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Green Acres Residential Development

Halifax Regional Municipality

Traffic Impact Study

Final Report

Prepared by:
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Prepared for:
DesignPoint Engineering & Surveying

November 2015

November 10, 2015

Mr. Andrew Forsythe, P.Eng.
Principal
DesignPoint Engineering and Surveying
200 Waterfront Drive, Suite 100
Bedford, NS B4A 4J4

Dear Mr. Forsythe:

RE: A Traffic Impact Assessment of the proposed Green Acres Residential Development

The GRIFFIN transportation group inc. is pleased to present the results of the enclosed traffic impact study carried out in support of the planning approval process for the proposed Green Acres Residential development, located on the west side of the Herring Cove Road corridor in the community of Spryfield, Halifax Regional Municipality. It is understood that a total of 1,000 detached and semi-detached housing units are being planned on a group of land parcels generally located between Green Acres Road and McIntosh Run.

The results flowing from the study have identified that the site-generated traffic volumes will have an acceptable level of impact on the study area streets and intersections with the mitigating measures in place. These include lane configuration and traffic signal upgrades to the Dentith Road intersection and a new traffic signal and northbound left turn lane at the new site access. However, it should be noted that the sensitivity analysis indicates the new site access intersection can function as an unsignalized stop-controlled intersection until such time that about 650-680 residential units have been completed and occupied.

It has been a pleasure working with the project team in completing this study. Feel free to contact the undersigned anytime to further discuss the details of this project.

Yours truly,

Original Signed

James J. Copeland, P.Eng.
Managing Principal
GRIFFIN transportation group inc.

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1. INTRODUCTION

1.1 Overview

At the request of *DesignPoint Engineering and Surveying (DesignPoint)*, the GRIFFIN transportation group inc. has been engaged to carry out a traffic impact study in support of the planning approval process for the proposed Green Acres residential development, located on the west side of Herring Cove Road in the community of Spryfield, Halifax Regional Municipality (HRM). It is understood that a total of 1,000 detached and semi-detached housing units are being planned on a group of land parcels generally located between Green Acres Road and civic #540 to the north. A key map of the proposed site location is shown in *Figure 1*.

Based on discussions with *DesignPoint*, the proposed Green Acres lands are currently zoned R-1 and R-2 (low density residential) and are located within the urban serviced area of the Halifax Mainland Bylaw area. Several individual properties will be combined to accommodate the entire Green Acres residential development and the frontage along Herring Cove Road is generally located between civic #540 and civic #609. It is understood that a new collector street will serve as the main access point to the development and this new street will connect to Herring Cove Road opposite civic #540.

1.2 Background and Context

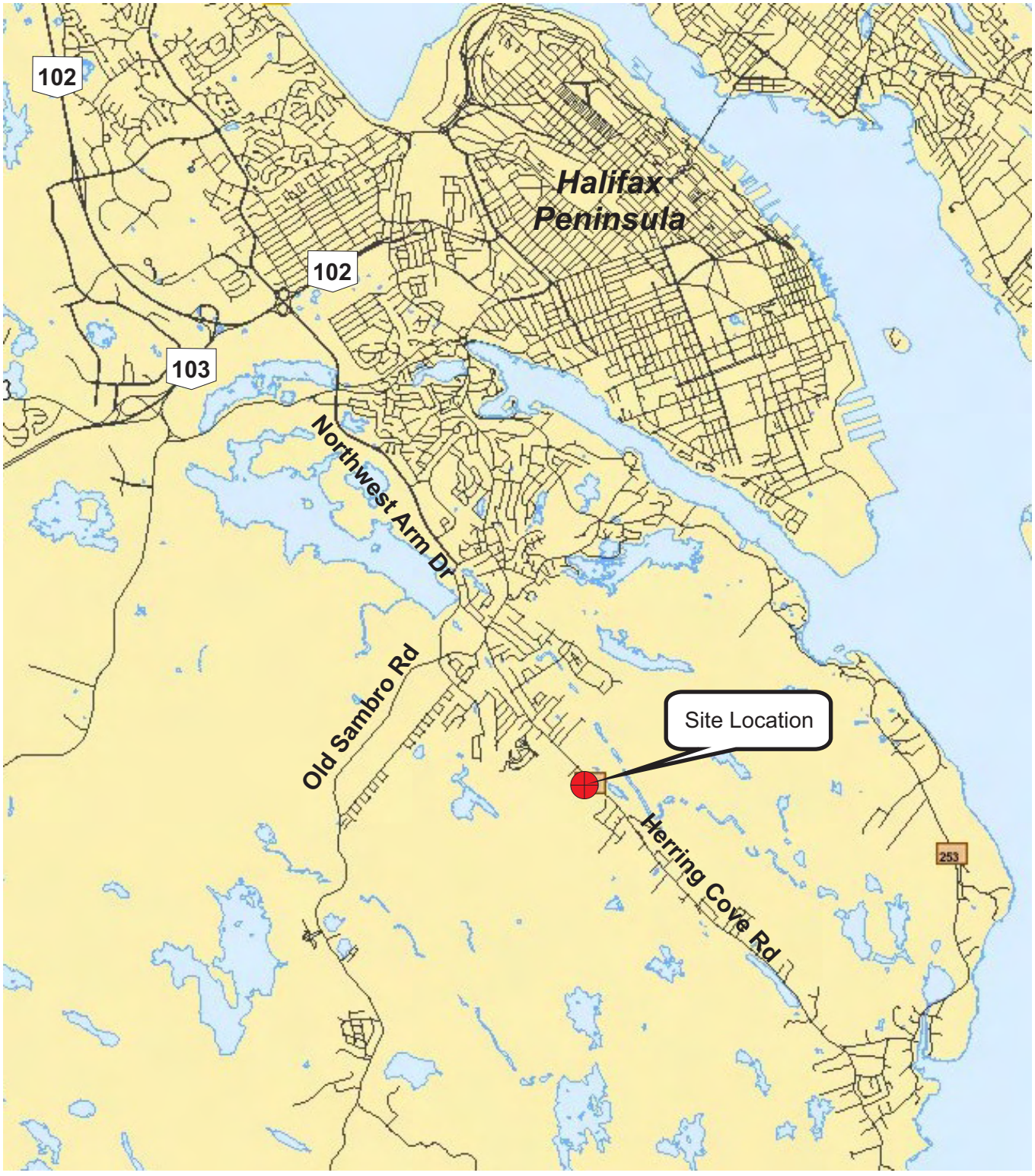
It is understood that two planning application submissions and associated studies have been prepared for these lands in the recent past. The known traffic impact studies submitted in the past include the following:

- *May 2013*: Green Acres TIS in support of an application for 668 residential units; and
- *July 2014*: Wildflower Ridge TIS in support of an application for 806 residential units.

Due to the fact that some of the details associated with the proposed street layout, connections to Herring Cove Road and proposed number of residential units has changed, the approving agency is requesting that a new TIS report be prepared. It is understood that the approving agency for the traffic impact study process is HRM's Traffic Management Department. As such, the general assumptions of the TIS process were discussed with Traffic Management representatives and the overall process follows the HRM traffic impact study guidelines. The terms of reference for this impact study were developed based on the following:

- The HRM's *Guidelines for the Preparation of Transportation Impact Studies*;
- A conceptual site plan drawing provided by *DesignPoint*;
- A meeting with representatives of HRM's Traffic Management and Planning departments held on May 20th, 2015 to establish the general scope of the TIS; and
- A site review carried out on May 26th, 2015

The approach and technical findings of this traffic impact study are discussed in the following sections of this report.



Source: Explore HRM GIS

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Key Map and Site Location

Figure 1

2. EXISTING CONDITIONS

This chapter describes the roadway network, traffic volumes, operational analysis results and other notable characteristics under the baseline conditions.

2.1 The Roadway Network

2.1.1 Overview

The subject lands are generally located in the community of Spryfield on the west side of Herring Cove Road. This is an established neighbourhood with numerous individual property accesses along the corridor as well as local residential street connections. In a larger context, Herring Cove Road serves as the main roadway connection between residential communities to the south and the Halifax urban area to the north. It is important to note this roadway not only serves vehicles but also public transit and active transportation modes. Based on this, and through discussions with representatives of HRM, it was necessary to include the following intersections in this study:

- Herring Cove Road / Green Acres Road (unsignalized);
- Herring Cove Road / Sussex Street (unsignalized);
- Herring Cove Road / Dentith Road (signalized); and
- Herring Cove Road / Proposed Site Access.

A description of the key study area roads is provided below. The immediate study area and site context is shown in *Figure 2*.

2.1.2 Herring Cove Road

Herring Cove Road is generally aligned in a north-south direction and appears to function as a major collector/minor arterial in the City's roadway system. Through the study area this roadway has a varied cross-section. To the north, in the vicinity of Dentith Road, the cross-section is comprised of five lanes (i.e. two travel lanes in each direction and either a centre median or centre left turn lanes). In the vicinity of the proposed site access the cross-section is comprised of one travel lane in each direction, a partially paved shoulder (i.e. 1-1.5m of pavement, 1.5-2m of gravel), and open ditches. Based on the field observations the partially paved shoulders can accommodate active transportation users (both cyclists and pedestrians), offer refuge for accelerating/decelerating vehicles turning at accesses and side streets as well as allow buses to move out of the travel lane when required to stop. The posted speed limit in the vicinity of the study area is 50 km/h.

2.1.3 Green Acres Road

Green Acres Road currently serves an existing residential neighbourhood and terminates approximately 250m west of Herring Cove Road, at Mansion Avenue. It is generally aligned in an east-west direction and currently functions as a local street, connecting to Herring Cove Road as a stop-controlled 3-leg intersection. It has an asphalt surface with asphalt curbing but no

drainage infrastructure such as catch basins. This street is expected to provide a secondary access point for the proposed development; however, will require upgrades to meet HRM design guidelines. There are no exclusive turning lanes at the intersection with Herring Cove Road.

2.1.4 Sussex Street

Sussex Street provides an important connection between the Herring Cove Road corridor and the Old Sambro Road corridor. It also provides a connection to the rear of the commercial shopping plaza and one of the main accesses to the Spryfield Community Centre. It is aligned in an east-west direction and is comprised of a two-lane, two-way urban cross-section that has a posted speed limit of 50 km/h.

2.1.5 Dentith Road

Dentith Road also provides an important link between the Herring Cove and Old Sambro Road corridors and serves as the main access to the commercial shopping plaza. It is aligned in an east-west direction and has a 4-lane urban cross-section. It terminates as a signalized 3-leg intersection with Herring Cove Road in the east and Old Sambro Road in the west. It also has a posted speed limit of 50 km/h.

2.2 Traffic Data

In order to facilitate an assessment of the existing and future traffic operations there was a need to develop a set of baseline traffic volumes. The source of these data for each of the study area intersections is summarized in *Table 1*.

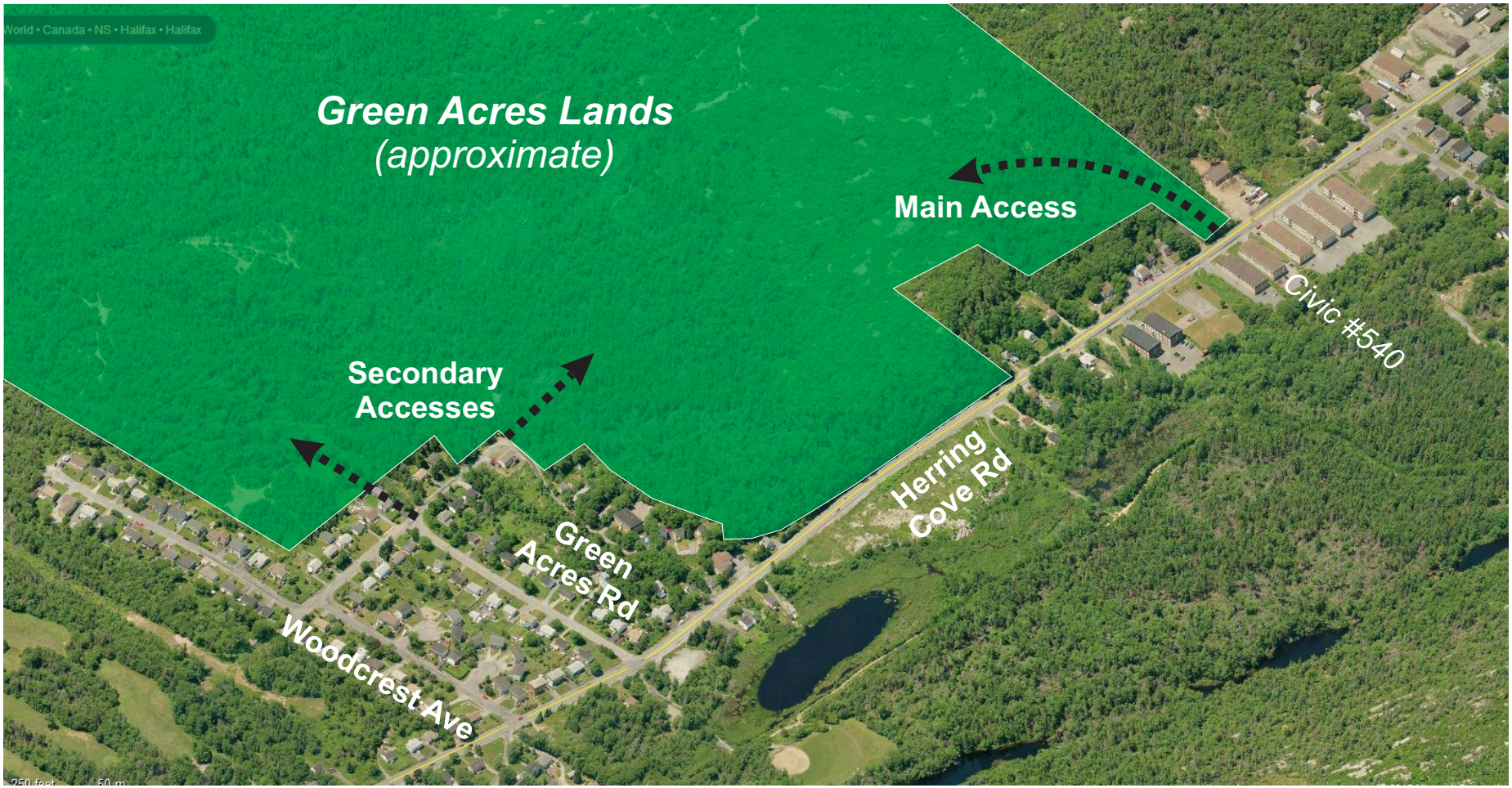
Table 1: Traffic Data Sources

	AM Peak	PM Peak	Source
Herring Cove Rd / Woodcrest-Princeton	December 2014	December 2014	GRIFFIN counts
Herring Cove Rd / Green Acres Rd	March 2013[A]	March 2013[A]	Wildflower Ridge TIS
Herring Cove Rd / Sussex St	May 2015	May 2015	GRIFFIN counts
Herring Cove Rd / Dentith Rd	March 2013[A]	March 2013[A]	Wildflower Ridge TIS

A – As stated in the Wildflower Ridge TIS report, the March 2013 recorded volumes were increased by 2% to 2014.

Traffic data sources for this study included the previous TIS report for this property[1] as well as a recent TIS report prepared by the GRIFFIN transportation group in January 2015 for the proposed Briarwood residential development. As part of this effort traffic counts were completed in December 2014 at the Herring Cove Road / Woodcrest-Princeton Avenue intersection. In order to provide a more recent set of volumes, the GRIFFIN transportation group also carried out supplementary AM and PM peak hour intersection turning movement counts on Tuesday May 26th, 2015 at the Herring Cove Road / Sussex Street intersection.

[1] Wildflower Ridge Traffic Impact Study report, July 2014.



Source: Bing Maps

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Study Area and Site Context

Figure 2

All of the intersection turning movement counts for both the weekday AM and PM peak hours were assembled. The more recent data recorded by the GRIFFIN transportation group were used to balance the volumes between intersections along the Herring Cove Road corridor. This process yielded a set of representative peak hour turning volumes at the key study area intersections and formed the basis of the traffic analysis discussed throughout the report.

Since the peak traffic generating periods for residential developments occur on weekday mornings and afternoons, the peak periods selected for the analysis included the weekday AM and weekday PM peak hours. The specific peak hours were determined using the recently recorded hourly traffic counts at the study area intersections. A summary of the Existing 2015 peak hour traffic volumes applied to the analysis are illustrated in *Figure 3*.

It should also be noted the historical HRM traffic data gathered in the Herring Cove Road corridor, within the study area, using automatic traffic recording (ATR) equipment dated back to 1996. The 1996 average annual weekday traffic (AAWT) volume was 8,315 vehicles and a more recent data set from 2012 had an AAWT of 7,100. Therefore, the corridor traffic volumes demonstrate no long term traffic growth increases.

2.3 Existing Conditions Operational Analysis

A capacity analysis process was carried out using the Existing 2015 traffic volumes (*Figure 3*) as well as the existing lane configurations and traffic control at the study area intersections. The analysis process used Trafficware's *Synchro 8* software tool following the Transportation Research Board's *Highway Capacity Manual* (HCM) methodology. The results of the existing conditions peak hour analysis are provided in *Table 2*.

Following the HRM TIS guidelines, the measures of effectiveness used to describe the operational performance included the average vehicle delay, volume-to-capacity ratio (v/c ratio) and 95th percentile queue length (metres) for the critical movement at each of the study area intersections. The results for each critical intersection movement, during each peak hour, have been summarized in *Table 2*. An expanded summary of results as well as the detailed capacity analysis reports are contained in *Appendix II*.

