru	Left		Thru	Left		Thru	Left	
Leading Detector (m)	2.0	10.0	2.0		10.0	2.0		10.0	2.0		10.0	2.0	
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0		0.6	2.0		0.6	2.0		0.6	2.0	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4		
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6		
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		
Detector 2 Channel													
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0		
Turn Type	Perm	NA	Perm		NA	Perm		NA	Perm		NA	Perm	
Protected Phases	4		8		2		6		6		6		
Permitted Phases	4		8		2		6		6		6		
Detector Phase	4	4	8		8		2		2		6		
Switch Phase													

Lanes, Volumes, Timings

2035 Future Background A.M.

8: Burnside Line & Division Road W

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		32.0	32.0		32.0	32.0	
Total Split (%)	41.8%	41.8%		41.8%	41.8%		58.2%	58.2%		58.2%	58.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5		27.5	27.5		27.5	27.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Total Lost Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	8.9		8.9		30.3		30.3		30.3		30.3	
Actuated g/C Ratio	0.18		0.18		0.63		0.63		0.63		0.63	
v/c Ratio	0.57		0.30		0.75		0.25		0.25		0.25	
Control Delay	13.3		17.7		17.4		5.5		5.5		5.5	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	13.3		17.7		17.4		5.5		5.5		5.5	
LOS	B		B		B		A		A		A	
Approach Delay	13.3		17.7		17.4		5.5		5.5		5.5	
Approach LOS	B		B		B		A		A		A	
Queue Length 50th (m)	7.5		6.5		25.7		5.5		5.5		5.5	
Queue Length 95th (m)	22.3		15.5		#97.3		17.3		17.3		17.3	
Internal Link Dist (m)	1322.1		247.7		1929.3		333.4		333.4		333.4	
Turn Bay Length (m)												
Base Capacity (vph)	735		638		738		810		810		810	
Starvation Cap Reductn	0		0		0		0		0		0	
Spillback Cap Reductn	0		0		0		0		0		0	
Storage Cap Reductn	0		0		0		0		0		0	
Reduced v/c Ratio	0.33		0.14		0.75		0.25		0.25		0.25	
Intersection Summary												
Area Type:	Other											
Cycle Length:	55											
Actuated Cycle Length:	48.3											
Natural Cycle:	60											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.75											
Intersection Signal Delay:	14.3						Intersection LOS: B					
Intersection Capacity Utilization:	62.1%						ICU Level of Service B					
Analysis Period (min):	15											
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

Lanes, Volumes, Timings  
8: Burnside Line & Division Road W

2035 Future Background A.M.  
09-25-2024

Splits and Phases: 8: Burnside Line & Division Road W



HCM 2010 TWSC  
9: Industrial Road & Hurlwood Lane

2035 Future Background A.M.  
09-25-2024

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔
Traffic Vol, veh/h	0	140	318	53	34	0
Future Vol, veh/h	0	140	318	53	34	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	152	346	58	37	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	404	0	0 527 375
Stage 1	-	-	- 375 -
Stage 2	-	-	- 152 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1155	-	- 512 671
Stage 1	-	-	- 695 -
Stage 2	-	-	- 876 -
Platoon blocked, %	-	-	- -
Mov Cap-1 Maneuver	1155	-	- 512 671
Mov Cap-2 Maneuver	-	-	- 579 -
Stage 1	-	-	- 695 -
Stage 2	-	-	- 876 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1155	-	-	-	579	-
HCM Lane V/C Ratio	-	-	-	-	0.064	-
HCM Control Delay (s)	0	-	-	-	11.6	0
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2	-



HCM 2010 TWSC  
10: Uthoff Line & Industrial Road

2035 Future Background A.M.  
09-25-2024

Intersection						
Int Delay, s/veh	3.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	159	0	90	189	0	133
Future Vol, veh/h	159	0	90	189	0	133
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	0	98	205	0	145
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	346	201	0	0	303	0
Stage 1	201	-	-	-	-	-
Stage 2	145	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	651	840	-	-	1258	-
Stage 1	833	-	-	-	-	-
Stage 2	882	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	651	840	-	-	1258	-
Mov Cap-2 Maneuver	651	-	-	-	-	-
Stage 1	833	-	-	-	-	-
Stage 2	882	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.5	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	651	-	1258	-
HCM Lane V/C Ratio	-	-	0.265	-	-	-
HCM Control Delay (s)	-	-	12.5	0	0	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	1.1	-	0	-

Lanes, Volumes, Timings  
1: Burnside Line & Industrial Road/Brodie Drive

2035 Future Total P.M.  
09-26-2024

	↖	→	↗	↖	←	↖	↗	↖	↗	↖	↗	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↗	↖	↖	↗	↖	↖	↗	↖	↖	↗	↖	↗
Traffic Volume (vph)	73	40	400	411	2	104	316	308	94	44	243	23	
Future Volume (vph)	73	40	400	411	2	104	316	308	94	44	243	23	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0	
Storage Lanes	1		1	1		1	1		1	1		0	
Taper Length (m)	7.5			7.5			7.5			7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1805	1900	1568	1770	1900	1615	1805	1863	1429	1805	1747	0	
Flt Permitted	0.757			0.568			0.392			0.562			
Satd. Flow (perm)	1438	1900	1568	1058	1900	1615	745	1863	1429	1068	1747	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)			404			200			200			5	
Link Speed (k/h)		50			60			60			60		
Link Distance (m)		140.4			136.5			65.5			1953.3		
Travel Time (s)		10.1			8.2			3.9			117.2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Heavy Vehicles (%)	0%	0%	3%	2%	0%	0%	0%	2%	13%	0%	8%	0%	
Adj. Flow (vph)	78	43	426	437	2	111	336	328	100	47	259	24	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	78	43	426	437	2	111	336	328	100	47	283	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		3.6			3.6			3.6			3.6		
Link Offset(m)		0.0			0.0			0.0			0.0		
Crosswalk Width(m)		4.8			4.8			4.8			4.8		
Two way Left Turn Lane		Yes											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (k/h)	25		15	25		15	25		15	25		15	
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2		
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru		
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0		
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Detector 2 Position(m)		9.4			9.4			9.4			9.4		
Detector 2 Size(m)		0.6			0.6			0.6			0.6		
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	7	4		3	8		5	2		1	6		

Lanes, Volumes, Timings

2035 Future Total P.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	10.4	21.0	21.0	21.5	32.1	32.1	15.0	38.0	38.0	9.5	32.5	
Total Split (%)	11.6%	23.3%	23.3%	23.9%	35.7%	35.7%	16.7%	42.2%	42.2%	10.6%	36.1%	
Maximum Green (s)	5.9	15.0	15.0	17.0	26.1	26.1	10.5	32.0	32.0	5.0	26.5	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	22.3	15.0	15.0	37.6	27.8	27.8	41.7	34.5	34.5	31.7	25.2	
Actuated g/C Ratio	0.25	0.17	0.17	0.43	0.31	0.31	0.47	0.39	0.39	0.36	0.29	
v/c Ratio	0.20	0.13	0.71	0.75	0.00	0.17	0.70	0.45	0.15	0.11	0.56	
Control Delay	18.2	32.8	11.9	29.1	22.5	0.6	25.0	23.7	0.5	14.1	31.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	18.2	32.8	11.9	29.1	22.5	0.6	25.0	23.7	0.5	14.1	31.6	
LOS	B	C	B	C	C	A	C	C	A	B	C	
Approach Delay		14.5			23.3			21.2			29.1	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	8.1	6.6	3.4	57.4	0.3	0.0	37.7	46.0	0.0	4.4	42.4	
Queue Length 95th (m)	16.9	16.1	33.3	#91.0	2.0	0.0	58.6	71.6	0.0	10.4	68.3	
Internal Link Dist (m)		116.4			112.5			41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0		65.0	40.0		
Base Capacity (vph)	389	323	602	587	598	645	478	743	690	425	527	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.20	0.13	0.71	0.74	0.00	0.17	0.70	0.44	0.14	0.11	0.54	

Intersection Summary

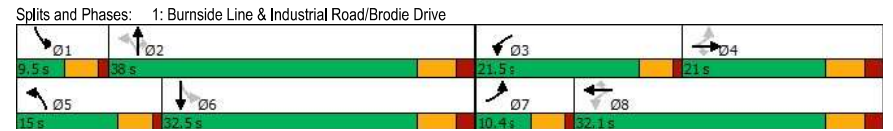
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	88.3
Natural Cycle:	80
Control Type:	Semi Act-Uncooord
Maximum v/c Ratio:	0.75
Intersection Signal Delay:	21.2
Intersection LOS:	C
Intersection Capacity Utilization:	82.1%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings

2035 Future Total P.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-26-2024



Lanes, Volumes, Timings

2035 Future Total P.M.

2: Burnside Line & Highway 11 Westbound On-Ramp

09-26-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑	↑
Traffic Volume (vph)	0	0	0	1057	655	373
Future Volume (vph)	0	0	0	1057	655	373
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1863	1863	1509
Flt Permitted						
Satd. Flow (perm)	0	0	0	1863	1863	1509
Link Speed (k/h)	50			50	50	
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			3.7	12.5	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	2%	2%	7%
Adj. Flow (vph)	0	0	0	1079	668	381
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1079	668	381
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.0%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings

2035 Future Total P.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↓	↑	↑	↑		↑
Traffic Volume (vph)	209	226	832	296	0	655
Future Volume (vph)	209	226	832	296	0	655
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1752	1599	1863	1615	0	1863
Flt Permitted	0.950					
Satd. Flow (perm)	1752	1599	1863	1615	0	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)			187	302		
Link Speed (k/h)	50		60			60
Link Distance (m)	241.7		160.3			51.5
Travel Time (s)	17.4		9.6			3.1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	1%	2%	0%	0%	2%
Adj. Flow (vph)	213	231	849	302	0	668
Shared Lane Traffic (%)						
Lane Group Flow (vph)	213	231	849	302	0	668
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2035 Future Total P.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024

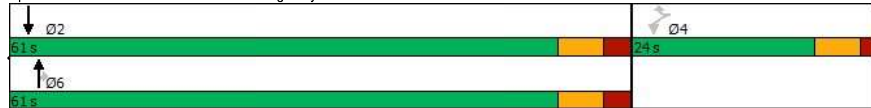


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.9	17.9	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.6	1.6	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.1	6.1	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	13.4	13.4	35.0	35.0		35.0
Actuated g/C Ratio	0.21	0.21	0.56	0.56		0.56
v/c Ratio	0.57	0.47	0.82	0.29		0.64
Control Delay	31.8	11.0	18.3	1.6		12.4
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	31.8	11.0	18.3	1.6		12.4
LOS	C	B	B	A		B
Approach Delay	20.9		14.0			12.4
Approach LOS	C		B			B
Queue Length 50th (m)	22.7	4.2	70.1	0.0		46.9
Queue Length 95th (m)	55.6	26.1	133.9	8.4		88.2
Internal Link Dist (m)	217.7		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	530	614	1579	1415		1579
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.40	0.38	0.54	0.21		0.42

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	62.7
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.82
Intersection Signal Delay:	14.9
Intersection Capacity Utilization:	68.9%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	C

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2035 Future Total P.M.

4: West Street North & Highway 11 Eastbound

09-26-2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↔
Traffic Volume (vph)	235	170	247	891	722	145
Future Volume (vph)	235	170	247	891	722	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1736	1583	1787	1881	1863	1583
Flt Permitted	0.950		0.118			
Satd. Flow (perm)	1736	1583	222	1881	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		179				78
Link Speed (k/h)	50			60	60	
Link Distance (m)	214.0			160.8	176.6	
Travel Time (s)	15.4			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	2%	1%	1%	2%	2%
Adj. Flow (vph)	247	179	260	938	760	153
Shared Lane Traffic (%)						
Lane Group Flow (vph)	247	179	260	938	760	153
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2035 Future Total P.M.

4: West Street North & Highway 11 Eastbound

09-26-2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	25.0	25.0	24.0	70.0	46.0	46.0
Total Split (%)	26.3%	26.3%	25.3%	73.7%	48.4%	48.4%
Maximum Green (s)	18.8	18.8	21.0	62.9	38.9	38.9
Yellow Time (s)	4.5	4.5	3.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	3.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	16.0	16.0	58.8	54.7	38.8	38.8
Actuated g/C Ratio	0.19	0.19	0.70	0.65	0.46	0.46
v/c Ratio	0.75	0.40	0.66	0.77	0.88	0.20
Control Delay	48.5	8.1	20.2	15.9	36.6	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.5	8.1	20.2	15.9	36.6	9.0
LOS	D	A	C	B	D	A
Approach Delay	31.6			16.8	32.0	
Approach LOS	C			B	C	
Queue Length 50th (m)	39.7	0.0	18.7	103.5	116.1	7.1
Queue Length 95th (m)	#78.2	17.4	44.6	161.8	#222.0	21.3
Internal Link Dist (m)	190.0			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	392	496	550	1422	873	783
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.36	0.47	0.66	0.87	0.20

Intersection Summary

Area Type:	Other
Cycle Length:	95
Actuated Cycle Length:	84.1
Natural Cycle:	70
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.88
Intersection Signal Delay:	24.8
Intersection LOS:	C
Intersection Capacity Utilization:	79.1%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings

2035 Future Total P.M.

4: West Street North & Highway 11 Eastbound

09-26-2024

Splits and Phases: 4: West Street North & Highway 11 Eastbound

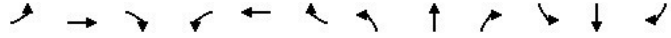


Lanes, Volumes, Timings

2035 Future Total P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024



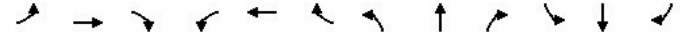
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	272	307	285	499	290	221	272	872	591	111	722	191
Future Volume (vph)	272	307	285	499	290	221	272	872	591	111	722	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00
Ped Bike Factor			0.98	1.00								
Frt			0.850		0.935			0.850				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1900	1599	1787	1766	0	3502	3539	1599	1805	3505	1583
Flt Permitted	0.167			0.161			0.950			0.129		
Satd. Flow (perm)	314	1900	1575	303	1766	0	3502	3539	1599	245	3505	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			208		30				605			186
Link Speed (k/h)		50			70			50			50	
Link Distance (m)		186.6			853.6			529.0			469.5	
Travel Time (s)		13.4			43.9			38.1			33.8	
Confl. Peds. (#/hr)			2		2							
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	0%	1%	1%	1%	0%	0%	2%	1%	0%	3%	2%
Adj. Flow (vph)	289	327	303	531	309	235	289	928	629	118	768	203
Shared Lane Traffic (%)												
Lane Group Flow (vph)	289	327	303	531	544	0	289	928	629	118	768	203
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2035 Future Total P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (%)	27.0	31.4	31.4	41.0	45.4		18.0	46.1	46.1	11.5	39.6	39.6
Total Split (%)	20.8%	24.2%	24.2%	31.5%	34.9%		13.8%	35.5%	35.5%	8.8%	30.5%	30.5%
Maximum Green (s)	22.0	24.2	24.2	36.0	38.2		14.0	38.1	38.1	7.5	31.6	31.6
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0					7.0		7.0
Flash Dont Walk (s)										6.0		6.0
Pedestrian Calls (#/hr)										0		0
Act Efft Green (s)	45.7	24.0	24.0	65.6	38.9		13.5	36.8	36.8	42.4	30.9	30.9
Actuated g/C Ratio	0.36	0.19	0.19	0.52	0.31		0.11	0.29	0.29	0.33	0.24	0.24
v/c Ratio	0.85	0.91	0.65	0.95	0.97		0.78	0.91	0.70	0.68	0.90	0.39
Control Delay	56.8	81.3	22.9	60.2	73.0		70.9	56.7	8.4	46.0	61.9	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.8	81.3	22.9	60.2	73.0		70.9	56.7	8.4	46.0	61.9	9.5
LOS	E	F	C	E	E		E	E	A	D	E	A
Approach Delay		54.4			66.7					42.5		50.4
Approach LOS		D			E					D		D
Queue Length 50th (m)	55.0	87.6	22.7	117.7	~142.8		39.6	126.3	4.7	19.8	106.3	3.5
Queue Length 95th (m)	#98.9	#145.2	56.5	#188.6	#219.6		#58.7	#163.4	41.6	#39.6	#141.8	24.0
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	375	362	469	578	561		387	1064	904	174	873	534
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.90	0.65	0.92	0.97		0.75	0.87	0.70	0.68	0.88	0.38
Intersection Summary												
Area Type:	Other											
Cycle Length:	130											
Actuated Cycle Length:	127											
Natural Cycle:	90											
Control Type:	Semi Act-Uncooord											
Maximum v/c Ratio:	0.97											
Intersection Signal Delay:	51.7						Intersection LOS: D					
Intersection Capacity Utilization:	94.7%						ICU Level of Service F					

Lanes, Volumes, Timings

2035 Future Total P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024

Analysis Period (min) 15

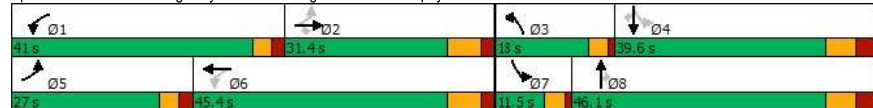
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



Lanes, Volumes, Timings

2035 Future Total P.M.

6: Unthoff Line & Murphy Road

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	577	5	0	3	3	3	2	0	0	2	0	331
Future Volume (vph)	577	5	0	3	3	3	2	0	0	2	0	331
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.955						0.866	
Flt Protected		0.953			0.984			0.950				
Satd. Flow (prot)	0	1534	0	0	1339	0	0	1805	0	0	1297	0
Flt Permitted		0.953			0.984			0.950				
Satd. Flow (perm)	0	1534	0	0	1339	0	0	1805	0	0	1297	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		853.6			117.8			131.4			177.2	
Travel Time (s)		61.5			8.5			7.9			10.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	18%	25%	0%	0%	100%	0%	0%	0%	0%	0%	0%	27%
Adj. Flow (vph)	641	6	0	3	3	3	2	0	0	2	0	368
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	647	0	0	9	0	0	2	0	0	370	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		25		15	25		15	25		15	25	
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 66.1%

ICU Level of Service C

Analysis Period (min) 15

HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2035 Future Total P.M.  
09-26-2024

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Vol, veh/h	577	5	0	3	3	3	2	0	0	2	0	331
Future Vol, veh/h	577	5	0	3	3	3	2	0	0	2	0	331
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	18	25	0	0	100	0	0	0	0	0	0	27
Mvmt Flow	641	6	0	3	3	3	2	0	0	2	0	368

Major/Minor	Minor2	Minor1	Major1	Major2									
Conflicting Flow All	195	192	184	195	376	0	368	0	0	0	0	0	0
Stage 1	188	188	-	4	4	-	-	-	-	-	-	-	-
Stage 2	7	4	-	191	372	-	-	-	-	-	-	-	-
Critical Hdwy	7.28	6.75	6.2	7.1	7.5	6.2	4.1	-	-	4.1	-	-	-
Critical Hdwy Stg 1	6.28	5.75	-	6.1	6.5	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.28	5.75	-	6.1	6.5	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.662	4.225	3.3	3.5	4.9	3.3	2.2	-	-	2.2	-	-	-
Pot Cap-1 Maneuver	731	664	864	769	429	-	1202	-	-	-	-	-	-
Stage 1	778	703	-	1024	731	-	-	-	-	-	-	-	-
Stage 2	975	849	-	815	478	-	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	663	864	763	428	-	1202	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	663	-	763	428	-	-	-	-	-	-	-	-
Stage 1	776	703	-	1022	730	-	-	-	-	-	-	-	-
Stage 2	969	847	-	809	478	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8			
HCM LOS	-			

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1202	-	-	-	-	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-	-	-	-	-
HCM Control Delay (s)	8	0	-	-	-	-	-	-
HCM Lane LOS	A	A	-	-	-	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

Lanes, Volumes, Timings  
7: Unthoff Line & Division Road W

2035 Future Total P.M.  
09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	4	242	14	40	306	17	23	45	78	7	43	2
Future Volume (vph)	4	242	14	40	306	17	23	45	78	7	43	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.993			0.994			0.928			0.995		
Flt Protected	0.999			0.995			0.992			0.993		
Satd. Flow (prot)	0	1850	0	0	1863	0	0	1749	0	0	1612	0
Flt Permitted	0.999			0.995			0.992			0.993		
Satd. Flow (perm)	0	1850	0	0	1863	0	0	1749	0	0	1612	0
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	350.0			1346.1			1393.8			405.2		
Travel Time (s)	25.2			96.9			100.4			29.2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%	20%	0%
Adj. Flow (vph)	4	260	15	43	329	18	25	48	84	8	46	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	279	0	0	390	0	0	157	0	0	56	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			0.0			0.0		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100			100			100		
Sign Control	Free			Free			Stop			Stop		

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.0%
ICU Level of Service A	
Analysis Period (min)	15



HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2035 Future Total P.M.  
09-26-2024

Intersection												
Int Delay, s/veh	4.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Vol, veh/h	4	242	14	40	306	17	23	45	78	7	43	2
Future Vol, veh/h	4	242	14	40	306	17	23	45	78	7	43	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	0	1	0	0	0	0	0	20	0
Mvmt Flow	4	260	15	43	329	18	25	48	84	8	46	2

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	347	0	0	275
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.1	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2
Pot Cap-1 Maneuver	1223	-	-	1300
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1223	-	-	1300
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.9	16.3	18.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	473	1223	-	-	1300	-	-	318
HCM Lane V/C Ratio	0.332	0.004	-	-	0.033	-	-	0.176
HCM Control Delay (s)	16.3	8	0	-	7.9	0	-	18.7
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.4	0	-	-	0.1	-	-	0.6

Lanes, Volumes, Timings  
8: Burnside Line & Division Road W

2035 Future Total P.M.  
09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (vph)	13	153	166	23	117	3	218	182	68	5	95	28
Future Volume (vph)	13	153	166	23	117	3	218	182	68	5	95	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932		0.997		0.980		0.970		0.998		0.970	
Flt Protected	0.998		0.992		0.977		0.998		0.998		0.998	
Satd. Flow (prot)	0	1742	0	0	1849	0	0	1793	0	0	1571	0
Flt Permitted	0.985		0.907		0.786		0.986		0.986		0.986	
Satd. Flow (perm)	0	1720	0	0	1690	0	0	1443	0	0	1552	0
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	99		2		22		30		30		30	
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	1346.1		271.7		1953.3		357.4		357.4		357.4	
Travel Time (s)	96.9		19.6		140.6		25.7		25.7		25.7	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	1%	0%	2%	0%	1%	4%	0%	23%	0%	0%
Adj. Flow (vph)	14	163	177	24	124	3	232	194	72	5	101	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	354	0	0	151	0	0	498	0	0	136	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width(m)	0.0		0.0		3.6		3.6		3.6		3.6	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100		100		100		100		100		100	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4		8		2		6		6		6	
Permitted Phases	4		8		2		6		6		6	
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												

Lanes, Volumes, Timings

2035 Future Total P.M.

8: Burnside Line & Division Road W

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		32.0	32.0		32.0	32.0	
Total Split (%)	41.8%	41.8%		41.8%	41.8%		58.2%	58.2%		58.2%	58.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5		27.5	27.5		27.5	27.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		12.6			12.6			28.0			28.0	
Actuated g/C Ratio		0.25			0.25			0.56			0.56	
v/c Ratio		0.69			0.35			0.61			0.15	
Control Delay		19.3			16.7			12.0			5.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		19.3			16.7			12.0			5.8	
LOS		B			B			B			A	
Approach Delay		19.3			16.7			12.0			5.8	
Approach LOS		B			B			B			A	
Queue Length 50th (m)		20.3			11.1			25.0			4.0	
Queue Length 95th (m)		42.2			23.0			65.3			13.0	
Internal Link Dist (m)		1322.1			247.7			1929.3			333.4	
Turn Bay Length (m)												
Base Capacity (vph)		707			635			823			888	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.50			0.24			0.61			0.15	

Intersection Summary

Area Type:	Other
Cycle Length:	55
Actuated Cycle Length:	49.6
Natural Cycle:	55
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.69
Intersection Signal Delay:	14.1
Intersection LOS:	B
Intersection Capacity Utilization:	64.2%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 8: Burnside Line & Division Road W

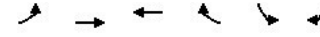


Lanes, Volumes, Timings

2035 Future Total P.M.

9: Industrial Road & Hurlwood Lane

09-26-2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↔	↔	↔	↕
Traffic Volume (vph)	0	150	498	130	163	0
Future Volume (vph)	0	150	498	130	163	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.972			
Flt Protected				0.950		
Satd. Flow (prot)	1863	1863	1811	0	1770	1863
Flt Permitted				0.950		
Satd. Flow (perm)	1863	1863	1811	0	1770	1863
Link Speed (k/h)		50	50		50	
Link Distance (m)		254.1	140.4		164.3	
Travel Time (s)		18.3	10.1		11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	163	541	141	177	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	163	682	0	177	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		100		100	100	100
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization:	49.8%
ICU Level of Service:	A
Analysis Period (min):	15

Intersection						
Int Delay, s/veh	3.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	0	150	498	130	163	0
Future Vol, veh/h	0	150	498	130	163	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	163	541	141	177	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	682	0	-	0	775 612
Stage 1	-	-	-	-	612 -
Stage 2	-	-	-	-	163 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	911	-	-	-	366 493
Stage 1	-	-	-	-	541 -
Stage 2	-	-	-	-	866 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	911	-	-	-	366 493
Mov Cap-2 Maneuver	-	-	-	-	452 -
Stage 1	-	-	-	-	541 -
Stage 2	-	-	-	-	866 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	18
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	911	-	-	-	452	-
HCM Lane V/C Ratio	-	-	-	-	0.392	-
HCM Control Delay (s)	0	-	-	-	18	0
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0	-	-	-	1.8	-

	↖	↗	↖	↗	↖	↗
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	199	36	387	193	23	138
Future Volume (vph)	199	36	387	193	23	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.850		0.955			
Flt Protected	0.950				0.993	
Satd. Flow (prot)	1770	1583	1779	0	0	1850
Flt Permitted	0.950				0.993	
Satd. Flow (perm)	1770	1583	1779	0	0	1850
Link Speed (k/h)	50		80		80	
Link Distance (m)	229.6		177.2		917.5	
Travel Time (s)	16.5		8.0		41.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	216	39	421	210	25	150
Shared Lane Traffic (%)						
Lane Group Flow (vph)	216	39	631	0	0	175
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100	100	100	100
Sign Control	Stop		Free		Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	49.8% ICU Level of Service A
Analysis Period (min)	15

HCM 2010 TWSC  
10: Uthoff Line & Industrial Road

2035 Future Total P.M.  
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Intersection						
Int Delay, s/veh	6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	199	36	387	193	23	138
Future Vol, veh/h	199	36	387	193	23	138
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	216	39	421	210	25	150

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	726	526	0	0	631
Stage 1	526	-	-	-	-
Stage 2	200	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	391	552	-	-	951
Stage 1	593	-	-	-	-
Stage 2	834	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	380	552	-	-	951
Mov Cap-2 Maneuver	380	-	-	-	-
Stage 1	593	-	-	-	-
Stage 2	810	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.1	0	1.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	380	552	951	-
HCM Lane V/C Ratio	-	-	0.569	0.071	0.026	-
HCM Control Delay (s)	-	-	26.3	12	8.9	0
HCM Lane LOS	-	-	D	B	A	A
HCM 95th %tile Q(veh)	-	-	3.4	0.2	0.1	-

Lanes, Volumes, Timings  
11: Uthoff Line & North Site Access 1

2035 Future Total P.M.  
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	↖	↗	↖	↗	↖	↗
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	22	12	164	36	18	107
Future Volume (vph)	22	12	164	36	18	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.953		0.976			
Flt Protected	0.969				0.993	
Satd. Flow (prot)	1720	0	1818	0	0	1850
Flt Permitted	0.969				0.993	
Satd. Flow (perm)	1720	0	1818	0	0	1850
Link Speed (k/h)	50		50		50	
Link Distance (m)	148.7		226.2		1393.8	
Travel Time (s)	10.7		16.3		100.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	13	178	39	20	116
Shared Lane Traffic (%)						
Lane Group Flow (vph)	37	0	217	0	0	136
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100	100	100	100
Sign Control	Stop		Free		Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	30.8%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	22	12	164	36	18	107
Future Vol, veh/h	22	12	164	36	18	107
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	13	178	39	20	116

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	354	198	0	0	217
Stage 1	198	-	-	-	-
Stage 2	156	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	644	843	-	-	1353
Stage 1	835	-	-	-	-
Stage 2	872	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	634	843	-	-	1353
Mov Cap-2 Maneuver	634	-	-	-	-
Stage 1	835	-	-	-	-
Stage 2	858	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	1.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	695	1353
HCM Lane V/C Ratio	-	-	0.053	0.014
HCM Control Delay (s)	-	-	10.5	7.7
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	22	0	199	36	0	129
Future Volume (vph)	22	0	199	36	0	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.979					
Flt Protected	0.950					
Satd. Flow (prot)	1770	0	1824	0	0	1863
Flt Permitted	0.950					
Satd. Flow (perm)	1770	0	1824	0	0	1863
Link Speed (k/h)	50		50		50	
Link Distance (m)	142.7		363.5		226.2	
Travel Time (s)	10.3		26.2		16.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	0	216	39	0	140
Shared Lane Traffic (%)						
Lane Group Flow (vph)	24	0	255	0	0	140
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6					
Link Offset(m)	0.0					
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100	100	100	100
Sign Control	Stop		Free		Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	22.7%
ICU Level of Service	A
Analysis Period (min)	15

HCM 2010 TWSC  
12: Uthoff Line & North Site Access 2

2035 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Traffic Vol, veh/h	22	0	199	36	0	129
Future Vol, veh/h	22	0	199	36	0	129
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	0	216	39	0	140
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	376	236	0	0	255	0
Stage 1	236	-	-	-	-	-
Stage 2	140	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	625	803	-	-	1310	-
Stage 1	803	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	625	803	-	-	1310	-
Mov Cap-2 Maneuver	625	-	-	-	-	-
Stage 1	803	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	11	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	625	1310	-	
HCM Lane V/C Ratio	-	-	0.038	-	-	
HCM Control Delay (s)	-	-	11	0	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Lanes, Volumes, Timings  
13: Uthoff Line & South Site Access

2035 Future Total P.M.  
09-26-2024

Lanes, Volumes, Timings						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Traffic Volume (vph)	56	12	224	162	18	133
Future Volume (vph)	56	12	224	162	18	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.976		0.943			
Flt Protected	0.960		0.994			
Satd. Flow (prot)	1745	0	1757	0	0	1852
Flt Permitted	0.960		0.994			
Satd. Flow (perm)	1745	0	1757	0	0	1852
Link Speed (k/h)	50		50			
Link Distance (m)	353.0		917.5			
Travel Time (s)	25.4		66.1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	13	243	176	20	145
Shared Lane Traffic (%)						
Lane Group Flow (vph)	74	0	419	0	0	165
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			
Link Offset(m)	0.0		0.0			
Crosswalk Width(m)	4.8		4.8			
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100	100	100	100
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	32.6%		ICU Level of Service A			
Analysis Period (min)	15					

HCM 2010 TWSC  
13: Uthoff Line & South Site Access

2035 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	1.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	56	12	224	162	18	133
Future Vol, veh/h	56	12	224	162	18	133
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	61	13	243	176	20	145
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	516	331	0	0	419	0
Stage 1	331	-	-	-	-	-
Stage 2	185	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	519	711	-	-	1140	-
Stage 1	728	-	-	-	-	-
Stage 2	847	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	509	711	-	-	1140	-
Mov Cap-2 Maneuver	509	-	-	-	-	-
Stage 1	728	-	-	-	-	-
Stage 2	831	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.8	0	1			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	536	1140	-	
HCM Lane V/C Ratio	-	-	0.138	0.017	-	
HCM Control Delay (s)	-	-	12.8	8.2	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-	

Lanes, Volumes, Timings  
1: Burnside Line & Industrial Road/Brodie Drive

2040 Future Background A.M.  
09-25-2024

Lanes, Volumes, Timings												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	48	30	131	261	6	44	324	319	94	42	278	47
Future Volume (vph)	48	30	131	261	6	44	324	319	94	42	278	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5		7.5			7.5			7.5			0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1615	1736	1900	1615	1805	1439	1468	1805	1520	0
Flt Permitted	0.753			0.581			0.308			0.551		
Satd. Flow (perm)	1431	1900	1615	1061	1900	1615	585	1439	1468	1047	1520	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			255			200			200			10
Link Speed (k/h)		50			60			60				60
Link Distance (m)		140.4			136.5			65.5				1953.3
Travel Time (s)		10.1			8.2			3.9				117.2
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	4%	0%	0%	0%	32%	10%	0%	26%	0%
Adj. Flow (vph)	53	33	144	287	7	48	356	351	103	46	305	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	33	144	287	7	48	356	351	103	46	357	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	1	2
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	NA
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2040 Future Background A.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	9.6	21.0	21.0	16.1	27.5	27.5	19.4	43.4	43.4	9.5	33.5	
Total Split (%)	10.7%	23.3%	23.3%	17.9%	30.6%	30.6%	21.6%	48.2%	48.2%	10.6%	37.2%	
Maximum Green (s)	5.1	15.0	15.0	11.6	21.5	21.5	14.9	37.4	37.4	5.0	27.5	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	21.6	15.0	15.0	32.1	25.0	25.0	46.6	39.5	39.5	32.6	26.1	
Actuated g/C Ratio	0.25	0.17	0.17	0.37	0.29	0.29	0.53	0.45	0.45	0.37	0.30	
v/c Ratio	0.14	0.10	0.30	0.61	0.01	0.08	0.70	0.54	0.13	0.11	0.78	
Control Delay	20.4	32.6	1.5	27.8	26.3	0.2	20.2	22.8	0.4	11.8	40.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.4	32.6	1.5	27.8	26.3	0.2	20.2	22.8	0.4	11.8	40.9	
LOS	C	C	A	C	C	A	C	C	A	B	D	
Approach Delay		10.3			23.9			18.8			37.6	
Approach LOS		B			C			B			D	
Queue Length 50th (m)	6.0	5.0	0.0	37.8	0.9	0.0	35.1	48.1	0.0	3.8	56.8	
Queue Length 95th (m)	14.2	13.5	0.0	62.7	4.5	0.0	54.3	77.2	0.0	8.8	#99.6	
Internal Link Dist (m)		116.4			112.5			41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0		65.0	40.0		
Base Capacity (vph)	374	325	487	478	541	603	518	653	775	432	484	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.10	0.30	0.60	0.01	0.08	0.69	0.54	0.13	0.11	0.74	

Intersection Summary

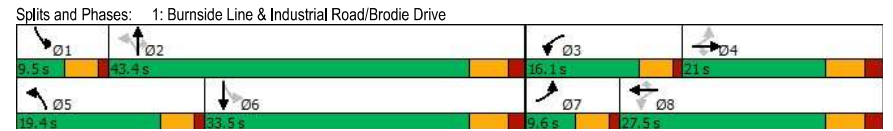
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	87.7
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	22.9
Intersection LOS:	C
Intersection Capacity Utilization:	73.7%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings

2040 Future Background A.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-25-2024





Lanes, Volumes, Timings

2040 Future Background A.M.

2: Burnside Line & Highway 11 Westbound On-Ramp

09-25-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑	↑
Traffic Volume (vph)	0	0	0	1103	388	273
Future Volume (vph)	0	0	0	1103	388	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1638	1810	1214
Flt Permitted						
Satd. Flow (perm)	0	0	0	1638	1810	1214
Link Speed (k/h)	50			70	60	
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			2.6	10.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	16%	5%	33%
Adj. Flow (vph)	0	0	0	1161	408	287
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1161	408	287
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	61.4%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings

2040 Future Background A.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↓	↑	↑	↑		↑
Traffic Volume (vph)	183	268	835	205	0	388
Future Volume (vph)	183	268	835	205	0	388
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1787	1583	1638	1509	0	1810
Flt Permitted	0.950					
Satd. Flow (perm)	1787	1583	1638	1509	0	1810
Right Turn on Red		Yes	Yes			
Satd. Flow (RTOR)		176	216			
Link Speed (k/h)	50		60			60
Link Distance (m)	104.8		160.3			51.5
Travel Time (s)	7.5		9.6			3.1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	16%	7%	0%	5%
Adj. Flow (vph)	193	282	879	216	0	408
Shared Lane Traffic (%)						
Lane Group Flow (vph)	193	282	879	216	0	408
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2040 Future Background A.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	9.7	9.7	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.6	17.6	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.9	1.9	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.4	6.4	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	13.5	13.5	41.9	41.9		41.9
Actuated g/C Ratio	0.19	0.19	0.60	0.60		0.60
v/c Ratio	0.56	0.63	0.89	0.22		0.38
Control Delay	35.1	18.8	25.2	1.5		8.2
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	35.1	18.8	25.2	1.5		8.2
LOS	D	B	C	A		A
Approach Delay	25.4		20.6			8.2
Approach LOS	C		C			A
Queue Length 50th (m)	25.4	13.3	89.0	0.0		24.7
Queue Length 95th (m)	50.8	41.3	#201.2	7.4		45.8
Internal Link Dist (m)	80.8		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	472	547	1284	1229		1419
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.41	0.52	0.68	0.18		0.29

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	69.7
Natural Cycle:	65
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.89
Intersection Signal Delay:	19.2
Intersection LOS:	B
Intersection Capacity Utilization:	72.0%
ICU Level of Service:	C
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

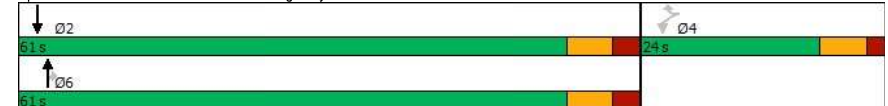
Lanes, Volumes, Timings

2040 Future Background A.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2040 Future Background A.M.

4: West Street North & Highway 11 Eastbound

09-25-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↗	↗
Traffic Volume (vph)	327	143	119	708	515	56
Future Volume (vph)	327	143	119	708	515	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1327	1524	1787	1827	1845	1442
Flt Permitted	0.950		0.241			
Satd. Flow (perm)	1327	1524	453	1827	1845	1442
Right Turn on Red		Yes			Yes	
Satd. Flow (RTOR)		151				43
Link Speed (k/h)	50			60	60	
Link Distance (m)	154.2			160.8	176.6	
Travel Time (s)	11.1			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	36%	6%	1%	4%	3%	12%
Adj. Flow (vph)	344	151	125	745	542	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	344	151	125	745	542	59
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2040 Future Background A.M.

4: West Street North & Highway 11 Eastbound

09-25-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	38.0	38.0	10.0	52.0	42.0	42.0
Total Split (%)	42.2%	42.2%	11.1%	57.8%	46.7%	46.7%
Maximum Green (s)	31.8	31.8	8.0	44.9	34.9	34.9
Yellow Time (s)	4.5	4.5	2.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	2.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	24.1	24.1	40.8	35.3	28.1	28.1
Actuated g/C Ratio	0.33	0.33	0.55	0.48	0.38	0.38
v/c Ratio	0.79	0.25	0.32	0.85	0.77	0.10
Control Delay	38.6	5.0	11.1	28.4	30.5	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	5.0	11.1	28.4	30.5	8.4
LOS	D	A	B	C	C	A
Approach Delay	28.4			25.9	28.3	
Approach LOS	C			C	C	
Queue Length 50th (m)	46.8	0.0	8.4	92.6	73.6	1.6
Queue Length 95th (m)	#95.1	12.4	18.7	#168.8	124.8	9.5
Internal Link Dist (m)	130.2			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	608	781	404	1183	929	747
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.19	0.31	0.63	0.58	0.08
Intersection Summary						
Area Type:	Other					
Cycle Length: 90						
Actuated Cycle Length: 73.6						
Natural Cycle: 80						
Control Type: Semi Act-Uncoord						
Maximum v/c Ratio: 0.85						
Intersection Signal Delay: 27.3	Intersection LOS: C					
Intersection Capacity Utilization 66.5%	ICU Level of Service C					
Analysis Period (min) 15						
# 95th percentile volume exceeds capacity, queue may be longer.						
Queue shown is maximum after two cycles.						

Lanes, Volumes, Timings

4: West Street North & Highway 11 Eastbound

2040 Future Background A.M.

09-25-2024

Splits and Phases: 4: West Street North & Highway 11 Eastbound

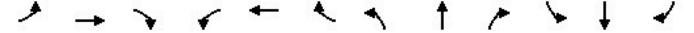


Lanes, Volumes, Timings

5: Highway 12 & West Ridge Boulevard/Murphy Road

2040 Future Background A.M.

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↗	↗	↖	↑	↗	↖	↑	↗
Traffic Volume (vph)	149	189	180	314	279	153	201	504	433	113	820	235
Future Volume (vph)	149	189	180	314	279	153	201	504	433	113	820	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.95	1.00	1.00
Frt			0.850		0.947				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1583	1787	1765	0	3467	3574	1568	1736	3471	1568
Flt Permitted	0.296			0.495			0.950			0.393		
Satd. Flow (perm)	557	1881	1583	931	1765	0	3467	3574	1568	718	3471	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			186		27				446			187
Link Speed (k/h)		60			60			70				70
Link Distance (m)		186.6			853.6			529.0				469.5
Travel Time (s)		11.2			51.2			27.2				24.1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	2%	1%	3%	0%	1%	3%	4%	3%	4%	3%
Adj. Flow (vph)	154	195	186	324	288	158	207	520	446	116	845	242
Shared Lane Traffic (%)												
Lane Group Flow (vph)	154	195	186	324	446	0	207	520	446	116	845	242
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2				7.2
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	100		15	25		15	25		100
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	

Lanes, Volumes, Timings

2040 Future Background A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	12.0	39.0	39.0	17.0	44.0		12.0	42.0	42.0	12.0	42.0	42.0
Total Split (%)	10.9%	35.5%	35.5%	15.5%	40.0%		10.9%	38.2%	38.2%	10.9%	38.2%	38.2%
Maximum Green (s)	7.0	31.8	31.8	12.0	36.8		8.0	34.0	34.0	8.0	34.0	34.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0					7.0		7.0
Flash Dont Walk (s)					19.0					6.0		6.0
Pedestrian Calls (#/hr)					0					0		0
Act Effct Green (s)	34.4	25.1	25.1	44.2	30.0		8.1	29.1	29.1	40.7	28.8	28.8
Actuated g/C Ratio	0.35	0.26	0.26	0.45	0.30		0.08	0.30	0.30	0.41	0.29	0.29
v/c Ratio	0.55	0.41	0.34	0.62	0.80		0.73	0.49	0.57	0.31	0.83	0.41
Control Delay	26.3	33.9	6.3	25.1	42.1		61.9	30.8	6.0	18.7	41.0	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.3	33.9	6.3	25.1	42.1		61.9	30.8	6.0	18.7	41.0	9.9
LOS	C	C	A	C	D		E	C	A	B	D	A
Approach Delay		22.1			34.9			26.8			32.6	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	18.6	33.3	0.0	43.7	79.0		21.5	44.7	0.0	13.0	82.1	8.0
Queue Length 95th (m)	33.3	55.7	16.6	69.6	122.8		#44.2	66.5	23.9	26.4	116.2	29.3
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	282	614	642	524	683		284	1247	837	382	1211	668
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.32	0.29	0.62	0.65		0.73	0.42	0.53	0.30	0.70	0.36

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	98.4
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.83
Intersection Signal Delay:	29.7
Intersection LOS:	C
Intersection Capacity Utilization:	82.7%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	

Lanes, Volumes, Timings

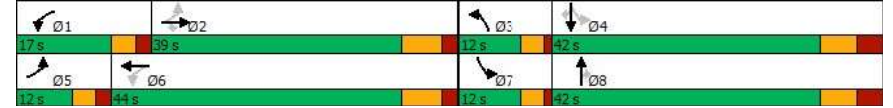
2040 Future Background A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024

Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2040 Future Background A.M.  
09-25-2024

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	260	5	2	0	11	0	0	0	0	0	0	272
Future Vol, veh/h	260	5	2	0	11	0	0	0	0	0	0	272
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	32	67	0	0	30	100	50	0	100	0	50	30
Mvmt Flow	283	5	2	0	12	0	0	0	0	0	0	296

Major/Minor	Minor2	Minor1	Major1	Major2									
Conflicting Flow All	154	148	148	152	296	0	296	0	0	0	0	0	0
Stage 1	148	148	-	0	0	-	-	-	-	-	-	-	-
Stage 2	6	0	-	152	296	-	-	-	-	-	-	-	-
Critical Hdwy	7.42	7.17	6.2	7.1	6.8	7.2	4.6	-	-	4.1	-	-	-
Critical Hdwy Stg 1	6.42	6.17	-	6.1	5.8	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.42	6.17	-	6.1	5.8	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.788	4.603	3.3	3.5	4.27	4.2	2.65	-	-	2.2	-	-	-
Pot Cap-1 Maneuver	749	639	904	820	572	-	1036	-	-	-	-	-	-
Stage 1	788	666	-	-	-	-	-	-	-	-	-	-	-
Stage 2	943	-	-	855	621	-	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	639	904	813	572	-	1036	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	639	-	813	572	-	-	-	-	-	-	-	-
Stage 1	788	666	-	-	-	-	-	-	-	-	-	-	-
Stage 2	943	-	-	846	621	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0	0
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1036	-	-	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	-	-	-
HCM Lane LOS	A	-	-	-	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2040 Future Background A.M.  
09-25-2024

Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	0	187	9	40	150	5	5	6	43	7	13	2
Future Vol, veh/h	0	187	9	40	150	5	5	6	43	7	13	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	2	0	0	1	0	0	25	3	0	11	0
Mvmt Flow	0	195	9	42	156	5	5	6	45	7	14	2

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	161	0	0	204	0	0	451	445	200	468	447	159
Stage 1	-	-	-	-	-	-	200	200	-	243	243	-
Stage 2	-	-	-	-	-	-	251	245	-	225	204	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.75	6.23	7.1	6.61	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.75	-	6.1	5.61	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.75	-	6.1	5.61	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.225	3.327	3.5	4.099	3.3
Pot Cap-1 Maneuver	1430	-	-	1380	-	-	522	475	838	509	493	892
Stage 1	-	-	-	-	-	-	806	695	-	765	688	-
Stage 2	-	-	-	-	-	-	758	663	-	782	716	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1430	-	-	1380	-	-	497	459	838	465	477	892
Mov Cap-2 Maneuver	-	-	-	-	-	-	497	459	-	465	477	-
Stage 1	-	-	-	-	-	-	806	695	-	765	665	-
Stage 2	-	-	-	-	-	-	716	641	-	734	716	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	10.4	12.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	725	1430	-	-	1380	-	-	494
HCM Lane V/C Ratio	0.078	-	-	-	0.03	-	-	0.046
HCM Control Delay (s)	10.4	0	-	-	7.7	0	-	12.6
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.1

Lanes, Volumes, Timings

2040 Future Background A.M.

8: Burnside Line & Division Road W

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↕			↕				↕			↕		
Traffic Volume (vph)	16	87	141	22	69	2	99	403	38	6	180	16	
Future Volume (vph)	16	87	141	22	69	2	99	403	38	6	180	16	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.922		0.997		0.991		0.990		0.990		0.990		
Flt Protected	0.997		0.988		0.991		0.998		0.998		0.998		
Satd. Flow (prot)	0	1724	0	0	1872	0	0	1276	0	0	1299	0	
Flt Permitted	0.975		0.854		0.903		0.985		0.985		0.985		
Satd. Flow (perm)	0	1686	0	0	1618	0	0	1162	0	0	1282	0	
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes		
Satd. Flow (RTOR)	135		2		10		11		11		11		
Link Speed (k/h)	50		50		70		60		60		60		
Link Distance (m)	1346.1		271.7		1953.3		357.4		357.4		357.4		
Travel Time (s)	96.9		19.6		100.5		21.4		21.4		21.4		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%	0%	62%	0%	0%	50%	0%	
Adj. Flow (vph)	17	95	153	24	75	2	108	438	41	7	196	17	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	265	0	0	101	0	0	587	0	0	220	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)	0.0		0.0		3.6		3.6		3.6		3.6		
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0		
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8		
Two way Left Turn Lane													
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (k/h)	25	15		25	15		25	15		25	15		
Number of Detectors	1	2	1		2	1		2	1		2	1	
Detector Template	Left	Thru	Left		Thru	Left		Thru	Left		Thru	Left	
Leading Detector (m)	2.0	10.0	2.0		10.0	2.0		10.0	2.0		10.0	2.0	
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0		0.6	2.0		0.6	2.0		0.6	2.0	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4		
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6		
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		
Detector 2 Channel													
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0		
Turn Type	Perm	NA	Perm		NA	Perm		NA	Perm		NA	Perm	
Protected Phases	4		8		2		6		6		6		
Permitted Phases	4		8		2		6		6		6		
Detector Phase	4		8		2		6		6		6		
Switch Phase													

Lanes, Volumes, Timings

2040 Future Background A.M.

8: Burnside Line & Division Road W

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		32.0	32.0		32.0	32.0	
Total Split (%)	41.8%	41.8%		41.8%	41.8%		58.2%	58.2%		58.2%	58.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5		27.5	27.5		27.5	27.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Total Lost Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	9.5		9.5		30.1		30.1		30.1		30.1	
Actuated g/C Ratio	0.20		0.20		0.62		0.62		0.62		0.62	
v/c Ratio	0.61		0.32		0.81		0.28		0.28		0.28	
Control Delay	14.5		17.6		21.9		6.1		6.1		6.1	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	14.5		17.6		21.9		6.1		6.1		6.1	
LOS	B		B		C		A		A		A	
Approach Delay	14.5		17.6		21.9		6.1		6.1		6.1	
Approach LOS	B		B		C		A		A		A	
Queue Length 50th (m)	9.6		7.1		30.8		6.7		6.7		6.7	
Queue Length 95th (m)	25.7		16.7		#109.3		20.8		20.8		20.8	
Internal Link Dist (m)	1322.1		247.7		1929.3		333.4		333.4		333.4	
Turn Bay Length (m)												
Base Capacity (vph)	728		620		722		796		796		796	
Starvation Cap Reductn	0		0		0		0		0		0	
Spillback Cap Reductn	0		0		0		0		0		0	
Storage Cap Reductn	0		0		0		0		0		0	
Reduced v/c Ratio	0.36		0.16		0.81		0.28		0.28		0.28	
Intersection Summary												
Area Type:	Other											
Cycle Length:	55											
Actuated Cycle Length:	48.7											
Natural Cycle:	65											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.81											
Intersection Signal Delay:	16.9						Intersection LOS: B					
Intersection Capacity Utilization:	66.1%						ICU Level of Service C					
Analysis Period (min):	15											
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

Lanes, Volumes, Timings  
8: Burnside Line & Division Road W

2040 Future Background A.M.  
09-25-2024

Splits and Phases: 8: Burnside Line & Division Road W



HCM 2010 TWSC  
9: Industrial Road & Hurlwood Lane

2040 Future Background A.M.  
09-25-2024

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔
Traffic Vol, veh/h	0	140	318	58	38	0
Future Vol, veh/h	0	140	318	58	38	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	152	346	63	41	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	409	0	0 530 378
Stage 1	-	-	- 378 -
Stage 2	-	-	- 152 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1150	-	- 510 669
Stage 1	-	-	- 693 -
Stage 2	-	-	- 876 -
Platoon blocked, %	-	-	- -
Mov Cap-1 Maneuver	1150	-	- 510 669
Mov Cap-2 Maneuver	-	-	- 577 -
Stage 1	-	-	- 693 -
Stage 2	-	-	- 876 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1150	-	-	-	577	-
HCM Lane V/C Ratio	-	-	-	-	0.072	-
HCM Control Delay (s)	0	-	-	-	11.7	0
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2	-



HCM 2010 TWSC  
10: Uthoff Line & Industrial Road

2040 Future Background A.M.  
09-25-2024

Intersection						
Int Delay, s/veh	3.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	159	0	97	189	0	143
Future Vol, veh/h	159	0	97	189	0	143
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	0	105	205	0	155
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	363	208	0	0	310	0
Stage 1	208	-	-	-	-	-
Stage 2	155	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	636	832	-	-	1250	-
Stage 1	827	-	-	-	-	-
Stage 2	873	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	636	832	-	-	1250	-
Mov Cap-2 Maneuver	636	-	-	-	-	-
Stage 1	827	-	-	-	-	-
Stage 2	873	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.8	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	636	-	1250	-
HCM Lane V/C Ratio	-	-	0.272	-	-	-
HCM Control Delay (s)	-	-	12.8	0	0	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	1.1	-	0	-

Lanes, Volumes, Timings  
1: Burnside Line & Industrial Road/Brodie Drive

2040 Future Background P.M.  
09-25-2024

Lanes, Volumes, Timings												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↗	↖	↖	↗	↖	↗	↗	↖	↗	↖
Traffic Volume (vph)	74	41	282	454	2	114	193	340	103	49	268	24
Future Volume (vph)	74	41	282	454	2	114	193	340	103	49	268	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr			0.850			0.850			0.850		0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1568	1770	1900	1615	1805	1863	1429	1805	1747	0
Flt Permitted	0.757			0.568			0.386			0.407		
Satd. Flow (perm)	1438	1900	1568	1058	1900	1615	733	1863	1429	773	1747	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			300			145			200			5
Link Speed (k/h)		50			60			60			60	
Link Distance (m)		140.4			136.5			65.5			1953.3	
Travel Time (s)		10.1			8.2			3.9			117.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	3%	2%	0%	0%	0%	2%	13%	0%	8%	0%
Adj. Flow (vph)	79	44	300	483	2	121	205	362	110	52	285	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	44	300	483	2	121	205	362	110	52	311	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	NA
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2040 Future Background P.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-25-2024

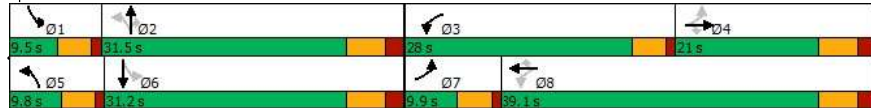


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	9.9	21.0	21.0	28.0	39.1	39.1	9.8	31.5	31.5	9.5	31.2	
Total Split (%)	11.0%	23.3%	23.3%	31.1%	43.4%	43.4%	10.9%	35.0%	35.0%	10.6%	34.7%	
Maximum Green (s)	5.4	15.0	15.0	23.5	33.1	33.1	5.3	25.5	25.5	5.0	25.2	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	21.9	15.0	15.0	41.6	32.3	32.3	33.9	29.3	29.3	31.6	25.1	
Actuated g/C Ratio	0.25	0.17	0.17	0.48	0.37	0.37	0.39	0.34	0.34	0.36	0.29	
v/c Ratio	0.21	0.13	0.58	0.72	0.00	0.18	0.58	0.18	0.18	0.15	0.61	
Control Delay	16.4	33.0	9.2	23.1	18.0	3.0	27.1	30.3	0.6	17.5	33.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	16.4	33.0	9.2	23.1	18.0	3.0	27.1	30.3	0.6	17.5	33.2	
LOS	B	C	A	C	B	A	C	C	A	B	C	
Approach Delay		13.0			19.1			24.5			30.9	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	7.2	6.8	0.0	58.1	0.3	0.0	23.9	57.5	0.0	5.6	47.7	
Queue Length 95th (m)	14.8	16.6	22.4	88.4	1.7	7.9	40.9	89.9	0.0	12.9	77.1	
Internal Link Dist (m)		116.4			112.5			41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0		65.0	40.0		
Base Capacity (vph)	384	327	518	698	729	709	351	629	615	339	510	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.21	0.13	0.58	0.69	0.00	0.17	0.58	0.58	0.18	0.15	0.61	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	87
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.72
Intersection Signal Delay:	21.7
Intersection LOS:	C
Intersection Capacity Utilization:	77.2%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 1: Burnside Line & Industrial Road/Brodie Drive



Lanes, Volumes, Timings

2040 Future Background P.M.

2: Burnside Line & Highway 11 Westbound On-Ramp

09-25-2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑	↑
Traffic Volume (vph)	0	0	0	1012	651	324
Future Volume (vph)	0	0	0	1012	651	324
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1863	1863	1509
Flt Permitted						
Satd. Flow (perm)	0	0	0	1863	1863	1509
Link Speed (k/h)	50	50	50	50	50	50
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			3.7	12.5	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	2%	2%	7%
Adj. Flow (vph)	0	0	0	1033	664	331
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1033	664	331
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization:	56.6%
ICU Level of Service:	B
Analysis Period (min):	15

Lanes, Volumes, Timings

2040 Future Background P.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑	↗	↘	↓
Traffic Volume (vph)	231	217	795	327	0	651
Future Volume (vph)	231	217	795	327	0	651
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1752	1599	1863	1615	0	1863
Flt Permitted	0.950					
Satd. Flow (perm)	1752	1599	1863	1615	0	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		203		334		
Link Speed (k/h)	50		60			60
Link Distance (m)	104.8		160.3			51.5
Travel Time (s)	7.5		9.6			3.1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	1%	2%	0%	0%	2%
Adj. Flow (vph)	236	221	811	334	0	664
Shared Lane Traffic (%)						
Lane Group Flow (vph)	236	221	811	334	0	664
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex		Ch+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Ch+Ex			Ch+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2040 Future Background P.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.9	17.9	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.6	1.6	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.1	6.1	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	13.8	13.8	34.1	34.1		34.1
Actuated g/C Ratio	0.22	0.22	0.55	0.55		0.55
v/c Ratio	0.61	0.43	0.79	0.32		0.65
Control Delay	32.2	8.5	17.5	1.7		12.9
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	32.2	8.5	17.5	1.7		12.9
LOS	C	A	B	A		B
Approach Delay	20.7		12.9			12.9
Approach LOS	C		B			B
Queue Length 50th (m)	24.8	1.7	66.1	0.0		47.4
Queue Length 95th (m)	61.6	20.7	122.4	8.8		87.3
Internal Link Dist (m)	80.8		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	534	629	1590	1428		1590
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.44	0.35	0.51	0.23		0.42

Intersection Summary

Area Type: Other  
 Cycle Length: 85  
 Actuated Cycle Length: 62.1  
 Natural Cycle: 60  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.79  
 Intersection Signal Delay: 14.5  
 Intersection Capacity Utilization 66.4%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service C

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2040 Future Background P.M.

