Harbour Garden Village Traffic Impact Study

November 2023

Prepared for

KWR Approvals Inc

JRL consulting

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1 Introduction

1.1 Background

Harbour Garden Village Inc. is working on a proposal to create a mixed-use development on their 46-acre property (PID 40192528) located in Musquodoboit Harbour, Nova Scotia. Exhibit 1.1 shows the site in red in the context of the surrounding area in Musquodoboit Harbour, Nova Scotia

Exhibit 1.1 – Harbour Garden Village in Musquodoboit Harbour, Nova Scotia

Source: Google Earth

Harbour Garden Village is envisioned as a new community that will explore new approaches to sustainability, society and work. It will include small clustered developments of 12 houses or fewer around a town square with shops to encourage neighborly interaction.

The project will be developed in five phases with the first phase to include a long term care facility with 48 beds called The Birches. Phases 2 through 6 will capture a mixture of land uses that will be refined based on market demand and site conditions. The developer has provided an initial view of these phases that we have captured in this report.

The concept design provided for the proposed development shows an internal road network for the development with primary access from Highway 7 just west of the existing Train Museum. A new road will be created at the northern edge of the property that will connect to Darius Lane to the west which is an existing private road that will be turned over to HRM. Darius Lane connects to Little River Drive which provides access to Highway 7.

Refer to Exhibit 1.2 for a view of the proposed entrance to Harbour Garden Village on Highway 7 and Exhibit 1.3 for a proposed concept design prepared by Englobe.

Exhibit 1.2 – Proposed Harbour Garden Village Entrance on left just west of Train Museum

Exhibit 1.3 – Harbour Garden Village Concept Design

The proposed development is located in Halifax Regional Municipality (HRM) and the surrounding transportation network is owned and operated by Nova Scotia Public Works (NSPW).

JRL consulting met with HRM and submitted our proposed Scope of Work for this Traffic Impact Study which was reviewed by NSPW.

We are pleased to submit this report that assesses the traffic impacts of the proposed Harbour Garden Village development on the surrounding road network and also includes our findings and recommendations.

1.2 Study Area

The study area defined for this Traffic Impact Study consists of the transportation network in the immediate vicinity of the proposed Harbour Garden Village development on PID 40192528 including the new connection on Highway 7 along with the following key intersections:

- Highway 7 at Highway 107
- Highway 7 at Little River Drive
- Highway 7 at Tim Hortons/Shell
- Highway 7 at New Site Access

We have set a horizon period of 10 years for this development (2028 to full build out plus 5 years to 2033) to allow it to be fully completed and occupied so we can assess future performance including applicable annual background traffic growth in the area.

1.3 Objectives

Given the background set out above, the objective of this Traffic Impact Study is to assess the impacts of the proposed development on the surrounding transportation network and to provide recommendations and solutions to allow the traffic generated by the proposed development to be introduced to the existing transportation network safely and efficiently.

Detailed objectives are presented below:

- Complete a Site Review to review road width, lane markings, stopping sight distances, pedestrian facilities, active transportation and roadway signage within the study area
- Complete new AM and PM peak hour manual traffic counts at these intersections:
    - Highway 7 at Shell Gas Station/Tim Hortons
    - Highway 7 at Little River Drive (eastern intersection)
    - Highway 7 at Highway 107
- Analyze the performance (2023) at the following key intersections using Synchro plus SimTraffic Version 11 and the procedures outlined in the Highway Capacity Manual and by the Transportation Association of Canada (TAC)
    - Highway 7 at Shell Gas Station/Tim Hortons
    - Highway 7 at Little River Drive (eastern intersection)
    - Highway 7 at Highway 107
- Review historic 24-hour traffic volumes from NSTIR to estimate annual background traffic growth in the area and apply that to rate to estimate 2033 background traffic volumes in the area.
- Analyze the future background performance (2033) at the following key intersections including site generated traffic using Synchro plus SimTraffic Version 11 and the procedures outlined in the Highway Capacity Manual and by the Transportation Association of Canada (TAC)
    - Highway 7 at Shell Gas Station/Tim Hortons
    - Highway 7 at Little River Drive (eastern intersection)
    - Highway 7 at Highway 107

- Estimate the amount of traffic that will generated by the proposed Harbour Garden Village development using Trip Generation Rates and equations published by the Institute of Transportation Engineers (11th Edition)
- Distribute new site generated traffic to the network based on observed traffic distribution from manual traffic counts
- Analyze the future performance (2033) including site generated traffic at the following key intersections including site generated traffic using Synchro plus SimTraffic Version 11 and the procedures outlined in the Highway Capacity Manual and by the Transportation Association of Canada (TAC)
    - Highway 7 at Shell Gas Station/Tim Hortons
    - Highway 7 at Little River Drive (eastern intersection)
    - Highway 7 at Highway 107
    - Highway 7 at New Site Access
- Assess the need for right and left turn auxiliary lanes at all key intersections in the Study Area in Musquodoboit Harbour.
- Complete traffic signal warrants if required at unsignalized intersections in the study area captured above following TAC's Canadian Traffic Signal Warrant Procedure 2005
- Complete an assessment of Stopping Site Distance at the proposed new access to Highway 7 just west of the existing Train Museum and at the connection of the new road on site at the rear of the property to Darius Lane.
- Assess road classification of proposed new road configuration to access development
- Assess the required intersection configurations
- Develop and list existing, potential and future problems or concerns along with recommendations to safely manage site generated traffic

2 Existing Traffic Conditions

2.1 Description

The principal routes affected by the proposed Harbour Garden Village development are Highway 7, Little River Drive and Highway 107.

Exhibit 2.1 summarizes HRM's Characteristics of Street Classes from HRM's Municipal Service Systems Design Guidelines and Exhibit 2.2 captures Transportation Association of Canada's (TAC) Characteristics of Urban Roads.

Exhibit 2.1 – HRM's Characteristics of Street Classes

Characteristic	Arterial Street	Major Collector	Minor Collector	Local Industrial	Local Street
1. Traffic Service Function	First Consideration	Traffic movement primary consideration, land access secondary consideration, some parking	Traffic movement of equal importance with land access, parking permitted	Traffic movement secondary consideration with land access primary consideration, parking permitted	Traffic movement secondary consideration with land access primary consideration, parking permitted
2. Land Access Function	Limited Access with no parking				
3. Range of design traffic average daily volume	More than 20,000	12,000 to 20,000 or more	Up to 12,000	Less than 3,000	Less than 3,000
4. Characteristics of traffic flow	Uninterrupted flow except at signals; w/ pedestrian overpass	Uninterrupted flow except at signals and crosswalks	Interrupted flow	Interrupted flow	Interrupted flow
5. Average running speed in off-peak conditions	50-70 km/hr	40-60 km/hr	30-50 km/hr	15-30 km/hr	15-30 km/hr
6. Vehicle types	All types	All types but trucks may be limited	All types with truck limitation	All types	Passenger and service vehicles, transit buses; large vehicles restricted
7. Connects to	Expressways, arterials, major collectors, minor collectors	Expressways, arterials, major collectors, minor collectors, some locals	Arterials, major collectors, minor collectors, locals	Some major collectors, minor collectors, locals	Some major collectors, minor collectors, locals

Exhibit 2.2 – Transportation Association of Canada Characteristics of Urban Roads

	Public Lanes		Locals		Collectors		Arterials		Expressways	Freeways
	Residential	Commercial	Residential	Indust./Comm.	Residential	Indust./Comm.	Minor	Major		
traffic service function	traffic movement not a consideration		traffic movement secondary consideration		traffic movement and land access of equal importance		traffic movement major consideration	traffic movement primary consideration	traffic movement primary consideration	optimum mobility
land service / access	land access only function		land access primary function		traffic movement and land access of equal importance		some access control	rigid access control	no access	no access
traffic volume (veh/day) (typical)	<500	<1000	<1000	<3000	<8000	1000 – 12 000	5000 – 20 000	10 000 – 30 000	>10 000	>20 000
flow characteristics	interrupted flow		interrupted flow		interrupted flow		uninterrrupted flow except at signals and crosswalks		uninterrupted flow except at signals	free-flow (grade separated)
design speed (km/h)	30 - 40		30 - 50		50 - 80		50 - 70	60 - 100	80 - 110	80 - 120
average running speeds (km/h) (off-peak)	20- 30		20 - 40		30 - 70		40 - 60	50 - 90	60 - 90	70 - 110
vehicle type	passenger and service vehicles	all types	passenger and service vehicles	all types	passenger and service vehicles	all types	all types	all types up to 20% trucks	all types up to 20% trucks	all types up to 20% trucks
desirable connections	public lanes, locals		public lanes, locals, collectors		locals, collectors, arterials		collectors, arterials, expressways, freeways		arterials, expressways, freeways	arterials, expressways, freeways
transit service	not permitted		generally avoided		permitted		express and local buses permitted		express buses only	express buses only
accommodation of cyclists	no restrictions or special facilities		no restrictions or special facilities		no restrictions or special facilities		lane widening or separate facilities desirable		prohibited	prohibited
accommodation of pedestrians	pedestrians permitted, no special facilities		sidewalks normally on one or both sides	sidewalks provided where required	sidewalks provided both sides	sidewalks provided where required	sidewalks may be provided, separation for traffic lanes preferred		pedestrians prohibited	pedestrians prohibited
parking (typically)	some restrictions		no restrictions or restrictions one side only		few restrictions other than peak hour		peak hour restrictions	prohibited or peak hour restrictions	prohibited	prohibited
min. intersection spacing[1] (m)	as needed		60		60		200	400	800	1600 (between interchanges)
right-of-way width (m) (typically)	6 - 10		15 - 22		20 - 24		20[2] - 45[3]		>45[3]	>60[3]

Highway 7 (Marine Drive) is a two-lane arterial road that runs in an east-west direction from downtown Dartmouth to the Eastern Shore. It provides access to homes, businesses, schools, a hospital and many other land uses in the study area. The posted speed limit is 50 Km/hr east of Little River Drive and 70 km/hr to the west of Little River Drive. There are no sidewalks in the study area but there is a graveled shoulder that is used by pedestrians. A marked crosswalk is located with on Highway 7 just west of its intersection with East Petpeswick Road.

Highway 107 is two-lane provincial highway that runs in a general east-west direction from Dartmouth to the Eastern Shore parallel to Highway 7. It has controlled access from its terminus at Highway 7 in Musquodoboit Harbour to its connection back with Highway 7 near Preston. The posted speed limit is 100 km/hr.

Little River Drive is a short, local asphalt road in a crescent configuration with two connections to Highway 7. It provides access to residential homes and connects to the existing private graveled Darius Lane. There are no sidewalks and the posted speed limit is 50 km/hr.

Refer to Exhibit 2.3 for photos of the Study Area.

Exhibit 2.3 – Study Area Photos

Proposed Entrance to Harbour Garden Village on Highway 7 looking north

Highway 7 looking east at proposed entrance to Harbour Garden Village on left

Highway 7 looking west at proposed entrance to Harbour Garden Village on right

Tim Hortons/Shell Gas Station/Convenience Store on Highway 7

Highway 7 at Tim Hortons/Shell Gas Station/Convenience Store looking west

Highway 7 at Tim Hortons/Shell Gas Station/Convenience Store looking east

Little River Drive at Highway 7 looking south

Highway 7 at Little River Drive looking west

Highway 7 at Little River Drive looking east

Little River Drive at Highway 7 looking north

Harbour Garden Village Rear Access Road at Darius Lane looking east

Darius Lane at Harbour Garden Village Rear Access Road looking north

Darius Lane at Harbour Garden Village Rear Access Road looking south

Darius Lane at Little River Drive looking north

Little River Drive at Darius Lane looking east

Little River Drive at Darius Lane looking west

Highway 7 at Highway 107 looking west

Highway 7 at Highway 107 looking east

Highway 7 at Highway 107 looking south

Highway 7 at Highway 107 looking north

Highway 7 at Scots Lake Road looking west

2.2 Existing Traffic Volumes

We completed AM peak hour (7:00am to 9:00am) and PM peak hour (4:00pm to 6:00pm) manual turning movement counts on Wednesday October 18th and Thursday October 19th at the following intersections:

- Highway 7 at Shell Gas Station/Tim Hortons
- Highway 7 at Little River Drive (eastern intersection)
- Highway 7 at Highway 107

We observed the following peak hours at these intersections:

INTERSECTION	AM PEAK	PM PEAK
Highway 7 at Shell Gas Station/Tim Hortons	7:00am to 8:00am	5:00pm to 6:00pm
Highway 7 at Little River Drive	7:15am to 8:15am	4:00pm to 5:00pm
Highway 7 at Highway 107	7:15am to 8:15am	4:00pm to 5:00pm

Refer to the following exhibits for existing traffic volumes in the study area.

Exhibit 2.4 – Highway 7 at Tim Hortons/Shell Gas Station/Convenience Store Existing Traffic 2023

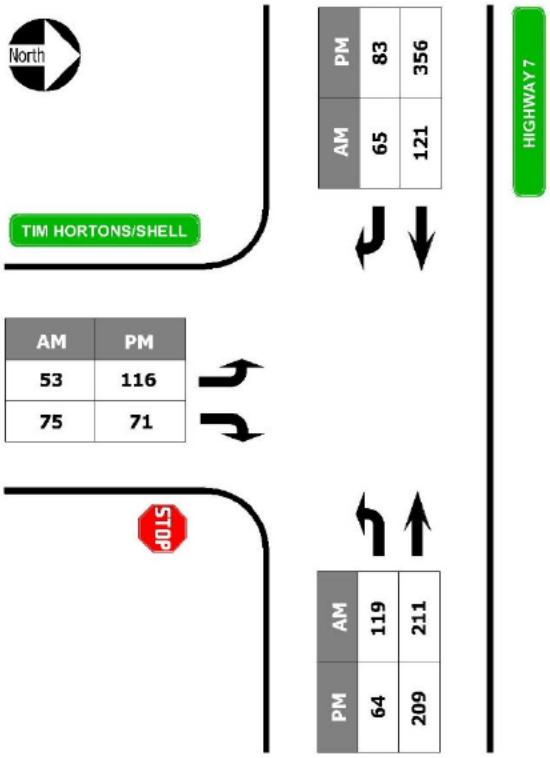


Exhibit 2.5 – Highway 7 at Little River Drive Existing Traffic 2023

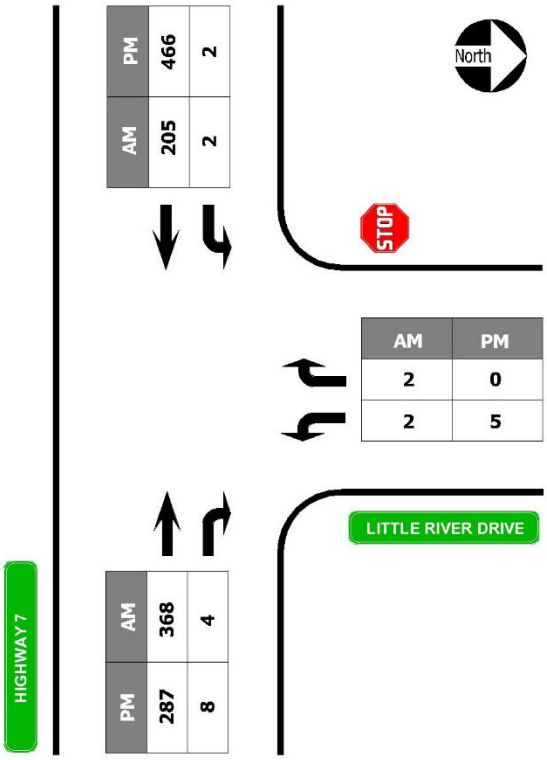
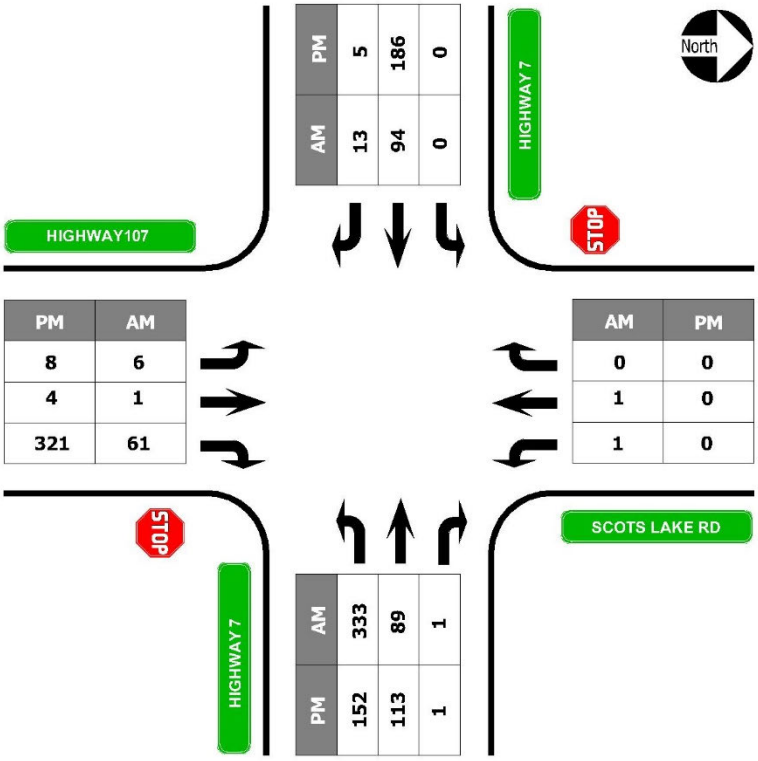


Exhibit 2.6 – Highway 7 at Highway 107 Existing Traffic 2023



2.3 Existing Trip Distribution

Our new traffic counts in the Study Area in Musquodoboit Harbour provide an indication of trip distribution in the area and we expect that traffic generated by the proposed Harbour Garden Village development will follow the same patterns. The majority of vehicles in the AM peak hour are heading west on Highway 7 towards Halifax and Dartmouth (64%) and this reverses in the PM peak as people return home eastbound (61%).