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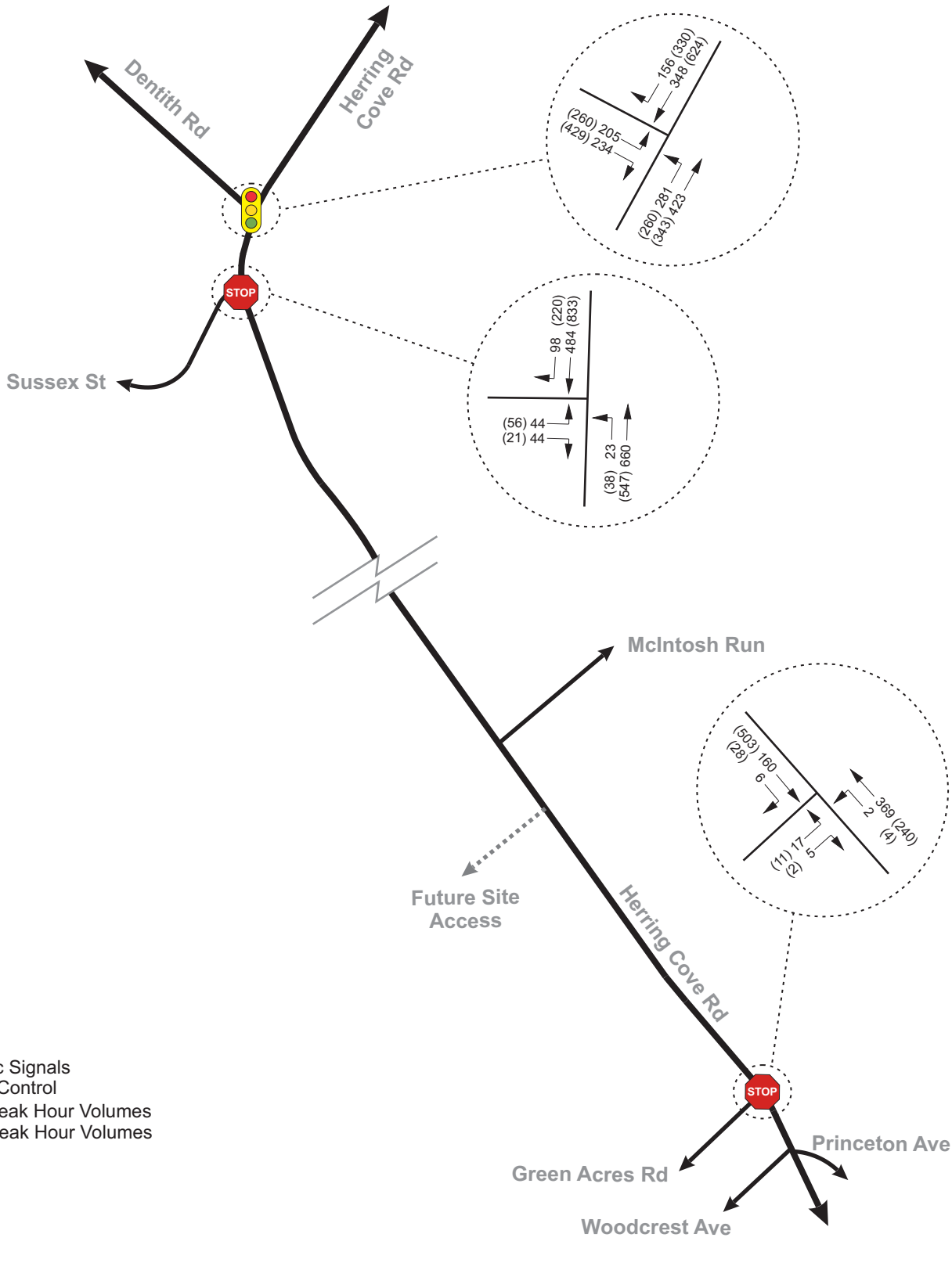

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Existing 2015 Peak Hour Volumes

Figure 3

Table 2: Existing Operational Analysis Results – Critical Movements

1. Herring Cove Road / Green Acres Road (TWSC)						
	AM Peak Hour			PM Peak Hour		
	Critical Move: Delay	V/C	Queue[A]	Critical Move: Delay	V/C	Queue[A]
Existing 2015	EB L-R: 12.1s	0.05	<10m	EB L-R: 15.5s	0.04	<10m

2. Herring Cove Road / Sussex Street (TWSC)						
	AM Peak Hour			PM Peak Hour		
	Critical Move: Delay	V/C	Queue[A]	Critical Move: Delay	V/C	Queue[A]
Existing 2015	EB Left: 16.8s	0.14	10m	EB Left: 26.6s	0.27	10m

3. Herring Cove Road / Dentith Road (signalized)						
	AM Peak Hour			PM Peak Hour		
	Critical Move: Delay	V/C	Queue[A]	Critical Move: Delay	V/C	Queue[A]
Existing 2015	EB Left: 23.4s	0.55	45m	EB Left: 30.2s	0.66	60m

A – Queue represents the calculated vehicle queue length in metres occurring 95% of the time (95th percentile).

Generally, these results appeared to be consistent with the vehicle operations and vehicle queues observed during the field review. The operational results indicate there is residual capacity for all movements at the study area intersections.

2.4 Sightline Review Along Herring Cove Road

A review of the available sightlines along Herring Cove Road was carried out at the proposed site access opposite civic #540. The review was based on the guidelines contained in the Transportation Association of Canada's (TAC) Geometric Design Guide for Canadian Roads. These guidelines were used to determine the appropriate minimum stopping sight distance (SSD) criteria. The posted speed limit on Herring Cove Road is 50 km/h. No speed data was available and it was assumed that the vehicle operating speeds along this street would likely be about 60 km/h and this speed formed the basis of the sightline review.

In the vicinity of the proposed site access Herring Cove Road has a relatively straight and flat alignment. Therefore, the available driver sight lines to the north and south along Herring Cove Road are greater than 100 m. These distances exceed the TAC minimum stopping sight distance (SSD) criteria of 85 m.

3. THE PROPOSED DEVELOPMENT

This chapter describes the existing site, proposed changes to the buildings/operations, and the changes to the site generated traffic.

3.1 Overview

As illustrated in *Figure 2*, the subject lands are currently undeveloped. Based on discussions with *DesignPoint Engineering*, it is understood that the subject lands will be developed to include a total of 1,000 low density residential units. The units will comprise a mix of single family detached houses (R1) and semi-detached houses (R2). The general site layout is illustrated in *Figure 4 – Proposed Site Plan.*

The proposed development will be served by a primary access via Herring Cove Road, generally opposite civic #540. This new street will function as a minor collector street given the number of residential lots it will serve. Secondary accesses will be provided via Green Acres Road and Mansion Avenue, although these connections should be postponed until later in the development process to ensure the majority of drivers enter/exit via the new collector street.

3.2 Site Trip Generation

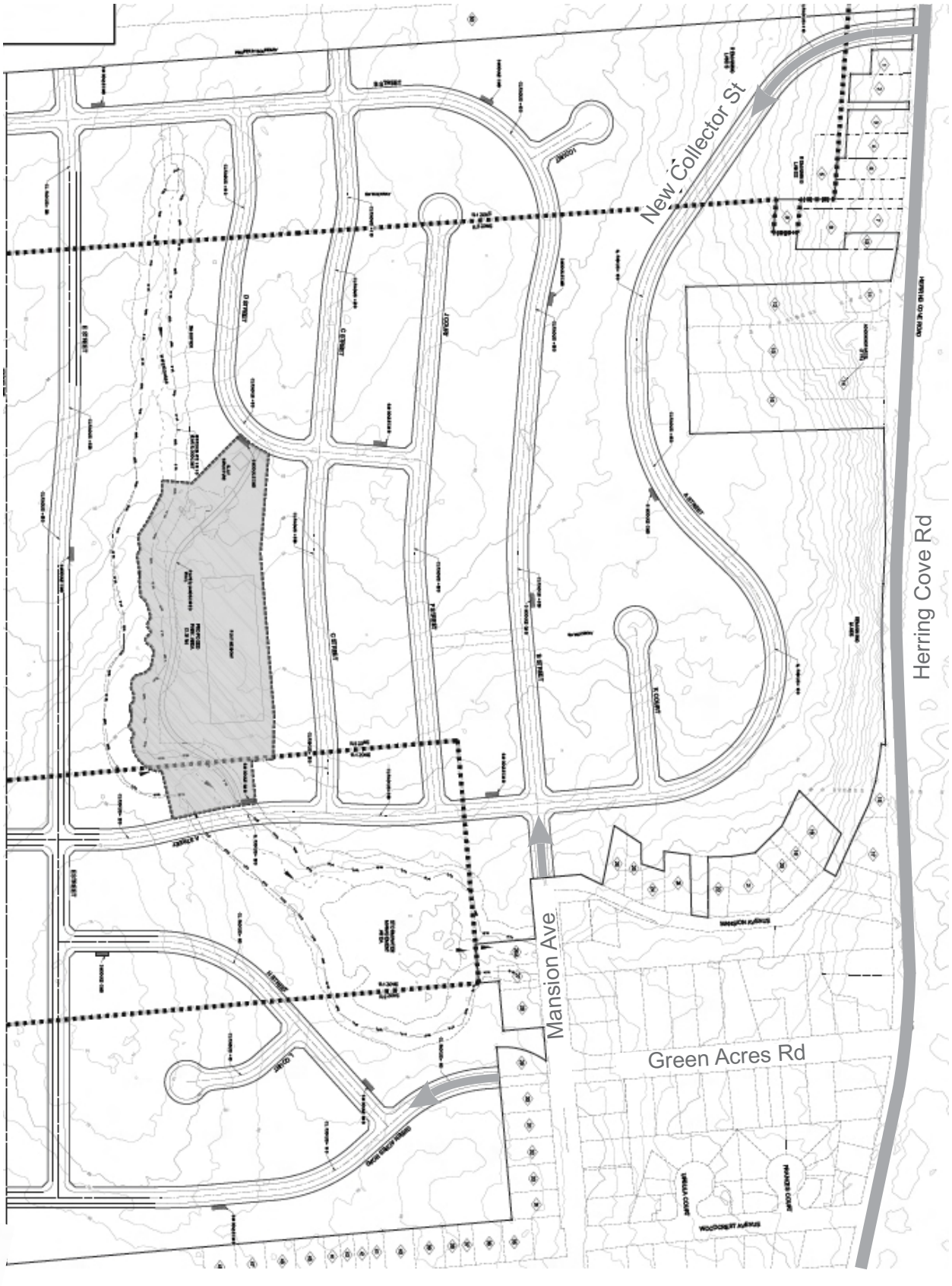
Typically, traffic engineers use rates of traffic generation for new developments that are published by the Institute of Transportation Engineers (ITE) if deemed appropriate and suitable for the land use under study. It was determined that the ITE trip generation rates contained in the *Trip Generation, 9th Edition* document were appropriate for this residential development. Therefore, site-generated trips were calculated based on ITE's land use code 210 – single detached dwelling units. Based on the ITE documentation, land use 210 is appropriate to apply to both detached housing units and semi-detached units. This approach is also consistent with other TIS reports for similar developments completed by the *GRIFFIN transportation group* in HRM.

Given the scale of the proposed residential development, the ITE formula was used to forecast the volume of traffic generated for a 1,000-unit development. A summary of the AM and PM peak hour site trip generation results are contained in *Table 3*.

Table 3: Forecast Site Trip Generation – AM & PM Peak Hours

Total No. of Units	AM Peak				PM Peak			
	Trip Rate[A]	In	Out	Total	Trip Rate[A]	In	Out	Total
Single Detached & Semi Detached Low Density Residential Units (ITE Code 210)								
1,000 units	0.71	178 *(25%)*	532 *(75%)*	**710**	0.84	526 *(63%)*	309 *(37%)*	**835**

A – ITE trip rate calculated using the provided formula.



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Proposed Site Plan

Figure 4

Based on the site-generated trip forecasts in *Table 3*, the proposed development is forecast to generate new trips totaling 710 vehicles/hour (vph) and 835 vph during the weekday AM and PM peak hours, respectively.

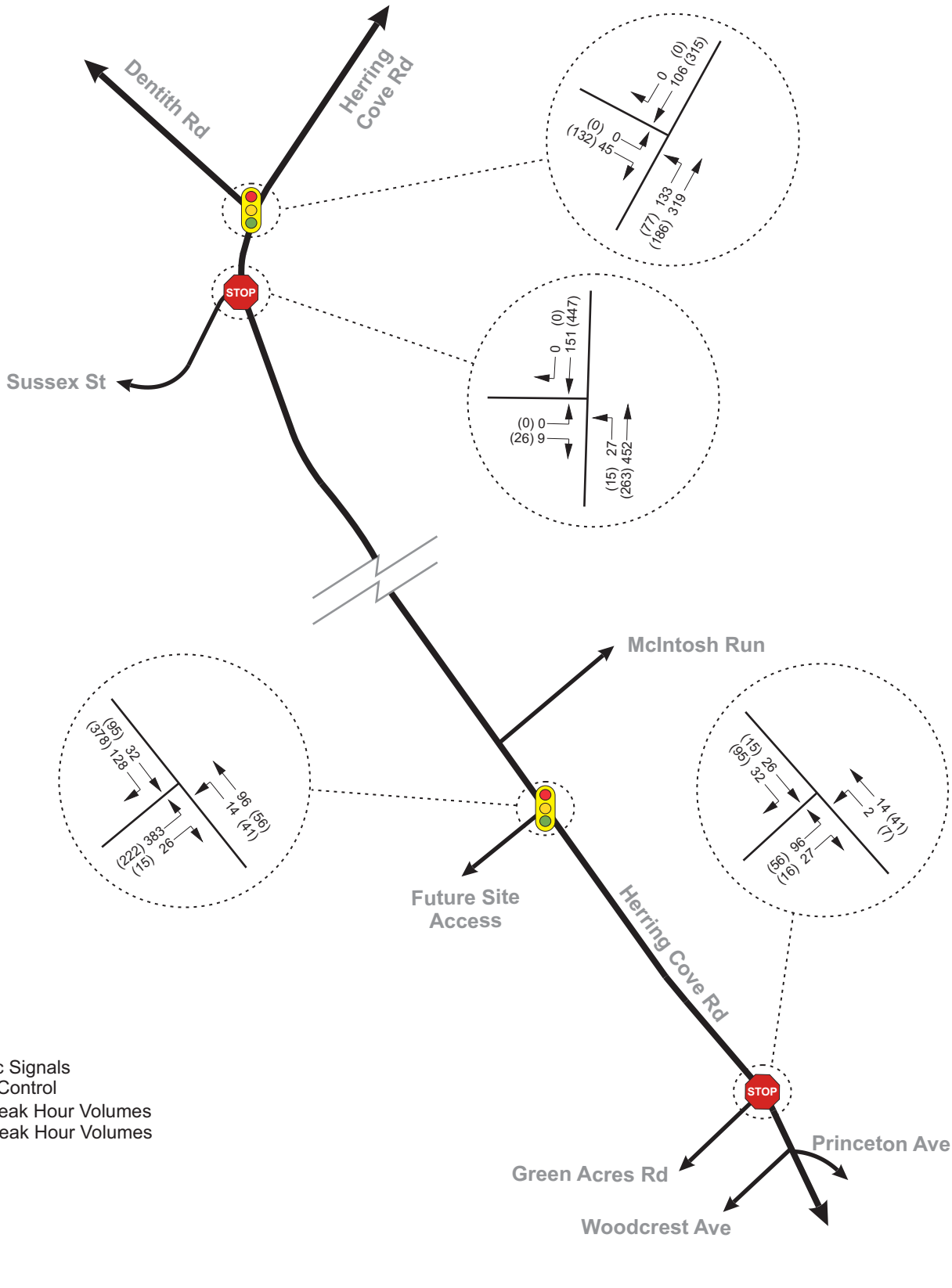
3.3 Trip Distribution

A review of the observed December 2014 traffic volumes and travel patterns at the Herring Cove Road / Woodcrest Avenue intersection was carried out to establish the future distribution patterns of the site-generated residential trips. It was assumed that the proposed residential trips would generally follow the same travel patterns that exist today on the study area roads. The existing distribution patterns indicate that about 90% of the trips are moving to/from the north and the remaining 10% are moving to/from the south. This appears appropriate given the large employment areas and community services located to the north. The distribution percentages to/from each of the study area gateways are contained in *Table 4*.

Table 4: Forecast Residential Trip Distribution

Direction	Via	AM & PM Peaks	
		Inbound	Outbound
North	Herring Cove Rd	60%	60%
West	Dentith Rd	25%	25%
	Sussex St	5%	5%
South	Herring Cove Rd	10%	10%
Total		**100%**	**100%**

All of the site-generated trips associated with the proposed residential development were assigned to the study area roadways and intersections using the above percentages. The resulting peak hour site-generated volumes are illustrated in *Figure 5*.



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Site-Generated Peak Hour Volumes

Figure 5

4. FUTURE CONDITIONS

This chapter summarizes the future year traffic conditions and assessment of the proposed development.

4.1 Overview

The future planning horizon chosen for a traffic impact study represents a milestone in the development process. Given the scale of this development it is expected that the construction and occupation of all 1,000 units will extend beyond the typical short term planning horizon of 5 years. This was discussed with HRM's Traffic Management representatives and it was agreed that a longer timeframe was more likely. As such, a 15-year planning horizon was considered to be more appropriate and assumes an average development rate of nearly 70 units per year. The future horizon year selected for this study was 2030.

Typically, the future traffic conditions assessment provides an evaluation of two scenarios:

- *Future Background conditions* – future volumes excluding the proposed development.
- *Future Total conditions* – future traffic volumes including the proposed development

The development of both sets of future year traffic volumes is discussed in the following Section.

4.2 Traffic Volume Forecasting Process

4.2.1 Future Background Traffic Volumes

Developing the future background traffic volumes excludes the forecast traffic explicitly associated with the proposed development under study but considers other contributing factors to traffic volume increases. Using information gleaned from the discussions with HRM representatives at the scope development meeting, in addition to the available background documentation, a set of traffic growth factors was assembled and a summary of this information is provided in *Table 5*.

Table 5: Summary of Background Traffic Factors

Contributing Factor	Description
General Traffic Growth	- Since traffic volumes in the Herring Cove Road corridor have been dropping since 1996, it was assumed that no growth/increase would occur in the background traffic out to the 2030 planning horizon. As such, the traffic increases in the corridor would all be associated with the future adjacent development discussed below.
Future Adjacent Development	- Through discussions with HRM it was determined that five adjacent residential development areas were to be explicitly included. These same adjacent developments were included in the previous analysis of the proposed Briarwood development TIS report for consistency.

Road Network Changes	- It is understood there are no planned road network changes in the area.

The historical traffic volume data in the Herring Cove Road corridor has shown no long term traffic growth. However, there are several planned adjacent residential developments that are either being contemplated or currently in the planning approval process. It was assumed that all five adjacent development would be complete by the 2030 planning horizon. As such, this study assumes that any growth in the Herring Cove Road corridor would be attributable to these known developments. A summary of these areas and an estimate of the site-generated traffic is provided in *Table 6*.