4: West Street North & Highway 11 Eastbound

09-25-2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↖	↖	↖
Traffic Volume (vph)	219	187	272	900	739	144
Future Volume (vph)	219	187	272	900	739	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1736	1583	1787	1881	1863	1583
Flt Permitted	0.950		0.106			
Satd. Flow (perm)	1736	1583	199	1881	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		197				69
Link Speed (k/h)	50			60	60	
Link Distance (m)	154.2			160.8	176.6	
Travel Time (s)	11.1			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	2%	1%	1%	2%	2%
Adj. Flow (vph)	231	197	286	947	778	152
Shared Lane Traffic (%)						
Lane Group Flow (vph)	231	197	286	947	778	152
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2040 Future Background P.M.

4: West Street North & Highway 11 Eastbound

09-25-2024



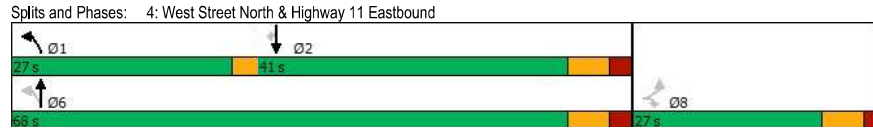
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	27.0	27.0	27.0	68.0	41.0	41.0
Total Split (%)	28.4%	28.4%	28.4%	71.6%	43.2%	43.2%
Maximum Green (s)	20.8	20.8	24.0	60.9	33.9	33.9
Yellow Time (s)	4.5	4.5	3.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	3.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	15.4	15.4	55.2	51.0	34.7	34.7
Actuated g/C Ratio	0.19	0.19	0.69	0.64	0.43	0.43
v/c Ratio	0.69	0.43	0.71	0.79	0.96	0.21
Control Delay	42.5	7.8	25.0	17.1	49.4	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.5	7.8	25.0	17.1	49.4	10.6
LOS	D	A	C	B	D	B
Approach Delay	26.6			19.0	43.1	
Approach LOS	C			B	D	
Queue Length 50th (m)	33.8	0.0	23.7	97.1	115.4	7.6
Queue Length 95th (m)	65.7	17.6	54.9	178.1	#243.2	24.1
Internal Link Dist (m)	130.2			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	458	563	621	1454	809	727
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.35	0.46	0.65	0.96	0.21

Intersection Summary

Area Type:	Other
Cycle Length: 95	
Actuated Cycle Length: 79.9	
Natural Cycle: 70	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 28.9	Intersection LOS: C
Intersection Capacity Utilization 80.5%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings  
4: West Street North & Highway 11 Eastbound

2040 Future Background P.M.  
09-25-2024



Lanes, Volumes, Timings  
5: Highway 12 & West Ridge Boulevard/Murphy Road

2040 Future Background P.M.  
09-25-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔	↔	↑	↔	↔	↔	↔
Traffic Volume (vph)	299	295	315	490	287	222	300	963	479	99	797	211
Future Volume (vph)	299	295	315	490	287	222	300	963	479	99	797	211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.98	1.00								
Frt			0.850		0.935				0.850			0.850
Frt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1900	1599	1787	1767	0	3502	3539	1599	1805	3505	1583
Frt Permitted	0.148			0.174			0.950			0.112		
Satd. Flow (perm)	278	1900	1575	327	1767	0	3502	3539	1599	213	3505	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			249		24				505			161
Link Speed (k/h)		50			70			50			50	
Link Distance (m)		186.6			853.6			529.0			469.5	
Travel Time (s)		13.4			43.9			38.1			33.8	
Confl. Peds. (#/hr)			2	2								
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	0%	1%	1%	1%	0%	0%	2%	1%	0%	3%	2%
Adj. Flow (vph)	318	314	335	521	305	236	319	1024	510	105	848	224
Shared Lane Traffic (%)												
Lane Group Flow (vph)	318	314	335	521	541	0	319	1024	510	105	848	224
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2040 Future Background P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	42.0	35.0	35.0	49.0	42.0		23.0	50.0	50.0	16.0	43.0	43.0
Total Split (%)	28.0%	23.3%	23.3%	32.7%	28.0%		15.3%	33.3%	33.3%	10.7%	28.7%	28.7%
Maximum Green (s)	37.0	27.8	27.8	44.0	34.8		19.0	42.0	42.0	12.0	35.0	35.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0			7.0	7.0			
Flash Dont Walk (s)					19.0			6.0	6.0			
Pedestrian Calls (#/hr)					0			0	0			
Act Effct Green (s)	55.5	27.0	27.0	72.9	39.3		17.0	42.4	42.4	49.7	35.5	35.5
Actuated g/C Ratio	0.39	0.19	0.19	0.51	0.28		0.12	0.30	0.30	0.35	0.25	0.25
v/c Ratio	0.82	0.87	0.67	0.93	1.07		0.76	0.97	0.61	0.56	0.97	0.43
Control Delay	56.3	81.5	22.3	58.1	107.1		74.3	71.9	7.1	39.7	77.4	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.3	81.5	22.3	58.1	107.1		74.3	71.9	7.1	39.7	77.4	17.4
LOS	E	F	C	E	F		E	E	A	D	E	B
Approach Delay		52.7			83.1			54.4			62.7	
Approach LOS		D			F			D			E	
Queue Length 50th (m)	77.1	96.5	23.9	127.1	~166.4		50.0	~170.9	1.1	20.2	~148.6	15.8
Queue Length 95th (m)	105.7	#152.5	61.8	#192.2	#279.3		67.7	#225.0	32.8	34.3	#193.4	42.6
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	521	372	508	620	505		469	1052	830	211	873	515
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.84	0.66	0.84	1.07		0.68	0.97	0.61	0.50	0.97	0.43

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	142.5
Natural Cycle:	110
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.07
Intersection Signal Delay:	62.0
Intersection LOS:	E
Intersection Capacity Utilization:	97.8%
ICU Level of Service:	F

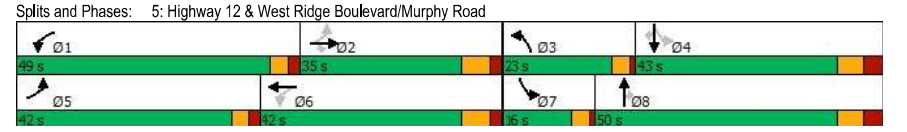
Lanes, Volumes, Timings

2040 Future Background P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024

Analysis Period (min)	15
~	Volume exceeds capacity, queue is theoretically infinite.
	Queue shown is maximum after two cycles.
#	95th percentile volume exceeds capacity, queue may be longer.
	Queue shown is maximum after two cycles.



HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2040 Future Background P.M.  
09-25-2024

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Vol, veh/h	395	6	0	3	3	3	2	0	0	2	0	318
Future Vol, veh/h	395	6	0	3	3	3	2	0	0	2	0	318
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	18	25	0	0	100	0	0	0	0	0	0	27
Mvmt Flow	439	7	0	3	3	3	2	0	0	2	0	353

Major/Minor	Minor2	Minor1	Major1	Major2							
Conflicting Flow All	188	185	177	188	361	0	353	0	0	0	0
Stage 1	181	181	-	4	4	-	-	-	-	-	-
Stage 2	7	4	-	184	357	-	-	-	-	-	-
Critical Hdwy	7.28	6.75	6.2	7.1	7.5	6.2	4.1	-	-	4.1	-
Critical Hdwy Stg 1	6.28	5.75	-	6.1	6.5	-	-	-	-	-	-
Critical Hdwy Stg 2	6.28	5.75	-	6.1	6.5	-	-	-	-	-	-
Follow-up Hdwy	3.662	4.225	3.3	3.5	4.9	3.3	2.2	-	-	2.2	-
Pot Cap-1 Maneuver	738	670	871	777	438	-	1217	-	-	-	-
Stage 1	785	708	-	1024	731	-	-	-	-	-	-
Stage 2	975	849	-	822	487	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	669	871	770	437	-	1217	-	-	-	-
Mov Cap-2 Maneuver	-	669	-	770	437	-	-	-	-	-	-
Stage 1	783	708	-	1022	730	-	-	-	-	-	-
Stage 2	969	847	-	814	487	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			8	
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1217	-	-	-	-	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-	-	-	-	-
HCM Control Delay (s)	8	0	-	-	-	-	-	-
HCM Lane LOS	A	A	-	-	-	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2040 Future Background P.M.  
09-25-2024

Intersection												
Int Delay, s/veh	3.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Vol, veh/h	5	267	16	44	338	18	25	24	86	7	7	2
Future Vol, veh/h	5	267	16	44	338	18	25	24	86	7	7	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	0	1	0	0	0	0	0	20	0
Mvmt Flow	5	287	17	47	363	19	27	26	92	8	8	2

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	382	0	0	304	0	0	778	782	296	832	781	373
Stage 1	-	-	-	-	-	-	306	306	-	467	467	-
Stage 2	-	-	-	-	-	-	472	476	-	365	314	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.7	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.7	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4.18	3.3
Pot Cap-1 Maneuver	1188	-	-	1268	-	-	316	328	748	291	306	678
Stage 1	-	-	-	-	-	-	708	665	-	580	533	-
Stage 2	-	-	-	-	-	-	576	560	-	658	625	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1188	-	-	1268	-	-	297	311	748	230	290	678
Mov Cap-2 Maneuver	-	-	-	-	-	-	297	311	-	230	290	-
Stage 1	-	-	-	-	-	-	704	662	-	577	508	-
Stage 2	-	-	-	-	-	-	539	534	-	551	622	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.9	15.4	18.8
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	489	1188	-	-	1268	-	-	278
HCM Lane V/C Ratio	0.297	0.005	-	-	0.037	-	-	0.062
HCM Control Delay (s)	15.4	8	0	-	7.9	0	-	18.8
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.2	0	-	-	0.1	-	-	0.2

Lanes, Volumes, Timings

2040 Future Background P.M.

8: Burnside Line & Division Road W

09-25-2024



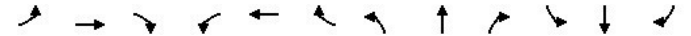
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Volume (vph)	14	169	183	25	130	3	241	194	75	6	104	31
Future Volume (vph)	14	169	183	25	130	3	241	194	75	6	104	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932		0.998		0.980		0.977		0.970		0.998	
Flt Protected	0.998		0.992		0.977		0.998		0.998		0.998	
Satd. Flow (prot)	0	1742	0	0	1851	0	0	1793	0	0	1572	0
Flt Permitted	0.985		0.892		0.776		0.983		0.983		0.983	
Satd. Flow (perm)	0	1720	0	0	1664	0	0	1424	0	0	1548	0
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	99		2		23		33		33		33	
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	1346.1		271.7		1953.3		357.4		357.4		357.4	
Travel Time (s)	96.9		19.6		140.6		25.7		25.7		25.7	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	1%	0%	2%	0%	1%	4%	0%	23%	0%	0%
Adj. Flow (vph)	15	180	195	27	138	3	256	206	80	6	111	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	390	0	0	168	0	0	542	0	0	150	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0		0.0		3.6		3.6		3.6		3.6	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100		100		100		100		100		100	
Number of Detectors	1	2	1	2	1	2	1	2	1	2	1	2
Detector Template	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru
Leading Detector (m)	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		2		6		6		6	
Permitted Phases	4		8		2		6		6		6	
Detector Phase	4	4	8	8	2	2	6	6	6	6	6	6
Switch Phase												

Lanes, Volumes, Timings

2040 Future Background P.M.

8: Burnside Line & Division Road W

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%	58.2%	58.2%	58.2%	58.2%	58.2%	58.2%
Maximum Green (s)	18.5	18.5	18.5	18.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Total Lost Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	13.4		13.4		27.7		27.7		27.7		27.7	
Actuated g/C Ratio	0.27		0.27		0.55		0.55		0.55		0.55	
v/c Ratio	0.73		0.38		0.68		0.17		0.17		0.17	
Control Delay	20.9		16.9		15.2		6.1		6.1		6.1	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	20.9		16.9		15.2		6.1		6.1		6.1	
LOS	C		B		B		A		A		A	
Approach Delay	20.9		16.9		15.2		6.1		6.1		6.1	
Approach LOS	C		B		B		A		A		A	
Queue Length 50th (m)	23.8		12.5		31.3		4.8		4.8		4.8	
Queue Length 95th (m)	48.4		25.3		#90.9		14.2		14.2		14.2	
Internal Link Dist (m)	1322.1		247.7		1929.3		333.4		333.4		333.4	
Turn Bay Length (m)												
Base Capacity (vph)	700		618		795		868		868		868	
Starvation Cap Reductn	0		0		0		0		0		0	
Spillback Cap Reductn	0		0		0		0		0		0	
Storage Cap Reductn	0		0		0		0		0		0	
Reduced v/c Ratio	0.56		0.27		0.68		0.17		0.17		0.17	
Intersection Summary												
Area Type:	Other											
Cycle Length:	55											
Actuated Cycle Length:	50.2											
Natural Cycle:	55											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.73											
Intersection Signal Delay:	16.1						Intersection LOS: B					
Intersection Capacity Utilization:	69.3%						ICU Level of Service C					
Analysis Period (min):	15											
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												



Lanes, Volumes, Timings  
8: Burnside Line & Division Road W

2040 Future Background P.M.  
09-25-2024

Splits and Phases: 8: Burnside Line & Division Road W



HCM 2010 TWSC  
9: Industrial Road & Hurlwood Lane

2040 Future Background P.M.  
09-25-2024

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔
Traffic Vol, veh/h	0	127	462	44	69	0
Future Vol, veh/h	0	127	462	44	69	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	138	502	48	75	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	550	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1020	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1020	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	13.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1020	-	-	-	501	-
HCM Lane V/C Ratio	-	-	-	-	0.15	-
HCM Control Delay (s)	0	-	-	-	13.4	0
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.5	-

HCM 2010 TWSC  
10: Uthhoff Line & Industrial Road

2040 Future Background P.M.  
09-25-2024

Intersection						
Int Delay, s/veh	4.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	199	0	206	193	0	125
Future Vol, veh/h	199	0	206	193	0	125
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	216	0	224	210	0	136
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	465	329	0	0	434	0
Stage 1	329	-	-	-	-	-
Stage 2	136	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	556	712	-	-	1126	-
Stage 1	729	-	-	-	-	-
Stage 2	890	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	556	712	-	-	1126	-
Mov Cap-2 Maneuver	556	-	-	-	-	-
Stage 1	729	-	-	-	-	-
Stage 2	890	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	15.5	0	0			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	556	-	1126	-
HCM Lane V/C Ratio	-	-	0.389	-	-	-
HCM Control Delay (s)	-	-	15.5	0	0	-
HCM Lane LOS	-	-	C	A	A	-
HCM 95th %tile Q(veh)	-	-	1.8	-	0	-

Lanes, Volumes, Timings  
1: Burnside Line & Industrial Road/Brodie Drive

2045 Future Background A.M.  
09-25-2024

Lane Group												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↖	↗	↖	↖	↗	↖	↖	↗	↖
Traffic Volume (vph)	49	30	134	288	7	49	328	352	104	46	307	49
Future Volume (vph)	49	30	134	288	7	49	328	352	104	46	307	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5		7.5			7.5			7.5			0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1615	1736	1900	1615	1805	1439	1468	1805	1520	0
Flt Permitted	0.752			0.580			0.269			0.533		
Satd. Flow (perm)	1429	1900	1615	1060	1900	1615	511	1439	1468	1013	1520	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			255			200			200			9
Link Speed (k/h)		50			60			60				60
Link Distance (m)		140.4			136.5			65.5				1953.3
Travel Time (s)		10.1			8.2			3.9				117.2
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	4%	0%	0%	0%	32%	10%	0%	26%	0%
Adj. Flow (vph)	54	33	147	316	8	54	360	387	114	51	337	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	33	147	316	8	54	360	387	114	51	391	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	NA
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2045 Future Background A.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	9.6	21.0	21.0	16.1	27.5	27.5	19.4	43.4	43.4	9.5	33.5	
Total Split (%)	10.7%	23.3%	23.3%	17.9%	30.6%	30.6%	21.6%	48.2%	48.2%	10.6%	37.2%	
Maximum Green (s)	5.1	15.0	15.0	11.6	21.5	21.5	14.9	37.4	37.4	5.0	27.5	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	21.6	15.0	15.0	32.3	25.1	25.1	47.0	39.9	39.9	33.0	26.5	
Actuated g/C Ratio	0.24	0.17	0.17	0.37	0.28	0.28	0.53	0.45	0.45	0.37	0.30	
v/c Ratio	0.15	0.10	0.30	0.67	0.01	0.09	0.74	0.60	0.15	0.12	0.85	
Control Delay	20.6	32.8	1.6	30.4	26.4	0.3	22.9	24.1	0.4	11.9	47.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.6	32.8	1.6	30.4	26.4	0.3	22.9	24.1	0.4	11.9	47.2	
LOS	C	C	A	C	C	A	C	C	A	B	D	
Approach Delay		10.4			26.0			20.5			43.1	
Approach LOS		B			C			C			D	
Queue Length 50th (m)	6.4	5.2	0.0	44.2	1.1	0.0	35.6	54.8	0.0	4.2	64.5	
Queue Length 95th (m)	14.3	13.5	0.0	69.6	4.7	0.0	#57.0	87.7	0.3	9.5	#114.7	
Internal Link Dist (m)		116.4			112.5			41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0		65.0	40.0		
Base Capacity (vph)	371	322	486	476	540	602	490	650	773	423	479	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.15	0.10	0.30	0.66	0.01	0.09	0.73	0.60	0.15	0.12	0.82	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	88.3
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	25.6
Intersection LOS:	C
Intersection Capacity Utilization:	75.4%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings

2045 Future Background A.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-25-2024

Splits and Phases: 1: Burnside Line & Industrial Road/Brodie Drive



Lanes, Volumes, Timings

2045 Future Background A.M.

2: Burnside Line & Highway 11 Westbound On-Ramp

09-25-2024

	↖	↗	↖	↑	↓	↗
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑	↗
Traffic Volume (vph)	0	0	0	1187	424	294
Future Volume (vph)	0	0	0	1187	424	294
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1638	1810	1214
Flt Permitted						
Satd. Flow (perm)	0	0	0	1638	1810	1214
Link Speed (k/h)	50			70	60	
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			2.6	10.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	16%	5%	33%
Adj. Flow (vph)	0	0	0	1249	446	309
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1249	446	309
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	65.8%
Analysis Period (min)	15
	ICU Level of Service C

Lanes, Volumes, Timings

2045 Future Background A.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024

	↖	↗	↑	↖	↗	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑	↖		↑
Traffic Volume (vph)	202	276	912	226	0	424
Future Volume (vph)	202	276	912	226	0	424
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1787	1583	1638	1509	0	1810
Flt Permitted	0.950					
Satd. Flow (perm)	1787	1583	1638	1509	0	1810
Right Turn on Red			Yes	Yes		
Satd. Flow (RTOR)			147	238		
Link Speed (k/h)	50		60			60
Link Distance (m)	104.8		160.3			51.5
Travel Time (s)	7.5		9.6			3.1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	16%	7%	0%	5%
Adj. Flow (vph)	213	291	960	238	0	446
Shared Lane Traffic (%)						
Lane Group Flow (vph)	213	291	960	238	0	446
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15		25
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2045 Future Background A.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	9.7	9.7	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.6	17.6	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.9	1.9	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.4	6.4	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	14.3	14.3	47.9	47.9		47.9
Actuated g/C Ratio	0.19	0.19	0.63	0.63		0.63
v/c Ratio	0.64	0.70	0.93	0.23		0.39
Control Delay	39.5	25.3	30.7	1.5		8.3
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	39.5	25.3	30.7	1.5		8.3
LOS	D	C	C	A		A
Approach Delay	31.3		24.9			8.3
Approach LOS	C		C			A
Queue Length 50th (m)	33.0	21.7	116.6	0.0		29.8
Queue Length 95th (m)	55.7	49.7	#232.6	7.7		51.2
Internal Link Dist (m)	80.8		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	423	487	1183	1156		1308
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.50	0.60	0.81	0.21		0.34

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	76.2
Natural Cycle:	80
Control Type:	Semi Act-Uncooord
Maximum v/c Ratio:	0.93
Intersection Signal Delay:	23.0
Intersection LOS:	C
Intersection Capacity Utilization:	76.5%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

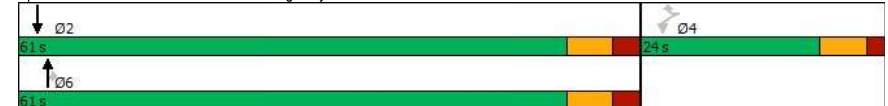
Lanes, Volumes, Timings

2045 Future Background A.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2045 Future Background A.M.

4: West Street North & Highway 11 Eastbound

09-25-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↗	↗
Traffic Volume (vph)	360	158	131	774	565	61
Future Volume (vph)	360	158	131	774	565	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1327	1524	1787	1827	1845	1442
Flt Permitted	0.950		0.198			
Satd. Flow (perm)	1327	1524	372	1827	1845	1442
Right Turn on Red		Yes			Yes	
Satd. Flow (RTOR)		166				42
Link Speed (k/h)	50			60	60	
Link Distance (m)	154.2			160.8	176.6	
Travel Time (s)	11.1			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	36%	6%	1%	4%	3%	12%
Adj. Flow (vph)	379	166	138	815	595	64
Shared Lane Traffic (%)						
Lane Group Flow (vph)	379	166	138	815	595	64
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2045 Future Background A.M.

4: West Street North & Highway 11 Eastbound

09-25-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	38.0	38.0	10.0	52.0	42.0	42.0
Total Split (%)	42.2%	42.2%	11.1%	57.8%	46.7%	46.7%
Maximum Green (s)	31.8	31.8	8.0	44.9	34.9	34.9
Yellow Time (s)	4.5	4.5	2.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	2.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	26.9	26.9	44.5	39.2	31.9	31.9
Actuated g/C Ratio	0.34	0.34	0.56	0.49	0.40	0.40
v/c Ratio	0.85	0.27	0.40	0.91	0.81	0.11
Control Delay	45.1	4.8	12.9	35.4	33.6	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.1	4.8	12.9	35.4	33.6	9.1
LOS	D	A	B	D	C	A
Approach Delay	32.8			32.1	31.2	
Approach LOS	C			C	C	
Queue Length 50th (m)	61.5	0.0	11.2	126.5	95.1	2.4
Queue Length 95th (m)	#110.8	13.0	20.4	#208.5	#155.4	10.5
Internal Link Dist (m)	130.2			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	547	726	354	1064	836	676
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.23	0.39	0.77	0.71	0.09

Intersection Summary

Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 79.9	
Natural Cycle: 80	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 32.0	Intersection LOS: C
Intersection Capacity Utilization 71.8%	ICU Level of Service C
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings

2045 Future Background A.M.

4: West Street North & Highway 11 Eastbound

09-25-2024

Splits and Phases: 4: West Street North & Highway 11 Eastbound

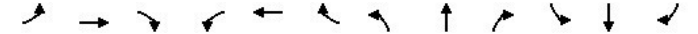


Lanes, Volumes, Timings

2045 Future Background A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑	↗	↖	↑	↗
Traffic Volume (vph)	164	206	199	338	300	163	222	557	463	121	905	260
Future Volume (vph)	164	206	199	338	300	163	222	557	463	121	905	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.95	1.00	1.00
Frt			0.850		0.947				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1583	1787	1765	0	3467	3574	1568	1736	3471	1568
Flt Permitted	0.249			0.469			0.950			0.353		
Satd. Flow (perm)	468	1881	1583	882	1765	0	3467	3574	1568	645	3471	1568
Right Turn on Red			Yes			Yes		Yes			Yes	Yes
Satd. Flow (RTOR)			205		27			477				187
Link Speed (k/h)		60			60			70				70
Link Distance (m)		186.6			853.6			529.0				469.5
Travel Time (s)		11.2			51.2			27.2				24.1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	2%	1%	3%	0%	1%	3%	4%	3%	4%	3%
Adj. Flow (vph)	169	212	205	348	309	168	229	574	477	125	933	268
Shared Lane Traffic (%)												
Lane Group Flow (vph)	169	212	205	348	477	0	229	574	477	125	933	268
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2				7.2
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	100		15	25		15	25		100
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	

Lanes, Volumes, Timings

2045 Future Background A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	12.0	39.0	39.0	17.0	44.0		12.0	42.0	42.0	12.0	42.0	42.0
Total Split (%)	10.9%	35.5%	35.5%	15.5%	40.0%		10.9%	38.2%	38.2%	10.9%	38.2%	38.2%
Maximum Green (s)	7.0	31.8	31.8	12.0	36.8		8.0	34.0	34.0	8.0	34.0	34.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0					7.0		7.0
Flash Dont Walk (s)					19.0					6.0		6.0
Pedestrian Calls (#/hr)					0					0		0
Act Effct Green (s)	36.0	26.7	26.7	46.0	31.7		8.1	31.5	31.5	43.2	31.3	31.3
Actuated g/C Ratio	0.35	0.26	0.26	0.45	0.31		0.08	0.31	0.31	0.42	0.31	0.31
v/c Ratio	0.66	0.43	0.36	0.69	0.84		0.84	0.52	0.59	0.35	0.88	0.44
Control Delay	33.5	34.9	6.2	28.6	46.4		74.8	31.7	6.0	19.8	45.1	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.5	34.9	6.2	28.6	46.4		74.8	31.7	6.0	19.8	45.1	11.9
LOS	C	C	A	C	D		E	C	A	B	D	B
Approach Delay		24.4			38.9			29.8			36.0	
Approach LOS		C			D			C			D	
Queue Length 50th (m)	22.0	38.4	0.0	50.9	91.6		25.9	53.0	0.0	15.1	98.9	12.6
Queue Length 95th (m)	#37.1	60.5	17.3	75.6	#136.8		#50.5	73.7	25.0	28.2	#139.3	36.4
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	255	587	635	502	654		272	1193	841	358	1158	647
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.36	0.32	0.69	0.73		0.84	0.48	0.57	0.35	0.81	0.41

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 102.5

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 32.9

Intersection LOS: C

Intersection Capacity Utilization 86.9%

ICU Level of Service E

Analysis Period (min) 15

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

Lanes, Volumes, Timings

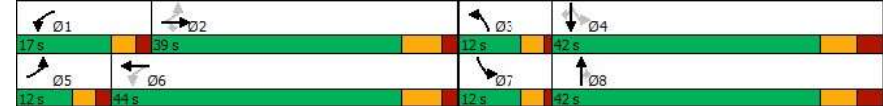
2045 Future Background A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024

Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road





HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2045 Future Background A.M.  
09-25-2024

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	269	5	2	0	13	0	0	0	0	0	0	283
Future Vol, veh/h	269	5	2	0	13	0	0	0	0	0	0	283
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	32	67	0	0	30	100	50	0	100	0	50	30
Mvmt Flow	292	5	2	0	14	0	0	0	0	0	0	308

Major/Minor	Minor2	Minor1	Major1	Major2									
Conflicting Flow All	161	154	154	158	308	0	308	0	0	0	0	0	0
Stage 1	154	154	-	0	0	-	-	-	-	-	-	-	-
Stage 2	7	0	-	158	308	-	-	-	-	-	-	-	-
Critical Hdwy	7.42	7.17	6.2	7.1	6.8	7.2	4.6	-	-	4.1	-	-	-
Critical Hdwy Stg 1	6.42	6.17	-	6.1	5.8	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.42	6.17	-	6.1	5.8	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.788	4.603	3.3	3.5	4.27	4.2	2.65	-	-	2.2	-	-	-
Pot Cap-1 Maneuver	741	634	897	813	563	-	1024	-	-	-	-	-	-
Stage 1	782	662	-	-	-	-	-	-	-	-	-	-	-
Stage 2	942	-	-	849	613	-	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	634	897	806	563	-	1024	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	634	-	806	563	-	-	-	-	-	-	-	-
Stage 1	782	662	-	-	-	-	-	-	-	-	-	-	-
Stage 2	942	-	-	840	613	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0	0
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1024	-	-	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	-	-	-
HCM Lane LOS	A	-	-	-	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2045 Future Background A.M.  
09-25-2024

Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	0	207	10	44	166	5	5	7	47	8	14	2
Future Vol, veh/h	0	207	10	44	166	5	5	7	47	8	14	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	2	0	0	1	0	0	25	3	0	11	0
Mvmt Flow	0	216	10	46	173	5	5	7	49	8	15	2

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	178	0	0	226	0	0	497	491	221	517	494	176
Stage 1	-	-	-	-	-	-	221	221	-	268	268	-
Stage 2	-	-	-	-	-	-	276	270	-	249	226	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.75	6.23	7.1	6.61	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.75	-	6.1	5.61	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.75	-	6.1	5.61	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.225	3.327	3.5	4.099	3.3
Pot Cap-1 Maneuver	1410	-	-	1354	-	-	487	446	816	472	464	872
Stage 1	-	-	-	-	-	-	786	680	-	742	671	-
Stage 2	-	-	-	-	-	-	735	646	-	759	700	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1410	-	-	1354	-	-	460	429	816	425	446	872
Mov Cap-2 Maneuver	-	-	-	-	-	-	460	429	-	425	446	-
Stage 1	-	-	-	-	-	-	786	680	-	742	646	-
Stage 2	-	-	-	-	-	-	689	621	-	706	700	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	10.7	13.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	696	1410	-	-	1354	-	-	457
HCM Lane V/C Ratio	0.088	-	-	-	0.034	-	-	0.055
HCM Control Delay (s)	10.7	0	-	-	7.8	0	-	13.3
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.2

Lanes, Volumes, Timings

2045 Future Background A.M.

8: Burnside Line & Division Road W

09-25-2024



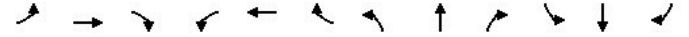
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕				↕			↕	
Traffic Volume (vph)	17	96	155	25	76	2	110	420	41	7	196	17
Future Volume (vph)	17	96	155	25	76	2	110	420	41	7	196	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.922		0.998		0.990		0.990		0.990		0.990	
Flt Protected	0.997		0.988		0.990		0.990		0.998		0.998	
Satd. Flow (prot)	0	1724	0	0	1873	0	0	1279	0	0	1299	0
Flt Permitted	0.976		0.840		0.892		0.983		0.983		0.983	
Satd. Flow (perm)	0	1688	0	0	1593	0	0	1153	0	0	1279	0
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	136		2		10		11		11		11	
Link Speed (k/h)	50		50		70		60		60		60	
Link Distance (m)	1346.1		271.7		1953.3		357.4		357.4		357.4	
Travel Time (s)	96.9		19.6		100.5		21.4		21.4		21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%	0%	62%	0%	0%	50%	0%
Adj. Flow (vph)	18	104	168	27	83	2	120	457	45	8	213	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	290	0	0	112	0	0	622	0	0	239	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0		0.0		3.6		3.6		3.6		3.6	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25		15		25		15	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4		8		2		6		6		6	
Permitted Phases	4		8		2		6		6		6	
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												

Lanes, Volumes, Timings

2045 Future Background A.M.

8: Burnside Line & Division Road W

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		32.0	32.0		32.0	32.0	
Total Split (%)	41.8%	41.8%		41.8%	41.8%		58.2%	58.2%		58.2%	58.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5		27.5	27.5		27.5	27.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Total Lost Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	10.1		10.1		29.4		29.4		29.4		29.4	
Actuated g/C Ratio	0.21		0.21		0.61		0.61		0.61		0.61	
v/c Ratio	0.63		0.34		0.89		0.31		0.31		0.31	
Control Delay	15.3		17.7		29.6		6.8		6.8		6.8	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	15.3		17.7		29.6		6.8		6.8		6.8	
LOS	B		B		C		A		A		A	
Approach Delay	15.3		17.7		29.6		6.8		6.8		6.8	
Approach LOS	B		B		C		A		A		A	
Queue Length 50th (m)	11.5		8.0		37.4		7.8		7.8		7.8	
Queue Length 95th (m)	28.9		18.1		#122.5		24.1		24.1		24.1	
Internal Link Dist (m)	1322.1		247.7		1929.3		333.4		333.4		333.4	
Turn Bay Length (m)												
Base Capacity (vph)	730		611		702		778		778		778	
Starvation Cap Reductn	0		0		0		0		0		0	
Spillback Cap Reductn	0		0		0		0		0		0	
Storage Cap Reductn	0		0		0		0		0		0	
Reduced v/c Ratio	0.40		0.18		0.89		0.31		0.31		0.31	
Intersection Summary												
Area Type:	Other											
Cycle Length:	55											
Actuated Cycle Length:	48.5											
Natural Cycle:	75											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.89											
Intersection Signal Delay:	21.0						Intersection LOS: C					
Intersection Capacity Utilization:	70.1%						ICU Level of Service C					
Analysis Period (min):	15											
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

Lanes, Volumes, Timings  
8: Burnside Line & Division Road W

2045 Future Background A.M.  
09-25-2024

Splits and Phases: 8: Burnside Line & Division Road W



HCM 2010 TWSC  
9: Industrial Road & Hurlwood Lane

2045 Future Background A.M.  
09-25-2024

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔
Traffic Vol, veh/h	0	140	318	64	41	0
Future Vol, veh/h	0	140	318	64	41	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	152	346	70	45	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	416	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1143	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1143	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1143	-	-	-	575	-
HCM Lane V/C Ratio	-	-	-	-	0.078	-
HCM Control Delay (s)	0	-	-	-	11.8	0
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.3	-

HCM 2010 TWSC  
10: Uthoff Line & Industrial Road

2045 Future Background A.M.  
09-25-2024

Intersection						
Int Delay, s/veh	3.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔			↔
Traffic Vol, veh/h	159	0	106	189	0	154
Future Vol, veh/h	159	0	106	189	0	154
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	0	115	205	0	167
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	385	218	0	0	320	0
Stage 1	218	-	-	-	-	-
Stage 2	167	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	618	822	-	-	1240	-
Stage 1	818	-	-	-	-	-
Stage 2	863	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	618	822	-	-	1240	-
Mov Cap-2 Maneuver	618	-	-	-	-	-
Stage 1	818	-	-	-	-	-
Stage 2	863	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	13.1	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	618	-	1240	-
HCM Lane V/C Ratio	-	-	0.28	-	-	-
HCM Control Delay (s)	-	-	13.1	0	0	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	1.1	-	0	-

Lanes, Volumes, Timings  
1: Burnside Line & Industrial Road/Brodie Drive

2045 Future Background P.M.  
09-25-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	75	42	288	501	2	126	197	375	114	54	296	25
Future Volume (vph)	75	42	288	501	2	126	197	375	114	54	296	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1568	1770	1900	1615	1805	1863	1429	1805	1748	0
Flt Permitted	0.757			0.568			0.344			0.316		
Satd. Flow (perm)	1438	1900	1568	1058	1900	1615	654	1863	1429	600	1748	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			306			145			200			5
Link Speed (k/h)	50			60			60			60		
Link Distance (m)	140.4			136.5			65.5			1953.3		
Travel Time (s)	10.1			8.2			3.9			117.2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	3%	2%	0%	0%	0%	2%	13%	0%	8%	0%
Adj. Flow (vph)	80	45	306	533	2	134	210	399	121	57	315	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	80	45	306	533	2	134	210	399	121	57	342	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.6			3.6			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane	Yes											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25		15		25		15	
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4			9.4			9.4			9.4		
Detector 2 Size(m)	0.6			0.6			0.6			0.6		
Detector 2 Type	CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	NA
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2045 Future Background P.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	9.9	21.0	21.0	28.0	39.1	39.1	9.8	31.5	31.5	9.5	31.2	
Total Split (%)	11.0%	23.3%	23.3%	31.1%	43.4%	43.4%	10.9%	35.0%	35.0%	10.6%	34.7%	
Maximum Green (s)	5.4	15.0	15.0	23.5	33.1	33.1	5.3	25.5	25.5	5.0	25.2	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	21.9	15.0	15.0	42.7	33.4	33.4	33.1	27.4	27.4	31.6	25.1	
Actuated g/C Ratio	0.25	0.17	0.17	0.48	0.38	0.38	0.38	0.31	0.31	0.36	0.28	
v/c Ratio	0.21	0.14	0.59	0.78	0.00	0.19	0.67	0.69	0.21	0.20	0.68	
Control Delay	16.5	33.3	9.3	25.9	18.0	3.7	32.2	35.6	1.2	18.4	36.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	16.5	33.3	9.3	25.9	18.0	3.7	32.2	35.6	1.2	18.4	36.1	
LOS	B	C	A	C	B	A	C	D	A	B	D	
Approach Delay		13.2			21.4			28.9			33.5	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	7.3	7.1	0.0	66.6	0.3	0.0	25.1	66.0	0.0	6.2	54.7	
Queue Length 95th (m)	15.0	16.9	22.7	100.8	1.7	10.0	#46.8	#107.9	1.6	13.8	85.7	
Internal Link Dist (m)		116.4			112.5			41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0		65.0	40.0		
Base Capacity (vph)	380	323	521	702	728	708	314	581	583	283	504	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.21	0.14	0.59	0.76	0.00	0.19	0.67	0.69	0.21	0.20	0.68	

Intersection Summary

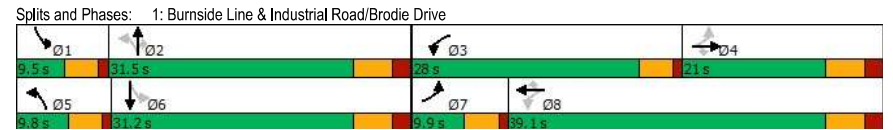
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	88.1
Natural Cycle:	80
Control Type:	Semi Act-Uncooord
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	24.5
Intersection LOS:	C
Intersection Capacity Utilization:	80.2%
ICU Level of Service:	D
Analysis Period (min):	15
#	95th percentile volume exceeds capacity, queue may be longer.
	Queue shown is maximum after two cycles.

Lanes, Volumes, Timings

2045 Future Background P.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-25-2024



Lanes, Volumes, Timings

2045 Future Background P.M.

2: Burnside Line & Highway 11 Westbound On-Ramp

09-25-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑	↑
Traffic Volume (vph)	0	0	0	1100	709	343
Future Volume (vph)	0	0	0	1100	709	343
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1863	1863	1509
Flt Permitted						
Satd. Flow (perm)	0	0	0	1863	1863	1509
Link Speed (k/h)	50			50	50	
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			3.7	12.5	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	2%	2%	7%
Adj. Flow (vph)	0	0	0	1122	723	350
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1122	723	350
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	61.2%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings

2045 Future Background P.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↓	↑	↑	↑		↑
Traffic Volume (vph)	255	227	874	361	0	709
Future Volume (vph)	255	227	874	361	0	709
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1752	1599	1863	1615	0	1863
Flt Permitted	0.950					
Satd. Flow (perm)	1752	1599	1863	1615	0	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		171		368		
Link Speed (k/h)	50		60			60
Link Distance (m)	104.8		160.3			51.5
Travel Time (s)	7.5		9.6			3.1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	1%	2%	0%	0%	2%
Adj. Flow (vph)	260	232	892	368	0	723
Shared Lane Traffic (%)						
Lane Group Flow (vph)	260	232	892	368	0	723
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2045 Future Background P.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.9	17.9	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.6	1.6	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.1	6.1	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	14.7	14.7	37.8	37.8		37.8
Actuated g/C Ratio	0.22	0.22	0.57	0.57		0.57
v/c Ratio	0.67	0.48	0.85	0.34		0.69
Control Delay	36.6	12.4	20.5	1.7		13.8
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	36.6	12.4	20.5	1.7		13.8
LOS	D	B	C	A		B
Approach Delay	25.2		15.0			13.8
Approach LOS	C		B			B
Queue Length 50th (m)	32.0	6.6	87.1	0.0		60.2
Queue Length 95th (m)	#74.0	29.4	148.3	9.2		100.0
Internal Link Dist (m)	80.8		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	497	576	1508	1377		1508
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.52	0.40	0.59	0.27		0.48

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	66.7
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	16.7
Intersection LOS:	B
Intersection Capacity Utilization:	71.3%
ICU Level of Service:	C
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings

2045 Future Background P.M.

3: Burnside Line & Highway 11 Westbound

09-25-2024

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2045 Future Background P.M.

4: West Street North & Highway 11 Eastbound

09-25-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↖	↖	↖
Traffic Volume (vph)	241	207	301	991	809	157
Future Volume (vph)	241	207	301	991	809	157
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1736	1583	1787	1881	1863	1583
Flt Permitted	0.950		0.104			
Satd. Flow (perm)	1736	1583	196	1881	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		218				68
Link Speed (k/h)	50			60	60	
Link Distance (m)	154.2			160.8	176.6	
Travel Time (s)	11.1			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	2%	1%	1%	2%	2%
Adj. Flow (vph)	254	218	317	1043	852	165
Shared Lane Traffic (%)						
Lane Group Flow (vph)	254	218	317	1043	852	165
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Ch+Ex	Ch+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2045 Future Background P.M.

4: West Street North & Highway 11 Eastbound

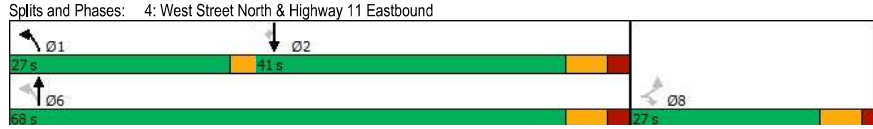
09-25-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	27.0	27.0	27.0	68.0	41.0	41.0
Total Split (%)	28.4%	28.4%	28.4%	71.6%	43.2%	43.2%
Maximum Green (s)	20.8	20.8	24.0	60.9	33.9	33.9
Yellow Time (s)	4.5	4.5	3.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	3.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	16.5	16.5	57.7	53.5	35.5	35.5
Actuated g/C Ratio	0.20	0.20	0.69	0.64	0.43	0.43
v/c Ratio	0.74	0.45	0.75	0.87	1.08	0.23
Control Delay	46.6	7.8	28.5	22.3	81.8	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.6	7.8	28.5	22.3	81.8	12.1
LOS	D	A	C	C	F	B
Approach Delay	28.7			23.7	70.5	
Approach LOS	C			C	E	
Queue Length 50th (m)	39.9	0.0	31.7	130.2	~165.4	9.9
Queue Length 95th (m)	72.3	18.5	62.3	#255.0	#283.5	28.0
Internal Link Dist (m)	130.2			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	439	563	600	1394	791	711
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.39	0.53	0.75	1.08	0.23
Intersection Summary						
Area Type:	Other					
Cycle Length:	95					
Actuated Cycle Length:	83.5					
Natural Cycle:	90					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	1.08					
Intersection Signal Delay:	41.3			Intersection LOS: D		
Intersection Capacity Utilization:	87.0%			ICU Level of Service E		
Analysis Period (min)	15					
~ Volume exceeds capacity, queue is theoretically infinite.						
Queue shown is maximum after two cycles.						
# 95th percentile volume exceeds capacity, queue may be longer.						
Queue shown is maximum after two cycles.						



Lanes, Volumes, Timings  
4: West Street North & Highway 11 Eastbound

2045 Future Background P.M.  
09-25-2024



Lanes, Volumes, Timings  
5: Highway 12 & West Ridge Boulevard/Murphy Road

2045 Future Background P.M.  
09-25-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↕
Traffic Volume (vph)	329	321	348	531	309	238	331	1063	513	106	880	232
Future Volume (vph)	329	321	348	531	309	238	331	1063	513	106	880	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.98									
Frt			0.850		0.935				0.850			0.850
Frt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1900	1599	1787	1767	0	3502	3539	1599	1805	3505	1583
Frt Permitted	0.144			0.122			0.950			0.114		
Satd. Flow (perm)	271	1900	1575	230	1767	0	3502	3539	1599	217	3505	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			233		24				489			161
Link Speed (k/h)		50			70			50			50	
Link Distance (m)		186.6			853.6			529.0			469.5	
Travel Time (s)		13.4			43.9			38.1			33.8	
Confl. Peds. (#/hr)			2	2								
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	0%	1%	1%	1%	0%	0%	2%	1%	0%	3%	2%
Adj. Flow (vph)	350	341	370	565	329	253	352	1131	546	113	936	247
Shared Lane Traffic (%)												
Lane Group Flow (vph)	350	341	370	565	582	0	352	1131	546	113	936	247
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2045 Future Background P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	42.0	35.0	35.0	49.0	42.0		23.0	50.0	50.0	16.0	43.0	43.0
Total Split (%)	28.0%	23.3%	23.3%	32.7%	28.0%		15.3%	33.3%	33.3%	10.7%	28.7%	28.7%
Maximum Green (s)	37.0	27.8	27.8	44.0	34.8		19.0	42.0	42.0	12.0	35.0	35.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0			7.0	7.0			
Flash Dont Walk (s)					19.0			6.0	6.0			
Pedestrian Calls (#/hr)					0			0	0			
Act Effct Green (s)	59.3	27.8	27.8	78.6	42.1		18.1	42.6	42.6	49.6	35.0	35.0
Actuated g/C Ratio	0.40	0.19	0.19	0.53	0.28		0.12	0.29	0.29	0.33	0.24	0.24
v/c Ratio	0.86	0.96	0.77	0.98	1.13		0.82	1.12	0.68	0.61	1.14	0.50
Control Delay	62.5	98.2	32.3	74.0	124.7		80.3	114.1	10.8	44.1	126.0	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.5	98.2	32.3	74.0	124.7		80.3	114.1	10.8	44.1	126.0	21.1
LOS	E	F	C	E	F		F	F	B	D	F	C
Approach Delay		63.5			99.7			80.4			98.8	
Approach LOS		E			F			F			F	
Queue Length 50th (m)	87.7	107.3	42.2	157.6	~207.6		56.0	~214.3	13.3	22.0	~180.0	22.2
Queue Length 95th (m)	119.3	#172.0	84.3	#237.5	#310.3		#77.3	#261.8	55.5	37.3	#224.1	51.5
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	498	355	483	581	517		447	1013	806	202	824	495
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.96	0.77	0.97	1.13		0.79	1.12	0.68	0.56	1.14	0.50

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	148.8
Natural Cycle:	150
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.14
Intersection Signal Delay:	85.5
Intersection LOS:	F
Intersection Capacity Utilization:	104.5%
ICU Level of Service:	G

Lanes, Volumes, Timings

2045 Future Background P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-25-2024

Analysis Period (min)	15
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



Lanes, Volumes, Timings  
6: Unthoff Line & Murphy Road

2045 Future Background P.M.  
09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	412	7	0	4	4	4	2	0	0	2	0	328
Future Volume (vph)	412	7	0	4	4	4	2	0	0	2	0	328
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.955						0.866		
Flt Protected		0.953			0.984			0.950				
Satd. Flow (prot)	0	1533	0	0	1339	0	0	1805	0	0	1297	0
Flt Permitted		0.953			0.984			0.950				
Satd. Flow (perm)	0	1533	0	0	1339	0	0	1805	0	0	1297	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		853.6			117.8			131.4			177.2	
Travel Time (s)		61.5			8.5			7.9			10.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	18%	25%	0%	0%	100%	0%	0%	0%	0%	0%	0%	27%
Adj. Flow (vph)	458	8	0	4	4	4	2	0	0	2	0	364
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	466	0	0	12	0	0	2	0	0	366	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	56.9%
ICU Level of Service	B
Analysis Period (min)	15

HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2045 Future Background P.M.  
09-25-2024

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	412	7	0	4	4	4	2	0	0	2	0	328
Future Vol, veh/h	412	7	0	4	4	4	2	0	0	2	0	328
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	18	25	0	0	100	0	0	0	0	0	0	27
Mvmt Flow	458	8	0	4	4	4	2	0	0	2	0	364

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	194	190	182	194
Stage 1	186	186	-	4
Stage 2	8	4	-	190
Critical Hdwy	7.28	6.75	6.2	7.1
Critical Hdwy Stg 1	6.28	5.75	-	6.1
Critical Hdwy Stg 2	6.28	5.75	-	6.1
Follow-up Hdwy	3.662	4.225	3.3	3.5
Pot Cap-1 Maneuver	732	666	866	770
Stage 1	780	705	-	1024
Stage 2	973	849	-	816
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	665	866	762
Mov Cap-2 Maneuver	-	665	-	762
Stage 1	778	705	-	1022
Stage 2	965	847	-	807

Approach	EB	WB	NB	SB				
HCM Control Delay, s			8					
HCM LOS	-	-						
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1206	-	-	-	-	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-	-	-	-	-
HCM Control Delay (s)	8	0	-	-	-	-	-	-
HCM Lane LOS	A	A	-	-	-	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

Lanes, Volumes, Timings  
7: Unthoff Line & Division Road W

2045 Future Background P.M.  
09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	5	295	17	49	373	20	28	26	94	8	8	2
Future Volume (vph)	5	295	17	49	373	20	28	26	94	8	8	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.994			0.914			0.986	
Flt Protected		0.999			0.994			0.991			0.978	
Satd. Flow (prot)	0	1850	0	0	1862	0	0	1721	0	0	1681	0
Flt Permitted		0.999			0.994			0.991			0.978	
Satd. Flow (perm)	0	1850	0	0	1862	0	0	1721	0	0	1681	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		350.0			1346.1			2901.0			405.2	
Travel Time (s)		25.2			96.9			208.9			29.2	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%	20%	0%
Adj. Flow (vph)	5	317	18	53	401	22	30	28	101	9	9	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	340	0	0	476	0	0	159	0	0	20	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		100			100			100			100	
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.6%
Analysis Period (min)	15
	ICU Level of Service B

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2045 Future Background P.M.  
09-25-2024

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	295	17	49	373	20	28	26	94	8	8	2
Future Vol, veh/h	5	295	17	49	373	20	28	26	94	8	8	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %		0			0			0			0	
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	0	1	0	0	0	0	0	20	0
Mvmt Flow	5	317	18	53	401	22	30	28	101	9	9	2

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	423	0	0	335
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.1	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2
Pot Cap-1 Maneuver	1147	-	-	1236
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1147	-	-	1236
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.9	17.6	21.5
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	444	1147	-	-	1236	-	-	237
HCM Lane V/C Ratio	0.358	0.005	-	-	0.043	-	-	0.082
HCM Control Delay (s)	17.6	8.2	0	-	8	0	-	21.5
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.6	0	-	-	0.1	-	-	0.3

Lanes, Volumes, Timings

2045 Future Background P.M.

8: Burnside Line & Division Road W

09-25-2024



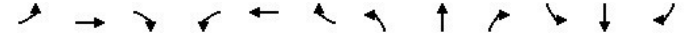
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	16	187	202	28	143	4	266	207	82	7	113	34
Future Volume (vph)	16	187	202	28	143	4	266	207	82	7	113	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.933			0.997			0.980			0.970	
Flt Protected		0.998			0.992			0.977			0.998	
Satd. Flow (prot)	0	1744	0	0	1849	0	0	1793	0	0	1573	0
Flt Permitted		0.984			0.878			0.767			0.979	
Satd. Flow (perm)	0	1720	0	0	1636	0	0	1408	0	0	1543	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		98			2			23			36	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1346.1			271.7			1953.3			357.4	
Travel Time (s)		96.9			19.6			140.6			25.7	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	1%	0%	2%	0%	1%	1%	4%	0%	23%	0%
Adj. Flow (vph)	17	199	215	30	152	4	283	220	87	7	120	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	431	0	0	186	0	0	590	0	0	163	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100		100	100	100		100	100	100	100		100
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases		4			8			2			6	
Detector Phase		4	4		8	8		2	2		6	6
Switch Phase												

Lanes, Volumes, Timings

2045 Future Background P.M.

8: Burnside Line & Division Road W

09-25-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		32.0	32.0		32.0	32.0	
Total Split (%)	41.8%	41.8%		41.8%	41.8%		58.2%	58.2%		58.2%	58.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5		27.5	27.5		27.5	27.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		14.5			14.5			27.7			27.7	
Actuated g/C Ratio		0.28			0.28			0.54			0.54	
v/c Ratio		0.78			0.40			0.77			0.19	
Control Delay		23.2			17.1			19.5			6.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		23.2			17.1			19.5			6.4	
LOS		C			B			B			A	
Approach Delay		23.2			17.1			19.5			6.4	
Approach LOS		C			B			B			A	
Queue Length 50th (m)		28.4			14.0			39.7			5.7	
Queue Length 95th (m)		55.9			28.0			#104.9			15.2	
Internal Link Dist (m)		1322.1			247.7			1929.3			333.4	
Turn Bay Length (m)												
Base Capacity (vph)		687			596			771			850	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.63			0.31			0.77			0.19	
Intersection Summary												
Area Type:	Other											
Cycle Length:	55											
Actuated Cycle Length:	51.2											
Natural Cycle:	55											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.78											
Intersection Signal Delay:	18.7						Intersection LOS: B					
Intersection Capacity Utilization:	74.9%						ICU Level of Service D					
Analysis Period (min):	15											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											

Lanes, Volumes, Timings  
8: Burnside Line & Division Road W

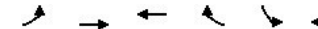
2045 Future Background P.M.  
09-25-2024

Splits and Phases: 8: Burnside Line & Division Road W



Lanes, Volumes, Timings  
9: Industrial Road & Hurlwood Lane

2045 Future Background P.M.  
09-25-2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑	↶	↷	↵	↶
Traffic Volume (vph)	0	127	462	49	76	0
Future Volume (vph)	0	127	462	49	76	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.987					
Flt Protected					0.950	
Satd. Flow (prot)	1863	1863	1839	0	1770	1863
Flt Permitted					0.950	
Satd. Flow (perm)	1863	1863	1839	0	1770	1863
Link Speed (k/h)	50		50	50		
Link Distance (m)	254.1		140.4	164.3		
Travel Time (s)	18.3		10.1	11.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	138	502	53	83	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	138	555	0	83	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	3.6		3.6	3.6		
Link Offset(m)	0.0		0.0	0.0		
Crosswalk Width(m)	4.8		4.8	4.8		
Two way Left Turn Lane	Yes		Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control	Free		Free	Stop		

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 38.2% ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔		↔	↔
Traffic Vol, veh/h	0	127	462	49	76	0
Future Vol, veh/h	0	127	462	49	76	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	138	502	53	83	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	555	0	0	667	529
Stage 1	-	-	-	529	-
Stage 2	-	-	-	138	-
Critical Hdwy	4.12	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	1015	-	-	424	550
Stage 1	-	-	-	591	-
Stage 2	-	-	-	889	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1015	-	-	424	550
Mov Cap-2 Maneuver	-	-	-	499	-
Stage 1	-	-	-	591	-
Stage 2	-	-	-	889	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	13.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1015	-	-	-	499	-
HCM Lane V/C Ratio	-	-	-	-	0.166	-
HCM Control Delay (s)	0	-	-	-	13.6	0
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.6	-

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group						
Lane Configurations	↔	↔	↔			↔
Traffic Volume (vph)	199	0	223	193	0	135
Future Volume (vph)	199	0	223	193	0	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.937					
Flt Protected	0.950					
Satd. Flow (prot)	1770	1863	1745	0	0	1863
Flt Permitted	0.950					
Satd. Flow (perm)	1770	1863	1745	0	0	1863
Link Speed (k/h)	50		80			80
Link Distance (m)	229.6		177.2			2901.0
Travel Time (s)	16.5		8.0			130.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	216	0	242	210	0	147
Shared Lane Traffic (%)						
Lane Group Flow (vph)	216	0	452	0	0	147
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100	100	100	100
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	41.2%
ICU Level of Service A	
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	4.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	199	0	223	193	0	135
Future Vol, veh/h	199	0	223	193	0	135
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	216	0	242	210	0	147

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	494	347	0
Stage 1	347	-	-
Stage 2	147	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	535	696	-
Stage 1	716	-	-
Stage 2	880	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	535	696	-
Mov Cap-2 Maneuver	535	-	-
Stage 1	716	-	-
Stage 2	880	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	535	-	1109
HCM Lane V/C Ratio	-	-	0.404	-	-
HCM Control Delay (s)	-	-	16.2	0	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.9	-	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↖	↗	↖↗	↖	↗	↖↗	↖↗	↖	↗	↖↗	↖↗
Traffic Volume (vph)	329	321	348	531	309	238	331	1063	513	106	880	232
Future Volume (vph)	329	321	348	531	309	238	331	1063	513	106	880	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	2		1	2		0	2		1	2		1
Taper Length (m)	70.0			65.0			80.0			100.0		
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor			0.99	1.00								
Frt			0.850		0.935				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3467	1900	1599	3467	1767	0	3502	3539	1599	3502	3505	1583
Flt Permitted	0.112			0.334			0.950			0.119		
Satd. Flow (perm)	409	1900	1577	1216	1767	0	3502	3539	1599	439	3505	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			208		34				403			156
Link Speed (k/h)		50			70			50			50	
Link Distance (m)		186.6			853.6			529.0			469.5	
Travel Time (s)		13.4			43.9			38.1			33.8	
Confl. Peds. (#/hr)			2	2								
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	0%	1%	1%	1%	0%	0%	2%	1%	0%	3%	2%
Adj. Flow (vph)	350	341	370	565	329	253	352	1131	546	113	936	247
Shared Lane Traffic (%)												
Lane Group Flow (vph)	350	341	370	565	582	0	352	1131	546	113	936	247
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	



Lanes, Volumes, Timings 2045 Future Background P.M. Mitigation  
 5: Highway 12 & West Ridge Boulevard/Murphy Road 09-06-2024

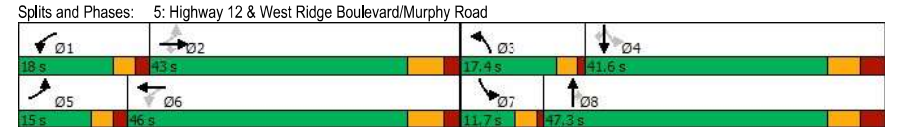


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	15.0	43.0	43.0	18.0	46.0		17.4	47.3	47.3	11.7	41.6	41.6
Total Split (%)	12.5%	35.8%	35.8%	15.0%	38.3%		14.5%	39.4%	39.4%	9.8%	34.7%	34.7%
Maximum Green (s)	10.0	35.8	35.8	13.0	38.8		13.4	39.3	39.3	7.7	33.6	33.6
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0			7.0	7.0			
Flash Dont Walk (s)					19.0			6.0	6.0			
Pedestrian Calls (#/hr)					0			0	0			
Act Effct Green (s)	48.0	35.8	35.8	54.0	38.8		13.4	39.5	39.5	44.9	33.5	33.5
Actuated g/C Ratio	0.40	0.30	0.30	0.45	0.32		0.11	0.33	0.33	0.37	0.28	0.28
v/c Ratio	0.84	0.60	0.60	0.71	0.98		0.90	0.97	0.69	0.32	0.96	0.45
Control Delay	42.6	41.3	19.7	26.6	70.5		79.1	60.1	13.8	21.3	62.8	15.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.6	41.3	19.7	26.6	70.5		79.1	60.1	13.8	21.3	62.8	15.9
LOS	D	D	B	C	E		E	E	B	C	E	B
Approach Delay		34.2			48.9			51.0			50.2	
Approach LOS		C			D			D			D	
Queue Length 50th (m)	26.4	72.3	33.2	44.8	135.9		45.1	145.0	27.9	7.8	120.0	17.3
Queue Length 95th (m)	#50.9	104.2	66.8	58.4	#212.5		#72.6	#193.1	71.1	13.4	#162.9	41.8
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	418	567	616	792	594		391	1165	796	362	982	555
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.60	0.60	0.71	0.98		0.90	0.97	0.69	0.31	0.95	0.45

Intersection Summary	
Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	119.9
Natural Cycle:	100
Control Type:	Semi Act-Uncooord
Maximum v/c Ratio:	0.98
Intersection Signal Delay:	47.1
Intersection LOS:	D
Intersection Capacity Utilization:	95.6%
ICU Level of Service:	F

Lanes, Volumes, Timings 2045 Future Background P.M. Mitigation  
 5: Highway 12 & West Ridge Boulevard/Murphy Road 09-06-2024

Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Lanes, Volumes, Timings

2031 Future Total A.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	47	30	149	219	5	37	326	267	79	35	233	44
Future Volume (vph)	47	30	149	219	5	37	326	267	79	35	233	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1615	1736	1900	1615	1805	1439	1468	1805	1521	0
Flt Permitted	0.754			0.580			0.377			0.581		
Satd. Flow (perm)	1433	1900	1615	1060	1900	1615	716	1439	1468	1104	1521	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			255			200			200			11
Link Speed (k/h)	50			60			60			60		60
Link Distance (m)	140.4			136.5			65.5			1953.3		
Travel Time (s)	10.1			8.2			3.9			117.2		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	4%	0%	0%	0%	32%	10%	0%	26%	0%
Adj. Flow (vph)	52	33	164	241	5	41	358	293	87	38	256	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	33	164	241	5	41	358	293	87	38	304	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width(m)	3.6			3.6			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane	Yes											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2031 Future Total A.M.

