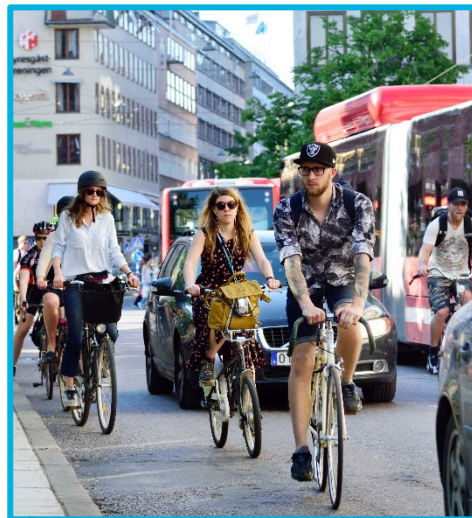




Towne Place Suite Traffic Impact Study

2180 Hotels Inc.

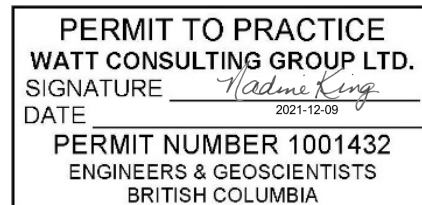


WATT CONSULTING GROUP
December 6, 2021

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TOWNE PLACE SUITES – VICTORIA AIRPORT

Traffic Impact Study



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Prepared For: 2180 Hotels Inc.
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APPENDICES

Appendix A: Synchro Background

1.0 INTRODUCTION

Watt Consulting Group was retained by 2180 Hotels Inc. to undertake a traffic study for the proposed Towne Place Suite within the Victoria Airport Authority in Sidney. The proposed development includes a hotel and restaurant.

This report examines the existing and long-term conditions within the study area, highlights any potential operational issues, and recommends mitigation measures to ensure accommodation of development traffic. The review will include a discussion of the longer-term plans for future improvements in the area. A review of the active transportation accommodations is provided.

1.1 Study Area

The proposed development site is on the south side of Beacon Avenue between Stirling Way and Highway 17. The site is located within the Victoria Airport Authority in Sidney. The study area includes the following key intersections:

- Highway 17 / Beacon Avenue.
- Beacon Avenue / Stirling Way.

See **Figure 1** for the study area and site location.



Figure 1: Study Area and Key Intersections

2.0 EXISTING CONDITIONS

2.1 Land Use

The site is currently undeveloped. The surrounding land use is comprised of the Victoria Airport, light industrial, and single family housing.

2.2 Road Network

There are three roadways within the study area as described below:

- **Patricia Bay Highway (Highway 17)** is a divided four lane highway with a posted speed limit of 80 km/h providing a connection between Swartz Bay Ferry Terminal, Victoria International Airport, and Greater Victoria.
- **Beacon Avenue** along the site is an undivided three lane collector road with a 50 km/h posted speed limit. The laning includes two eastbound through lanes, a westbound through lane, back-to-back left turn lanes, bike lanes and a sidewalk on the north side of the road. There is an existing transit stop on Beacon Avenue fronting the site serving Routes 71, 82, 83, 85, 87 and 88. Beacon Avenue provides connection to downtown Sidney and the Sidney Business Park / Industrial area.
- **Stirling Way** is an undivided two-lane collector road with a rural cross section and posted 40 km/h speed limit. Stirling Avenue does not have any sidewalks or cycling facilities, but the Airport Flight Path (a multiuse trail around the airport) is provided along the west side of Stirling Way between Beacon Avenue and Ocean Avenue West. Stirling Avenue provides connection between Sidney Business Park, the Victoria International Airport, and East Saanich Road.

Two key intersections were identified within the study area:

- **Highway 17 / Beacon Avenue** is a four-leg, signalized intersection with separate right and left turn lanes on each approach. The westbound left has a dual left turn lane. There are two through lanes for the eastbound, northbound, and southbound approaches. All left turns have protected phases except for the eastbound left which has permitted phasing.
- **Beacon Avenue / Stirling Way** is a T-intersection with stop control on the south leg (Stirling Way). There are separate northbound left / right turn lanes and a westbound left turn lane.

2.3 Traffic Modelling – Background Information

Analysis of the traffic conditions at the study intersections was undertaken using Synchro Studio (version 10/11). Synchro / SimTraffic is a two-part traffic modelling software that provides analysis of the traffic conditions based on the Highway Capacity Manual (2010) evaluation methodology. A detailed description is provided in **Appendix A**.