2.4 Background Changes in Traffic Conditions

We reviewed historical 24-hour Average Annual Daily Traffic (AADT) counts provided by NSPW that were completed on Highway 7 approximately 1km east of Highway 107. There was no clear pattern of background traffic growth over the past 11 years as shown in Exhibit 2.7.

Exhibit 2.7 – NSPW AADT Traffic Counts in Musquodoboit Harbour, Nova Scotia

Year	AADT
2013	6670
2015	7450
2016	7580
2017	6450
2018	7160
2020	7730
2021	6180
2022	8270

The average annual increase in daily traffic from 2013 to 2022 at this location was 2.42%, however there were anomalies in 2017 and 2021 (which was likely impacted by the pandemic).

For this study, we applied an annual background traffic volume growth rate of 2% to observed 2023 traffic volumes as outlined in Section 2.2 to establish baseline traffic volumes in 2033 for analysis. Refer to Exhibits 2.8, 2.9 and 2.10 for estimated 2033 background traffic volumes at all key intersections.

Exhibit 2.8 – Highway 7 at Tim Hortons/Shell/Convenience Store Background Traffic 2033

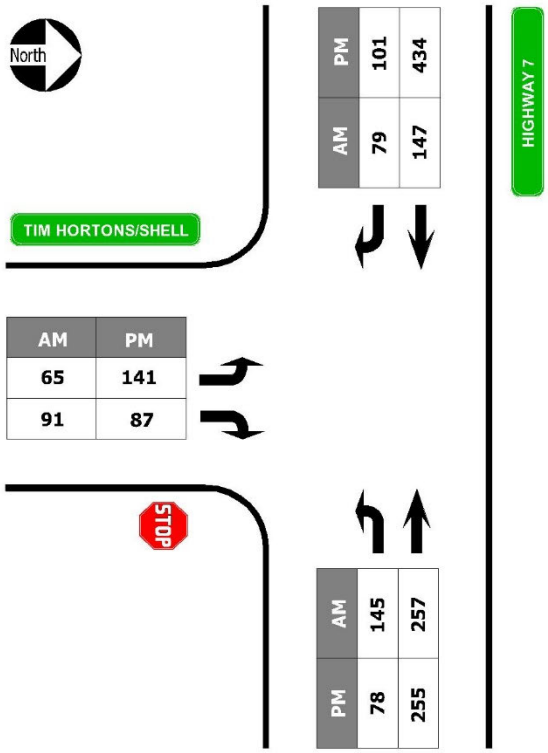


Exhibit 2.9 – Highway 7 at Little River Drive Background Traffic 2033

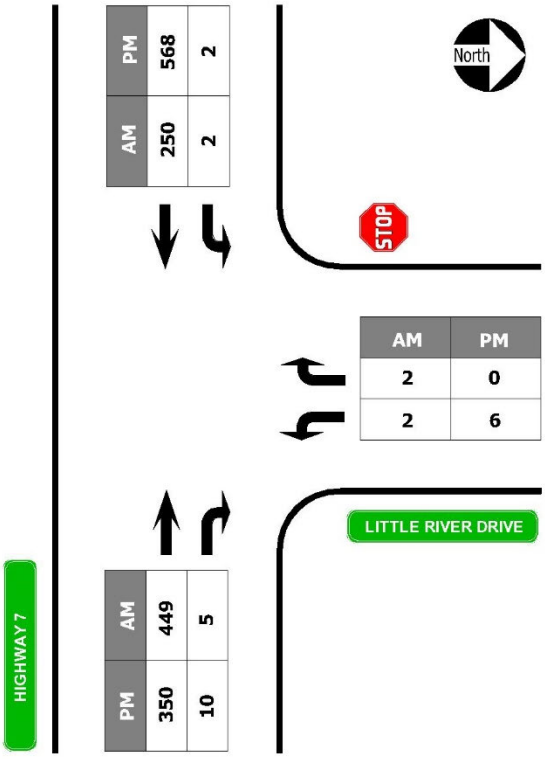
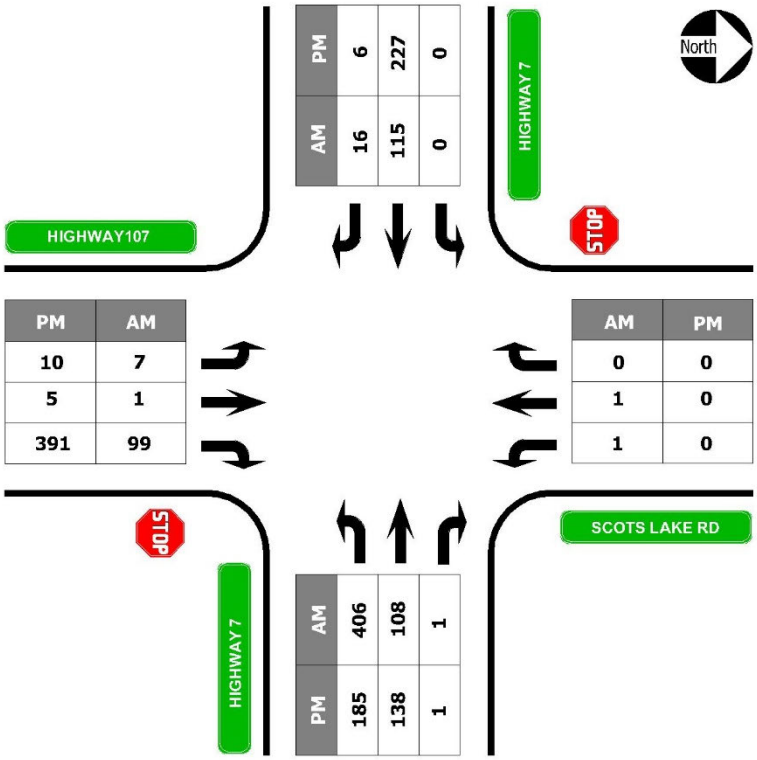


Exhibit 2.10 – Highway 7 at Highway 107 Background Traffic 2033



2.5 Transit, Pedestrians and Active Transportation

There are no transit services in the area near the proposed development, however, MusGo Rider is a community-based transportation service that offers accessible, reliable, affordable door-to-door transportation in the area and throughout HRM. MusGo Rider seeks to provide safe and affordable rural transportation to help clients get to where they need to go while helping to combat rural isolation and improve the quality of life for residents. It's a pre-booked service.

We observed a number of school buses in the AM and PM peaks hour during our manual traffic counts servicing schools in the area including Eastern Shore District High School located near the intersection of Highway 7 and West Petpeswick Road

There are no sidewalks in the area so pedestrians use the graveled shoulder on Highway 7. A marked crosswalk is located on Highway 7 approximately 165 meters east of the proposed new access to Harbour Garden Village.

In our manual traffic counts completed on Wednesday October 18th and Thursday October 19th we observed a very limited amount of pedestrians in the AM and PM peak hours and none were observed crossing Highway 7 at any intersection that we counted.

For the detailed analysis in this report we have modeled 10 persons per hour for all intersection approaches in the study area which is consistent with HRM's guidelines of 10 persons an hour in a suburban area.

3 Site Generated Traffic

3.1 Trip Generation

Harbour Garden Village is envisioned as a new community that will explore new approaches to sustainability, society and work. It will include small clustered developments of 12 houses or fewer around a town square with shops to encourage neighbourly interaction.

The project will be developed in five phases with the first phase to include a long term care facility with 48 beds called The Birches. Phases 2 through 6 will capture a mixture of land uses that will be refined based on market demand and site conditions. The developer has provided an initial view of these phases that we have captured to estimate new vehicle trips.

A total of 6 enclaves are planned with 12 single family homes in each enclave (72 total single family units). Four sets of Row Houses are planned with 6 units in each block (24 total townhouse units). An area with small shops and apartments will have four buildings and each building will have 6 apartments (600 sqft each and a total of 24 apartments) and 6 small shops (600 sqft each for a total of 14,400 sqft of retail). Village buildings will include a 2,500 sqft Farm Market, a 24-room boutique hotel along with a Botanical Garden and Woodshop. A self-storage barn with 110 storage units is planned and raised deck parking for 100 vehicles is envisioned to provide on-site parking. We have added the total area of the small shops to the Farm Market to capture a total retail area of 16,900 sqft and we assessed this space collectively as a Retail Plaza.

We reviewed Institute for Transportation Engineer's Trip Generation Manual 11th Edition to determine appropriate Land Use Codes to estimate site generated traffic for the development.

- ITE Land Use 620 Nursing Home

"A nursing home is a facility whose primary function is to provide care for persons who are unable to care for themselves. Examples include rest homes, chronic care, and convalescent homes. Skilled nurses and nursing aides are present 24 hours a day at these sites. Residents often require treatment from a registered healthcare professional for ongoing medical issues. A nursing home resident is not capable of operating a vehicle. Traffic is generated by employees, visitors, and deliveries." The unit of measurement for average vehicle trip ends is beds.

- ITE Land Use 210 Single Family Detached Housing

"Single-family detached housing includes all single-family detached homes on individual lots. A typical site surveyed is a suburban subdivision." The unit of measurement for average vehicle trip ends is dwelling units.

- ITE Land Use 221 Multifamily Housing (Mid-Rise)

"Mid-rise multifamily housing includes apartments and condominiums located within the same building that has between four and 10 floors of living space. Access to individual dwelling units is through an outside building entrance, a lobby, elevator, and a set if hallways." The unit of measurement for average vehicle trip ends is dwelling units.

- ITE Land Use 822 Retail Plaza (<40K)

"*A strip retail plaza is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. Each study site in this land use has less than 40,000 square feet of gross leasable area (GLA). No shopping plaza with a supermarket as its anchor is smaller than 40,000 square feet GLA.*" The unit of measurement for average vehicle trip ends is 1,000 Square Feet Gross Floor Area.

- ITE Land Use 220 Multifamily Housing (Low-Rise)

"Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels). Various configurations fit this description, including walkup apartment, mansion apartment, and stacked townhouse." The unit of measurement for average vehicle trip ends is dwelling units.

- ITE Land Use 310 Hotel

"Are places of lodging that provide sleeping accommodations and supporting facilities such as restaurants, cocktail lounges, meeting and banquet rooms or convention facilities, limited recreational facilities (pool, fitness room), and/or other retail and service shops." The unit of measurement for average vehicle trip ends is rooms.

- ITE Land Use 151 Mini-Warehouse

"A mini-warehouse is a building in which a number of storage units or vaults are rented for the storage of goods. They are typically referred to as "self-storage" facilities. Each unit is physically separated from other units, and access is usually provided through an overhead door or other common access point." The unit of measurement for average vehicle trip ends is 1,000 Square Feet Gross Floor Area.

Exhibit 3.1 – Estimated Site Generated Traffic Volumes for Harbour Garden Village

LAND USE	QUANTITY	AM PEAK			PM PEAK			WEEKDAY		
		TOTAL	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL	ENTER	EXIT
Nursing Home Land Use 620	48	10	72%	28%	9	33%	67%	147	50%	50%
			7	3		3	6		73	73
Single Family Land Use 210	72	55	25%	75%	73	63%	37%	746	50%	50%
			14	41		46	27		373	373
Apartments Land Use 221	24	9	23%	77%	9	61%	39%	109	50%	50%
			2	7		6	4		54	54
Retail Land Use 822	16,900 sqft	41	60%	40%	113	50%	50%	943	50%	50%
			24	16		57	57		471	417
Row Houses Land Use 220	24	30	24%	76%	31	63%	37%	229	50%	50%
			7	23		19	11		114	114
Boutique Hotel Land Use 310	24	11	56%	44%	14	51%	49%	192	50%	50%
			6	5		7	7		96	96
Self-Storage Land Use 151	110	1	51%	49%	2	50%	50%	20	50%	50%
			1	44		1	1		10	10
TOTAL		158	62	96	251	139	113	2385	1192	1192

We estimate that the proposed development will generate net new traffic volumes of **158** vehicles in the AM peak hour, **251** vehicles in the PM peak hour and **2385** vehicles on a weekday.

3.2 Trip Distribution and Assignment

We distributed and assigned the site-generated trips to the transportation network by analyzing our manual traffic counts and associated trip distribution in Musquodoboit Harbour.

The concept plan for Harbour Green Village in Exhibit 1.3 shows five phases of the proposed development with the first phase, The Birches Long Term Care Facility, centered on the property. The location of the different land uses has not been finalized at this stage of the development and will be influenced by site conditions and market demands.

We reviewed the proposed road layout as well as the transportation network in the area and we expect that the majority of site generated traffic will use the proposed new connection to Highway 7 just west of the existing train museum as this area offers other services and is a direct connection to the main route in the area (Highway 7).

Phase 4 of the proposed development is located on the western edge of the property with access to the road at the rear of the property that connects to Darius Lane and Little River Drive which provides access to Highway 7.

For this analysis we have allocated 75% of all site generated traffic to the new connection to Highway 7 planned for Harbour Garden Village and the remaining 25% to the road at the rear of the property which will funnel site generated traffic to and from Highway 7 through Little River Road. We have also loaded all new traffic to Little River Drive at its eastern connection to Highway 7 to assess a worst case scenario.

Exhibit 3.2 – Estimated Site Generated Traffic Allocation

LOCATION	%	AM PEAK			PM PEAK			WEEKDAY		
		TOTAL	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL	ENTER	EXIT
Little River Drive	25%	39	15	24	63	35	28	596	298	298
New Site Access to Highway 7	76%	118	46	72	189	104	84	1789	894	894
TOTAL		158	62	96	251	139	113	2385	1192	1192

3.3 Total Traffic

The estimated distributed site-generated traffic was added to the estimated 2033 background traffic volumes to obtain the total estimated future traffic volumes at all key intersections in the study area including the new connection to Highway 7.