Table 6: Summary of Background Development Traffic Volumes

Development	Location	Residential Units	AM Peak Traffic[A]	PM Peak Traffic[A]
1. MacIntosh Run	North of Green Acres	350 units	255 vph	324 vph
2. Sylvia/Autumn/Lynette	North of Green Acres	110 Units	83 vph	110 vph
3. Chambers Hill / Creek Dr	South of Green Acres	52 Units	39 vph	52 vph
4. Holy Drive	South of Green Acres	17 Units	13 vph	17 vph
5. Briarwood	South of Green Acres	275 units	202 vph	261 vph

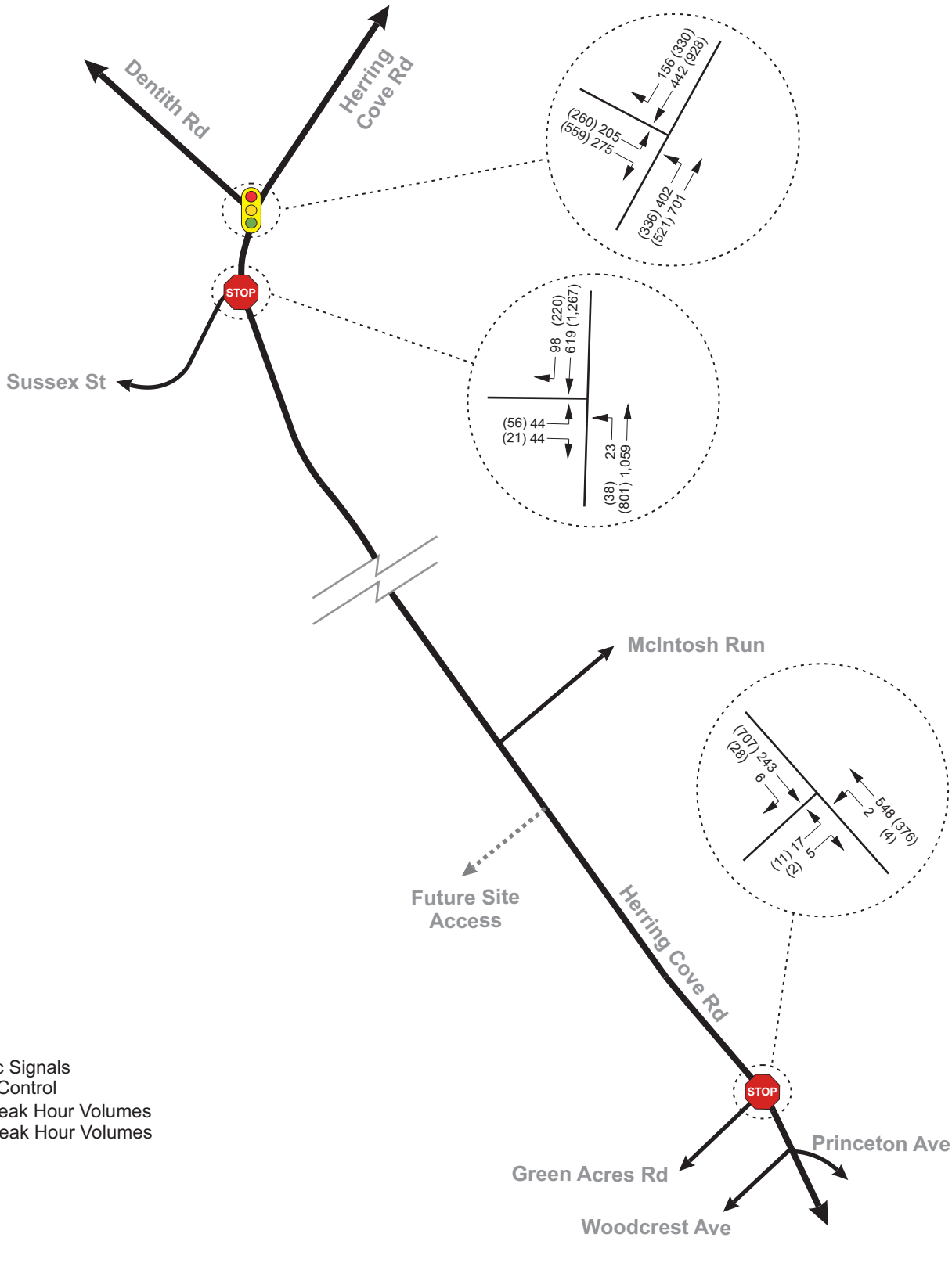
A – ITE trip rates for land use 210 were used to calculate these forecast volumes.

The site-generated traffic volumes from each of these background development areas were assigned to the study area road network using the same distribution assumptions as the proposed Green Acres development, discussed in *Section 3*. A summary of the future Background 2030 peak hour traffic volumes used in the analysis are illustrated in *Figure 6*.

4.2.2 Future Total Traffic Volumes

The assembly of Future Total 2030 AM and PM peak hour traffic volumes is shown in *Figure 7* and was based on the following:

- Existing 2015 weekday peak hour traffic volumes; plus
- No general traffic increases were assumed over the study period based on the fact there has been no long term growth in the Herring Cove Road corridor; plus
- Additional traffic volumes in the Herring Cove Road corridor associated with the five development areas shown in Table 6; plus
- Assumed diversion of vehicles (i.e. 10 vph AM, 20 vph PM) away from the Sussex Street intersection due to the long delay times anticipated for the eastbound left turn movement, these volumes were assumed to migrate to the signalized Dentith Road intersection; plus
- Site-generated traffic associated with the proposed 1,000-unit Green Acres development.



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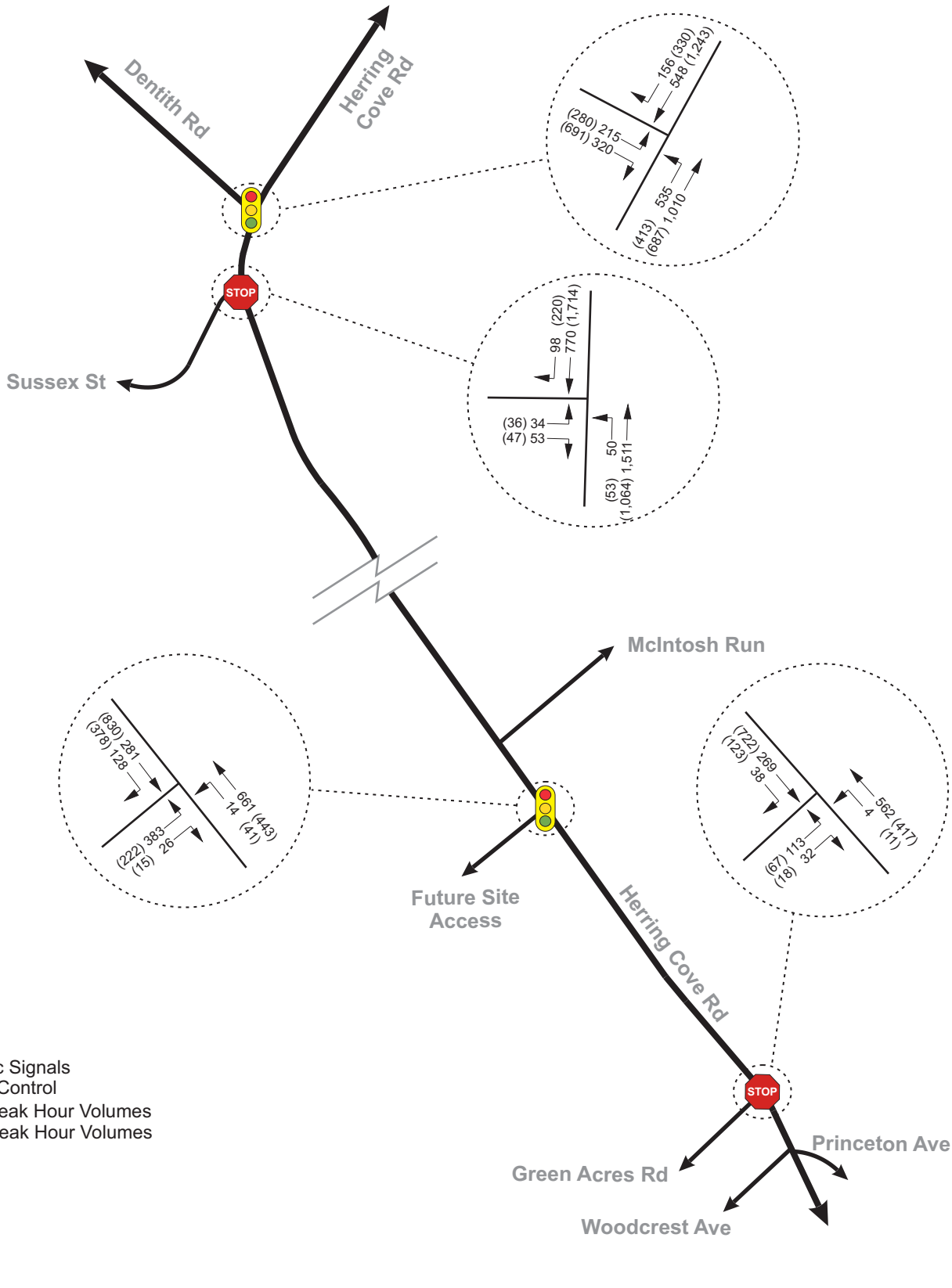
Future Background 2030 Peak Hour Volumes

Figure 6



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Future Total 2030 Peak Hour Volumes

Figure 7

4.3 Future 2030 Operational Analysis

4.3.1 Traffic Signal Warrant Analysis

A traffic signal warrant review was carried out as the initial step in the analysis of the future conditions. This type of analysis is carried out at the study area stop-controlled intersections to identify the need for traffic control upgrades. The analysis process followed the Transportation Association of Canada's (TAC) signal warrant methodology which is widely used by road agencies across Canada, including the HRM. The TAC procedure uses a set of average intersection volumes measured over the six highest hours of a typical day. The results are presented as priority points that indicate whether a traffic signal is warranted. When the number of priority points exceeds 100, the traffic signal warrant is met.

The detailed signal warrant analysis reports are contained in *Appendix III* and a summary of the results is provided in *Table 7*.

Table 7: Intersection Signal Warrant Analysis Results Summary

Intersection	2015 Existing (no development)	2030 Background (no development)	2030 Total (Development Complete)
1. Herring Cove Rd / Green Acres Rd	11	16	51
2. Herring Cove Rd / Sussex St	45	66	93
3. Herring Cove Rd / Dentith Rd	*existing signalization*		
4. Herring Cove Rd / New Site Access			146

- priority points are approaching the 100 point threshold.
- priority points meet/exceed the 100 point threshold.
- intersection does not exist under this scenario.

The results flowing from the future planning horizons indicate that no new traffic control upgrades will be required under Future Background 2030 conditions. However, under future Total 2030 conditions the Sussex Street intersection will be approaching the need for signalization and the proposed site access will exceed the 100-point threshold, indicating a need for signalization.

4.3.2 Auxiliary Turning Lane Review

The second step in the analysis process included a review of the auxiliary turn lane warrants at the two study area intersections that would provide access to the proposed development: Green Acres Road and the proposed new site access. The left turn lane warrant review was undertaken following Ministry of Transportation of Ontario (MTO) procedures. The right turn lane warrant review followed the Ohio Department of Transportation (ODOT) methodology. A summary of the auxiliary turn lane assessment results are provided in *Table 8*.

Table 8: Summary of Auxiliary Turn Lane Assessment

Scenario	Turn Lane Location	1. Green Acres Rd	2. Site Access
Background 2030	Southbound Right Turn Lane	Warrant not met	*n/a*[A]
	Northbound Left Turn Lane	Warrant not met	*n/a*[A]
Total 2030	Southbound Right Turn Lane	**Warrant met**	**Warrant met**
	Northbound Left Turn Lane	Warrant not met	**Warrant met**

A – Intersection does not exist under the future Background 2030 planning horizon.

The results of the auxiliary turn lane assessment suggest that the warrant criteria for a southbound right turn lane under future Total 2030 traffic conditions was met at both the Green Acres and new site access intersections. However, the presence of paved shoulders and the provision of a larger corner radius may mitigate the need for these turn lanes. This will be examined further in the capacity analysis in *Section 4.3.3*.

The results of the northbound left turn lane warrant indicate that such a lane is not required at the Green Acres Road intersection; however, one will be required at the proposed new site access under a full build-out scenario. An exclusive northbound left turn would also allow the newly signalized intersection to operate with improved performance.

4.3.3 Future 2030 Intersection Capacity Analysis

A capacity analysis effort was carried out for the study area intersections using both sets of future 2030 forecast traffic volumes. Where possible, the analysis applied the existing lane configurations to provide a true comparison of results from one analysis scenario to another. However, if unacceptable measures of effectiveness were calculated then mitigating measures were identified and included in the analysis. The analysis process used Trafficware's *Synchro 8* software tool. The results for the critical movements at the study area intersections are contained in *Table 9* and a complete summary Table as well as detailed capacity reports are contained in *Appendix II*.

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Table 9: Future 2030 Operational Analysis Results – Critical Movements

1. Herring Cove Road / Green Acres Road (TWSC)						
	AM Peak Hour			PM Peak Hour		
	Critical Move: Delay	V/C	Queue[A]	Critical Move: Delay	V/C	Queue[A]
Existing 2015[B]	EB L-R: 12.1s	0.05	<10m	EB L-R: 15.5s	0.04	<10m
Background 2030[B]	EB L-R: 15.4s	0.06	<10m	EB L-R: 22.6s	0.07	<10m
Total 2030[B]	EB L-R: 24.6s	0.47	20m	EB L-R: 41.4s	0.49	20m

2. Herring Cove Road / Sussex Street (TWSC)						
	AM Peak Hour			PM Peak Hour		
	Critical Move: Delay	V/C	Queue[A]	Critical Move: Delay	V/C	Queue[A]
Existing 2015[B]	EB Left: 16.8s	0.14	10m	EB Left: 26.6s	0.27	10m
Background 2030[B]	EB Left: 18.2s	0.15	10m	EB Left: 43.7s	0.40	15m
Total 2030[B]	EB Left: 24.1s	0.16	10m	EB Left: 83.8s	0.48	15m

3. Herring Cove Road / Dentith Road (signalized)						
	AM Peak Hour			PM Peak Hour		
	Critical Move: Delay	V/C	Queue[A]	Critical Move: Delay	V/C	Queue[A]
Existing 2015[B]	EB Left: 23.4s	0.55	45m	EB Left: 30.2s	0.66	60m
Background 2030[C]	NB Left: 29.6s	0.64	55m	NB Left: 53.9s	0.81	65m
Total 2030[C]	NB Left: 34.1s	0.77	80m	NB Left: 57.0s	0.83	85m

4. Herring Cove Road / Proposed Site Access (signalized)						
	AM Peak Hour			PM Peak Hour		
	Critical Move: Delay	V/C	Queue[A]	Critical Move: Delay	V/C	Queue[A]
Existing 2015	-	-	-	-	-	-
Background 2030	-	-	-	-	-	-
Total 2030[D]	EB Left: 30.6s	0.77	75m	EB Left: 45.0s	0.74	60m

A – Queue represents the calculated vehicle queue length in metres occurring 95% of the time (95th percentile).

B – Evaluated with existing lane configurations and traffic control.

C – Includes lane configuration upgrades and/or signal timing changes to improve unacceptable measures of effectiveness.

D – Proposed new intersection evaluated with a semi-actuated timing plan.

The results flowing from the intersection capacity analysis indicate that the Green Acres Road and Sussex Street intersections will operate with acceptable measures of effectiveness out to

the 2030 planning horizon without the need for additional infrastructure and can remain as unsignalized intersections. Under future Background 2030 conditions, the Dentith Road signalized intersection will require upgrades to accommodate the background traffic growth which includes signal timing changes and the addition of a northbound double left turn lane. These intersection upgrades are necessary to manage the northbound queues and results in a change of the critical movement. There are two existing receiving lanes for this movement on Dentith Road; however, Herring Cove Road will likely require widening along the northbound approach. With the addition of the Green Acres site-generated traffic volumes, combined with background development traffic growth, the Dentith Road intersection will require further upgrades that include the addition of a southbound right turn lane as well as signal timing modifications. These mitigating measures are required to manage the northbound vehicle queues and prevent spillback into the Sussex Street intersection.

The capacity analysis indicates that the Green Acres Road and proposed new site access can function with acceptable delay times and queue lengths without the provision of southbound right turn lanes. Since paved shoulders exist along Herring Cove Road it was assumed they would serve as a deceleration refuge for vehicles slowing to turn right at the study area intersections. In addition, consideration should be given to applying increased corner radii during the design stages that attempt to balance the need to increase the flow of southbound right turning traffic without greatly increasing operating speeds.

The changes to the study area lane configurations in order to accommodate the forecast traffic volumes under future Background and future Total conditions is summarized graphically in *Appendix I*. The detailed intersection capacity reports are contained in *Appendix II*.

4.4 Site Access Sensitivity Analysis

A sensitivity analysis process was carried out at the proposed new site access intersection with Herring Cove Road to determine the approximate timing of need for signalization. The TAC signal warrant analysis results presented in *Section 4.3.1* indicate that under a full build-out scenario of 1,000 residential units, and having the secondary connection to Green Acres Road in place, the signal warrant priority points would be 146, well above the 100-point threshold.

Building on these results, several additional iterative calculations were carried out to identify the approximate number of units that could be built and occupied before the warrant for traffic signals would be met. The analysis assumed that all other traffic conditions, including adjacent background developments, would remain the same. The results produced from the sensitivity analysis process indicate that the proposed new site access will require traffic signals and a northbound left turn lane once 650-680 units are built and occupied.

5. CONCLUSIONS AND RECOMMENDATIONS

This chapter summarizes the salient findings of the analysis process and identifies necessary infrastructure changes.

5.1 Conclusions

The following conclusions were gleaned from the traffic impact assessment:

- *The Proposed Development*: A total 1,000 residential units comprised of a mix of R1 and R2 lots are proposed on the Green Acres development lands. The most recent version of ITE's *Trip Generation* document indicates that a development of this size will generate new trips on the study area roads totaling 710 vph and 835 vph during the weekday AM and PM peak hours, respectively.
- *Adjacent Background Developments*: Five adjacent residential developments, or 804 low density units, are expected to occur within the planning horizon and were explicitly considered in the study analyses, all contributing traffic volume increases in the Herring Cove Road corridor. The increase in traffic volumes associated with these background developments will require infrastructure upgrades at the Dentith Road signalized intersection that include a northbound double left turn lane and signal timing adjustments in order to manage the northbound vehicle queues and minimize the impact on the Sussex Street intersection.
- *Dentith Road and Sussex Street*: The combination of both the proposed Green Acres development and the five background developments (i.e. future Total 2030 conditions) will require a northbound double left turn lane at the Dentith Road intersection, as discussed above, as well as an exclusive southbound right turn lane. At the Sussex Street intersection, the existing lane configuration and traffic control should remain given the close proximity (i.e. 110m) to the signalized intersection of Dentith Road. Drivers who experience long delays at the Sussex Street stop bar can easily change their travel route and use the Dentith Road signal to the north to enter into the Herring Cove Road traffic stream. A graphical summary of these findings is provided in *Appendix I*.
- *Site Accesses*: The proposed development has a primary access location via a new collector street connecting to Herring Cove Road opposite civic #540, and a secondary access via the existing Green Acres Road. The results of the operational analysis indicated the following requirements by the 2030 planning horizon:
    - *Green Acres Road (full build-out)*:
        - Can remain as a two-way stop-controlled intersection;
        - Can function with acceptable performance measures with the current lane configuration, despite the southbound right turn lane warrant being met.
    - *Proposed New Access (full build-out)*:
        - Traffic signal warrant is met;
        - A northbound left turn lane warrant is met;

- Can function with acceptable performance measures without an exclusive southbound right turn lane, despite the southbound right turn lane warrant being met.

Due to the fact that a paved shoulder exists along Herring Cove Road – in what is considered to be a low-speed urban environment – the paved shoulders provide a refuge for decelerating/accelerating vehicles. In addition, any intersection upgrades should consider the use of larger radii. With these measures in place, it was determined that the addition of an exclusive right turn lane at the Green Acres Road and new street intersections would not be required.

In summary, with the addition of the roadway mitigating measures the forecast site-generated volumes associated with the proposed 1,000-unit residential development is expected to have an acceptable operational impact on the study area streets and intersections out to the study planning horizon.