For unsignalized (stop-controlled) intersections, the level of service (LOS) is based on the computed delay on each of the critical movements. LOS A represents minimal delays for minor street traffic movements, and LOS F represents a scenario with an insufficient number of gaps on the major street for minor street motorists to complete their movements without significant delays.

2.4 Existing Traffic Conditions (2021)

Intersection movement counts were conducted during the PM peak hour between August 27th and September 2nd, 2020. It has been observed that traffic volumes during the Covid pandemic are lower than would typically be expected. In order to estimate typical 2020 traffic volumes, a Covid factor was applied to the observed volumes. This factor was determined by comparing the observed volumes on Highway 17 and Beacon Avenue to previous historical counts, including counts conducted in September 2019. It was determined that the volumes on Highway 17 were 15% lower than expected, while traffic volumes on Beacon Avenue were only 1.5% lower than expected. The volume reduction on Beacon Avenue was assumed to be representative of the reduction on the remaining roads in the study area. As a result, a Covid factor of 15% was applied to the observed volumes on Highway 17 and a Covid factor of 2% was applied to the remaining volumes within the study area.

The adjusted volumes were used to model the existing 2021 PM peak hour traffic conditions. See **Table 1** and **Figure 2** for the existing PM peak hour traffic volumes and conditions.

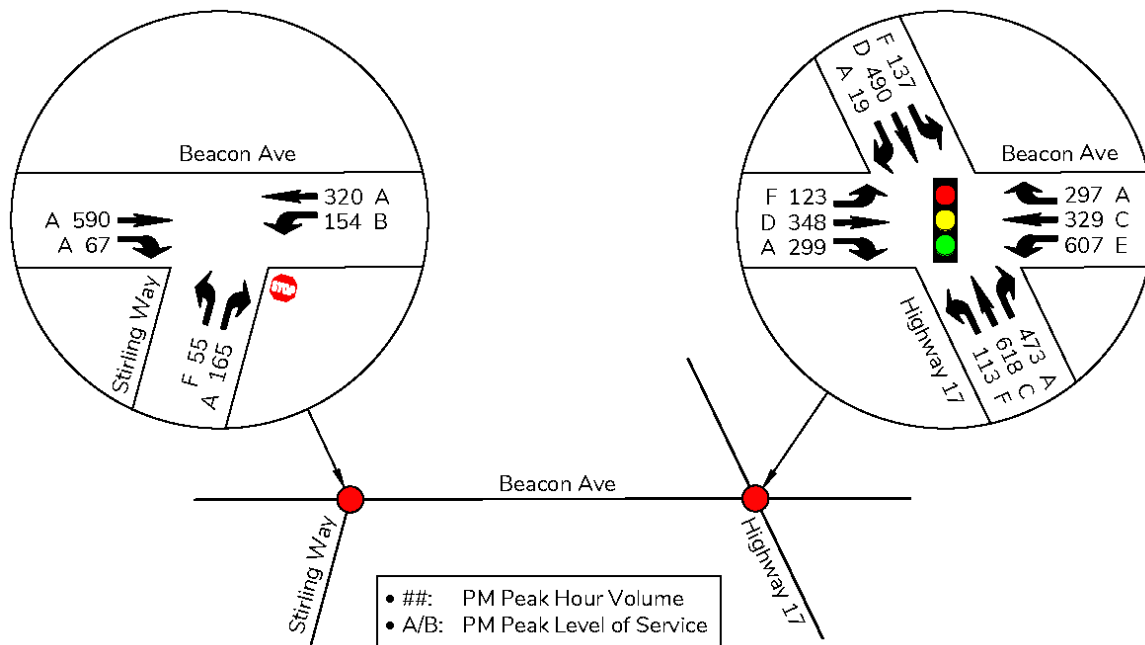


Figure 2: Existing 2021 PM Peak Hour Volume / LOS

Table 1: 2021 Existing Conditions – PM Peak Hour

Intersection	Movement	LOS	Delay (s)	95 th % Queue (m)
Highway 17 / Beacon Ave	EBL	F	110.7	55
	EBT	D	44.0	50
	EBR	A	0.3	0
	WBL	E	70.5	95
	WBT	C	21.8	70
	WBR	A	0.3	0
	NBL	F	101.4	55
	NBT	C	34.0	75
	NBR	A	0.5	0
	SBL	F	86.0	55
	SBT	D	47.5	55
	SBR	A	0.1	0
Beacon Ave / Stirling Way	EB	A	0.0	0
	WBL	B	10.6	10
	WBT	A	0.0	0
	NBL	F	106.4	30
	NBR	A	0.0	0

The Highway 17 / Beacon Avenue intersection has brief periods of high southbound traffic with the arrival of the larger BC Ferries at Swartz Bay Terminal. During these times the intersection has many movements at or approaching failing levels of service which may occur outside of the peak hour.