Please refer to the following Exhibits for a summary of total traffic volumes in 2033 and the Appendix for detailed summaries that show how site-generated traffic was distributed to and from the proposed Harbour Garden Village.

Exhibit 3.3 – Highway 7 at Harbour Garden Village Site Access Total Traffic 2033

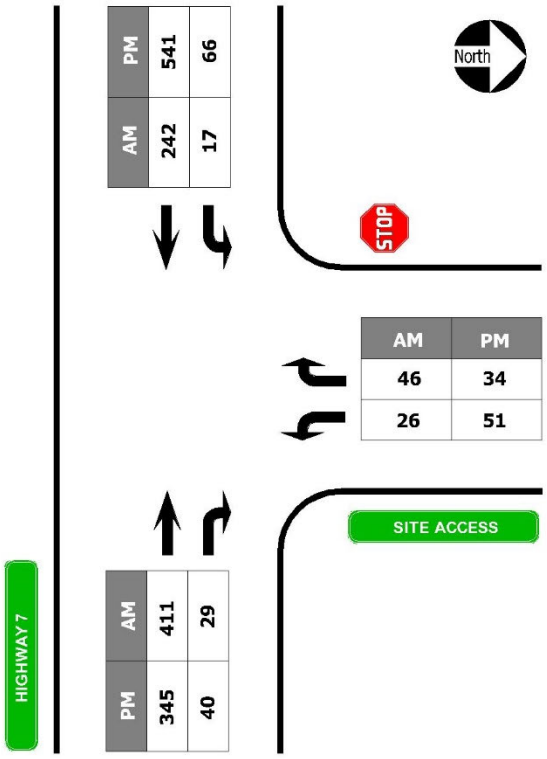


Exhibit 3.4 – Highway 7 at Tim Hortons/Shell/Convenience Store Total Traffic 2033

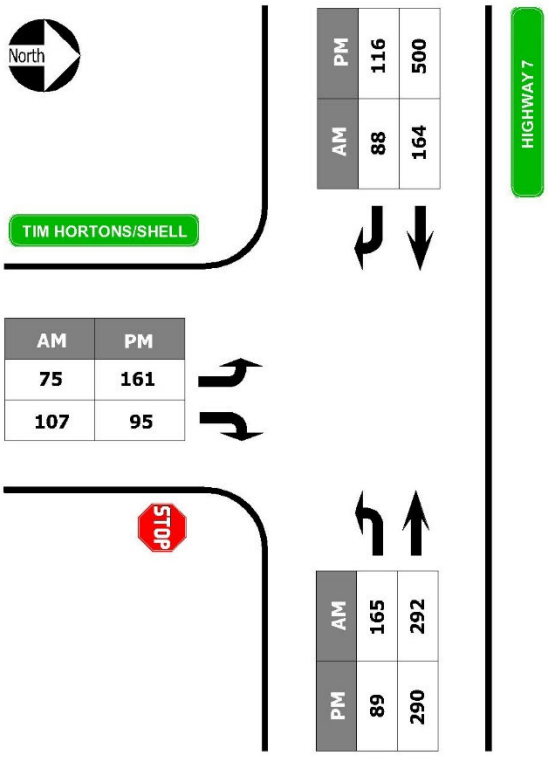


Exhibit 3.5 – Highway 7 at Little River Drive Total Traffic 2033

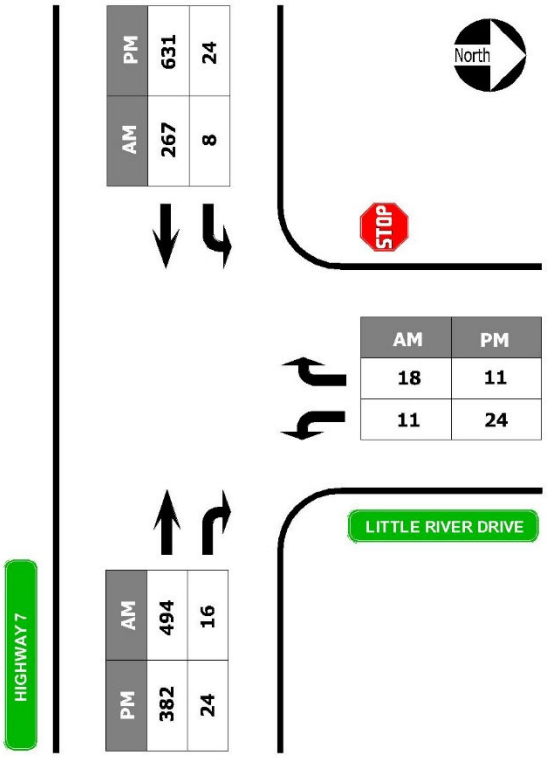
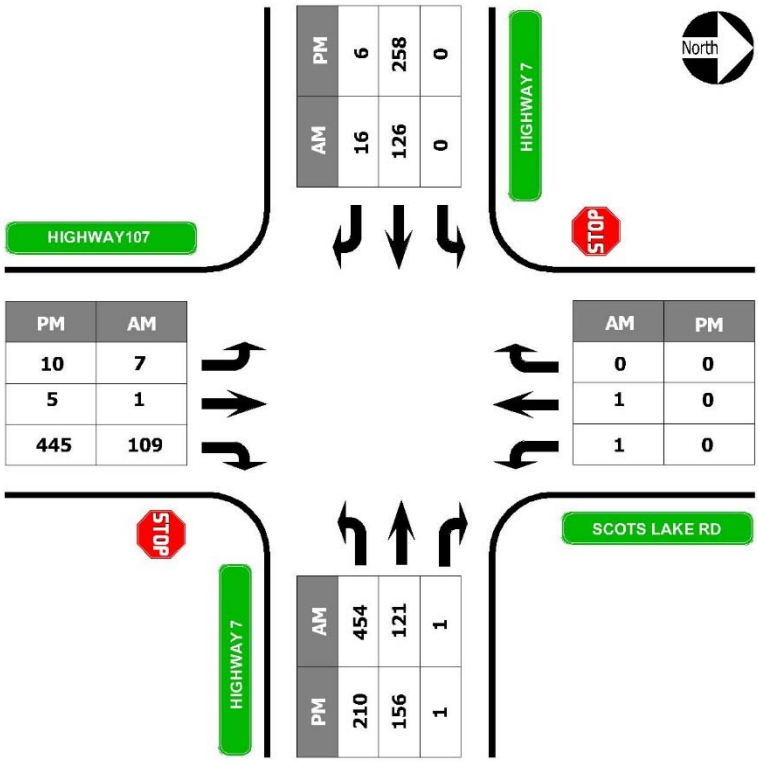


Exhibit 3.6 – Highway 7 at Highway 107 Total Traffic 2033



4 Evaluation of Impacts

4.1 Turning Lane Assessments

Left turn warrants and storage lane lengths for unsignalized intersections are based on turning, advancing and opposing design hour volumes and to determine if turning traffic will impede through traffic to a level that will warrant a dedicated left turn lane.

Ministry of Transportation for the Province of Ontario (MTO) procedures to determine the requirement for left turn lanes provide graphs that assess left turn volumes versus Opposing Volume for two-lane undivided highways.

We observed a significant volume of westbound left turn traffic in the AM and PM peak hours at the existing driveway to Tim Hortons/Shell Gas Station/Convenience Store during our traffic counts so we completed left turn warrants at that intersection with existing 2023 traffic, background 2033 traffic and total traffic in 2033 which includes site generated traffic.

A westbound left turn lane with 15 meters storage is warranted on Highway 7 at the entrance to Tim Hortons/Shell Gas Station/Convenience Store based on existing traffic volumes. The addition of Harbour Garden Village site generated traffic at full build out increases the storage requirement of this westbound left turn lane to 25 meters. Refer to Exhibits 4.1 to 4.6.

We completed a left turn warrant at the proposed entrance to Harbour Garden Village with 2033 total traffic and an eastbound left turn lane is warranted with PM peak traffic with 15 meters of storage. Refer to Exhibits 4.7 and 4.7.

Eastbound left turn traffic at the Highway 7 at Little River Drive is relatively minor in all scenarios including 2033 total traffic and a left turn lane is not warranted at this interaction.

Exhibit 4.1 – Left Turn Warrant on Highway 7 at Shell/Tim Hortons AM Peak 2023 Existing Traffic

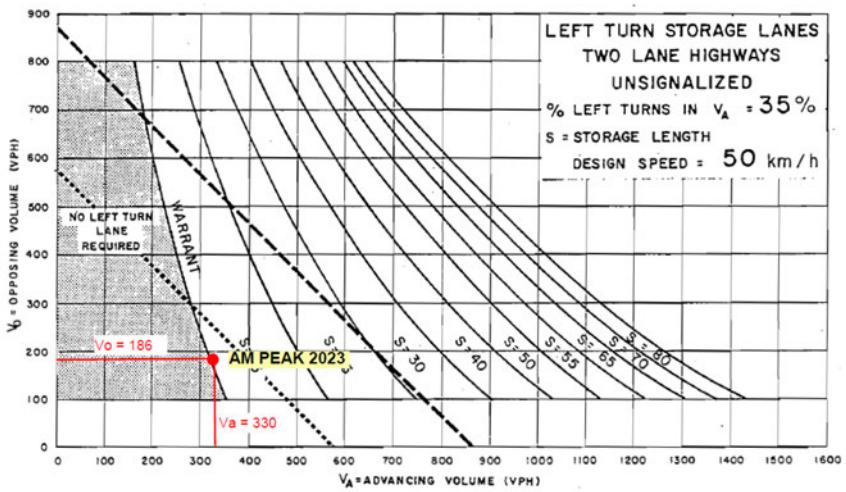


Exhibit 4.2 – Left Turn Warrant on Highway 7 at Shell/Tim Hortons PM Peak 2023 Existing Traffic

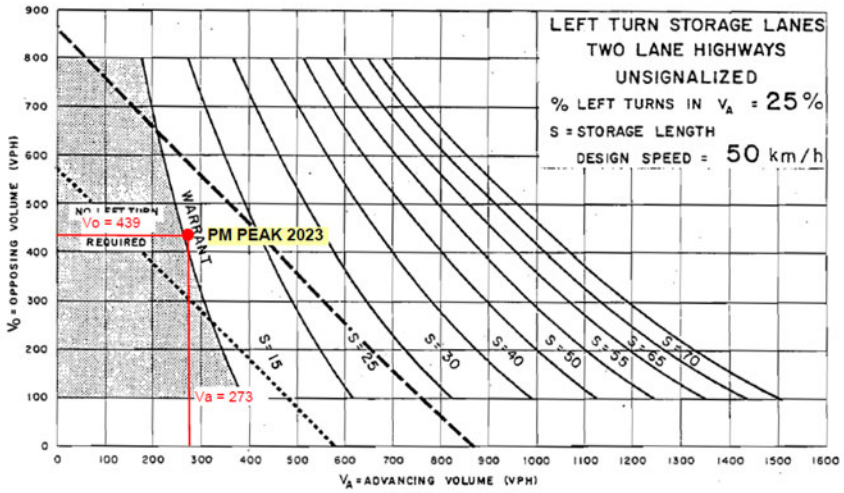


Exhibit 4.3 – Left Turn Warrant on Highway 7 at Shell/Tim Hortons AM Peak 2033 Background

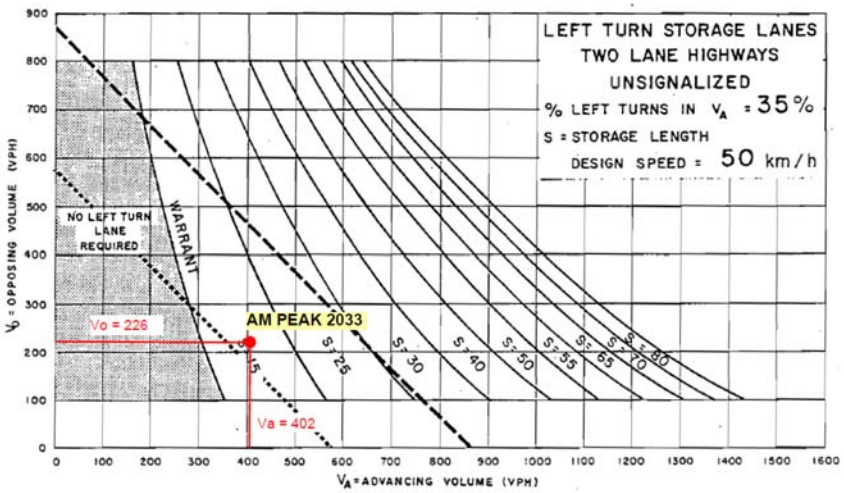


Exhibit 4.4 – Left Turn Warrant on Highway 7 at Shell/Tim Hortons PM Peak 2033 Background

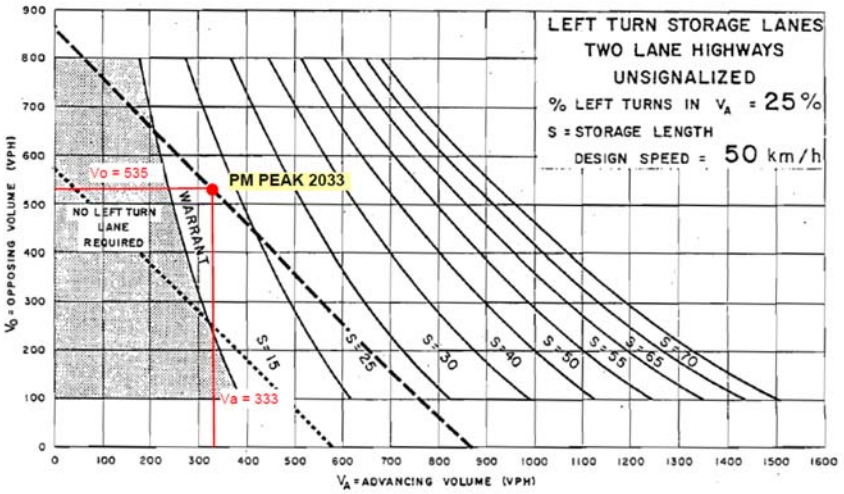


Exhibit 4.5 – Left Turn Warrant on Highway 7 at Shell/Tim Hortons AM Peak 2033 Total Traffic

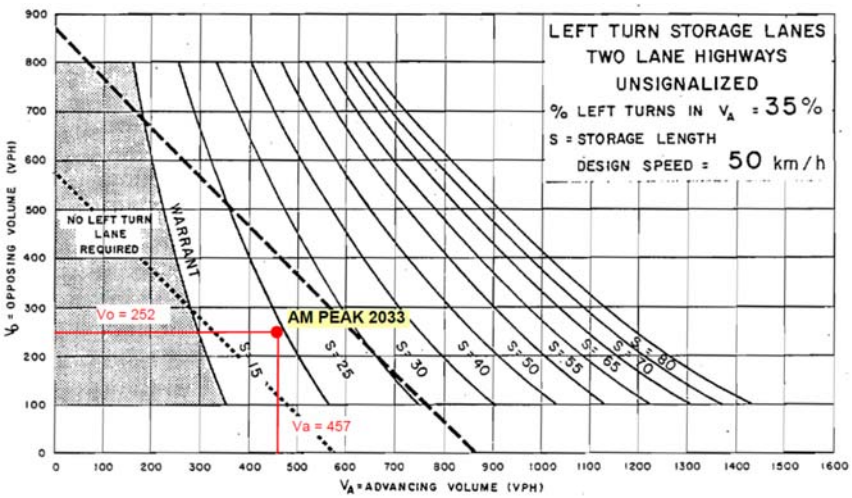


Exhibit 4.6 – Left Turn Warrant on Highway 7 at Shell/Tim Hortons PM Peak 2033 Total Traffic