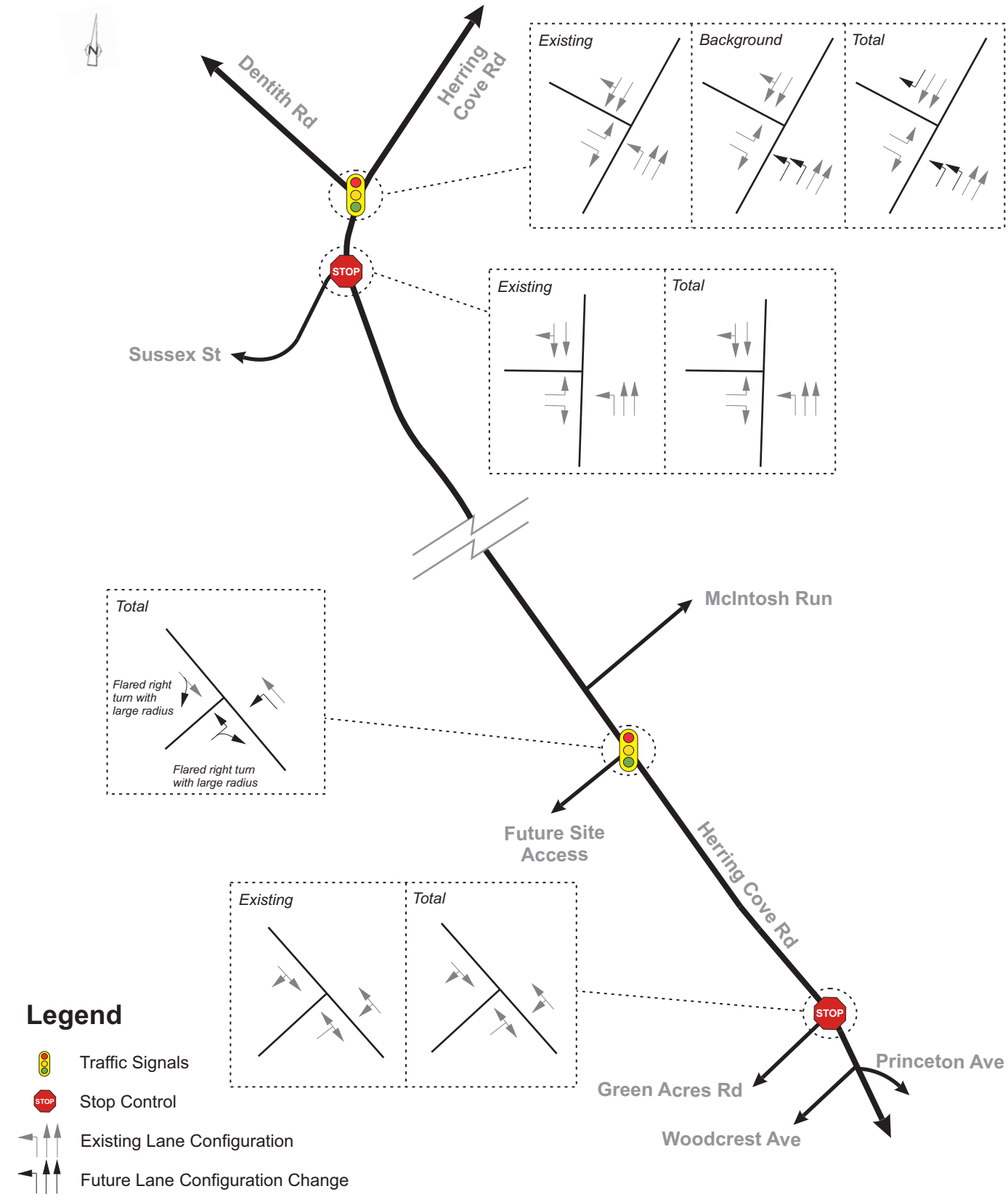
5.2 Recommendations

The following recommendations were developed based on the findings flowing from this study:

- That all geometric design changes to the roadway infrastructure follow HRM and TAC design guidelines. This includes the design and construction of the primary site access street to meet HRM`s collector street requirements.
- That all new signage and pavement markings associated with the necessary roadway upgrades be installed in accordance with the *Manual of Uniform Traffic Control Devices of Canada* (MUTCDC).
- That the proposed new site access serve as the primary access point to the development and that connections to Green Acres Road only be made later in the project. This new site access is expected to operate with acceptable performance measures as an unsignalized, stop-controlled intersection until about 650-680 of the 1,000 units are built and occupied. At this point in time the intersection of the proposed site access with Herring Cove Road will likely require new traffic signals to be installed as well as an exclusive northbound left turn lane. It would also be prudent to have a traffic impact study update completed to confirm these findings once the number of completed units approaches 50% completion.
- That the Dentith Road intersection upgrades occur under the following conditions:
    - A northbound double left turn and traffic signal timing adjustments be implemented assuming all of the residential units associated with the adjacent background developments are built and occupied – a total of 804 units;
    - Under future Total conditions, an exclusive southbound right turn lane and associated signal timing adjustments will be necessary to accommodate the traffic associated with the additional 1,000 units proposed within the Green Acres development.

APPENDIX I

Intersection Infrastructure Changes



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Recommended Intersection Lane Configurations

Figure I-A

APPENDIX II

Intersection capacity analysis

Existing 2015 Operational Results

1. Herring Cove Road / Green Acres Road (TWSC)						
	AM Peak Hour			PM Peak Hour		
Approach	Move: Delay (sec)	V/C	Queue	Move: Delay (sec)	V/C	Queue
Northbound	NB Left: 7.6s	0.01	<10m	NB Left: 8.6s	0.01	<10m
Southbound[A]	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Eastbound	EB Left/Right: 12.1s	0.05	<10m	EB Left/Right: 15.5s	0.04	<10m

2. Herring Cove Road / Sussex Street (TWSC)						
	AM Peak Hour			PM Peak Hour		
Approach	Move: Delay (sec)	V/C	Queue	Move: Delay (sec)	V/C	Queue
Northbound	NB Left: 9.1s	0.03	<10m	NB Left: 11.6s	0.07	<10m
Southbound[A]	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Eastbound	EB Left: 16.8s EB Right:11.1s	0.14 0.08	10m <10m	EB Left: 26.6s EB Right: 13.7s	0.27 0.05	10m <10m

3. Herring Cove Road / Dentith Road (signalized)						
	AM Peak Hour			PM Peak Hour		
Approach	Move: Delay (sec)	V/C	Queue	Move: Delay (sec)	V/C	Queue
Northbound	NB Left: 11.3s NB T: 7.3s	0.58 0.25	35m 25m	NB Left: 22.1s NB T: 7.5s	0.71 0.19	60m 25m
Southbound	SB T-R: 17.1s	0.61	40m	SB T-R: 25.4s	0.85	105m
Eastbound	EB Left: 23.4s EB Right: 0.7s	0.55 0.27	45m <10m	EB Left: 30.2s EB Right: 4.2s	0.66 0.59	60m 10m

A – First order free-flow unsignalized intersection movement; therefore, no delay, v/c ratio, or queue can be calculated.

Future Background 2030 Operational Results

1. Herring Cove Road / Green Acres Road (TWSC)						
	AM Peak Hour			PM Peak Hour		
Approach	Move: Delay (sec)	V/C	Queue	Move: Delay (sec)	V/C	Queue
Northbound	NB Left: 7.8s	0.01	<10m	NB Left: 9.4s	0.01	<10m
Southbound[A]	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Eastbound	EB Left/Right: 15.4s	0.06	<10m	EB Left/Right: 22.6s	0.07	<10m

2. Herring Cove Road / Sussex Street (TWSC)						
	AM Peak Hour			PM Peak Hour		
Approach	Move: Delay (sec)	V/C	Queue	Move: Delay (sec)	V/C	Queue
Northbound	NB Left: 9.6 s	0.03	<10m	NB Left: 15.4 s	0.11	10m
Southbound[A]	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Eastbound	EB Left: 18.2s EB Right:11.9s	0.15 0.08	10m <10m	EB Left: 43.7s EB Right: 17.7s	0.40 0.07	15m <10m

3. Herring Cove Road / Dentith Road (signalized)						
	AM Peak Hour			PM Peak Hour		
Approach	Move: Delay (sec)	V/C	Queue	Move: Delay (sec)	V/C	Queue
Northbound	NB Left: 29.6s NB T: 7.7s	0.64 0.38	55m 40m	NB Left: 53.9s NB T: 6.9s	0.81 0.25	65m 30m
Southbound	SB T-R: 21.2s	0.68	55m	SB T-R: 30.5s	0.90	155m
Eastbound	EB Left: 28.9s EB Right: 1.0s	0.59 0.33	50m <10m	EB Left: 45.6s EB Right: 14.0s	0.76 0.80	80m 55m

A – First order free-flow unsignalized intersection movement; therefore, no delay, v/c ratio, or queue can be calculated.

Future Total 2030 Operational Results

1. Herring Cove Road / Green Acres Road (TWSC)						
	AM Peak Hour			PM Peak Hour		
Approach	Move: Delay (sec)	V/C	Queue	Move: Delay (sec)	V/C	Queue
Northbound	NB Left: 8.0s	0.01	<10m	NB Left: 9.9s	0.02	<10m
Southbound[A]	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Eastbound	EB Left/Right: 24.6s	0.47	20m	EB Left/Right: 41.4s	0.49	20m

2. Herring Cove Road / Sussex Street (TWSC)						
	AM Peak Hour			PM Peak Hour		
Approach	Move: Delay (sec)	V/C	Queue	Move: Delay (sec)	V/C	Queue
Northbound	NB Left: 10.6s	0.08	<10m	NB Left: 23.7s	0.23	10m
Southbound[A]	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Eastbound	EB Left: 24.1s EB Right:13.0s	0.16 0.11	10m 10m	EB Left: 83.8s EB Right: 27.4s	0.48 0.24	15m 10m

3. Herring Cove Road / Dentith Road (signalized)						
	AM Peak Hour			PM Peak Hour		
Approach	Move: Delay (sec)	V/C	Queue	Move: Delay (sec)	V/C	Queue
Northbound	NB Left: 34.1s NB T: 9.7s	0.77 0.55	80m 70m	NB Left: 57.0s NB T: 8.1s	0.83 0.32	85m 50m
Southbound	SB T: 25.0s SB Right: 2.4s	0.66 0.18	60m 10m	SB T: 33.8s SB Right: 5.0s	0.88 0.34	175m 35m
Eastbound	EB Left: 29.3s EB Right: 1.2s	0.60 0.38	55m <10m	EB Left: 52.0s EB Right: 11.0s	0.78 0.82	95m 45m

4. Herring Cove Road / Proposed Site Access (signalized)						
	AM Peak Hour			PM Peak Hour		
Approach	Move: Delay (sec)	V/C	Queue	Move: Delay (sec)	V/C	Queue
Northbound	NB Left: 10.1s NB T: 21.2s	0.03 0.76	10m 150m	NB Left: 8.0s NB T: 7.6s	0.18 0.39	10m 55m
Southbound	SB T-R: 11.6s	0.32	45m	SB T-R: 13.7s	0.73	145m
Eastbound	EB Left: 30.6s EB Right: 11.8s	0.77 0.06	75m 10m	EB Left: 45.0s EB Right: 15.1s	0.74 0.06	60m 10m

A – First order free-flow unsignalized intersection movement; therefore, no delay, v/c ratio, or queue can be calculated.

Existing 2015 Results

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	17	5	2	369	160	6
Conflicting Peds, #/hr	0	0	5	0	0	5
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	18	5	2	401	174	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	582	182	180	0	-	0
Stage 1	177	-	-	-	-	-
Stage 2	405	-	-	-	-	-
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	475	861	1396	-	-	-
Stage 1	854	-	-	-	-	-
Stage 2	673	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	474	857	1390	-	-	-
Mov Cap-2 Maneuver	474	-	-	-	-	-
Stage 1	854	-	-	-	-	-
Stage 2	672	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1390	-	528	-	-
HCM Lane V/C Ratio	0.002	-	0.045	-	-
HCM Control Delay (s)	7.6	0	12.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	11	2	4	240	503	28
Conflicting Peds, #/hr	0	0	5	0	0	5
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	12	2	4	261	547	30

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	832	567	577	0	-	0
Stage 1	562	-	-	-	-	-
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	339	523	996	-	-	-
Stage 1	571	-	-	-	-	-
Stage 2	775	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	337	521	992	-	-	-
Mov Cap-2 Maneuver	337	-	-	-	-	-
Stage 1	571	-	-	-	-	-
Stage 2	771	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.5	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	992	-	356	-	-
HCM Lane V/C Ratio	0.004	-	0.04	-	-
HCM Control Delay (s)	8.6	0	15.5	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	44	44	23	660	484	98
Conflicting Peds, #/hr	10	10	10	0	0	10
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yeild	-	None	-	None
Storage Length	0	250	500	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	48	48	25	717	526	107

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	998	336	643	0	-	0
Stage 1	589	-	-	-	-	-
Stage 2	409	-	-	-	-	-
Critical Hdwy	6.9	7	4.2	-	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.25	-	-	-
Pot Cap-1 Maneuver	235	651	918	-	-	-
Stage 1	509	-	-	-	-	-
Stage 2	630	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	225	640	910	-	-	-
Mov Cap-2 Maneuver	353	-	-	-	-	-
Stage 1	505	-	-	-	-	-
Stage 2	608	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	910	-	353	640	-	-
HCM Lane V/C Ratio	0.027	-	0.135	0.075	-	-
HCM Control Delay (s)	9.1	-	16.8	11.1	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	0.2	-	-

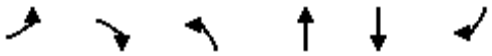
Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	56	21	38	547	833	220
Conflicting Peds, #/hr	10	10	10	0	0	10
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yeild	-	None	-	None
Storage Length	0	250	500	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	61	23	41	595	905	239

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1415	592	1155	0	-	0
Stage 1	1035	-	-	-	-	-
Stage 2	380	-	-	-	-	-
Critical Hdwy	6.86	6.96	4.16	-	-	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.53	3.33	2.23	-	-	-
Pot Cap-1 Maneuver	127	447	595	-	-	-
Stage 1	301	-	-	-	-	-
Stage 2	658	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	116	439	590	-	-	-
Mov Cap-2 Maneuver	227	-	-	-	-	-
Stage 1	298	-	-	-	-	-
Stage 2	607	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	23.1	0.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	590	-	227	439	-	-
HCM Lane V/C Ratio	0.07	-	0.268	0.052	-	-
HCM Control Delay (s)	11.6	-	26.6	13.7	-	-
HCM Lane LOS	B	-	D	B	-	-
HCM 95th %tile Q(veh)	0.2	-	1	0.2	-	-

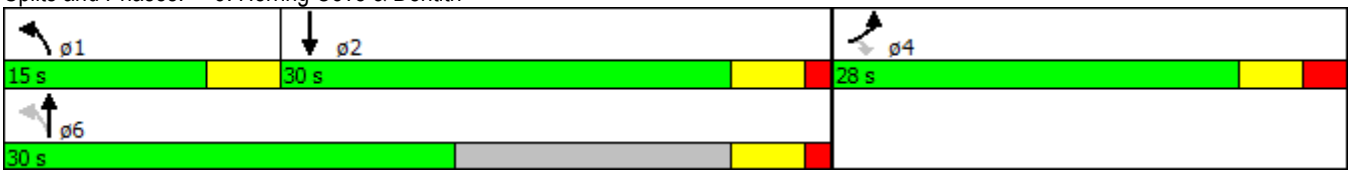


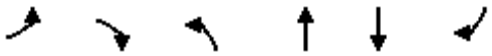
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	205	234	281	423	348	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor	0.99	0.97	0.99		0.98	
Frt		0.850			0.953	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1719	1538	1719	3438	3223	0
Flt Permitted	0.950		0.301			
Satd. Flow (perm)	1702	1499	540	3438	3223	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		*750			107	
Link Speed (k/h)	50			50	50	
Link Distance (m)	289.3			125.8	86.5	
Travel Time (s)	20.8			9.1	6.2	
Confl. Peds. (#/hr)	10	10	10			10
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	223	254	305	460	378	170
Shared Lane Traffic (%)						
Lane Group Flow (vph)	223	254	305	460	548	0
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	4		1	6	2	
Permitted Phases		4	6			
Detector Phase	4	4	1	6	2	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	28.0	28.0	15.0	22.1	23.6	
Total Split (s)	28.0	28.0	15.0	30.0	30.0	
Total Split (%)	38.4%	38.4%	20.5%	41.1%	41.1%	
Yellow Time (s)	3.5	3.5	4.0	4.1	4.1	
All-Red Time (s)	2.5	2.5	0.0	1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	5.6	5.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	None	Min	Min	
Act Effct Green (s)	12.1	12.1	28.3	26.7	12.8	
Actuated g/C Ratio	0.24	0.24	0.56	0.53	0.25	
v/c Ratio	0.55	0.27	0.58	0.25	0.61	
Control Delay	23.4	0.7	11.3	7.3	17.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	23.4	0.7	11.3	7.3	17.1	
LOS	C	A	B	A	B	
Approach Delay	11.3			8.9	17.1	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach LOS	B			A	B	
Queue Length 50th (m)	18.6	0.0	13.1	10.8	19.1	
Queue Length 95th (m)	41.3	0.0	31.9	22.4	37.3	
Internal Link Dist (m)	265.3			101.8	62.5	
Turn Bay Length (m)			50.0			
Base Capacity (vph)	769	1085	565	2823	1653	
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	0.23	0.54	0.16	0.33	

Intersection Summary			
Area Type:	Other		
Cycle Length: 73			
Actuated Cycle Length: 50.7			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 12.1		Intersection LOS: B	
Intersection Capacity Utilization 56.8%		ICU Level of Service B	
Analysis Period (min) 15			
* User Entered Value			

Splits and Phases: 3: Herring Cove & Dentith



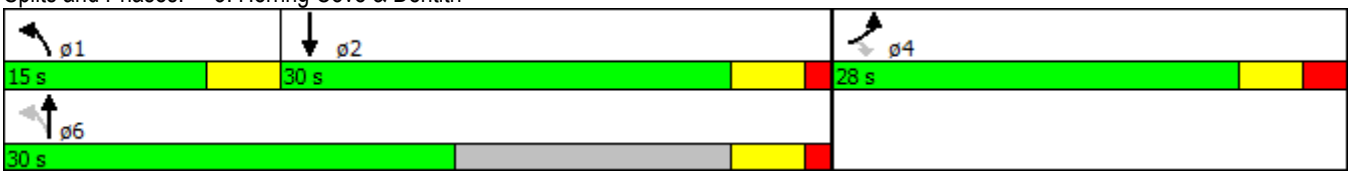


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	260	429	260	343	624	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor	0.99	0.97			0.98	
Frt		0.850			0.948	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1752	1568	1752	3505	3262	0
Flt Permitted	0.950		0.152			
Satd. Flow (perm)	1735	1528	280	3505	3262	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		*550			142	
Link Speed (k/h)	50			50	50	
Link Distance (m)	289.3			125.8	86.5	
Travel Time (s)	20.8			9.1	6.2	
Confl. Peds. (#/hr)	10	10	10			10
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	283	466	283	373	678	359
Shared Lane Traffic (%)						
Lane Group Flow (vph)	283	466	283	373	1037	0
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	4		1	6	2	
Permitted Phases		4	6			
Detector Phase	4	4	1	6	2	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	28.0	28.0	15.0	30.0	30.0	
Total Split (s)	28.0	28.0	15.0	30.0	30.0	
Total Split (%)	38.4%	38.4%	20.5%	41.1%	41.1%	
Yellow Time (s)	3.5	3.5	4.0	4.1	4.1	
All-Red Time (s)	2.5	2.5	0.0	1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	5.6	5.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	None	Min	Min	
Act Effct Green (s)	15.6	15.6	38.1	36.4	22.2	
Actuated g/C Ratio	0.24	0.24	0.60	0.57	0.35	
v/c Ratio	0.66	0.59	0.71	0.19	0.85	
Control Delay	30.2	4.2	22.1	7.5	25.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	30.2	4.2	22.1	7.5	25.4	
LOS	C	A	C	A	C	
Approach Delay	14.0			13.8	25.4	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach LOS	B			B	C	
Queue Length 50th (m)	33.8	0.0	15.1	10.4	54.3	
Queue Length 95th (m)	56.9	10.0	#55.3	20.4	#101.4	
Internal Link Dist (m)	265.3			101.8	62.5	
Turn Bay Length (m)			50.0			
Base Capacity (vph)	616	893	425	2206	1358	
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	0.46	0.52	0.67	0.17	0.76	