1: Burnside Line & Industrial Road/Brodie Drive

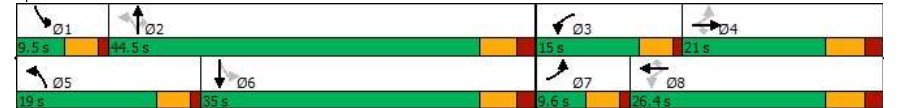
09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	9.6	21.0	21.0	15.0	26.4	26.4	19.0	44.5	44.5	9.5	35.0	
Total Split (%)	10.7%	23.3%	23.3%	16.7%	29.3%	29.3%	21.1%	49.4%	49.4%	10.6%	38.9%	
Maximum Green (s)	5.1	15.0	15.0	10.5	20.4	20.4	14.5	38.5	38.5	5.0	29.0	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	21.6	15.0	15.0	31.0	23.8	23.8	45.9	38.8	38.8	32.3	25.8	
Actuated g/C Ratio	0.25	0.17	0.17	0.36	0.28	0.28	0.53	0.45	0.45	0.38	0.30	
v/c Ratio	0.14	0.10	0.33	0.52	0.01	0.07	0.64	0.45	0.11	0.08	0.66	
Control Delay	20.1	31.7	2.3	25.5	26.4	0.2	17.5	20.3	0.3	11.2	33.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.1	31.7	2.3	25.5	26.4	0.2	17.5	20.3	0.3	11.2	33.2	
LOS	C	C	A	C	C	A	B	C	A	B	C	
Approach Delay		9.9			21.9			16.6			30.7	
Approach LOS		A			C			B			C	
Queue Length 50th (m)	5.8	4.9	0.0	30.2	0.7	0.0	34.3	37.2	0.0	3.0	44.6	
Queue Length 95th (m)	14.2	13.5	1.9	53.6	3.6	0.0	53.1	60.8	0.0	7.4	72.9	
Internal Link Dist (m)		116.4			112.5			41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0		65.0	40.0		
Base Capacity (vph)	382	332	492	465	527	592	566	676	795	456	521	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.10	0.33	0.52	0.01	0.07	0.63	0.43	0.11	0.08	0.58	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	85.9
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.66
Intersection Signal Delay:	19.5
Intersection LOS:	B
Intersection Capacity Utilization:	71.4%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 1: Burnside Line & Industrial Road/Brodie Drive



Lanes, Volumes, Timings

2031 Future Total A.M.

2: Burnside Line & Highway 11 Westbound On-Ramp

09-26-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑	↑
Traffic Volume (vph)	0	0	0	978	353	238
Future Volume (vph)	0	0	0	978	353	238
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1638	1810	1214
Flt Permitted						
Satd. Flow (perm)	0	0	0	1638	1810	1214
Link Speed (k/h)	50			70	60	
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			2.6	10.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	16%	5%	33%
Adj. Flow (vph)	0	0	0	1029	372	251
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1029	372	251
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.8%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings

2031 Future Total A.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↓	↑	↑	↑		↑
Traffic Volume (vph)	153	256	722	172	0	353
Future Volume (vph)	153	256	722	172	0	353
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1787	1583	1638	1509	0	1810
Flt Permitted	0.950					
Satd. Flow (perm)	1787	1583	1638	1509	0	1810
Right Turn on Red			Yes	Yes		
Satd. Flow (RTOR)			227	181		
Link Speed (k/h)	50		60			60
Link Distance (m)	241.7		160.3			51.5
Travel Time (s)	17.4		9.6			3.1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	16%	7%	0%	5%
Adj. Flow (vph)	161	269	760	181	0	372
Shared Lane Traffic (%)						
Lane Group Flow (vph)	161	269	760	181	0	372
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2031 Future Total A.M.

3: Burnside Line & Highway 11 Westbound

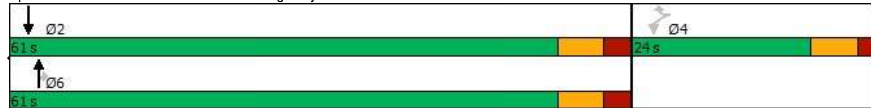
09-26-2024

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	9.7	9.7	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.6	17.6	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.9	1.9	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.4	6.4	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	12.2	12.2	33.6	33.6		33.6
Actuated g/C Ratio	0.20	0.20	0.56	0.56		0.56
v/c Ratio	0.44	0.54	0.83	0.20		0.37
Control Delay	28.8	11.0	20.1	1.6		8.3
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	28.8	11.0	20.1	1.6		8.3
LOS	C	B	C	A		A
Approach Delay	17.7		16.5			8.3
Approach LOS	B		B			A
Queue Length 50th (m)	15.8	3.8	58.2	0.0		19.2
Queue Length 95th (m)	42.9	27.8	127.4	6.8		41.1
Internal Link Dist (m)	217.7		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	552	646	1430	1340		1580
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.29	0.42	0.53	0.14		0.24

Intersection Summary

Area Type:	Other	
Cycle Length:	85	
Actuated Cycle Length:	60.3	
Natural Cycle:	60	
Control Type:	Semi Act-Uncoord	
Maximum v/c Ratio:	0.83	
Intersection Signal Delay:	15.1	Intersection LOS: B
Intersection Capacity Utilization:	65.3%	ICU Level of Service C
Analysis Period (min):	15	

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2031 Future Total A.M.

4: West Street North & Highway 11 Eastbound

09-26-2024

	↙	↖	↗	↑	↓	↘
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↖	↗	↑	↓	↘
Traffic Volume (vph)	277	120	99	613	458	49
Future Volume (vph)	277	120	99	613	458	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1327	1524	1787	1827	1845	1442
Flt Permitted	0.950		0.313			
Satd. Flow (perm)	1327	1524	589	1827	1845	1442
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		126				42
Link Speed (k/h)	50			60	60	
Link Distance (m)	214.0			160.8	176.6	
Travel Time (s)	15.4			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	36%	6%	1%	4%	3%	12%
Adj. Flow (vph)	292	126	104	645	482	52
Shared Lane Traffic (%)						
Lane Group Flow (vph)	292	126	104	645	482	52
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2031 Future Total A.M.

4: West Street North & Highway 11 Eastbound

09-26-2024

	↖	↘	↙	↗	↘	↙
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	38.0	38.0	10.0	52.0	42.0	42.0
Total Split (%)	42.2%	42.2%	11.1%	57.8%	46.7%	46.7%
Maximum Green (s)	31.8	31.8	8.0	44.9	34.9	34.9
Yellow Time (s)	4.5	4.5	2.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	2.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	20.0	20.0	38.1	32.7	25.5	25.5
Actuated g/C Ratio	0.30	0.30	0.57	0.49	0.38	0.38
v/c Ratio	0.74	0.23	0.22	0.72	0.68	0.09
Control Delay	34.4	5.3	9.1	20.0	25.5	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.4	5.3	9.1	20.0	25.5	7.6
LOS	C	A	A	B	C	A
Approach Delay	25.6			18.5	23.7	
Approach LOS	C			B	C	
Queue Length 50th (m)	32.8	0.0	5.4	60.6	53.2	0.8
Queue Length 95th (m)	72.1	11.5	16.0	128.8	106.7	8.3
Internal Link Dist (m)	190.0			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	671	833	488	1294	1025	819
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.15	0.21	0.50	0.47	0.06

Intersection Summary

Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 66.8	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 21.9	Intersection LOS: C
Intersection Capacity Utilization 59.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: West Street North & Highway 11 Eastbound



Lanes, Volumes, Timings

2031 Future Total A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024

	↖	→	↘	↙	←	↖	↘	↙	↗	↘	↙	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	125	167	151	336	257	144	168	422	404	102	686	197
Future Volume (vph)	125	167	151	336	257	144	168	422	404	102	686	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.95	1.00	1.00
Frt			0.850		0.946				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1583	1787	1763	0	3467	3574	1568	1736	3471	1568
Flt Permitted	0.360			0.532			0.950			0.499		
Satd. Flow (perm)	677	1881	1583	1001	1763	0	3467	3574	1568	912	3471	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			156		27				416			187
Link Speed (k/h)		60			60			70				70
Link Distance (m)		186.6			853.6			529.0				469.5
Travel Time (s)		11.2			51.2			27.2				24.1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	2%	1%	3%	0%	1%	3%	4%	4%	4%	3%
Adj. Flow (vph)	129	172	156	346	265	148	173	435	416	105	707	203
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	172	156	346	413	0	173	435	416	105	707	203
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2				7.2
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	100		15	25		15	25		100
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	

Lanes, Volumes, Timings

2031 Future Total A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	12.0	39.0	39.0	17.0	44.0		12.0	42.0	42.0	12.0	42.0	42.0
Total Split (%)	10.9%	35.5%	35.5%	15.5%	40.0%		10.9%	38.2%	38.2%	10.9%	38.2%	38.2%
Maximum Green (s)	7.0	31.8	31.8	12.0	36.8		8.0	34.0	34.0	8.0	34.0	34.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0					7.0		7.0
Flash Dont Walk (s)					19.0					6.0		6.0
Pedestrian Calls (#/hr)					0					0		0
Act Effct Green (s)	32.8	23.5	23.5	42.6	28.4		8.0	27.5	27.5	36.6	24.7	24.7
Actuated g/C Ratio	0.35	0.25	0.25	0.46	0.31		0.09	0.30	0.30	0.39	0.27	0.27
v/c Ratio	0.40	0.36	0.30	0.62	0.74		0.58	0.41	0.55	0.24	0.76	0.37
Control Delay	20.4	31.8	6.5	23.5	36.7		51.7	28.6	5.9	17.6	37.5	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	31.8	6.5	23.5	36.7		51.7	28.6	5.9	17.6	37.5	7.3
LOS	C	C	A	C	D		D	C	A	B	D	A
Approach Delay		20.0			30.6			23.3			29.4	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	13.3	26.3	0.0	41.3	63.9		15.6	34.0	0.0	10.6	61.0	2.1
Queue Length 95th (m)	28.3	49.7	15.5	74.9	111.1		#34.2	55.3	22.8	24.2	93.6	19.5
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	324	653	651	564	724		303	1327	844	435	1289	699
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.26	0.24	0.61	0.57		0.57	0.33	0.49	0.24	0.55	0.29

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	92.7
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.76
Intersection Signal Delay:	26.4
Intersection LOS:	C
Intersection Capacity Utilization:	80.2%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	

Lanes, Volumes, Timings

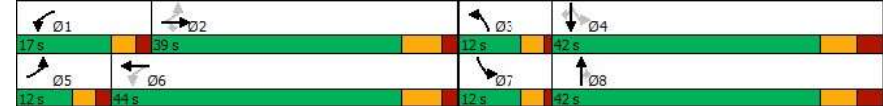
2031 Future Total A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024

Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2031 Future Total A.M.  
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Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	273	4	2	0	10	0	0	0	0	0	0	331
Future Vol, veh/h	273	4	2	0	10	0	0	0	0	0	0	331
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	32	67	0	0	30	100	50	0	100	0	50	30
Mvmt Flow	297	4	2	0	11	0	0	0	0	0	0	360

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	186	180	180	183
Stage 1	180	180	-	0
Stage 2	6	0	-	183
Critical Hdwy	7.42	7.17	6.2	7.1
Critical Hdwy Stg 1	6.42	6.17	-	6.1
Critical Hdwy Stg 2	6.42	6.17	-	6.1
Follow-up Hdwy	3.788	4.603	3.3	3.5
Pot Cap-1 Maneuver	713	612	868	783
Stage 1	757	643	-	-
Stage 2	943	-	-	823
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	612	868	777
Mov Cap-2 Maneuver	-	612	-	777
Stage 1	757	643	-	-
Stage 2	943	-	-	815

Approach	EB	WB	NB	SB
HCM Control Delay, s			0	0
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	976	-	-	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	-	-	-
HCM Lane LOS	A	-	-	-	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2031 Future Total A.M.  
09-26-2024

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	0	157	7	34	126	4	4	16	36	6	15	2
Future Vol, veh/h	0	157	7	34	126	4	4	16	36	6	15	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	2	0	0	1	0	0	25	3	0	11	0
Mvmt Flow	0	164	7	35	131	4	4	17	38	6	16	2

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	135	0	0	171
Stage 1	-	-	-	168
Stage 2	-	-	-	212
Critical Hdwy	4.1	-	-	4.1
Critical Hdwy Stg 1	-	-	-	6.1
Critical Hdwy Stg 2	-	-	-	6.1
Follow-up Hdwy	2.2	-	-	2.2
Pot Cap-1 Maneuver	1462	-	-	1418
Stage 1	-	-	-	839
Stage 2	-	-	-	795
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1462	-	-	1418
Mov Cap-2 Maneuver	-	-	-	555
Stage 1	-	-	-	839
Stage 2	-	-	-	755

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	10.6	11.9
HCM LOS	-	-	B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	701	1462	-	-	1418	-	-	545
HCM Lane V/C Ratio	0.083	-	-	-	0.025	-	-	0.044
HCM Control Delay (s)	10.6	0	-	-	7.6	0	-	11.9
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.1



Lanes, Volumes, Timings

2031 Future Total A.M.

8: Burnside Line & Division Road W

09-26-2024



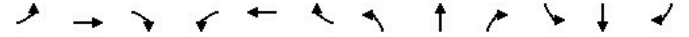
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕				↕			↕	
Traffic Volume (vph)	13	73	118	19	58	2	83	376	32	5	156	13
Future Volume (vph)	13	73	118	19	58	2	83	376	32	5	156	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.922		0.997		0.991		0.990		0.990		0.990	
Flt Protected	0.997		0.988		0.992		0.999		0.999		0.999	
Satd. Flow (prot)	0	1724	0	0	1872	0	0	1266	0	0	1296	0
Flt Permitted	0.976		0.881		0.921		0.990		0.990		0.990	
Satd. Flow (perm)	0	1688	0	0	1669	0	0	1176	0	0	1285	0
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	128		2		9		10		10		10	
Link Speed (k/h)	50		50		70		60		60		60	
Link Distance (m)	1346.1		271.7		1953.3		357.4		357.4		357.4	
Travel Time (s)	96.9		19.6		100.5		21.4		21.4		21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%	0%	62%	0%	0%	50%	0%
Adj. Flow (vph)	14	79	128	21	63	2	90	409	35	5	170	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	221	0	0	86	0	0	534	0	0	189	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0		0.0		3.6		3.6		3.6		3.6	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25		15		25		15	
Number of Detectors	1	2	1	2	1	2	1	2	1	2	1	2
Detector Template	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru
Leading Detector (m)	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		2		6		6		6	
Permitted Phases	4		8		2		6		6		6	
Detector Phase	4	4	8	8	2	2	6	6	6	6	6	6
Switch Phase												

Lanes, Volumes, Timings

2031 Future Total A.M.

8: Burnside Line & Division Road W

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%	58.2%	58.2%	58.2%	58.2%	58.2%	58.2%
Maximum Green (s)	18.5	18.5	18.5	18.5	18.5	18.5	27.5	27.5	27.5	27.5	27.5	27.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Total Lost Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	8.6		8.6		30.3		30.3		30.3		30.3	
Actuated g/C Ratio	0.18		0.18		0.63		0.63		0.63		0.63	
v/c Ratio	0.54		0.29		0.72		0.23		0.23		0.23	
Control Delay	12.8		17.6		15.3		5.2		5.2		5.2	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	12.8		17.6		15.3		5.2		5.2		5.2	
LOS	B		B		B		A		A		A	
Approach Delay	12.8		17.6		15.3		5.2		5.2		5.2	
Approach LOS	B		B		B		A		A		A	
Queue Length 50th (m)	6.7		6.0		23.2		5.0		5.0		5.0	
Queue Length 95th (m)	20.8		14.7		#89.5		15.8		15.8		15.8	
Internal Link Dist (m)	1322.1		247.7		1929.3		333.4		333.4		333.4	
Turn Bay Length (m)												
Base Capacity (vph)	735		651		746		815		815		815	
Starvation Cap Reductn	0		0		0		0		0		0	
Spillback Cap Reductn	0		0		0		0		0		0	
Storage Cap Reductn	0		0		0		0		0		0	
Reduced v/c Ratio	0.30		0.13		0.72		0.23		0.23		0.23	
Intersection Summary												
Area Type:	Other											
Cycle Length:	55											
Actuated Cycle Length:	48											
Natural Cycle:	60											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.72											
Intersection Signal Delay:	13.1						Intersection LOS: B					
Intersection Capacity Utilization:	59.4%						ICU Level of Service B					
Analysis Period (min):	15											
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												



Lanes, Volumes, Timings  
8: Burnside Line & Division Road W

2031 Future Total A.M.  
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Splits and Phases: 8: Burnside Line & Division Road W



HCM 2010 TWSC  
9: Industrial Road & Hurlwood Lane

2031 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔
Traffic Vol, veh/h	0	162	326	49	32	0
Future Vol, veh/h	0	162	326	49	32	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	176	354	53	35	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	407	0	-	0	557	381
Stage 1	-	-	-	-	381	-
Stage 2	-	-	-	-	176	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1152	-	-	-	491	666
Stage 1	-	-	-	-	691	-
Stage 2	-	-	-	-	855	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1152	-	-	-	491	666
Mov Cap-2 Maneuver	-	-	-	-	566	-
Stage 1	-	-	-	-	691	-
Stage 2	-	-	-	-	855	-
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	11.8			
HCM LOS			B			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1152	-	-	-	566	-
HCM Lane V/C Ratio	-	-	-	-	0.061	-
HCM Control Delay (s)	0	-	-	-	11.8	0
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2	-

HCM 2010 TWSC  
10: Uthoff Line & Industrial Road

2031 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	3.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔			↔
Traffic Vol, veh/h	159	8	110	189	22	202
Future Vol, veh/h	159	8	110	189	22	202
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	9	120	205	24	220

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	491	223	0	0	325
Stage 1	223	-	-	-	-
Stage 2	268	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	537	817	-	-	1235
Stage 1	814	-	-	-	-
Stage 2	777	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	525	817	-	-	1235
Mov Cap-2 Maneuver	525	-	-	-	-
Stage 1	814	-	-	-	-
Stage 2	760	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.9	0	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	525	817	1235
HCM Lane V/C Ratio	-	-	0.329	0.011	0.019
HCM Control Delay (s)	-	-	15.2	9.5	8
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.4	0	0.1

HCM 2010 TWSC  
11: Uthoff Line & North Site Access 1

2031 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	2.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Vol, veh/h	48	11	68	17	4	88
Future Vol, veh/h	48	11	68	17	4	88
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	12	74	18	4	96

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	187	83	0	0	92
Stage 1	83	-	-	-	-
Stage 2	104	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	802	976	-	-	1503
Stage 1	940	-	-	-	-
Stage 2	920	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	800	976	-	-	1503
Mov Cap-2 Maneuver	800	-	-	-	-
Stage 1	940	-	-	-	-
Stage 2	917	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.7	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	828	1503
HCM Lane V/C Ratio	-	-	0.077	0.003
HCM Control Delay (s)	-	-	9.7	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0

HCM 2010 TWSC  
12: Uthoff Line & North Site Access 2

2031 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	1.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Vol, veh/h	49	0	85	17	0	136
Future Vol, veh/h	49	0	85	17	0	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	0	92	18	0	148
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	249	101	0	0	110	0
Stage 1	101	-	-	-	-	-
Stage 2	148	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	739	954	-	-	1480	-
Stage 1	923	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	739	954	-	-	1480	-
Mov Cap-2 Maneuver	739	-	-	-	-	-
Stage 1	923	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	10.2	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	739	1480	-	-
HCM Lane V/C Ratio	-	-	0.072	-	-	-
HCM Control Delay (s)	-	-	10.2	0	-	-
HCM Lane LOS	-	-	B	A	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-	-

HCM 2010 TWSC  
13: Uthoff Line & South Site Access

2031 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Vol, veh/h	0	0	101	0	0	185
Future Vol, veh/h	0	0	101	0	0	185
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	110	0	0	201
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	311	110	0	0	110	0
Stage 1	110	-	-	-	-	-
Stage 2	201	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	681	943	-	-	1480	-
Stage 1	915	-	-	-	-	-
Stage 2	833	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	681	943	-	-	1480	-
Mov Cap-2 Maneuver	681	-	-	-	-	-
Stage 1	915	-	-	-	-	-
Stage 2	833	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	0	0	0			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	-	1480	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-	-
HCM Lane LOS	-	-	A	A	-	-
HCM 95th %tile Q(veh)	-	-	-	0	-	-

Lanes, Volumes, Timings

2031 Future Total P.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	72	40	288	380	2	96	211	284	87	41	224	23
Future Volume (vph)	72	40	288	380	2	96	211	284	87	41	224	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1568	1770	1900	1615	1805	1863	1429	1805	1746	0
Flt Permitted	0.757			0.569			0.421			0.576		
Satd. Flow (perm)	1438	1900	1568	1060	1900	1615	800	1863	1429	1094	1746	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			306			200			200		6	
Link Speed (k/h)	50			60			60			60		
Link Distance (m)	140.4			136.5			65.5			1953.3		
Travel Time (s)	10.1			8.2			3.9			117.2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	3%	2%	0%	0%	0%	2%	13%	0%	8%	0%
Adj. Flow (vph)	77	43	306	404	2	102	224	302	93	44	238	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	43	306	404	2	102	224	302	93	44	262	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width(m)	3.6			3.6			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane	Yes											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Ch+Ex			Ch+Ex			Ch+Ex			Ch+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2031 Future Total P.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	10.4	21.0	21.0	21.5	32.1	32.1	15.0	38.0	38.0	9.5	32.5	
Total Split (%)	11.6%	23.3%	23.3%	23.9%	35.7%	35.7%	16.7%	42.2%	42.2%	10.6%	36.1%	
Maximum Green (s)	5.9	15.0	15.0	17.0	26.1	26.1	10.5	32.0	32.0	5.0	26.5	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	22.3	15.0	15.0	37.1	27.4	27.4	41.2	34.0	34.0	31.5	25.0	
Actuated g/C Ratio	0.26	0.17	0.17	0.42	0.31	0.31	0.47	0.39	0.39	0.36	0.29	
v/c Ratio	0.20	0.13	0.59	0.70	0.00	0.16	0.45	0.42	0.14	0.10	0.52	
Control Delay	17.9	32.5	9.2	26.2	22.0	0.5	17.4	23.1	0.4	14.0	30.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	17.9	32.5	9.2	26.2	22.0	0.5	17.4	23.1	0.4	14.0	30.3	
LOS	B	C	A	C	C	A	B	C	A	B	C	
Approach Delay		13.1			21.0			17.6			27.9	
Approach LOS		B			C			B			C	
Queue Length 50th (m)	7.9	6.6	0.0	51.8	0.3	0.0	23.3	41.7	0.0	4.1	38.4	
Queue Length 95th (m)	16.4	16.0	22.6	79.8	1.9	0.0	38.6	65.9	0.0	10.0	62.9	
Internal Link Dist (m)		116.4			112.5			41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0		65.0	40.0		
Base Capacity (vph)	394	327	522	589	596	644	498	745	691	435	534	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.20	0.13	0.59	0.69	0.00	0.16	0.45	0.41	0.13	0.10	0.49	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	87.3
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.70
Intersection Signal Delay:	19.2
Intersection Capacity Utilization:	74.0%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	D

Splits and Phases: 1: Burnside Line & Industrial Road/Brodie Drive



Lanes, Volumes, Timings

2031 Future Total P.M.

2: Burnside Line & Highway 11 Westbound On-Ramp

09-26-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑	↑
Traffic Volume (vph)	0	0	0	896	575	293
Future Volume (vph)	0	0	0	896	575	293
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1863	1863	1509
Flt Permitted						
Satd. Flow (perm)	0	0	0	1863	1863	1509
Link Speed (k/h)	50			50	50	
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			3.7	12.5	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	2%	2%	7%
Adj. Flow (vph)	0	0	0	914	587	299
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	914	587	299
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	50.5%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings

2031 Future Total P.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↓	↑	↑	↑		↑
Traffic Volume (vph)	193	202	694	274	0	575
Future Volume (vph)	193	202	694	274	0	575
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1752	1599	1863	1615	0	1863
Flt Permitted	0.950					
Satd. Flow (perm)	1752	1599	1863	1615	0	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		206		280		
Link Speed (k/h)	50		60			60
Link Distance (m)	241.7		160.3			51.5
Travel Time (s)	17.4		9.6			3.1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	1%	2%	0%	0%	2%
Adj. Flow (vph)	197	206	708	280	0	587
Shared Lane Traffic (%)						
Lane Group Flow (vph)	197	206	708	280	0	587
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2031 Future Total P.M.

3: Burnside Line & Highway 11 Westbound

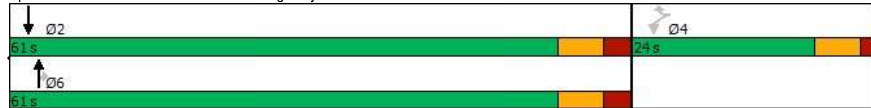
09-26-2024

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.9	17.9	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.6	1.6	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.1	6.1	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	12.5	12.5	28.1	28.1		28.1
Actuated g/C Ratio	0.23	0.23	0.52	0.52		0.52
v/c Ratio	0.49	0.39	0.74	0.29		0.61
Control Delay	25.2	6.4	15.7	1.9		12.4
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	25.2	6.4	15.7	1.9		12.4
LOS	C	A	B	A		B
Approach Delay	15.6		11.8			12.4
Approach LOS	B		B			B
Queue Length 50th (m)	16.6	0.0	47.1	0.0		35.3
Queue Length 95th (m)	44.3	15.5	100.3	8.9		75.3
Internal Link Dist (m)	217.7		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	599	682	1718	1511		1718
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.33	0.30	0.41	0.19		0.34

Intersection Summary

Area Type:	Other	
Cycle Length:	85	
Actuated Cycle Length:	54.5	
Natural Cycle:	60	
Control Type:	Semi Act-Uncoord	
Maximum v/c Ratio:	0.74	
Intersection Signal Delay:	12.7	Intersection LOS: B
Intersection Capacity Utilization:	60.2%	ICU Level of Service B
Analysis Period (min):	15	

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2031 Future Total P.M.

4: West Street North & Highway 11 Eastbound

09-26-2024

	↙	↖	↑	↗	↘	↓
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↖	↙	↗	↗	↙
Traffic Volume (vph)	184	157	228	782	646	124
Future Volume (vph)	184	157	228	782	646	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1736	1583	1787	1881	1863	1583
Flt Permitted	0.950		0.166			
Satd. Flow (perm)	1736	1583	312	1881	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		165				74
Link Speed (k/h)	50			60	60	
Link Distance (m)	214.0			160.8	176.6	
Travel Time (s)	15.4			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	2%	1%	1%	2%	2%
Adj. Flow (vph)	194	165	240	823	680	131
Shared Lane Traffic (%)						
Lane Group Flow (vph)	194	165	240	823	680	131
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2031 Future Total P.M.

4: West Street North & Highway 11 Eastbound

09-26-2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	25.0	25.0	24.0	70.0	46.0	46.0
Total Split (%)	26.3%	26.3%	25.3%	73.7%	48.4%	48.4%
Maximum Green (s)	18.8	18.8	21.0	62.9	38.9	38.9
Yellow Time (s)	4.5	4.5	3.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	3.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	14.1	14.1	50.6	46.4	32.4	32.4
Actuated g/C Ratio	0.19	0.19	0.68	0.62	0.44	0.44
v/c Ratio	0.59	0.38	0.56	0.70	0.84	0.18
Control Delay	37.8	8.2	11.2	13.3	30.5	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.8	8.2	11.2	13.3	30.5	7.8
LOS	D	A	B	B	C	A
Approach Delay	24.2			12.8	26.8	
Approach LOS	C			B	C	
Queue Length 50th (m)	27.2	0.0	10.6	69.4	81.7	4.5
Queue Length 95th (m)	54.6	16.4	28.2	125.9	#178.2	17.2
Internal Link Dist (m)	190.0			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	455	536	644	1589	1010	892
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.31	0.37	0.52	0.67	0.15

Intersection Summary

Area Type:	Other
Cycle Length:	95
Actuated Cycle Length:	74.3
Natural Cycle:	70
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.84
Intersection Signal Delay:	19.7
Intersection LOS:	B
Intersection Capacity Utilization:	71.2%
ICU Level of Service:	C
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings

2031 Future Total P.M.

4: West Street North & Highway 11 Eastbound

09-26-2024

Splits and Phases: 4: West Street North & Highway 11 Eastbound



Lanes, Volumes, Timings

2031 Future Total P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024



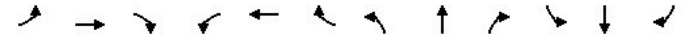
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	252	265	264	467	260	202	251	806	487	95	667	176
Future Volume (vph)	252	265	264	467	260	202	251	806	487	95	667	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor			0.98	1.00								
Frt			0.850		0.934				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1900	1599	1787	1765	0	3502	3539	1599	1805	3505	1583
Flt Permitted	0.241			0.267			0.950			0.160		
Satd. Flow (perm)	453	1900	1575	502	1765	0	3502	3539	1599	304	3505	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			229		30				518			186
Link Speed (k/h)		50			70			50			50	
Link Distance (m)		186.6			853.6			529.0			469.5	
Travel Time (s)		13.4			43.9			38.1			33.8	
Confl. Peds. (#/hr)			2	2								
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	0%	1%	1%	1%	0%	0%	2%	1%	0%	3%	2%
Adj. Flow (vph)	268	282	281	497	277	215	267	857	518	101	710	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	268	282	281	497	492	0	267	857	518	101	710	187
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2031 Future Total P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (%)	27.0	31.4	31.4	41.0	45.4		18.0	46.1	46.1	11.5	39.6	39.6
Total Split (%)	20.8%	24.2%	24.2%	31.5%	34.9%		13.8%	35.5%	35.5%	8.8%	30.5%	30.5%
Maximum Green (s)	22.0	24.2	24.2	36.0	38.2		14.0	38.1	38.1	7.5	31.6	31.6
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0			7.0	7.0			
Flash Dont Walk (s)					19.0			6.0	6.0			
Pedestrian Calls (#/hr)					0			0	0			
Act Effct Green (s)	43.0	23.5	23.5	60.3	35.7		12.9	34.3	34.3	40.4	28.9	28.9
Actuated g/C Ratio	0.36	0.20	0.20	0.51	0.30		0.11	0.29	0.29	0.34	0.24	0.24
v/c Ratio	0.75	0.76	0.57	0.87	0.90		0.70	0.84	0.63	0.51	0.84	0.36
Control Delay	38.7	61.0	15.5	39.6	59.0		63.8	49.2	6.7	33.2	53.8	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.7	61.0	15.5	39.6	59.0		63.8	49.2	6.7	33.2	53.8	7.6
LOS	D	E	B	D	E		E	D	A	C	D	A
Approach Delay		38.4			49.2			38.2				43.1
Approach LOS		D			D			D				D
Queue Length 50th (m)	40.3	70.6	11.5	86.6	115.8		35.1	108.5	0.0	15.8	92.2	0.2
Queue Length 95th (m)	70.6	#116.1	41.1	#134.7	#188.4		51.6	139.8	28.8	29.2	120.7	19.4
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0	120.0	110.0			50.0
Base Capacity (vph)	431	390	505	646	594		416	1146	868	199	941	561
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.72	0.56	0.77	0.83		0.64	0.75	0.60	0.51	0.75	0.33
Intersection Summary												
Area Type:	Other											
Cycle Length:	130											
Actuated Cycle Length:	119.3											
Natural Cycle:	90											
Control Type:	Semi Act-Uncooord											
Maximum v/c Ratio:	0.90											
Intersection Signal Delay:	41.8						Intersection LOS: D					
Intersection Capacity Utilization:	90.8%						ICU Level of Service E					



Lanes, Volumes, Timings

5: Highway 12 & West Ridge Boulevard/Murphy Road

2031 Future Total P.M.

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Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



HCM 2010 TWSC

6: Unthoff Line & Murphy Road

2031 Future Total P.M.

09-26-2024

Intersection

Int Delay, s/veh 0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Vol, veh/h	448	5	0	3	3	3	2	0	0	2	0	351
Future Vol, veh/h	448	5	0	3	3	3	2	0	0	2	0	351
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	18	25	0	0	100	0	0	0	0	0	0	27
Mvmt Flow	498	6	0	3	3	3	2	0	0	2	0	390

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	206	203	195	206
Stage 1	199	199	-	4
Stage 2	7	4	-	202
Critical Hdwy	7.28	6.75	6.2	7.1
Critical Hdwy Stg 1	6.28	5.75	-	6.1
Critical Hdwy Stg 2	6.28	5.75	-	6.1
Follow-up Hdwy	3.662	4.225	3.3	3.5
Pot Cap-1 Maneuver	718	654	851	756
Stage 1	767	695	-	1024
Stage 2	975	849	-	805
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	653	851	750
Mov Cap-2 Maneuver	-	653	-	750
Stage 1	765	695	-	1022
Stage 2	969	847	-	799

Approach	EB	WB	NB	SB
HCM Control Delay, s			8.1	
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1180	-	-	-	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-	-	-	-
HCM Control Delay (s)	8.1	0	-	-	-	-	-
HCM Lane LOS	A	A	-	-	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2031 Future Total P.M.  
09-26-2024

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Vol, veh/h	4	223	13	37	283	15	21	28	72	6	18	2
Future Vol, veh/h	4	223	13	37	283	15	21	28	72	6	18	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	0	1	0	0	0	0	0	20	0
Mvmt Flow	4	240	14	40	304	16	23	30	77	6	19	2

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	320	0	0	254
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.1	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2
Pot Cap-1 Maneuver	1251	-	-	1323
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1251	-	-	1323
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.9	13.8	16.3
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	537	1251	-	-	1323	-	-	347
HCM Lane V/C Ratio	0.242	0.003	-	-	0.03	-	-	0.081
HCM Control Delay (s)	13.8	7.9	0	-	7.8	0	-	16.3
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.9	0	-	-	0.1	-	-	0.3

Lanes, Volumes, Timings  
8: Burnside Line & Division Road W

2031 Future Total P.M.  
09-26-2024

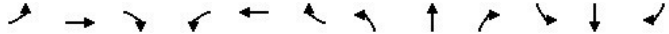
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (vph)	12	142	153	21	108	3	202	173	63	5	89	26
Future Volume (vph)	12	142	153	21	108	3	202	173	63	5	89	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.933		0.997		0.981		0.970		0.998		0.970	
Flt Protected	0.998		0.992		0.977		0.998		0.998		0.998	
Satd. Flow (prot)	0	1744	0	0	1849	0	0	1795	0	0	1571	0
Flt Permitted	0.985		0.916		0.795		0.986		0.986		0.986	
Satd. Flow (perm)	0	1722	0	0	1707	0	0	1461	0	0	1552	0
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	98		2		22		28		28		28	
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	1346.1		271.7		1953.3		357.4		357.4		357.4	
Travel Time (s)	96.9		19.6		140.6		25.7		25.7		25.7	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	1%	0%	2%	0%	1%	4%	0%	23%	0%	0%
Adj. Flow (vph)	13	151	163	22	115	3	215	184	67	5	95	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	327	0	0	140	0	0	466	0	0	128	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width(m)	0.0		0.0		3.6		3.6		3.6		3.6	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100		100		100		100		100		100	
Number of Detectors	1	2	1	2	1	2	1	2	1	2	1	2
Detector Template	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru
Leading Detector (m)	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		2		6		6		6	
Permitted Phases	4		8		2		6		6		6	
Detector Phase	4	4	8	8	2	2	6	6	6	6	6	6
Switch Phase												

Lanes, Volumes, Timings

2031 Future Total P.M.

8: Burnside Line & Division Road W

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		32.0	32.0		32.0	32.0	
Total Split (%)	41.8%	41.8%		41.8%	41.8%		58.2%	58.2%		58.2%	58.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5		27.5	27.5		27.5	27.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		12.0			12.0			28.4			28.4	
Actuated g/C Ratio		0.24			0.24			0.57			0.57	
v/c Ratio		0.67			0.34			0.55			0.14	
Control Delay		18.2			16.6			10.5			5.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		18.2			16.6			10.5			5.6	
LOS		B			B			B			A	
Approach Delay		18.2			16.6			10.5			5.6	
Approach LOS		B			B			B			A	
Queue Length 50th (m)		17.9			10.2			21.0			3.5	
Queue Length 95th (m)		38.0			21.3			58.1			12.5	
Internal Link Dist (m)		1322.1			247.7			1929.3			333.4	
Turn Bay Length (m)												
Base Capacity (vph)		708			642			848			903	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.46			0.22			0.55			0.14	

Intersection Summary

Area Type:	Other
Cycle Length:	55
Actuated Cycle Length:	49.4
Natural Cycle:	55
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.67
Intersection Signal Delay:	13.1
Intersection LOS:	B
Intersection Capacity Utilization:	57.0%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 8: Burnside Line & Division Road W



HCM 2010 TWSC

2031 Future Total P.M.

9: Industrial Road & Hurlwood Lane

09-26-2024

Intersection	EBL	EBT	WBT	WBR	SBL	SBR
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔
Traffic Vol, veh/h	0	142	485	37	58	0
Future Vol, veh/h	0	142	485	37	58	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	154	527	40	63	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	567	0	701
Stage 1	-	-	547
Stage 2	-	-	154
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.518
Pot Cap-1 Maneuver	1005	-	405
Stage 1	-	-	580
Stage 2	-	-	874
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1005	-	405
Mov Cap-2 Maneuver	-	-	486
Stage 1	-	-	580
Stage 2	-	-	874

Approach	EB	WB	SB
HCM Control Delay, s	0	0	13.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1005	-	-	-	486	-
HCM Lane V/C Ratio	-	-	-	-	0.13	-
HCM Control Delay (s)	0	-	-	-	13.5	0
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.4	-

HCM 2010 TWSC  
10: Uthoff Line & Industrial Road

2031 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	199	23	259	193	15	158
Future Vol, veh/h	199	23	259	193	15	158
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	216	25	282	210	16	172

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	591	387	0	0	492
Stage 1	387	-	-	-	-
Stage 2	204	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	470	661	-	-	1071
Stage 1	686	-	-	-	-
Stage 2	830	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	462	661	-	-	1071
Mov Cap-2 Maneuver	462	-	-	-	-
Stage 1	686	-	-	-	-
Stage 2	816	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.6	0	0.7
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	462	661	1071
HCM Lane V/C Ratio	-	-	0.468	0.038	0.015
HCM Control Delay (s)	-	-	19.5	10.7	8.4
HCM Lane LOS	-	-	C	B	A
HCM 95th %tile Q(veh)	-	-	2.4	0.1	0

HCM 2010 TWSC  
11: Uthoff Line & North Site Access 1

2031 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	1.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	31	8	141	51	12	82
Future Vol, veh/h	31	8	141	51	12	82
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	9	153	55	13	89

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	296	181	0	0	208
Stage 1	181	-	-	-	-
Stage 2	115	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	695	862	-	-	1363
Stage 1	850	-	-	-	-
Stage 2	910	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	688	862	-	-	1363
Mov Cap-2 Maneuver	688	-	-	-	-
Stage 1	850	-	-	-	-
Stage 2	901	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	718	1363
HCM Lane V/C Ratio	-	-	0.059	0.01
HCM Control Delay (s)	-	-	10.3	7.7
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 2010 TWSC  
12: Uthoff Line & North Site Access 2

2031 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Vol, veh/h	32	0	192	51	0	113
Future Vol, veh/h	32	0	192	51	0	113
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	35	0	209	55	0	123
Major/Minor						
	Minor1	Major1	Major2			
Conflicting Flow All	360	237	0	0	264	0
Stage 1	237	-	-	-	-	-
Stage 2	123	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	639	802	-	-	1300	-
Stage 1	802	-	-	-	-	-
Stage 2	902	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	639	802	-	-	1300	-
Mov Cap-2 Maneuver	639	-	-	-	-	-
Stage 1	802	-	-	-	-	-
Stage 2	902	-	-	-	-	-
Approach						
	WB	NB	SB			
HCM Control Delay, s	11	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt						
	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	639	1300		
HCM Lane V/C Ratio	-	-	0.054	-		
HCM Control Delay (s)	-	-	11	0		
HCM Lane LOS	-	-	B	A		
HCM 95th %tile Q(veh)	-	-	0.2	0		

HCM 2010 TWSC  
13: Uthoff Line & South Site Access

2031 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Vol, veh/h	0	0	243	0	0	145
Future Vol, veh/h	0	0	243	0	0	145
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	264	0	0	158
Major/Minor						
	Minor1	Major1	Major2			
Conflicting Flow All	422	264	0	0	264	0
Stage 1	264	-	-	-	-	-
Stage 2	158	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	588	775	-	-	1300	-
Stage 1	780	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	588	775	-	-	1300	-
Mov Cap-2 Maneuver	588	-	-	-	-	-
Stage 1	780	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Approach						
	WB	NB	SB			
HCM Control Delay, s	0	0	0			
HCM LOS	A					
Minor Lane/Major Mvmt						
	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	-	1300		
HCM Lane V/C Ratio	-	-	-	-		
HCM Control Delay (s)	-	-	0	0		
HCM Lane LOS	-	-	A	A		
HCM 95th %tile Q(veh)	-	-	-	0		

Lanes, Volumes, Timings

2033 Future Total A.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	47	30	247	228	5	39	351	278	82	36	242	45
Future Volume (vph)	47	30	247	228	5	39	351	278	82	36	242	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1615	1736	1900	1615	1805	1439	1468	1805	1522	0
Flt Permitted	0.754			0.581			0.363			0.574		
Satd. Flow (perm)	1433	1900	1615	1061	1900	1615	690	1439	1468	1091	1522	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			271			200			200		11	
Link Speed (k/h)	50			60			60			60		60
Link Distance (m)	140.4			136.5			65.5			1953.3		
Travel Time (s)	10.1			8.2			3.9			117.2		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	4%	0%	0%	0%	32%	10%	0%	26%	0%
Adj. Flow (vph)	52	33	271	251	5	43	386	305	90	40	266	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	33	271	251	5	43	386	305	90	40	315	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width(m)	3.6			3.6			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane	Yes											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2033 Future Total A.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	9.6	21.0	21.0	15.0	26.4	26.4	19.0	44.5	44.5	9.5	35.0	
Total Split (%)	10.7%	23.3%	23.3%	16.7%	29.3%	29.3%	21.1%	49.4%	49.4%	10.6%	38.9%	
Maximum Green (s)	5.1	15.0	15.0	10.5	20.4	20.4	14.5	38.5	38.5	5.0	29.0	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	21.6	15.0	15.0	31.0	23.9	23.9	46.2	39.0	39.0	32.4	25.9	
Actuated g/C Ratio	0.25	0.17	0.17	0.36	0.28	0.28	0.54	0.45	0.45	0.38	0.30	
v/c Ratio	0.14	0.10	0.54	0.55	0.01	0.07	0.70	0.47	0.12	0.09	0.68	
Control Delay	20.2	31.8	8.8	26.2	26.4	26.4	19.5	20.6	0.3	11.2	34.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.2	31.8	8.8	26.2	26.4	26.4	19.5	20.6	0.3	11.2	34.2	
LOS	C	C	A	C	C	A	B	C	A	B	C	
Approach Delay		12.6			22.5			17.8			31.6	
Approach LOS		B			C			B			C	
Queue Length 50th (m)	5.8	4.9	0.0	31.7	0.7	0.0	37.7	39.1	0.0	3.1	46.7	
Queue Length 95th (m)	14.2	13.5	21.2	55.7	3.6	0.0	57.8	63.7	0.0	7.7	76.0	
Internal Link Dist (m)		116.4			112.5			41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0		65.0	40.0		
Base Capacity (vph)	381	330	505	464	525	591	557	676	796	451	519	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.10	0.54	0.54	0.01	0.07	0.69	0.45	0.11	0.09	0.61	

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 86.2  
 Natural Cycle: 75  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.70  
 Intersection Signal Delay: 20.3  
 Intersection LOS: C  
 Intersection Capacity Utilization 73.3%  
 ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 1: Burnside Line & Industrial Road/Brodie Drive



Lanes, Volumes, Timings

2033 Future Total A.M.

2: Burnside Line & Highway 11 Westbound On-Ramp

09-26-2024

	↖	↘	↙	↑	↓	↗
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑	↗
Traffic Volume (vph)	0	0	0	1028	409	298
Future Volume (vph)	0	0	0	1028	409	298
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1638	1810	1214
Flt Permitted						
Satd. Flow (perm)	0	0	0	1638	1810	1214
Link Speed (k/h)	50			70	60	
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			2.6	10.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	16%	5%	33%
Adj. Flow (vph)	0	0	0	1082	431	314
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1082	431	314
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Free			Free	Free	

Intersection Summary

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

Lanes, Volumes, Timings

2033 Future Total A.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024

	↖	↘	↑	↗	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑	↗		↑
Traffic Volume (vph)	159	264	766	179	0	409
Future Volume (vph)	159	264	766	179	0	409
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1787	1583	1638	1509	0	1810
Flt Permitted	0.950					
Satd. Flow (perm)	1787	1583	1638	1509	0	1810
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		205		188		
Link Speed (k/h)	50		60			60
Link Distance (m)	241.7		160.3			51.5
Travel Time (s)	17.4		9.6			3.1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	16%	7%	0%	5%
Adj. Flow (vph)	167	278	806	188	0	431
Shared Lane Traffic (%)						
Lane Group Flow (vph)	167	278	806	188	0	431
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15		25
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2033 Future Total A.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	9.7	9.7	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.6	17.6	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.9	1.9	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.4	6.4	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	12.6	12.6	35.9	35.9		35.9
Actuated g/C Ratio	0.20	0.20	0.57	0.57		0.57
v/c Ratio	0.47	0.58	0.86	0.20		0.42
Control Delay	30.6	14.0	22.3	1.6		8.7
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	30.6	14.0	22.3	1.6		8.7
LOS	C	B	C	A		A
Approach Delay	20.2		18.4			8.7
Approach LOS	C		B			A
Queue Length 50th (m)	17.9	7.4	67.3	0.0		24.0
Queue Length 95th (m)	44.4	34.0	144.2	6.9		48.9
Internal Link Dist (m)	217.7		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	530	613	1385	1305		1531
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.32	0.45	0.58	0.14		0.28

Intersection Summary

Area Type:	Other	
Cycle Length:	85	
Actuated Cycle Length:	63	
Natural Cycle:	60	
Control Type:	Semi Act-Uncoord	
Maximum v/c Ratio:	0.86	
Intersection Signal Delay:	16.6	Intersection LOS: B
Intersection Capacity Utilization:	68.1%	ICU Level of Service C
Analysis Period (min):	15	

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2033 Future Total A.M.

4: West Street North & Highway 11 Eastbound

09-26-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	296	125	103	644	505	64
Future Volume (vph)	296	125	103	644	505	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1327	1524	1787	1827	1845	1442
Flt Permitted	0.950		0.262			
Satd. Flow (perm)	1327	1524	493	1827	1845	1442
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		132				49
Link Speed (k/h)	50			60	60	
Link Distance (m)	214.0			160.8	176.6	
Travel Time (s)	15.4			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	36%	6%	1%	4%	3%	12%
Adj. Flow (vph)	312	132	108	678	532	67
Shared Lane Traffic (%)						
Lane Group Flow (vph)	312	132	108	678	532	67
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	



Lanes, Volumes, Timings

2033 Future Total A.M.

4: West Street North & Highway 11 Eastbound

09-26-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	38.0	38.0	10.0	52.0	42.0	42.0
Total Split (%)	42.2%	42.2%	11.1%	57.8%	46.7%	46.7%
Maximum Green (s)	31.8	31.8	8.0	44.9	34.9	34.9
Yellow Time (s)	4.5	4.5	2.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	2.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	21.6	21.6	39.8	34.4	27.2	27.2
Actuated g/C Ratio	0.31	0.31	0.57	0.49	0.39	0.39
v/c Ratio	0.76	0.24	0.25	0.76	0.75	0.11
Control Delay	36.7	5.3	9.8	22.0	28.3	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.7	5.3	9.8	22.0	28.3	8.1
LOS	D	A	A	C	C	A
Approach Delay	27.3			20.3	26.0	
Approach LOS	C			C	C	
Queue Length 50th (m)	38.7	0.0	6.3	71.1	65.0	1.6
Queue Length 95th (m)	78.0	11.8	16.4	139.4	121.6	10.3
Internal Link Dist (m)	190.0			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	642	806	437	1244	980	789
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.16	0.25	0.55	0.54	0.08

Intersection Summary

Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 70.2	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 23.9	Intersection LOS: C
Intersection Capacity Utilization 63.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: West Street North & Highway 11 Eastbound



Lanes, Volumes, Timings

2033 Future Total A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	177	157	364	280	155	175	439	430	108	714	205
Future Volume (vph)	130	177	157	364	280	155	175	439	430	108	714	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.95	1.00	1.00
Frt			0.850		0.947				0.850			0.850
Flt Protected	0.950			0.950			0.950		0.950			0.950
Satd. Flow (prot)	1787	1881	1583	1787	1765	0	3467	3574	1568	1736	3471	1568
Flt Permitted	0.313			0.519			0.950		0.446			
Satd. Flow (perm)	589	1881	1583	976	1765	0	3467	3574	1568	815	3471	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			162		27				443			187
Link Speed (k/h)		60			60			70				70
Link Distance (m)		186.6			853.6			529.0				469.5
Travel Time (s)		11.2			51.2			27.2				24.1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	2%	1%	3%	0%	1%	3%	4%	4%	4%	3%
Adj. Flow (vph)	134	182	162	375	289	160	180	453	443	111	736	211
Shared Lane Traffic (%)												
Lane Group Flow (vph)	134	182	162	375	449	0	180	453	443	111	736	211
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2				7.2
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	100		15	25		15	25		100
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	

Lanes, Volumes, Timings

2033 Future Total A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	12.0	39.0	39.0	17.0	44.0		12.0	42.0	42.0	12.0	42.0	42.0
Total Split (%)	10.9%	35.5%	35.5%	15.5%	40.0%		10.9%	38.2%	38.2%	10.9%	38.2%	38.2%
Maximum Green (s)	7.0	31.8	31.8	12.0	36.8		8.0	34.0	34.0	8.0	34.0	34.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0				7.0			7.0
Flash Dont Walk (s)					19.0				6.0			6.0
Pedestrian Calls (#/hr)					0				0			0
Act Effct Green (s)	34.0	24.7	24.7	44.1	29.8		8.0	26.0	26.0	37.7	25.8	25.8
Actuated g/C Ratio	0.36	0.26	0.26	0.46	0.31		0.08	0.27	0.27	0.40	0.27	0.27
v/c Ratio	0.45	0.37	0.31	0.68	0.79		0.62	0.46	0.59	0.28	0.78	0.38
Control Delay	22.0	32.2	6.4	25.9	39.8		54.4	30.7	6.4	18.5	38.8	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	32.2	6.4	25.9	39.8		54.4	30.7	6.4	18.5	38.8	8.0
LOS	C	C	A	C	D		D	C	A	B	D	A
Approach Delay		20.6			33.5			24.6			30.5	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	14.4	28.7	0.0	47.3	73.8		17.2	37.2	0.0	12.0	67.2	3.3
Queue Length 95th (m)	29.4	52.4	15.7	82.0	123.6		#36.1	57.5	23.7	25.5	98.3	21.4
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	299	636	642	555	707		295	1292	849	403	1255	686
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.29	0.25	0.68	0.64		0.61	0.35	0.52	0.28	0.59	0.31

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	95.2
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.79
Intersection Signal Delay:	28.0
Intersection LOS:	C
Intersection Capacity Utilization:	82.6%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	

Lanes, Volumes, Timings

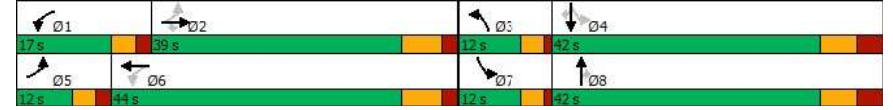
2033 Future Total A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024

Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2033 Future Total A.M.  
09-26-2024

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	299	4	2	0	10	0	0	0	0	0	0	324
Future Vol, veh/h	299	4	2	0	10	0	0	0	0	0	0	324
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	32	67	0	0	30	100	50	0	100	0	50	30
Mvmt Flow	325	4	2	0	11	0	0	0	0	0	0	352

Major/Minor	Minor2	Minor1	Major1	Major2								
Conflicting Flow All	182	176	176	179	352	0	352	0	0	0	0	0
Stage 1	176	176	-	0	0	-	-	-	-	-	-	-
Stage 2	6	0	-	179	352	-	-	-	-	-	-	-
Critical Hdwy	7.42	7.17	6.2	7.1	6.8	7.2	4.6	-	-	4.1	-	-
Critical Hdwy Stg 1	6.42	6.17	-	6.1	5.8	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.42	6.17	-	6.1	5.8	-	-	-	-	-	-	-
Follow-up Hdwy	3.788	4.603	3.3	3.5	4.27	4.2	2.65	-	-	2.2	-	-
Pot Cap-1 Maneuver	718	615	872	787	530	-	983	-	-	-	-	-
Stage 1	761	646	-	-	-	-	-	-	-	-	-	-
Stage 2	943	-	-	827	585	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	615	872	781	530	-	983	-	-	-	-	-
Mov Cap-2 Maneuver	-	615	-	781	530	-	-	-	-	-	-	-
Stage 1	761	646	-	-	-	-	-	-	-	-	-	-
Stage 2	943	-	-	819	585	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0	0
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	983	-	-	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	-	-	-
HCM Lane LOS	A	-	-	-	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2033 Future Total A.M.  
09-26-2024

Intersection												
Int Delay, s/veh	3.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	0	163	8	35	131	4	4	32	38	6	20	2
Future Vol, veh/h	0	163	8	35	131	4	4	32	38	6	20	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	2	0	0	1	0	0	25	3	0	11	0
Mvmt Flow	0	170	8	36	136	4	4	33	40	6	21	2

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	140	0	0	178	0	0	396	386	174	421	388	138
Stage 1	-	-	-	-	-	-	174	174	-	210	210	-
Stage 2	-	-	-	-	-	-	222	212	-	211	178	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.75	6.23	7.1	6.61	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.75	-	6.1	5.61	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.75	-	6.1	5.61	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.225	3.327	3.5	4.099	3.3
Pot Cap-1 Maneuver	1456	-	-	1410	-	-	568	514	867	546	533	916
Stage 1	-	-	-	-	-	-	833	713	-	797	712	-
Stage 2	-	-	-	-	-	-	785	686	-	796	735	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1456	-	-	1410	-	-	538	500	867	484	518	916
Mov Cap-2 Maneuver	-	-	-	-	-	-	538	500	-	484	518	-
Stage 1	-	-	-	-	-	-	833	713	-	797	692	-
Stage 2	-	-	-	-	-	-	738	667	-	724	735	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	11.4	12.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	642	1456	-	-	1410	-	-	526
HCM Lane V/C Ratio	0.12	-	-	-	0.026	-	-	0.055
HCM Control Delay (s)	11.4	0	-	-	7.6	0	-	12.2
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	0.2