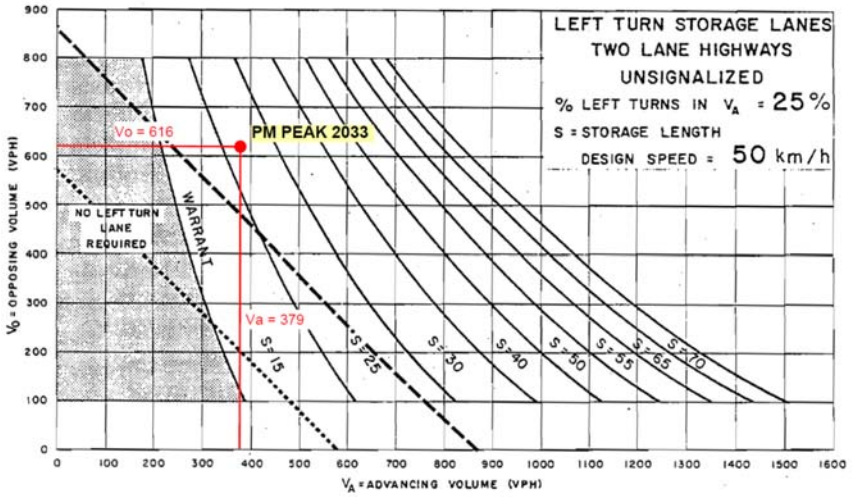


Exhibit 4.7 – Left Turn Warrant on Highway 7 at Site Access AM Peak 2033 Total Traffic

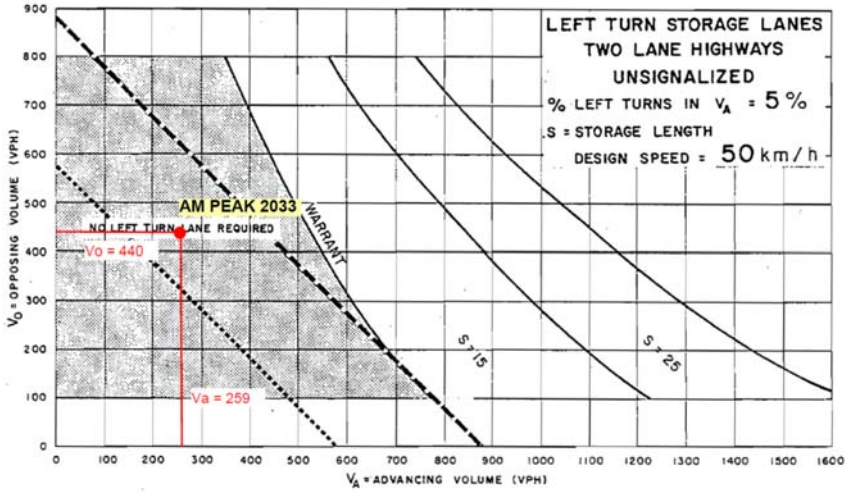
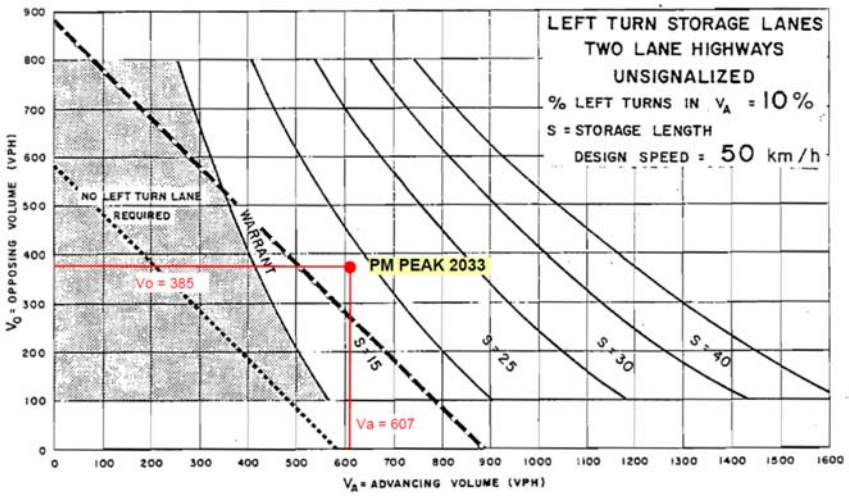


Exhibit 4.8 – Left Turn Warrant on Highway 7 at Site Access PM Peak 2033 Total Traffic



We complete right turn warrants on Highway 7 at the proposed entrance to Harbour Garden Village based on procedures and graphs prepared by the Ohio Department of Transportation. Westbound right turn volumes are not significant in the AM and PM peak hours and a right turn lane is not warranted at the proposed site access. Refer to Exhibits 4.9 and 4.10

We reviewed right turn volumes at the entrance to the Tim Hortons/Shell Gas Station/Convenience Store and completed right turn warrants using existing 2023 traffic, background 2033 traffic and total traffic in 2033 which includes site generated traffic.

An eastbound right turn lane is not warranted with current 2023 traffic volumes although the PM peak hour right turn traffic volume of 81 vehicles with an advancing volume of 439 vehicles is very close to the warrant line

Background traffic volumes in the PM peak hour in 2033 will warrant an eastbound right turn lane on Highway 7 at the entrance to the Tim Hortons/Shell Gas Station/Convenience Store which also means that 2033 total traffic including Harbour Garden Village will warrant a right turn lane at this location. Refer to Exhibits 4.11 through 4.16.

Exhibit 4.9 – Right Turn Warrant on Highway 7 at Site Access AM Peak 2033 Total Traffic

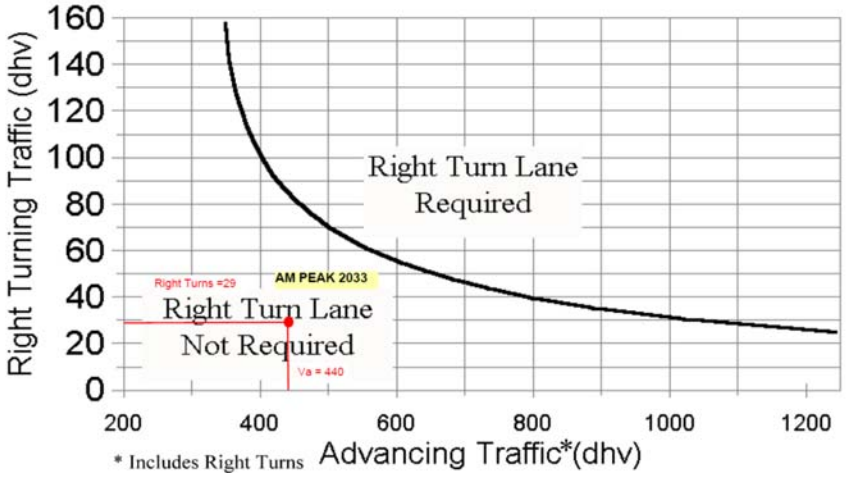


Exhibit 4.10 – Right Turn Warrant on Highway 7 at Site Access PM Peak 2033 Total Traffic

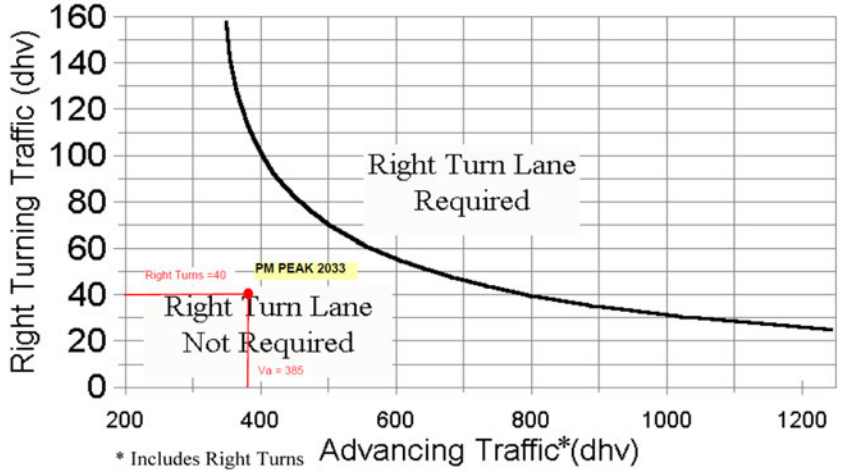


Exhibit 4.11 – Right Turn Warrant on Highway 7 at Shell/Tim Hortons AM Peak 2023 Existing

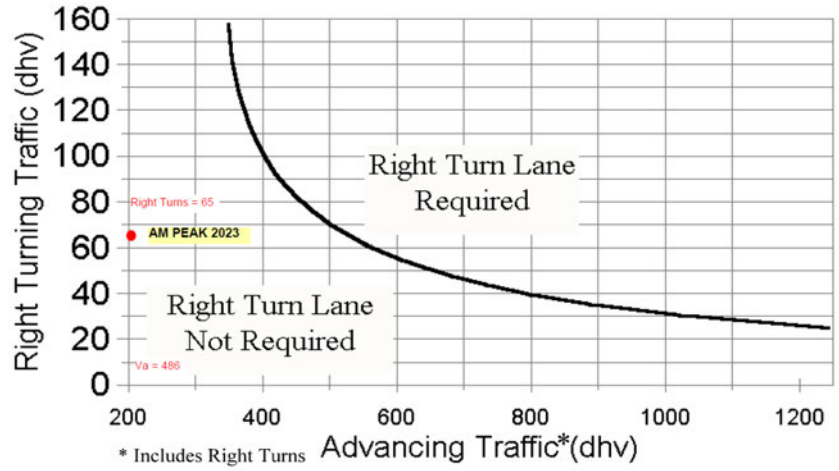


Exhibit 4.12 – Right Turn Warrant on Highway 7 at Shell/Tim Hortons PM Peak 2023 Existing

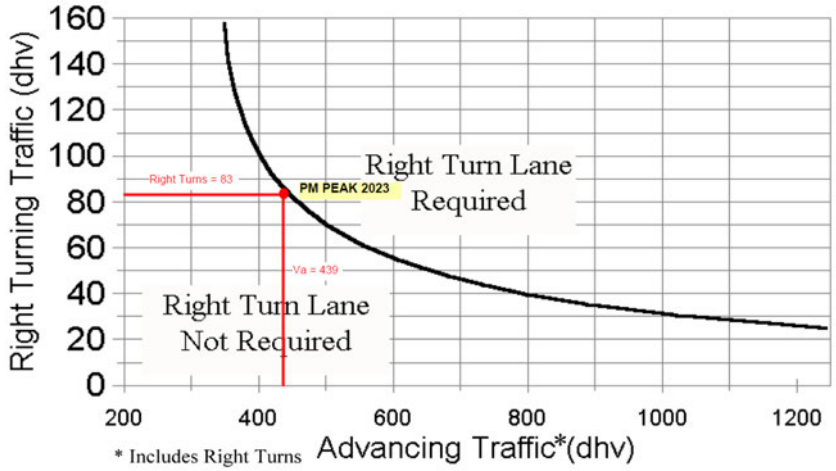


Exhibit 4.13 – Right Turn Warrant on Highway 7 at Shell/Tim Hortons AM Peak 2033 Background

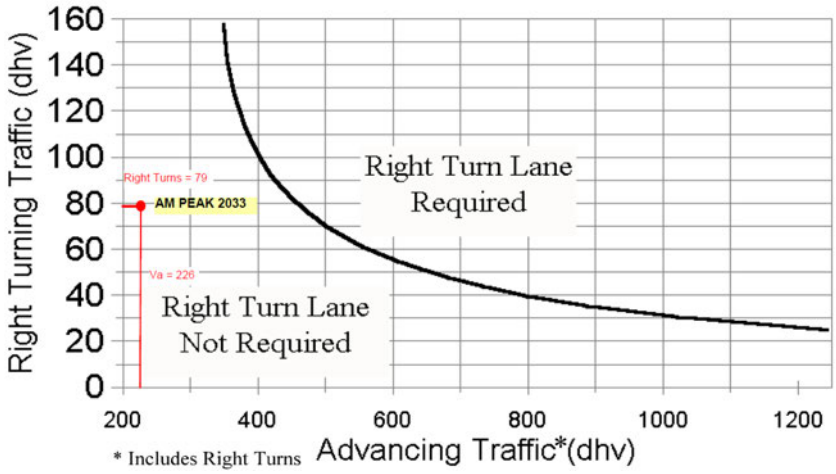


Exhibit 4.14 – Right Turn Warrant on Highway 7 at Shell/Tim Hortons PM Peak 2033 Background

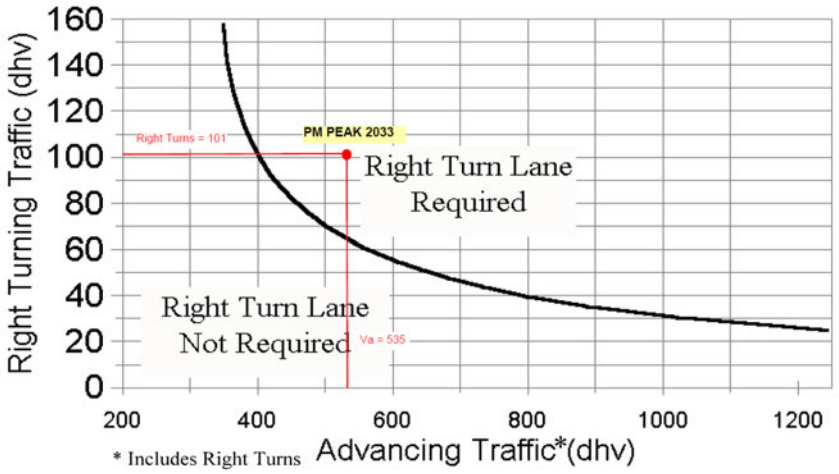


Exhibit 4.15 – Right Turn Warrant on Highway 7 at Shell/Tim Hortons AM Peak 2033 Total Traffic

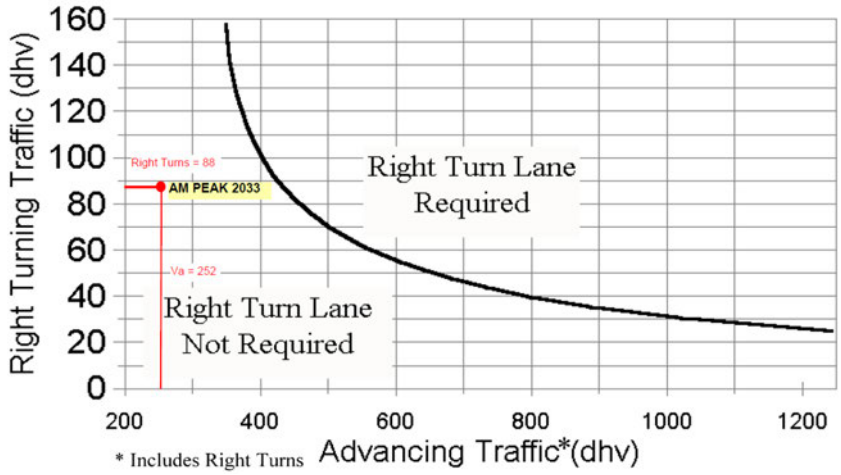
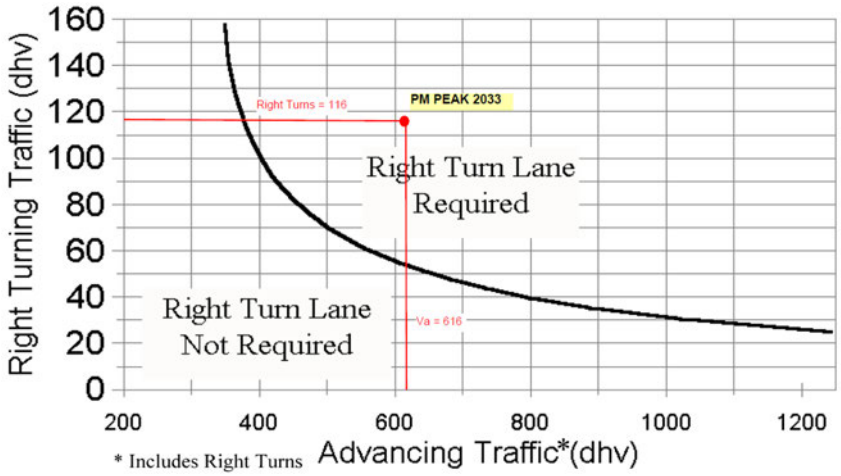


Exhibit 4.16 – Right Turn Warrant on Highway 7 at Shell/Tim Hortons PM Peak 2033 Total Traffic



4.2 Level of Service Analysis

As described in the Highway Capacity Manual *"the concept of levels of service used qualitative measures that characterize operational conditions within a traffic stream and their perception by motorists and passengers. The descriptions of individual levels of service characterize these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.*

Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations from A to F, with LOS A representing the best operating conditions and LOS F the worst."