Intersection Summary			
Area Type:	Other		
Cycle Length: 73			
Actuated Cycle Length: 63.9			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 18.8		Intersection LOS: B	
Intersection Capacity Utilization 71.1%		ICU Level of Service C	
Analysis Period (min) 15			
* User Entered Value			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Herring Cove & Dentith



Background 2030 Results

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	17	5	2	548	243	6
Conflicting Peds, #/hr	0	0	5	0	0	5
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	18	5	2	596	264	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	867	272	271	0	-	0
Stage 1	267	-	-	-	-	-
Stage 2	600	-	-	-	-	-
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	323	767	1292	-	-	-
Stage 1	778	-	-	-	-	-
Stage 2	548	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	322	764	1287	-	-	-
Mov Cap-2 Maneuver	322	-	-	-	-	-
Stage 1	778	-	-	-	-	-
Stage 2	547	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.4	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1287	-	371	-	-
HCM Lane V/C Ratio	0.002	-	0.064	-	-
HCM Control Delay (s)	7.8	0	15.4	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	11	2	4	376	707	28
Conflicting Peds, #/hr	0	0	5	0	0	5
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	12	2	4	409	768	30

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1201	789	799	0	-	0
Stage 1	784	-	-	-	-	-
Stage 2	417	-	-	-	-	-
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	204	391	824	-	-	-
Stage 1	450	-	-	-	-	-
Stage 2	665	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	203	389	821	-	-	-
Mov Cap-2 Maneuver	203	-	-	-	-	-
Stage 1	450	-	-	-	-	-
Stage 2	661	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.6	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	821	-	219	-	-
HCM Lane V/C Ratio	0.005	-	0.065	-	-
HCM Control Delay (s)	9.4	0	22.6	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	44	44	23	1059	619	98
Conflicting Peds, #/hr	10	10	10	0	0	10
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yeild	-	None	-	None
Storage Length	0	250	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	48	48	25	1151	673	107

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1362	410	789	0	-	0
Stage 1	736	-	-	-	-	-
Stage 2	626	-	-	-	-	-
Critical Hdwy	6.9	7	4.2	-	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.25	-	-	-
Pot Cap-1 Maneuver	135	582	807	-	-	-
Stage 1	427	-	-	-	-	-
Stage 2	487	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	129	572	800	-	-	-
Mov Cap-2 Maneuver	321	-	-	-	-	-
Stage 1	423	-	-	-	-	-
Stage 2	468	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.1	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	800	-	321	572	-	-
HCM Lane V/C Ratio	0.031	-	0.149	0.084	-	-
HCM Control Delay (s)	9.6	-	18.2	11.9	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	0.3	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	56	21	38	801	1267	220
Conflicting Peds, #/hr	10	10	10	0	0	10
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yeild	-	None	-	None
Storage Length	0	250	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	61	23	41	871	1377	239

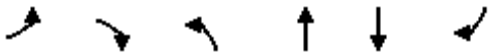
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2025	828	1626	0	-	0
Stage 1	1507	-	-	-	-	-
Stage 2	518	-	-	-	-	-
Critical Hdwy	6.86	6.96	4.16	-	-	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.53	3.33	2.23	-	-	-
Pot Cap-1 Maneuver	~ 50	312	391	-	-	-
Stage 1	168	-	-	-	-	-
Stage 2	560	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 44	307	388	-	-	-
Mov Cap-2 Maneuver	152	-	-	-	-	-
Stage 1	167	-	-	-	-	-
Stage 2	497	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	36.6	0.7	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	388	-	152	307	-	-
HCM Lane V/C Ratio	0.106	-	0.4	0.074	-	-
HCM Control Delay (s)	15.4	-	43.7	17.7	-	-
HCM Lane LOS	C	-	E	C	-	-
HCM 95th %tile Q(veh)	0.4	-	1.7	0.2	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

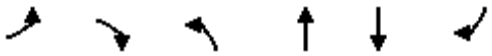


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	205	275	402	701	442	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	1	2			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	0.97	0.95	0.95	0.95
Ped Bike Factor	0.99	0.97	0.99		0.99	
Frt		0.850			0.961	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1719	1538	3335	3438	3274	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1698	1494	3288	3438	3274	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		*750			69	
Link Speed (k/h)	50			50	50	
Link Distance (m)	289.3			125.8	86.5	
Travel Time (s)	20.8			9.1	6.2	
Confl. Peds. (#/hr)	10	10	10			10
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	223	299	437	762	480	170
Shared Lane Traffic (%)						
Lane Group Flow (vph)	223	299	437	762	650	0
Turn Type	Prot	Perm	Prot	NA	NA	
Protected Phases	4		1	6	2	
Permitted Phases		4				
Detector Phase	4	4	1	6	2	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	28.0	28.0	13.0	22.0	24.0	
Total Split (s)	28.0	28.0	18.0	44.0	44.0	
Total Split (%)	31.1%	31.1%	20.0%	48.9%	48.9%	
Yellow Time (s)	3.5	3.5	4.0	4.1	4.1	
All-Red Time (s)	2.5	2.5	2.0	1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	5.6	5.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	None	Min	Min	
Act Effct Green (s)	13.1	13.1	12.2	35.0	16.6	
Actuated g/C Ratio	0.22	0.22	0.20	0.58	0.28	
v/c Ratio	0.59	0.33	0.64	0.38	0.68	
Control Delay	28.9	1.0	29.6	7.7	21.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	28.9	1.0	29.6	7.7	21.2	
LOS	C	A	C	A	C	
Approach Delay	12.9			15.7	21.2	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach LOS	B			B	C	
Queue Length 50th (m)	22.6	0.0	23.3	21.1	30.2	
Queue Length 95th (m)	47.7	0.0	#53.4	39.8	52.5	
Internal Link Dist (m)	265.3			101.8	62.5	
Turn Bay Length (m)			100.0			
Base Capacity (vph)	643	1028	681	3166	2163	
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	0.29	0.64	0.24	0.30	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 59.9			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 16.6		Intersection LOS: B	
Intersection Capacity Utilization 56.9%		ICU Level of Service B	
Analysis Period (min) 15			
* User Entered Value			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Herring Cove & Dentith



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	260	559	336	521	928	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	1	2			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	0.97	0.95	0.95	0.95
Ped Bike Factor	0.99	0.97	0.99		0.99	
Frt		0.850			0.961	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1752	1568	3400	3505	3337	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1730	1523	3382	3505	3337	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		*550			71	
Link Speed (k/h)	50			50	50	
Link Distance (m)	289.3			125.8	86.5	
Travel Time (s)	20.8			9.1	6.2	
Confl. Peds. (#/hr)	10	10	10			10
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	283	608	365	566	1009	359
Shared Lane Traffic (%)						
Lane Group Flow (vph)	283	608	365	566	1368	0
Turn Type	Prot	Perm	Prot	NA	NA	
Protected Phases	4		1	6	2	
Permitted Phases		4				
Detector Phase	4	4	1	6	2	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	28.0	28.0	13.0	22.1	23.6	
Total Split (s)	28.0	28.0	17.0	47.0	47.0	
Total Split (%)	30.4%	30.4%	18.5%	51.1%	51.1%	
Yellow Time (s)	3.5	3.5	4.0	4.1	4.1	
All-Red Time (s)	2.5	2.5	2.0	1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	5.6	5.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	None	Min	Min	
Act Effct Green (s)	18.1	18.1	11.1	54.8	37.5	
Actuated g/C Ratio	0.21	0.21	0.13	0.65	0.44	
v/c Ratio	0.76	0.80	0.81	0.25	0.90	
Control Delay	45.6	14.0	53.9	6.9	30.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	45.6	14.0	53.9	6.9	30.5	
LOS	D	B	D	A	C	
Approach Delay	24.0			25.3	30.5	

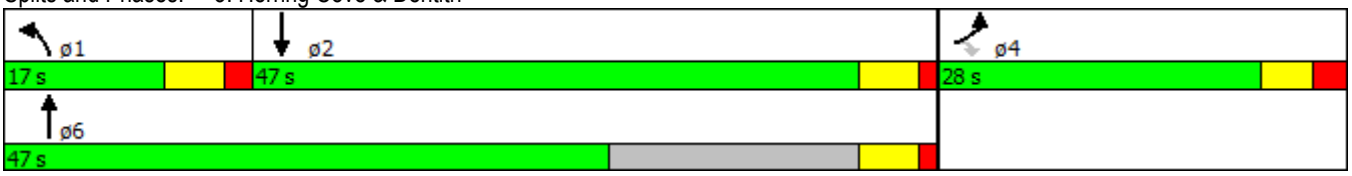
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach LOS	C			C	C	
Queue Length 50th (m)	48.0	8.6	34.3	20.5	109.7	
Queue Length 95th (m)	76.1	50.6	#61.0	29.8	#154.4	
Internal Link Dist (m)	265.3			101.8	62.5	
Turn Bay Length (m)			100.0			
Base Capacity (vph)	461	806	448	2452	1690	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.61	0.75	0.81	0.23	0.81	

Intersection Summary			
Area Type:	Other		
Cycle Length: 92			
Actuated Cycle Length: 84.6			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 27.2		Intersection LOS: C	
Intersection Capacity Utilization 81.8%		ICU Level of Service D	
Analysis Period (min) 15			

* User Entered Value

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

Splits and Phases: 3: Herring Cove & Dentith



Total 2030 Results

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	113	32	4	562	269	38
Conflicting Peds, #/hr	0	0	5	0	0	5
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	123	35	4	611	292	41

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	933	318	334	0	-	0
Stage 1	313	-	-	-	-	-
Stage 2	620	-	-	-	-	-
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	295	723	1225	-	-	-
Stage 1	741	-	-	-	-	-
Stage 2	536	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	294	720	1220	-	-	-
Mov Cap-2 Maneuver	294	-	-	-	-	-
Stage 1	741	-	-	-	-	-
Stage 2	533	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24.6	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1220	-	338	-	-
HCM Lane V/C Ratio	0.004	-	0.466	-	-
HCM Control Delay (s)	8	0	24.6	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	2.4	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	67	18	11	417	722	123
Conflicting Peds, #/hr	0	0	5	0	0	5
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	73	20	12	453	785	134

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1329	857	918	0	-	0
Stage 1	852	-	-	-	-	-
Stage 2	477	-	-	-	-	-
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	171	357	743	-	-	-
Stage 1	418	-	-	-	-	-
Stage 2	624	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	167	355	740	-	-	-
Mov Cap-2 Maneuver	167	-	-	-	-	-
Stage 1	418	-	-	-	-	-
Stage 2	610	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	41.4	0.3	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	740	-	188	-	-
HCM Lane V/C Ratio	0.016	-	0.491	-	-
HCM Control Delay (s)	9.9	0	41.4	-	-
HCM Lane LOS	A	A	E	-	-
HCM 95th %tile Q(veh)	0	-	2.4	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	34	53	50	1511	770	98
Conflicting Peds, #/hr	10	10	10	0	0	10
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yeild	-	None	-	None
Storage Length	0	250	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	37	58	54	1642	837	107

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1830	492	953	0	-	0
Stage 1	900	-	-	-	-	-
Stage 2	930	-	-	-	-	-
Critical Hdwy	6.9	7	4.2	-	-	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.55	3.35	2.25	-	-	-
Pot Cap-1 Maneuver	66	515	699	-	-	-
Stage 1	350	-	-	-	-	-
Stage 2	337	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	60	506	693	-	-	-
Mov Cap-2 Maneuver	225	-	-	-	-	-
Stage 1	347	-	-	-	-	-
Stage 2	308	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.3	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	693	-	225	506	-	-
HCM Lane V/C Ratio	0.078	-	0.164	0.114	-	-
HCM Control Delay (s)	10.6	-	24.1	13	-	-
HCM Lane LOS	B	-	C	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.6	0.4	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	36	47	53	1064	1714	220
Conflicting Peds, #/hr	10	10	10	0	0	10
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yeild	-	None	-	None
Storage Length	0	250	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	39	51	58	1157	1863	239

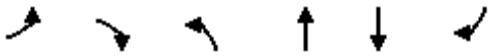
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2686	1071	2112	0	-	0
Stage 1	1993	-	-	-	-	-
Stage 2	693	-	-	-	-	-
Critical Hdwy	6.86	6.96	4.16	-	-	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.53	3.33	2.23	-	-	-
Pot Cap-1 Maneuver	~ 17	215	252	-	-	-
Stage 1	91	-	-	-	-	-
Stage 2	455	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 13	211	250	-	-	-
Mov Cap-2 Maneuver	82	-	-	-	-	-
Stage 1	90	-	-	-	-	-
Stage 2	346	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	51.9	1.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	250	-	82	211	-	-
HCM Lane V/C Ratio	0.23	-	0.477	0.242	-	-
HCM Control Delay (s)	23.7	-	83.8	27.4	-	-
HCM Lane LOS	C	-	F	D	-	-
HCM 95th %tile Q(veh)	0.9	-	2	0.9	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

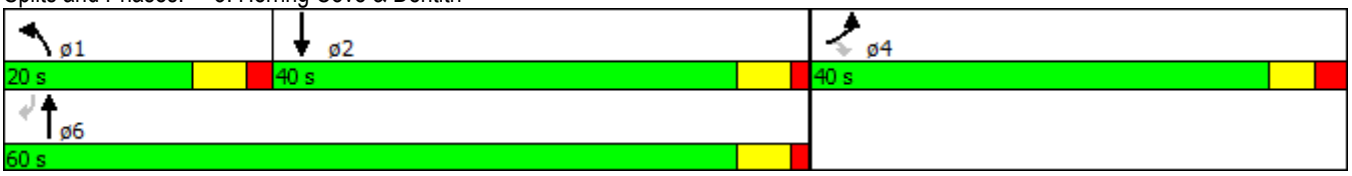


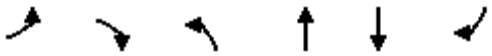
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	215	320	535	1010	548	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			20.0
Storage Lanes	1	1	2			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	0.97	0.95	0.95	1.00
Ped Bike Factor	0.99	0.97	0.98			0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1719	1538	3335	3438	3438	1538
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1696	1494	3279	3438	3438	1508
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		*750				150
Link Speed (k/h)	50			50	50	
Link Distance (m)	289.3			125.8	86.5	
Travel Time (s)	20.8			9.1	6.2	
Confl. Peds. (#/hr)	10	10	10			10
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	234	348	582	1098	596	170
Shared Lane Traffic (%)						
Lane Group Flow (vph)	234	348	582	1098	596	170
Turn Type	Prot	Perm	Prot	NA	NA	custom
Protected Phases	4		1	6	2	
Permitted Phases		4				6
Detector Phase	4	4	1	6	2	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	35.0	35.0	15.0	30.0	30.0	30.0
Total Split (s)	40.0	40.0	20.0	60.0	40.0	60.0
Total Split (%)	40.0%	40.0%	20.0%	60.0%	40.0%	60.0%
Yellow Time (s)	3.5	3.5	4.0	4.1	4.1	4.1
All-Red Time (s)	2.5	2.5	2.0	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.6	5.6	5.6
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	None	Min	Min	Min
Act Effct Green (s)	14.4	14.4	14.3	37.0	16.6	37.0
Actuated g/C Ratio	0.23	0.23	0.23	0.59	0.26	0.59
v/c Ratio	0.60	0.38	0.77	0.55	0.66	0.18
Control Delay	29.3	1.2	34.1	9.7	25.0	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	1.2	34.1	9.7	25.0	2.4
LOS	C	A	C	A	C	A
Approach Delay	12.5			18.2	20.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach LOS	B			B	B	
Queue Length 50th (m)	25.1	0.0	33.5	36.7	33.3	0.9
Queue Length 95th (m)	50.7	0.0	#78.2	69.7	56.6	9.1
Internal Link Dist (m)	265.3			101.8	62.5	
Turn Bay Length (m)			100.0			20.0
Base Capacity (vph)	942	1158	753	2985	1907	1329
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	0.25	0.30	0.77	0.37	0.31	0.13

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 63.2			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 17.5		Intersection LOS: B	
Intersection Capacity Utilization 58.8%		ICU Level of Service B	
Analysis Period (min) 15			
* User Entered Value			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Herring Cove & Dentith



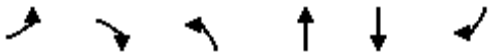


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	280	691	413	687	1243	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			20.0
Storage Lanes	1	1	2			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	0.97	0.95	0.95	1.00
Ped Bike Factor	0.98	0.97	0.99			0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1752	1568	3400	3505	3505	1568
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1726	1519	3378	3505	3505	1539
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		*750				165
Link Speed (k/h)	50			50	50	
Link Distance (m)	289.3			125.8	86.5	
Travel Time (s)	20.8			9.1	6.2	
Confl. Peds. (#/hr)	10	10	10			10
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	304	751	449	747	1351	359
Shared Lane Traffic (%)						
Lane Group Flow (vph)	304	751	449	747	1351	359
Turn Type	Prot	Perm	Prot	NA	NA	custom
Protected Phases	4		1	6	2	
Permitted Phases		4				6
Detector Phase	4	4	1	6	2	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	28.0	28.0	13.0	22.0	24.0	22.0
Total Split (s)	33.0	33.0	22.0	77.0	55.0	77.0
Total Split (%)	30.0%	30.0%	20.0%	70.0%	50.0%	70.0%
Yellow Time (s)	3.5	3.5	4.0	4.1	4.1	4.1
All-Red Time (s)	2.5	2.5	2.0	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.6	5.6	5.6
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	None	Min	Min	Min
Act Effct Green (s)	22.0	22.0	15.7	65.2	43.4	65.2
Actuated g/C Ratio	0.22	0.22	0.16	0.66	0.44	0.66
v/c Ratio	0.78	0.82	0.83	0.32	0.88	0.34
Control Delay	52.0	11.0	57.0	8.1	33.8	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.0	11.0	57.0	8.1	33.8	5.0
LOS	D	B	E	A	C	A
Approach Delay	22.8			26.5	27.8	

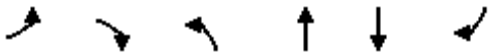
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach LOS	C			C	C	
Queue Length 50th (m)	61.8	0.2	49.7	33.3	133.7	14.8
Queue Length 95th (m)	94.8	42.6	#81.5	46.4	172.7	30.5
Internal Link Dist (m)	265.3			101.8	62.5	
Turn Bay Length (m)			100.0			20.0
Base Capacity (vph)	487	963	560	2577	1783	1175
Starvation Cap 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	0.62	0.78	0.80	0.29	0.76	0.31

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 99.1			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 26.1		Intersection LOS: C	
Intersection Capacity Utilization 87.8%		ICU Level of Service E	
Analysis Period (min) 15			
* User Entered Value			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Herring Cove & Dentith



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	383	26	14	661	281	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	5.0	15.0			5.0
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
Ped Bike Factor	0.99	0.96	0.99			0.97
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583
Flt Permitted	0.950		0.568			
Satd. Flow (perm)	1750	1527	1051	1863	1863	1528
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		9				70
Link Speed (k/h)	50			50	50	
Link Distance (m)	160.1			192.5	64.2	
Travel Time (s)	11.5			13.9	4.6	
Confl. Peds. (#/hr)	5	5	5			5
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	416	28	15	718	305	139
Shared Lane Traffic (%)						
Lane Group Flow (vph)	416	28	15	718	305	139
Turn Type	Prot	Perm	Perm	NA	NA	custom
Protected Phases	4			6	2	
Permitted Phases		4	6			6
Detector Phase	4	4	6	6	2	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	32.0	32.0	38.0	38.0	38.0	38.0
Total Split (%)	45.7%	45.7%	54.3%	54.3%	54.3%	54.3%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Max	Max	Max	Max
Act Effct Green (s)	19.3	19.3	32.2	32.2	32.2	32.2
Actuated g/C Ratio	0.30	0.30	0.51	0.51	0.51	0.51
v/c Ratio	0.77	0.06	0.03	0.76	0.32	0.17
Control Delay	30.6	11.8	10.1	21.2	11.6	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.6	11.8	10.1	21.2	11.6	6.3
LOS	C	B	B	C	B	A
Approach Delay	29.4			21.0	9.9	
Approach LOS	C			C	A	