Lanes, Volumes, Timings

2033 Future Total A.M.

8: Burnside Line & Division Road W

09-26-2024



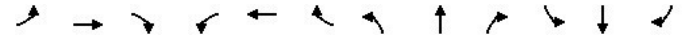
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	14	76	122	20	60	2	87	382	33	5	161	14
Future Volume (vph)	14	76	122	20	60	2	87	382	33	5	161	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.922			0.997			0.991			0.990	
Flt Protected		0.997			0.988			0.991			0.999	
Satd. Flow (prot)	0	1724	0	0	1872	0	0	1268	0	0	1297	0
Flt Permitted		0.975			0.868			0.916			0.990	
Satd. Flow (perm)	0	1686	0	0	1644	0	0	1172	0	0	1285	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		133			2			9			11	
Link Speed (k/h)		50			50			70			60	
Link Distance (m)		1346.1			271.7			1953.3			357.4	
Travel Time (s)		96.9			19.6			100.5			21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%	0%	62%	0%	0%	50%	0%
Adj. Flow (vph)	15	83	133	22	65	2	95	415	36	5	175	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	231	0	0	89	0	0	546	0	0	195	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases		4			8			2			6	
Detector Phase		4	4		8	8		2	2		6	6
Switch Phase												

Lanes, Volumes, Timings

2033 Future Total A.M.

8: Burnside Line & Division Road W

09-26-2024

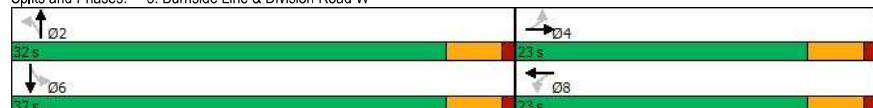


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		23.0	23.0		23.0	23.0	
Total Split (%)	41.8%	41.8%		41.8%	41.8%		58.2%	58.2%		58.2%	58.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5		27.5	27.5		27.5	27.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		8.7			8.7			30.3			30.3	
Actuated g/C Ratio		0.18			0.18			0.63			0.63	
v/c Ratio		0.56			0.30			0.74			0.24	
Control Delay		13.0			17.7			16.5			5.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		13.0			17.7			16.5			5.4	
LOS		B			B			B			A	
Approach Delay		13.0			17.7			16.5			5.4	
Approach LOS		B			B			B			A	
Queue Length 50th (m)		7.0			6.3			24.7			5.3	
Queue Length 95th (m)		21.5			15.2			#93.9			16.6	
Internal Link Dist (m)		1322.1			247.7			1929.3			333.4	
Turn Bay Length (m)												
Base Capacity (vph)		735			639			741			812	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.31			0.14			0.74			0.24	
Intersection Summary												
Area Type:	Other											
Cycle Length:	55											
Actuated Cycle Length:	48.1											
Natural Cycle:	60											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.74											
Intersection Signal Delay:	13.8						Intersection LOS: B					
Intersection Capacity Utilization:	60.8%						ICU Level of Service B					
Analysis Period (min):	15											
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

Lanes, Volumes, Timings  
8: Burnside Line & Division Road W

2033 Future Total A.M.  
09-26-2024

Splits and Phases: 8: Burnside Line & Division Road W



HCM 2010 TWSC  
9: Industrial Road & Hurlwood Lane

2033 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	2.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔
Traffic Vol, veh/h	0	167	327	73	126	0
Future Vol, veh/h	0	167	327	73	126	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	182	355	79	137	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	434	0	-	0	577	395
Stage 1	-	-	-	-	395	-
Stage 2	-	-	-	-	182	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1126	-	-	-	478	654
Stage 1	-	-	-	-	681	-
Stage 2	-	-	-	-	849	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1126	-	-	-	478	654
Mov Cap-2 Maneuver	-	-	-	-	556	-
Stage 1	-	-	-	-	681	-
Stage 2	-	-	-	-	849	-
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	13.6			
HCM LOS			B			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1126	-	-	-	556	-
HCM Lane V/C Ratio	-	-	-	-	0.246	-
HCM Control Delay (s)	0	-	-	-	13.6	0
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	1	-

HCM 2010 TWSC  
10: Uthoff Line & Industrial Road

2033 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	159	9	136	189	27	195
Future Vol, veh/h	159	9	136	189	27	195
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	10	148	205	29	212

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	521	251	0	0	353
Stage 1	251	-	-	-	-
Stage 2	270	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	516	788	-	-	1206
Stage 1	791	-	-	-	-
Stage 2	775	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	502	788	-	-	1206
Mov Cap-2 Maneuver	502	-	-	-	-
Stage 1	791	-	-	-	-
Stage 2	754	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.6	0	1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	502	788	1206
HCM Lane V/C Ratio	-	-	0.344	0.012	0.024
HCM Control Delay (s)	-	-	15.9	9.6	8.1
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.5	0	0.1

HCM 2010 TWSC  
11: Uthoff Line & North Site Access 1

2033 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	2.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	39	14	85	14	5	96
Future Vol, veh/h	39	14	85	14	5	96
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	42	15	92	15	5	104

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	214	100	0	0	107
Stage 1	100	-	-	-	-
Stage 2	114	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	774	956	-	-	1484
Stage 1	924	-	-	-	-
Stage 2	911	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	771	956	-	-	1484
Mov Cap-2 Maneuver	771	-	-	-	-
Stage 1	924	-	-	-	-
Stage 2	907	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	813	1484
HCM Lane V/C Ratio	-	-	0.071	0.004
HCM Control Delay (s)	-	-	9.8	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 2010 TWSC  
12: Uthoff Line & North Site Access 2

2033 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	1.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	53	0	98	18	0	135
Future Vol, veh/h	53	0	98	18	0	135
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	0	107	20	0	147
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	264	117	0	0	127	0
Stage 1	117	-	-	-	-	-
Stage 2	147	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	725	935	-	-	1459	-
Stage 1	908	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	725	935	-	-	1459	-
Mov Cap-2 Maneuver	725	-	-	-	-	-
Stage 1	908	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	10.4	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	725	1459	-	-
HCM Lane V/C Ratio	-	-	0.079	-	-	-
HCM Control Delay (s)	-	-	10.4	0	-	-
HCM Lane LOS	-	-	B	A	-	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-	-

HCM 2010 TWSC  
13: Uthoff Line & South Site Access

2033 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	53	14	102	27	5	183
Future Vol, veh/h	53	14	102	27	5	183
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	15	111	29	5	199
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	335	126	0	0	140	0
Stage 1	126	-	-	-	-	-
Stage 2	209	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	660	924	-	-	1443	-
Stage 1	900	-	-	-	-	-
Stage 2	826	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	657	924	-	-	1443	-
Mov Cap-2 Maneuver	657	-	-	-	-	-
Stage 1	900	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	10.7	0	0.2			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	699	1443	-	-
HCM Lane V/C Ratio	-	-	0.104	0.004	-	-
HCM Control Delay (s)	-	-	10.7	7.5	0	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-	-

Lanes, Volumes, Timings

2033 Future Total P.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	73	40	354	395	2	100	286	296	90	42	234	23
Future Volume (vph)	73	40	354	395	2	100	286	296	90	42	234	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1568	1770	1900	1615	1805	1863	1429	1805	1748	0
Flt Permitted	0.757			0.569			0.405			0.569		
Satd. Flow (perm)	1438	1900	1568	1060	1900	1615	770	1863	1429	1081	1748	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			377			200			200			5
Link Speed (k/h)	50			60			60			60		60
Link Distance (m)	140.4			136.5			65.5			1953.3		
Travel Time (s)	10.1			8.2			3.9			117.2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	3%	2%	0%	0%	0%	2%	13%	0%	8%	0%
Adj. Flow (vph)	78	43	377	420	2	106	304	315	96	45	249	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	43	377	420	2	106	304	315	96	45	273	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width(m)	3.6			3.6			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane	Yes											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Ch+Ex			Ch+Ex			Ch+Ex			Ch+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2033 Future Total P.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	10.4	21.0	21.0	21.5	32.1	32.1	15.0	38.0	38.0	9.5	32.5	
Total Split (%)	11.6%	23.3%	23.3%	23.9%	35.7%	35.7%	16.7%	42.2%	42.2%	10.6%	36.1%	
Maximum Green (s)	5.9	15.0	15.0	17.0	26.1	26.1	10.5	32.0	32.0	5.0	26.5	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	22.3	15.0	15.0	37.3	27.6	27.6	41.5	34.4	34.4	31.5	25.0	
Actuated g/C Ratio	0.25	0.17	0.17	0.42	0.31	0.31	0.47	0.39	0.39	0.36	0.28	
v/c Ratio	0.20	0.13	0.65	0.72	0.00	0.16	0.62	0.43	0.14	0.10	0.54	
Control Delay	18.0	32.6	9.7	27.5	22.0	0.6	21.6	23.4	0.4	14.1	31.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	18.0	32.6	9.7	27.5	22.0	0.6	21.6	23.4	0.4	14.1	31.1	
LOS	B	C	A	C	C	A	C	C	A	B	C	
Approach Delay		13.0			22.0			19.5			28.7	
Approach LOS		B			C			B			C	
Queue Length 50th (m)	8.1	6.6	0.0	54.6	0.3	0.0	33.3	43.9	0.0	4.2	40.5	
Queue Length 95th (m)	16.7	16.1	25.2	84.0	1.9	0.0	52.7	68.8	0.0	10.0	65.6	
Internal Link Dist (m)			116.4				112.5			41.5		1929.3
Turn Bay Length (m)	25.0		75.0	100.0			75.0			65.0	40.0	
Base Capacity (vph)	391	324	580	587	596	644	487	747	692	429	530	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.20	0.13	0.65	0.72	0.00	0.16	0.62	0.42	0.14	0.10	0.52	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	87.9
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.72
Intersection Signal Delay:	20.0
Intersection Capacity Utilization:	79.0%
Analysis Period (min):	15
Intersection LOS:	C
ICU Level of Service:	D

Splits and Phases: 1: Burnside Line & Industrial Road/Brodie Drive





Lanes, Volumes, Timings

2033 Future Total P.M.

2: Burnside Line & Highway 11 Westbound On-Ramp

09-26-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑	↑
Traffic Volume (vph)	0	0	0	998	623	334
Future Volume (vph)	0	0	0	998	623	334
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1863	1863	1509
Flt Permitted						
Satd. Flow (perm)	0	0	0	1863	1863	1509
Link Speed (k/h)	50			50	50	
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			3.7	12.5	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	2%	2%	7%
Adj. Flow (vph)	0	0	0	1018	636	341
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1018	636	341
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.9%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings

2033 Future Total P.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↑	↗		↑
Traffic Volume (vph)	201	219	781	285	0	623
Future Volume (vph)	201	219	781	285	0	623
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1752	1599	1863	1615	0	1863
Flt Permitted	0.950					
Satd. Flow (perm)	1752	1599	1863	1615	0	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		209		291		
Link Speed (k/h)	50		60			60
Link Distance (m)	241.7		160.3			51.5
Travel Time (s)	17.4		9.6			3.1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	1%	2%	0%	0%	2%
Adj. Flow (vph)	205	223	797	291	0	636
Shared Lane Traffic (%)						
Lane Group Flow (vph)	205	223	797	291	0	636
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2033 Future Total P.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.9	17.9	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.6	1.6	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.1	6.1	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	13.0	13.0	32.6	32.6		32.6
Actuated g/C Ratio	0.22	0.22	0.55	0.55		0.55
v/c Ratio	0.54	0.44	0.78	0.29		0.63
Control Delay	29.6	8.2	16.9	1.7		12.2
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	29.6	8.2	16.9	1.7		12.2
LOS	C	A	B	A		B
Approach Delay	18.5		12.8			12.2
Approach LOS	B		B			B
Queue Length 50th (m)	19.6	1.2	60.0	0.0		41.5
Queue Length 95th (m)	52.9	20.0	119.0	8.4		82.0
Internal Link Dist (m)	217.7		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	554	649	1638	1455		1638
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.37	0.34	0.49	0.20		0.39

Intersection Summary

Area Type:	Other	
Cycle Length:	85	
Actuated Cycle Length:	59.8	
Natural Cycle:	60	
Control Type:	Semi Act-Uncoord	
Maximum v/c Ratio:	0.78	
Intersection Signal Delay:	13.7	Intersection LOS: B
Intersection Capacity Utilization:	65.8%	ICU Level of Service C
Analysis Period (min):	15	

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2033 Future Total P.M.

4: West Street North & Highway 11 Eastbound

09-26-2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↔
Traffic Volume (vph)	220	163	237	844	688	137
Future Volume (vph)	220	163	237	844	688	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1736	1583	1787	1881	1863	1583
Flt Permitted	0.950		0.136			
Satd. Flow (perm)	1736	1583	256	1881	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		172				77
Link Speed (k/h)	50			60	60	
Link Distance (m)	214.0			160.8	176.6	
Travel Time (s)	15.4			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	2%	1%	1%	2%	2%
Adj. Flow (vph)	232	172	249	888	724	144
Shared Lane Traffic (%)						
Lane Group Flow (vph)	232	172	249	888	724	144
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2033 Future Total P.M.

4: West Street North & Highway 11 Eastbound

09-26-2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	25.0	25.0	24.0	70.0	46.0	46.0
Total Split (%)	26.3%	26.3%	25.3%	73.7%	48.4%	48.4%
Maximum Green (s)	18.8	18.8	21.0	62.9	38.9	38.9
Yellow Time (s)	4.5	4.5	3.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	3.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	15.3	15.3	55.4	51.2	36.0	36.0
Actuated g/C Ratio	0.19	0.19	0.69	0.64	0.45	0.45
v/c Ratio	0.70	0.39	0.61	0.74	0.87	0.19
Control Delay	44.2	8.1	15.4	14.8	34.4	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.2	8.1	15.4	14.8	34.4	8.7
LOS	D	A	B	B	C	A
Approach Delay	28.8			14.9	30.1	
Approach LOS	C			B	C	
Queue Length 50th (m)	36.4	0.0	12.7	88.7	101.9	6.0
Queue Length 95th (m)	66.5	16.8	37.4	145.1	#204.0	19.5
Internal Link Dist (m)	190.0			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	417	511	588	1493	927	826
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.34	0.42	0.59	0.78	0.17

Intersection Summary

Area Type:	Other
Cycle Length:	95
Actuated Cycle Length:	80.2
Natural Cycle:	70
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.87
Intersection Signal Delay:	22.7
Intersection LOS:	C
Intersection Capacity Utilization:	75.9%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings

2033 Future Total P.M.

4: West Street North & Highway 11 Eastbound

09-26-2024

Splits and Phases: 4: West Street North & Highway 11 Eastbound



Lanes, Volumes, Timings

2033 Future Total P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	261	290	274	493	278	212	261	838	547	105	694	183
Future Volume (vph)	261	290	274	493	278	212	261	838	547	105	694	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor			0.98	1.00								
Frt			0.850		0.935				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1900	1599	1787	1766	0	3502	3539	1599	1805	3505	1583
Flt Permitted	0.190			0.200			0.950			0.136		
Satd. Flow (perm)	357	1900	1575	376	1766	0	3502	3539	1599	258	3505	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			214		30				582			186
Link Speed (k/h)		50			70			50			50	
Link Distance (m)		186.6			853.6			529.0			469.5	
Travel Time (s)		13.4			43.9			38.1			33.8	
Confl. Peds. (#/hr)			2	2								
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	0%	1%	1%	1%	0%	0%	2%	1%	0%	3%	2%
Adj. Flow (vph)	278	309	291	524	296	226	278	891	582	112	738	195
Shared Lane Traffic (%)												
Lane Group Flow (vph)	278	309	291	524	522	0	278	891	582	112	738	195
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2033 Future Total P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (%)	27.0	31.4	31.4	41.0	45.4		18.0	46.1	46.1	11.5	39.6	39.6
Total Split (%)	20.8%	24.2%	24.2%	31.5%	34.9%		13.8%	35.5%	35.5%	8.8%	30.5%	30.5%
Maximum Green (s)	22.0	24.2	24.2	36.0	38.2		14.0	38.1	38.1	7.5	31.6	31.6
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0			7.0	7.0			
Flash Dont Walk (s)					19.0			6.0	6.0			
Pedestrian Calls (#/hr)					0			0	0			
Act Efft Green (s)	44.6	23.6	23.6	63.7	37.7		13.3	35.9	35.9	41.6	30.1	30.1
Actuated g/C Ratio	0.36	0.19	0.19	0.51	0.30		0.11	0.29	0.29	0.33	0.24	0.24
v/c Ratio	0.81	0.86	0.62	0.93	0.94		0.74	0.87	0.66	0.63	0.87	0.37
Control Delay	49.0	72.6	20.0	52.4	66.6		67.7	52.8	7.0	41.2	57.9	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	72.6	20.0	52.4	66.6		67.7	52.8	7.0	41.2	57.9	8.6
LOS	D	E	B	D	E		E	D	A	D	E	A
Approach Delay		47.7			59.5			39.9			46.9	
Approach LOS		D			E			D			D	
Queue Length 50th (m)	49.7	81.8	18.0	107.9	131.2		38.0	119.6	0.0	18.7	101.0	1.9
Queue Length 95th (m)	#84.7	#133.4	49.8	#174.4	#206.6		#54.1	146.8	30.9	#33.7	#132.6	21.5
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0	120.0	110.0			50.0
Base Capacity (vph)	393	373	481	604	576		398	1094	896	180	898	544
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.83	0.60	0.87	0.91		0.70	0.81	0.65	0.62	0.82	0.36
Intersection Summary												
Area Type:	Other											
Cycle Length:	130											
Actuated Cycle Length:	124.2											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.94											
Intersection Signal Delay:	47.2						Intersection LOS: D					
Intersection Capacity Utilization:	93.1%						ICU Level of Service F					

Lanes, Volumes, Timings

5: Highway 12 & West Ridge Boulevard/Murphy Road

2033 Future Total P.M.

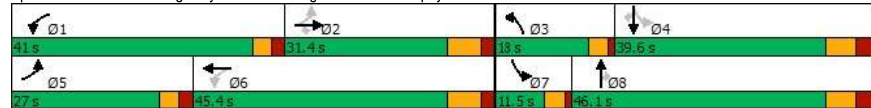
09-26-2024

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



HCM 2010 TWSC

6: Unthoff Line & Murphy Road

2033 Future Total P.M.

09-26-2024

Intersection

Int Delay, s/veh 0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Vol, veh/h	527	5	0	3	3	3	2	0	0	2	0	349
Future Vol, veh/h	527	5	0	3	3	3	2	0	0	2	0	349
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	18	25	0	0	100	0	0	0	0	0	0	27
Mvmt Flow	586	6	0	3	3	3	2	0	0	2	0	388

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	205	202	194	205
Stage 1	198	198	-	4
Stage 2	7	4	-	201
Critical Hdwy	7.28	6.75	6.2	7.1
Critical Hdwy Stg 1	6.28	5.75	-	6.1
Critical Hdwy Stg 2	6.28	5.75	-	6.1
Follow-up Hdwy	3.662	4.225	3.3	3.5
Pot Cap-1 Maneuver	720	655	853	757
Stage 1	768	696	-	1024
Stage 2	975	849	-	805
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	654	853	751
Mov Cap-2 Maneuver	-	654	-	751
Stage 1	766	696	-	1022
Stage 2	969	847	-	799

Approach	EB	WB	NB	SB
HCM Control Delay, s			8.1	
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1182	-	-	-	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-	-	-	-
HCM Control Delay (s)	8.1	0	-	-	-	-	-
HCM Lane LOS	A	A	-	-	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2033 Future Total P.M.  
09-26-2024

Intersection												
Int Delay, s/veh	4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Vol, veh/h	4	232	14	39	294	16	22	39	75	6	34	2
Future Vol, veh/h	4	232	14	39	294	16	22	39	75	6	34	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	0	1	0	0	0	0	0	20	0
Mvmt Flow	4	249	15	42	316	17	24	42	81	6	37	2

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	333	0	0	264
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.1	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2
Pot Cap-1 Maneuver	1238	-	-	1312
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1238	-	-	1312
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.9	15.2	17.5
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	498	1238	-	-	1312	-	-	332
HCM Lane V/C Ratio	0.294	0.003	-	-	0.032	-	-	0.136
HCM Control Delay (s)	15.2	7.9	0	-	7.8	0	-	17.5
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.2	0	-	-	0.1	-	-	0.5

Lanes, Volumes, Timings  
8: Burnside Line & Division Road W

2033 Future Total P.M.  
09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (vph)	12	147	159	22	113	3	210	178	65	5	92	27
Future Volume (vph)	12	147	159	22	113	3	210	178	65	5	92	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932		0.997		0.992		0.981		0.970		0.998	
Flt Protected	0.998		0.992		0.977		0.998		0.998		0.998	
Satd. Flow (prot)	0	1742	0	0	1849	0	0	1795	0	0	1571	0
Flt Permitted	0.986		0.912		0.791		0.986		0.986		0.986	
Satd. Flow (perm)	0	1722	0	0	1700	0	0	1454	0	0	1552	0
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	99		2		22		29		29		29	
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	1346.1		271.7		1953.3		357.4		357.4		357.4	
Travel Time (s)	96.9		19.6		140.6		25.7		25.7		25.7	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	1%	0%	2%	0%	1%	1%	4%	0%	23%	0%
Adj. Flow (vph)	13	156	169	23	120	3	223	189	69	5	98	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	338	0	0	146	0	0	481	0	0	132	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width(m)	0.0		0.0		3.6		3.6		3.6		3.6	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100		100		100		100		100		100	
Number of Detectors	1	2	1	2	1	2	1	2	1	2	1	2
Detector Template	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru
Leading Detector (m)	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		2		6		6		6	
Permitted Phases	4		8		2		6		6		6	
Detector Phase	4	4	8	8	2	2	6	6	6	6	6	6
Switch Phase												

Lanes, Volumes, Timings

2033 Future Total P.M.

8: Burnside Line & Division Road W

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		32.0	32.0		32.0	32.0	
Total Split (%)	41.8%	41.8%		41.8%	41.8%		58.2%	58.2%		58.2%	58.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5		27.5	27.5		27.5	27.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		12.2			12.2			28.2			28.2	
Actuated g/C Ratio		0.25			0.25			0.57			0.57	
v/c Ratio		0.88			0.35			0.57			0.15	
Control Delay		18.6			16.7			11.1			5.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		18.6			16.7			11.1			5.7	
LOS		B			B			B			A	
Approach Delay		18.6			16.7			11.1			5.7	
Approach LOS		B			B			B			A	
Queue Length 50th (m)		18.8			10.7			22.8			3.8	
Queue Length 95th (m)		39.6			22.2			61.4			12.8	
Internal Link Dist (m)		1322.1			247.7			1929.3			333.4	
Turn Bay Length (m)												
Base Capacity (vph)		709			641			838			897	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.48			0.23			0.57			0.15	

Intersection Summary

Area Type:	Other
Cycle Length:	55
Actuated Cycle Length:	49.4
Natural Cycle:	55
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	13.5
Intersection LOS:	B
Intersection Capacity Utilization:	58.4%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 8: Burnside Line & Division Road W



HCM 2010 TWSC

2033 Future Total P.M.

9: Industrial Road & Hurlwood Lane

09-26-2024

Intersection	EBL	EBT	WBT	WBR	SBL	SBR
Int Delay, s/veh	2.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔
Traffic Vol, veh/h	0	145	490	109	122	0
Future Vol, veh/h	0	145	490	109	122	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	158	533	118	133	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	651	0	750
Stage 1	-	-	592
Stage 2	-	-	158
Critical Hdwy	4.12	-	6.22
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.318
Pot Cap-1 Maneuver	935	-	506
Stage 1	-	-	553
Stage 2	-	-	871
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	935	-	506
Mov Cap-2 Maneuver	-	-	463
Stage 1	-	-	553
Stage 2	-	-	871

Approach	EB	WB	SB
HCM Control Delay, s	0	0	15.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	935	-	-	-	463	-
HCM Lane V/C Ratio	-	-	-	-	0.286	-
HCM Control Delay (s)	0	-	-	-	15.9	0
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0	-	-	-	1.2	-

HCM 2010 TWSC  
10: Uthoff Line & Industrial Road

2033 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	5.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	199	28	337	193	18	156
Future Vol, veh/h	199	28	337	193	18	156
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	216	30	366	210	20	170

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	681	471	0	0	576
Stage 1	471	-	-	-	-
Stage 2	210	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	416	593	-	-	997
Stage 1	628	-	-	-	-
Stage 2	825	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	407	593	-	-	997
Mov Cap-2 Maneuver	407	-	-	-	-
Stage 1	628	-	-	-	-
Stage 2	807	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21.9	0	0.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	407	593	997
HCM Lane V/C Ratio	-	-	0.531	0.051	0.02
HCM Control Delay (s)	-	-	23.4	11.4	8.7
HCM Lane LOS	-	-	C	B	A
HCM 95th %tile Q(veh)	-	-	3	0.2	0.1

HCM 2010 TWSC  
11: Uthoff Line & North Site Access 1

2033 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	26	9	155	42	14	99
Future Vol, veh/h	26	9	155	42	14	99
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	10	168	46	15	108

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	329	191	0	0	214
Stage 1	191	-	-	-	-
Stage 2	138	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	665	851	-	-	1356
Stage 1	841	-	-	-	-
Stage 2	889	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	657	851	-	-	1356
Mov Cap-2 Maneuver	657	-	-	-	-
Stage 1	841	-	-	-	-
Stage 2	878	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	698	1356
HCM Lane V/C Ratio	-	-	0.055	0.011
HCM Control Delay (s)	-	-	10.5	7.7
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0



HCM 2010 TWSC  
12: Uthoff Line & North Site Access 2

2033 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Vol, veh/h	35	0	197	56	0	125
Future Vol, veh/h	35	0	197	56	0	125
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	0	214	61	0	136
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	381	245	0	0	275	0
Stage 1	245	-	-	-	-	-
Stage 2	136	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	621	794	-	-	1288	-
Stage 1	796	-	-	-	-	-
Stage 2	890	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	621	794	-	-	1288	-
Mov Cap-2 Maneuver	621	-	-	-	-	-
Stage 1	796	-	-	-	-	-
Stage 2	890	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	11.2	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	621	1288	-	-
HCM Lane V/C Ratio	-	-	0.061	-	-	-
HCM Control Delay (s)	-	-	11.2	0	-	-
HCM Lane LOS	-	-	B	A	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-	-

HCM 2010 TWSC  
13: Uthoff Line & South Site Access

2033 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Vol, veh/h	35	9	243	84	14	146
Future Vol, veh/h	35	9	243	84	14	146
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	10	264	91	15	159
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	499	310	0	0	355	0
Stage 1	310	-	-	-	-	-
Stage 2	189	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	531	730	-	-	1204	-
Stage 1	744	-	-	-	-	-
Stage 2	843	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	524	730	-	-	1204	-
Mov Cap-2 Maneuver	524	-	-	-	-	-
Stage 1	744	-	-	-	-	-
Stage 2	831	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.1	0	0.7			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	556	1204	-	-
HCM Lane V/C Ratio	-	-	0.086	0.013	-	-
HCM Control Delay (s)	-	-	12.1	8	0	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-	-

Lanes, Volumes, Timings

2035 Future Total A.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	30	316	237	5	40	361	289	85	38	252	45
Future Volume (vph)	48	30	316	237	5	40	361	289	85	38	252	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1615	1736	1900	1615	1805	1439	1468	1805	1520	0
Flt Permitted	0.754			0.581			0.350			0.568		
Satd. Flow (perm)	1433	1900	1615	1061	1900	1615	665	1439	1468	1079	1520	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			347			200			200		10	
Link Speed (k/h)	50				60			60			60	
Link Distance (m)	140.4				136.5			65.5			1953.3	
Travel Time (s)	10.1				8.2			3.9			117.2	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	4%	0%	0%	0%	32%	10%	0%	26%	0%
Adj. Flow (vph)	53	33	347	260	5	44	397	318	93	42	277	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	33	347	260	5	44	397	318	93	42	326	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.6				3.6			3.6			3.6	
Link Offset(m)	0.0				0.0			0.0			0.0	
Crosswalk Width(m)	4.8				4.8			4.8			4.8	
Two way Left Turn Lane	Yes											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2035 Future Total A.M.

1: Burnside Line & Industrial Road/Brodie Drive

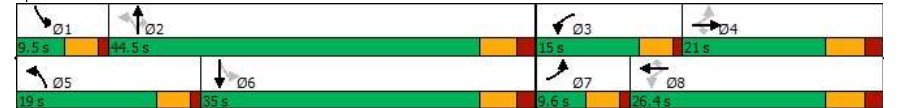
09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	9.6	21.0	21.0	15.0	26.4	26.4	19.0	44.5	44.5	9.5	35.0	
Total Split (%)	10.7%	23.3%	23.3%	16.7%	29.3%	29.3%	21.1%	49.4%	49.4%	10.6%	38.9%	
Maximum Green (s)	5.1	15.0	15.0	10.5	20.4	20.4	14.5	38.5	38.5	5.0	29.0	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	21.6	15.0	15.0	31.1	23.9	23.9	46.4	39.3	39.3	32.6	26.1	
Actuated g/C Ratio	0.25	0.17	0.17	0.36	0.28	0.28	0.54	0.45	0.45	0.38	0.30	
v/c Ratio	0.14	0.10	0.61	0.57	0.01	0.07	0.73	0.49	0.12	0.09	0.70	
Control Delay	20.4	32.0	9.1	27.0	26.6	0.2	21.0	0.3	11.3	35.3		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.4	32.0	9.1	27.0	26.6	0.2	21.0	0.3	11.3	35.3		
LOS	C	C	A	C	C	A	C	C	A	B	D	
Approach Delay		12.2			23.1			18.6			32.6	
Approach LOS		B			C			B			C	
Queue Length 50th (m)	5.9	4.9	0.0	33.0	0.7	0.0	39.1	41.3	0.0	3.3	49.0	
Queue Length 95th (m)	14.5	13.5	24.2	57.7	3.6	0.0	59.8	67.2	0.0	8.0	79.5	
Internal Link Dist (m)		116.4			112.5			41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0		65.0	40.0		
Base Capacity (vph)	379	329	567	463	524	590	548	675	795	448	516	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.10	0.61	0.56	0.01	0.07	0.72	0.47	0.12	0.09	0.63	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	86.5
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	20.6
Intersection LOS:	C
Intersection Capacity Utilization:	74.4%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 1: Burnside Line & Industrial Road/Brodie Drive



Lanes, Volumes, Timings

2035 Future Total A.M.

2: Burnside Line & Highway 11 Westbound On-Ramp

09-26-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑	↑
Traffic Volume (vph)	0	0	0	1066	440	355
Future Volume (vph)	0	0	0	1066	440	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1638	1810	1214
Flt Permitted						
Satd. Flow (perm)	0	0	0	1638	1810	1214
Link Speed (k/h)	50			70	60	
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			2.6	10.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	16%	5%	33%
Adj. Flow (vph)	0	0	0	1122	463	374
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1122	463	374
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.4%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings

2035 Future Total A.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↓	↑	↑	↑		↑
Traffic Volume (vph)	166	267	799	186	0	440
Future Volume (vph)	166	267	799	186	0	440
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1787	1583	1638	1509	0	1810
Flt Permitted	0.950					
Satd. Flow (perm)	1787	1583	1638	1509	0	1810
Right Turn on Red		Yes	Yes			
Satd. Flow (RTOR)		191	196			
Link Speed (k/h)	50		60			60
Link Distance (m)	241.7		160.3			51.5
Travel Time (s)	17.4		9.6			3.1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	16%	7%	0%	5%
Adj. Flow (vph)	175	281	841	196	0	463
Shared Lane Traffic (%)						
Lane Group Flow (vph)	175	281	841	196	0	463
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2035 Future Total A.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	9.7	9.7	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.6	17.6	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.9	1.9	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.4	6.4	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	12.9	12.9	39.0	39.0		39.0
Actuated g/C Ratio	0.19	0.19	0.59	0.59		0.59
v/c Ratio	0.51	0.61	0.87	0.20		0.44
Control Delay	32.7	16.5	23.2	1.6		8.8
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	32.7	16.5	23.2	1.6		8.8
LOS	C	B	C	A		A
Approach Delay	22.8		19.1			8.8
Approach LOS	C		B			A
Queue Length 50th (m)	20.5	10.1	76.2	0.0		27.4
Queue Length 95th (m)	46.3	37.8	#159.4	7.0		53.6
Internal Link Dist (m)	217.7		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	500	581	1345	1275		1487
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.35	0.48	0.63	0.15		0.31

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	66.4
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.87
Intersection Signal Delay:	17.5
Intersection LOS:	B
Intersection Capacity Utilization:	70.0%
ICU Level of Service:	C
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings

2035 Future Total A.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2035 Future Total A.M.

4: West Street North & Highway 11 Eastbound

09-26-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↖	↖	↖
Traffic Volume (vph)	310	130	107	672	537	69
Future Volume (vph)	310	130	107	672	537	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1327	1524	1787	1827	1845	1442
Flt Permitted	0.950		0.231			
Satd. Flow (perm)	1327	1524	435	1827	1845	1442
Right Turn on Red		Yes			Yes	
Satd. Flow (RTOR)		137				51
Link Speed (k/h)	50			60	60	
Link Distance (m)	214.0			160.8	176.6	
Travel Time (s)	15.4			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	36%	6%	1%	4%	3%	12%
Adj. Flow (vph)	326	137	113	707	565	73
Shared Lane Traffic (%)						
Lane Group Flow (vph)	326	137	113	707	565	73
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2035 Future Total A.M.

4: West Street North & Highway 11 Eastbound

09-26-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	38.0	38.0	10.0	52.0	42.0	42.0
Total Split (%)	42.2%	42.2%	11.1%	57.8%	46.7%	46.7%
Maximum Green (s)	31.8	31.8	8.0	44.9	34.9	34.9
Yellow Time (s)	4.5	4.5	2.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	2.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	22.8	22.8	41.2	35.7	28.6	28.6
Actuated g/C Ratio	0.31	0.31	0.57	0.49	0.39	0.39
v/c Ratio	0.79	0.24	0.29	0.79	0.78	0.12
Control Delay	38.6	5.2	10.5	23.8	30.5	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	5.2	10.5	23.8	30.5	8.4
LOS	D	A	B	C	C	A
Approach Delay	28.7			22.0	27.9	
Approach LOS	C			C	C	
Queue Length 50th (m)	44.2	0.0	7.1	81.2	74.8	2.1
Queue Length 95th (m)	82.5	11.9	17.2	149.5	#137.0	11.1
Internal Link Dist (m)	190.0			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	619	784	404	1204	945	763
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.17	0.28	0.59	0.60	0.10
Intersection Summary						
Area Type:	Other					
Cycle Length: 90						
Actuated Cycle Length: 72.7						
Natural Cycle: 80						
Control Type: Semi Act-Uncoord						
Maximum v/c Ratio: 0.79						
Intersection Signal Delay: 25.6				Intersection LOS: C		
Intersection Capacity Utilization 65.8%				ICU Level of Service C		
Analysis Period (min) 15						
# 95th percentile volume exceeds capacity, queue may be longer.						
Queue shown is maximum after two cycles.						

Lanes, Volumes, Timings

4: West Street North & Highway 11 Eastbound

2035 Future Total A.M.

09-26-2024

Splits and Phases: 4: West Street North & Highway 11 Eastbound



Lanes, Volumes, Timings

5: Highway 12 & West Ridge Boulevard/Murphy Road

2035 Future Total A.M.

09-26-2024

	←	→	↶	↷	←	→	↶	↷	←	→	↶	↷
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	135	186	163	360	294	162	182	457	450	112	743	213
Future Volume (vph)	135	186	163	360	294	162	182	457	450	112	743	213
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.95	1.00	1.00
Frt			0.850		0.947				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1583	1787	1765	0	3467	3574	1568	1736	3471	1568
Flt Permitted	0.279			0.505			0.950			0.429		
Satd. Flow (perm)	525	1881	1583	950	1765	0	3467	3574	1568	784	3471	1568
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)			168		27				464			187
Link Speed (k/h)		60			60			70				70
Link Distance (m)		186.6			853.6			529.0				469.5
Travel Time (s)		11.2			51.2			27.2				24.1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	2%	1%	3%	0%	1%	3%	4%	3%	4%	3%
Adj. Flow (vph)	139	192	168	371	303	167	188	471	464	115	766	220
Shared Lane Traffic (%)												
Lane Group Flow (vph)	139	192	168	371	470	0	188	471	464	115	766	220
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2				7.2
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	100		15	25		15	25		100
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	

Lanes, Volumes, Timings

2035 Future Total A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	12.0	39.0	39.0	17.0	44.0		12.0	42.0	42.0	12.0	42.0	42.0
Total Split (%)	10.9%	35.5%	35.5%	15.5%	40.0%		10.9%	38.2%	38.2%	10.9%	38.2%	38.2%
Maximum Green (s)	7.0	31.8	31.8	12.0	36.8		8.0	34.0	34.0	8.0	34.0	34.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0					7.0		7.0
Flash Dont Walk (s)					19.0					6.0		6.0
Pedestrian Calls (#/hr)					0					0		0
Act Effct Green (s)	35.0	25.7	25.7	45.1	30.7		8.1	27.3	27.3	39.0	27.1	27.1
Actuated g/C Ratio	0.36	0.26	0.26	0.46	0.31		0.08	0.28	0.28	0.40	0.28	0.28
v/c Ratio	0.50	0.39	0.31	0.68	0.82		0.66	0.47	0.60	0.29	0.79	0.39
Control Delay	23.9	32.7	6.3	26.7	42.4		57.6	31.1	6.4	19.0	39.7	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.9	32.7	6.3	26.7	42.4		57.6	31.1	6.4	19.0	39.7	8.6
LOS	C	C	A	C	D		E	C	A	B	D	A
Approach Delay		21.4			35.5			25.3			31.3	
Approach LOS		C			D			C			C	
Queue Length 50th (m)	15.9	31.7	0.0	49.3	82.2		19.2	40.6	0.0	13.2	73.6	4.8
Queue Length 95th (m)	30.3	55.0	15.9	81.1	131.5		#38.6	60.0	24.2	26.2	103.0	23.8
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	280	621	635	543	691		288	1262	854	394	1226	674
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.31	0.26	0.68	0.68		0.65	0.37	0.54	0.29	0.62	0.33

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	97.5
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.82
Intersection Signal Delay:	29.0
Intersection LOS:	C
Intersection Capacity Utilization:	83.1%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	

Lanes, Volumes, Timings

2035 Future Total A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024

Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2035 Future Total A.M.  
09-26-2024

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	315	4	2	0	10	0	0	0	0	0	0	296
Future Vol, veh/h	315	4	2	0	10	0	0	0	0	0	0	296
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	32	67	0	0	30	100	50	0	100	0	50	30
Mvmt Flow	342	4	2	0	11	0	0	0	0	0	0	322

Major/Minor	Minor2	Minor1	Major1	Major2								
Conflicting Flow All	167	161	161	164	322	0	322	0	0	0	0	0
Stage 1	161	161	-	0	0	-	-	-	-	-	-	-
Stage 2	6	0	-	164	322	-	-	-	-	-	-	-
Critical Hdwy	7.42	7.17	6.2	7.1	6.8	7.2	4.6	-	-	4.1	-	-
Critical Hdwy Stg 1	6.42	6.17	-	6.1	5.8	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.42	6.17	-	6.1	5.8	-	-	-	-	-	-	-
Follow-up Hdwy	3.788	4.603	3.3	3.5	4.27	4.2	2.65	-	-	2.2	-	-
Pot Cap-1 Maneuver	735	628	889	805	552	-	1011	-	-	-	-	-
Stage 1	775	657	-	-	-	-	-	-	-	-	-	-
Stage 2	943	-	-	843	604	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	628	889	799	552	-	1011	-	-	-	-	-
Mov Cap-2 Maneuver	-	628	-	799	552	-	-	-	-	-	-	-
Stage 1	775	657	-	-	-	-	-	-	-	-	-	-
Stage 2	943	-	-	835	604	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0	0
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1011	-	-	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	-	-	-
HCM Lane LOS	A	-	-	-	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2035 Future Total A.M.  
09-26-2024

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	0	170	8	37	136	4	4	39	39	7	24	2
Future Vol, veh/h	0	170	8	37	136	4	4	39	39	7	24	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	2	0	0	1	0	0	25	3	0	11	0
Mvmt Flow	0	177	8	39	142	4	4	41	41	7	25	2

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	146	0	0	185	0	0	417	405	181	444	407	144
Stage 1	-	-	-	-	-	-	181	181	-	222	222	-
Stage 2	-	-	-	-	-	-	236	224	-	222	185	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.75	6.23	7.1	6.61	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.75	-	6.1	5.61	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.75	-	6.1	5.61	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.225	3.327	3.5	4.099	3.3
Pot Cap-1 Maneuver	1448	-	-	1402	-	-	550	501	859	528	520	909
Stage 1	-	-	-	-	-	-	825	708	-	785	703	-
Stage 2	-	-	-	-	-	-	772	678	-	785	730	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1448	-	-	1402	-	-	516	486	859	460	504	909
Mov Cap-2 Maneuver	-	-	-	-	-	-	516	486	-	460	504	-
Stage 1	-	-	-	-	-	-	825	708	-	785	682	-
Stage 2	-	-	-	-	-	-	720	658	-	705	730	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	11.8	12.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	615	1448	-	-	1402	-	-	507
HCM Lane V/C Ratio	0.139	-	-	-	0.027	-	-	0.068
HCM Control Delay (s)	11.8	0	-	-	7.6	0	-	12.6
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0.2



Lanes, Volumes, Timings

2035 Future Total A.M.

8: Burnside Line & Division Road W

09-26-2024



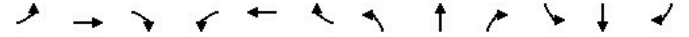
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	14	79	127	20	63	2	90	387	34	5	166	14
Future Volume (vph)	14	79	127	20	63	2	90	387	34	5	166	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.922			0.997			0.991			0.990	
Flt Protected		0.997			0.988			0.991			0.999	
Satd. Flow (prot)	0	1724	0	0	1872	0	0	1270	0	0	1296	0
Flt Permitted		0.976			0.869			0.914			0.990	
Satd. Flow (perm)	0	1688	0	0	1646	0	0	1171	0	0	1284	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		135			2			9			11	
Link Speed (k/h)		50			50			70			60	
Link Distance (m)		1346.1			271.7			1953.3			357.4	
Travel Time (s)		96.9			19.6			100.5			21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%	0%	62%	0%	0%	50%	0%
Adj. Flow (vph)	15	86	138	22	68	2	98	421	37	5	180	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	239	0	0	92	0	0	556	0	0	200	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases		4			8			2			6	
Detector Phase		4	4		8	8		2	2		6	6
Switch Phase												

Lanes, Volumes, Timings

2035 Future Total A.M.

8: Burnside Line & Division Road W

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		23.0	23.0		23.0	23.0	
Total Split (%)	41.8%	41.8%		41.8%	41.8%		58.2%	58.2%		58.2%	58.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5		27.5	27.5		27.5	27.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		8.9			8.9			30.3			30.3	
Actuated g/C Ratio		0.18			0.18			0.63			0.63	
v/c Ratio		0.57			0.30			0.75			0.25	
Control Delay		13.3			17.7			17.4			5.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		13.3			17.7			17.4			5.5	
LOS		B			B			B			A	
Approach Delay		13.3			17.7			17.4			5.5	
Approach LOS		B			B			B			A	
Queue Length 50th (m)		7.5			6.5			25.7			5.5	
Queue Length 95th (m)		22.3			15.5			#97.3			17.3	
Internal Link Dist (m)		1322.1			247.7			1929.3			333.4	
Turn Bay Length (m)												
Base Capacity (vph)		735			638			738			810	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.33			0.14			0.75			0.25	
Intersection Summary												
Area Type:	Other											
Cycle Length:	55											
Actuated Cycle Length:	48.3											
Natural Cycle:	60											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.75											
Intersection Signal Delay:	14.3						Intersection LOS: B					
Intersection Capacity Utilization:	62.1%						ICU Level of Service B					
Analysis Period (min):	15											
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

Lanes, Volumes, Timings  
8: Burnside Line & Division Road W

2035 Future Total A.M.  
09-26-2024

Splits and Phases: 8: Burnside Line & Division Road W



HCM 2010 TWSC  
9: Industrial Road & Hurlwood Lane

2035 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	3.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔
Traffic Vol, veh/h	0	174	330	81	187	0
Future Vol, veh/h	0	174	330	81	187	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	189	359	88	203	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	447	0	0	592	403	
Stage 1	-	-	-	403	-	
Stage 2	-	-	-	189	-	
Critical Hdwy	4.12	-	-	6.42	6.22	
Critical Hdwy Stg 1	-	-	-	5.42	-	
Critical Hdwy Stg 2	-	-	-	5.42	-	
Follow-up Hdwy	2.218	-	-	3.518	3.318	
Pot Cap-1 Maneuver	1113	-	-	469	647	
Stage 1	-	-	-	675	-	
Stage 2	-	-	-	843	-	
Platoon blocked, %	-	-	-	-	-	
Mov Cap-1 Maneuver	1113	-	-	469	647	
Mov Cap-2 Maneuver	-	-	-	549	-	
Stage 1	-	-	-	675	-	
Stage 2	-	-	-	843	-	
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	15.4			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1113	-	-	-	549	-
HCM Lane V/C Ratio	-	-	-	-	0.37	-
HCM Control Delay (s)	0	-	-	-	15.4	0
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0	-	-	-	1.7	-

HCM 2010 TWSC  
10: Uthoff Line & Industrial Road

2035 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	4.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔			↔
Traffic Vol, veh/h	159	12	152	189	34	167
Future Vol, veh/h	159	12	152	189	34	167
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	13	165	205	37	182

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	524	268	0	0	370
Stage 1	268	-	-	-	-
Stage 2	256	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	514	771	-	-	1189
Stage 1	777	-	-	-	-
Stage 2	787	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	496	771	-	-	1189
Mov Cap-2 Maneuver	496	-	-	-	-
Stage 1	777	-	-	-	-
Stage 2	759	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.7	0	1.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	496	771	1189
HCM Lane V/C Ratio	-	-	0.348	0.017	0.031
HCM Control Delay (s)	-	-	16.1	9.8	8.1
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.5	0.1	0.1

HCM 2010 TWSC  
11: Uthoff Line & North Site Access 1

2035 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	2.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔			↔
Traffic Vol, veh/h	34	17	91	12	6	101
Future Vol, veh/h	34	17	91	12	6	101
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	18	99	13	7	110

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	230	106	0	0	112
Stage 1	106	-	-	-	-
Stage 2	124	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	758	948	-	-	1478
Stage 1	918	-	-	-	-
Stage 2	902	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	754	948	-	-	1478
Mov Cap-2 Maneuver	754	-	-	-	-
Stage 1	918	-	-	-	-
Stage 2	897	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	809	1478
HCM Lane V/C Ratio	-	-	0.069	0.004
HCM Control Delay (s)	-	-	9.8	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 2010 TWSC  
12: Uthoff Line & North Site Access 2

2035 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Vol, veh/h	34	0	103	12	0	135
Future Vol, veh/h	34	0	103	12	0	135
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	0	112	13	0	147
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	266	119	0	0	125	0
Stage 1	119	-	-	-	-	-
Stage 2	147	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	723	933	-	-	1462	-
Stage 1	906	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	723	933	-	-	1462	-
Mov Cap-2 Maneuver	723	-	-	-	-	-
Stage 1	906	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	10.2	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	723	1462	-	-
HCM Lane V/C Ratio	-	-	0.051	-	-	-
HCM Control Delay (s)	-	-	10.2	0	-	-
HCM Lane LOS	-	-	B	A	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-	-

HCM 2010 TWSC  
13: Uthoff Line & South Site Access

2035 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	2.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Vol, veh/h	85	17	97	51	6	163
Future Vol, veh/h	85	17	97	51	6	163
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	92	18	105	55	7	177
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	324	133	0	0	160	0
Stage 1	133	-	-	-	-	-
Stage 2	191	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	670	916	-	-	1419	-
Stage 1	893	-	-	-	-	-
Stage 2	841	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	667	916	-	-	1419	-
Mov Cap-2 Maneuver	667	-	-	-	-	-
Stage 1	893	-	-	-	-	-
Stage 2	837	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	11.1	0	0.3			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	699	1419	-	-
HCM Lane V/C Ratio	-	-	0.159	0.005	-	-
HCM Control Delay (s)	-	-	11.1	7.5	0	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.6	0	-	-

Lanes, Volumes, Timings

2035 Future Total P.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-06-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	40	400	411	2	104	316	308	94	44	243	23
Future Volume (vph)	73	40	400	411	2	104	316	308	94	44	243	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1568	1770	1900	1615	1805	1863	1429	1805	1747	0
Flt Permitted	0.757			0.568			0.392			0.562		
Satd. Flow (perm)	1438	1900	1568	1058	1900	1615	745	1863	1429	1068	1747	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			404			200			200		5	
Link Speed (k/h)	50			60			60			60		
Link Distance (m)	140.4			136.5			65.5			1953.3		
Travel Time (s)	10.1			8.2			3.9			117.2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	3%	2%	0%	0%	2%	13%	0%	8%	0%	0%
Adj. Flow (vph)	78	43	426	437	2	111	336	328	100	47	259	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	43	426	437	2	111	336	328	100	47	283	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.6			3.6			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane	Yes											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Ch+Ex			Ch+Ex			Ch+Ex			Ch+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2035 Future Total P.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-06-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	10.4	21.0	21.0	21.5	32.1	32.1	15.0	38.0	38.0	9.5	32.5	
Total Split (%)	11.6%	23.3%	23.3%	23.9%	35.7%	35.7%	16.7%	42.2%	42.2%	10.6%	36.1%	
Maximum Green (s)	5.9	15.0	15.0	17.0	26.1	26.1	10.5	32.0	32.0	5.0	26.5	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	22.3	15.0	15.0	37.6	27.8	27.8	41.7	34.5	34.5	31.7	25.2	
Actuated g/C Ratio	0.25	0.17	0.17	0.43	0.31	0.31	0.47	0.39	0.39	0.36	0.29	
v/c Ratio	0.20	0.13	0.71	0.75	0.00	0.17	0.70	0.45	0.15	0.11	0.56	
Control Delay	18.2	32.8	11.9	29.1	22.5	0.6	25.0	23.7	0.5	14.1	31.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	18.2	32.8	11.9	29.1	22.5	0.6	25.0	23.7	0.5	14.1	31.6	
LOS	B	C	B	C	C	A	C	C	A	B	C	
Approach Delay		14.5			23.3			21.2			29.1	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	8.1	6.6	3.4	57.4	0.3	0.0	37.7	46.0	0.0	4.4	42.4	
Queue Length 95th (m)	16.9	16.1	33.3	#91.0	2.0	0.0	58.6	71.6	0.0	10.4	68.3	
Internal Link Dist (m)		116.4			112.5			41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0			65.0	40.0	
Base Capacity (vph)	389	323	602	587	598	645	478	743	690	425	527	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.20	0.13	0.71	0.74	0.00	0.17	0.70	0.44	0.14	0.11	0.54	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 88.3												
Natural Cycle: 80												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.75												
Intersection Signal Delay: 21.2							Intersection LOS: C					
Intersection Capacity Utilization 82.1%							ICU Level of Service E					
Analysis Period (min) 15												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

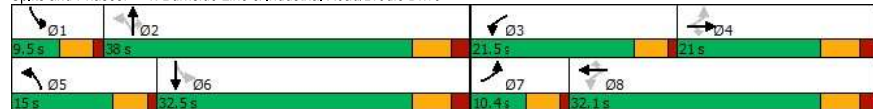
Lanes, Volumes, Timings

1: Burnside Line & Industrial Road/Brodie Drive

2035 Future Total P.M.

09-06-2024

Splits and Phases: 1: Burnside Line & Industrial Road/Brodie Drive



Lanes, Volumes, Timings

2: Burnside Line & Highway 11 Westbound On-Ramp

2035 Future Total P.M.

09-06-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group						
Lane Configurations				↑	↑	↑
Traffic Volume (vph)	0	0	0	1057	655	373
Future Volume (vph)	0	0	0	1057	655	373
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1863	1863	1509
Flt Permitted						
Satd. Flow (perm)	0	0	0	1863	1863	1509
Link Speed (k/h)	50			50	50	
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			3.7	12.5	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	2%	2%	7%
Adj. Flow (vph)	0	0	0	1079	668	381
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1079	668	381
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Free			Free	Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	59.0%			ICU Level of Service B		
Analysis Period (min)	15					

Lanes, Volumes, Timings

2035 Future Total P.M.

3: Burnside Line & Highway 11 Westbound

09-06-2024

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑	↗	↘	↓
Traffic Volume (vph)	209	226	832	296	0	655
Future Volume (vph)	209	226	832	296	0	655
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1752	1599	1863	1615	0	1863
Flt Permitted	0.950					
Satd. Flow (perm)	1752	1599	1863	1615	0	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		187		302		
Link Speed (k/h)	50		60			60
Link Distance (m)	241.7		160.3			51.5
Travel Time (s)	17.4		9.6			3.1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	1%	2%	0%	0%	2%
Adj. Flow (vph)	213	231	849	302	0	668
Shared Lane Traffic (%)						
Lane Group Flow (vph)	213	231	849	302	0	668
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex		Ch+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Ch+Ex			Ch+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2035 Future Total P.M.

3: Burnside Line & Highway 11 Westbound

09-06-2024

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.9	17.9	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.6	1.6	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.1	6.1	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	13.4	13.4	35.0	35.0		35.0
Actuated g/C Ratio	0.21	0.21	0.56	0.56		0.56
v/c Ratio	0.57	0.47	0.82	0.29		0.64
Control Delay	31.8	11.0	18.3	1.6		12.4
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	31.8	11.0	18.3	1.6		12.4
LOS	C	B	B	A		B
Approach Delay	20.9		14.0			12.4
Approach LOS	C		B			B
Queue Length 50th (m)	22.7	4.2	70.1	0.0		46.9
Queue Length 95th (m)	55.6	26.1	133.9	8.4		88.2
Internal Link Dist (m)	217.7		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	530	614	1579	1415		1579
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.40	0.38	0.54	0.21		0.42

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	62.7
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.82
Intersection Signal Delay:	14.9
Intersection Capacity Utilization:	68.9%
Intersection LOS:	B
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2035 Future Total P.M.

4: West Street North & Highway 11 Eastbound

09-06-2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↖	↖	↖
Traffic Volume (vph)	235	170	247	891	722	145
Future Volume (vph)	235	170	247	891	722	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1736	1583	1787	1881	1863	1583
Flt Permitted	0.950		0.118			
Satd. Flow (perm)	1736	1583	222	1881	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		179				78
Link Speed (k/h)	50			60	60	
Link Distance (m)	214.0			160.8	176.6	
Travel Time (s)	15.4			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	2%	1%	1%	2%	2%
Adj. Flow (vph)	247	179	260	938	760	153
Shared Lane Traffic (%)						
Lane Group Flow (vph)	247	179	260	938	760	153
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2035 Future Total P.M.