As stated in the Highway Capacity Manual, *"analysis of signalized intersections focuses on the capacity and level of service of intersection approaches and the intersection as a whole. Capacity is evaluated in terms of the ratio of demand flow rate (volume) to capacity (v/c ratio) while the level of service is evaluated on the basis of average control delay per vehicle (in seconds per vehicle)."* Exhibit 4.17 defines Level of Service for signalized intersections.

The Highway Capacity Manual also states that *"the level of service is determined by the computed or measured control delay and is defined for each minor movement. Level of Service is not defined for the intersection as a whole."*LOS criteria for unsignalized intersections are summarized in Exhibit 4.18.

Exhibit 4.17 - Level of Service Criteria for Signalized Intersections

Level of Service	Description	Control, Delay Per Vehicle (Seconds)
A	Very low delay; most vehicles do not stop (Excellent)	≤ 10
B	Higher delay; more vehicles stop (Very Good)	≥ 10 and ≤ 20
C	Higher number of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping (Good)	≥ 20 and ≤ 35
D	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; Many vehicles stop (Satisfactory)	≥ 35 and ≤ 55
E	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of acceptable delay	≥ 55 and ≤ 80
F	This level is considered to be unacceptable for most drivers; occurs when arrival flow rates exceed the capacity of the intersection (Unacceptable)	≥ 80

Exhibit 4.18 - Level of Service Criteria for Unsignalized Intersections

Level of Service	Delay Range (Seconds)
A	≤ 10
B	≥ 10 and ≤ 15
C	≥ 15 and ≤ 25
D	≥ 25 and ≤ 35
E	≥ 35 and ≤ 50
F	≥ 50

Traffic volumes are at their highest during the AM and PM peak periods so the impact of the trips generated by the proposed development during these hours will provide a worst case assessment of their impacts on the existing transportation network.

NSTIR's Guide for the Preparation of Traffic Impact Studies states that:

"for signalized and unsignalized intersections and overall LOS rating of "A" to "D" (based on delay), and a volume/capacity (v/c) ratio less than 0.90 for any individual movement, are normally considered acceptable. Where existing or horizon year levels of service are "E" or "F", or v/c ratios exceed 0.90, without the proposed development, LOS and v/c ratios equal to or better than existing levels may be acceptable as long as the average stopped delay per vehicle per movement is not increased after the development."

We reviewed our traffic counts to determine both the Peak Hour Factor (PHF) and Heavy Truck percentages in the AM and PM peak hours at each intersection in the study area as summarized in Exhibit 4.19.

Exhibit 4.19 – Observed Peak Hour Factors and Truck Percentages in Study Area

Intersection	Peak Hour Factor		Truck Percentage	
	AM Peak	PM Peak	AM Peak	PM Peak
Highway 7 at Tim Hortons/Shell	0.91	0.95	3.84%	3.33%
Highway 7 at Little River Drive	0.94	0.88	4.12%	3.52%
Highway 7 at Highway 107	0.93	0.99	4.52%	3.33%

In our analysis for 2033 total traffic, which captures the impacts of Harbour Garden Village, we included the following auxiliary lanes as outlined in Section 4.1.

1. Eastbound left turn lane with 15 meters storage on Highway 7 at proposed site access
2. Westbound left turn lane with 25 meters storage on Highway 7 at Tim Hortons/Shell

We didn't include the eastbound right turn lane on Highway 7 at Tim Hortons as the performance of this intersection was acceptable without it, however, the need for this lane should be monitored in the future.

Level of Service (LOS), Volume-to-Capacity ratios (v/c) and 95% Queue Length in vehicles (95% Queue) results from all key movements at all intersections in the study area are provided in the following Exhibits and detailed Synchro reports have been included in the Appendix.

Exhibit 4.20 – Harbour Garden Village Site Access at Highway 7 Level of Service Results

	Highway 7		Site Access		Total
	EB-L	EB-T	SB-LR		
AM PEAK HOUR – TOTAL TRAFFIC 2033					
Delay	8.4	-	14.3		1.5
LOS	A	A	B		
v/c	0.017		0.168		
95% Queue	0.1		0.6		
PM PEAK HOUR – TOTAL TRAFFIC 2033					
Delay	8.4	-	24.4		2.4
LOS	A	A	C		
v/c	0.064		0.334		
95% Queue	0.2		1.4		

All intersection movements at the proposed new access to Harbour Garden Village on Highway 7 will operate with acceptable LOS during the AM and PM peak hours with the addition of site generated traffic and background traffic volumes in 2033.

Exhibit 4.21 – Tim Hortons/Shell Gas Station at Highway 7 Level of Service Results

	Highway 7		Tim Hortons/Shell		Total
	WB-L	WB-T	NB-L	NB-R	
AM PEAK HOUR – EXISTING TRAFFIC 2023					
Delay	7.9	-	18.8	9.7	5.4
LOS	A	A	C	A	
v/c	0.092		0.317	0.088	
95% Queue	0.3		1.3	0.3	
AM PEAK HOUR – BACKGROUND TRAFFIC 2033					
Delay	8.1	-	27.3	10.0	6.9
LOS	A	A	D	B	
v/c	0.116		0.482	0.112	
95% Queue	0.4		2.5	0.4	
AM PEAK HOUR – TOTAL TRAFFIC 2033					
Delay	8.3	-	39.1	10.3	9.0
LOS	A	A	E	B	
v/c	0.136		0.63	0.126	
95% Queue	0.5		3.9	0.4	
PM PEAK HOUR – EXISTING TRAFFIC 2023					
Delay	8.6	-	18.4	11.8	2.9
LOS	A	A	C	B	
v/c	0.063		0.172	0.13	
95% Queue	0.2		0.6	0.4	
PM PEAK HOUR – BACKGROUND TRAFFIC 2033					
Delay	9.0	-	24.6	13.1	3.4
LOS	A	A	C	B	
v/c	0.083		0.273	0.178	
95% Queue	0.3		1.1	0.6	
PM PEAK HOUR – TOTAL TRAFFIC 2033					
Delay	9.4	-	32.7	14.6	4.1
LOS	A	A	D	B	
v/c	0.102		0.381	0.231	
95% Queue	0.3		1.7	0.9	

All key intersection movements will operate with acceptable LOS during the AM and PM peak hours with existing traffic in 2023 and will continue to do so with the addition of site generated traffic and background traffic volumes in 2033.

Exhibit 4.22 – Little River Drive at Highway 7 Level of Service Results

	Highway 7		Little River Drive		Total
	EB-L	EB-T	SB-LR		
AM PEAK HOUR – EXISTING TRAFFIC 2023					
Delay	8.2	-	12.1		0.1
LOS	A	A	B		
v/c	0.002		0.008		
95% Queue	0		0		
AM PEAK HOUR – BACKGROUND TRAFFIC 2033					
Delay	8.4	-	13.3		0.1
LOS	A	A	B		
v/c	0.002		0.01		
95% Queue	0		0		
AM PEAK HOUR – TOTAL TRAFFIC 2033					
Delay	8.6	-	15.1		0.5
LOS	A	A	C		
v/c	0.009		0.053		
95% Queue	0		0.2		
PM PEAK HOUR – EXISTING TRAFFIC 2023					
Delay	8.0	-	16.9		0.1
LOS	A	A	C		
v/c	0.002		0.019		
95% Queue	0		0.1		
PM PEAK HOUR – BACKGROUND TRAFFIC 2033					
Delay	8.2	-	20.6		0.1
LOS	A	A	C		
v/c	0.002		0.029		
95% Queue	0		0.1		
PM PEAK HOUR – TOTAL TRAFFIC 2033					
Delay	8.4	-	23.8		0.9
LOS	A	A	C		
v/c	0.025		0.172		
95% Queue	0.1		0.6		

All key intersection movements will operate with acceptable LOS during the AM and PM peak hours with existing traffic in 2023 and will continue to do so with the addition of site generated traffic and background traffic volumes in 2033.

Exhibit 4.23 – Highway 107 at Highway 7 Level of Service Results

	Highway 7		Highway 107		Total
	WB-L	EB-L	NB-LTR	SB-LTR	
AM PEAK HOUR – EXISTING TRAFFIC 2023					
Delay	8.4	-	9.1	27.4	5.9
LOS	A	A	A	D	
v/c	0.266		0.103	0.014	
95% Queue	1.1		0.3	0	
AM PEAK HOUR – BACKGROUND TRAFFIC 2033					
Delay	8.9	-	9.4	39	6.2
LOS	A	A	A	E	
v/c	0.332		0.13	0.021	
95% Queue	1.5		0.4	0.1	
AM PEAK HOUR – TOTAL TRAFFIC 2033					
Delay	9.2	-	9.6	50.2	6.4
LOS	A	A	A	F	
v/c	0.375		0.146	0.028	
95% Queue	1.8		0.5	0.1	
PM PEAK HOUR – EXISTING TRAFFIC 2023					
Delay	8.0	-	12.2	-	6.7
LOS	A	A	B	A	
v/c	0.115		0.404	-	
95% Queue	0.4		2.0	-	
PM PEAK HOUR – BACKGROUND TRAFFIC 2033					
Delay	8.2	-	14.3	-	7.6
LOS	A	A	B	A	
v/c	0.145		0.52	-	
95% Queue	0.5		3.1	-	
PM PEAK HOUR – TOTAL TRAFFIC 2033					
Delay	8.4	-	17.0	-	8.8
LOS	A	A	C	A	
v/c	0.169		0.615	-	
95% Queue	0.6		4.3	-	

All key intersection movements will operate with acceptable LOS during the AM and PM peak hours with existing traffic in 2023 and will continue to do so with the addition of site generated traffic and background traffic volumes in 2033.

4.3 Stopping Site Distance

As per the Transportation of Canada Geometric Design Guide for Canadian Roads, adequate stopping site distance *"is essential for safe operation that the vehicle operator be able to see far enough ahead to stop if necessary. Conditions that would force a vehicle operator to stop are for example, an object on the roadway, a culvert washout or other fault in the roadway.*

Adequate stopping site distance is required throughout the length of the roadway. Minimum stopping site distance is the sum of two distances namely:

- *Brake reaction distance*

The distance travelled during the brake reaction time, that is the time that elapses from the instant an object, for which the driver decides to stop, comes into view to the instant the driver takes remedial action (contacts brake pedal).

- *Braking distance*

The distance travelled from the time that braking begins to the time the vehicle comes to a stop."

For a design speed of 50 km/h, the minimum stopping site distance is 65 m while a design speed of 60 km/hr requires a minimum stopping site distance of 85 m.

We completed a Stopping Site Distance (SSD) review on November 5, 2023 at the proposed Harbour Garden Village connection on Highway 7 and at the existing rear access road for Harbour Garden Village that connects to Darius Lane. Field measurements were recorded using an object height of 0.6 m and a driver eye height of 1.05 m.

Visibility on Highway 7 for eastbound and westbound drivers exceeds TAC requirements of 65 m and available SSD is greater than 120 m for westbound drivers and greater than 150 m for eastbound drivers.

Visibility on Darius Lane for northbound drivers and eastbound drivers exceeds TAC requirements of 65 meters. We noted that visibility for eastbound drivers is limited due to a horizontal/vertical curve and an existing gate that encroaches on the private road's right-of-way.

Refer to Exhibit 4.24 for a summary of Stopping Site Distance for Harbour Garden Village as well Exhibits 4.25 through 4.28 for photos from our field assessment.

Exhibit 4.24 – Stopping Site Distance for Harbour Garden Village Access Points

Location	Direction	Minimum SSD	Available SSD
Harbour Garden Village (New) at Highway 7	Eastbound	65 m	> 120 m
	Westbound	65 m	> 150 m
Harbour Garden Village (Rear Road) at Darius Lane	Eastbound	65 m	> 65 m
	Northbound	65 m	> 85 m

Exhibit 4.25 – Eastbound Driver View to Harbour Garden Village Rear Access Road at 65 m

Exhibit 4.26 – Northbound Driver View to Harbour Garden Village Rear Access Road at 85 m

Exhibit 4.27 – Westbound Driver View to Harbour Garden Village Main Entrance at 120 m

Exhibit 4.28 – Eastbound Driver View to Harbour Garden Village Main Entrance at 150 m

4.4 Site Access and Internal Road Network

The proposed access to Highway 7 for the main entrance to Harbour Garden Village will be located just west of the existing train museum in Musquodoboit Harbour. This road should be constructed as a local street per TAC and HRM geometric design guidelines and its connection to Highway 7 should also follow TAC and HRM geometric design guidelines. A stop sign will be required at this minor approach to Highway 7 and it should be installed in accordance with TAC's Manual of Uniform Control Devices for Canada (MUTCDC). A shared left/right lane exiting Harbour Garden Village will operate with acceptable LOS.

Full buildout traffic plus background traffic in 2033 will warrant an eastbound left turn lane with 15 meters storage that should be designed and constructed per TAC, NSPW and HRM geometric design guidelines and appropriate signage and pavement markings should be installed in accordance with TAC's Manual of Uniform Control Devices for Canada (MUTCDC).

A stop sign will be required at the western end of the rear access road to Harbour Green Village at its connection to Darius Lane and it should be installed in accordance with TAC's Manual of Uniform Control Devices for Canada (MUTCDC). Additional stops signs will be required within Harbour Garden Village and their locations should be assessed once a final site plan has been confirmed.

We reviewed the internal road network concept design in Exhibit 1.3 and we recommend that all new roads be designed and constructed as local streets per TAC and HRM geometric design guidelines. The site plan and the proposed internal road network should be reviewed to ensure that emergency vehicles and larger service vehicles can be accommodated.

Typical daily volumes for a local street are less than 3,000 vehicles per day and the average running speed is 15-30 km/hr. With a local street, traffic movement is a secondary consideration with land access as the primary consideration.

Our analysis of the weekday trip generation volumes for Harbour Garden Village estimated a total of 2385 vehicles per day which supports the recommendation for local streets in the development.

5 Conclusions and Recommendations

- This Traffic Impact Study has provided a detailed assessment of the potential traffic impacts of the proposed Harbour Garden Village community which will be located on a 46-acre property (PID 40192528) in Musquodoboit Harbour, Nova Scotia.

- Harbour Garden Village will contain a mixture of land uses including a long term care facility with 48 beds (The Birches) which will be completed in the initial phase. The remaining phases will capture a mixture of land uses (residential and commercial) that will be refined based on market demand and site conditions. The initial plan includes 72 single family homes in enclaves, 24 row houses, 24 apartments, 24 small shops, a farm market, 24-room boutique hotel and a self-storage barn with 110 storage units. Raised deck parking for 100 vehicles is envisioned on site.

- We estimate that the proposed Harbour Garden Village development will generate **158** new vehicle trips (62 enter, 72 exit) in the AM Peak Hour, **251** new vehicle trips (139 enter, 113 exit) in the PM Peak Hour and **2385** vehicles on a weekday.