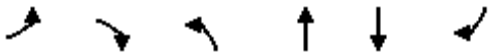


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (m)	46.0	1.6	0.9	66.8	20.8	4.1
Queue Length 95th (m)	74.9	6.4	4.1	#148.3	43.4	14.5
Internal Link Dist (m)	136.1			168.5	40.2	
Turn Bay Length (m)		5.0	15.0			5.0
Base Capacity (vph)	728	633	531	943	943	808
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.04	0.03	0.76	0.32	0.17

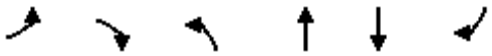
Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 63.6			
Natural Cycle: 60			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 20.3		Intersection LOS: C	
Intersection Capacity Utilization 66.0%		ICU Level of Service C	
Analysis Period (min) 15			

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

Splits and Phases: 4: Site Access & Herring Cove



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	222	15	41	443	830	378
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	20.0	15.0			5.0
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
Ped Bike Factor	0.99	0.96				0.96
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583
Flt Permitted	0.950		0.202			
Satd. Flow (perm)	1747	1519	376	1863	1863	1528
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		13				92
Link Speed (k/h)	50			50	50	
Link Distance (m)	160.1			192.5	64.2	
Travel Time (s)	11.5			13.9	4.6	
Confl. Peds. (#/hr)	5	5	5			5
Confl. Bikes (#/hr)		5				5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	241	16	45	482	902	411
Shared Lane Traffic (%)						
Lane Group Flow (vph)	241	16	45	482	902	411
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	23.0	23.0	57.0	57.0	57.0	57.0
Total Split (%)	28.8%	28.8%	71.3%	71.3%	71.3%	71.3%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Max	Max	Max	Max
Act Effct Green (s)	14.8	14.8	53.8	53.8	53.8	53.8
Actuated g/C Ratio	0.18	0.18	0.67	0.67	0.67	0.67
v/c Ratio	0.74	0.06	0.18	0.39	0.73	0.39
Control Delay	45.0	15.1	8.0	7.6	13.7	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.0	15.1	8.0	7.6	13.7	6.2
LOS	D	B	A	A	B	A
Approach Delay	43.1			7.6	11.3	
Approach LOS	D			A	B	



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (m)	35.4	0.4	2.5	31.6	84.7	19.5
Queue Length 95th (m)	59.5	5.3	7.7	51.4	140.7	37.2
Internal Link Dist (m)	136.1			168.5	40.2	
Turn Bay Length (m)		20.0	15.0			5.0
Base Capacity (vph)	373	331	250	1243	1243	1050
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	0.65	0.05	0.18	0.39	0.73	0.39

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80.6			
Natural Cycle: 60			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 14.3		Intersection LOS: B	
Intersection Capacity Utilization 66.1%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 4: Site Access & Herring Cove

APPENDIX III

TAC Signal Warrant Reports

HRM - Traffic Signal Warrant Analysis

Main Street (name)	Herring Cove Rd	Direction (EW or NS)	NS	Road Authority:	HRM
Side Street (name)	Green Acres Rd	Direction (EW or NS)	EW	City:	HRM - Dartmouth
Quadrant / Int #	1	Comments	Green Acres TIS 2015 Existing	Analysis Date:	2015 Jun 04, Thu
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			Count Date:	
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Herring Cove Rd	NB			1				2,000	1
Herring Cove Rd	SB			1				2,000	1
Green Acres Rd	WB								
Green Acres Rd	EB				1				
Are the Green Acres Rd EB right turns significantly impeded by through movements? (y/n)							n		

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	380,000
Central Business District	(y/n)	n

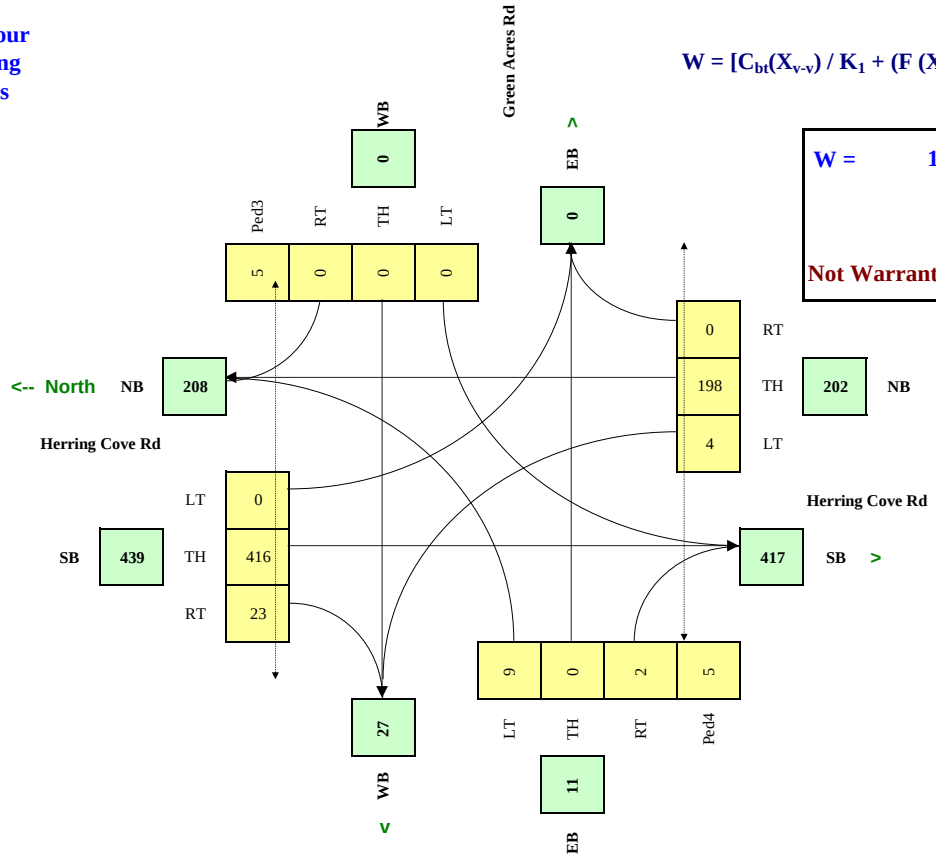
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Herring Cove Rd	NS	60	2.0%	y	0.0
Green Acres Rd	EW		2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
7:00 - 8:00	3	177	0	0	371	21	0	0	0	8	0	1	5	5	5	5
8:00 - 9:00	4	211	0	0	442	25	0	0	0	10	0	2	5	5	5	5
12:00 - 13:00	3	175	0	0	367	20	0	0	0	8	0	1	5	5	5	5
13:00 - 14:00	3	157	0	0	330	18	0	0	0	7	0	1	5	5	5	5
16:00 - 17:00	4	230	0	0	481	27	0	0	0	11	0	2	5	5	5	5
17:00 - 18:00	4	240	0	0	503	28	0	0	0	11	0	2	5	5	5	5
Total (6-hour peak)	**21**	**1,190**	**0**	**0**	**2,494**	**139**	**0**	**0**	**0**	**55**	**0**	**9**	**30**	**30**	**30**	**30**
Average (6-hour peak)	**4**	**198**	**0**	**0**	**416**	**23**	**0**	**0**	**0**	**9**	**0**	**2**	**5**	**5**	**5**	**5**

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	11	5	6
		Veh	*Ped*

Not Warranted - Vs<75

RESET SHEET

HRM - Traffic Signal Warrant Analysis

Main Street (name)	Herring Cove Rd	Direction (EW or NS)	NS	Road Authority:	HRM
Side Street (name)	Green Acres Rd	Direction (EW or NS)	EW	City:	HRM - Dartmouth
Quadrant / Int #	1	Comments	Green Acres TIS 2030 Background	Analysis Date:	2015 Jun 04, Thu
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			Count Date:	
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Herring Cove Rd	NB			1				2,000	1
Herring Cove Rd	SB			1				2,000	1
Green Acres Rd	WB								
Green Acres Rd	EB				1				
Are the Green Acres Rd EB right turns significantly impeded by through movements? (y/n)							n		

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	380,000
Central Business District	(y/n)	n

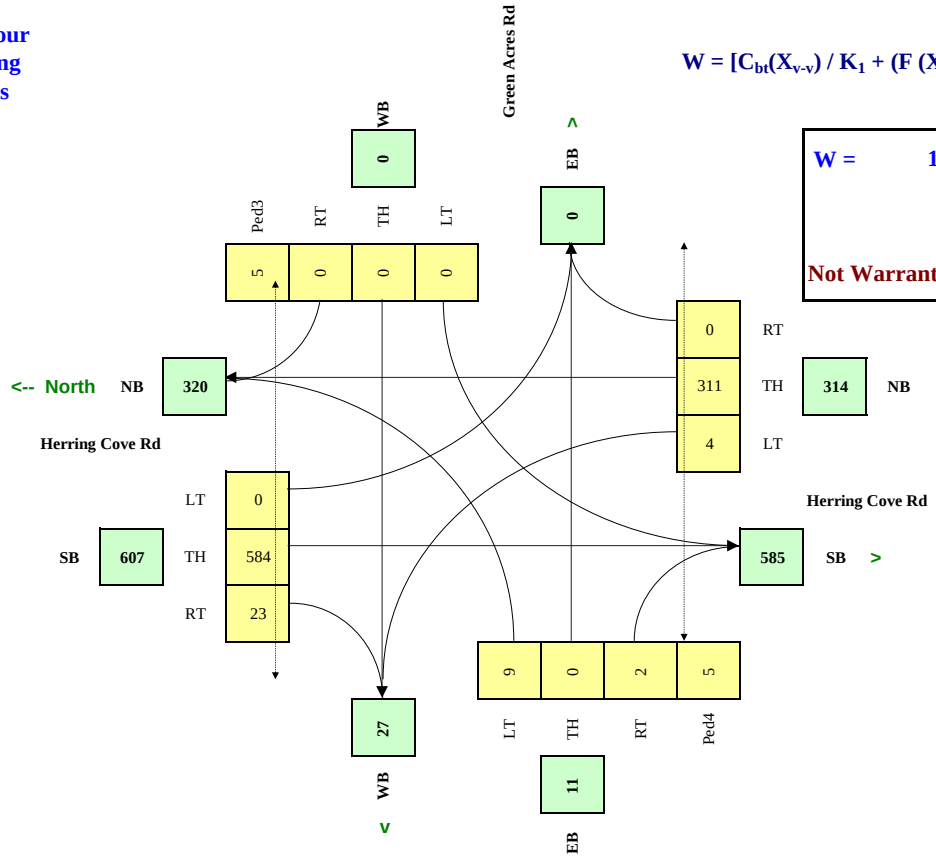
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Herring Cove Rd	NS	60	2.0%	y	0.0
Green Acres Rd	EW		2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
7:00 - 8:00	3	277	0	0	521	21	0	0	0	8	0	1	5	5	5	5
8:00 - 9:00	4	330	0	0	621	25	0	0	0	10	0	2	5	5	5	5
12:00 - 13:00	3	274	0	0	515	20	0	0	0	8	0	1	5	5	5	5
13:00 - 14:00	3	246	0	0	463	18	0	0	0	7	0	1	5	5	5	5
16:00 - 17:00	4	360	0	0	676	27	0	0	0	11	0	2	5	5	5	5
17:00 - 18:00	4	376	0	0	707	28	0	0	0	11	0	2	5	5	5	5
Total (6-hour peak)	**21**	**1,863**	**0**	**0**	**3,503**	**139**	**0**	**0**	**0**	**55**	**0**	**9**	**30**	**30**	**30**	**30**
Average (6-hour peak)	**4**	**311**	**0**	**0**	**584**	**23**	**0**	**0**	**0**	**9**	**0**	**2**	**5**	**5**	**5**	**5**

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	16	7	9
		Veh	*Ped*

Not Warranted - Vs<75

RESET SHEET

HRM - Traffic Signal Warrant Analysis

Main Street (name)	Herring Cove Rd	Direction (EW or NS)	NS	Road Authority:	HRM
Side Street (name)	Green Acres Rd	Direction (EW or NS)	EW	City:	HRM - Dartmouth
Quadrant / Int #	1	Comments	Green Acres TIS 2030 Total	Analysis Date:	2015 Jun 04, Thu
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			Count Date:	
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Herring Cove Rd	NB			1				2,000	1
Herring Cove Rd	SB			1				2,000	1
Green Acres Rd	WB								
Green Acres Rd	EB				1				
Are the Green Acres Rd EB right turns significantly impeded by through movements? (y/n)							n		

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	380,000
Central Business District	(y/n)	n

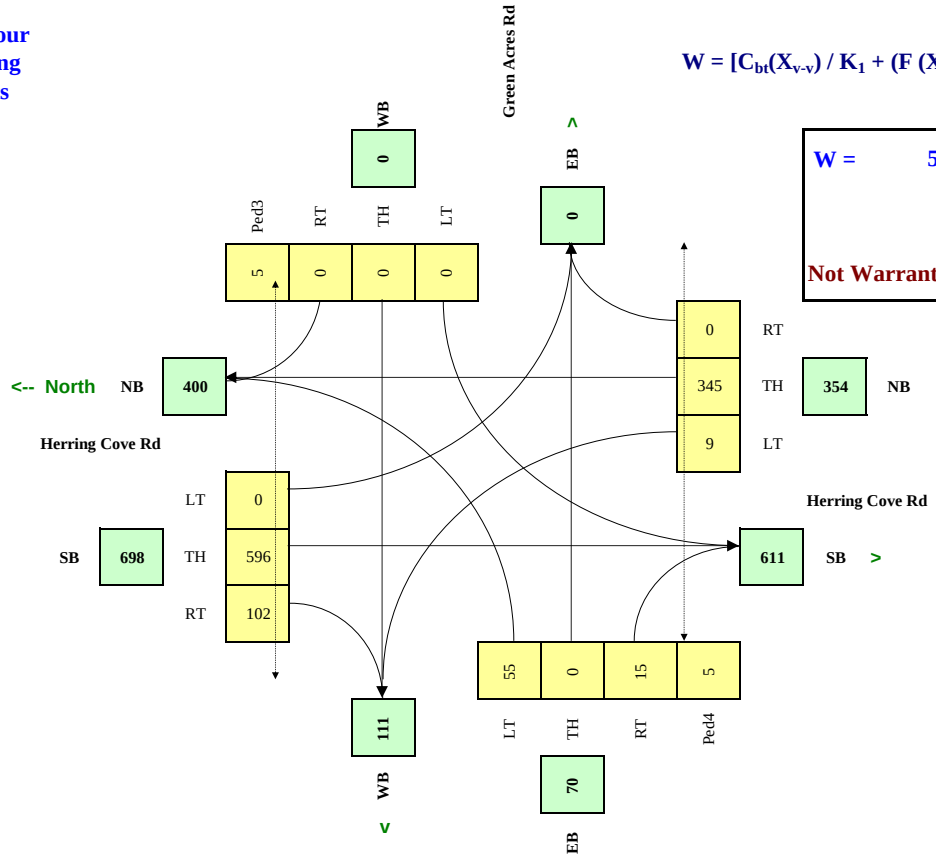
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Herring Cove Rd	NS	60	2.0%	y	0.0
Green Acres Rd	EW		2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
7:00 - 8:00	8	308	0	0	532	91	0	0	0	49	0	13	5	5	5	5
8:00 - 9:00	10	366	0	0	634	108	0	0	0	59	0	16	5	5	5	5
12:00 - 13:00	8	304	0	0	526	90	0	0	0	49	0	13	5	5	5	5
13:00 - 14:00	7	273	0	0	473	81	0	0	0	44	0	12	5	5	5	5
16:00 - 17:00	11	399	0	0	691	118	0	0	0	64	0	17	5	5	5	5
17:00 - 18:00	11	417	0	0	722	123	0	0	0	67	0	18	5	5	5	5
Total (6-hour peak)	**55**	**2,067**	**0**	**0**	**3,578**	**611**	**0**	**0**	**0**	**332**	**0**	**89**	**30**	**30**	**30**	**30**
Average (6-hour peak)	**9**	**345**	**0**	**0**	**596**	**102**	**0**	**0**	**0**	**55**	**0**	**15**	**5**	**5**	**5**	**5**

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	51	40	11
		Veh	*Ped*

Not Warranted - Vs<75

RESET SHEET

HRM - Traffic Signal Warrant Analysis

Main Street (name)	Herring Cove Rd	Direction (EW or NS)	NS	Road Authority:	HRM
Side Street (name)	Sussex St	Direction (EW or NS)	EW	City:	HRM - Dartmouth
Quadrant / Int #	2	Comments	Green Acres TIS 2015 Existing	Analysis Date:	2015 Jun 04, Thu
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			Count Date:	
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Herring Cove Rd	NB	1		2				2,000	2
Herring Cove Rd	SB			1		1		110	2
Sussex St	WB								
Sussex St	EB	1					1		
							0		

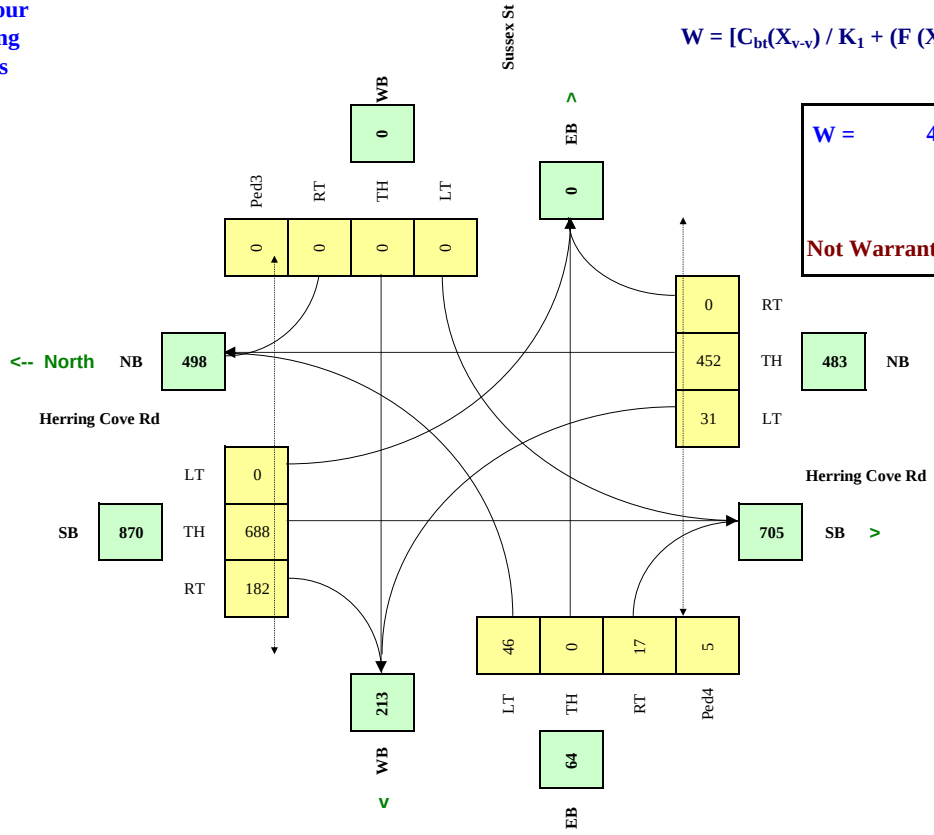
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	380,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Herring Cove Rd	NS	60	3.0%	y	0.0
Sussex St	EW		3.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
7:00 - 8:00	28	403	0	0	614	162	0	0	0	41	0	15	5	5	0	5
8:00 - 9:00	33	480	0	0	731	193	0	0	0	49	0	18	5	5	0	5
12:00 - 13:00	28	399	0	0	607	160	0	0	0	41	0	15	5	5	0	5
13:00 - 14:00	25	359	0	0	546	144	0	0	0	37	0	14	5	5	0	5
16:00 - 17:00	36	523	0	0	797	210	0	0	0	54	0	20	5	5	0	5
17:00 - 18:00	38	547	0	0	833	220	0	0	0	56	0	21	5	5	0	5
Total (6-hour peak)	**188**	**2,711**	**0**	**0**	**4,128**	**1,089**	**0**	**0**	**0**	**278**	**0**	**103**	**30**	**30**	**0**	**30**
Average (6-hour peak)	**31**	**452**	**0**	**0**	**688**	**182**	**0**	**0**	**0**	**46**	**0**	**17**	**5**	**5**	**0**	**5**