4: West Street North & Highway 11 Eastbound

09-06-2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	25.0	25.0	24.0	70.0	46.0	46.0
Total Split (%)	26.3%	26.3%	25.3%	73.7%	48.4%	48.4%
Maximum Green (s)	18.8	18.8	21.0	62.9	38.9	38.9
Yellow Time (s)	4.5	4.5	3.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	3.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	16.0	16.0	58.8	54.7	38.8	38.8
Actuated g/C Ratio	0.19	0.19	0.70	0.65	0.46	0.46
v/c Ratio	0.75	0.40	0.66	0.77	0.88	0.20
Control Delay	48.5	8.1	20.2	15.9	36.6	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.5	8.1	20.2	15.9	36.6	9.0
LOS	D	A	C	B	D	A
Approach Delay	31.6			16.8	32.0	
Approach LOS	C			B	C	
Queue Length 50th (m)	39.7	0.0	18.7	103.5	116.1	7.1
Queue Length 95th (m)	#78.2	17.4	44.6	161.8	#222.0	21.3
Internal Link Dist (m)	190.0			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	392	496	550	1422	873	783
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.36	0.47	0.66	0.87	0.20

Intersection Summary

Area Type:	Other
Cycle Length: 95	
Actuated Cycle Length: 84.1	
Natural Cycle: 70	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 24.8	Intersection LOS: C
Intersection Capacity Utilization 79.1%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



Lanes, Volumes, Timings

4: West Street North & Highway 11 Eastbound

2035 Future Total P.M.

09-06-2024

Splits and Phases: 4: West Street North & Highway 11 Eastbound

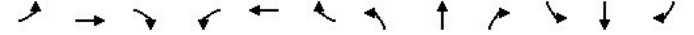


Lanes, Volumes, Timings

5: Highway 12 & West Ridge Boulevard/Murphy Road

2035 Future Total P.M.

09-06-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	272	307	285	499	290	221	272	872	591	111	722	191
Future Volume (vph)	272	307	285	499	290	221	272	872	591	111	722	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.98	1.00								
Frt			0.850		0.935				0.850			0.850
Frt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1900	1599	1787	1766	0	3502	3539	1599	1805	3505	1583
Frt Permitted	0.167			0.161			0.950			0.129		
Satd. Flow (perm)	314	1900	1575	303	1766	0	3502	3539	1599	245	3505	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			208		30				605			186
Link Speed (k/h)		50			70			50			50	
Link Distance (m)		186.6			853.6			529.0			469.5	
Travel Time (s)		13.4			43.9			38.1			33.8	
Confl. Peds. (#/hr)			2	2								
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	0%	1%	1%	1%	0%	0%	2%	1%	0%	3%	2%
Adj. Flow (vph)	289	327	303	531	309	235	289	928	629	118	768	203
Shared Lane Traffic (%)												
Lane Group Flow (vph)	289	327	303	531	544	0	289	928	629	118	768	203
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2035 Future Total P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-06-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	27.0	31.4	31.4	41.0	45.4		18.0	46.1	46.1	11.5	39.6	39.6
Total Split (%)	20.8%	24.2%	24.2%	31.5%	34.9%		13.8%	35.5%	35.5%	8.8%	30.5%	30.5%
Maximum Green (s)	22.0	24.2	24.2	36.0	38.2		14.0	38.1	38.1	7.5	31.6	31.6
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0			7.0	7.0			
Flash Dont Walk (s)					19.0			6.0	6.0			
Pedestrian Calls (#/hr)					0			0	0			
Act Effct Green (s)	45.7	24.0	24.0	65.6	38.9		13.5	36.8	36.8	42.4	30.9	30.9
Actuated g/C Ratio	0.36	0.19	0.19	0.52	0.31		0.11	0.29	0.29	0.33	0.24	0.24
v/c Ratio	0.85	0.91	0.65	0.95	0.97		0.78	0.91	0.70	0.68	0.90	0.39
Control Delay	56.8	81.3	22.9	60.2	73.0		70.9	56.7	8.4	46.0	61.9	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.8	81.3	22.9	60.2	73.0		70.9	56.7	8.4	46.0	61.9	9.5
LOS	E	F	C	E	E		E	E	A	D	E	A
Approach Delay		54.4			66.7			42.5			50.4	
Approach LOS		D			E			D			D	
Queue Length 50th (m)	55.0	87.6	22.7	117.7	~142.8		39.6	126.3	4.7	19.8	106.3	3.5
Queue Length 95th (m)	#98.9	#145.2	56.5	#188.6	#219.6		#58.7	#163.4	41.6	#39.6	#141.8	24.0
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	375	362	469	578	561		387	1064	904	174	873	534
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.90	0.65	0.92	0.97		0.75	0.87	0.70	0.68	0.88	0.38

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	127
Natural Cycle:	90
Control Type:	Semi Act-Uncoordinated
Maximum v/c Ratio:	0.97
Intersection Signal Delay:	51.7
Intersection LOS:	D
Intersection Capacity Utilization:	94.7%
ICU Level of Service:	F

Lanes, Volumes, Timings

2035 Future Total P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-06-2024

Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2035 Future Total P.M.  
09-06-2024

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Vol, veh/h	577	5	0	3	3	3	2	0	0	2	0	331
Future Vol, veh/h	577	5	0	3	3	3	2	0	0	2	0	331
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	18	25	0	0	100	0	0	0	0	0	0	27
Mvmt Flow	641	6	0	3	3	3	2	0	0	2	0	368

Major/Minor	Minor2	Minor1	Major1	Major2									
Conflicting Flow All	195	192	184	195	376	0	368	0	0	0	0	0	0
Stage 1	188	188	-	4	4	-	-	-	-	-	-	-	-
Stage 2	7	4	-	191	372	-	-	-	-	-	-	-	-
Critical Hdwy	7.28	6.75	6.2	7.1	7.5	6.2	4.1	-	-	4.1	-	-	-
Critical Hdwy Stg 1	6.28	5.75	-	6.1	6.5	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.28	5.75	-	6.1	6.5	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.662	4.225	3.3	3.5	4.9	3.3	2.2	-	-	2.2	-	-	-
Pot Cap-1 Maneuver	731	664	864	769	429	-	1202	-	-	-	-	-	-
Stage 1	778	703	-	1024	731	-	-	-	-	-	-	-	-
Stage 2	975	849	-	815	478	-	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	663	864	763	428	-	1202	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	663	-	763	428	-	-	-	-	-	-	-	-
Stage 1	776	703	-	1022	730	-	-	-	-	-	-	-	-
Stage 2	969	847	-	809	478	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			8	
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1202	-	-	-	-	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-	-	-	-	-
HCM Control Delay (s)	8	0	-	-	-	-	-	-
HCM Lane LOS	A	A	-	-	-	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2035 Future Total P.M.  
09-06-2024

Intersection												
Int Delay, s/veh	4.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Vol, veh/h	4	242	14	40	306	17	23	45	78	7	43	2
Future Vol, veh/h	4	242	14	40	306	17	23	45	78	7	43	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	0	1	0	0	0	0	0	20	0
Mvmt Flow	4	260	15	43	329	18	25	48	84	8	46	2

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	347	0	0	275	0	0	724	709	268	766	707	338
Stage 1	-	-	-	-	-	-	276	276	-	424	424	-
Stage 2	-	-	-	-	-	-	448	433	-	342	283	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.7	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.7	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4.18	3.3
Pot Cap-1 Maneuver	1223	-	-	1300	-	-	344	362	776	322	339	709
Stage 1	-	-	-	-	-	-	735	685	-	612	557	-
Stage 2	-	-	-	-	-	-	594	585	-	677	646	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1223	-	-	1300	-	-	295	346	776	248	324	709
Mov Cap-2 Maneuver	-	-	-	-	-	-	295	346	-	248	324	-
Stage 1	-	-	-	-	-	-	732	682	-	610	534	-
Stage 2	-	-	-	-	-	-	519	561	-	559	643	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.9	16.3	18.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	473	1223	-	-	1300	-	-	318
HCM Lane V/C Ratio	0.332	0.004	-	-	0.033	-	-	0.176
HCM Control Delay (s)	16.3	8	0	-	7.9	0	-	18.7
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.4	0	-	-	0.1	-	-	0.6

Lanes, Volumes, Timings

2035 Future Total P.M.

8: Burnside Line & Division Road W

09-06-2024

	↖	→	↘	↙	←	↖	↙	↑	↘	↙	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕				↕			↕	
Traffic Volume (vph)	13	153	166	23	117	3	218	182	68	5	95	28
Future Volume (vph)	13	153	166	23	117	3	218	182	68	5	95	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932		0.997		0.980		0.977		0.970		0.998	
Flt Protected	0.998		0.992		0.977		0.998					
Satd. Flow (prot)	0	1742	0	0	1849	0	0	1793	0	0	1571	0
Flt Permitted	0.985		0.907		0.786		0.986					
Satd. Flow (perm)	0	1720	0	0	1690	0	0	1443	0	0	1552	0
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	99		2		22		30					
Link Speed (k/h)	50		50		50		50					
Link Distance (m)	1346.1		271.7		1953.3		357.4					
Travel Time (s)	96.9		19.6		140.6		25.7					
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	1%	0%	2%	0%	1%	1%	4%	0%	23%	0%
Adj. Flow (vph)	14	163	177	24	124	3	232	194	72	5	101	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	354	0	0	151	0	0	498	0	0	136	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0		0.0		3.6		3.6		0.0		3.6	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100		100		100		100		100		100	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4		8		2		6		6		6	
Permitted Phases	4		8		2		6		6		6	
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												

Lanes, Volumes, Timings

2035 Future Total P.M.

8: Burnside Line & Division Road W

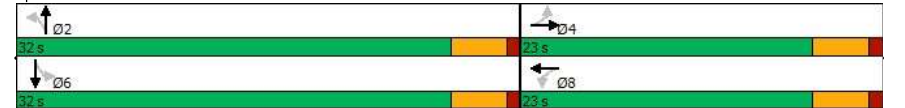
09-06-2024

	↖	→	↘	↙	←	↖	↙	↑	↘	↙	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		32.0	32.0		32.0	32.0	
Total Split (%)	41.8%	41.8%		41.8%	41.8%		58.2%	58.2%		58.2%	58.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5		27.5	27.5		27.5	27.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Total Lost Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	12.6		12.6		28.0		28.0		28.0		28.0	
Actuated g/C Ratio	0.25		0.25		0.56		0.56		0.56		0.56	
v/c Ratio	0.69		0.35		0.61		0.15		0.15		0.15	
Control Delay	19.3		16.7		12.0		5.8		5.8		5.8	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	19.3		16.7		12.0		5.8		5.8		5.8	
LOS	B		B		B		A		A		A	
Approach Delay	19.3		16.7		12.0		5.8		5.8		5.8	
Approach LOS	B		B		B		A		A		A	
Queue Length 50th (m)	20.3		11.1		25.0		4.0		4.0		4.0	
Queue Length 95th (m)	42.2		23.0		65.3		13.0		13.0		13.0	
Internal Link Dist (m)	1322.1		247.7		1929.3		333.4		333.4		333.4	
Turn Bay Length (m)												
Base Capacity (vph)	707		635		823		888		888		888	
Starvation Cap Reductn	0		0		0		0		0		0	
Spillback Cap Reductn	0		0		0		0		0		0	
Storage Cap Reductn	0		0		0		0		0		0	
Reduced v/c Ratio	0.50		0.24		0.61		0.15		0.15		0.15	

Intersection Summary

Area Type:	Other
Cycle Length:	55
Actuated Cycle Length:	49.6
Natural Cycle:	55
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.69
Intersection Signal Delay:	14.1
Intersection LOS:	B
Intersection Capacity Utilization:	64.2%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 8: Burnside Line & Division Road W



HCM 2010 TWSC  
9: Industrial Road & Hurlwood Lane

2035 Future Total P.M.  
09-06-2024

Intersection						
Int Delay, s/veh	3.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔		↔	↔
Traffic Vol, veh/h	0	150	498	130	163	0
Future Vol, veh/h	0	150	498	130	163	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	163	541	141	177	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	682	0	0	775	612	
Stage 1	-	-	-	612	-	
Stage 2	-	-	-	163	-	
Critical Hdwy	4.12	-	-	6.42	6.22	
Critical Hdwy Stg 1	-	-	-	5.42	-	
Critical Hdwy Stg 2	-	-	-	5.42	-	
Follow-up Hdwy	2.218	-	-	3.518	3.318	
Pot Cap-1 Maneuver	911	-	-	366	493	
Stage 1	-	-	-	541	-	
Stage 2	-	-	-	866	-	
Platoon blocked, %	-	-	-	-	-	
Mov Cap-1 Maneuver	911	-	-	366	493	
Mov Cap-2 Maneuver	-	-	-	452	-	
Stage 1	-	-	-	541	-	
Stage 2	-	-	-	866	-	
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	18			
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	911	-	-	-	452	-
HCM Lane V/C Ratio	-	-	-	-	0.392	-
HCM Control Delay (s)	0	-	-	-	18	0
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0	-	-	-	1.8	-

HCM 2010 TWSC  
10: Uthoff Line & Industrial Road

2035 Future Total P.M.  
09-06-2024

Intersection						
Int Delay, s/veh	7.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	199	36	387	193	23	138
Future Vol, veh/h	199	36	387	193	23	138
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	216	39	421	210	25	150
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	726	526	0	0	631	0
Stage 1	526	-	-	-	-	-
Stage 2	200	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	391	552	-	-	951	-
Stage 1	593	-	-	-	-	-
Stage 2	834	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	380	552	-	-	951	-
Mov Cap-2 Maneuver	380	-	-	-	-	-
Stage 1	593	-	-	-	-	-
Stage 2	810	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	28.7	0	1.3			
HCM LOS	D					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	399	951	-	-
HCM Lane V/C Ratio	-	-	0.64	0.026	-	-
HCM Control Delay (s)	-	-	28.7	8.9	0	-
HCM Lane LOS	-	-	D	A	A	-
HCM 95th %tile Q(veh)	-	-	4.3	0.1	-	-

HCM 2010 TWSC  
11: Uthoff Line & North Site Access 1

2035 Future Total P.M.  
09-06-2024

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	22	12	164	36	18	107
Future Vol, veh/h	22	12	164	36	18	107
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	13	178	39	20	116
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	354	198	0	0	217	0
Stage 1	198	-	-	-	-	-
Stage 2	156	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	644	843	-	-	1353	-
Stage 1	835	-	-	-	-	-
Stage 2	872	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	634	843	-	-	1353	-
Mov Cap-2 Maneuver	634	-	-	-	-	-
Stage 1	835	-	-	-	-	-
Stage 2	858	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	10.5	0	1.1			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	695	1353	-	
HCM Lane V/C Ratio	-	-	0.053	0.014	-	
HCM Control Delay (s)	-	-	10.5	7.7	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	

HCM 2010 TWSC  
12: Uthoff Line & North Site Access 2

2035 Future Total P.M.  
09-06-2024

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	22	0	199	36	0	129
Future Vol, veh/h	22	0	199	36	0	129
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	0	216	39	0	140
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	376	236	0	0	255	0
Stage 1	236	-	-	-	-	-
Stage 2	140	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	625	803	-	-	1310	-
Stage 1	803	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	625	803	-	-	1310	-
Mov Cap-2 Maneuver	625	-	-	-	-	-
Stage 1	803	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	11	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	625	1310	-	
HCM Lane V/C Ratio	-	-	0.038	-	-	
HCM Control Delay (s)	-	-	11	0	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

HCM 2010 TWSC  
13: Uthoff Line & South Site Access

2035 Future Total P.M.  
09-06-2024

Intersection						
Int Delay, s/veh	1.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	56	12	224	162	18	133
Future Vol, veh/h	56	12	224	162	18	133
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	61	13	243	176	20	145
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	516	331	0	0	419	0
Stage 1	331	-	-	-	-	-
Stage 2	185	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	519	711	-	-	1140	-
Stage 1	728	-	-	-	-	-
Stage 2	847	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	509	711	-	-	1140	-
Mov Cap-2 Maneuver	509	-	-	-	-	-
Stage 1	728	-	-	-	-	-
Stage 2	831	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.8	0	1			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	536	1140	-	
HCM Lane V/C Ratio	-	-	0.138	0.017	-	
HCM Control Delay (s)	-	-	12.8	8.2	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-	

Lanes, Volumes, Timings  
1: Burnside Line & Industrial Road/Brodie Drive

2040 Future Total A.M.  
09-26-2024

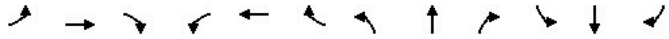
Lane Group												
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	48	30	318	261	6	44	364	319	94	42	278	47
Future Volume (vph)	48	30	318	261	6	44	364	319	94	42	278	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5		7.5			7.5			7.5			0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1615	1736	1900	1615	1805	1439	1468	1805	1520	0
Flt Permitted	0.753			0.580			0.316			0.551		
Satd. Flow (perm)	1431	1900	1615	1060	1900	1615	600	1439	1468	1047	1520	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)			349			200		200		10		
Link Speed (k/h)		50			60			60			60	
Link Distance (m)		140.4			136.5			65.5			1953.3	
Travel Time (s)		10.1			8.2			3.9			117.2	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	4%	0%	0%	0%	32%	10%	0%	26%	0%
Adj. Flow (vph)	53	33	349	287	7	48	400	351	103	46	305	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	33	349	287	7	48	400	351	103	46	357	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2040 Future Total A.M.

1: Burnside Line & Industrial Road/Brodie Drive

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	9.6	21.0	21.0	15.0	26.4	26.4	19.0	44.5	44.5	9.5	35.0	
Total Split (%)	10.7%	23.3%	23.3%	16.7%	29.3%	29.3%	21.1%	49.4%	49.4%	10.6%	38.9%	
Maximum Green (s)	5.1	15.0	15.0	10.5	20.4	20.4	14.5	38.5	38.5	5.0	29.0	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	21.6	15.0	15.0	31.2	24.0	24.0	47.1	40.0	40.0	33.1	26.6	
Actuated g/C Ratio	0.25	0.17	0.17	0.36	0.27	0.27	0.54	0.46	0.46	0.38	0.30	
v/c Ratio	0.14	0.10	0.62	0.63	0.01	0.08	0.76	0.53	0.13	0.10	0.76	
Control Delay	20.7	32.3	9.2	29.3	27.0	0.3	23.4	21.9	0.4	11.3	38.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.7	32.3	9.2	29.3	27.0	0.3	23.4	21.9	0.4	11.3	38.7	
LOS	C	C	A	C	C	A	C	C	A	B	D	
Approach Delay		12.4			25.2			20.0			35.6	
Approach LOS		B			C			C			D	
Queue Length 50th (m)	5.9	4.9	0.0	37.1	0.9	0.0	39.4	47.0	0.0	3.6	55.3	
Queue Length 95th (m)	14.5	13.5	24.1	64.0	4.6	0.0	#65.8	75.3	0.0	8.6	#89.6	
Internal Link Dist (m)		116.4			112.5			41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0		65.0	40.0		
Base Capacity (vph)	376	326	566	460	522	589	523	672	792	440	512	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.10	0.62	0.62	0.01	0.08	0.76	0.52	0.13	0.10	0.70	

Intersection Summary

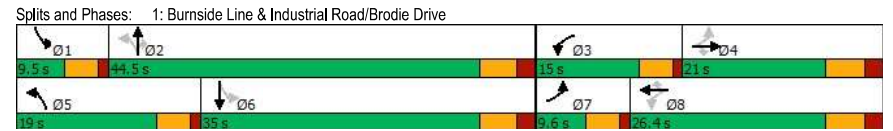
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	87.3
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.76
Intersection Signal Delay:	22.3
Intersection LOS:	C
Intersection Capacity Utilization:	75.9%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings

2040 Future Total A.M.

1: Burnside Line & Industrial Road/Brodie Drive

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Lanes, Volumes, Timings

2040 Future Total A.M.

2: Burnside Line & Highway 11 Westbound On-Ramp

09-26-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group						
Lane Configurations				↑	↑	↑
Traffic Volume (vph)	0	0	0	1143	473	375
Future Volume (vph)	0	0	0	1143	473	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1638	1810	1214
Flt Permitted						
Satd. Flow (perm)	0	0	0	1638	1810	1214
Link Speed (k/h)	50			70	60	
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			2.6	10.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	16%	5%	33%
Adj. Flow (vph)	0	0	0	1203	498	395
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1203	498	395
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	63.5%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings

2040 Future Total A.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group						
Lane Configurations	↓	↑	↑	↑		↑
Traffic Volume (vph)	183	274	869	205	0	473
Future Volume (vph)	183	274	869	205	0	473
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1787	1583	1638	1509	0	1810
Flt Permitted	0.950					
Satd. Flow (perm)	1787	1583	1638	1509	0	1810
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)			163	216		
Link Speed (k/h)	50		60			60
Link Distance (m)	241.7		160.3			51.5
Travel Time (s)	17.4		9.6			3.1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	16%	7%	0%	5%
Adj. Flow (vph)	193	288	915	216	0	498
Shared Lane Traffic (%)						
Lane Group Flow (vph)	193	288	915	216	0	498
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2040 Future Total A.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	9.7	9.7	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.6	17.6	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.9	1.9	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.4	6.4	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	13.6	13.6	44.7	44.7		44.7
Actuated g/C Ratio	0.19	0.19	0.62	0.62		0.62
v/c Ratio	0.58	0.67	0.91	0.21		0.45
Control Delay	36.6	22.1	26.9	1.5		8.8
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	36.6	22.1	26.9	1.5		8.8
LOS	D	C	C	A		A
Approach Delay	27.9		22.0			8.8
Approach LOS	C		C			A
Queue Length 50th (m)	28.4	17.8	99.7	0.0		32.9
Queue Length 95th (m)	50.8	45.5	#215.3	7.4		58.9
Internal Link Dist (m)	217.7		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	450	521	1243	1198		1374
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.43	0.55	0.74	0.18		0.36

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	72.5
Natural Cycle:	70
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.91
Intersection Signal Delay:	20.3
Intersection LOS:	C
Intersection Capacity Utilization:	74.1%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings

2040 Future Total A.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2040 Future Total A.M.

4: West Street North & Highway 11 Eastbound

09-26-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↶	↷	↶	↷	↷	↷
Traffic Volume (vph)	339	143	119	731	583	73
Future Volume (vph)	339	143	119	731	583	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1327	1524	1787	1827	1845	1442
Flt Permitted	0.950		0.181			
Satd. Flow (perm)	1327	1524	340	1827	1845	1442
Right Turn on Red		Yes			Yes	
Satd. Flow (RTOR)		151			49	
Link Speed (k/h)	50			60	60	
Link Distance (m)	214.0			160.8	176.6	
Travel Time (s)	15.4			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	36%	6%	1%	4%	3%	12%
Adj. Flow (vph)	357	151	125	769	614	77
Shared Lane Traffic (%)						
Lane Group Flow (vph)	357	151	125	769	614	77
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2040 Future Total A.M.

4: West Street North & Highway 11 Eastbound

09-26-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	38.0	38.0	10.0	52.0	42.0	42.0
Total Split (%)	42.2%	42.2%	11.1%	57.8%	46.7%	46.7%
Maximum Green (s)	31.8	31.8	8.0	44.9	34.9	34.9
Yellow Time (s)	4.5	4.5	2.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	2.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	25.7	25.7	43.4	38.0	30.8	30.8
Actuated g/C Ratio	0.33	0.33	0.56	0.49	0.40	0.40
v/c Ratio	0.82	0.25	0.37	0.86	0.84	0.13
Control Delay	41.6	4.9	12.3	29.8	35.4	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.6	4.9	12.3	29.8	35.4	9.1
LOS	D	A	B	C	D	A
Approach Delay	30.7			27.3	32.5	
Approach LOS	C			C	C	
Queue Length 50th (m)	56.7	0.0	9.3	106.6	94.4	2.9
Queue Length 95th (m)	#101.2	12.4	18.7	#189.8	#163.4	12.0
Internal Link Dist (m)	190.0			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	571	742	346	1111	872	708
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.20	0.36	0.69	0.70	0.11
Intersection Summary						
Area Type:	Other					
Cycle Length: 90						
Actuated Cycle Length: 77.7						
Natural Cycle: 80						
Control Type: Semi Act-Uncoord						
Maximum v/c Ratio: 0.86						
Intersection Signal Delay: 29.9				Intersection LOS: C		
Intersection Capacity Utilization 70.5%				ICU Level of Service C		
Analysis Period (min) 15						
# 95th percentile volume exceeds capacity, queue may be longer.						
Queue shown is maximum after two cycles.						

Lanes, Volumes, Timings

4: West Street North & Highway 11 Eastbound

2040 Future Total A.M.

09-26-2024

Splits and Phases: 4: West Street North & Highway 11 Eastbound

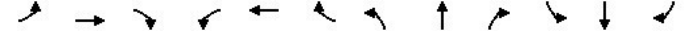


Lanes, Volumes, Timings

5: Highway 12 & West Ridge Boulevard/Murphy Road

2040 Future Total A.M.

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↗	↖	↕	↗	↕	↕	↗	↖	↕	↗
Traffic Volume (vph)	149	201	180	382	313	170	201	504	478	119	820	235
Future Volume (vph)	149	201	180	382	313	170	201	504	478	119	820	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.95	1.00	1.00
Frt			0.850		0.947				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1583	1787	1765	0	3467	3574	1568	1736	3471	1568
Flt Permitted	0.231			0.484			0.950			0.389		
Satd. Flow (perm)	435	1881	1583	910	1765	0	3467	3574	1568	711	3471	1568
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)			186		27				493			187
Link Speed (k/h)		60			60			70				70
Link Distance (m)		186.6			853.6			529.0				469.5
Travel Time (s)		11.2			51.2			27.2				24.1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	2%	1%	3%	0%	1%	3%	4%	3%	4%	3%
Adj. Flow (vph)	154	207	186	394	323	175	207	520	493	123	845	242
Shared Lane Traffic (%)												
Lane Group Flow (vph)	154	207	186	394	498	0	207	520	493	123	845	242
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2				7.2
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	100		15	25		15	25		100
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	

Lanes, Volumes, Timings

2040 Future Total A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	12.0	39.0	39.0	17.0	44.0		12.0	42.0	42.0	12.0	42.0	42.0
Total Split (%)	10.9%	35.5%	35.5%	15.5%	40.0%		10.9%	38.2%	38.2%	10.9%	38.2%	38.2%
Maximum Green (s)	7.0	31.8	31.8	12.0	36.8		8.0	34.0	34.0	8.0	34.0	34.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0					7.0		7.0
Flash Dont Walk (s)					19.0					6.0		6.0
Pedestrian Calls (#/hr)					0					0		0
Act Effct Green (s)	36.5	27.2	27.2	46.6	32.2		8.1	29.6	29.6	41.3	29.4	29.4
Actuated g/C Ratio	0.36	0.27	0.27	0.46	0.32		0.08	0.29	0.29	0.41	0.29	0.29
v/c Ratio	0.61	0.41	0.33	0.75	0.86		0.75	0.50	0.61	0.33	0.84	0.41
Control Delay	30.0	33.7	6.1	31.3	47.0		65.1	31.8	6.3	19.8	42.5	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	33.7	6.1	31.3	47.0		65.1	31.8	6.3	19.8	42.5	10.1
LOS	C	C	A	C	D		E	C	A	B	D	B
Approach Delay		23.3			40.0			27.1			33.7	
Approach LOS		C			D			C			C	
Queue Length 50th (m)	19.2	36.5	0.0	57.7	95.1		23.2	48.5	0.0	15.3	89.0	8.6
Queue Length 95th (m)	33.3	59.1	16.6	#88.8	#152.7		#44.2	66.5	25.2	27.7	116.2	29.3
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	251	596	629	523	665		276	1212	857	373	1177	655
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.35	0.30	0.75	0.75		0.75	0.43	0.58	0.33	0.72	0.37

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	101.2
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.86
Intersection Signal Delay:	31.6
Intersection LOS:	C
Intersection Capacity Utilization:	86.5%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	

Lanes, Volumes, Timings

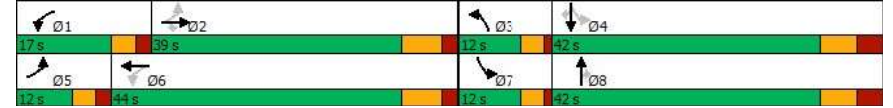
2040 Future Total A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024

Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2040 Future Total A.M.  
09-26-2024

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	322	5	2	0	11	0	0	0	0	0	0	306
Future Vol, veh/h	322	5	2	0	11	0	0	0	0	0	0	306
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	32	67	0	0	30	100	50	0	100	0	50	30
Mvmt Flow	350	5	2	0	12	0	0	0	0	0	0	333

Major/Minor	Minor2	Minor1	Major1	Major2								
Conflicting Flow All	173	167	167	170	333	0	333	0	0	0	0	0
Stage 1	167	167	-	0	0	-	-	-	-	-	-	-
Stage 2	6	0	-	170	333	-	-	-	-	-	-	-
Critical Hdwy	7.42	7.17	6.2	7.1	6.8	7.2	4.6	-	-	4.1	-	-
Critical Hdwy Stg 1	6.42	6.17	-	6.1	5.8	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.42	6.17	-	6.1	5.8	-	-	-	-	-	-	-
Follow-up Hdwy	3.788	4.603	3.3	3.5	4.27	4.2	2.65	-	-	2.2	-	-
Pot Cap-1 Maneuver	728	623	882	798	544	-	1001	-	-	-	-	-
Stage 1	769	652	-	-	-	-	-	-	-	-	-	-
Stage 2	943	-	-	837	597	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	623	882	791	544	-	1001	-	-	-	-	-
Mov Cap-2 Maneuver	-	623	-	791	544	-	-	-	-	-	-	-
Stage 1	769	652	-	-	-	-	-	-	-	-	-	-
Stage 2	943	-	-	828	597	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0	0
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1001	-	-	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	-	-	-
HCM Lane LOS	A	-	-	-	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2040 Future Total A.M.  
09-26-2024

Intersection												
Int Delay, s/veh	3.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	0	187	9	40	150	5	5	40	43	7	25	2
Future Vol, veh/h	0	187	9	40	150	5	5	40	43	7	25	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	2	0	0	1	0	0	25	3	0	11	0
Mvmt Flow	0	195	9	42	156	5	5	42	45	7	26	2

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	161	0	0	204	0	0	457	445	200	486	447	159
Stage 1	-	-	-	-	-	-	200	200	-	243	243	-
Stage 2	-	-	-	-	-	-	257	245	-	243	204	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.75	6.23	7.1	6.61	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.75	-	6.1	5.61	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.75	-	6.1	5.61	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.225	3.327	3.5	4.099	3.3
Pot Cap-1 Maneuver	1430	-	-	1380	-	-	517	475	838	495	493	892
Stage 1	-	-	-	-	-	-	806	695	-	765	688	-
Stage 2	-	-	-	-	-	-	752	663	-	765	716	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1430	-	-	1380	-	-	482	459	838	425	477	892
Mov Cap-2 Maneuver	-	-	-	-	-	-	482	459	-	425	477	-
Stage 1	-	-	-	-	-	-	806	695	-	765	665	-
Stage 2	-	-	-	-	-	-	697	641	-	681	716	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	12.2	13.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	591	1430	-	-	1380	-	-	478
HCM Lane V/C Ratio	0.155	-	-	-	0.03	-	-	0.074
HCM Control Delay (s)	12.2	0	-	-	7.7	0	-	13.1
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0.2

Lanes, Volumes, Timings

2040 Future Total A.M.

8: Burnside Line & Division Road W

09-26-2024



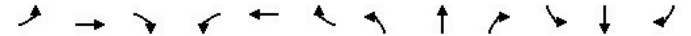
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕				↕			↕	
Traffic Volume (vph)	16	87	141	22	69	2	99	403	38	6	180	16
Future Volume (vph)	16	87	141	22	69	2	99	403	38	6	180	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.922		0.997		0.991		0.990		0.990		0.990	
Flt Protected	0.997		0.988		0.991		0.998		0.998		0.998	
Satd. Flow (prot)	0	1724	0	0	1872	0	0	1276	0	0	1299	0
Flt Permitted	0.975		0.854		0.903		0.985		0.985		0.985	
Satd. Flow (perm)	0	1686	0	0	1618	0	0	1162	0	0	1282	0
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	135		2		10		11		11		11	
Link Speed (k/h)	50		50		70		60		60		60	
Link Distance (m)	1346.1		271.7		1953.3		357.4		357.4		357.4	
Travel Time (s)	96.9		19.6		100.5		21.4		21.4		21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%	0%	62%	0%	0%	50%	0%
Adj. Flow (vph)	17	95	153	24	75	2	108	438	41	7	196	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	265	0	0	101	0	0	587	0	0	220	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0		0.0		3.6		3.6		3.6		3.6	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25		15		25		15	
Number of Detectors	1	2	1	2	1	2	1	2	1	2	1	2
Detector Template	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru
Leading Detector (m)	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		2		6		6		6	
Permitted Phases	4		8		2		6		6		6	
Detector Phase	4	4	8	8	2	2	6	6	6	6	6	6
Switch Phase												

Lanes, Volumes, Timings

2040 Future Total A.M.

8: Burnside Line & Division Road W

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%	58.2%	58.2%	58.2%	58.2%	58.2%	58.2%
Maximum Green (s)	18.5	18.5	18.5	18.5	18.5	18.5	27.5	27.5	27.5	27.5	27.5	27.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Total Lost Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	9.5		9.5		30.1		30.1		30.1		30.1	
Actuated g/C Ratio	0.20		0.20		0.62		0.62		0.62		0.62	
v/c Ratio	0.61		0.32		0.81		0.28		0.28		0.28	
Control Delay	14.5		17.6		21.9		6.1		6.1		6.1	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	14.5		17.6		21.9		6.1		6.1		6.1	
LOS	B		B		C		A		A		A	
Approach Delay	14.5		17.6		21.9		6.1		6.1		6.1	
Approach LOS	B		B		C		A		A		A	
Queue Length 50th (m)	9.6		7.1		30.8		6.7		6.7		6.7	
Queue Length 95th (m)	25.7		16.7		#109.3		20.8		20.8		20.8	
Internal Link Dist (m)	1322.1		247.7		1929.3		333.4		333.4		333.4	
Turn Bay Length (m)												
Base Capacity (vph)	728		620		722		796		796		796	
Starvation Cap Reductn	0		0		0		0		0		0	
Spillback Cap Reductn	0		0		0		0		0		0	
Storage Cap Reductn	0		0		0		0		0		0	
Reduced v/c Ratio	0.36		0.16		0.81		0.28		0.28		0.28	
Intersection Summary												
Area Type:	Other											
Cycle Length:	55											
Actuated Cycle Length:	48.7											
Natural Cycle:	65											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.81											
Intersection Signal Delay:	16.9						Intersection LOS: B					
Intersection Capacity Utilization:	66.1%						ICU Level of Service C					
Analysis Period (min):	15											
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

Lanes, Volumes, Timings  
8: Burnside Line & Division Road W

2040 Future Total A.M.  
09-26-2024

Splits and Phases: 8: Burnside Line & Division Road W



HCM 2010 TWSC  
9: Industrial Road & Hurlwood Lane

2040 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	3.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔
Traffic Vol, veh/h	0	174	330	86	191	0
Future Vol, veh/h	0	174	330	86	191	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	189	359	93	208	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	452	0	0 595 406
Stage 1	-	-	- 406 -
Stage 2	-	-	- 189 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1109	-	- 467 645
Stage 1	-	-	- 673 -
Stage 2	-	-	- 843 -
Platoon blocked, %	-	-	- -
Mov Cap-1 Maneuver	1109	-	- 467 645
Mov Cap-2 Maneuver	-	-	- 548 -
Stage 1	-	-	- 673 -
Stage 2	-	-	- 843 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	15.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1109	-	-	-	548	-
HCM Lane V/C Ratio	-	-	-	-	0.379	-
HCM Control Delay (s)	0	-	-	-	15.5	0
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0	-	-	-	1.8	-



HCM 2010 TWSC  
10: Uthoff Line & Industrial Road

2040 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	4.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	159	12	159	189	34	177
Future Vol, veh/h	159	12	159	189	34	177
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	13	173	205	37	192

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	542	276	0	0	378
Stage 1	276	-	-	-	-
Stage 2	266	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	501	763	-	-	1180
Stage 1	771	-	-	-	-
Stage 2	779	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	483	763	-	-	1180
Mov Cap-2 Maneuver	483	-	-	-	-
Stage 1	771	-	-	-	-
Stage 2	752	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16	0	1.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	483	763	1180
HCM Lane V/C Ratio	-	-	0.358	0.017	0.031
HCM Control Delay (s)	-	-	16.5	9.8	8.1
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.6	0.1	0.1

HCM 2010 TWSC  
11: Uthoff Line & North Site Access 1

2040 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	34	17	98	12	6	111
Future Vol, veh/h	34	17	98	12	6	111
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	18	107	13	7	121

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	249	114	0	0	120
Stage 1	114	-	-	-	-
Stage 2	135	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	739	939	-	-	1468
Stage 1	911	-	-	-	-
Stage 2	891	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	735	939	-	-	1468
Mov Cap-2 Maneuver	735	-	-	-	-
Stage 1	911	-	-	-	-
Stage 2	887	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.9	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	792	1468
HCM Lane V/C Ratio	-	-	0.07	0.004
HCM Control Delay (s)	-	-	9.9	7.5
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 2010 TWSC  
12: Uthoff Line & North Site Access 2

2040 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Vol, veh/h	34	0	110	12	0	145
Future Vol, veh/h	34	0	110	12	0	145
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	0	120	13	0	158
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	285	127	0	0	133	0
Stage 1	127	-	-	-	-	-
Stage 2	158	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	705	923	-	-	1452	-
Stage 1	899	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	705	923	-	-	1452	-
Mov Cap-2 Maneuver	705	-	-	-	-	-
Stage 1	899	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	10.4	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	705	1452	-	-
HCM Lane V/C Ratio	-	-	0.052	-	-	-
HCM Control Delay (s)	-	-	10.4	0	-	-
HCM Lane LOS	-	-	B	A	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-	-

HCM 2010 TWSC  
13: Uthoff Line & South Site Access

2040 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	2.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Vol, veh/h	85	17	104	51	6	173
Future Vol, veh/h	85	17	104	51	6	173
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	92	18	113	55	7	188
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	343	141	0	0	168	0
Stage 1	141	-	-	-	-	-
Stage 2	202	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	653	907	-	-	1410	-
Stage 1	886	-	-	-	-	-
Stage 2	832	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	649	907	-	-	1410	-
Mov Cap-2 Maneuver	649	-	-	-	-	-
Stage 1	886	-	-	-	-	-
Stage 2	827	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	11.3	0	0.3			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	681	1410	-	-
HCM Lane V/C Ratio	-	-	0.163	0.005	-	-
HCM Control Delay (s)	-	-	11.3	7.6	0	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.6	0	-	-

Lanes, Volumes, Timings

2040 Future Total P.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	41	405	454	2	114	319	340	103	49	268	24
Future Volume (vph)	74	41	405	454	2	114	319	340	103	49	268	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1568	1770	1900	1615	1805	1863	1429	1805	1747	0
Flt Permitted	0.757			0.568			0.355			0.529		
Satd. Flow (perm)	1438	1900	1568	1058	1900	1615	674	1863	1429	1005	1747	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			372			200			200		5	
Link Speed (k/h)	50			60			60			60		
Link Distance (m)	140.4			136.5			65.5			1953.3		
Travel Time (s)	10.1			8.2			3.9			117.2		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	3%	2%	0%	0%	0%	2%	13%	0%	8%	0%
Adj. Flow (vph)	79	44	431	483	2	121	339	362	110	52	285	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	44	431	483	2	121	339	362	110	52	311	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.6			3.6			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane	Yes											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Ch+Ex			Ch+Ex			Ch+Ex			Ch+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2040 Future Total P.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	10.4	21.0	21.0	21.5	32.1	32.1	15.0	38.0	38.0	9.5	32.5	
Total Split (%)	11.6%	23.3%	23.3%	23.9%	35.7%	35.7%	16.7%	42.2%	42.2%	10.6%	36.1%	
Maximum Green (s)	5.9	15.0	15.0	17.0	26.1	26.1	10.5	32.0	32.0	5.0	26.5	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	22.3	15.0	15.0	38.0	28.2	28.2	41.8	34.6	34.6	31.8	25.3	
Actuated g/C Ratio	0.25	0.17	0.17	0.43	0.32	0.32	0.47	0.39	0.39	0.36	0.28	
v/c Ratio	0.21	0.14	0.75	0.82	0.00	0.19	0.75	0.50	0.16	0.13	0.62	
Control Delay	18.3	32.9	16.0	34.1	22.5	1.0	28.3	24.6	0.5	14.2	33.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	18.3	32.9	16.0	34.1	22.5	1.0	28.3	24.6	0.5	14.2	33.4	
LOS	B	C	B	C	C	A	C	C	A	B	C	
Approach Delay		17.6			27.5			22.9			30.7	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	8.2	6.8	9.2	65.8	0.3	0.0	38.1	51.9	0.0	4.9	47.5	
Queue Length 95th (m)	17.2	16.6	#46.9	#119.4	2.0	1.6	#65.0	79.9	0.0	11.1	75.4	
Internal Link Dist (m)		116.4			112.5			41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0		65.0	40.0		
Base Capacity (vph)	387	321	573	589	603	649	451	738	687	404	524	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.20	0.14	0.75	0.82	0.00	0.19	0.75	0.49	0.16	0.13	0.59	
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	88.8											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.82											
Intersection Signal Delay:	24.0						Intersection LOS: C					
Intersection Capacity Utilization:	84.8%						ICU Level of Service E					
Analysis Period (min)	15											
#	95th percentile volume exceeds capacity, queue may be longer.											
	Queue shown is maximum after two cycles.											

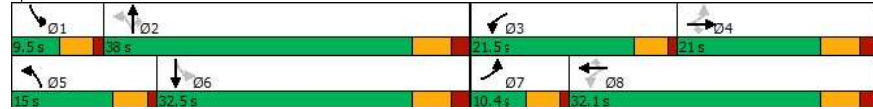
Lanes, Volumes, Timings

1: Burnside Line & Industrial Road/Brodie Drive

2040 Future Total P.M.

09-26-2024

Splits and Phases: 1: Burnside Line & Industrial Road/Brodie Drive



Lanes, Volumes, Timings

2: Burnside Line & Highway 11 Westbound On-Ramp

2040 Future Total P.M.

09-26-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑	↑
Traffic Volume (vph)	0	0	0	1138	707	391
Future Volume (vph)	0	0	0	1138	707	391
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1863	1863	1509
Flt Permitted						
Satd. Flow (perm)	0	0	0	1863	1863	1509
Link Speed (k/h)	50			50	50	
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			3.7	12.5	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	2%	2%	7%
Adj. Flow (vph)	0	0	0	1161	721	399
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1161	721	399
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Free			Free	Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	63.2%			ICU Level of Service B		
Analysis Period (min)	15					

Lanes, Volumes, Timings

2040 Future Total P.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↷	↩	↷	↶	↷
Traffic Volume (vph)	231	235	903	327	0	707
Future Volume (vph)	231	235	903	327	0	707
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1752	1599	1863	1615	0	1863
Flt Permitted	0.950					
Satd. Flow (perm)	1752	1599	1863	1615	0	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		160		334		
Link Speed (k/h)	50		60			60
Link Distance (m)	241.7		160.3			51.5
Travel Time (s)	17.4		9.6			3.1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	1%	2%	0%	0%	2%
Adj. Flow (vph)	236	240	921	334	0	721
Shared Lane Traffic (%)						
Lane Group Flow (vph)	236	240	921	334	0	721
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	0.0	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2040 Future Total P.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.9	17.9	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.6	1.6	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.1	6.1	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	14.3	14.3	38.5	38.5		38.5
Actuated g/C Ratio	0.21	0.21	0.57	0.57		0.57
v/c Ratio	0.63	0.51	0.86	0.31		0.67
Control Delay	35.3	14.7	21.4	1.6		13.3
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	35.3	14.7	21.4	1.6		13.3
LOS	D	B	C	A		B
Approach Delay	25.0		16.1			13.3
Approach LOS	C		B			B
Queue Length 50th (m)	28.8	8.9	88.3	0.0		57.0
Queue Length 95th (m)	61.6	33.4	158.6	8.8		99.5
Internal Link Dist (m)	217.7		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	496	567	1506	1370		1506
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.48	0.42	0.61	0.24		0.48

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	67
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.86
Intersection Signal Delay:	17.0
Intersection Capacity Utilization:	73.2%
Intersection LOS:	B
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2040 Future Total P.M.

4: West Street North & Highway 11 Eastbound

09-26-2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↖	↖	↖
Traffic Volume (vph)	255	187	272	972	784	156
Future Volume (vph)	255	187	272	972	784	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1736	1583	1787	1881	1863	1583
Flt Permitted	0.950		0.094			
Satd. Flow (perm)	1736	1583	177	1881	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		197				77
Link Speed (k/h)	50			60	60	
Link Distance (m)	214.0			160.8	176.6	
Travel Time (s)	15.4			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	2%	1%	1%	2%	2%
Adj. Flow (vph)	268	197	286	1023	825	164
Shared Lane Traffic (%)						
Lane Group Flow (vph)	268	197	286	1023	825	164
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2040 Future Total P.M.

4: West Street North & Highway 11 Eastbound

09-26-2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	25.0	25.0	24.0	70.0	46.0	46.0
Total Split (%)	26.3%	26.3%	25.3%	73.7%	48.4%	48.4%
Maximum Green (s)	18.8	18.8	21.0	62.9	38.9	38.9
Yellow Time (s)	4.5	4.5	3.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	3.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	16.8	16.8	60.6	56.5	39.5	39.5
Actuated g/C Ratio	0.19	0.19	0.70	0.65	0.46	0.46
v/c Ratio	0.80	0.42	0.75	0.84	0.97	0.21
Control Delay	53.1	8.1	29.8	19.6	51.2	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.1	8.1	29.8	19.6	51.2	9.9
LOS	D	A	C	B	D	A
Approach Delay	34.0			21.8	44.4	
Approach LOS	C			C	D	
Queue Length 50th (m)	44.7	0.0	29.9	130.4	~143.7	8.9
Queue Length 95th (m)	#88.7	18.1	57.1	198.1	#252.0	23.9
Internal Link Dist (m)	190.0			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	379	499	517	1375	848	763
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.39	0.55	0.74	0.97	0.21

Intersection Summary

Area Type:	Other
Cycle Length:	95
Actuated Cycle Length:	86.7
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.97
Intersection Signal Delay:	31.9
Intersection LOS:	C
Intersection Capacity Utilization:	84.9%
ICU Level of Service:	E
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings  
4: West Street North & Highway 11 Eastbound

2040 Future Total P.M.  
09-26-2024

Splits and Phases: 4: West Street North & Highway 11 Eastbound



Lanes, Volumes, Timings  
5: Highway 12 & West Ridge Boulevard/Murphy Road

2040 Future Total P.M.  
09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	299	331	315	535	310	234	300	963	622	117	797	211
Future Volume (vph)	299	331	315	535	310	234	300	963	622	117	797	211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.98	1.00								
Frt			0.850		0.935				0.850			0.850
Frt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1900	1599	1787	1766	0	3502	3539	1599	1805	3505	1583
Frt Permitted	0.165			0.137			0.950		0.126			
Satd. Flow (perm)	310	1900	1575	257	1766	0	3502	3539	1599	239	3505	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			195		30				595			186
Link Speed (k/h)		50			70			50			50	
Link Distance (m)		186.6			853.6			529.0			469.5	
Travel Time (s)		13.4			43.9			38.1			33.8	
Confl. Peds. (#/hr)			2	2								
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	0%	1%	1%	1%	0%	0%	2%	1%	0%	3%	2%
Adj. Flow (vph)	318	352	335	569	330	249	319	1024	662	124	848	224
Shared Lane Traffic (%)												
Lane Group Flow (vph)	318	352	335	569	579	0	319	1024	662	124	848	224
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2040 Future Total P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	27.0	31.4	31.4	41.0	45.4		18.0	46.1	46.1	11.5	39.6	39.6
Total Split (%)	20.8%	24.2%	24.2%	31.5%	34.9%		13.8%	35.5%	35.5%	8.8%	30.5%	30.5%
Maximum Green (s)	22.0	24.2	24.2	36.0	38.2		14.0	38.1	38.1	7.5	31.6	31.6
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0			7.0	7.0			
Flash Dont Walk (s)					19.0			6.0	6.0			
Pedestrian Calls (#/hr)					0			0	0			
Act Effct Green (s)	47.3	24.2	24.2	67.4	39.3		13.9	38.1	38.1	43.2	31.7	31.7
Actuated g/C Ratio	0.36	0.19	0.19	0.52	0.30		0.11	0.29	0.29	0.33	0.24	0.24
v/c Ratio	0.91	1.00	0.74	1.02	1.05		0.86	0.99	0.74	0.73	0.99	0.43
Control Delay	66.3	100.0	31.5	80.2	92.4		78.6	70.8	11.0	51.6	77.9	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.3	100.0	31.5	80.2	92.4		78.6	70.8	11.0	51.6	77.9	11.7
LOS	E	F	C	F	F		E	E	B	D	E	B
Approach Delay		66.5			86.3			52.3			62.8	
Approach LOS		E			F			D			E	
Queue Length 50th (m)	65.6	95.9	36.2	~145.0	~167.3		44.2	144.8	13.4	20.9	120.9	8.0
Queue Length 95th (m)	#118.1	#160.3	73.3	#218.3	#240.7		#68.8	#192.3	61.2	#44.3	#166.3	31.1
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	365	353	451	556	554		377	1037	889	169	855	527
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.87	1.00	0.74	1.02	1.05		0.85	0.99	0.74	0.73	0.99	0.43

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	130
Natural Cycle:	120
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.05
Intersection Signal Delay:	64.6
Intersection LOS:	E
Intersection Capacity Utilization:	100.4%
ICU Level of Service:	G

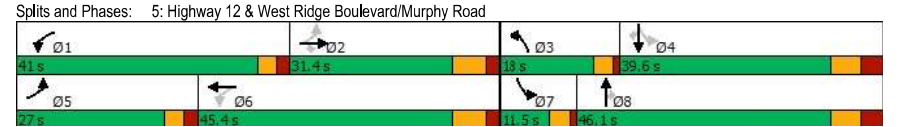
Lanes, Volumes, Timings

2040 Future Total P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024

Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.





HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2040 Future Total P.M.  
09-26-2024

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	592	6	0	3	3	3	2	0	0	2	0	340
Future Vol, veh/h	592	6	0	3	3	3	2	0	0	2	0	340
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	18	25	0	0	100	0	0	0	0	0	0	27
Mvmt Flow	658	7	0	3	3	3	2	0	0	2	0	378

Major/Minor	Minor2	Minor1	Major1	Major2									
Conflicting Flow All	200	197	189	201	386	0	378	0	0	0	0	0	0
Stage 1	193	193	-	4	4	-	-	-	-	-	-	-	-
Stage 2	7	4	-	197	382	-	-	-	-	-	-	-	-
Critical Hdwy	7.28	6.75	6.2	7.1	7.5	6.2	4.1	-	-	4.1	-	-	-
Critical Hdwy Stg 1	6.28	5.75	-	6.1	6.5	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.28	5.75	-	6.1	6.5	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.662	4.225	3.3	3.5	4.9	3.3	2.2	-	-	2.2	-	-	-
Pot Cap-1 Maneuver	725	660	858	762	423	-	1192	-	-	-	-	-	-
Stage 1	773	700	-	1024	731	-	-	-	-	-	-	-	-
Stage 2	975	849	-	809	473	-	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	659	858	755	422	-	1192	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	659	-	755	422	-	-	-	-	-	-	-	-
Stage 1	771	700	-	1022	730	-	-	-	-	-	-	-	-
Stage 2	969	847	-	801	473	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			8	
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1192	-	-	-	-	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-	-	-	-	-
HCM Control Delay (s)	8	0	-	-	-	-	-	-
HCM Lane LOS	A	A	-	-	-	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2040 Future Total P.M.  
09-26-2024

Intersection												
Int Delay, s/veh	4.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	5	267	16	44	338	18	25	47	86	7	43	2
Future Vol, veh/h	5	267	16	44	338	18	25	47	86	7	43	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	0	1	0	0	0	0	0	20	0
Mvmt Flow	5	287	17	47	363	19	27	51	92	8	46	2

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	382	0	0	304	0	0	797	782	296	844	781	373
Stage 1	-	-	-	-	-	-	306	306	-	467	467	-
Stage 2	-	-	-	-	-	-	491	476	-	377	314	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.7	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.7	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4.18	3.3
Pot Cap-1 Maneuver	1188	-	-	1268	-	-	307	328	748	285	306	678
Stage 1	-	-	-	-	-	-	708	665	-	580	533	-
Stage 2	-	-	-	-	-	-	563	560	-	649	625	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1188	-	-	1268	-	-	258	311	748	210	290	678
Mov Cap-2 Maneuver	-	-	-	-	-	-	258	311	-	210	290	-
Stage 1	-	-	-	-	-	-	704	662	-	577	508	-
Stage 2	-	-	-	-	-	-	486	534	-	523	622	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.9	18.5	20.9
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	435	1188	-	-	1268	-	-	282
HCM Lane V/C Ratio	0.391	0.005	-	-	0.037	-	-	0.198
HCM Control Delay (s)	18.5	8	0	-	7.9	0	-	20.9
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.8	0	-	-	0.1	-	-	0.7

Lanes, Volumes, Timings

2040 Future Total P.M.

8: Burnside Line & Division Road W

09-26-2024



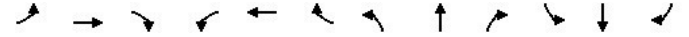
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕				↕			↕	
Traffic Volume (vph)	14	169	183	25	130	3	241	194	75	6	104	31
Future Volume (vph)	14	169	183	25	130	3	241	194	75	6	104	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932		0.998		0.980		0.977		0.970		0.998	
Flt Protected	0.998		0.992		0.977		0.998		0.998		0.998	
Satd. Flow (prot)	0	1742	0	0	1851	0	0	1793	0	0	1572	0
Flt Permitted	0.985		0.892		0.776		0.983		0.983		0.983	
Satd. Flow (perm)	0	1720	0	0	1664	0	0	1424	0	0	1548	0
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	99		2		23		33		33		33	
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	1346.1		271.7		1953.3		357.4		357.4		357.4	
Travel Time (s)	96.9		19.6		140.6		25.7		25.7		25.7	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	1%	0%	2%	0%	1%	1%	4%	0%	23%	0%
Adj. Flow (vph)	15	180	195	27	138	3	256	206	80	6	111	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	390	0	0	168	0	0	542	0	0	150	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0		0.0		3.6		3.6		3.6		3.6	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100		100		100		100		100		100	
Number of Detectors	1	2	1	2	1	2	1	2	1	2	1	2
Detector Template	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left	Thru
Leading Detector (m)	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		2		6		6		6	
Permitted Phases	4		8		2		6		6		6	
Detector Phase	4	4	8	8	2	2	6	6	6	6	6	6
Switch Phase												

Lanes, Volumes, Timings

2040 Future Total P.M.

8: Burnside Line & Division Road W

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%	41.8%
Maximum Green (s)	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Total Lost Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	13.4		13.4		27.7		27.7		27.7		27.7	
Actuated g/C Ratio	0.27		0.27		0.55		0.55		0.55		0.55	
v/c Ratio	0.73		0.38		0.68		0.17		0.17		0.17	
Control Delay	20.9		16.9		15.2		6.1		6.1		6.1	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	20.9		16.9		15.2		6.1		6.1		6.1	
LOS	C		B		B		A		A		A	
Approach Delay	20.9		16.9		15.2		6.1		6.1		6.1	
Approach LOS	C		B		B		A		A		A	
Queue Length 50th (m)	23.8		12.5		31.3		4.8		4.8		4.8	
Queue Length 95th (m)	48.4		25.3		#90.9		14.2		14.2		14.2	
Internal Link Dist (m)	1322.1		247.7		1929.3		333.4		333.4		333.4	
Turn Bay Length (m)												
Base Capacity (vph)	700		618		795		868		868		868	
Starvation Cap Reductn	0		0		0		0		0		0	
Spillback Cap Reductn	0		0		0		0		0		0	
Storage Cap Reductn	0		0		0		0		0		0	
Reduced v/c Ratio	0.56		0.27		0.68		0.17		0.17		0.17	
Intersection Summary												
Area Type:	Other											
Cycle Length:	55											
Actuated Cycle Length:	50.2											
Natural Cycle:	55											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.73											
Intersection Signal Delay:	16.1						Intersection LOS: B					
Intersection Capacity Utilization:	69.3%						ICU Level of Service C					
Analysis Period (min):	15											
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

Lanes, Volumes, Timings  
8: Burnside Line & Division Road W

2040 Future Total P.M.  
09-26-2024

Splits and Phases: 8: Burnside Line & Division Road W



HCM 2010 TWSC  
9: Industrial Road & Hurlwood Lane

2040 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	3.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔
Traffic Vol, veh/h	0	150	498	134	169	0
Future Vol, veh/h	0	150	498	134	169	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	163	541	146	184	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	687	0	-	0	777	614
Stage 1	-	-	-	-	614	-
Stage 2	-	-	-	-	163	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	907	-	-	-	365	492
Stage 1	-	-	-	-	540	-
Stage 2	-	-	-	-	866	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	907	-	-	-	365	492
Mov Cap-2 Maneuver	-	-	-	-	452	-
Stage 1	-	-	-	-	540	-
Stage 2	-	-	-	-	866	-
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	18.3			
HCM LOS			C			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	907	-	-	-	452	-
HCM Lane V/C Ratio	-	-	-	-	0.406	-
HCM Control Delay (s)	0	-	-	-	18.3	0
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0	-	-	-	1.9	-

HCM 2010 TWSC  
10: Uthoff Line & Industrial Road

2040 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	6.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	199	36	403	193	23	147
Future Vol, veh/h	199	36	403	193	23	147
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	216	39	438	210	25	160

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	753	543	0	0	648
Stage 1	543	-	-	-	-
Stage 2	210	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	377	540	-	-	938
Stage 1	582	-	-	-	-
Stage 2	825	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	366	540	-	-	938
Mov Cap-2 Maneuver	366	-	-	-	-
Stage 1	582	-	-	-	-
Stage 2	801	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.7	0	1.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	366	540	938
HCM Lane V/C Ratio	-	-	0.591	0.072	0.027
HCM Control Delay (s)	-	-	28.1	12.2	8.9
HCM Lane LOS	-	-	D	B	A
HCM 95th %tile Q(veh)	-	-	3.6	0.2	0.1

HCM 2010 TWSC  
11: Uthoff Line & North Site Access 1

2040 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	1.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	22	12	180	36	18	116
Future Vol, veh/h	22	12	180	36	18	116
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	13	196	39	20	126

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	382	216	0	0	235
Stage 1	216	-	-	-	-
Stage 2	166	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	620	824	-	-	1332
Stage 1	820	-	-	-	-
Stage 2	863	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	610	824	-	-	1332
Mov Cap-2 Maneuver	610	-	-	-	-
Stage 1	820	-	-	-	-
Stage 2	849	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.7	0	1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	672	1332
HCM Lane V/C Ratio	-	-	0.055	0.015
HCM Control Delay (s)	-	-	10.7	7.7
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 2010 TWSC  
12: Uthoff Line & North Site Access 2

2040 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Vol, veh/h	22	0	215	36	0	138
Future Vol, veh/h	22	0	215	36	0	138
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	0	234	39	0	150

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	404	254	0	0	273
Stage 1	254	-	-	-	-
Stage 2	150	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	603	785	-	-	1290
Stage 1	788	-	-	-	-
Stage 2	878	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	603	785	-	-	1290
Mov Cap-2 Maneuver	603	-	-	-	-
Stage 1	788	-	-	-	-
Stage 2	878	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	603	1290
HCM Lane V/C Ratio	-	-	0.04	-
HCM Control Delay (s)	-	-	11.2	0
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM 2010 TWSC  
13: Uthoff Line & South Site Access

2040 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Vol, veh/h	56	12	240	162	18	142
Future Vol, veh/h	56	12	240	162	18	142
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	61	13	261	176	20	154

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	543	349	0	0	437
Stage 1	349	-	-	-	-
Stage 2	194	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	501	694	-	-	1123
Stage 1	714	-	-	-	-
Stage 2	839	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	491	694	-	-	1123
Mov Cap-2 Maneuver	491	-	-	-	-
Stage 1	714	-	-	-	-
Stage 2	823	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.1	0	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	518	1123
HCM Lane V/C Ratio	-	-	0.143	0.017
HCM Control Delay (s)	-	-	13.1	8.3
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1

Lanes, Volumes, Timings

2045 Future Total A.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	30	321	288	7	49	368	352	104	46	307	49
Future Volume (vph)	49	30	321	288	7	49	368	352	104	46	307	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1615	1736	1900	1615	1805	1439	1468	1805	1520	0
Flt Permitted	0.752			0.580			0.278			0.533		
Satd. Flow (perm)	1429	1900	1615	1060	1900	1615	528	1439	1468	1013	1520	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			353			200			200		9	
Link Speed (k/h)	50			60			60			60		60
Link Distance (m)	140.4			136.5			65.5			1953.3		
Travel Time (s)	10.1			8.2			3.9			117.2		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	4%	0%	0%	0%	32%	10%	0%	26%	0%
Adj. Flow (vph)	54	33	353	316	8	54	404	387	114	51	337	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	33	353	316	8	54	404	387	114	51	391	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.6			3.6			3.6			3.6		3.6
Link Offset(m)	0.0			0.0			0.0			0.0		0.0
Crosswalk Width(m)	4.8			4.8			4.8			4.8		4.8
Two way Left Turn Lane	Yes											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2045 Future Total A.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	9.6	21.0	21.0	15.0	26.4	26.4	19.0	44.5	44.5	9.5	35.0	
Total Split (%)	10.7%	23.3%	23.3%	16.7%	29.3%	29.3%	21.1%	49.4%	49.4%	10.6%	38.9%	
Maximum Green (s)	5.1	15.0	15.0	10.5	20.4	20.4	14.5	38.5	38.5	5.0	29.0	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	21.6	15.0	15.0	31.5	24.3	24.3	47.7	40.6	40.6	33.7	27.2	
Actuated g/C Ratio	0.24	0.17	0.17	0.36	0.28	0.28	0.54	0.46	0.46	0.38	0.31	
v/c Ratio	0.15	0.10	0.62	0.69	0.02	0.09	0.82	0.58	0.15	0.12	0.82	
Control Delay	21.1	32.6	9.3	32.3	27.1	0.3	27.6	23.2	0.4	11.3	43.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.1	32.6	9.3	32.3	27.1	0.3	27.6	23.2	0.4	11.3	43.8	
LOS	C	C	A	C	C	A	C	C	A	B	D	
Approach Delay		12.5			27.6			22.3			40.0	
Approach LOS		B			C			C			D	
Queue Length 50th (m)	6.4	5.1	0.0	44.3	1.1	0.0	39.9	53.5	0.0	4.0	62.8	
Queue Length 95th (m)	14.6	13.5	24.2	#71.4	4.8	0.0	#75.7	85.6	0.3	9.3	#109.7	
Internal Link Dist (m)		116.4			112.5			41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0			65.0	40.0	
Base Capacity (vph)	371	323	567	458	524	590	495	665	786	431	505	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.15	0.10	0.62	0.69	0.02	0.09	0.82	0.58	0.15	0.12	0.77	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 88.2												
Natural Cycle: 90												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.82												
Intersection Signal Delay: 24.8							Intersection LOS: C					
Intersection Capacity Utilization 77.6%							ICU Level of Service D					
Analysis Period (min) 15												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

Lanes, Volumes, Timings

1: Burnside Line & Industrial Road/Brodie Drive

2045 Future Total A.M.

09-26-2024

Splits and Phases: 1: Burnside Line & Industrial Road/Brodie Drive



Lanes, Volumes, Timings

2: Burnside Line & Highway 11 Westbound On-Ramp

2045 Future Total A.M.

09-26-2024


	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group						
Lane Configurations				↑	↑	↑
Traffic Volume (vph)	0	0	0	1227	509	396
Future Volume (vph)	0	0	0	1227	509	396
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1638	1810	1214
Flt Permitted						
Satd. Flow (perm)	0	0	0	1638	1810	1214
Link Speed (k/h)	50			70	60	
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			2.6	10.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	16%	5%	33%
Adj. Flow (vph)	0	0	0	1292	536	417
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1292	536	417
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Free			Free	Free	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	67.9%			ICU Level of Service C		
Analysis Period (min)	15					

Lanes, Volumes, Timings

2045 Future Total A.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024


						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	202	282	946	226	0	509
Future Volume (vph)	202	282	946	226	0	509
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1787	1583	1638	1509	0	1810
Flt Permitted	0.950					
Satd. Flow (perm)	1787	1583	1638	1509	0	1810
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		136		238		
Link Speed (k/h)	50		60			60
Link Distance (m)	241.7		160.3			51.5
Travel Time (s)	17.4		9.6			3.1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	16%	7%	0%	5%
Adj. Flow (vph)	213	297	996	238	0	536
Shared Lane Traffic (%)						
Lane Group Flow (vph)	213	297	996	238	0	536
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2045 Future Total A.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	9.7	9.7	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.6	17.6	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.9	1.9	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.4	6.4	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	14.3	14.3	50.9	50.9		50.9
Actuated g/C Ratio	0.18	0.18	0.64	0.64		0.64
v/c Ratio	0.66	0.75	0.95	0.23		0.46
Control Delay	41.4	29.5	32.8	1.5		9.0
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	41.4	29.5	32.8	1.5		9.0
LOS	D	C	C	A		A
Approach Delay	34.5		26.8			9.0
Approach LOS	C		C			A
Queue Length 50th (m)	33.0	24.8	127.8	0.0		38.3
Queue Length 95th (m)	55.7	53.4	#246.2	7.7		65.2
Internal Link Dist (m)	217.7		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	403	462	1126	1112		1245
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.53	0.64	0.88	0.21		0.43
Intersection Summary						
Area Type:	Other					
Cycle Length:	85					
Actuated Cycle Length:	79.1					
Natural Cycle:	90					
Control Type:	Semi Act-Uncoord					
Maximum v/c Ratio:	0.95					
Intersection Signal Delay:	24.3			Intersection LOS: C		
Intersection Capacity Utilization:	78.7%			ICU Level of Service D		
Analysis Period (min)	15					
#	95th percentile volume exceeds capacity, queue may be longer.					
	Queue shown is maximum after two cycles.					