- New site generated traffic will most likely follow existing trip distribution patterns in the surrounding area with **64%** of site generated traffic moving westbound towards Halifax and Dartmouth on Highway 7 in the AM peak hour and **61%** of site generated traffic moving eastbound away from Halifax and Dartmouth on Highway 7 in the PM peak hour.

- At this stage only the long term care facility (The Birches) with 48 beds has been confirmed and it will generate minimal traffic during the AM and PM peak hours so it will not have any impact on the surrounding transportation network in Musquodoboit Harbour.

- A westbound left turn lane with 15 meters storage **is warranted** on Highway 7 at the entrance to Tim Hortons/Shell Gas Station/Convenience Store based on existing 2023 traffic volumes. The addition of Harbour Garden Village site generated traffic at full build out increases the storage requirement of this westbound left turn lane to 25 meters.

- An eastbound left turn lane with 15 meters storage **is warranted** on Highway 7 at the proposed entrance to Harbour Garden Village with 2033 total traffic volumes.

- An eastbound right turn lane **is warranted** on Highway 7 at the entrance to Tim Hortons/Shell Gas Station/Convenience Store based on background traffic volumes in 2033.

- A westbound right turn lane is not warranted on Highway 7 at the proposed entrance to Harbour Garden Village.

- No upgrades are required at the existing Highway 7/Highway 107 and Highway 7/Little River Drive intersections as they can accommodate full build out traffic in 2033 with their current configurations.

- Stopping Site Distance on Highway 7 exceeds TAC requirements of 65 m at the proposed entrance to Harbour Garden Village and available SSD is greater than 120 m for westbound drivers and greater than 150 m for eastbound drivers.

- Stopping Site Distance on Darius Lane exceeds TAC requirements of 65 m at the proposed rear access to Harbour Garden Village for eastbound and northbound drivers. Visibility for eastbound drivers is limited due to a horizontal/vertical curve and an existing gate that encroaches on the right of way so we recommend that the gate be removed or relocated.

- We recommend that all new roads in Harbour Garden Village be designed and constructed as local streets per Transportation Association of Canada (TAC) and Halifax Regional Municipality (HRM) geometric design guidelines. The final site plan and proposed internal road network should be reviewed to ensure that emergency vehicles and larger service vehicles can be accommodated.

- Stop signs will be required at Harbour Garden Village's main access to Highway 7 and at the western end of the rear access road to Harbour Garden Village. Additional stops signs will be required within Harbour Garden Village and their locations should be assessed once a final site plan has been confirmed. All required signs should be installed per TAC's Manual of Uniform Control Devices for Canada (MUTCDC).

- Auxiliary turning lanes on Highway 7 should be should be designed and constructed per TAC, NSPW and HRM geometric design guidelines and appropriate signage and pavement markings should be installed in accordance with TAC's Manual of Uniform Control Devices for Canada (MUTCDC).

- All movements at all intersections in the study area will operate with acceptable Level of Service during the AM and PM peak hours in 2033 with background traffic growth and site generated traffic.

- The final plan and land uses for Harbour Garden Village are still in development so we recommend that this Traffic Impact Study be updated once those details have been finalized to reassess site generated and background traffic as well as recommended transportation infrastructure upgrades including the eastbound left turn lane on Highway 7 at Harbour Garden Village and the additional 10 m storage for the westbound left turn lane on Highway 7 at Tim Hortons/Shell Gas Station/Convenience Store that is warranted with existing 2023 traffic.

- We haven't identified any significant traffic related concerns with the proposed Harbour Garden Village development and new traffic that it will generate can be introduced safely and efficiently into the existing transportation network in Musquodoboit Harbour, Nova Scotia with the recommendations outlined above.

APPENDIX

TRAFFIC COUNTS

TRIP GENERATION ESTIMATES

TOTAL TRAFFIC ANALYSIS

SYNCHRO 11 REPORTS

HARBOUR GARDEN VILLAGE TRAFFIC IMPACT STUDY

MANUAL TRAFFIC COUNTS

PEAK HOUR TRAFFIC COUNTS COMPLETED ON WEDNESDAY OCTOBER 18, 2023 and THURSDAY OCTOBER 19. 2023

AM PEAK		TIM HORTONS/SHELL						HIGHWAY 7					
ENTER		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
EXIT		L	T	R	L	T	R	L	T	R	L	T	R
2023													
07:00:00 AM	07:15:00 AM	20		10					29	17	27	43	
07:15:00 AM	07:30:00 AM	39		15					26	17	30	53	
07:30:00 AM	07:45:00 AM	23		16					37	23	27	57	
07:45:00 AM	08:00:00 AM	29		23					27	10	35	50	
08:00:00 AM	08:15:00 AM	25		17					31	15	27	51	
08:15:00 AM	08:30:00 AM	29		14					32	17	28	44	
08:30:00 AM	08:45:00 AM	17		24					33	14	27	45	
08:45:00 AM	09:00:00 AM	21		16					37	19	21	59	
2023													
07:15:00 AM	08:15:00 AM	116		71					121	65	119	211	

PM PEAK		TIM HORTONS/SHELL						HIGHWAY 7					
ENTER		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
EXIT		L	T	R	L	T	R	L	T	R	L	T	R
2023													
04:00:00 PM	04:15:00 PM	14		11					94	13	18	49	
04:15:00 PM	04:30:00 PM	11		14					91	25	22	60	
04:30:00 PM	04:45:00 PM	13		25					93	30	15	50	
04:45:00 PM	05:00:00 PM	15		25					78	15	9	50	
05:00:00 PM	05:15:00 PM	11		18					75	19	18	58	
05:15:00 PM	05:30:00 PM	16		28					89	18	15	42	
05:30:00 PM	05:45:00 PM	9		24					80	19	18	52	
05:45:00 PM	06:00:00 PM	10		20					89	21	10	42	
2023													
04:00:00 PM	05:00:00 PM	53		75					356	83	64	209	

HARBOUR GARDEN VILLAGE TRAFFIC IMPACT STUDY

MANUAL TRAFFIC COUNTS

PEAK HOUR TRAFFIC COUNTS COMPLETED ON THURSDAY OCTOBER 19. 2023

AM PEAK		LITTLE RIVER DRIVE						HIGHWAY 7					
ENTER		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
EXIT		L	T	R	L	T	R	L	T	R	L	T	R
2023													
07:00:00 AM	07:15:00 AM				1		0	1	30			105	1
07:15:00 AM	07:30:00 AM				0		1	0	44			124	1
07:30:00 AM	07:45:00 AM				1		1	0	48			83	0
07:45:00 AM	08:00:00 AM				1		0	1	53			74	2
08:00:00 AM	08:15:00 AM				0		0	1	60			87	1
08:15:00 AM	08:30:00 AM				2		0	0	49			55	2
08:30:00 AM	08:45:00 AM				0		0	1	58			70	0
08:45:00 AM	09:00:00 AM				1		0	0	88			82	2
2023													
07:15:00 AM	08:15:00 AM				2		2	2	205			368	4

PM PEAK		LITTLE RIVER DRIVE						HIGHWAY 7					
ENTER		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
EXIT		L	T	R	L	T	R	L	T	R	L	T	R
2023													
04:00:00 PM	04:15:00 PM				4		0	2	117			77	3
04:15:00 PM	04:30:00 PM				0		0	0	128			74	2
04:30:00 PM	04:45:00 PM				1		0	0	112			59	1
04:45:00 PM	05:00:00 PM				0		0	0	109			77	2
05:00:00 PM	05:15:00 PM				0		0	2	108			63	1
05:15:00 PM	05:30:00 PM				1		0	0	114			52	0
05:30:00 PM	05:45:00 PM				0		0	1	103			62	0
05:45:00 PM	06:00:00 PM				0		1	1	124			43	0
2023													
04:15:00 PM	05:15:00 PM				5		0	2	466			287	8

HARBOUR GARDEN VILLAGE TRAFFIC IMPACT STUDY

MANUAL TRAFFIC COUNTS

PEAK HOUR TRAFFIC COUNTS COMPLETED ON WEDNESDAY OCTOBER 18, 2023 and THURSDAY OCTOBER 19. 2023

AM PEAK		HIGHWAY 107						HIGHWAY 7					
ENTER		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
EXIT		L	T	R	L	T	R	L	T	R	L	T	R
2023													
07:00:00 AM	07:15:00 AM	1		18				108	21			14	3
07:15:00 AM	07:30:00 AM	3		12		1		103	30			26	1
07:30:00 AM	07:45:00 AM	0		26				61	19			23	5
07:45:00 AM	08:00:00 AM	2	1	25	1			61	19	1		31	4
08:00:00 AM	08:15:00 AM	2	3	41				60	21			22	1
08:15:00 AM	08:30:00 AM	1		24				35	24	2		21	2
08:30:00 AM	08:45:00 AM	1	1	34				48	31	1		28	1
08:45:00 AM	09:00:00 AM	1		39	1	1		43	42			48	0
2023													
07:00:00 AM	08:00:00 AM	6	1	81	1	1	0	333	89	1	0	94	13

PM PEAK		HIGHWAY 107						HIGHWAY 7					
ENTER		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
EXIT		L	T	R	L	T	R	L	T	R	L	T	R
2023													
04:00:00 PM	04:15:00 PM	1		67				62	44	1		46	3
04:15:00 PM	04:30:00 PM	0	1	77				27	26			41	0
04:30:00 PM	04:45:00 PM	6	1	75		1		51	31			48	0
04:45:00 PM	05:00:00 PM	0	1	66			1	22	32			48	1
05:00:00 PM	05:15:00 PM	1		65				43	43			39	0
05:15:00 PM	05:30:00 PM	2	1	89				34	23			60	4
05:30:00 PM	05:45:00 PM	1	0	94				45	24			36	1
05:45:00 PM	06:00:00 PM	4	3	73				30	23	1		51	0
2023													
05:00:00 PM	06:00:00 PM	8	4	321	0	0	0	152	113	1	0	186	5

HARBOUR GARDEN VILLAGE TRAFFIC IMPACT STUDY

TRIP GENERATION ESTIMATES

Source - ITE Trip Generation Manual 11th Edition

Land Use 620	Nursing Home	
AM PEAK	T = 0.10(X) +5.42	Average Vehicle Trip Ends versus Beds
PM PEAK	T = 0.11(X) +3.98	Average Vehicle Trip Ends versus Beds
WEEKDAY	3.06	Average Vehicle Trip Ends versus Beds
Land Use 210	Single Family Detached Housing	
AM PEAK	Ln(T) = 0.91Ln(X) + 0.12	Average Vehicle Trip Ends versus 1000 sqft GLA
PM PEAK	Ln(T) = 0.94Ln(X) + 0.27	Average Vehicle Trip Ends versus 1000 sqft GLA
PM PEAK	Ln(T) = 0.91Ln(X) + 0.12	Average Vehicle Trip Ends versus 1000 sqft GLA
Land Use 221	Multi Family Housing (Mid-Rise)	
AM PEAK	0.37	Average Vehicle Trip Ends per unit
PM PEAK	0.39	Average Vehicle Trip Ends per unit
WEEKDAY	4.54	Average Vehicle Trip Ends per unit
Land Use 822	Strip Retail Plaza (<40k)	
AM PEAK	Ln(T) = 0.66Ln(X) + 1.84	Average Vehicle Trip Ends per unit
PM PEAK	Ln(T) = 071Ln(X) + 2.72	Average Vehicle Trip Ends per unit
WEEKDAY	T = 42.20(X) + 229.68	Average Vehicle Trip Ends per unit
Land Use 220	Multi Family Housing (Low-Rise)	
AM PEAK	T = 0.31(X) + 22.85	Average Vehicle Trip Ends per unit
PM PEAK	T = 0.43(X) + 20.55	Average Vehicle Trip Ends per unit
WEEKDAY	T = 6.41(X) + 75.31	Average Vehicle Trip Ends per unit
Land Use 310	Hotel	
AM PEAK	0.46	Average Vehicle Trip Ends per unit
PM PEAK	0.59	Average Vehicle Trip Ends per unit
WEEKDAY	7.99	Average Vehicle Trip Ends per unit
Land Use 151	Mini-Warehouse	
AM PEAK	1.21	Average Vehicle Trip Ends per unit (100s)
PM PEAK	1.68	Average Vehicle Trip Ends per unit (100s)
WEEKDAY	17.96	Average Vehicle Trip Ends per unit (100s)

LAND USE	QUANTITY	AM PEAK			PM PEAK			WEEKDAY		
		TOTAL TRIPS	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL	ENTER	EXIT
Nursing Home The Birches	48	10	72% 7	28% 3	9	33% 3	67% 6	147	50% 73	50% 73
Single Family The Enclaves	72	55	25% 14	75% 41	73	63% 46	37% 27	746	50% 373	50% 373
Multifamily Mid Rise Apartments	24	9	23% 2	77% 7	9	61% 6	39% 4	109	50% 54	50% 54
Strip Retail Plaza (<40k) Shops + Farmers Market	16.9	41	60% 24	40% 16	113	50% 57	50% 57	943	50% 471	50% 471
Multifamily Low-Rise Row Houses	24	30	24% 7	76% 23	31	63% 19	37% 11	229	50% 114	50% 114
Boutique Hotel	24	11	56% 6	44% 5	14	51% 7	49% 7	192	50% 96	50% 96
Mini-Warehouse Self Storage	1.1	1	51% 1	49% 1	2	50% 1	50% 1	20	50% 10	50% 10
TOTAL		**158**	**62**	**96**	**251**	**139**	**113**	**2385**	**1192**	**1192**
Little River Road	25%	**39**	**15**	**24**	**63**	**35**	**28**	**596**	**298**	**298**
Site Access	75%	**118**	**46**	**72**	**189**	**104**	**84**	**1789**	**894**	**894**

HARBOUR GARDEN VILLAGE TRAFFIC IMPACT STUDY

TOTAL TRAFFIC ANALYSIS

PEAK HOUR TRAFFIC COUNTS COMPLETED ON THURSDAY OCTOBER 19. 2023

AM PEAK		SITE ACCESS						HIGHWAY 7					
ENTER	46	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
EXIT	72	L	T	R	L	T	R	L	T	R	L	T	R
ENTER WB	10												
ENTER EB	9												
2023													
07:00:00 AM	07:15:00 AM												
07:15:00 AM	07:30:00 AM												
07:30:00 AM	07:45:00 AM												
07:45:00 AM	08:00:00 AM												
08:00:00 AM	08:15:00 AM												
08:15:00 AM	08:30:00 AM												
08:30:00 AM	08:45:00 AM												
08:45:00 AM	09:00:00 AM												
2023													
07:15:00 AM	08:15:00 AM								192			330	
2033													
07:15:00 AM	08:15:00 AM								234			402	
DISTRIBUTION													
07:15:00 AM	08:15:00 AM				37%		63%	37%					63%
SITE ACCESS													
07:15:00 AM	08:15:00 AM				26		46	17					29
DISTRIBUTION													
07:15:00 AM	08:15:00 AM						10%	7%	93%			90%	
LITTLE RIVER DRIVE													
07:15:00 AM	08:15:00 AM						1	1	8			9	
TOTAL TRAFFIC 2033													
07:15:00 AM	08:15:00 AM				26		46	17	242			411	29

PM PEAK		SITE ACCESS						HIGHWAY 7					
ENTER	104	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
EXIT	84	L	T	R	L	T	R	L	T	R	L	T	R
ENTER WB	14												
ENTER EB	17												
2023													
04:00:00 PM	04:15:00 PM												
04:15:00 PM	04:30:00 PM												
04:30:00 PM	04:45:00 PM												
04:45:00 PM	05:00:00 PM												
05:00:00 PM	05:15:00 PM												
05:15:00 PM	05:30:00 PM												
05:30:00 PM	05:45:00 PM												
05:45:00 PM	06:00:00 PM												
2023													
04:00:00 PM	05:00:00 PM								431			273	
2033													
04:00:00 PM	05:00:00 PM								525			333	
DISTRIBUTION													
04:00:00 PM	05:00:00 PM				61%		39%	61%					39%
SITE ACCESS													
04:00:00 PM	05:00:00 PM				51		33	64					40
DISTRIBUTION													
04:00:00 PM	05:00:00 PM						9%	11%	89%			91%	
LITTLE RIVER DRIVE													
04:00:00 PM	05:00:00 PM						1	2	15			12	
TOTAL TRAFFIC 2033													
04:00:00 PM	05:00:00 PM				51		34	66	541			345	40