Average 6-hour Peak Turning Movements



$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$

W =	45	39	6
		Veh	*Ped*

Not Warranted - Vs<75

RESET SHEET

HRM - Traffic Signal Warrant Analysis

Main Street (name)	Herring Cove Rd	Direction (EW or NS)	NS	Road Authority:	HRM
Side Street (name)	Sussex St	Direction (EW or NS)	EW	City:	HRM - Dartmouth
Quadrant / Int #	2	Comments	Green Acres TIS 2030 Background	Analysis Date:	2015 Jun 04, Thu
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			Count Date:	
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Herring Cove Rd	NB	1		2				2,000	2
Herring Cove Rd	SB			1		1		110	2
Sussex St	WB								
Sussex St	EB	1					1		
							0		

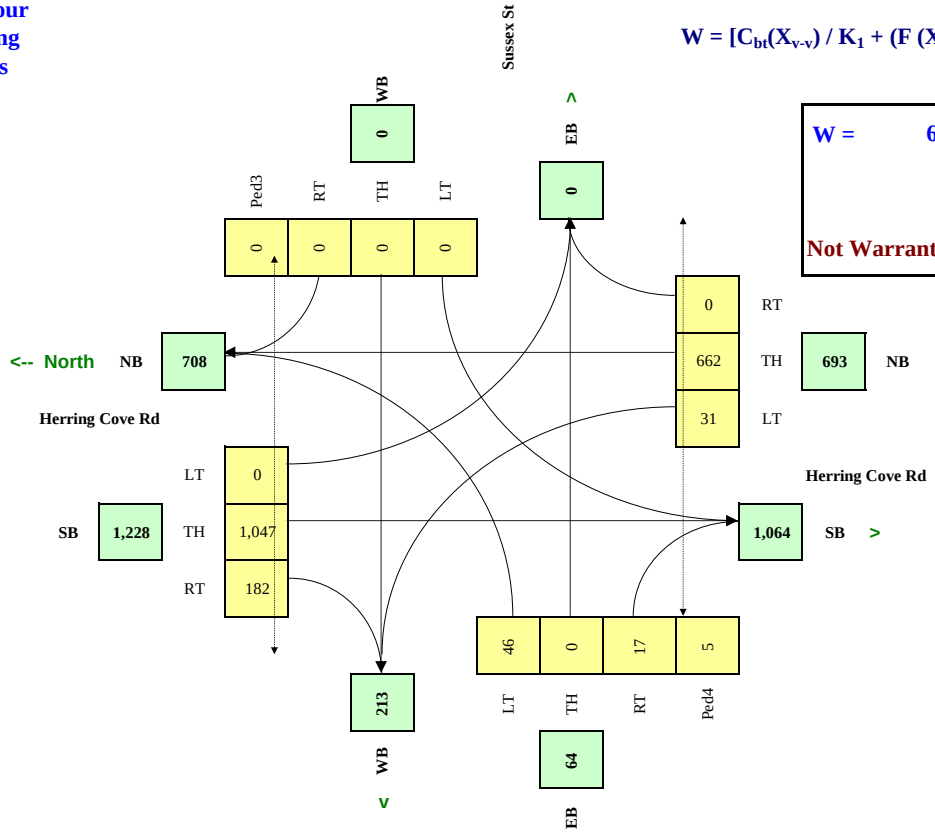
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	380,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Herring Cove Rd	NS	60	3.0%	y	0.0
Sussex St	EW		3.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
7:00 - 8:00	28	591	0	0	934	162	0	0	0	41	0	15	5	5	0	5
8:00 - 9:00	33	703	0	0	1112	193	0	0	0	49	0	18	5	5	0	5
12:00 - 13:00	28	584	0	0	924	160	0	0	0	41	0	15	5	5	0	5
13:00 - 14:00	25	525	0	0	831	144	0	0	0	37	0	14	5	5	0	5
16:00 - 17:00	36	766	0	0	1212	210	0	0	0	54	0	20	5	5	0	5
17:00 - 18:00	38	801	0	0	1267	220	0	0	0	56	0	21	5	5	0	5
Total (6-hour peak)	**188**	**3,970**	**0**	**0**	**6,280**	**1,089**	**0**	**0**	**0**	**278**	**0**	**103**	**30**	**30**	**0**	**30**
Average (6-hour peak)	**31**	**662**	**0**	**0**	**1,047**	**182**	**0**	**0**	**0**	**46**	**0**	**17**	**5**	**5**	**0**	**5**

Average 6-hour Peak Turning Movements



$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$

W =	66	57	9
		Veh	*Ped*

Not Warranted - Vs<75

RESET SHEET

HRM - Traffic Signal Warrant Analysis

Main Street (name)	Herring Cove Rd	Direction (EW or NS)	NS	Road Authority:	HRM
Side Street (name)	Sussex St	Direction (EW or NS)	EW	City:	HRM - Dartmouth
Quadrant / Int #	2	Comments	Green Acres TIS 2030 Total	Analysis Date:	2015 Jun 04, Thu
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			Count Date:	
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Herring Cove Rd	NB	1		2				2,000	2
Herring Cove Rd	SB			1		1		110	2
Sussex St	WB								
Sussex St	EB	1					1		
							0		

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	380,000
Central Business District	(y/n)	n

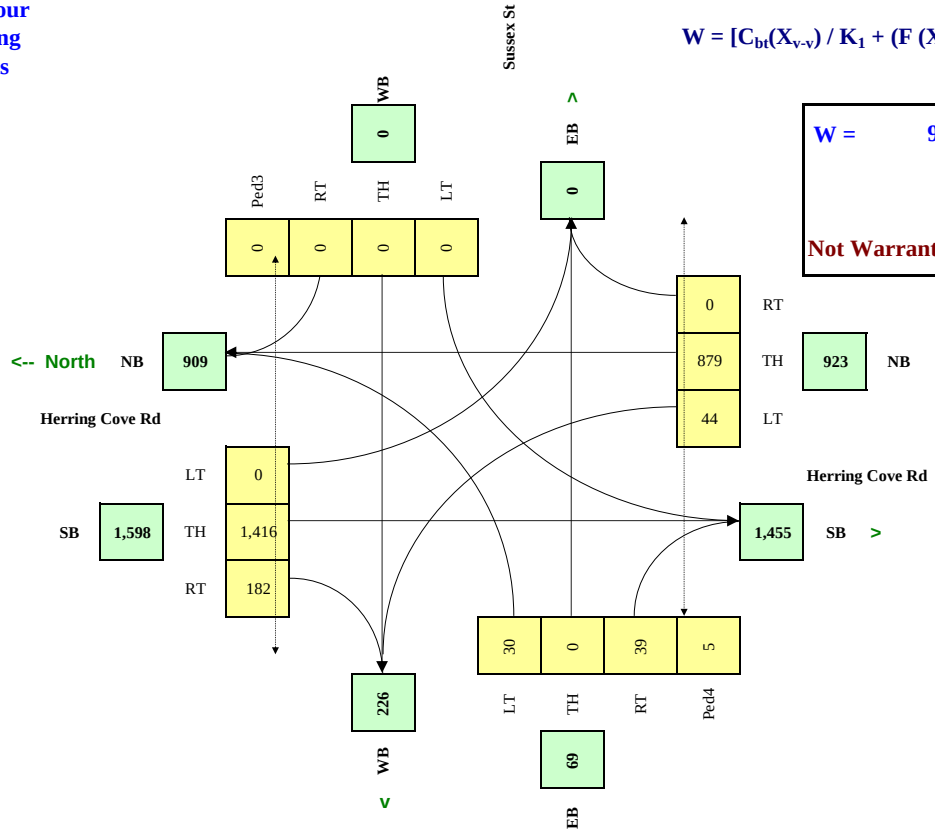
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Herring Cove Rd	NS	60	3.0%	y	0.0
Sussex St	EW		3.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1	Ped2	Ped3	Ped4
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	NS	NS	EW	EW
													W Side	E Side	N Side	S Side
7:00 - 8:00	39	785	0	0	1264	162	0	0	0	27	0	35	5	5	0	5
8:00 - 9:00	47	934	0	0	1505	193	0	0	0	32	0	41	5	5	0	5
12:00 - 13:00	39	776	0	0	1250	160	0	0	0	26	0	34	5	5	0	5
13:00 - 14:00	35	697	0	0	1124	144	0	0	0	24	0	31	5	5	0	5
16:00 - 17:00	51	1018	0	0	1639	210	0	0	0	34	0	45	5	5	0	5
17:00 - 18:00	53	1064	0	0	1714	220	0	0	0	36	0	47	5	5	0	5
Total (6-hour peak)	**264**	**5,274**	**0**	**0**	**8,496**	**1,089**	**0**	**0**	**0**	**179**	**0**	**233**	**30**	**30**	**0**	**30**
Average (6-hour peak)	**44**	**879**	**0**	**0**	**1,416**	**182**	**0**	**0**	**0**	**30**	**0**	**39**	**5**	**5**	**0**	**5**

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W = 93 82 11

Veh *Ped*

Not Warranted - Vs<75

RESET SHEET

HRM - Traffic Signal Warrant Analysis

Main Street (name)	Herring Cove Rd	Direction (EW or NS)	NS	Road Authority:	HRM
Side Street (name)	New Site Access	Direction (EW or NS)	EW	City:	HRM - Dartmouth
Quadrant / Int #	4	Comments	Green Acres TIS 2030 Total	Analysis Date:	2015 Jun 04, Thu
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			Count Date:	
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Herring Cove Rd	NB	1		1				2,000	1
Herring Cove Rd	SB					1		2,000	1
New Site Access	WB								
New Site Access	EB				1				

Are the New Site Access EB right turns significantly impeded by through movements? (y/n) n

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	380,000
Central Business District	(y/n)	n

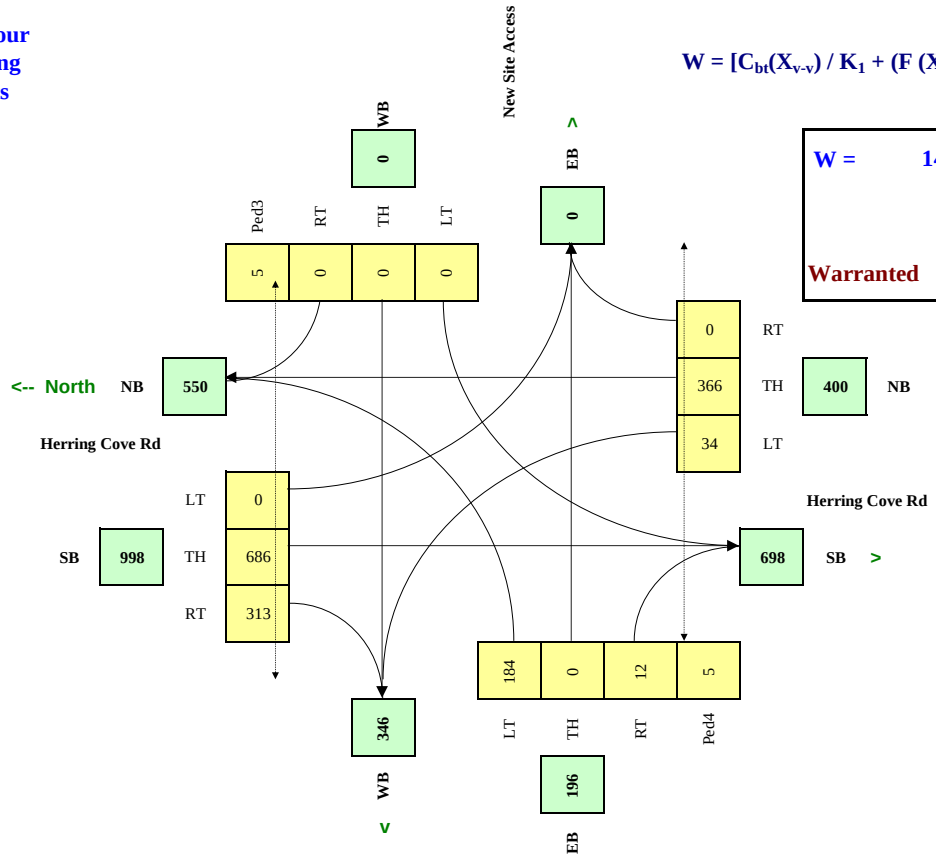
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Herring Cove Rd	NS	60	2.0%	y	0.0
New Site Access	EW		2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
7:00 - 8:00	30	327	0	0	612	279	0	0	0	164	0	11	5	5	5	5
8:00 - 9:00	36	389	0	0	729	332	0	0	0	195	0	13	5	5	5	5
12:00 - 13:00	30	323	0	0	605	276	0	0	0	162	0	11	5	5	5	5
13:00 - 14:00	27	290	0	0	544	248	0	0	0	146	0	10	5	5	5	5
16:00 - 17:00	39	424	0	0	794	362	0	0	0	212	0	14	5	5	5	5
17:00 - 18:00	41	443	0	0	830	378	0	0	0	222	0	15	5	5	5	5
Total (6-hour peak)	**203**	**2,196**	**0**	**0**	**4,114**	**1,875**	**0**	**0**	**0**	**1,101**	**0**	**74**	**30**	**30**	**30**	**30**
Average (6-hour peak)	**34**	**366**	**0**	**0**	**686**	**313**	**0**	**0**	**0**	**184**	**0**	**12**	**5**	**5**	**5**	**5**

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	146	133	13
		Veh	*Ped*

Warranted

RESET SHEET

HRM - Traffic Signal Warrant Analysis

Main Street (name)	Herring Cove Rd	Direction (EW or NS)	NS	Road Authority:	HRM
Side Street (name)	New Site Access	Direction (EW or NS)	EW	City:	HRM - Dartmouth
Quadrant / Int #	4	Comments	Green Acres TIS 2030 Total 650 Units	Analysis Date:	2015 Jun 04, Thu
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			Count Date:	
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Herring Cove Rd	NB	1		1				2,000	1
Herring Cove Rd	SB					1		2,000	1
New Site Access	WB								
New Site Access	EB				1				

Are the New Site Access EB right turns significantly impeded by through movements? (y/n) n

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	380,000
Central Business District	(y/n)	n

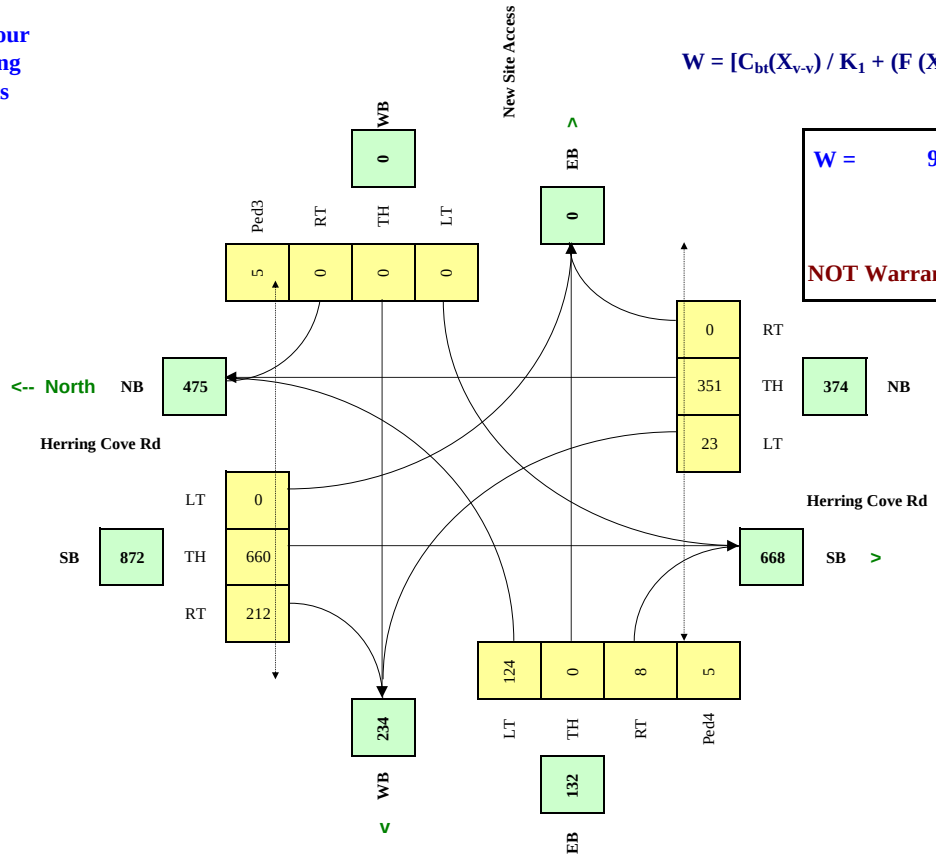
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Herring Cove Rd	NS	60	2.0%	y	0.0
New Site Access	EW		2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1	Ped2	Ped3	Ped4
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	NS	NS	EW	EW
													W Side	E Side	N Side	S Side
7:00 - 8:00	20	313	0	0	589	189	0	0	0	111	0	7	5	5	5	5
8:00 - 9:00	24	373	0	0	701	225	0	0	0	132	0	9	5	5	5	5
12:00 - 13:00	20	310	0	0	583	187	0	0	0	109	0	7	5	5	5	5
13:00 - 14:00	18	279	0	0	524	168	0	0	0	98	0	7	5	5	5	5
16:00 - 17:00	26	407	0	0	764	245	0	0	0	143	0	10	5	5	5	5
17:00 - 18:00	27	425	0	0	799	256	0	0	0	150	0	10	5	5	5	5
Total (6-hour peak)	**135**	**2,107**	**0**	**0**	**3,960**	**1,270**	**0**	**0**	**0**	**743**	**0**	**50**	**30**	**30**	**30**	**30**
Average (6-hour peak)	**23**	**351**	**0**	**0**	**660**	**212**	**0**	**0**	**0**	**124**	**0**	**8**	**5**	**5**	**5**	**5**