Lanes, Volumes, Timings  
3: Burnside Line & Highway 11 Westbound

2045 Future Total A.M.  
09-26-2024

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings  
4: West Street North & Highway 11 Eastbound

2045 Future Total A.M.  
09-26-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↗	↙	↕	↕	↗
Traffic Volume (vph)	372	158	131	797	633	78
Future Volume (vph)	372	158	131	797	633	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1327	1524	1787	1827	1845	1442
Flt Permitted	0.950		0.118			
Satd. Flow (perm)	1327	1524	222	1827	1845	1442
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		166				48
Link Speed (k/h)	50			60	60	
Link Distance (m)	214.0			160.8	176.6	
Travel Time (s)	15.4			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	36%	6%	1%	4%	3%	12%
Adj. Flow (vph)	392	166	138	839	666	82
Shared Lane Traffic (%)						
Lane Group Flow (vph)	392	166	138	839	666	82
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2045 Future Total A.M.

4: West Street North & Highway 11 Eastbound

09-26-2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	38.0	38.0	10.0	52.0	42.0	42.0
Total Split (%)	42.2%	42.2%	11.1%	57.8%	46.7%	46.7%
Maximum Green (s)	31.8	31.8	8.0	44.9	34.9	34.9
Yellow Time (s)	4.5	4.5	2.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	2.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	28.1	28.1	47.9	42.7	32.9	32.9
Actuated g/C Ratio	0.33	0.33	0.57	0.51	0.39	0.39
v/c Ratio	0.89	0.27	0.51	0.91	0.93	0.14
Control Delay	50.7	4.7	16.7	35.4	46.2	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.7	4.7	16.7	35.4	46.2	9.8
LOS	D	A	B	D	D	A
Approach Delay	37.0			32.7	42.2	
Approach LOS	D			C	D	
Queue Length 50th (m)	64.6	0.0	11.3	134.9	113.8	3.8
Queue Length 95th (m)	#116.1	13.0	21.6	#218.1	#184.8	13.0
Internal Link Dist (m)	190.0			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	507	685	276	986	774	632
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.24	0.50	0.85	0.86	0.13

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	84.3
Natural Cycle:	90
Control Type:	Semi Act-Uncooord
Maximum v/c Ratio:	0.93
Intersection Signal Delay:	36.9
Intersection LOS:	D
Intersection Capacity Utilization:	75.6%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

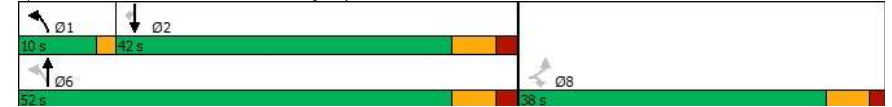
Lanes, Volumes, Timings

2045 Future Total A.M.

4: West Street North & Highway 11 Eastbound

09-26-2024

Splits and Phases: 4: West Street North & Highway 11 Eastbound



Lanes, Volumes, Timings

2045 Future Total A.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	164	218	199	406	334	180	222	557	508	127	905	260
Future Volume (vph)	164	218	199	406	334	180	222	557	508	127	905	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.95	1.00	1.00
Frt			0.850		0.947				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1583	1787	1765	0	3467	3574	1568	1736	3471	1568
Flt Permitted	0.184			0.458			0.950			0.349		
Satd. Flow (perm)	346	1881	1583	862	1765	0	3467	3574	1568	638	3471	1568
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)			205		27				514			187
Link Speed (k/h)		60			60			70				70
Link Distance (m)		186.6			853.6			529.0				469.5
Travel Time (s)		11.2			51.2			27.2				24.1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	2%	1%	3%	0%	1%	3%	4%	4%	3%	3%
Adj. Flow (vph)	169	225	205	419	344	186	229	574	524	131	933	268
Shared Lane Traffic (%)												
Lane Group Flow (vph)	169	225	205	419	530	0	229	574	524	131	933	268
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	100		15	25		15	25		100
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CH+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	

Lanes, Volumes, Timings

2045 Future Total A.M.

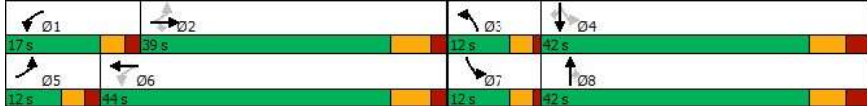
5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	12.0	39.0	39.0	17.0	44.0		12.0	42.0	42.0	12.0	42.0	42.0
Total Split (%)	10.9%	35.5%	35.5%	15.5%	40.0%		10.9%	38.2%	38.2%	10.9%	38.2%	38.2%
Maximum Green (s)	7.0	31.8	31.8	12.0	36.8		8.0	34.0	34.0	8.0	34.0	34.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0					7.0		7.0
Flash Dont Walk (s)					19.0					6.0		6.0
Pedestrian Calls (#/hr)					0					0		0
Act Effct Green (s)	37.8	28.6	28.6	47.9	33.6		8.1	32.0	32.0	43.6	31.7	31.7
Actuated g/C Ratio	0.36	0.27	0.27	0.46	0.32		0.08	0.31	0.31	0.42	0.30	0.30
v/c Ratio	0.76	0.44	0.35	0.84	0.91		0.86	0.53	0.63	0.38	0.89	0.44
Control Delay	43.6	34.8	6.0	38.9	53.7		78.6	32.6	6.7	20.9	46.7	12.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.6	34.8	6.0	38.9	53.7		78.6	32.6	6.7	20.9	46.7	12.2
LOS	D	C	A	D	D		E	C	A	C	D	B
Approach Delay		27.4			47.2			30.3			37.2	
Approach LOS		C			D			C			D	
Queue Length 50th (m)	22.0	41.0	0.0	64.5	107.0		26.9	56.0	1.6	17.0	104.4	13.3
Queue Length 95th (m)	#45.1	64.0	17.3	#109.8	#169.5		#50.5	73.7	29.0	29.5	#139.3	36.4
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	221	574	626	500	641		266	1167	858	351	1133	638
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.39	0.33	0.84	0.83		0.86	0.49	0.61	0.37	0.82	0.42
Intersection Summary												
Area Type:	Other											
Cycle Length:	110											
Actuated Cycle Length:	104.8											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.91											
Intersection Signal Delay:	35.9						Intersection LOS: D					
Intersection Capacity Utilization:	90.7%						ICU Level of Service E					
Analysis Period (min)	15											
# 95th percentile volume exceeds capacity, queue may be longer.												

Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔ ↔ ↔ ↔											
Traffic Vol, veh/h	331	5	2	0	13	0	0	0	0	0	0	317
Future Vol, veh/h	331	5	2	0	13	0	0	0	0	0	0	317
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	32	67	0	0	30	100	50	0	100	0	50	30
Mvmt Flow	360	5	2	0	14	0	0	0	0	0	0	345

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	180	173	173	176
Stage 1	173	173	-	0
Stage 2	7	0	-	176
Critical Hdwy	7.42	7.17	6.2	7.1
Critical Hdwy Stg 1	6.42	6.17	-	6.1
Critical Hdwy Stg 2	6.42	6.17	-	6.1
Follow-up Hdwy	3.788	4.603	3.3	3.5
Pot Cap-1 Maneuver	720	618	876	791
Stage 1	764	648	-	-
Stage 2	942	-	-	831
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	618	876	784
Mov Cap-2 Maneuver	-	618	-	784
Stage 1	764	648	-	-
Stage 2	942	-	-	822

Approach	EB	WB	NB	SB
HCM Control Delay, s	-	-	0	0
HCM LOS	-	-	-	-

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	990	-	-	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	-	0	-	-
HCM Lane LOS	A	-	-	-	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2045 Future Total A.M.  
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Intersection												
Int Delay, s/veh	3.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Vol, veh/h	0	207	10	44	166	5	5	41	47	8	26	2
Future Vol, veh/h	0	207	10	44	166	5	5	41	47	8	26	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	2	0	0	1	0	0	25	3	0	11	0
Mvmt Flow	0	216	10	46	173	5	5	43	49	8	27	2

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	178	0	0	226
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.1	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2
Pot Cap-1 Maneuver	1410	-	-	1354
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1410	-	-	1354
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	12.7	13.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	566	1410	-	-	1354	-	-	443
HCM Lane V/C Ratio	0.171	-	-	-	0.034	-	-	0.085
HCM Control Delay (s)	12.7	0	-	-	7.8	0	-	13.9
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.6	0	-	-	0.1	-	-	0.3

Lanes, Volumes, Timings  
8: Burnside Line & Division Road W

2045 Future Total A.M.  
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (vph)	17	96	155	25	76	2	110	420	41	7	196	17
Future Volume (vph)	17	96	155	25	76	2	110	420	41	7	196	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.922		0.998		0.990		0.990		0.990		0.990	
Flt Protected	0.997		0.988		0.990		0.990		0.998		0.998	
Satd. Flow (prot)	0	1724	0	0	1873	0	0	1279	0	0	1299	0
Flt Permitted	0.976		0.840		0.892		0.892		0.983		0.983	
Satd. Flow (perm)	0	1688	0	0	1593	0	0	1153	0	0	1279	0
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	136		2		10		11		11		11	
Link Speed (k/h)	50		50		70		60		60		60	
Link Distance (m)	1346.1		271.7		1953.3		357.4		357.4		357.4	
Travel Time (s)	96.9		19.6		100.5		21.4		21.4		21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%	0%	62%	0%	0%	50%	0%
Adj. Flow (vph)	18	104	168	27	83	2	120	457	45	8	213	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	290	0	0	112	0	0	622	0	0	239	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0		0.0		3.6		3.6		3.6		3.6	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15		25		15		25		15	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4		8		2		6		6		6	
Permitted Phases	4		8		2		6		6		6	
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												

Lanes, Volumes, Timings

2045 Future Total A.M.

8: Burnside Line & Division Road W

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		32.0	32.0		32.0	32.0	
Total Split (%)	41.8%	41.8%		41.8%	41.8%		58.2%	58.2%		58.2%	58.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5		27.5	27.5		27.5	27.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		10.1			10.1			29.4			29.4	
Actuated g/C Ratio		0.21			0.21			0.61			0.61	
v/c Ratio		0.63			0.34			0.89			0.31	
Control Delay		15.3			17.7			29.6			6.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		15.3			17.7			29.6			6.8	
LOS		B			B			C			A	
Approach Delay		15.3			17.7			29.6			6.8	
Approach LOS		B			B			C			A	
Queue Length 50th (m)		11.5			8.0			37.4			7.8	
Queue Length 95th (m)		28.9			18.1			#122.5			24.1	
Internal Link Dist (m)		1322.1			247.7			1929.3			333.4	
Turn Bay Length (m)												
Base Capacity (vph)		730			611			702			778	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.40			0.18			0.89			0.31	

Intersection Summary

Area Type:	Other
Cycle Length:	55
Actuated Cycle Length:	48.5
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.89
Intersection Signal Delay:	21.0
Intersection LOS:	C
Intersection Capacity Utilization:	70.1%
ICU Level of Service:	C
Analysis Period (min):	15
#	95th percentile volume exceeds capacity, queue may be longer.
	Queue shown is maximum after two cycles.

Lanes, Volumes, Timings

2045 Future Total A.M.

8: Burnside Line & Division Road W

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Splits and Phases: 8: Burnside Line & Division Road W



HCM 2010 TWSC  
9: Industrial Road & Hurlwood Lane

2045 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	3.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔		↔	↔
Traffic Vol, veh/h	0	174	330	92	194	0
Future Vol, veh/h	0	174	330	92	194	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	189	359	100	211	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	459	0	0	598	409
Stage 1	-	-	-	409	-
Stage 2	-	-	-	189	-
Critical Hdwy	4.12	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	1102	-	-	465	642
Stage 1	-	-	-	671	-
Stage 2	-	-	-	843	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1102	-	-	465	642
Mov Cap-2 Maneuver	-	-	-	546	-
Stage 1	-	-	-	671	-
Stage 2	-	-	-	843	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	15.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1102	-	-	-	546	-
HCM Lane V/C Ratio	-	-	-	-	0.386	-
HCM Control Delay (s)	0	-	-	-	15.7	0
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0	-	-	-	1.8	-

HCM 2010 TWSC  
10: Uthoff Line & Industrial Road

2045 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	4.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔		↔	↔
Traffic Vol, veh/h	159	12	168	189	34	188
Future Vol, veh/h	159	12	168	189	34	188
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	13	183	205	37	204

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	564	286	0	0	388
Stage 1	286	-	-	-	-
Stage 2	278	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	487	753	-	-	1170
Stage 1	763	-	-	-	-
Stage 2	769	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	469	753	-	-	1170
Mov Cap-2 Maneuver	469	-	-	-	-
Stage 1	763	-	-	-	-
Stage 2	741	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.6	0	1.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	469	753	1170	-
HCM Lane V/C Ratio	-	-	0.368	0.017	0.032	-
HCM Control Delay (s)	-	-	17.1	9.9	8.2	0
HCM Lane LOS	-	-	C	A	A	A
HCM 95th %tile Q(veh)	-	-	1.7	0.1	0.1	-

HCM 2010 TWSC  
11: Uthoff Line & North Site Access 1

2045 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	1.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	34	17	107	12	6	122
Future Vol, veh/h	34	17	107	12	6	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	18	116	13	7	133
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	270	123	0	0	129	0
Stage 1	123	-	-	-	-	-
Stage 2	147	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	719	928	-	-	1457	-
Stage 1	902	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	715	928	-	-	1457	-
Mov Cap-2 Maneuver	715	-	-	-	-	-
Stage 1	902	-	-	-	-	-
Stage 2	876	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	10	0	0.4			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	774	1457	-	-
HCM Lane V/C Ratio	-	-	0.072	0.004	-	-
HCM Control Delay (s)	-	-	10	7.5	0	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-	-

HCM 2010 TWSC  
12: Uthoff Line & North Site Access 2

2045 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	1.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	34	0	119	12	0	156
Future Vol, veh/h	34	0	119	12	0	156
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	0	129	13	0	170
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	306	136	0	0	142	0
Stage 1	136	-	-	-	-	-
Stage 2	170	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	686	913	-	-	1441	-
Stage 1	890	-	-	-	-	-
Stage 2	860	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	686	913	-	-	1441	-
Mov Cap-2 Maneuver	686	-	-	-	-	-
Stage 1	890	-	-	-	-	-
Stage 2	860	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	10.5	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	686	1441	-	-
HCM Lane V/C Ratio	-	-	0.054	-	-	-
HCM Control Delay (s)	-	-	10.5	0	-	-
HCM Lane LOS	-	-	B	A	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-	-



HCM 2010 TWSC  
13: Uthoff Line & South Site Access

2045 Future Total A.M.  
09-26-2024

Intersection						
Int Delay, s/veh	2.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	85	17	113	51	6	184
Future Vol, veh/h	85	17	113	51	6	184
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	92	18	123	55	7	200
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	365	151	0	0	178	0
Stage 1	151	-	-	-	-	-
Stage 2	214	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	635	895	-	-	1398	-
Stage 1	877	-	-	-	-	-
Stage 2	822	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	631	895	-	-	1398	-
Mov Cap-2 Maneuver	631	-	-	-	-	-
Stage 1	877	-	-	-	-	-
Stage 2	817	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	11.5	0	0.2			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	664	1398	-	
HCM Lane V/C Ratio	-	-	0.167	0.005	-	
HCM Control Delay (s)	-	-	11.5	7.6	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.6	0	-	

Lanes, Volumes, Timings  
1: Burnside Line & Industrial Road/Brodie Drive

2045 Future Total P.M.  
09-26-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	75	42	411	501	2	126	323	375	114	54	296	25
Future Volume (vph)	75	42	411	501	2	126	323	375	114	54	296	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		75.0	100.0		0.0	75.0		65.0	40.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1900	1568	1770	1900	1615	1805	1863	1429	1805	1748	0
Flt Permitted	0.757			0.567			0.309			0.447		
Satd. Flow (perm)	1438	1900	1568	1056	1900	1615	587	1863	1429	849	1748	0
Right Turn on Red			Yes			Yes		Yes				Yes
Satd. Flow (RTOR)			340			200		200				5
Link Speed (k/h)		50			60			60				60
Link Distance (m)		140.4			136.5			65.5				1953.3
Travel Time (s)		10.1			8.2			3.9				117.2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	3%	2%	0%	0%	0%	2%	13%	0%	8%	0%
Adj. Flow (vph)	80	45	437	533	2	134	344	399	121	57	315	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	80	45	437	533	2	134	344	399	121	57	342	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2	1	1	1	2
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	0.6	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	NA
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings

2045 Future Total P.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	9.5	21.0	21.0	9.5	21.0	21.0	9.5	31.0	31.0	9.5	31.0	
Total Split (s)	10.4	21.0	21.0	21.5	32.1	32.1	15.0	38.0	38.0	9.5	32.5	
Total Split (%)	11.6%	23.3%	23.3%	23.9%	35.7%	35.7%	16.7%	42.2%	42.2%	10.6%	36.1%	
Maximum Green (s)	5.9	15.0	15.0	17.0	26.1	26.1	10.5	32.0	32.0	5.0	26.5	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	Min	Min	None	Min	
Act Effct Green (s)	22.3	15.0	15.0	38.0	28.2	28.2	41.8	32.7	32.7	31.8	25.3	
Actuated g/C Ratio	0.25	0.17	0.17	0.43	0.32	0.32	0.47	0.37	0.37	0.36	0.28	
v/c Ratio	0.21	0.14	0.80	0.91	0.00	0.21	0.82	0.58	0.19	0.16	0.68	
Control Delay	18.3	33.0	21.3	43.7	22.5	1.7	34.4	27.5	0.9	14.6	35.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	18.3	33.0	21.3	43.7	22.5	1.7	34.4	27.5	0.9	14.6	35.8	
LOS	B	C	C	D	C	A	C	C	A	B	D	
Approach Delay		21.8			35.2			26.5			32.7	
Approach LOS		C			D			C			C	
Queue Length 50th (m)	8.3	6.9	15.5	75.5	0.3	0.0	38.8	58.7	0.0	5.4	53.5	
Queue Length 95th (m)	17.5	16.9	#64.8	#155.1	2.0	3.8	#74.5	89.2	1.4	12.0	83.8	
Internal Link Dist (m)		116.4			112.5			41.5			1929.3	
Turn Bay Length (m)	25.0		75.0	100.0			75.0		65.0	40.0		
Base Capacity (vph)	387	321	547	588	603	649	420	705	665	358	524	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.21	0.14	0.80	0.91	0.00	0.21	0.82	0.57	0.18	0.16	0.65	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	88.8
Natural Cycle:	90
Control Type:	Semi Act-Uncooord
Maximum v/c Ratio:	0.91
Intersection Signal Delay:	28.8
Intersection LOS:	C
Intersection Capacity Utilization:	87.8%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings

2045 Future Total P.M.

1: Burnside Line & Industrial Road/Brodie Drive

09-26-2024

Splits and Phases: 1: Burnside Line & Industrial Road/Brodie Drive



Lanes, Volumes, Timings

2045 Future Total P.M.

2: Burnside Line & Highway 11 Westbound On-Ramp

09-26-2024

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑	↑	↑
Traffic Volume (vph)	0	0	0	1226	765	410
Future Volume (vph)	0	0	0	1226	765	410
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	0	0	1863	1863	1509
Flt Permitted						
Satd. Flow (perm)	0	0	0	1863	1863	1509
Link Speed (k/h)	50			50	50	
Link Distance (m)	185.9			51.5	174.3	
Travel Time (s)	13.4			3.7	12.5	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	2%	2%	7%
Adj. Flow (vph)	0	0	0	1251	781	418
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1251	781	418
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100	100	100			100
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	67.9%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings

2045 Future Total P.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↓	↑	↑	↑		↑
Traffic Volume (vph)	255	245	982	361	0	765
Future Volume (vph)	255	245	982	361	0	765
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		80.0	0.0	
Storage Lanes	1	1		1	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950					
Satd. Flow (prot)	1752	1599	1863	1615	0	1863
Flt Permitted	0.950					
Satd. Flow (perm)	1752	1599	1863	1615	0	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		135		368		
Link Speed (k/h)	50		60			60
Link Distance (m)	241.7		160.3			51.5
Travel Time (s)	17.4		9.6			3.1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	1%	2%	0%	0%	2%
Adj. Flow (vph)	260	250	1002	368	0	781
Shared Lane Traffic (%)						
Lane Group Flow (vph)	260	250	1002	368	0	781
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1		2
Detector Template	Left	Right	Thru	Right		Thru
Leading Detector (m)	2.0	2.0	10.0	2.0		10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0		0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0		0.6
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0		0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm		NA
Protected Phases			6			2

Lanes, Volumes, Timings

2045 Future Total P.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	4		6		
Detector Phase	4	4	6	6		2
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0	20.0		20.0
Minimum Split (s)	16.1	16.1	27.3	27.3		27.3
Total Split (s)	24.0	24.0	61.0	61.0		61.0
Total Split (%)	28.2%	28.2%	71.8%	71.8%		71.8%
Maximum Green (s)	17.9	17.9	53.7	53.7		53.7
Yellow Time (s)	4.5	4.5	4.5	4.5		4.5
All-Red Time (s)	1.6	1.6	2.8	2.8		2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.1	6.1	7.3	7.3		7.3
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.2	3.2		3.2
Recall Mode	None	None	None	None		None
Act Effct Green (s)	15.3	15.3	44.5	44.5		44.5
Actuated g/C Ratio	0.21	0.21	0.60	0.60		0.60
v/c Ratio	0.72	0.57	0.89	0.33		0.70
Control Delay	41.9	19.7	24.4	1.6		13.9
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	41.9	19.7	24.4	1.6		13.9
LOS	D	B	C	A		B
Approach Delay	31.0		18.3			13.9
Approach LOS	C		B			B
Queue Length 50th (m)	39.8	16.1	120.1	0.0		74.6
Queue Length 95th (m)	#74.0	40.7	#222.8	9.2		114.4
Internal Link Dist (m)	217.7		136.3			27.5
Turn Bay Length (m)				80.0		
Base Capacity (vph)	443	505	1390	1298		1390
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.59	0.50	0.72	0.28		0.56

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	73.7
Natural Cycle:	70
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.89
Intersection Signal Delay:	19.4
Intersection LOS:	B
Intersection Capacity Utilization:	78.0%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

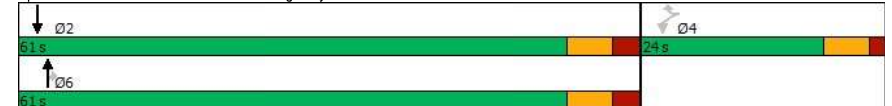
Lanes, Volumes, Timings

2045 Future Total P.M.

3: Burnside Line & Highway 11 Westbound

09-26-2024

Splits and Phases: 3: Burnside Line & Highway 11 Westbound



Lanes, Volumes, Timings

2045 Future Total P.M.

4: West Street North & Highway 11 Eastbound

09-26-2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↖	↖	↖
Traffic Volume (vph)	277	207	301	1063	854	169
Future Volume (vph)	277	207	301	1063	854	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	55.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1736	1583	1787	1881	1863	1583
Flt Permitted	0.950		0.092			
Satd. Flow (perm)	1736	1583	173	1881	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		218				76
Link Speed (k/h)	50			60	60	
Link Distance (m)	214.0			160.8	176.6	
Travel Time (s)	15.4			9.6	10.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	2%	1%	1%	2%	2%
Adj. Flow (vph)	292	218	317	1119	899	178
Shared Lane Traffic (%)						
Lane Group Flow (vph)	292	218	317	1119	899	178
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings

2045 Future Total P.M.

4: West Street North & Highway 11 Eastbound

09-26-2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	7.0	20.0	20.0	20.0
Minimum Split (s)	18.0	18.0	10.0	41.0	41.0	41.0
Total Split (s)	25.0	25.0	24.0	70.0	46.0	46.0
Total Split (%)	26.3%	26.3%	25.3%	73.7%	48.4%	48.4%
Maximum Green (s)	18.8	18.8	21.0	62.9	38.9	38.9
Yellow Time (s)	4.5	4.5	3.0	4.5	4.5	4.5
All-Red Time (s)	1.7	1.7	0.0	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	3.0	7.1	7.1	7.1
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.2	3.2	3.2
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	17.7	17.7	62.7	58.6	40.3	40.3
Actuated g/C Ratio	0.20	0.20	0.70	0.65	0.45	0.45
v/c Ratio	0.85	0.45	0.80	0.91	1.08	0.24
Control Delay	59.9	8.0	34.9	26.3	80.8	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	8.0	34.9	26.3	80.8	10.8
LOS	E	A	C	C	F	B
Approach Delay	37.7			28.2	69.2	
Approach LOS	D			C	E	
Queue Length 50th (m)	54.8	0.0	38.5	160.5	~191.6	11.1
Queue Length 95th (m)	#100.1	19.0	66.5	#278.9	#283.9	26.7
Internal Link Dist (m)	190.0			136.8	152.6	
Turn Bay Length (m)			55.0			40.0
Base Capacity (vph)	366	506	501	1328	835	752
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.43	0.63	0.84	1.08	0.24

Intersection Summary

Area Type:	Other
Cycle Length:	95
Actuated Cycle Length:	89.7
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.08
Intersection Signal Delay:	44.4
Intersection LOS:	D
Intersection Capacity Utilization:	91.4%
ICU Level of Service:	F
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Lanes, Volumes, Timings  
4: West Street North & Highway 11 Eastbound

2045 Future Total P.M.  
09-26-2024

Splits and Phases: 4: West Street North & Highway 11 Eastbound



Lanes, Volumes, Timings  
5: Highway 12 & West Ridge Boulevard/Murphy Road

2045 Future Total P.M.  
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷	↷	↶	↷	↷	↶	↷	↷	↶	↷	↷
Traffic Volume (vph)	329	357	348	576	332	250	331	1063	656	124	880	232
Future Volume (vph)	329	357	348	576	332	250	331	1063	656	124	880	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor			0.98									
Frt			0.850		0.936				0.850			0.850
Frt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1900	1599	1787	1768	0	3502	3539	1599	1805	3505	1583
Frt Permitted	0.165			0.137			0.950			0.127		
Satd. Flow (perm)	310	1900	1575	258	1768	0	3502	3539	1599	241	3505	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			193		30				587			186
Link Speed (k/h)		50			70			50			50	
Link Distance (m)		186.6			853.6			529.0			469.5	
Travel Time (s)		13.4			43.9			38.1			33.8	
Confl. Peds. (#/hr)			2	2								
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	0%	1%	1%	1%	0%	0%	2%	1%	0%	3%	2%
Adj. Flow (vph)	350	380	370	613	353	266	352	1131	698	132	936	247
Shared Lane Traffic (%)												
Lane Group Flow (vph)	350	380	370	613	619	0	352	1131	698	132	936	247
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2045 Future Total P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	27.0	31.4	31.4	41.0	45.4		18.0	46.1	46.1	11.5	39.6	39.6
Total Split (%)	20.8%	24.2%	24.2%	31.5%	34.9%		13.8%	35.5%	35.5%	8.8%	30.5%	30.5%
Maximum Green (s)	22.0	24.2	24.2	36.0	38.2		14.0	38.1	38.1	7.5	31.6	31.6
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0			7.0	7.0			
Flash Dont Walk (s)					19.0			6.0	6.0			
Pedestrian Calls (#/hr)					0			0	0			
Act Effct Green (s)	48.3	24.2	24.2	67.4	38.3		14.0	38.1	38.1	43.1	31.6	31.6
Actuated g/C Ratio	0.37	0.19	0.19	0.52	0.29		0.11	0.29	0.29	0.33	0.24	0.24
v/c Ratio	0.96	1.08	0.82	1.10	1.14		0.93	1.09	0.79	0.78	1.10	0.47
Control Delay	76.6	119.3	39.9	103.4	124.5		89.7	99.1	14.5	56.6	107.4	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.6	119.3	39.9	103.4	124.5		89.7	99.1	14.5	56.6	107.4	14.6
LOS	E	F	D	F	F		F	F	B	E	F	B
Approach Delay		79.0			114.0			70.5			84.9	
Approach LOS		E			F			E			F	
Queue Length 50th (m)	76.1	~113.8	48.0	~169.8	~189.9		49.2	~180.5	23.8	22.3	~150.3	13.0
Queue Length 95th (m)	#138.6	#177.7	#99.4	#244.4	#265.0		#79.2	#224.5	82.4	#49.5	#193.1	38.6
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	50.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	365	353	450	557	541		377	1037	883	170	851	525
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.96	1.08	0.82	1.10	1.14		0.93	1.09	0.79	0.78	1.10	0.47

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	130
Natural Cycle:	130
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.14
Intersection Signal Delay:	84.6
Intersection LOS:	F
Intersection Capacity Utilization:	107.4%
ICU Level of Service:	G

Lanes, Volumes, Timings

2045 Future Total P.M.

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-26-2024

Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



HCM 2010 TWSC  
6: Unthoff Line & Murphy Road

2045 Future Total P.M.  
09-26-2024

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	609	7	0	4	4	4	2	0	0	2	0	350
Future Vol, veh/h	609	7	0	4	4	4	2	0	0	2	0	350
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	18	25	0	0	100	0	0	0	0	0	0	27
Mvmt Flow	677	8	0	4	4	4	2	0	0	2	0	389

Major/Minor	Minor2		Minor1		Major1		Major2				
Conflicting Flow All	207	203	195	207	397	0	389	0	0	0	0
Stage 1	199	199	-	4	4	-	-	-	-	-	-
Stage 2	8	4	-	203	393	-	-	-	-	-	-
Critical Hdwy	7.28	6.75	6.2	7.1	7.5	6.2	4.1	-	-	4.1	-
Critical Hdwy Stg 1	6.28	5.75	-	6.1	6.5	-	-	-	-	-	-
Critical Hdwy Stg 2	6.28	5.75	-	6.1	6.5	-	-	-	-	-	-
Follow-up Hdwy	3.662	4.225	3.3	3.5	4.9	3.3	2.2	-	-	2.2	-
Pot Cap-1 Maneuver	717	654	851	755	416	-	1181	-	-	-	-
Stage 1	767	695	-	1024	731	-	-	-	-	-	-
Stage 2	973	849	-	804	467	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	653	851	747	415	-	1181	-	-	-	-
Mov Cap-2 Maneuver	-	653	-	747	415	-	-	-	-	-	-
Stage 1	765	695	-	1022	730	-	-	-	-	-	-
Stage 2	965	847	-	795	467	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	-		-		8.1		-	
HCM LOS	-		-		-		-	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1181	-	-	-	-	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-	-	-	-	-
HCM Control Delay (s)	8.1	0	-	-	-	-	-	-
HCM Lane LOS	A	A	-	-	-	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	-

HCM 2010 TWSC  
7: Unthoff Line & Division Road W

2045 Future Total P.M.  
09-26-2024

Intersection												
Int Delay, s/veh	5.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	5	295	17	49	373	20	28	49	94	8	44	2
Future Vol, veh/h	5	295	17	49	373	20	28	49	94	8	44	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	0	1	0	0	0	0	0	20	0
Mvmt Flow	5	317	18	53	401	22	30	53	101	9	47	2

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	423	0	0	335	0	0	879	865	326	931	863	412
Stage 1	-	-	-	-	-	-	336	336	-	518	518	-
Stage 2	-	-	-	-	-	-	543	529	-	413	345	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.7	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.7	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4.18	3.3
Pot Cap-1 Maneuver	1147	-	-	1236	-	-	270	294	720	249	274	644
Stage 1	-	-	-	-	-	-	682	645	-	544	505	-
Stage 2	-	-	-	-	-	-	528	530	-	620	605	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1147	-	-	1236	-	-	221	276	720	175	257	644
Mov Cap-2 Maneuver	-	-	-	-	-	-	221	276	-	175	257	-
Stage 1	-	-	-	-	-	-	679	642	-	541	477	-
Stage 2	-	-	-	-	-	-	447	500	-	487	602	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0.1		0.9		22		24.2	
HCM LOS	-		-		C		C	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	393	1147	-	-	1236	-	-	245
HCM Lane V/C Ratio	0.468	0.005	-	-	0.043	-	-	0.237
HCM Control Delay (s)	22	8.2	0	-	8	0	-	24.2
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	2.4	0	-	-	0.1	-	-	0.9



Lanes, Volumes, Timings

2045 Future Total P.M.

8: Burnside Line & Division Road W

09-26-2024



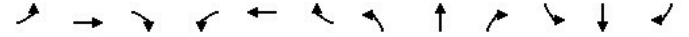
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕				↕			↕	
Traffic Volume (vph)	16	187	202	28	143	4	266	207	82	7	113	34
Future Volume (vph)	16	187	202	28	143	4	266	207	82	7	113	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.933		0.997		0.980		0.970		0.998		0.970	
Flt Protected	0.998		0.992		0.977		0.998		0.998		0.998	
Satd. Flow (prot)	0	1744	0	0	1849	0	0	1793	0	0	1573	0
Flt Permitted	0.984		0.878		0.767		0.979		0.979		0.979	
Satd. Flow (perm)	0	1720	0	0	1636	0	0	1408	0	0	1543	0
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	98		2		23		36		36		36	
Link Speed (k/h)	50		50		50		50		50		50	
Link Distance (m)	1346.1		271.7		1953.3		357.4		357.4		357.4	
Travel Time (s)	96.9		19.6		140.6		25.7		25.7		25.7	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	1%	0%	2%	0%	1%	1%	4%	0%	23%	0%
Adj. Flow (vph)	17	199	215	30	152	4	283	220	87	7	120	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	431	0	0	186	0	0	590	0	0	163	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0		0.0		3.6		3.6		3.6		3.6	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100		100		100		100		100		100	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	9.4		9.4		9.4		9.4		9.4		9.4	
Detector 2 Size(m)	0.6		0.6		0.6		0.6		0.6		0.6	
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex		CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4		8		2		6		6		6	
Permitted Phases	4		8		2		6		6		6	
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												

Lanes, Volumes, Timings

2045 Future Total P.M.

8: Burnside Line & Division Road W

09-26-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		32.0	32.0		32.0	32.0	
Total Split (%)	41.8%	41.8%		41.8%	41.8%		58.2%	58.2%		58.2%	58.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5		27.5	27.5		27.5	27.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Total Lost Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	14.5		14.5		27.7		27.7		27.7		27.7	
Actuated g/C Ratio	0.28		0.28		0.54		0.54		0.54		0.54	
v/c Ratio	0.78		0.40		0.77		0.19		0.19		0.19	
Control Delay	23.2		17.1		19.5		6.4		6.4		6.4	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	23.2		17.1		19.5		6.4		6.4		6.4	
LOS	C		B		B		A		A		A	
Approach Delay	23.2		17.1		19.5		6.4		6.4		6.4	
Approach LOS	C		B		B		A		A		A	
Queue Length 50th (m)	28.4		14.0		39.7		5.7		5.7		5.7	
Queue Length 95th (m)	55.9		28.0		#104.9		15.2		15.2		15.2	
Internal Link Dist (m)	1322.1		247.7		1929.3		333.4		333.4		333.4	
Turn Bay Length (m)												
Base Capacity (vph)	687		596		771		850		850		850	
Starvation Cap Reductn	0		0		0		0		0		0	
Spillback Cap Reductn	0		0		0		0		0		0	
Storage Cap Reductn	0		0		0		0		0		0	
Reduced v/c Ratio	0.63		0.31		0.77		0.19		0.19		0.19	
Intersection Summary												
Area Type:	Other											
Cycle Length:	55											
Actuated Cycle Length:	51.2											
Natural Cycle:	55											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.78											
Intersection Signal Delay:	18.7						Intersection LOS: B					
Intersection Capacity Utilization:	74.9%						ICU Level of Service D					
Analysis Period (min):	15											
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

Lanes, Volumes, Timings  
8: Burnside Line & Division Road W

2045 Future Total P.M.  
09-26-2024

Splits and Phases: 8: Burnside Line & Division Road W



HCM 2010 TWSC  
9: Industrial Road & Hurlwood Lane

2045 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	3.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔	↔	↔	↔
Traffic Vol, veh/h	0	150	498	139	176	0
Future Vol, veh/h	0	150	498	139	176	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	163	541	151	191	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	692	0	0 780 617
Stage 1	-	-	- 617 -
Stage 2	-	-	- 163 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	903	-	- 364 490
Stage 1	-	-	- 538 -
Stage 2	-	-	- 866 -
Platoon blocked, %	-	-	- -
Mov Cap-1 Maneuver	903	-	- 364 490
Mov Cap-2 Maneuver	-	-	- 450 -
Stage 1	-	-	- 538 -
Stage 2	-	-	- 866 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	18.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	903	-	-	-	450	-
HCM Lane V/C Ratio	-	-	-	-	0.425	-
HCM Control Delay (s)	0	-	-	-	18.8	0
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0	-	-	-	2.1	-

HCM 2010 TWSC  
10: Uthoff Line & Industrial Road

2045 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	6.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	199	36	420	193	23	157
Future Vol, veh/h	199	36	420	193	23	157
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	216	39	457	210	25	171

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	783	562	0	0	667
Stage 1	562	-	-	-	-
Stage 2	221	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	362	526	-	-	923
Stage 1	571	-	-	-	-
Stage 2	816	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	351	526	-	-	923
Mov Cap-2 Maneuver	351	-	-	-	-
Stage 1	571	-	-	-	-
Stage 2	792	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	27.6	0	1.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	351	526	923
HCM Lane V/C Ratio	-	-	0.616	0.074	0.027
HCM Control Delay (s)	-	-	30.4	12.4	9
HCM Lane LOS	-	-	D	B	A
HCM 95th %tile Q(veh)	-	-	3.9	0.2	0.1

HCM 2010 TWSC  
11: Uthoff Line & North Site Access 1

2045 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	1.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	22	12	197	36	18	126
Future Vol, veh/h	22	12	197	36	18	126
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	13	214	39	20	137

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	411	234	0	0	253
Stage 1	234	-	-	-	-
Stage 2	177	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	597	805	-	-	1312
Stage 1	805	-	-	-	-
Stage 2	854	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	587	805	-	-	1312
Mov Cap-2 Maneuver	587	-	-	-	-
Stage 1	805	-	-	-	-
Stage 2	840	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	649	1312
HCM Lane V/C Ratio	-	-	0.057	0.015
HCM Control Delay (s)	-	-	10.9	7.8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 2010 TWSC  
12: Uthoff Line & North Site Access 2

2045 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	22	0	232	36	0	148
Future Vol, veh/h	22	0	232	36	0	148
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	0	252	39	0	161

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	433	272	0	0	291
Stage 1	272	-	-	-	-
Stage 2	161	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	580	767	-	-	1271
Stage 1	774	-	-	-	-
Stage 2	868	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	580	767	-	-	1271
Mov Cap-2 Maneuver	580	-	-	-	-
Stage 1	774	-	-	-	-
Stage 2	868	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.5	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	580	1271
HCM Lane V/C Ratio	-	-	0.041	-
HCM Control Delay (s)	-	-	11.5	0
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM 2010 TWSC  
13: Uthoff Line & South Site Access

2045 Future Total P.M.  
09-26-2024

Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	56	12	257	162	18	152
Future Vol, veh/h	56	12	257	162	18	152
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	61	13	279	176	20	165

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	572	367	0	0	455
Stage 1	367	-	-	-	-
Stage 2	205	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	482	678	-	-	1106
Stage 1	701	-	-	-	-
Stage 2	829	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	472	678	-	-	1106
Mov Cap-2 Maneuver	472	-	-	-	-
Stage 1	701	-	-	-	-
Stage 2	812	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.5	0	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	499	1106
HCM Lane V/C Ratio	-	-	0.148	0.018
HCM Control Delay (s)	-	-	13.5	8.3
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1

Lanes, Volumes, Timings

2045 Future Total P.M. Mitigation

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-06-2024



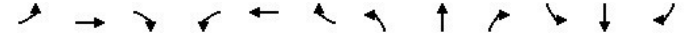
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑	↔	↔↔	↔	↔	↔↔	↔↔	↔	↔	↔↔	↔
Traffic Volume (vph)	329	357	348	576	332	250	331	1063	656	124	880	232
Future Volume (vph)	329	357	348	576	332	250	331	1063	656	124	880	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	115.0		0.0	100.0		120.0	110.0		50.0
Storage Lanes	2		1	2		0	2		1	1		1
Taper Length (m)	70.0			65.0			80.0		100.0			
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor			0.99	1.00								
Frt			0.850		0.936				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3467	1900	1599	3467	1768	0	3502	3539	1599	1805	3505	1583
Flt Permitted	0.115			0.259			0.950			0.121		
Satd. Flow (perm)	420	1900	1577	944	1768	0	3502	3539	1599	230	3505	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			220		34				352			202
Link Speed (k/h)		50			70			50			50	
Link Distance (m)		186.6			853.6			529.0			469.5	
Travel Time (s)		13.4			43.9			38.1			33.8	
Confl. Peds. (#/hr)			2	2								
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	0%	1%	1%	1%	0%	0%	2%	1%	0%	3%	2%
Adj. Flow (vph)	350	380	370	613	353	266	352	1131	698	132	936	247
Shared Lane Traffic (%)												
Lane Group Flow (vph)	350	380	370	613	619	0	352	1131	698	132	936	247
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2045 Future Total P.M. Mitigation

5: Highway 12 & West Ridge Boulevard/Murphy Road

09-06-2024



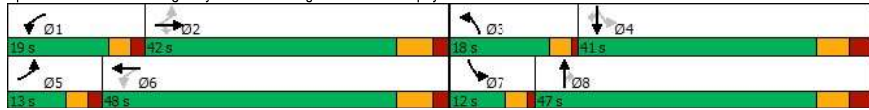
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6					8	4		4
Detector Phase	5	2	2	1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	12.0	27.2	27.2	12.0	33.2		11.5	21.0	21.0	11.5	22.5	22.5
Total Split (s)	13.0	42.0	42.0	19.0	48.0		18.0	47.0	47.0	12.0	41.0	41.0
Total Split (%)	10.8%	35.0%	35.0%	15.8%	40.0%		15.0%	39.2%	39.2%	10.0%	34.2%	34.2%
Maximum Green (s)	8.0	34.8	34.8	14.0	40.8		14.0	39.0	39.0	8.0	33.0	33.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.2	2.2	2.0	2.2		1.0	3.5	3.5	1.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2		4.0	8.0	8.0	4.0	8.0	8.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.6	3.6	3.0	3.6		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Walk Time (s)					7.0			7.0	7.0			
Flash Dont Walk (s)					19.0			6.0	6.0			
Pedestrian Calls (#/hr)					0			0	0			
Act Efect Green (s)	45.0	34.8	34.8	56.0	40.8		13.9	39.0	39.0	44.9	33.0	33.0
Actuated g/C Ratio	0.38	0.29	0.29	0.47	0.34		0.12	0.33	0.33	0.37	0.28	0.28
v/c Ratio	0.97	0.69	0.60	0.84	0.99		0.87	0.98	0.92	0.69	0.97	0.43
Control Delay	67.3	45.4	18.9	32.8	72.2		73.8	63.2	38.1	41.2	66.0	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.3	45.4	18.9	32.8	72.2		73.8	63.2	38.1	41.2	66.0	10.4
LOS	E	D	B	C	E		E	E	D	D	E	B
Approach Delay		43.4			52.6			56.9			53.1	
Approach LOS		D			D			E			D	
Queue Length 50th (m)	27.3	83.6	30.7	49.4	145.8		44.7	145.8	94.2	18.7	120.9	8.3
Queue Length 95th (m)	#58.9	119.5	64.4	#66.5	#225.9		#70.3	#194.3	#176.4	#40.8	#165.3	30.8
Internal Link Dist (m)		162.6			829.6			505.0			445.5	
Turn Bay Length (m)	60.0			115.0			100.0		120.0	110.0		50.0
Base Capacity (vph)	360	551	613	734	623		408	1151	757	191	964	581
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.69	0.60	0.84	0.99		0.86	0.98	0.92	0.69	0.97	0.43
Intersection Summary												
Area Type:	Other											
Cycle Length:	120											
Actuated Cycle Length:	119.9											
Natural Cycle:	110											
Control Type:	Semi Act-Uncooord											
Maximum v/c Ratio:	0.99											
Intersection Signal Delay:	52.6						Intersection LOS: D					
Intersection Capacity Utilization:	98.5%						ICU Level of Service F					

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: Highway 12 & West Ridge Boulevard/Murphy Road



# APPENDIX G

## Environmental Study Report Excerpts (Tatham, 2021)

# **Appendix A: Transportation Needs & Justification Study**





Enhancing our communities



# Inch Farm & North Orillia Employment Lands

**TRANSPORTATION NEEDS & JUSTIFICATION**

City of Orillia

## 2 Traffic Volumes

### 2.1 METHODOLOGY

To establish the future traffic volumes on the Inch Farm arterial road (for the 2030 and 2040 horizons), consideration was given to the following:

- diversion of existing study area traffic to the proposed arterial road;
- background growth (including induced travel);
- ongoing development within the Orillia West area; and
- proposed development within the Inch Farm and North Orillia Employment Lands areas.

Baseline conditions (2020) were established based on the assumed traffic diversion detailed below. The baseline condition is a theoretical scenario that illustrates the anticipated traffic volumes on the arterial road should it be constructed currently (2020) in its entirety (i.e. from Uthoff Line to Burnside Line). The intent of establishing a theoretical baseline condition is to provide reference volumes from which future volumes can be projected. Background growth, induced travel and development specific traffic have been added to the 2020 baseline conditions to establish future volumes for the 2030 and 2040 horizon years. The transportation needs and justification assessment has focused on the 2030 and 2040 conditions.

### 2.2 BASELINE CONDITIONS

#### 2.2.1 Diverted Trips

Diverted traffic consists of existing traffic on the surrounding road network that diverts to a new or improved travel route that provides similar or better travel time or provides some other perceived benefit to the motorist. In considering the proposed arterial road, which will provide north-south service parallel to Highway 11, connecting the Orillia West development area to Burnside Line/Orillia Square Mall area, it is anticipated that most traffic diverting to the new arterial will be trips generated by existing development within the Orillia West area – specifically, trips travelling to/from the north via Highway 11. An aerial map of the study area road network is provided in Figure 2, illustrating the roads that will connect the proposed arterial road to the Orillia West area.

To determine the volume of traffic anticipated to divert to the new arterial road, traffic counts conducted on Tuesday March 10, 2020 at the intersections of Highway 12 with the Highway 11 ramps were reviewed. The counts were conducted as part of the *Orillia West Transportation*



*Planning Study Update*<sup>1</sup> and as they were completed prior to restrictive measures being implemented by the Province in response to Covid-19, they are considered representative of typical conditions. The detailed traffic count data is provided in Appendix A.

In reviewing the traffic data, it was determined that approximately 20% of traffic on Highway 12 (west of the Highway 11 ramps), is travelling to/from the north via Highway 11. For the purpose of this study, a diversion rate of 20% has been applied (i.e. 20% of the existing traffic travelling to/from the north will divert to the new arterial road, whereas the remaining 80% will continue to use Highway 11). The diversion of trips to the proposed arterial road is illustrated in Figure 3, amounting to approximately 45 to 55 vehicles per hour per direction.

It is noted that the assumed diversion will only occur once the arterial road is extended through to Burnside Line. Regardless, such has been considered to ensure that the portion of the arterial road constructed within the City's limits can accommodate future volumes.

### 2.2.2 Uhthoff Line

While Uhthoff Line has not been included in the transportation assessment in so far as lane capacity is concerned, the operations of its future intersection with the proposed arterial road have been considered to ensure that the intersection is designed to adequately accommodate future volumes. The traffic volumes on Uhthoff Line are based on volumes provided in the *Inch Farm Traffic Impact Study*<sup>2</sup> for the intersection of Uhthoff Line with Murphy Road, as illustrated in Figure 4.

### 2.2.3 Baseline Volumes

The baseline (2020) traffic volumes for the proposed arterial road are illustrated in Figure 5, reflective of the assumed traffic diversion and the noted volumes on Uhthoff Line. As indicated, the baseline volumes utilizing the arterial road are in the order of 50 to 65 vehicles per peak hour (which accounts for rounding of volumes and minimum of 5 vehicles per movement).

## 2.3 FUTURE TRAFFIC VOLUMES

### 2.3.1 Background Growth

#### Population Growth

As per the available 2016 census data for the City of Orillia, the population increased from 30,546 person in 2011 to 31,128 in 2016, which translates to an annual growth rate of 0.38%.

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<sup>1</sup> *Orillia West Transportation Planning Study Update*. Tatham Engineering Ltd. April 2021.

<sup>2</sup> *Inch Farm Traffic Impact Study (Draft)*. Tatham Engineering Limited. February 2021



the remaining 90% assigned to/from the south towards Highway 12 (thus maintaining a conservative approach in that it maximizes the peak volumes on the arterial road). As a result, the trip assignment to the access points was also revised slightly to consider 80% of trips using the arterial road access and 20% the Uthoff Line access. The revised trip assignment to the road network is illustrated in Figure 8.

**Table 2: Trip Estimates – Inch Farm Residential Development**

LAND USE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
	In	Out	Total	In	Out	Total
single detached units	22	65	87	73	43	116
semi-detached units	8	24	33	27	16	44
<b>Totals</b>	<b>30</b>	<b>89</b>	<b>119</b>	<b>100</b>	<b>59</b>	<b>159</b>

#### North Orillia Employment Lands

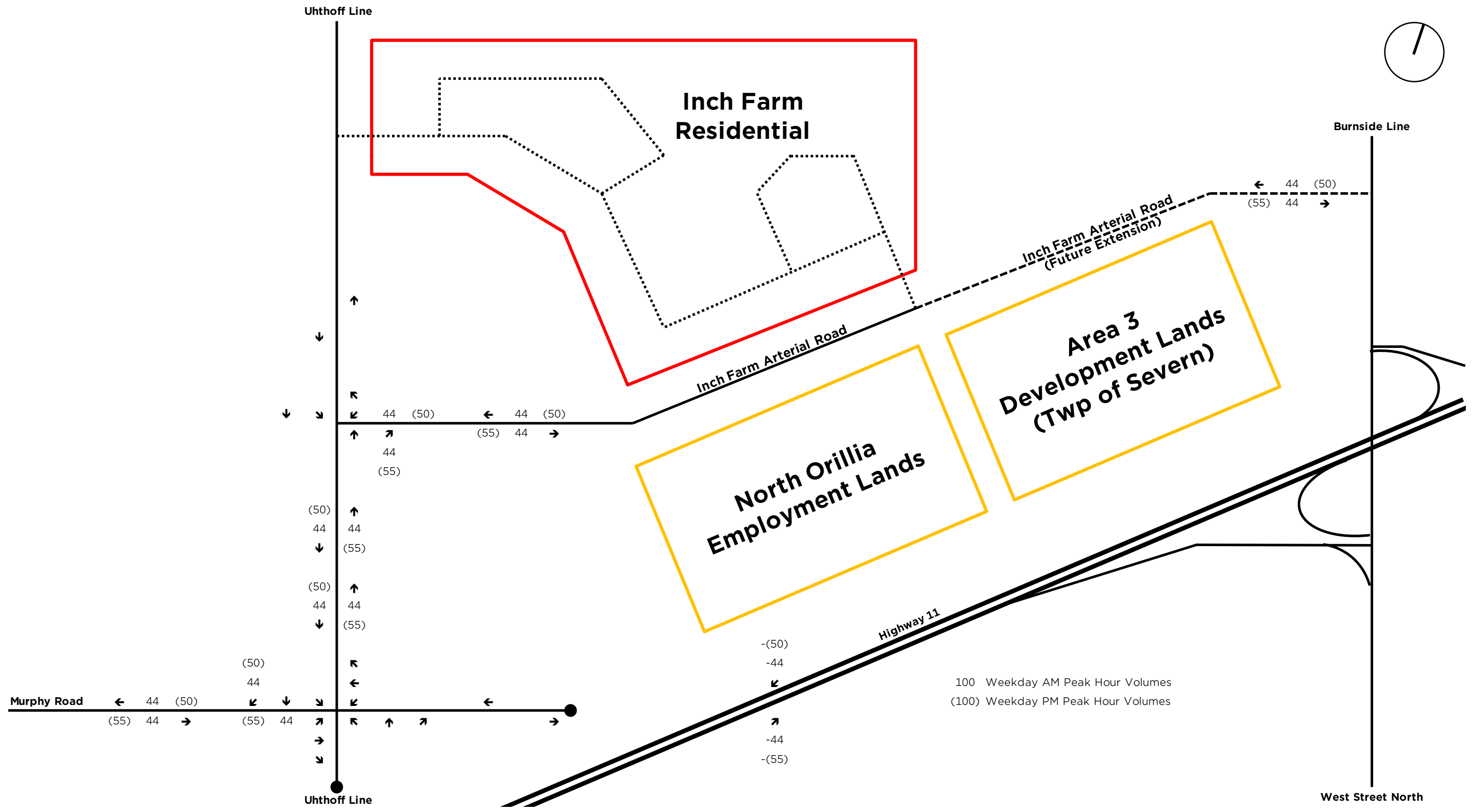
The North Orillia Employment Lands (formerly known as the Inch Farm Industrial Lands) consist of approximately 3.88 hectares (9.5 acres) of industrial land. As there is no definitive site plan for the development, it has been assumed that the gross floor area (GFA) of the development will reflect a lot coverage of 20%, which amounts to 7,689 m<sup>2</sup> (82,763 ft<sup>2</sup>). It is understood that the lands will be divided into industrial lots, each with their own access to the proposed arterial road. Full build-out of the North Orillia Employment Lands has been assumed by 2030.

Trip estimates for the North Orillia Employment Lands reflect those applied in the *Orillia West Study*. The trip estimates are provided in Table 3. With respect to trip assignment, 10% of the site traffic has been distributed to/from the north via the proposed arterial road with the remaining 90% assigned to/from the south towards Highway 12. The trip assignment to the road network is illustrated in Figure 9..