HARBOUR GARDEN VILLAGE TRAFFIC IMPACT STUDY

TOTAL TRAFFIC ANALYSIS

PEAK HOUR TRAFFIC COUNTS COMPLETED ON WEDNESDAY OCTOBER 18, 2023 and THURSDAY OCTOBER 19. 2023

AM PEAK		TIM HORTONS/SHELL						HIGHWAY 7					
ENTER WB	46	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
ENTER EB	17	L	T	R	L	T	R	L	T	R	L	T	R
ENTER WB	10												
ENTER EB	9												
2023													
07:00:00 AM	07:15:00 AM	20		10					29	17	27	43	
07:15:00 AM	07:30:00 AM	39		15					26	17	30	53	
07:30:00 AM	07:45:00 AM	23		16					37	23	27	57	
07:45:00 AM	08:00:00 AM	29		23					27	10	35	50	
08:00:00 AM	08:15:00 AM	25		17					31	15	27	51	
08:15:00 AM	08:30:00 AM	29		14					32	17	28	44	
08:30:00 AM	08:45:00 AM	17		24					33	14	27	45	
08:45:00 AM	09:00:00 AM	21		16					37	19	21	59	
2023													
07:15:00 AM	08:15:00 AM	116		71					121	65	119	211	
2033													
07:15:00 AM	08:15:00 AM	141		87					147	79	145	257	
DISTRIBUTION													
07:15:00 AM	08:15:00 AM								65%	35%	36%	64%	
SITE ACCESS													
07:15:00 AM	08:15:00 AM	16		6					11	6	16	29	
DISTRIBUTION													
07:15:00 AM	08:15:00 AM								65%	35%	36%	64%	
LITTLE RIVER DRIVE													
07:15:00 AM	08:15:00 AM	3		3					6	3	3	6	
TOTAL TRAFFIC 2033													
07:15:00 AM	08:15:00 AM	161		95					164	88	165	292	

PM PEAK		TIM HORTONS/SHELL						HIGHWAY 7					
ENTER WB	33	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
ENTER EB	64	L	T	R	L	T	R	L	T	R	L	T	R
ENTER WB	14												
ENTER EB	17												
2023													
04:00:00 PM	04:15:00 PM	14		11					94	13	18	49	
04:15:00 PM	04:30:00 PM	11		14					91	25	22	60	
04:30:00 PM	04:45:00 PM	13		25					93	30	15	50	
04:45:00 PM	05:00:00 PM	15		25					78	15	9	50	
05:00:00 PM	05:15:00 PM	11		18					75	19	18	58	
05:15:00 PM	05:30:00 PM	16		28					89	18	15	42	
05:30:00 PM	05:45:00 PM	9		24					80	19	18	52	
05:45:00 PM	06:00:00 PM	10		20					89	21	10	42	
2023													
04:00:00 PM	05:00:00 PM	53		75					356	83	64	209	
2033													
04:00:00 PM	05:00:00 PM	65		91					434	101	78	255	
DISTRIBUTION													
04:00:00 PM	05:00:00 PM								81%	19%	23%	77%	
SITE ACCESS													
04:00:00 PM	05:00:00 PM	8		12					52	12	8	25	
DISTRIBUTION													
04:00:00 PM	05:00:00 PM								81%	19%	23%	77%	
LITTLE RIVER DRIVE													
04:00:00 PM	05:00:00 PM	3		3					14	3	3	10	
TOTAL TRAFFIC 2033													
04:00:00 PM	05:00:00 PM	75		107					500	116	89	290	

HARBOUR GARDEN VILLAGE TRAFFIC IMPACT STUDY

TOTAL TRAFFIC ANALYSIS

PEAK HOUR TRAFFIC COUNTS COMPLETED ON THURSDAY OCTOBER 19. 2023

AM PEAK		LITTLE RIVER DRIVE						HIGHWAY 7					
ENTER WB	46	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
ENTER EB	17	L	T	R	L	T	R	L	T	R	L	T	R
ENTER	15												
EXIT	24												
2023													
07:00:00 AM	07:15:00 AM				1		0	1	30			105	1
07:15:00 AM	07:30:00 AM				0		1	0	44			124	1
07:30:00 AM	07:45:00 AM				1		1	0	48			83	0
07:45:00 AM	08:00:00 AM				1		0	1	53			74	2
08:00:00 AM	08:15:00 AM				0		0	1	60			87	1
08:15:00 AM	08:30:00 AM				2		0	0	49			55	2
08:30:00 AM	08:45:00 AM				0		0	1	58			70	0
08:45:00 AM	09:00:00 AM				1		0	0	88			82	2
2023													
07:15:00 AM	08:15:00 AM				2		2	2	205			368	4
2033													
07:15:00 AM	08:15:00 AM				2		2	2	250			449	5
DISTRIBUTION													
07:15:00 AM	08:15:00 AM				1%				99%			99%	1%
SITE ACCESS													
07:15:00 AM	08:15:00 AM				0				17			45	1
DISTRIBUTION													
07:15:00 AM	08:15:00 AM								36%			64%	
LITTLE RIVER DRIVE													
07:15:00 AM	08:15:00 AM				9		15	5					10
TOTAL TRAFFIC 2033													
07:15:00 AM	08:15:00 AM				11		18	8	267			494	16

PM PEAK		LITTLE RIVER DRIVE						HIGHWAY 7					
ENTER WB	33	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
ENTER EB	64	L	T	R	L	T	R	L	T	R	L	T	R
ENTER	35												
EXIT	28												
2023													
04:00:00 PM	04:15:00 PM				4		0	2	117			77	3
04:15:00 PM	04:30:00 PM				0		0	0	128			74	2
04:30:00 PM	04:45:00 PM				1		0	0	112			59	1
04:45:00 PM	05:00:00 PM				0		0	0	109			77	2
05:00:00 PM	05:15:00 PM				0		0	2	108			63	1
05:15:00 PM	05:30:00 PM				1		0	0	114			52	0
05:30:00 PM	05:45:00 PM				0		0	1	103			62	0
05:45:00 PM	06:00:00 PM				0		1	1	124			43	0
2023													
04:00:00 PM	05:00:00 PM				5		0	2	466			287	8
2033													
04:00:00 PM	05:00:00 PM				6		0	2	568			350	10
DISTRIBUTION													
04:15:00 PM	05:15:00 PM				1%				99%			97%	3%
SITE ACCESS													
04:15:00 PM	05:15:00 PM				1				63			32	1
DISTRIBUTION													
04:15:00 PM	05:15:00 PM								61%			39%	
LITTLE RIVER DRIVE													
04:15:00 PM	05:15:00 PM				17		11	21					14
TOTAL TRAFFIC 2033													
04:15:00 PM	05:15:00 PM				24		11	24	631			382	24

HARBOUR GARDEN VILLAGE TRAFFIC IMPACT STUDY

TOTAL TRAFFIC ANALYSIS

PEAK HOUR TRAFFIC COUNTS COMPLETED ON WEDNESDAY OCTOBER 18, 2023 and THURSDAY OCTOBER 19. 2023

AM PEAK		HIGHWAY 107						HIGHWAY 7					
ENTER WB	45	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
ENTER EB	17	L	T	R	L	T	R	L	T	R	L	T	R
ENTER WB	15												
ENTER EB	5												
2023													
07:00:00 AM	07:15:00 AM	1	0	18	0	0	0	0	14	3	108	21	0
07:15:00 AM	07:30:00 AM	3	0	12	0	1	0	0	26	1	103	30	0
07:30:00 AM	07:45:00 AM	0	0	26	0	0	0	0	23	5	61	19	0
07:45:00 AM	08:00:00 AM	2	1	25	1	0	0	0	31	4	61	19	1
08:00:00 AM	08:15:00 AM	2	3	41	0	0	0	0	22	1	60	21	0
08:15:00 AM	08:30:00 AM	1	0	24	0	0	0	0	21	2	35	24	2
08:30:00 AM	08:45:00 AM	1	1	34	0	0	0	0	28	1	48	31	1
08:45:00 AM	09:00:00 AM	1	0	39	1	1	0	0	48	0	43	42	0
2023													
07:00:00 AM	08:00:00 AM	6	1	81	1	1	0	0	94	13	333	89	1
2033													
07:00:00 AM	08:00:00 AM	7	1	99	1	1	0	0	115	16	406	108	1
DISTRIBUTION													
07:00:00 AM	08:00:00 AM			46%	1%				53%		79%	21%	0%
SITE ACCESS													
07:00:00 AM	08:00:00 AM			8	0				9		35	9	0
DISTRIBUTION													
07:00:00 AM	08:00:00 AM			46%	1%				53%		79%	21%	0%
LITTLE RIVER DRIVE													
07:00:00 AM	08:00:00 AM			2	0				3		12	3	0
TOTAL TRAFFIC 2033													
07:00:00 AM	08:00:00 AM	7	1	109	1	1	0	0	126	16	454	121	1

PM PEAK		HIGHWAY 107						HIGHWAY 7					
ENTER WB	32	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
ENTER EB	63	L	T	R	L	T	R	L	T	R	L	T	R
ENTER WB	11												
ENTER EB	21												
2023													
04:00:00 PM	04:15:00 PM	1		67					46	3	62	44	1
04:15:00 PM	04:30:00 PM	0	1	77					41	0	27	26	
04:30:00 PM	04:45:00 PM	6	1	75		1			48	0	51	31	
04:45:00 PM	05:00:00 PM	0	1	66			1		48	1	22	32	
05:00:00 PM	05:15:00 PM	1		65					39	0	43	43	
05:15:00 PM	05:30:00 PM	2	1	89					60	4	34	23	
05:30:00 PM	05:45:00 PM	1	0	94					36	1	45	24	
05:45:00 PM	06:00:00 PM	4	3	73					51	0	30	23	1
2023													
05:00:00 PM	06:00:00 PM	8	4	321	0	0	0	0	186	5	152	113	1
2033													
05:00:00 PM	06:00:00 PM	10	5	391	0	0	0	0	227	6	185	138	1
DISTRIBUTION													
05:00:00 PM	06:00:00 PM			63%	0%				37%		57%	42%	0%
SITE ACCESS													
05:00:00 PM	06:00:00 PM			40	0				23		18	13	0
DISTRIBUTION													
05:00:00 PM	06:00:00 PM			63%	0%				37%		57%	42%	0%
LITTLE RIVER DRIVE													
04:15:00 PM	05:15:00 PM			14	0				8		6	5	0
TOTAL TRAFFIC 2033													
05:00:00 PM	06:00:00 PM	10	5	445	0	0	0	0	258	6	210	156	1

Intersection	
Int Delay, s/veh	1.5

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	26	46	17	242	411	29
Future Vol, veh/h	26	46	17	242	411	29
Conflicting Peds, #/hr	10	10	10	0	0	10
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	15	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	50	18	263	447	32

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	782	483	489	0	-	0
Stage 1	473	-	-	-	-	-
Stage 2	309	-	-	-	-	-
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	363	584	1074	-	-	-
Stage 1	627	-	-	-	-	-
Stage 2	745	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	351	574	1065	-	-	-
Mov Cap-2 Maneuver	351	-	-	-	-	-
Stage 1	611	-	-	-	-	-
Stage 2	739	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	14.3	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	1065	-	467	-	-
HCM Lane V/C Ratio	0.017	-	0.168	-	-
HCM Control Delay (s)	8.4	-	14.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-

Intersection	
Int Delay, s/veh	2.4

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	51	34	66	541	345	40
Future Vol, veh/h	51	34	66	541	345	40
Conflicting Peds, #/hr	10	10	10	0	0	10
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	15	-	-	-
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	55	37	72	588	375	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1149	417	428	0	-	0
Stage 1	407	-	-	-	-	-
Stage 2	742	-	-	-	-	-
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	219	636	1131	-	-	-
Stage 1	672	-	-	-	-	-
Stage 2	471	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	202	625	1121	-	-	-
Mov Cap-2 Maneuver	202	-	-	-	-	-
Stage 1	624	-	-	-	-	-
Stage 2	467	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	24.4	0.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	1121	-	277	-	-
HCM Lane V/C Ratio	0.064	-	0.334	-	-
HCM Control Delay (s)	8.4	-	24.4	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.2	-	1.4	-	-

Intersection	
Int Delay, s/veh	5.4

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	116	71	121	65	119	211
Future Vol, veh/h	116	71	121	65	119	211
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	121	74	126	68	124	220

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	648	180	0	0	204	0
Stage 1	170	-	-	-	-	-
Stage 2	478	-	-	-	-	-
Critical Hdwy	6.44	6.24	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	-	-	2.236	-
Pot Cap-1 Maneuver	432	858	-	-	1356	-
Stage 1	855	-	-	-	-	-
Stage 2	620	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	381	844	-	-	1345	-
Mov Cap-2 Maneuver	381	-	-	-	-	-
Stage 1	848	-	-	-	-	-
Stage 2	550	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	15.3	0	2.9
HCM LOS	C		

Minor Lane/Major Mvmt	NET	NER	NWLn1	NWLn2	SWL	SWT
Capacity (veh/h)	-	-	381	844	1345	-
HCM Lane V/C Ratio	-	-	0.317	0.088	0.092	-
HCM Control Delay (s)	-	-	18.8	9.7	7.9	0
HCM Lane LOS	-	-	C	A	A	A
HCM 95th %tile Q(veh)	-	-	1.3	0.3	0.3	-

Intersection	
Int Delay, s/veh	2.9

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	53	75	356	83	64	209
Future Vol, veh/h	53	75	356	83	64	209
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	56	79	375	87	67	220

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	793	439	0	0	472	0
Stage 1	429	-	-	-	-	-
Stage 2	364	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	356	616	-	-	1085	-
Stage 1	655	-	-	-	-	-
Stage 2	701	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	325	606	-	-	1076	-
Mov Cap-2 Maneuver	325	-	-	-	-	-
Stage 1	650	-	-	-	-	-
Stage 2	646	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	14.5	0	2
HCM LOS	B		

Minor Lane/Major Mvmt	NET	NER	NWLn1	NWLn2	SWL	SWT
Capacity (veh/h)	-	-	325	606	1076	-
HCM Lane V/C Ratio	-	-	0.172	0.13	0.063	-
HCM Control Delay (s)	-	-	18.4	11.8	8.6	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.4	0.2	-

Intersection	
Int Delay, s/veh	6.9

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	141	87	147	79	145	257
Future Vol, veh/h	141	87	147	79	145	257
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	147	91	153	82	151	268

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	784	214	0	0	245	0
Stage 1	204	-	-	-	-	-
Stage 2	580	-	-	-	-	-
Critical Hdwy	6.44	6.24	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	-	-	2.236	-
Pot Cap-1 Maneuver	359	821	-	-	1309	-
Stage 1	825	-	-	-	-	-
Stage 2	556	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	305	807	-	-	1298	-
Mov Cap-2 Maneuver	305	-	-	-	-	-
Stage 1	818	-	-	-	-	-
Stage 2	476	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	20.7	0	2.9
HCM LOS	C		

Minor Lane/Major Mvmt	NET	NER	NWLn1	NWLn2	SWL	SWT
Capacity (veh/h)	-	-	305	807	1298	-
HCM Lane V/C Ratio	-	-	0.482	0.112	0.116	-
HCM Control Delay (s)	-	-	27.3	10	8.1	0
HCM Lane LOS	-	-	D	B	A	A
HCM 95th %tile Q(veh)	-	-	2.5	0.4	0.4	-