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	97	84	13
		Veh	*Ped*

NOT Warranted

RESET SHEET

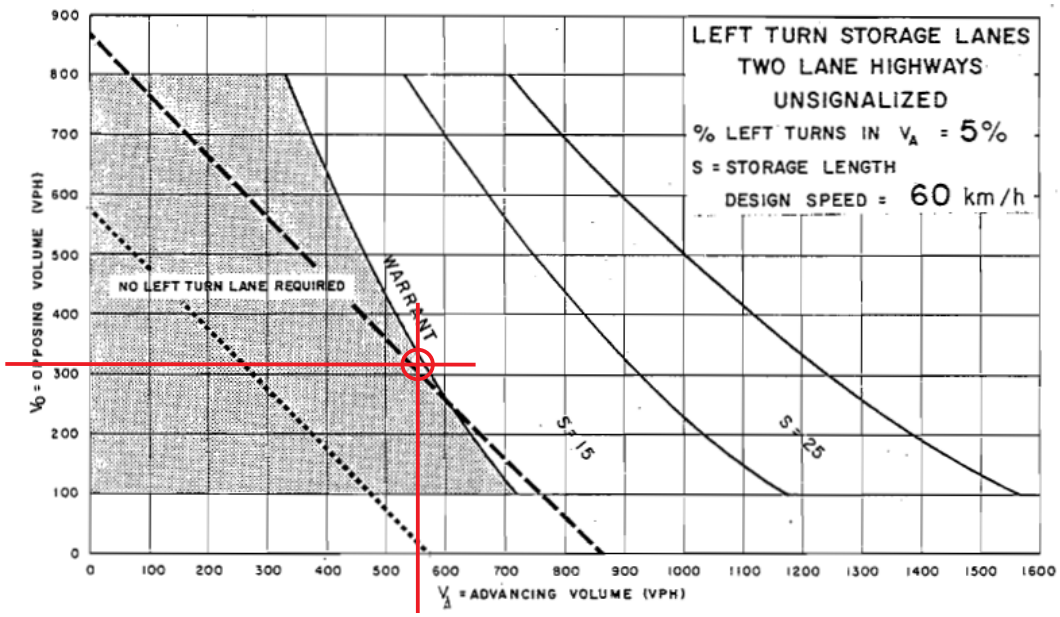
APPENDIX IV

Auxiliary Turn Lane Warrant Results

Left Turn Lane Warrant Analysis
Total 2030 Traffic Volumes
Green Acres Rd - Northbound Left

Weekday AM Peak Period - GDSOH Figure EA-6:

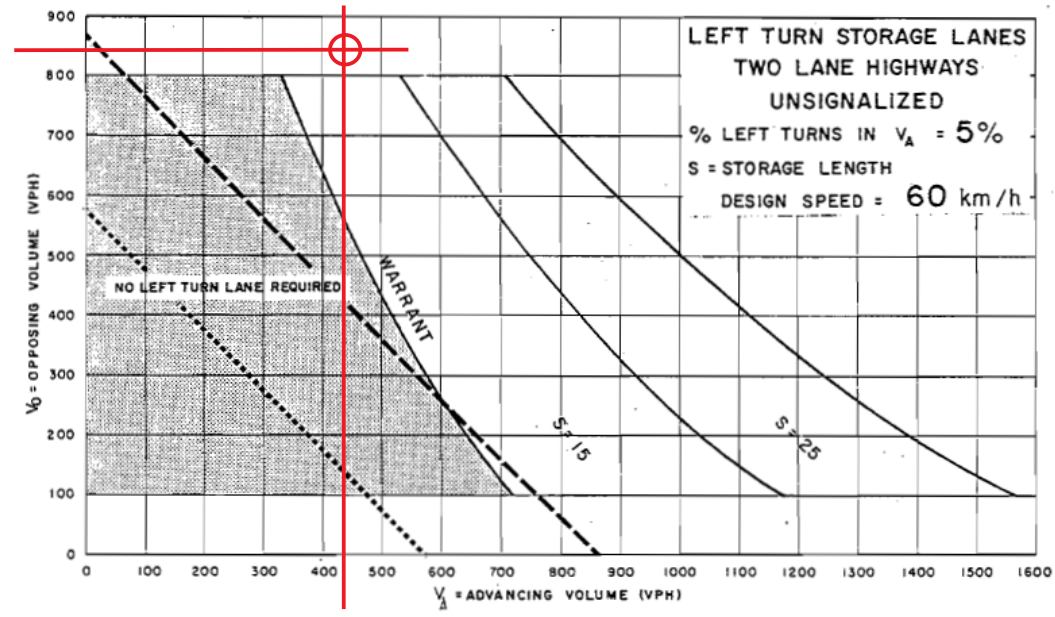
V_O = 307 vph



Advancing Traffic:
V_A = 566 vph
V_L = 4 vph
Left turns = 0.7% ***Less than 3% - Not Warranted***

Weekday PM Peak Period - GDSOH Figure EA-6:

V_O = 845 vph

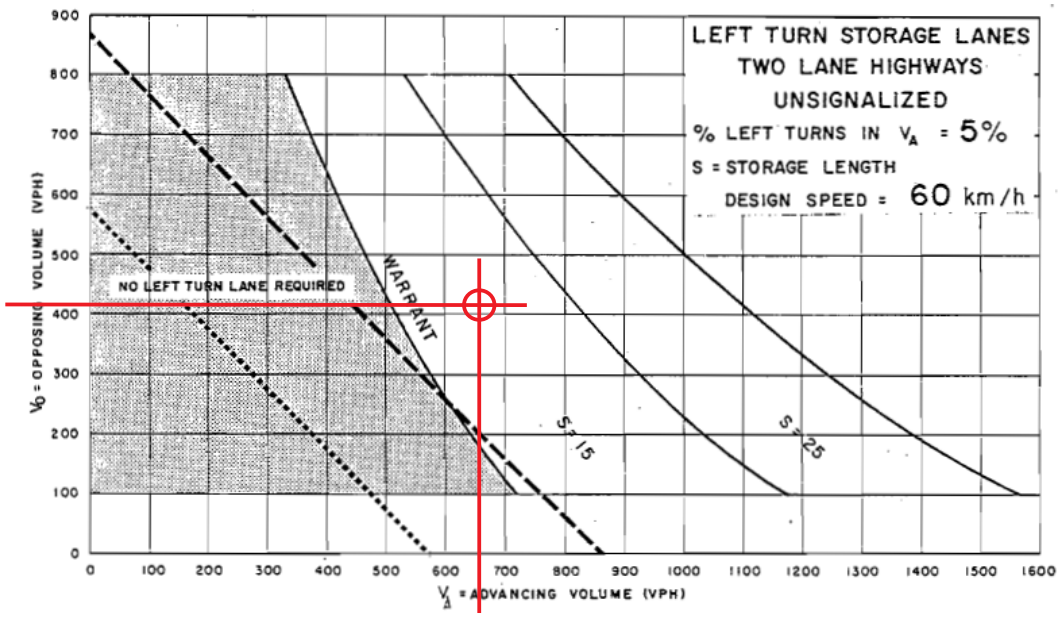


Advancing Traffic:
V_A = 428 vph
V_L = 11 vph
Left turns = 2.6% ***Less than 3% - Not Warranted***

Left Turn Lane Warrant Analysis
Total 2030 Traffic Volumes
New Collector St - Northbound Left

Weekday AM Peak Period - GDSOH Figure EA-6:

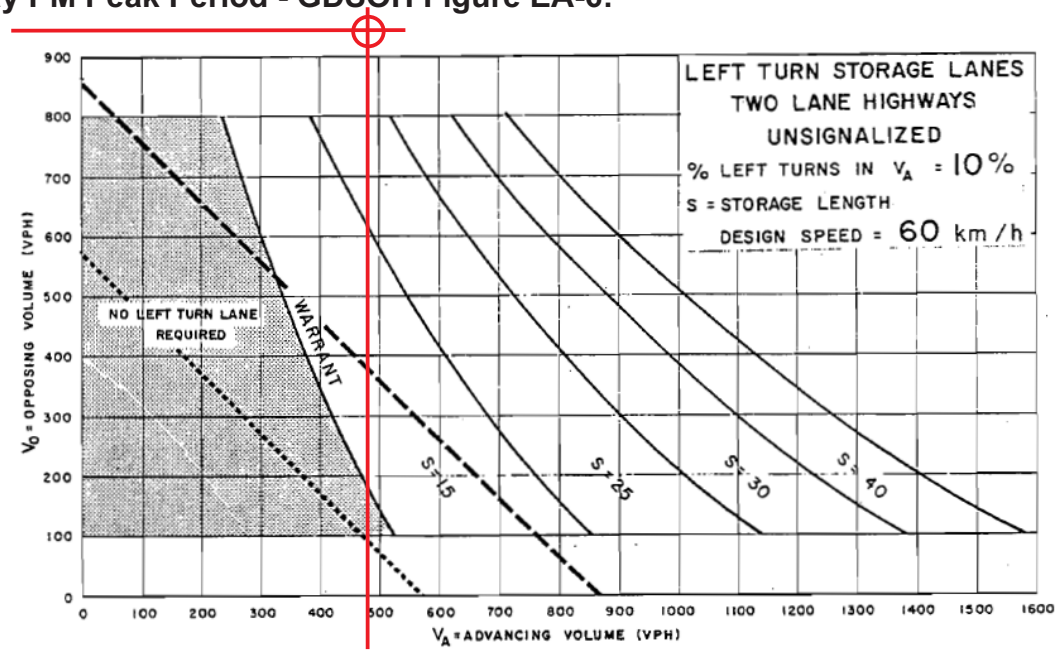
V_O = 409 vph



Advancing Traffic:
V_A = 661 vph
V_L = 14 vph
Left turns = 2.1% ***Less than 3% - Not Warranted***

Weekday PM Peak Period - GDSOH Figure EA-6:

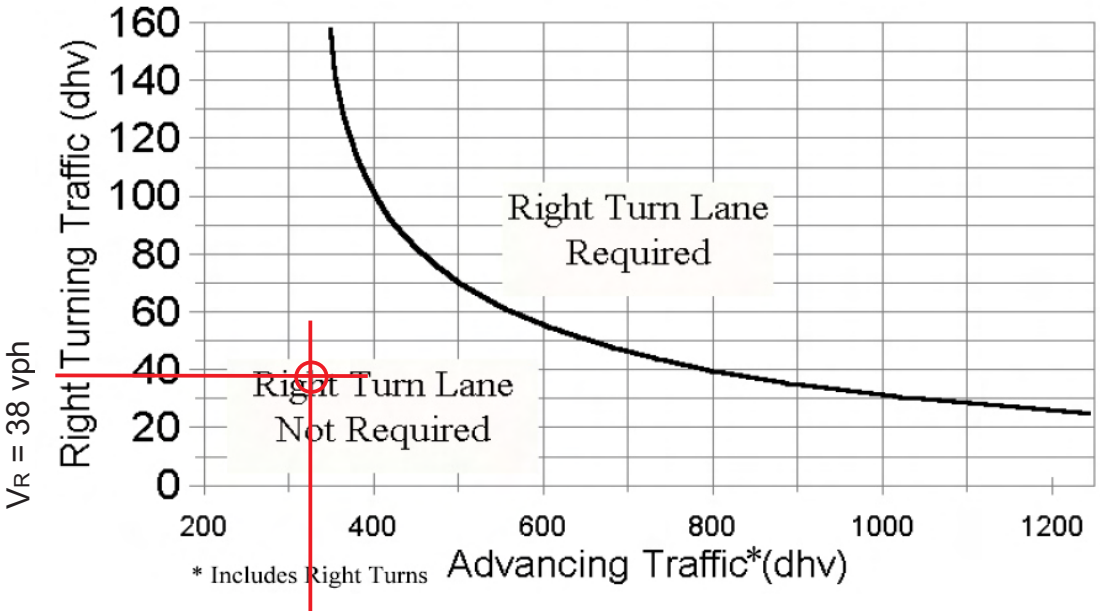
V_O = 1,208 vph



Advancing Traffic:
V_A = 484 vph
V_L = 41 vph
Left turns = 8.5%

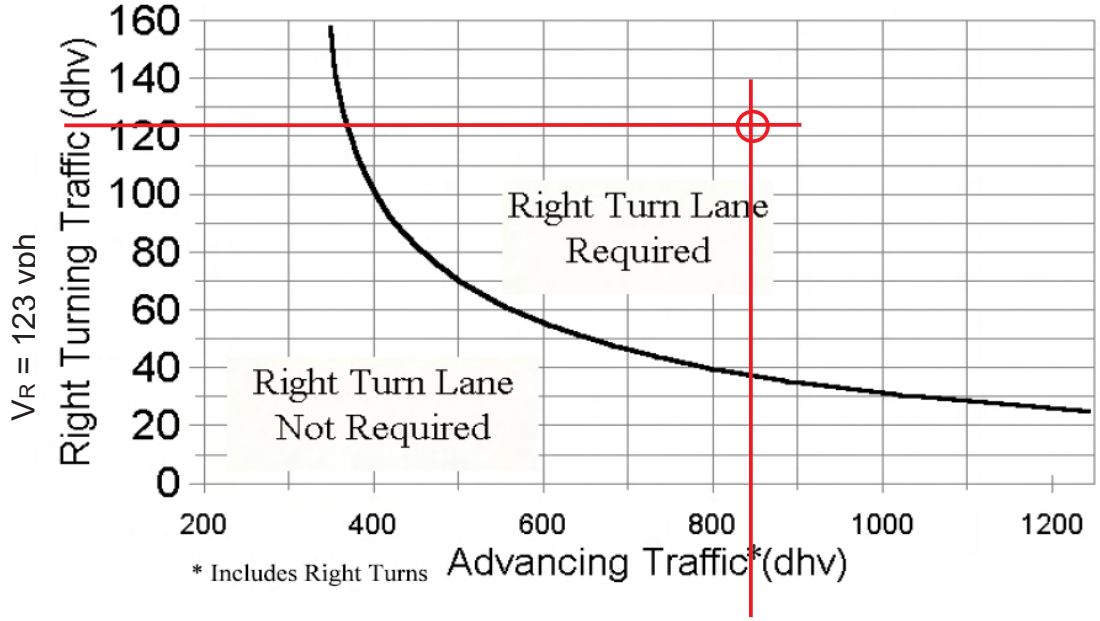
Right Turn Lane Warrant Analysis
Total 2030 Peak Hour Volumes
Green Acres Rd - Southbound Right

Weekday AM Peak Period - ODOT Page 44:



Advancing Volume:
V_A = 307 vph

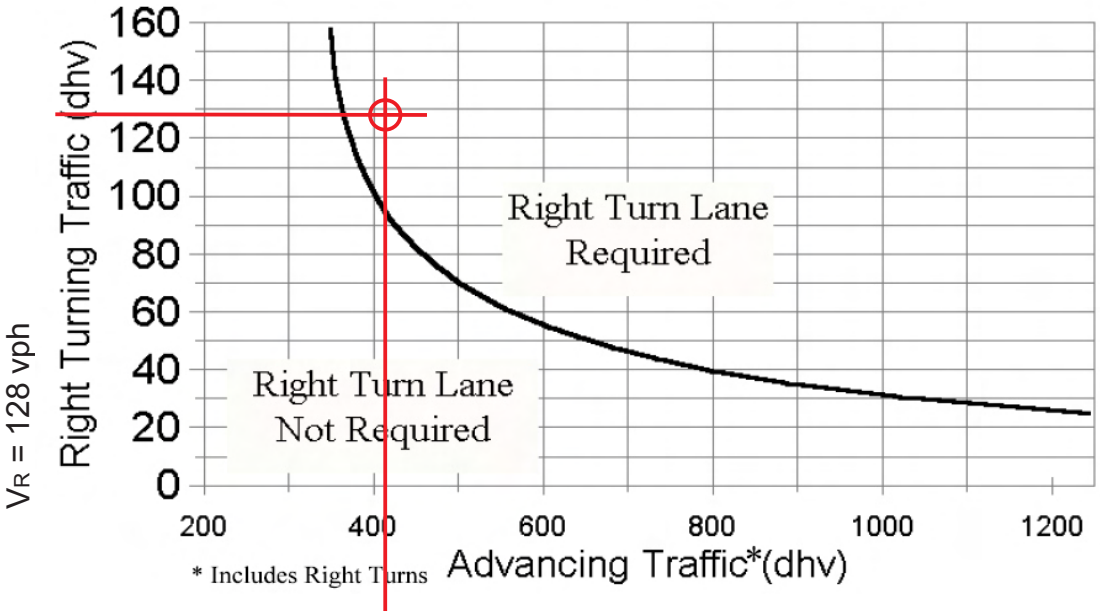
Weekday PM Peak Period - ODOT Page 44:



Advancing Volume:
V_A = 845 vph

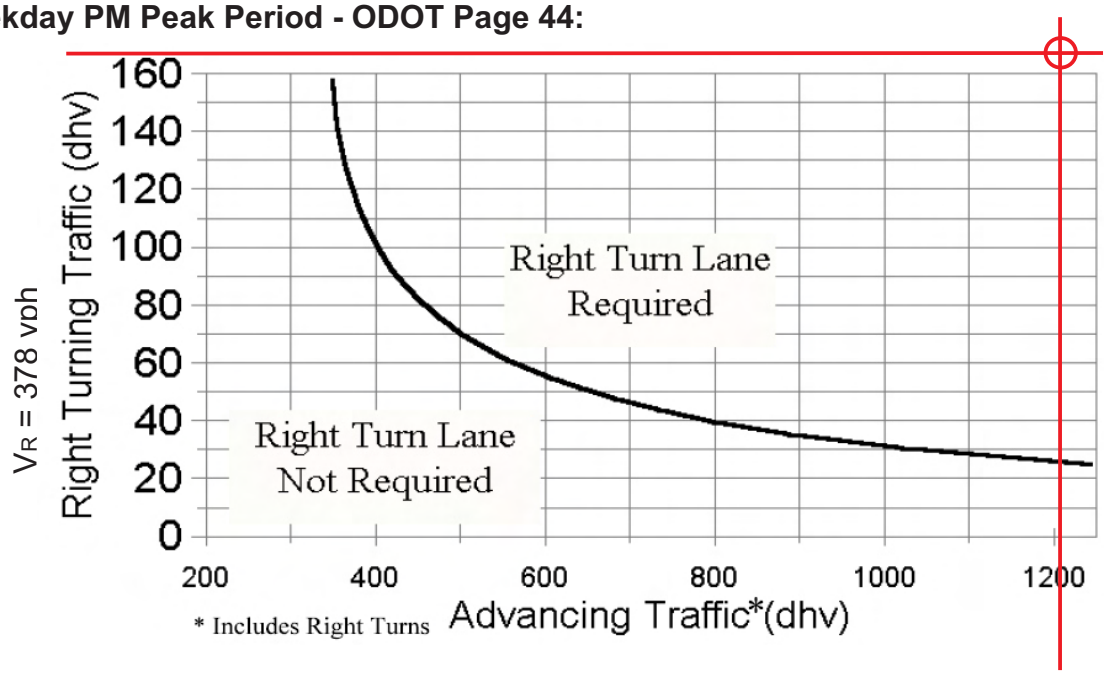
Right Turn Lane Warrant Analysis
Total 2030 Peak Hour Volumes
New Collector St - Southbound Right

Weekday AM Peak Period - ODOT Page 44:



Advancing Volume:
V_A = 409 vph

Weekday PM Peak Period - ODOT Page 44:



Advancing Volume:
V_A = 1,208 vph