**Table 3: Trip Estimates - North Orillia Employment Lands**

LAND USE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
	In	Out	Total	In	Out	Total
general light industrial (82,763 ft <sup>2</sup> GFA)	51	7	58	7	45	52





**Inch Farm Class EA**  
Figure 3: 2020 Diverted Traffic Volumes





**Inch Farm Class EA**  
 Figure 8: Inch Farm Residential Development Traffic





**Inch Farm Class EA**  
 Figure 9: North Orillia Employment Lands Traffic



# APPENDIX H

## Industrial Road Intersection Design





**CORPORATION  
OF THE  
CITY OF ORILLIA**

**INCH FARM ARTERIAL ROAD  
ISSUED FOR CONSTRUCTION**

**LEGEND**



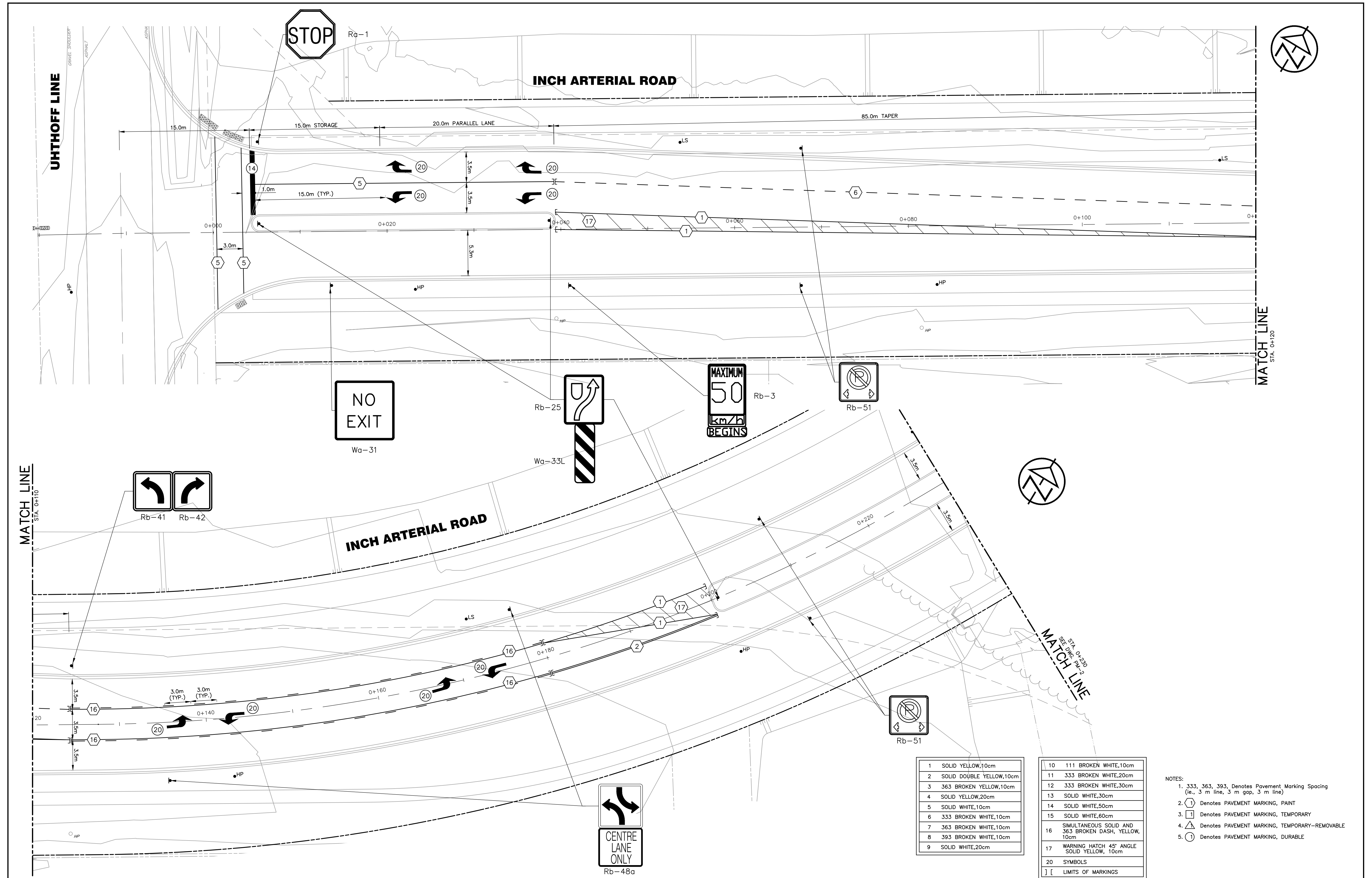
**KEY PLAN  
N.T.S.**

TELEPHONE NUMBERS	PHONE (705)	AFTER HOURS
CITY OF ORILLIA	325-1311	326-4671
WATER & SANITARY SEWERS	325-2293	
ROADS & STORM SEWERS	329-7249	
TRANSIT	325-8434	
TATHAM ENGINEERING	325-1753	
BELL CANADA	611	
ROGERS CABLE (LOCATES)	1-800-738-7893	
ROGERS CABLE (CABLE HITS & REPAIRS)	1-888-ROGERS1	
ORILLIA POWER DISTRIBUTION CORP. (HYDRO)	326-7315	
UNION GAS	325-1505	
EMERGENCY (FIRE-POLICE-AMBULANCE)	911	
ONTARIO PROVINCIAL POLICE	1-800-310-1122	
FIRE DEPARTMENT	325-5201	
AMBULANCE	325-1578	

- EXISTING SANITARY MAIN/ SIZE
- EXISTING STORM SEWER/ SIZE
- EXISTING WATERMAIN/ SIZE
- EXISTING GAS MAIN
- EXISTING SANITARY SERVICE
- EXISTING PROPERTY LINE
- EXISTING EASEMENT LINE
- EXISTING CENTERLINE
- EXISTING EDGE OF ASPHALT
- EXISTING EDGE OF SHOULDER
- EXISTING DITCH
- EXISTING FENCE LINE
- EXISTING EDGE OF BUSH
- EXISTING TEMPORARY BENCHMARK
- EXISTING BOREHOLE/ NUMBER
- EXISTING SANITARY MANHOLE/ NUMBER
- EXISTING CULVERT
- EXISTING WATERMAIN PLUG AND THRUST BLOCK
- EXISTING CABLE PEDESTAL
- EXISTING BELL MANHOLE
- EXISTING BELL PEDISTAL
- EXISTING BELL POLE
- EXISTING HYDRO POLE
- EXISTING HYDRO GUY POLE
- EXISTING HYDRO GUY WIRE
- EXISTING GAS MARKER
- EXISTING STANDARD IRON BAR
- EXISTING TRAFFIC SIGN
- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- PROPOSED SANITARY SEWER/ SIZE/  
DIRECTION OF FLOW
- PROPOSED STORM SEWER/ SIZE/  
DIRECTION OF FLOW
- PROPOSED WATERMAIN/SIZE
- PROPOSED SANITARY SERVICE
- PROPOSED WATER SERVICE
- PROPOSED DITCH
- PROPERTY LINE
- LOT LINE
- PROPOSED CENTERLINE
- PROPOSED EDGE OF ASPHALT
- PROPOSED EDGE OF SHOULDER
- PROPOSED SANITARY MANHOLE/ NUMBER
- PROPOSED SANITARY CLEANOUT
- PROPOSED DITCH INLET CATCHBASIN
- PROPOSED STORM MANHOLE/ NUMBER
- PROPOSED CATCHBASIN
- PROPOSED DOUBLE CATCHBASIN
- PROPOSED CULVERT
- PROPOSED RIPRAP
- PROPOSED HYDRANT & WATER VALVE
- PROPOSED WATER VALVE
- PROPOSED WATER CURB STOP
- PROPOSED WATER VALVE CHAMBER
- PROPOSED PRESSURE REDUCING WATER VALVE CHAMBER
- PROPOSED AIR RELIEF VALVE CHAMBER
- PROPOSED BLOWOFF
- PROPOSED CURB CUT
- PROPOSED WATERMAIN PLUG AND THRUST BLOCK
- PROPOSED LIGHT STANDARD
- PROPOSED CURB CUT
- PROPOSED TRAFFIC SIGN







1	SOLID YELLOW,10cm	10	111 BROKEN WHITE,10cm
2	SOLID DOUBLE YELLOW,10cm	11	333 BROKEN WHITE,20cm
3	363 BROKEN YELLOW,10cm	12	333 BROKEN WHITE,30cm
4	SOLID YELLOW,20cm	13	SOLID WHITE,30cm
5	SOLID WHITE,10cm	14	SOLID WHITE,50cm
6	333 BROKEN WHITE,10cm	15	SOLID WHITE,60cm
7	363 BROKEN WHITE,10cm	16	SIMULTANEOUS SOLID AND 363 BROKEN DASH, YELLOW, 10cm
8	393 BROKEN WHITE,10cm	17	WARNING HATCH 45° ANGLE SOLID YELLOW, 10cm
9	SOLID WHITE,20cm	20	SYMBOLS
		[ ]	LIMITS OF MARKINGS

- NOTES:
- 1, 333, 363, 393, Denotes Pavement Marking Spacing (ie., 3 m line, 3 m gap, 3 m line)
  - ① Denotes PAVEMENT MARKING, PAINT
  - ② Denotes PAVEMENT MARKING, TEMPORARY
  - ③ Denotes PAVEMENT MARKING, TEMPORARY-REMOVABLE
  - ④ Denotes PAVEMENT MARKING, DURABLE

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**BENCHMARKS**  
 TBM 1 - ELEVATION 240.645m  
 NAIL & WASHER IN HYDRO POLE ON WEST SIDE OF UHTHOFF LINE, NORTH OF NORTH MAINTENANCE ACCESS TO SWM FACILITY.  
 TBM 2 - ELEVATION 242.321m  
 NAIL & WASHER IN HYDRO POLE ON WEST SIDE OF UHTHOFF LINE, SOUTH OF NORTH ENTRANCE TO SWM FACILITY.  
 TBM 3 - ELEVATION 248.596m  
 NAIL & WASHER IN HYDRO POLE ON WEST SIDE OF UHTHOFF LINE JUST NORTH OF INTERSECTION OF UHTHOFF LINE AND MURPHY ROAD.

**NOTES**

No.	REVISION DESCRIPTION	DATE	ENGINEER STAMP
2.	ISSUED FOR TENDER	JUNE 2022	
3.	ADDENDUM No. 2	JULY 2022	
4.	REVISED ROAD AND F/M DESIGN	AUG. 2023	
5.	ISSUED FOR APPROVALS	MAR. 2024	
6.	ISSUED FOR CONSTRUCTION	MAR. 2024	

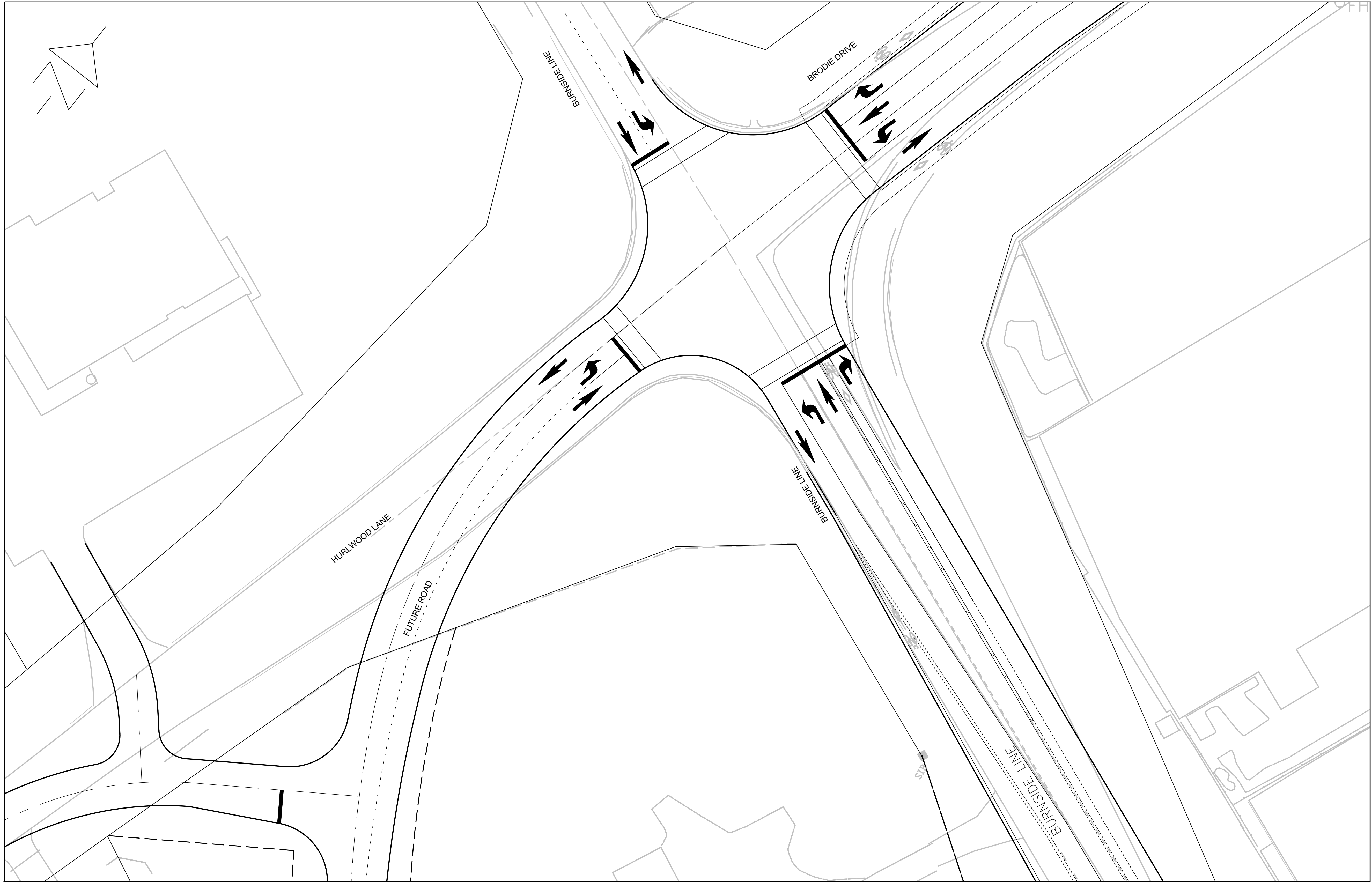
**INCH FARM ARTERIAL ROAD**  
 CITY OF ORILLIA  
**PAVEMENT MARKINGS & TRAFFIC SIGNS**

**TATHAM ENGINEERING**

DESIGN: CU/BH	FILE: 320852	DWG: <b>PM-1</b>
DRAWN: CU/BH	DATE: DEC. 2020	
CHECK: BWL	SCALE: 1:200	



FILE: Z:\Project-design\Current Projects\2021\2170 Township of Severn Road Reconstruction Project Brodie Dr and Carlyon Line\8 Working Drawings\Burnside\_Brodie\_Hurlwood Intersection\Burnside\_Brodie\_Hurlwood Intersection Concept.dwg



NO.	REVISIONS	DATE	BY
1	FOR TOWNSHIP REVIEW	1/30/22	BK
2			
3			
4			
5			
6			

CONCEPT

TOWNSHIP OF SEVERN  
 BURNSIDE LINE &  
 BRODIE DR. INTERSECTION

SCALE HOR: 1:100	VERT: 1:100	SHEET NO.
DESIGNED BK	DRAWN #	A
REVIEWED ##	DATE 1/30/2022	



# AREA 3

# ARTERIAL ROAD

## TOWNSHIP OF SEVERN

## COUNTY OF SIMCOE



MUNICIPALITY

TOWNSHIP OF SEVERN  
1024 HURLWOOD LANE  
SEVERN, ONTARIO L3V 0Y6

DEVELOPER

LIV COMMUNITIES  
1005 SKYVIEW DRIVE, SUITE 301  
BURLINGTON, ONTARIO L7P 5B1

DEVELOPER'S ENGINEER



70 HURON STREET, SUITE 201  
COLLINGWOOD, ON, L9Y 4L4  
705-446-3510 T  
705-446-3520 F  
WWW.CFCROZIER.CA  
INFO@CFCROZIER.CA

DRAWING

TITLE

DRAWING	TITLE
C100	TITLE PAGE AND INDEX
C101	CONSTRUCTION NOTES AND DETAILS
C102A	REMOVALS & EROSION CONTROL PLAN - STA. 0+670 TO STA. 1+000
C102B	REMOVALS & EROSION CONTROL PLAN - STA. 1+000 TO STA. 1+280
C102C	REMOVALS & EROSION CONTROL PLAN - STA. 1+280 TO STA. 1+530
C102D	REMOVALS & EROSION CONTROL PLAN - STA. 1+530 TO STA. 1+830
C103A	PLAN AND PROFILE - ARTERIAL ROAD - STA. 0+670 TO STA. 0+820
C103B	PLAN AND PROFILE - ARTERIAL ROAD - STA. 0+820 TO STA. 0+970
C103C	PLAN AND PROFILE - ARTERIAL ROAD - STA. 0+970 TO STA. 1+120
C103D	PLAN AND PROFILE - ARTERIAL ROAD - STA. 1+120 TO STA. 1+270
C103E	PLAN AND PROFILE - ARTERIAL ROAD - STA. 1+270 TO STA. 1+420
C103F	PLAN AND PROFILE - ARTERIAL ROAD - STA. 1+420 TO STA. 1+580
C103G	PLAN AND PROFILE - ARTERIAL ROAD - STA. 1+580 TO STA. 1+730
C103H	PLAN AND PROFILE - ARTERIAL ROAD - STA. 1+730 TO STA. 1+850
C103I	PLAN AND PROFILE - HURLWOOD LANE - STA. 2+880 TO STA. 3+020
C104A	GRADING PLAN - STA. 0+670 TO STA. 1+000
C104B	GRADING PLAN - STA. 1+000 TO STA. 1+280
C104C	GRADING PLAN - STA. 1+280 TO STA. 1+530
C104D	GRADING PLAN - STA. 1+530 TO STA. 1+830
C105A	PAVEMENT MARKING & SIGNAGE PLAN - STA. 0+670 TO STA. 0+970
C105B	PAVEMENT MARKING & SIGNAGE PLAN - STA. 0+970 TO STA. 1+270
C105C	PAVEMENT MARKING & SIGNAGE PLAN - STA. 1+270 TO STA. 1+580
C105D	PAVEMENT MARKING & SIGNAGE PLAN - STA. 1+580 TO STA. 1+850
C106A	STORM CATCHMENT PLAN
C106B	STORM DESIGN SHEET
C107A	SANITARY CATCHMENT PLAN
C107B	SANITARY DESIGN SHEET