Intersection	
Int Delay, s/veh	3.4

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	65	91	434	101	78	255
Future Vol, veh/h	65	91	434	101	78	255
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	68	96	457	106	82	268

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	962	530	0	0	573	0
Stage 1	520	-	-	-	-	-
Stage 2	442	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	283	547	-	-	995	-
Stage 1	595	-	-	-	-	-
Stage 2	646	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	251	538	-	-	987	-
Mov Cap-2 Maneuver	251	-	-	-	-	-
Stage 1	590	-	-	-	-	-
Stage 2	578	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	17.9	0	2.1
HCM LOS	C		

Minor Lane/Major Mvmt	NET	NER	NWLn1	NWLn2	SWL	SWT
Capacity (veh/h)	-	-	251	538	987	-
HCM Lane V/C Ratio	-	-	0.273	0.178	0.083	-
HCM Control Delay (s)	-	-	24.6	13.1	9	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	1.1	0.6	0.3	-

Intersection	
Int Delay, s/veh	9

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	161	95	164	88	165	292
Future Vol, veh/h	161	95	164	88	165	292
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	25	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	168	99	171	92	172	304

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	885	237	0	0	273	0
Stage 1	227	-	-	-	-	-
Stage 2	658	-	-	-	-	-
Critical Hdwy	6.44	6.24	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	-	-	2.236	-
Pot Cap-1 Maneuver	313	797	-	-	1279	-
Stage 1	806	-	-	-	-	-
Stage 2	511	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	266	784	-	-	1268	-
Mov Cap-2 Maneuver	266	-	-	-	-	-
Stage 1	800	-	-	-	-	-
Stage 2	438	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	28.4	0	3
HCM LOS	D		

Minor Lane/Major Mvmt	NET	NER	NWLn1	NWLn2	SWL	SWT
Capacity (veh/h)	-	-	266	784	1268	-
HCM Lane V/C Ratio	-	-	0.63	0.126	0.136	-
HCM Control Delay (s)	-	-	39.1	10.3	8.3	-
HCM Lane LOS	-	-	E	B	A	-
HCM 95th %tile Q(veh)	-	-	3.9	0.4	0.5	-

Intersection	
Int Delay, s/veh	4.1

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	75	107	500	116	89	290
Future Vol, veh/h	75	107	500	116	89	290
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	25	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	79	113	526	122	94	305

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1100	607	0	0	658	0
Stage 1	597	-	-	-	-	-
Stage 2	503	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	234	495	-	-	925	-
Stage 1	548	-	-	-	-	-
Stage 2	605	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	207	487	-	-	917	-
Mov Cap-2 Maneuver	207	-	-	-	-	-
Stage 1	544	-	-	-	-	-
Stage 2	538	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	22.1	0	2.2
HCM LOS	C		

Minor Lane/Major Mvmt	NET	NER	NWLn1	NWLn2	SWL	SWT
Capacity (veh/h)	-	-	207	487	917	-
HCM Lane V/C Ratio	-	-	0.381	0.231	0.102	-
HCM Control Delay (s)	-	-	32.7	14.6	9.4	-
HCM Lane LOS	-	-	D	B	A	-
HCM 95th %tile Q(veh)	-	-	1.7	0.9	0.3	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	205	368	4	2	2
Future Vol, veh/h	2	205	368	4	2	2
Conflicting Peds, #/hr	10	0	0	10	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	2	218	391	4	2	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	405	0	-	0	635	413
Stage 1	-	-	-	-	403	-
Stage 2	-	-	-	-	232	-
Critical Hdwy	4.14	-	-	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.236	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	1143	-	-	-	439	635
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	802	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1133	-	-	-	431	624
Mov Cap-2 Maneuver	-	-	-	-	431	-
Stage 1	-	-	-	-	664	-
Stage 2	-	-	-	-	796	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	12.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1133	-	-	-	510
HCM Lane V/C Ratio	0.002	-	-	-	0.008
HCM Control Delay (s)	8.2	0	-	-	12.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	466	287	8	5	0
Future Vol, veh/h	2	466	287	8	5	0
Conflicting Peds, #/hr	10	0	0	10	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	2	530	326	9	6	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	345	0	-	0	885	351
Stage 1	-	-	-	-	341	-
Stage 2	-	-	-	-	544	-
Critical Hdwy	4.14	-	-	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.236	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	1203	-	-	-	313	688
Stage 1	-	-	-	-	716	-
Stage 2	-	-	-	-	578	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1193	-	-	-	307	676
Mov Cap-2 Maneuver	-	-	-	-	307	-
Stage 1	-	-	-	-	709	-
Stage 2	-	-	-	-	573	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	16.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1193	-	-	-	307
HCM Lane V/C Ratio	0.002	-	-	-	0.019
HCM Control Delay (s)	8	0	-	-	16.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	250	449	5	2	2
Future Vol, veh/h	2	250	449	5	2	2
Conflicting Peds, #/hr	10	0	0	10	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	2	266	478	5	2	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	493	0	-	0	771	501
Stage 1	-	-	-	-	491	-
Stage 2	-	-	-	-	280	-
Critical Hdwy	4.14	-	-	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.236	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	1060	-	-	-	366	566
Stage 1	-	-	-	-	611	-
Stage 2	-	-	-	-	763	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1051	-	-	-	359	556
Mov Cap-2 Maneuver	-	-	-	-	359	-
Stage 1	-	-	-	-	605	-
Stage 2	-	-	-	-	757	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	13.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1051	-	-	-	436
HCM Lane V/C Ratio	0.002	-	-	-	0.01
HCM Control Delay (s)	8.4	0	-	-	13.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	568	350	10	6	0
Future Vol, veh/h	2	568	350	10	6	0
Conflicting Peds, #/hr	10	0	0	10	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	2	645	398	11	7	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	419	0	-	0	1073	424
Stage 1	-	-	-	-	414	-
Stage 2	-	-	-	-	659	-
Critical Hdwy	4.14	-	-	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.236	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	1129	-	-	-	242	626
Stage 1	-	-	-	-	663	-
Stage 2	-	-	-	-	511	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1119	-	-	-	237	615
Mov Cap-2 Maneuver	-	-	-	-	237	-
Stage 1	-	-	-	-	656	-
Stage 2	-	-	-	-	507	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	20.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1119	-	-	-	237
HCM Lane V/C Ratio	0.002	-	-	-	0.029
HCM Control Delay (s)	8.2	0	-	-	20.6
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	267	494	16	11	8
Future Vol, veh/h	8	267	494	16	11	8
Conflicting Peds, #/hr	10	0	0	10	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	9	284	526	17	12	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	553	0	-	0	857	555
Stage 1	-	-	-	-	545	-
Stage 2	-	-	-	-	312	-
Critical Hdwy	4.14	-	-	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.236	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	1007	-	-	-	325	527
Stage 1	-	-	-	-	577	-
Stage 2	-	-	-	-	738	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	998	-	-	-	316	518
Mov Cap-2 Maneuver	-	-	-	-	316	-
Stage 1	-	-	-	-	566	-
Stage 2	-	-	-	-	732	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	15.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	998	-	-	-	378
HCM Lane V/C Ratio	0.009	-	-	-	0.053
HCM Control Delay (s)	8.6	0	-	-	15.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	24	631	382	24	24	11
Future Vol, veh/h	24	631	382	24	24	11
Conflicting Peds, #/hr	10	0	0	10	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	27	717	434	27	27	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	471	0	-	0	1239	468
Stage 1	-	-	-	-	458	-
Stage 2	-	-	-	-	781	-
Critical Hdwy	4.14	-	-	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.236	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	1080	-	-	-	192	591
Stage 1	-	-	-	-	633	-
Stage 2	-	-	-	-	448	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1071	-	-	-	181	581
Mov Cap-2 Maneuver	-	-	-	-	181	-
Stage 1	-	-	-	-	601	-
Stage 2	-	-	-	-	444	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	23.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1071	-	-	-	231
HCM Lane V/C Ratio	0.025	-	-	-	0.172
HCM Control Delay (s)	8.4	0	-	-	23.8
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	94	13	333	89	1	6	1	81	1	1	0
Future Vol, veh/h	0	94	13	333	89	1	6	1	81	1	1	0
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	80	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	107	15	378	101	1	7	1	92	1	1	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	112	0	0	132	0	0	993	993	135	993	1000	122
Stage 1	-	-	-	-	-	-	125	125	-	868	868	-
Stage 2	-	-	-	-	-	-	868	868	-	125	132	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.15	6.55	6.25	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1459	-	-	1435	-	-	221	243	906	221	240	921
Stage 1	-	-	-	-	-	-	872	787	-	343	366	-
Stage 2	-	-	-	-	-	-	343	366	-	872	781	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1447	-	-	1423	-	-	172	175	891	154	173	905
Mov Cap-2 Maneuver	-	-	-	-	-	-	172	175	-	154	173	-
Stage 1	-	-	-	-	-	-	865	781	-	340	266	-
Stage 2	-	-	-	-	-	-	249	266	-	774	775	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	6.6	9.1	27.4
HCM LOS			A	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	968	1447	-	-	1423	-	-	163
HCM Lane V/C Ratio	0.103	-	-	-	0.266	-	-	0.014
HCM Control Delay (s)	9.1	0	-	-	8.4	-	-	27.4
HCM Lane LOS	A	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.3	0	-	-	1.1	-	-	0

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↑			↕			↕	
Traffic Vol, veh/h	0	186	5	152	113	1	8	4	321	0	0	0
Future Vol, veh/h	0	186	5	152	113	1	8	4	321	0	0	0
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	80	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	190	5	155	115	1	8	4	328	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	126	0	0	205	0	0	639	639	213	641	641	136
Stage 1	-	-	-	-	-	-	203	203	-	436	436	-
Stage 2	-	-	-	-	-	-	436	436	-	205	205	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1454	-	-	1360	-	-	387	393	825	386	392	910
Stage 1	-	-	-	-	-	-	797	732	-	597	578	-
Stage 2	-	-	-	-	-	-	597	578	-	795	730	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1442	-	-	1348	-	-	347	342	811	205	341	895
Mov Cap-2 Maneuver	-	-	-	-	-	-	347	342	-	205	341	-
Stage 1	-	-	-	-	-	-	791	726	-	592	507	-
Stage 2	-	-	-	-	-	-	524	507	-	467	724	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	4.6	12.2	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	841	1442	-	-	1348	-	-	-
HCM Lane V/C Ratio	0.404	-	-	-	0.115	-	-	-
HCM Control Delay (s)	12.2	0	-	-	8	-	-	0
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	2	0	-	-	0.4	-	-	-

Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↑			↕			↕	
Traffic Vol, veh/h	0	115	16	406	108	1	7	1	99	1	1	0
Future Vol, veh/h	0	115	16	406	108	1	7	1	99	1	1	0
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	80	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	131	18	461	123	1	8	1	113	1	1	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	134	0	0	159	0	0	1206	1206	160	1207	1215	144
Stage 1	-	-	-	-	-	-	150	150	-	1056	1056	-
Stage 2	-	-	-	-	-	-	1056	1056	-	151	159	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.15	6.55	6.25	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1432	-	-	1402	-	-	158	181	877	158	179	895
Stage 1	-	-	-	-	-	-	845	767	-	269	298	-
Stage 2	-	-	-	-	-	-	269	298	-	844	761	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1420	-	-	1390	-	-	115	119	862	100	118	880
Mov Cap-2 Maneuver	-	-	-	-	-	-	115	119	-	100	118	-
Stage 1	-	-	-	-	-	-	838	761	-	267	198	-
Stage 2	-	-	-	-	-	-	177	198	-	727	755	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	7	9.4	39
HCM LOS			A	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	932	1420	-	-	1390	-	-	108
HCM Lane V/C Ratio	0.13	-	-	-	0.332	-	-	0.021
HCM Control Delay (s)	9.4	0	-	-	8.9	-	-	39
HCM Lane LOS	A	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0.4	0	-	-	1.5	-	-	0.1

Intersection	
Int Delay, s/veh	7.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↑			↕			↕	
Traffic Vol, veh/h	0	227	6	185	138	1	10	5	391	0	0	0
Future Vol, veh/h	0	227	6	185	138	1	10	5	391	0	0	0
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	80	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	232	6	189	141	1	10	5	399	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	152	0	0	248	0	0	775	775	255	778	778	162
Stage 1	-	-	-	-	-	-	245	245	-	530	530	-
Stage 2	-	-	-	-	-	-	530	530	-	248	248	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1423	-	-	1312	-	-	314	328	781	312	326	880
Stage 1	-	-	-	-	-	-	756	702	-	531	525	-
Stage 2	-	-	-	-	-	-	531	525	-	754	699	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1411	-	-	1301	-	-	274	276	768	129	274	865
Mov Cap-2 Maneuver	-	-	-	-	-	-	274	276	-	129	274	-
Stage 1	-	-	-	-	-	-	750	696	-	527	445	-
Stage 2	-	-	-	-	-	-	450	445	-	357	693	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	4.7	14.3	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	797	1411	-	-	1301	-	-	-
HCM Lane V/C Ratio	0.52	-	-	-	0.145	-	-	-
HCM Control Delay (s)	14.3	0	-	-	8.2	-	-	0
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	3.1	0	-	-	0.5	-	-	-

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↱			↕			↕	
Traffic Vol, veh/h	0	126	16	454	121	1	7	1	109	1	1	0
Future Vol, veh/h	0	126	16	454	121	1	7	1	109	1	1	0
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	80	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	143	18	516	138	1	8	1	124	1	1	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	149	0	0	171	0	0	1343	1343	172	1344	1352	159
Stage 1	-	-	-	-	-	-	162	162	-	1181	1181	-
Stage 2	-	-	-	-	-	-	1181	1181	-	163	171	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.15	6.55	6.25	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1414	-	-	1388	-	-	127	150	864	127	148	878
Stage 1	-	-	-	-	-	-	833	758	-	228	260	-
Stage 2	-	-	-	-	-	-	228	260	-	832	752	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1402	-	-	1376	-	-	88	92	849	75	91	863
Mov Cap-2 Maneuver	-	-	-	-	-	-	88	92	-	75	91	-
Stage 1	-	-	-	-	-	-	826	752	-	226	161	-
Stage 2	-	-	-	-	-	-	140	161	-	704	746	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	7.2	9.6	50.2
HCM LOS			A	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	911	1402	-	-	1376	-	-	82
HCM Lane V/C Ratio	0.146	-	-	-	0.375	-	-	0.028
HCM Control Delay (s)	9.6	0	-	-	9.2	-	-	50.2
HCM Lane LOS	A	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0.5	0	-	-	1.8	-	-	0.1

Intersection	
Int Delay, s/veh	8.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↑			↕			↕	
Traffic Vol, veh/h	0	258	6	210	156	1	10	5	445	0	0	0
Future Vol, veh/h	0	258	6	210	156	1	10	5	445	0	0	0
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	80	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	263	6	214	159	1	10	5	454	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	170	0	0	279	0	0	874	874	286	877	877	180
Stage 1	-	-	-	-	-	-	276	276	-	598	598	-
Stage 2	-	-	-	-	-	-	598	598	-	279	279	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1401	-	-	1278	-	-	269	287	751	268	286	860
Stage 1	-	-	-	-	-	-	728	680	-	487	489	-
Stage 2	-	-	-	-	-	-	487	489	-	725	678	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1389	-	-	1267	-	-	230	235	738	87	234	845
Mov Cap-2 Maneuver	-	-	-	-	-	-	230	235	-	87	234	-
Stage 1	-	-	-	-	-	-	722	675	-	483	403	-
Stage 2	-	-	-	-	-	-	401	403	-	274	673	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	4.8	17	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	763	1389	-	-	1267	-	-	-
HCM Lane V/C Ratio	0.615	-	-	-	0.169	-	-	-
HCM Control Delay (s)	17	0	-	-	8.4	-	-	0
HCM Lane LOS	C	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	4.3	0	-	-	0.6	-	-	-