**MASTER LEGEND**

**EXISTING FEATURES (EX.)**

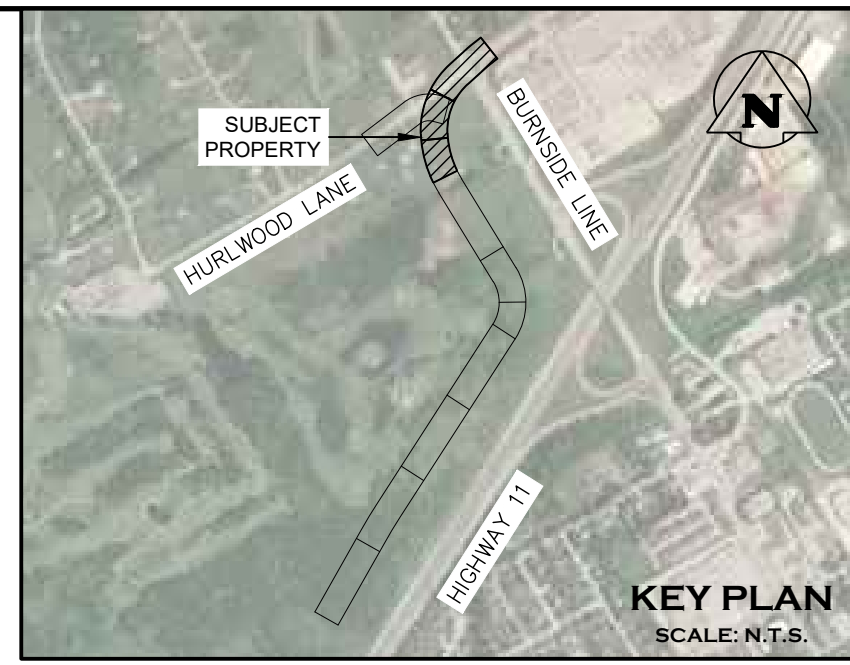
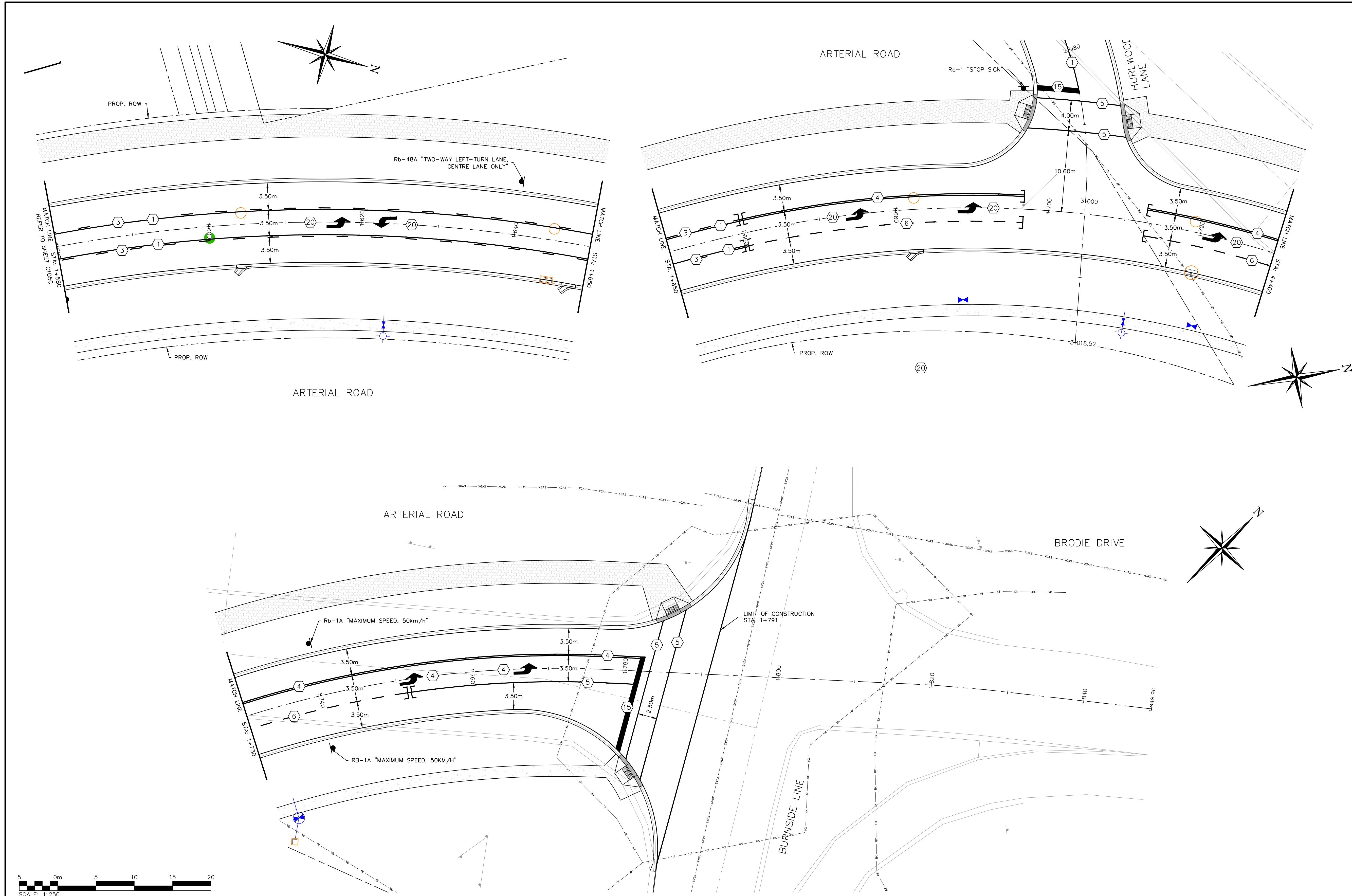
---XXX.X---	EX. CONTOUR
+XXX.XX	EX. GRADE
~~~~~	EX. TREELINE
=====	EX. WATERCOURSE
--->---	EX. DITCH
---XBM---	EX. WATERMAIN
---WS---	EX. WATER SERVICE
---FH---	EX. FIRE HYDRANT & VALVE
---SSM---	EX. SANITARY SEWER & MANHOLE
---SFM---	EX. SANITARY FORCEMAIN
---SS---	EX. SANITARY SERVICE
---SSM---	EX. STORM SEWER & MANHOLE
□	EX. STORM CATCHBASIN
□	EX. STORM DOUBLE CATCHBASIN
○	EX. STORM CATCHBASIN MANHOLE
○	EX. STORM DOUBLE CATCHBASIN MANHOLE
---XGAS---	EX. GAS MAIN
---XB---	EX. BELL LINE
□	EX. BELL PEDESTAL
□	EX. CABLE TELEVISION PEDESTAL
○HP	EX. HYDRO POLE
○	EX. LIGHT STANDARD
+	EX. SIGN
▨	EX. BUILDING
⊕BM#	EX. BENCHMARK NUMBER & LOCATION
⊕BH#	EX. BOREHOLE NUMBER & LOCATION

**PROPOSED FEATURES (PR.)**

---	PR. PROPERTY LIMITS
+XXX.XX	PR. ELEVATION
+XXX.XX	PR. ELEVATION (MATCH EX. ELEVATION)
X.XX	PR. SWALE & SLOPE
--->---	PR. DITCH DRAINAGE
---W---	PR. WATERMAIN & VALVE
---WS---	PR. WATER SERVICE
---FH---	PR. FIRE HYDRANT & VALVE
---SSM---	PR. WATER VALVE CHAMBER
---SSM---	PR. WATER QUALITY TESTING STATION
---SSM---	PR. SANITARY SEWER & MANHOLE
---SFM---	PR. SANITARY FORCEMAIN
---SS---	PR. SANITARY SERVICE
---	PR. SANITARY CATCHMENT
○	CATCHMENT AREA ID
○	AREA (ha)
○	POPULATION (3.5 p.p.u.)
---SSM---	PR. STORM SEWER & MANHOLE
□	PR. CATCHBASIN
□	PR. DOUBLE CATCHBASIN
○	PR. CATCHBASIN MANHOLE
○	PR. DOUBLE CATCHBASIN MANHOLE
---	PR. STORM CATCHMENT
○	CATCHMENT AREA ID
○	RUNOFF COEFFICIENT
○	DRAINAGE AREA (ha)
---	PR. CURB CUT
□	PR. CANADA POST COMMUNITY MAIL BOX
□	PR. TRANSFORMER
□	PR. STOP SIGN
□	PR. NAME SIGN
□	PR. NO PARKING SIGN
---	PR. FENCE
---	PR. BUILDING ENVELOPE
---	PR. LIGHT DUTY SILT FENCE
---	PR. HEAVY DUTY SILT FENCE
---	PR. STRAW BALE CHECK FLOW
---	PR. ROCK CHECK DAM
---	PR. SLOPE (3:1 MAX.)
---	PR. TREE PRESERVATION AREA
---	PR. TOPSOIL STOCKPILE LOCATION

**PROJECT No.: 1935-6135**  
**FIRST SUBMISSION**





1	SOLID YELLOW,10cm
2	SOLID DOUBLE YELLOW,10cm
3	363 BROKEN YELLOW,10cm
4	SOLID YELLOW,20cm
5	SOLID WHITE,10cm
6	333 BROKEN WHITE,10cm
7	363 BROKEN WHITE,10cm
8	393 BROKEN WHITE,10cm
9	SOLID WHITE,20cm
10	111 BROKEN WHITE,20cm
11	333 BROKEN WHITE,20cm
12	333 BROKEN WHITE,30cm
13	SOLID WHITE,30cm
14	SOLID WHITE,45cm
15	SOLID WHITE,60cm
20	SYMBOLS
[ ]	LIMITS OF MARKINGS

- NOTES:
- 1, 333, 363, 393, Denotes Pavement Marking Spacing (i.e., 3 m line, 3 m gap, 3 m line)
  - Use (1) to Denote PAVEMENT MARKING
  - Use [ ] to Denote PAVEMENT MARKING, TEMPORARY
  - Use (A) to Denote PAVEMENT MARKING, TEMPORARY-REMOVABLE
  - Use (D) to Denote PAVEMENT MARKING, DURABLE

MINISTRY OF TRANSPORTATION ONTARIO DRAWING	Date	1994 04 01	Rev
LEGEND		Issue Date	
PAVEMENT MARKINGS		Issued By	
		MTOD	101.070



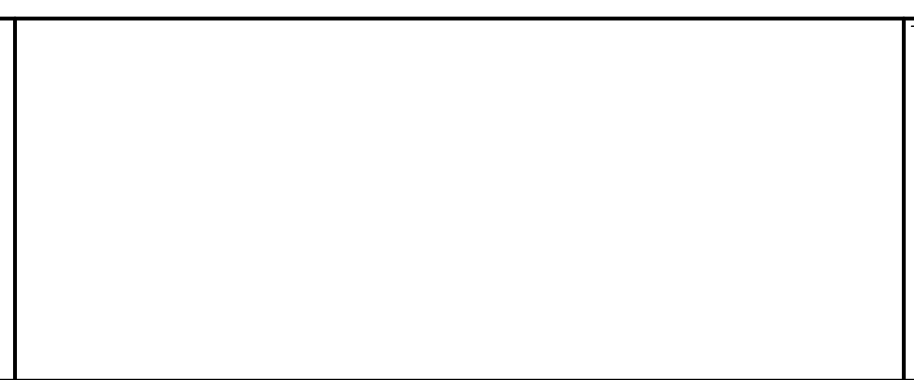
1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE REPRODUCTION OF ANY PART WITHOUT PRIOR WRITTEN CONSENT OF THIS OFFICE IS STRICTLY PROHIBITED.

2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.

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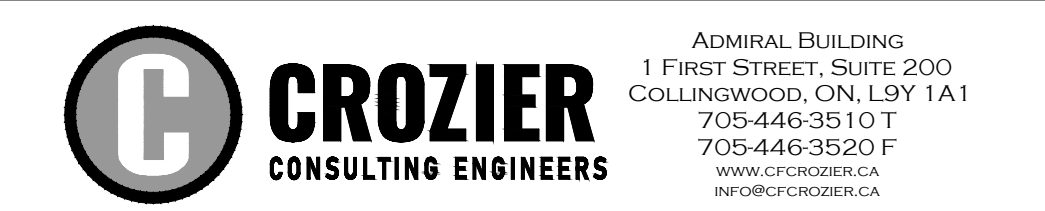
No.	ISSUE	DATE: MMM/DD/YYYY
1.	ISSUED FOR 1st SUBMISSION	JUN/28/2024

Engineer	
Engineer	
Project	
Drawing	

**PRELIMINARY**  
NOT TO BE USED FOR CONSTRUCTION

**AREA 3**  
**TOWNSHIP OF SEVERN**

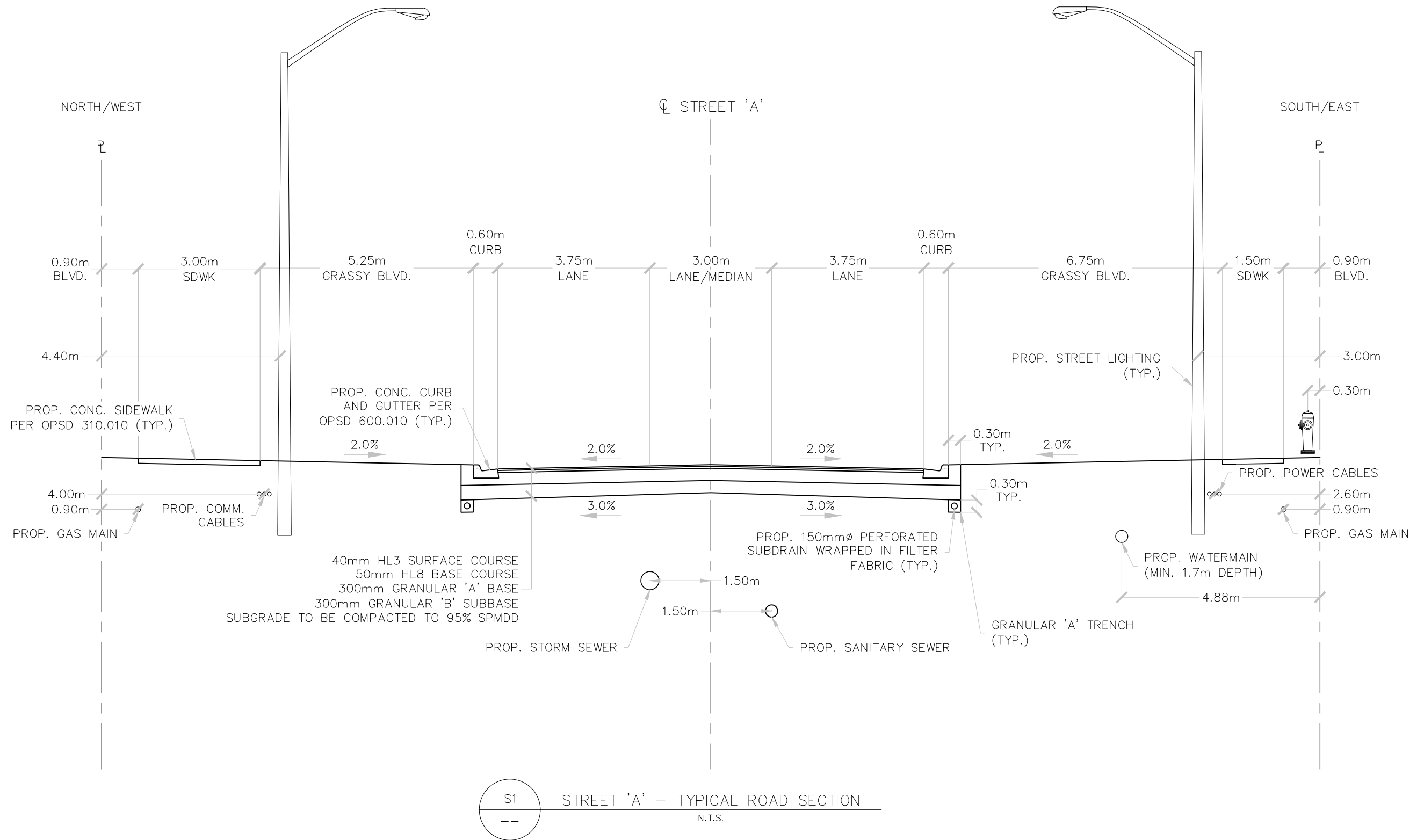
**ARTERIAL ROAD**  
**PAVEMENT MARKING AND SIGNAGE PLAN**  
**STA. 1+580 TO STA. 1+850**




Drawn By	D.E.	Design By	D.E./D.K.	Project	1935-6135
Check By	B.H.	Check By	D.E.	Scale	1:250
				Drawing	C105D

# APPENDIX I

## Industrial Road Proposed Cross-Section



Project		AREA 3 DEVELOPMENT TOWNSHIP OF SEVERN		 ADMIRAL BUILDING 1 FIRST STREET, SUITE 200 COLLINGWOOD, ON, L9Y 1A1 705-446-3510 T 705-446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA					
Drawing		STREET 'A' - TYPICAL ROAD SECTION		Drawn By	D.E./R.D.M.	Design By	D.E./Z.H.	Project	1935-6135
Scale	1:1000	Date	APR/29/2022	Check By	B.H./B.R.	Drawing	101-XS-1		

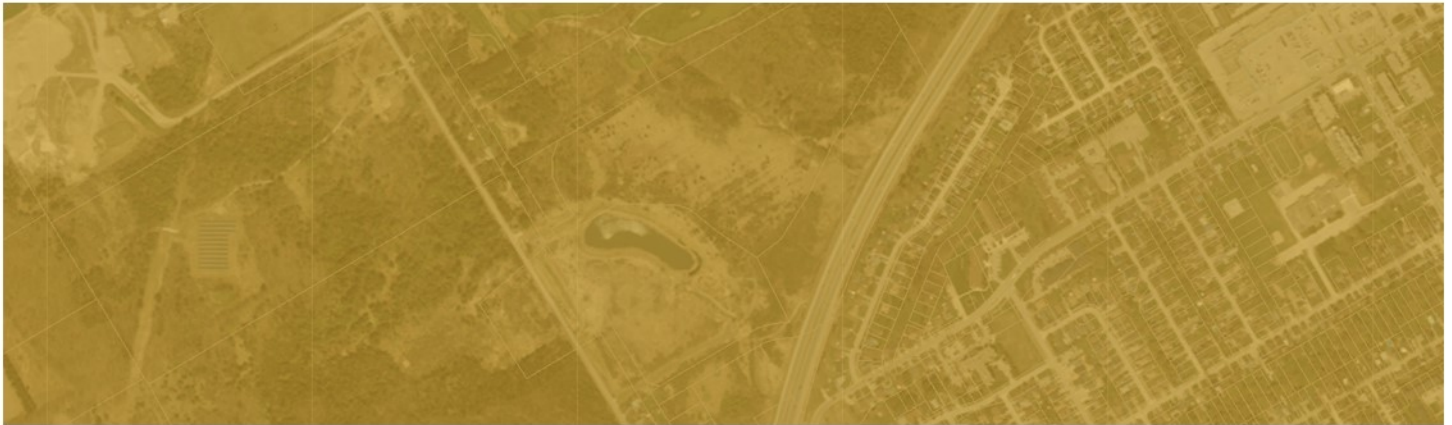
# APPENDIX J

## Inch Farm Residential Development TIS (Tatham, 2023)





Enhancing our communities



# Inch Farm Residential Development

## TRAFFIC IMPACT STUDY

LIV Communities

# 1 Introduction

This study is intended to provide a transportation review in support of the Inch Farm Residential Development, the location of which is illustrated in Figure 1. It is noted that there have been a number of transportation studies completed over the past 15 years within the Orillia West planning area which have given due consideration to the Inch Farm development. These studies include:

- the overall *Orillia West Transportation Planning Study* (April 2008)<sup>1</sup>;
- the *Orillia West Transportation Planning Study - 5 & 10 Year Implementation Plans* (June 2011)<sup>2</sup>;
- the *West Orillia Employment Lands Transportation Review* (August 2013)<sup>3</sup>;
- the *Traffic Impact Study Proposed Costco University Avenue* (March 2014)<sup>4</sup>;
- the *Proposed Costco, University Avenue Traffic Impact Study - Response to MTO Comments* (April 21, 2015)<sup>5</sup>;
- the *Traffic Impact Study 600 Harvie Settlement Road* (February 2017)<sup>6</sup>;
- the *Highway 12 Improvements from West Ridge Boulevard/Murphy Road to the Highway 12 North/Highway 11 (Coldwater Road) Interchange Design and Construction Report* (January 2018)<sup>7</sup>;
- the *Traffic Operations Analysis Update 600 Harvie Settlement Road* (March 15, 2018)<sup>8</sup>;
- the MTO Highway 12 Preliminary Design Study;
- the *Orillia West Transportation Planning Study Update* (April 2021)<sup>9</sup>; and
- the *Inch Farm & North Orillia Employment Lands Transportation Needs & Justification* (September 9, 2021)<sup>10</sup>.

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<sup>1</sup> *Orillia West Transportation Planning Study*. C.C. Tatham & Associates Ltd, April 2008.

<sup>2</sup> *Orillia West Transportation Planning Study - 5 & 10 Year Implementation Plans*. C.C. Tatham & Associates Ltd, June 2011.

<sup>3</sup> *West Orillia Employment Lands Transportation Review*. C.C. Tatham & Associates Ltd, August 30, 2013.

<sup>4</sup> *Traffic Impact Study Proposed Costco University Avenue*. R.J. Burnside & Associates Limited, March 2014.

<sup>5</sup> *Proposed Costco, University Avenue Traffic Impact Study - Response to MTO Comments* R.J. Burnside & Associates Limited, April 21, 2015.

<sup>6</sup> *Traffic Impact Study 600 Harvie Settlement Road*. C.F. Crozier & Associates Inc., February 2017.

<sup>7</sup> *Highway 12 Improvements from West Ridge Boulevard/Murphy Road to the Highway 12 North/Highway 11 (Coldwater Road) Interchange Design and Construction Report*. The Ainley Group, January 2018.

<sup>8</sup> *Traffic Operations Analysis Update 600 Harvie Settlement Road*. C.F. Crozier & Associates Inc., March 15, 2018.

<sup>9</sup> *Orillia West Transportation Planning Study Update*. Tatham Engineering Limited, April 22, 2021.

<sup>10</sup> *Inch Farm & North Orillia Employment Lands Transportation Needs & Justification*. Tatham Engineering, September 9, 2021.



Recognizing that the above noted studies considered the traffic operations and implications of development growth on the broader area road system, including consideration for the Inch Farm development, the scope of such has not been repeated within this study. Rather, the intent of this study is to provide a review of the key intersections within the immediate area of the Inch Farm development with consideration for the 2023 revised draft plan as proposed by LIV Communities. The key intersections include:

- Highway 12 and Murphy Road/West Ridge Boulevard;
- Murphy Road and Uthoff Line;
- Uthoff Line and the proposed means of access to the subdivision, namely
  - Uthoff Line & Street 'A'; and
  - Uthoff Line & Inch Arterial Road



## 2 Inch Farm Development

This chapter will provide additional details with respect to the proposed development, including the land uses and size, location, vehicular access, the projected site generated traffic volumes and the assignment of such to the adjacent road network.

### 2.1 SITE LOCATION

As illustrated in Figure 1, the Inch Farm development lands are located between Uthoff Line and Highway 11 in the City of Orillia.

### 2.2 SITE DRAFT PLANS

#### 2.2.1 1993 Approved Draft Plan

A draft plan of subdivision was approved in 1993, consisting of the following:

- 123 detached residential units;
- 46 semi-detached residential units; and
- 3.88 ha (9.6 acres) of prestige industrial lands.

Overall, 169 residential units would be provided; the corresponding development plan is provided in Figure 2, illustrating the development lots and associated road system.

#### 2.2.2 2023 Revised Draft Plan (LIV Communities)

A revised plan has been prepared as illustrated in Figure 3 and summarized below:

- West Block            25 single detached units and 197 townhouse units;
- East Block            14 single detached units and 115 townhouse units; and
- Total                    351 residential units.

It is noted that the industrial lands contained within the 1993 Draft Plan will be developed separately by the City of Orillia (referred to as the North Orillia Employment Lands) and thus have not been considered as part of LIV's 2023 residential subdivision. Further consideration for the North Orillia Employment Lands is provided in Section 3.1.1.

With respect to phasing, it is assumed that full build-out of the revised Inch Farm Residential Development will be achieved by 2028. Subsequent horizon years of 2033 (5 years beyond build-out) and 2038 (10 years beyond) will also be considered.



**Table 3: Trip Generation Estimates – 1993 Approved Draft Plan**

LAND USE & UNITS		AM PEAK HOUR			PM PEAK HOUR			SAT PEAK HOUR		
		In	Out	Total	In	Out	Total	In	Out	Total
single detached units	123	22	64	86	73	43	116	61	52	113
semi-detached units	46	7	15	22	15	11	26	13	14	26
<b>Totals</b>	<b>169</b>	<b>29</b>	<b>79</b>	<b>108</b>	<b>88</b>	<b>54</b>	<b>142</b>	<b>74</b>	<b>66</b>	<b>139</b>

**2.4.3 Trip Generation Estimates - 2023 Revised Draft Plan**

The trip estimates corresponding to the 2023 Revised Draft Plan are summarized in Table 4, with reference to location within the overall development (West Block and East Block as illustrated in Figure 3).

**Table 4: Trip Generation Estimates – 2023 Revised Draft Plan**

LAND USE & UNITS		AM PEAK HOUR			PM PEAK HOUR			SAT PEAK HOUR			
		In	Out	Total	In	Out	Total	In	Out	Total	
<b>West Block</b>	singles	25	5	13	18	15	9	24	12	11	23
	towns	197	29	65	95	64	48	112	54	58	112
	<b>Total</b>	<b>222</b>	<b>34</b>	<b>78</b>	<b>112</b>	<b>79</b>	<b>57</b>	<b>136</b>	<b>66</b>	<b>69</b>	<b>135</b>
<b>East Block</b>	singles	14	3	7	10	8	5	13	7	6	13
	towns	115	17	38	55	37	28	66	31	34	66
	<b>Total</b>	<b>129</b>	<b>20</b>	<b>45</b>	<b>65</b>	<b>46</b>	<b>33</b>	<b>79</b>	<b>38</b>	<b>40</b>	<b>78</b>
<b>Grand Total</b>		<b>351</b>	<b>54</b>	<b>124</b>	<b>177</b>	<b>124</b>	<b>90</b>	<b>215</b>	<b>105</b>	<b>109</b>	<b>214</b>
<b>Trip increase vs 169 Units</b>			<b>24</b>	<b>45</b>	<b>69</b>	<b>37</b>	<b>36</b>	<b>73</b>	<b>31</b>	<b>43</b>	<b>74</b>

The current residential development proposal will generate 177 trips in the AM peak hour, 215 trips in the PM peak and 214 trips in the Saturday peak hour.



As compared to the trip estimates associated with the 1993 approved draft plan (169 units), the increase in units will generate 69 more trips in the AM peak hour, 73 in the PM peak hour and 74 in the Saturday peak hour (which is considered a nominal increase – approximately 1 to 2 additional trips per minute).

#### 2.4.4 Trip Distribution & Assignment

The distribution of the site-generated traffic to the area road system reflects the following overall distribution, as maintained from the *Orillia West Transportation Study Update*:

- 20% to/from the west via Highway 12;
- 30% to/from the south via West Ridge Boulevard; and
- 50% to/from the east via Highway 12.

Significant traffic is assigned east along Highway 12, reflective of both traffic travelling to/from the built-up areas of Orillia (east of the subject site) and north/south via Highway 11.

The assignment of the site generated trips to the individual access points was based on the location of the residential units with respect to the access points and the directness of the internal road system.

The resulting site generated traffic volumes are indicated in Figure 5 and Figure 6, reflective of full build-out, considering the following development scenarios:

- 169 units as per the 1993 approved draft plan (Figure 5); and
- 351 units as per the 2023 revised draft plan (Figure 6).

In comparing the corresponding volume projections, the increased unit count will result in the following:

- 20 to 40 additional peak hour trips per direction on Murphy Road;
- 5 to 20 additional peak hour trips per direction on Highway 12; and
- 5 to 15 additional peak hour trips per direction on West Ridge Boulevard.

While the 2023 revised draft plan will result in additional volumes, the impacts will be somewhat comparable to those associated with the approved draft plan.

In considering the site access volumes, the following are noted:

- 54 to 65 vehicles per hour (vph) to use Street A via Uthoff Line (total of inbound and outbound directions) during the AM, PM and Saturday peak hours;
- 58 to 71 vph to use Street B via the future arterial;



## 3 Other Area Developments

### 3.1 DEVELOPMENT LISTING

There are a number of other developments within the immediate area that are currently under development or in the planning stage, with the expectation that they will be developed within the horizon years considered as part of this study. As illustrated in Figure 7, these include:

- North Orillia (formerly referred to as the Inch Farm Industrial Lands), West Orillia, Charter and Murphy Road Employment Lands;
- continued growth at Lakehead University;
- continued development at Stone Ridge Phase 1;
- development at Stone Ridge Phase 2;
- SmartCentres Development;
- Xchange Development (600 Harvie Settlement Road);
- Hydro One Development;
- OPP Development;
- 4 Mulcahy Court; and
- RioCan (former Walmart site).

Additional details/assumptions regarding each, as referenced from the above noted developments, are summarized below, as determined from the previously referenced studies and/or information provided by the City.

#### 3.1.1 North Orillia Employment Lands

The North Orillia Employment Lands, formerly considered as part of the Inch Farm Development, has 3.88 hectares of lands designated for prestige industrial development.

#### 3.1.2 West Orillia Employment Lands

The West Orillia Employment Lands have a total area of approximately 14 hectares (34.6 acres), of which 9.78 hectares (24.2 acres) are considered developable (i.e. net of road and SWM requirements). The employment lands include 17 industrial lots and will be served via a cul-de-sac with connection to Swinimer Drive. A total gross floor area equal to 20% of the developable area has been assumed (19,587 m<sup>2</sup> or 210,830 ft<sup>2</sup>).



developed into a commercial/retail use consisting of a 3,455 m<sup>2</sup> (37,200 ft<sup>2</sup>) gross floor area. This reflects approximately 20% lot coverage of the developable land.

### 3.1.12 RioCan Commercial

The RioCan property is an existing commercial development (former Walmart site) located on Monarch Drive. As per the RioCan website, two standalone buildings remain to be built within the existing property with a total gross floor area of 606 m<sup>2</sup> (6,523 ft<sup>2</sup>)

## 3.2 DEVELOPMENT TRAFFIC

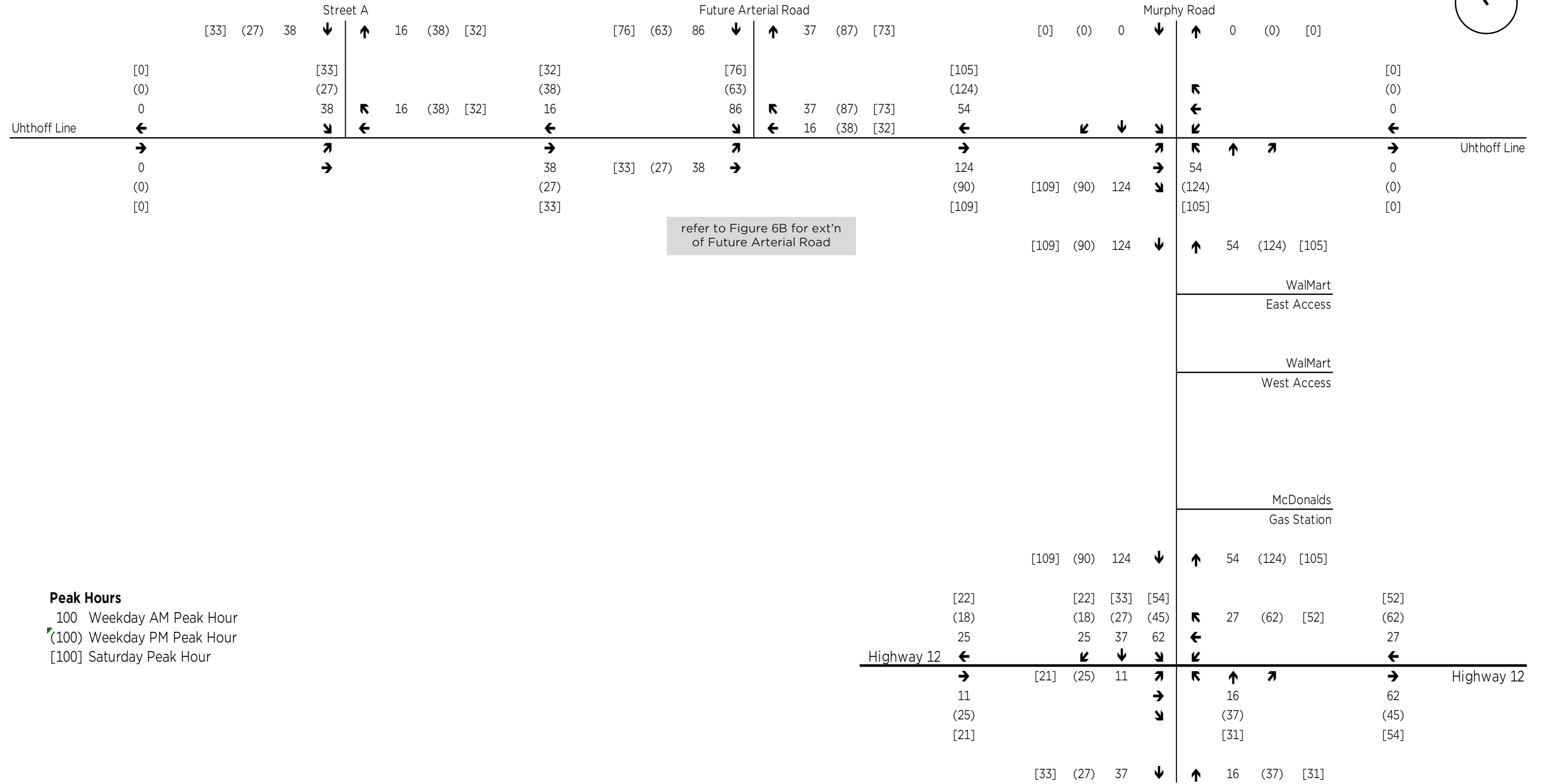
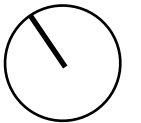
A summary of the trip estimates for the various developments considered (under the development assumptions previously presented) is provided in Table 5, considering full build-out of each. The associated traffic volumes anticipated through the study area network are illustrated in Appendix A, premised on the travel assumptions of the *Orillia West Transportation Study Update*.

**Table 5: Other Development Traffic**

DEVELOPMENT	AM PEAK HOUR			PM PEAK HOUR			SAT PEAK HOUR		
	In	Out	Total	In	Out	Total	In	Out	Total
North Orillia Employment Land	51	7	58	7	45	52	16	18	34
West Orillia Employment Lands	159	30	189	44	131	175	48	65	113
Charter Employment Lands	59	11	70	16	49	65	17	24	41
Murphy Road Employment Land	70	14	84	19	58	77	22	29	51
Lakehead University	655	185	840	269	571	840	336	224	560
Stone Ridge Phase 1	132	382	514	400	248	648	323	312	635
Stone Ridge Phase 2	241	722	963	811	476	1287	653	556	1209
Xchange Development	97	76	173	85	99	184	96	86	182
SmartCentres	36	22	58	113	123	236	145	134	279
Hydro One	158	20	178	26	145	171	43	43	86
OPP	54	7	61	9	49	58	15	15	30
4/8/10 Mulcahy Court	56	38	94	106	113	218	133	126	259
RioCan Commercial	4	2	6	12	13	25	15	14	30
<b>Total Trips</b>	<b>1,772</b>	<b>1,516</b>	<b>3,288</b>	<b>1,917</b>	<b>2,120</b>	<b>4,037</b>	<b>1,862</b>	<b>1,646</b>	<b>3,508</b>



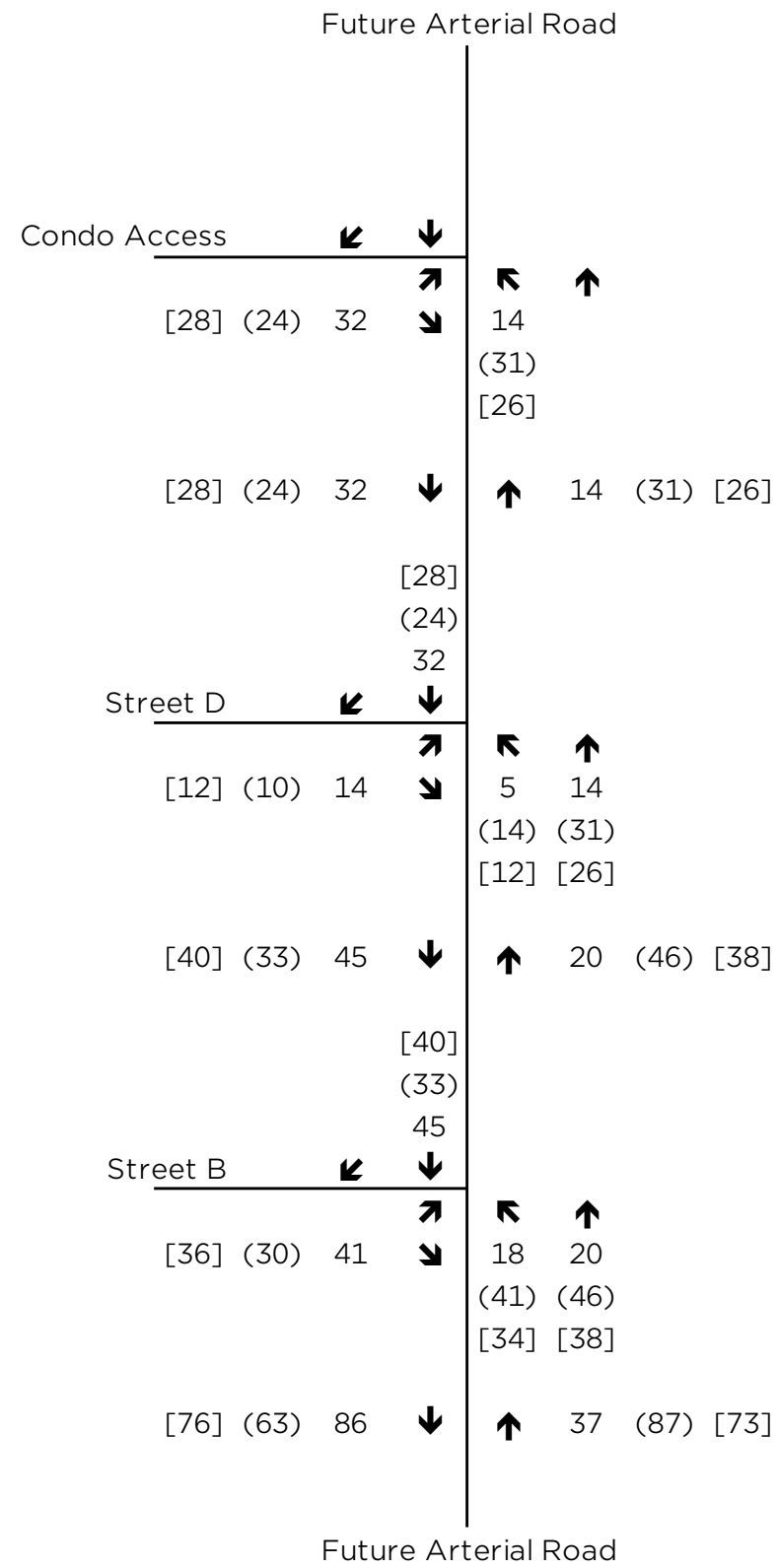
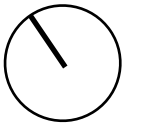




**Peak Hours**  
 100 Weekday AM Peak Hour  
 (100) Weekday PM Peak Hour  
 [100] Saturday Peak Hour

**INCH FARM RESIDENTIAL DEVELOPMENT**  
 Figure 6A: Inch Farm Site Traffic (2023 Revised Draft Plan - 351 Units)





refer to Figure 6A for the remainder of the road system



# APPENDIX K

## Area 3 Subdivision TIS (Crozier, 2024)

**TRAFFIC IMPACT STUDY UPDATE**

**AREA 3  
LIV (Hawk Ridge) LP  
FILE: 43T-99002**

**TOWNSHIP OF SEVERN**

**PREPARED BY:**

**C.F. CROZIER & ASSOCIATES INC.  
1 FIRST STREET, SUITE 200  
COLLINGWOOD, ON L9Y 1A1**

**ORIGINAL: MAY 2022  
UPDATE: JULY 2024**

**CFCA FILE NO. 1935-6135**

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



## 1.0 Executive Summary

C.F. Crozier & Associates Inc. was retained by LIV (Hawk Ridge) LP to complete a Traffic Impact Study (TIS) to support the Draft Plan of Subdivision for part of Lot 4, Concession 4 in the Township of Severn. The proposed development is referred to as Area 3 and is located to the west of Highway 11.

An original TIS was prepared prior to an Ontario Municipal Board (OMB) decision in September 2000 and a revised transportation review was completed in February 2005 (File: 43T-99002). An updated TIS was completed in May 2022 to account for updates to the Draft Plan and to fulfill the Draft Plan conditions. This TIS Update (February 2024) has been prepared to address recent comments provided by the Township's reviewed, dated October 13, 2023.

The proposed Conceptual Master Plan consists of 297 condominium townhouses, the existing HawkrIDGE Golf Course and 6.35 ha of industrial lands. Based on the permitted zoning, a lot coverage of 60% has been utilized as the gross floor area (GFA) of the industrial units. It is noted that the trip generation is based on an old plan that identified an industrial area of 6.47 ha. Applying a 60% lot coverage to the 6.47 ha equates to a GFA of 38,820 m<sup>2</sup> (417,855 ft<sup>2</sup>). This area has been maintained in this analysis to provide a conservative assessment. The Conceptual Master Plan residential statistics were used for the analysis of this report.

The future arterial roadway (referred to herein as "Industrial Road") is a continuation of the Inch Farm Arterial Road and divides the Draft Plan between residential and industrial areas. The arterial roadway will connect Uthhoff Line to Burnside Line when completed. In addition, the following key intersections within the study area have been analysed:

- Burnside Line/West Street N and the Highway 11 northbound ramps
- Burnside Line/West Street N and the Highway 11 southbound ramps
- Hurlwood Lane/Brodie Drive and Burnside Line
- Murphy Road and Uthhoff Line
- Highway 12 and Murphy Road/West Ridge Boulevard

Turning movement counts at the study intersections were undertaken by Spectrum Traffic Data Inc. on Tuesday April 12, 2022. Under the existing traffic conditions, the study intersections operate with a LOS "C" or better in the weekday a.m. and p.m. peak hours. The maximum control delay of 27.9 s and maximum volume-to-capacity ratio of 0.85 (EBT) at the intersection of Murphy Road/West Ridge Boulevard and Highway 12 indicate that the boundary road network is operating acceptably and has capacity for increases in traffic volumes.

In accordance with the agreed upon Terms of Reference, full build-out is expected by the year 2027. As such, 5 and 10-years beyond build-out (2032 and 2037) were also assessed. A growth rate of 2% was utilized to forecast background growth on the boundary road network. This growth rate was established based on historic growth along Highway 11.

Construction work on the reconfiguration of the Highway 11 overpass of Burnside Line/ West Street N that was ongoing at the time of the second TIS submission, has been completed at the time of this updated report. Construction drawings provided by the MTO illustrate that the eastbound volumes on Burnside Line will now have a separate on-ramp for merging southbound onto Highway 11. As this on-ramp will operate with free flow conditions, it has not been included as an intersection analysed under future background or future total conditions. A future 1.8 m sidewalk and 1.8 m bike lane are also noted on the construction drawings. The analysis contained herein accounts for the changes to the roadway and demonstrates the acceptable operations of the future ramps.

As previously stated, the new Industrial Road will connect Uhthoff Line and Burnside Line. The roadway will run parallel to Highway 11. Appendix A of the Inch Farm Arterial Road & Industrial Employment Land Environmental Study Report (ESR) (Tatham, December 2021) provides the expected roadway alignment. The ESR also outlines the redistribution of existing volumes with the opening of the roadway.

In addition to the Area 3 subdivision, the adjacent Inch Farm Subdivision and North Orillia Employment Lands will contribute additional volumes to the boundary road network. The trip assignment for the residential development and employment lands was included as part of the ESR. Tatham prepared an updated Traffic Impact Study for the residential development in January 2023, which was provided by LIV Communities.

Under the 2037 future background horizon the study intersections are expected to operate with a LOS "D" or better in the weekday a.m. and p.m. peak hours. A maximum control delay and volume-to-capacity ratio of 43.1 s and 0.90 (EBTR) is forecasted at the intersection of West Ridge Boulevard/Murphy Road and Highway 12.

These results indicate that the boundary road network is forecasted to continue operating acceptably with reserve capacity for additional traffic volumes at the majority of intersections. The MTO has previously noted that when right-turn movements exceed 200 vehicles per hour an exclusive right-turn lane should be considered. If implemented, an eastbound right-turn lane could mitigate the eastbound through movement critical v/c ratio at Highway 12 and West Ridge Boulevard.

A total of 149 a.m. and 174 p.m. two-way volumes are forecasted to be generated by the residential dwelling units, while 309 a.m. and 272 p.m. two-way volumes are forecasted to be generated by the industrial development. The trips generated were distributed to the boundary road network based on Transportation Tomorrow Survey (TTS) data. No additional signals were found to be warranted based on future total volumes.

The study intersections are anticipated to continue operating with a LOS "D" or better in the a.m. and p.m. peak hours with exception of Murphy Road and Uhthoff Line which is forecasted to operate with LOS "E" during p.m. peak hours. There is an opportunity to reorient the stop signs at the intersection, to allow for free-flowing conditions for the increased northbound left-turn movements. This would shift the delay to the low volume dead-end segment of Uhthoff Line.

The optimized intersection of West Ridge Boulevard/Murphy Road and Highway 12 is expected to operate with a maximum control delay of 45.2 s and maximum volume-to-capacity ratio of 0.91 (EBTR). The 95th percentile queue for the northbound left-turn movement at the intersection is expected to be 89.3 m which will be contained within the 110 m of parallel length available for queued vehicles. Additionally, the southbound volumes have an effective storage length of 135 m to the commercial access and Synchro forecasts the 95th percentile queue to be 135.5 m. SimTraffic modelling estimates the southbound left-turn 95th percentile queue to be 101.4 m, which can be contained within the available storage.

With the introduction of a protected-permissive signal for the southbound left-turn movement on Brodie Drive in the p.m. peak hour, the 60 m of storage provided is sufficient. In the a.m. peak hour, the westbound left-turn 95th percentile queue is anticipated to be 48.9 m, which can be accommodated within the available taper and is not expected to impact the through volumes.

These results indicate that the boundary road network is forecast to continue operating acceptably. As previously stated under future background conditions, an eastbound right turn lane on Highway 12 at West Ridge Boulevard should be considered by the MTO should volumes reach their 200-vehicle threshold in the future. An assessment of the operations at the internal residential and industrial

accesses was performed. The site accesses are anticipated to operate with a LOS “B” or better with minimal delays and excess capacity. No operational concerns are forecasted at the internal site accesses.

The improvements outlined in **Table E1** are both planned background improvements as well as future background and future total recommendations. Signal timings should be continually monitored by the MTO and municipalities to confirm when optimization is required.

**Table E1: Network Improvements**

Location	Improvement	Timeline	Intention	Responsibility
Planned Background Improvement				
Highway 11 Overpass on Burnside Line	<ul style="list-style-type: none"> <li>Relocation of Highway 11 Southbound on-ramp on Burnside Line as a right-in/right-out south leg access just east of Hurlwood Line/Brodie Drive and Burnside Line</li> <li>Construction of westbound outbound dual lanes at Highway 11 Southbound off-ramp and Burnside Line.</li> </ul>	Completed 2024	Planned Highway Improvements	MTO
Recommended Background Improvement				
Murphy Road/West Ridge Boulevard and Highway 12	<ul style="list-style-type: none"> <li>Optimization of signal timings and increase of cycle length to 120 s.</li> </ul>	2027	In support of the Inch Farm development	MTO
Murphy Road and Uthoff Line	<ul style="list-style-type: none"> <li>Consideration for reorientation of two-way stop control</li> </ul>	2027	In support of development	LIV Communities
Industrial Road	<ul style="list-style-type: none"> <li>Construction of Industrial Road (arterial)</li> <li>Creation of T-intersection at Industrial Road and Hurlwood Lane</li> <li>Creation of T-intersection at Industrial Road and Uthoff Line</li> </ul>	2027	In support of development	LIV Communities
Industrial Road/Brodie Drive and Burnside Line	<ul style="list-style-type: none"> <li>Addition of a southbound right-turn lane on Brodie Drive</li> </ul>	2027	In support of development	LIV Communities
	<ul style="list-style-type: none"> <li>Optimization of signal timings and increase of cycle length to 75 s with a southbound-left protected-permissive phase in the p.m. peak hour.</li> </ul>	2032	In support of development	LIV Communities
Murphy Road/West Ridge Boulevard and Highway 12	<ul style="list-style-type: none"> <li>Eastbound right-turn lane</li> </ul>	2032	Support operation of more than 200 right-turning vehicles	MTO
Recommended Future Improvement				
Industrial Road	<ul style="list-style-type: none"> <li>Industrial Road transit stops</li> </ul>	TBD	In support of development	Orillia Transit

Several of the proposed private residential accesses have reduced spacing from the 200 m recommended by the Transportation Association of Canada for arterial roads. This distance is recommended to accommodate back-to-back left turn lanes. However, the Industrial Road is proposed to have a two-way left-turn lane which will accommodate any queueing.

Based on the internal assessment, the forecasted 95<sup>th</sup> percentile left-turn queue is anticipated to be less than 5 m and can be accommodated between accesses without conflict. Exact access locations will be finalized through Site Plan Applications.

The required intersection sight distances were determined to be 130 m for a posted speed limit of 50 km/h (design speed of 60 km/h). With the exception of the south access to Block 2, all proposed access location will achieve a minimum of 130 m of sight distance. ‘

The southern access to Block 2 will achieve more than 130 m of sight distance to the north. To the south, 98 m of linear sight distance (>40 km/h design speed requirement of 85m) can be achieved within the limits of the ROW. The field of vision for a person looking to make a left turn may extend past this point. Approaching vehicles will be on the curve and any left-turning vehicles will be slowing down. Additionally, vehicles exiting the access will have the centre left-turn lane available for two-stage gap acceptance, if required. Therefore, maintaining a full-moves access is recommended.

The emergency access proposed for Block 3 will achieve 130 m of sight distance to the east, as long as future signage and vegetation is trimmed back along the edge of the right-of-way (ROW). It is recommended that future access to the industrial block be aligned with the access to Block 3 to avoid left-turn conflicts and delays.

The proposed cross-section for Industrial Road illustrates that the roadway will have a 1.5 m sidewalk on one side and a 3.0 m sidewalk/multi-use path on the opposite side. These facilities will provide pedestrians and cyclists with connections to the proposed sidewalks and bike lanes on Burnside Line. The analysis described herein was prepared based on the Master Concept Plan, dated April 27, 2023. Any minor changes to the Plan will not materially impact the conclusions of this report.

It is concluded that the proposed development can be supported from a traffic operations perspective, with the noted recommendations.



## 2.0 Introduction

### 2.1 Background

C.F. Crozier & Associates Inc. (Crozier) was retained by LIV (Hawk Ridge) LP to complete a Traffic Impact Study (TIS) to support the Draft Plan of Subdivision for part of Lot 4, Concession 4 in the Township of Severn (Township). The proposed development is referred to as Area 3 and is located to the west of Highway 11.

An original TIS was prepared prior to an Ontario Municipal Board (OMB) decision in September 2000 and a revised transportation review was completed in February 2005 (File: 43T-99002). An updated TIS was completed in May 2022 to account for updates to the Draft Plan and fulfill the Draft Plan conditions. This TIS update (July 2023) has been prepared to address recent comments provided by the Township and changes to the Draft Plan.

The current Draft Plan (dated May 4, 2022) has been included as **Figure 1**. The Conceptual Master Plan (dated April 27, 2023) has been included as **Figure 2**.

### 2.2 Purpose & Scope

The purpose of the study is to assess the impacts of the proposed development on the boundary road network and to recommend warranted mitigation measures. The study reviewed aspects of the proposed development from a transportation engineering perspective including the forecasted trip generation of the proposed development and the existing, future background, and future total traffic operations at the study intersections.

The Traffic Impact Study was conducted in accordance with the original Terms of Reference circulated and based on comments provided by the Township of Severn, City of Orillia, and Ministry of Transportation (MTO). A Comment Response Memo has been prepared to address comments received on the second submission from the Township's reviewer, dated October 13, 2023.

**Appendix A** contains the Terms of Reference correspondence with the updated work plan and **Appendix B** contains the Comment Response Memo.

### 2.3 Development Proposal

The proposed Draft Plan of Subdivision consists of the following:

- 297 condominium townhouses
- The existing Hawkridge Golf Course
- 6.35 ha of industrial lands
- Internal road network

Based on the permitted zoning, 60% lot coverage of the industrial lands has been utilized to establish the gross floor area (GFA) of the industrial units. It is noted that the trip generation is based on an old plan that identified an industrial area of 6.47 ha. Applying a 60% lot coverage to the 6.47 ha equates to a GFA of 38,820 m<sup>2</sup> (417,855 ft<sup>2</sup>). This area has been maintained in this analysis to provide a conservative assessment.

The future arterial roadway (referred to herein as "Industrial Road") is a continuation of the Inch Farm Arterial Road and divides the Draft Plan between residential and industrial areas. The arterial roadway will connect Uthhoff Line to Burnside Line when completed.

## 5.0 Site Generated Traffic

### 5.1 Trip Generation

The development will result in additional vehicles on the boundary road network that previously did not exist.

The trip generation of the development was forecasted using the fitted curve equations provided in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11<sup>th</sup> Edition. Land use code (LUC) 215 “Single-Family Attached Housing” and LUC 110 “General Light Industrial” were used to forecast trips generated by the proposed development with exception of the p.m. peak hour for the General Light Industrial as the average rate was selected for a more conservative assessment.

Based on the permitted zoning, 60% lot coverage of the industrial lands has been utilized to estimate the gross floor area (GFA) of the industrial units. This equates to a GFA of 38,820 m<sup>2</sup> (417,855 ft<sup>2</sup>).

**Table 9** summarizes the trip generation of the proposed development and **Appendix L** contains the relevant ITE excerpts.

**Table 9: Trip Generation**

Land Use	Peak Hour	Number of Trips		
		Inbound	Outbound	Total
LUC 215 “Single-Family Attached Housing” (297 units)	Weekday A.M.	37	112	149
	Weekday P.M.	103	71	174
LUC 110 “General Light Industrial” (417,855 ft <sup>2</sup> )	Weekday A.M.	272	37	309
	Weekday P.M.	38	234	272
<b>TOTAL</b>	<b>Weekday A.M.</b>	<b>309</b>	<b>149</b>	<b>458</b>
	<b>Weekday P.M.</b>	<b>141</b>	<b>305</b>	<b>446</b>

### 5.2 Trip Distribution & Assignment

The trips generated by the residential and industrial development were distributed to the boundary road network based on Transportation Tomorrow Survey (TTS) data. TTS data from Zone 8657 (Severn) and 8682 (Orillia) was utilized for the residential development and Zone 8657 (Severn) and 8685 (Orillia) was utilized for the industrial development. The different Orillia zones were used due to their variance in residential and commercial/industrial areas. **Table 10** summarizes the distribution that was applied for both the a.m. and p.m. peak hours.

The residential trip distribution is illustrated in **Figure 11**, with the corresponding trip assignment illustrated in **Figure 12**. The industrial trip distribution is illustrated in **Figure 13**, with the corresponding trip assignment illustrated in **Figure 14**.

**Table 10: Trip Distribution**

To/From The	Residential	Industrial
South on Highway 11 via Burnside Line	40%	45%
North via Highway 11	5%	5%
East via Burnside Line/West Street	20%	25%
West via Burnside Line	10%	10%
South via Murphy Road/West Ridge	10%	0%
West via Highway 12 WB	5%	5%
South on Highway 11 via Highway 12 EB	10%	10%

## 6.0 Total Future Conditions

### 6.1 Future Total Intersection Modelling

The traffic impacts arising from the proposed development were assessed based on the site generated traffic illustrated in **Figure 12** and **Figure 14** being superimposed on the future background traffic volumes in **Figures 8, 9, and 10**. The resulting 2027, 2032, and 2037 future total traffic volumes for the weekday a.m. and p.m. peak hours are illustrated in **Figures 15, 16, and 17**, respectively.

**Figure 18** illustrates the future traffic control and lane configurations.

### 6.2 Signal Warrant

Signal warrants were evaluated for the intersections of Uthhoff Line and Industrial Road and Uthhoff Line and Murphy Road under the 2037 horizon year. The analysis followed the procedures specified in Chapter 4 of the "Ontario Traffic Manual – Book 12", March 2012. Justification 7 was used to evaluate the projected volumes on the proposed Industrial Road and the Uthhoff Line intersection. For the Uthhoff Line and Murphy Road intersection, Justifications 1 (Minimum Vehicular Volume), 2 (Delay to Cross Traffic), and 3 (Combination of Justifications 1 and 2) were applied using an 8-hr format.

Signal warrants results indicate that signals are not warranted at the two requested intersections. **Appendix M** contains the signal warrants results.

### 6.3 Intersection Operations

**Table 11, Table 12** and, **Table 13** outline the future total traffic operations for the 2027, 2032 and 2037 horizon years, respectively. **Appendix F** contains Level of Service definitions, and **Appendix G** contains detailed capacity analysis worksheets. Signal optimizations under future background conditions have been carried forward to the future total horizons.

# APPENDIX L

## Signal Warrant



**TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)  
PER OTM BOOK 12**

**Project and Scenario Summary**

<b>Project</b>	Hawk Ridge	<b>Project Number</b>	1915-6133
		<b>Date</b>	2024.08.21
<b>Horizon</b>	2045	<b>Analyst</b>	K. Hagan

**Study Intersection Summary**

<b>Major Street</b>	Division Road	<b>Direction</b>	East/West
<b>Minor Street</b>	Uthhoff Line	<b>Direction</b>	North/South

**Intersection Details for Warrant Parameters**

<b>Flow Conditions</b>	Restricted Flow (Urban)	<b>Number of Lanes</b>	1
<b>T-Intersection?</b>	No	<b>Intersection Type</b>	Existing

Notes: Free Flow (Rural) is used when the operating speed is greater than or equal to 70km/h. Restricted Flow (Urban) is used otherwise.  
The Number of Lanes greater than 1 only needs to be for one direction along the major road.  
An intersection is considered New if at least 1-leg is added to an existing intersection.

**Input Volumes and Average Hourly Volume Determination**

Peak Hour	Major: Division Road						Minor: Uthhoff Line						Pedestrians Crossing Major Street
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	0	207	10	44	166	5	5	41	47	8	26	2	0
PM	5	295	17	49	373	20	28	49	94	8	44	2	0
AHV	1	126	7	23	135	6	8	23	35	4	18	1	0

The AHV is determined by the availability of the peak hour estimates. If both Peak 1 and Peak 2 Peak Hour Volume estimates are available then AHV = (Peak1phv + Peak2phv)/4. In only the case that one estimate is available then AHV = Peak1phv/2 or Peak2phv/2.

**Justification 7 - OTM Book 12**

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT 1 LANE HIGHWAYS		MINIMUM REQUIREMENT 2 OR MORE LANE HIGHWAYS		COMPLIANCE		
		Free Flow	Restricted Flow	Free Flow	Restricted Flow	Sectional		Entire Percentage
						Numerical	Percentage	
1. Minimum Vehicular Volume	A. Vehicle Volume, All Approaches (Avg. Hour)	480	720	600	900	387	53.8%	52.4%
	B. Vehicle Volume, Along Minor Streets (Avg. Hour)	120	170	120	170	89	52.4%	
2. Delay to Cross Traffic	A. Vehicle Volume, Major Street (Avg. Hour)	480	720	600	900	298	41.4%	41.4%
	B. Combined Vehicle and Pedestrian Volume Crossing Artery From Minor Streets (Avg. Hour)	50	75	50	75	35	46.7%	
Applicable Threshold			<b>X</b>					

Note: For T-intersections the thresholds for 1B have been increased by 50% per OTM Book 12.  
Existing Intersections Require 120% Justification  
New/Proposed Intersections Require 150% Justification

Percent Compliance: 52.4%  
Percentage Required to be Justified: 120%

**Signal Justification 7 Met:**       Yes       No



**TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)  
PER OTM BOOK 12**

**Project and Scenario Summary**

<b>Project</b>	Hawk Ridge	<b>Project Number</b>	1915-6133
		<b>Date</b>	2024.08.21
<b>Horizon</b>	2045	<b>Analyst</b>	K. Hagan

**Study Intersection Summary**

<b>Major Street</b>	Unthoff Line	<b>Direction</b>	North/South
<b>Minor Street</b>	Industrial Road	<b>Direction</b>	East/West

**Intersection Details for Warrant Parameters**

<b>Flow Conditions</b>	Restricted Flow (Urban)	<b>Number of Lanes</b>	1
<b>T-Intersection?</b>	Yes	<b>Intersection Type</b>	New

Notes: Free Flow (Rural) is used when the operating speed is greater than or equal to 70km/h. Restricted Flow (Urban) is used otherwise.  
The Number of Lanes greater than 1 only needs to be for one direction along the major road.  
An intersection is considered New if at least 1-leg is added to an existing intersection.

**Input Volumes and Average Hourly Volume Determination**

Peak Hour	Major: Unthoff Line						Minor: Industrial Road						Pedestrians Crossing Major Street
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
AM	0	168	189	34	188	0	0	0	0	159	0	12	0
PM	0	420	193	23	157	0	0	0	0	199	0	36	0
AHV	0	147	96	14	86	0	0	0	0	90	0	12	0

The AHV is determined by the availability of the peak hour estimates. If both Peak 1 and Peak 2 Peak Hour Volume estimates are available then AHV = (Peak1phv + Peak2phv)/4. In only the case that one estimate is available then AHV = Peak1phv/2 or Peak2phv/2.

**Justification 7 - OTM Book 12**

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT 1 LANE HIGHWAYS		MINIMUM REQUIREMENT 2 OR MORE LANE HIGHWAYS		COMPLIANCE		
		Free Flow	Restricted Flow	Free Flow	Restricted Flow	Sectional		Entire Percentage
						Numerical	Percentage	
1. Minimum Vehicular Volume	A. Vehicle Volume, All Approaches (Avg. Hour)	480	720	600	900	445	61.8%	40.0%
	B. Vehicle Volume, Along Minor Streets (Avg. Hour)	180	255	180	255	102	40.0%	
2. Delay to Cross Traffic	A. Vehicle Volume, Major Street (Avg. Hour)	480	720	600	900	343	47.6%	47.6%
	B. Combined Vehicle and Pedestrian Volume Crossing Artery From Minor Streets (Avg. Hour)	50	75	50	75	90	120.0%	
Applicable Threshold			<b>X</b>					

Note: For T-intersections the thresholds for 1B have been increased by 50% per OTM Book 12.  
Existing Intersections Require 120% Justification  
New/Proposed Intersections Require 150% Justification

Percent Compliance: 47.6%  
Percentage Required to be Justified: 150%

**Signal Justification 7 Met:**  Yes  No



**TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)  
PER OTM BOOK 12**

**Project and Scenario Summary**

<b>Project</b>	Hawk Ridge	<b>Project Number</b>	1915-6133
		<b>Date</b>	2024.08.21
<b>Horizon</b>	2045	<b>Analyst</b>	K. Hagan

**Study Intersection Summary**

<b>Major Street</b>	Uthoff Line	<b>Direction</b>	North/South
<b>Minor Street</b>	Murphy Road	<b>Direction</b>	East/West

**Intersection Details for Warrant Parameters**

<b>Flow Conditions</b>	Restricted Flow (Urban)	<b>Number of Lanes</b>	1
<b>T-Intersection?</b>	No	<b>Intersection Type</b>	Existing

Notes: Free Flow (Rural) is used when the operating speed is greater than or equal to 70km/h. Restricted Flow (Urban) is used otherwise.  
The Number of Lanes greater than 1 only needs to be for one direction along the major road.  
An intersection is considered New if at least 1-leg is added to an existing intersection.

**Input Volumes and Average Hourly Volume Determination**

Peak Hour	Major: Uthoff Line						Minor: Murphy Road						Pedestrians Crossing Major Street
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
AM	0	0	0	0	0	317	331	5	2	0	13	0	0
PM	2	0	0	2	0	350	609	7	0	4	4	4	0
AHV	1	0	0	1	0	167	235	3	1	1	4	1	0

The AHV is determined by the availability of the peak hour estimates. If both Peak 1 and Peak 2 Peak Hour Volume estimates are available then AHV = (Peak1phv + Peak2phv)/4. In only the case that one estimate is available then AHV = Peak1phv/2 or Peak2phv/2.

**Justification 7 - OTM Book 12**

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT 1 LANE HIGHWAYS		MINIMUM REQUIREMENT 2 OR MORE LANE HIGHWAYS		COMPLIANCE		
		Free Flow	Restricted Flow	Free Flow	Restricted Flow	Sectional		Entire Percentage
						Numerical	Percentage	
1. Minimum Vehicular Volume	A. Vehicle Volume, All Approaches (Avg. Hour)	480	720	600	900	414	57.5%	57.5%
	B. Vehicle Volume, Along Minor Streets (Avg. Hour)	120	170	120	170	245	144.1%	
2. Delay to Cross Traffic	A. Vehicle Volume, Major Street (Avg. Hour)	480	720	600	900	169	23.5%	23.5%
	B. Combined Vehicle and Pedestrian Volume Crossing Artery From Minor Streets (Avg. Hour)	50	75	50	75	240	320.0%	
Applicable Threshold			<b>X</b>					

Note: For T-intersections the thresholds for 1B have been increased by 50% per OTM Book 12.  
Existing Intersections Require 120% Justification  
New/Proposed Intersections Require 150% Justification

Percent Compliance: 57.5%  
Percentage Required to be Justified: 120%

**Signal Justification 7 Met:**       Yes       No



**TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)  
PER OTM BOOK 12**

**Project and Scenario Summary**

<b>Project</b>	Hawk Ridge	<b>Project Number</b>	1915-6133
		<b>Date</b>	2024.08.21
<b>Horizon</b>	2045	<b>Analyst</b>	K. Hagan

**Study Intersection Summary**

<b>Major Street</b>	Industrial Road	<b>Direction</b>	East/West
<b>Minor Street</b>	Hurlwood Lane	<b>Direction</b>	North/South

**Intersection Details for Warrant Parameters**

<b>Flow Conditions</b>	Restricted Flow (Urban)	<b>Number of Lanes</b>	1
<b>T-Intersection?</b>	Yes	<b>Intersection Type</b>	New

Notes: Free Flow (Rural) is used when the operating speed is greater than or equal to 70km/h. Restricted Flow (Urban) is used otherwise.  
The Number of Lanes greater than 1 only needs to be for one direction along the major road.  
An intersection is considered New if at least 1-leg is added to an existing intersection.

**Input Volumes and Average Hourly Volume Determination**

Peak Hour	Major: Industrial Road						Minor: Hurlwood Lane						Pedestrians Crossing Major Street
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	0	174	0	0	99	92	0	0	0	194	0	0	0
PM	0	150	0	0	178	139	0	0	0	176	0	0	0
AHV	0	81	0	0	69	58	0	0	0	93	0	0	0

The AHV is determined by the availability of the peak hour estimates. If both Peak 1 and Peak 2 Peak Hour Volume estimates are available then AHV = (Peak1phv + Peak2phv)/4. In only the case that one estimate is available then AHV = Peak1phv/2 or Peak2phv/2.

**Justification 7 - OTM Book 12**

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT 1 LANE HIGHWAYS		MINIMUM REQUIREMENT 2 OR MORE LANE HIGHWAYS		COMPLIANCE		
		Free Flow	Restricted Flow	Free Flow	Restricted Flow	Sectional		Entire Percentage
						Numerical	Percentage	
1. Minimum Vehicular Volume	A. Vehicle Volume, All Approaches (Avg. Hour)	480	720	600	900	301	41.8%	36.5%
	B. Vehicle Volume, Along Minor Streets (Avg. Hour)	180	255	180	255	93	36.5%	
2. Delay to Cross Traffic	A. Vehicle Volume, Major Street (Avg. Hour)	480	720	600	900	208	28.9%	28.9%
	B. Combined Vehicle and Pedestrian Volume Crossing Artery From Minor Streets (Avg. Hour)	50	75	50	75	93	124.0%	
Applicable Threshold			<b>X</b>					

Note: For T-intersections the thresholds for 1B have been increased by 50% per OTM Book 12.  
Existing Intersections Require 120% Justification  
New/Proposed Intersections Require 150% Justification

Percent Compliance: 36.5%  
Percentage Required to be Justified: 150%

**Signal Justification 7 Met:**  Yes  No



# APPENDIX M

## Auxiliary Turn Lane Warrant

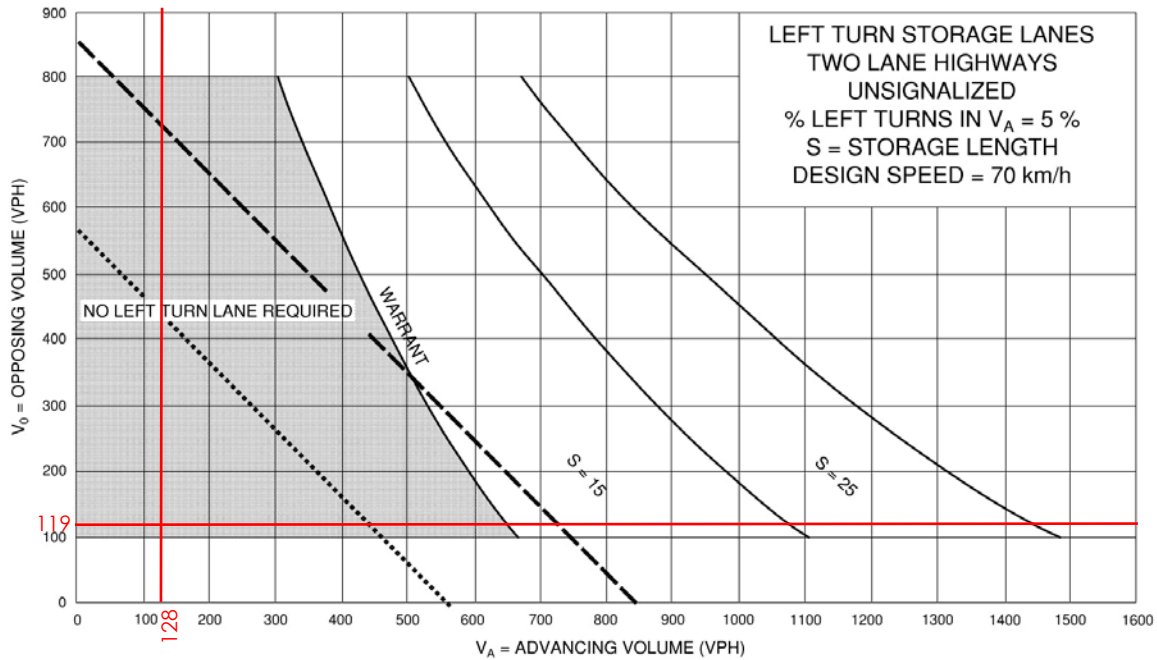
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**FOR**  
**TAC GEOMETRIC DESIGN GUIDE (GDG) FOR**  
**CANADIAN ROADS**

APRIL 2020

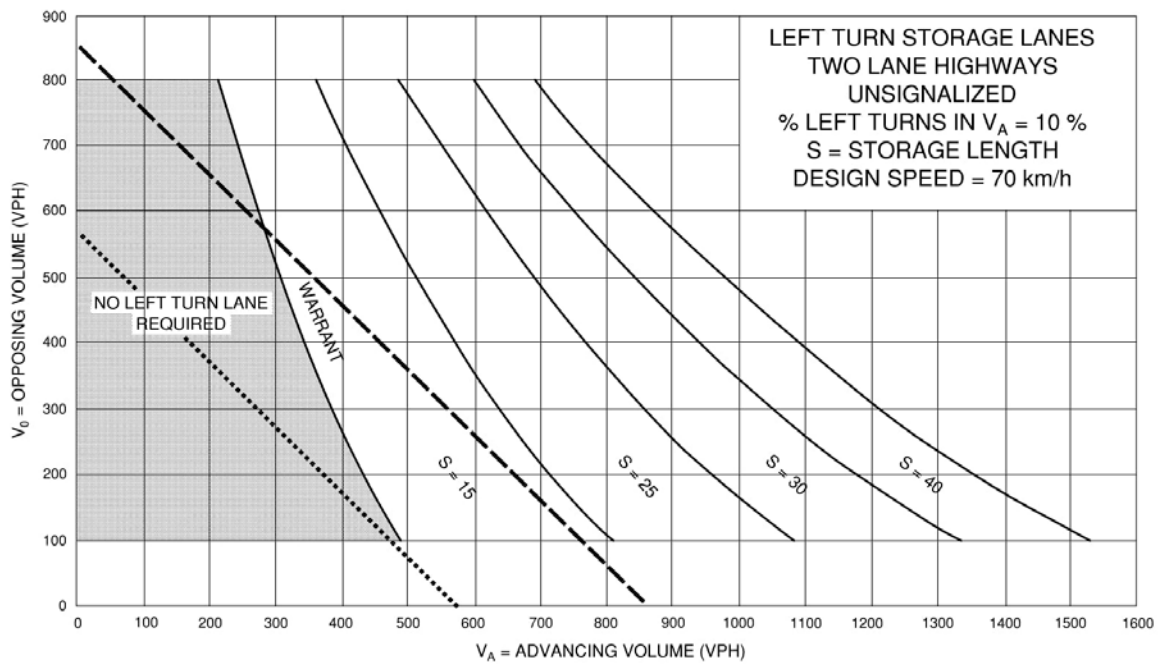
STANDARDS &  
SPECIFICATIONS BRANCH  
DESIGN STANDARDS &  
SPECIFICATIONS OFFICE

**Exhibit 9A-11**

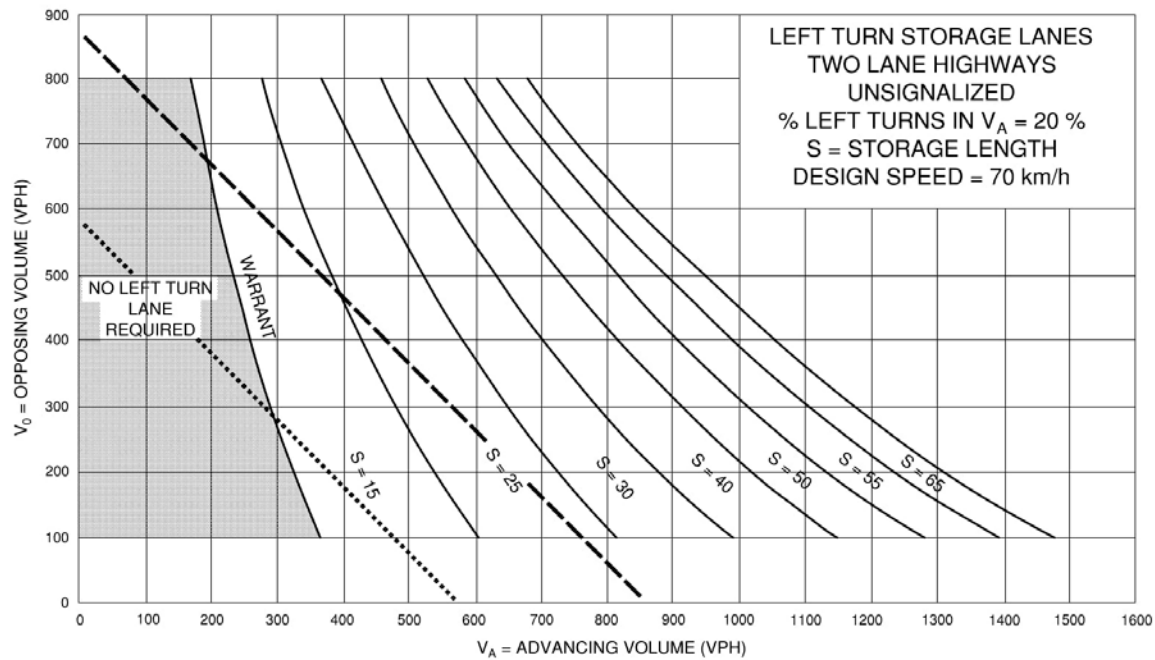
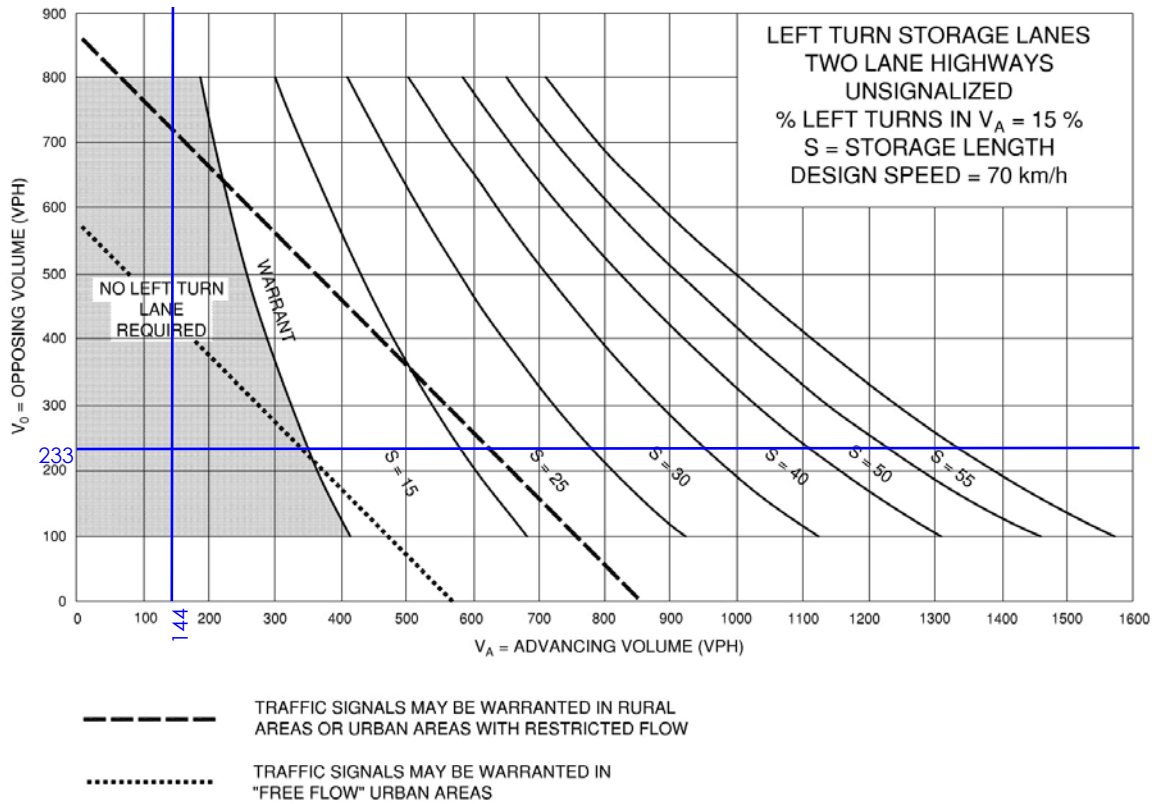
**Uthhoff Line & North Site Access 1  
2045 AM Peak Hour Volumes**



- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW
- ..... TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

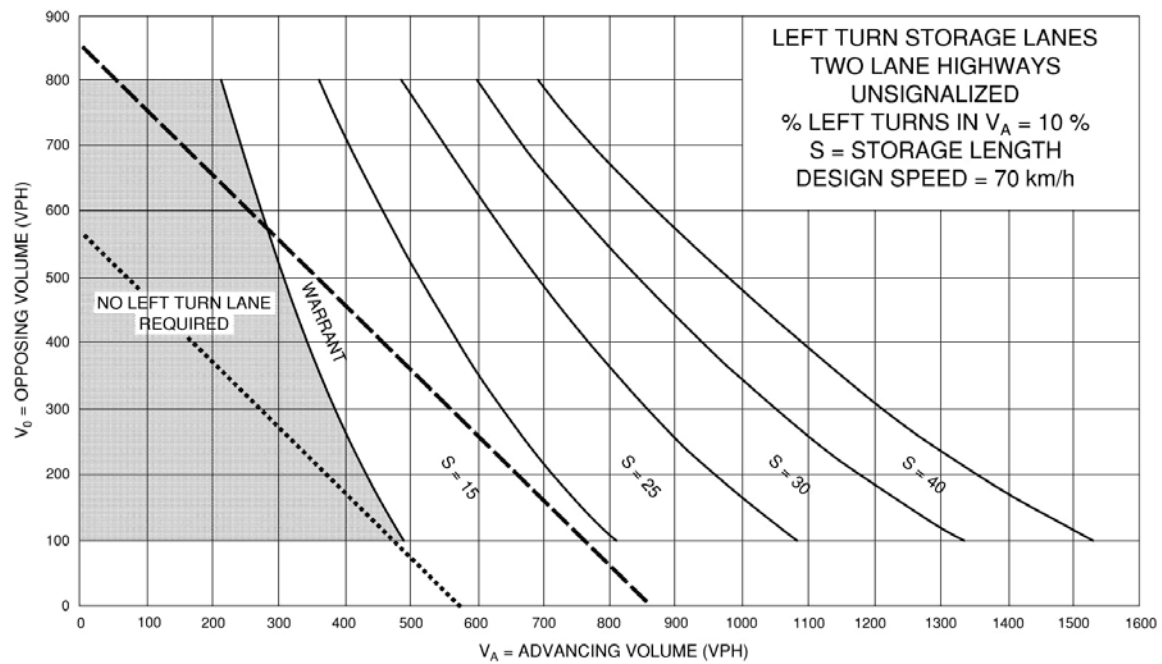
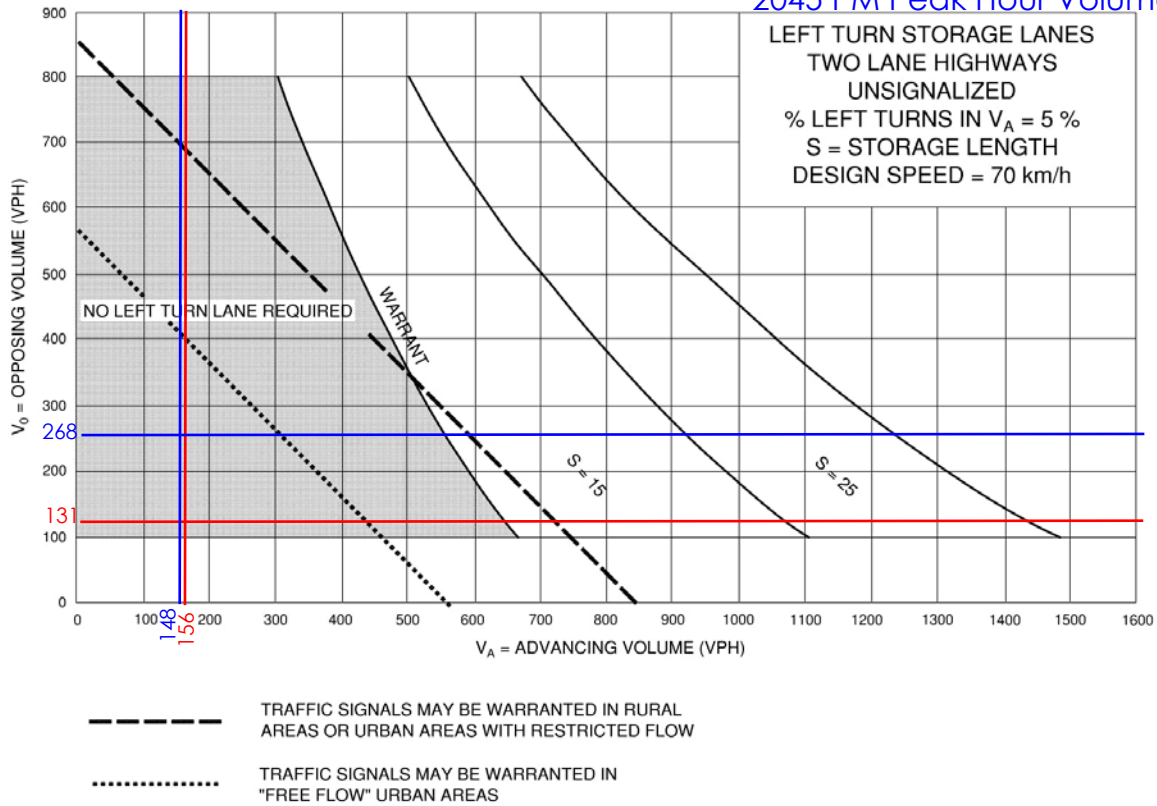


**Exhibit 9A-12** Uthhoff Line & North Site Access 1  
2045 PM Peak Hour Volumes



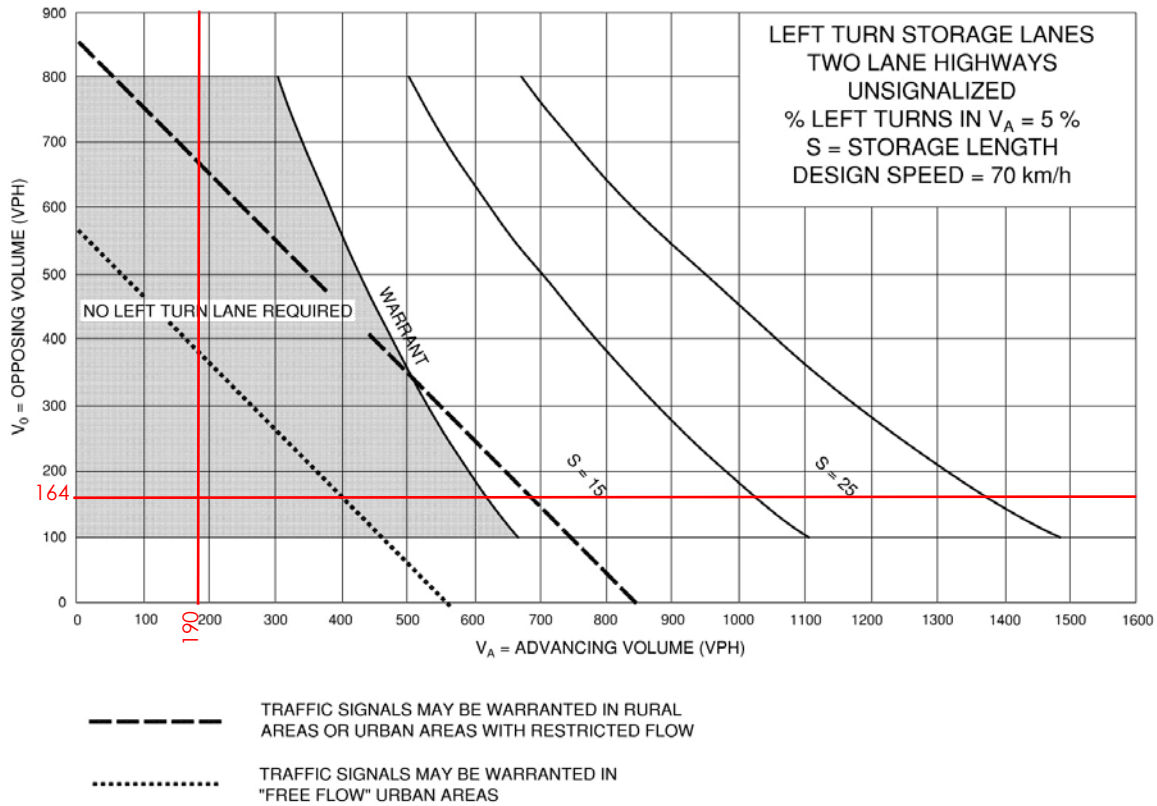
Uthoff Line & North Site Access 2  
 2045 AM Peak Hour Volumes  
 2045 PM Peak Hour Volumes

**Exhibit 9A-11**

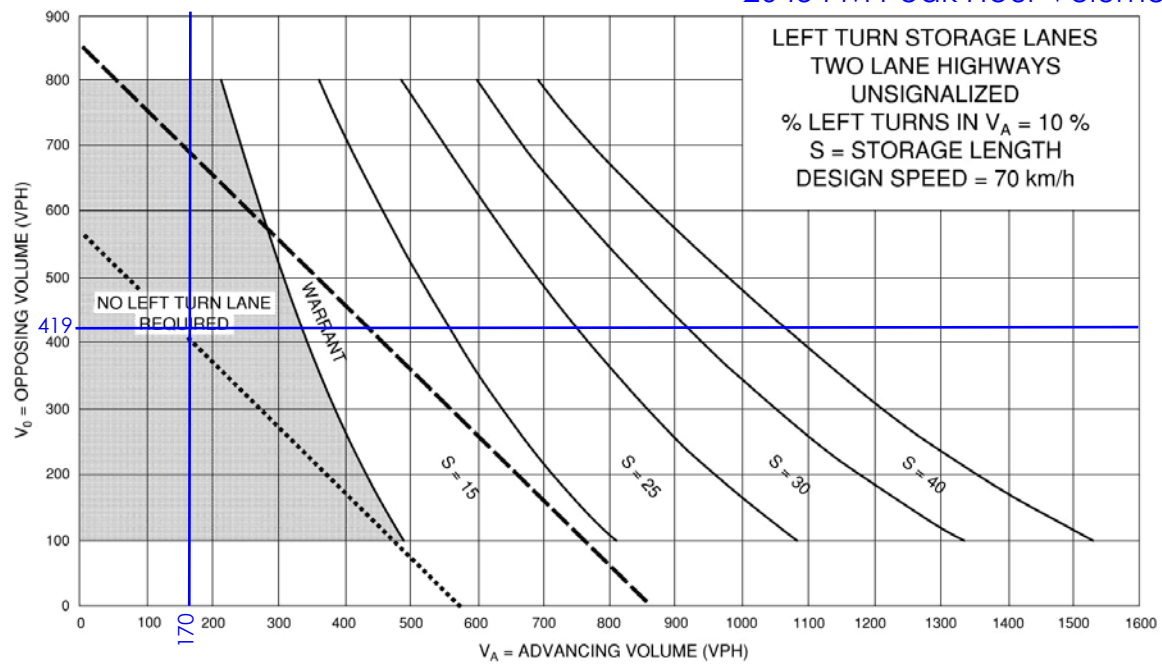


**Exhibit 9A-11**

**Uthhoff Line & South Site Access  
2045 AM Peak Hour Volumes**

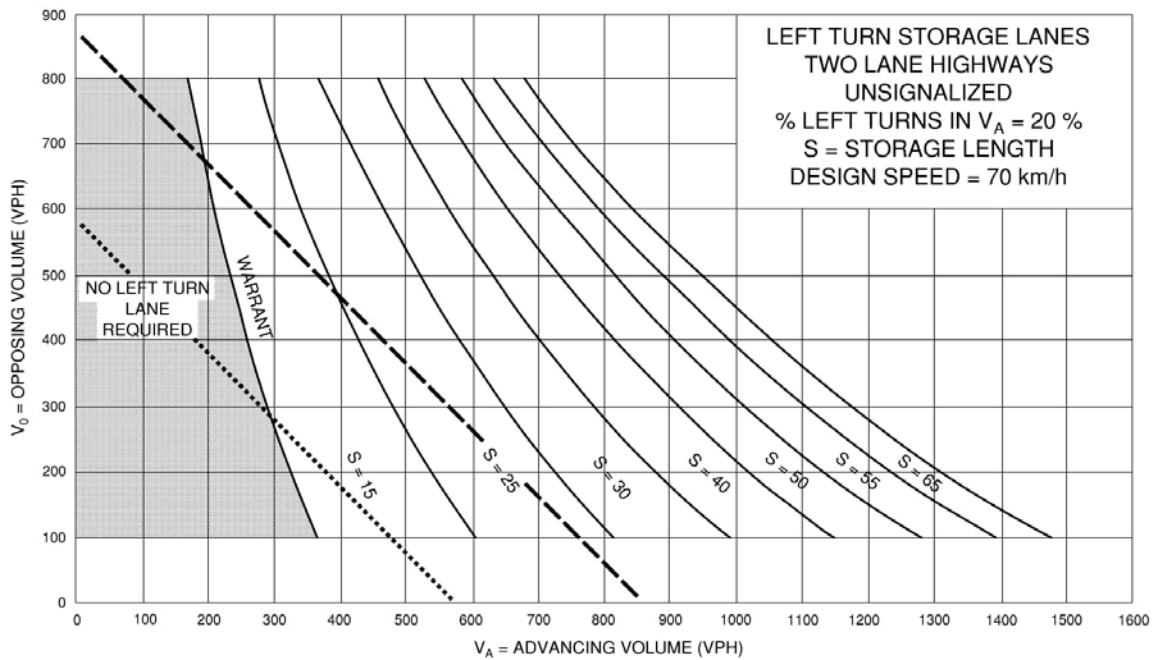
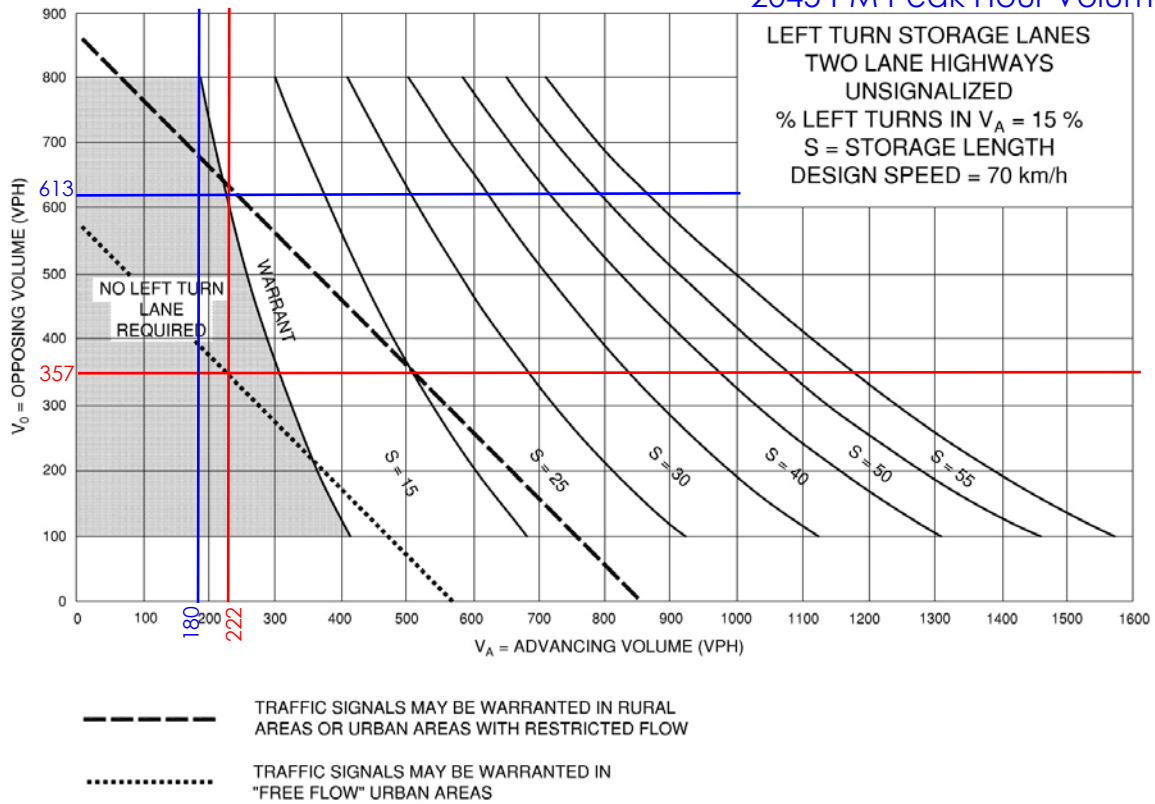


**Uthhoff Line & South Site Access  
2045 PM Peak Hour Volumes**



Uthhoff Line & Industrial Road  
 2045 AM Peak Hour Volumes  
 2045 PM Peak Hour Volumes

**Exhibit 9A-12**



# APPENDIX N

## Division Road West Intersection Photos



### Uthhoff Line at Division Road West



Uthhoff Line looking northeast along Division Road West. Drivers at the stop bar are unable to see approaching traffic from more than 100 m when there are leaves on the trees.



Uthhoff Line looking northwest along Division Road West. Drivers are unable to see approaching traffic from more than 50 m. Vehicles are approaching the intersection downhill and the speed limit increases from 60 km/h to 80 k/h just east of the intersection. Drivers must move forward on Uthhoff Line to see along the roadway.





Uthoff Line looking southeast along Division Road West.  
Drivers at the stop bar are unable to see more than 30 m when the plants have foliage.

**Burnside Line at Division Road West**



Division Road West looking northeast along Burnside Line.  
Currently there is construction equipment impacting sightlines. Google Streetview imagery shows that sightlines are adequate.





Division Road West looking southeast along Burnside Line.  
At the stop bar drivers can see approaching traffic from approximately 140 m.



Division Road West looking southwest along Burnside Line.  
Drivers at the stop bar are unable to see more than 70 m when the plants have foliage.