At Highway 17 / Beacon Avenue all the left turn movements are currently operating at LOS E / F in the PM peak hour. All through and right movements at this intersection are operating at LOS D or better. The Beacon Avenue / Stirling Way intersection operates at LOS B or better for all movements except for the northbound left which operates at LOS F.

3.0 POST DEVELOPMENT

3.1 Site Access

The proposed site is a 125-unit hotel with full movement access on Stirling Way approximately 110m south of Beacon Avenue as shown in **Figure 3**.

The corner clearance from the potential site access on Beacon Avenue is approximately 105m which exceeds the Transportation Association of Canada's (TAC) Geometric Design Guide for Canadian Roads recommended minimum corner clearance spacing of 35m. Though the exact location of the site access is not yet known, it should be located to provide acceptable corner clearances as per TAC.

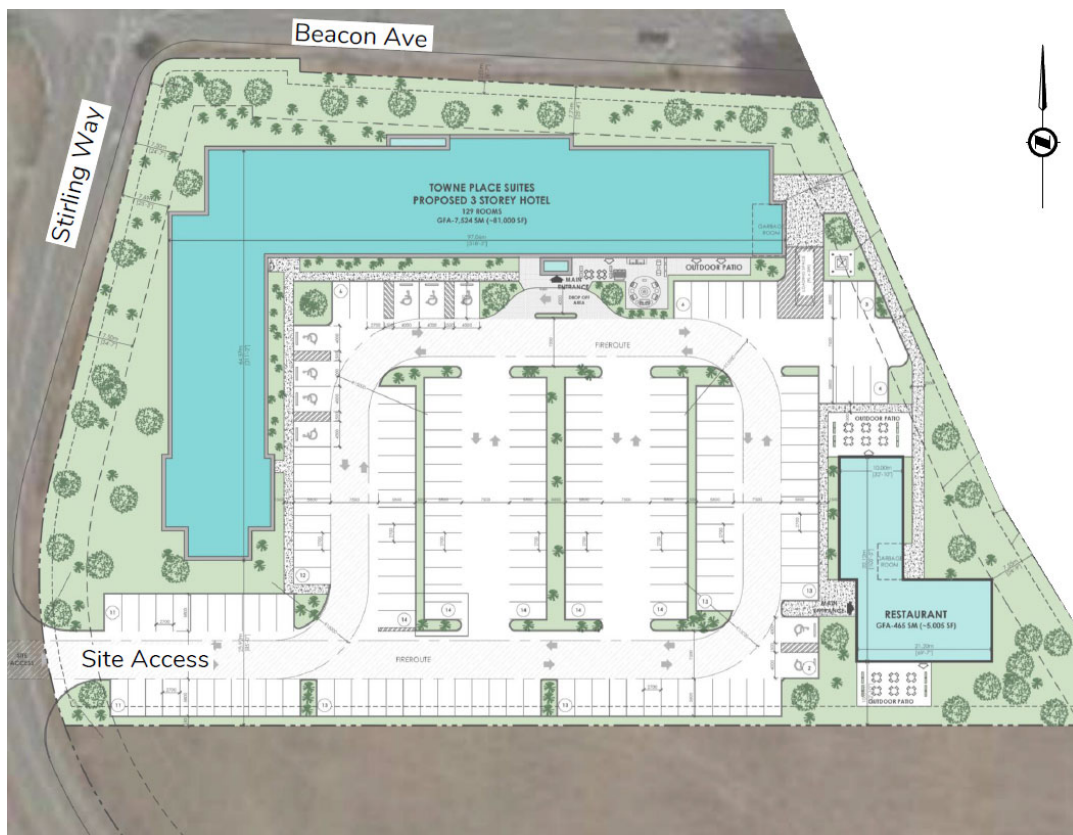


Figure 3: Proposed Site Plan

3.2 Site Distance

TAC provides criteria for minimum sight distances for a vehicle turning left and right onto a two-lane roadway from a stop. Drivers entering a road with a 40 km/h speed limit (Stirling Way) should be provided with 85m sight distance to make the turn without having a vehicle on Stirling Way reduce their speed to less than 70% of their initial speed. The potential site access will provide adequate sight distance to a driver's right. However, the sight distance to the left may be limited by the horizontal curve to the south. In order to provide sufficient sight distance

to a driver's left, the area shown in **Figure 4** is required to be kept clear of any fixed objects (fences, signs, trees, or other visual obstructions greater than 1.0m in height). During the design of the site the placement of the site access must ensure that 85m of clear sight distance to the left (south) can be provided.

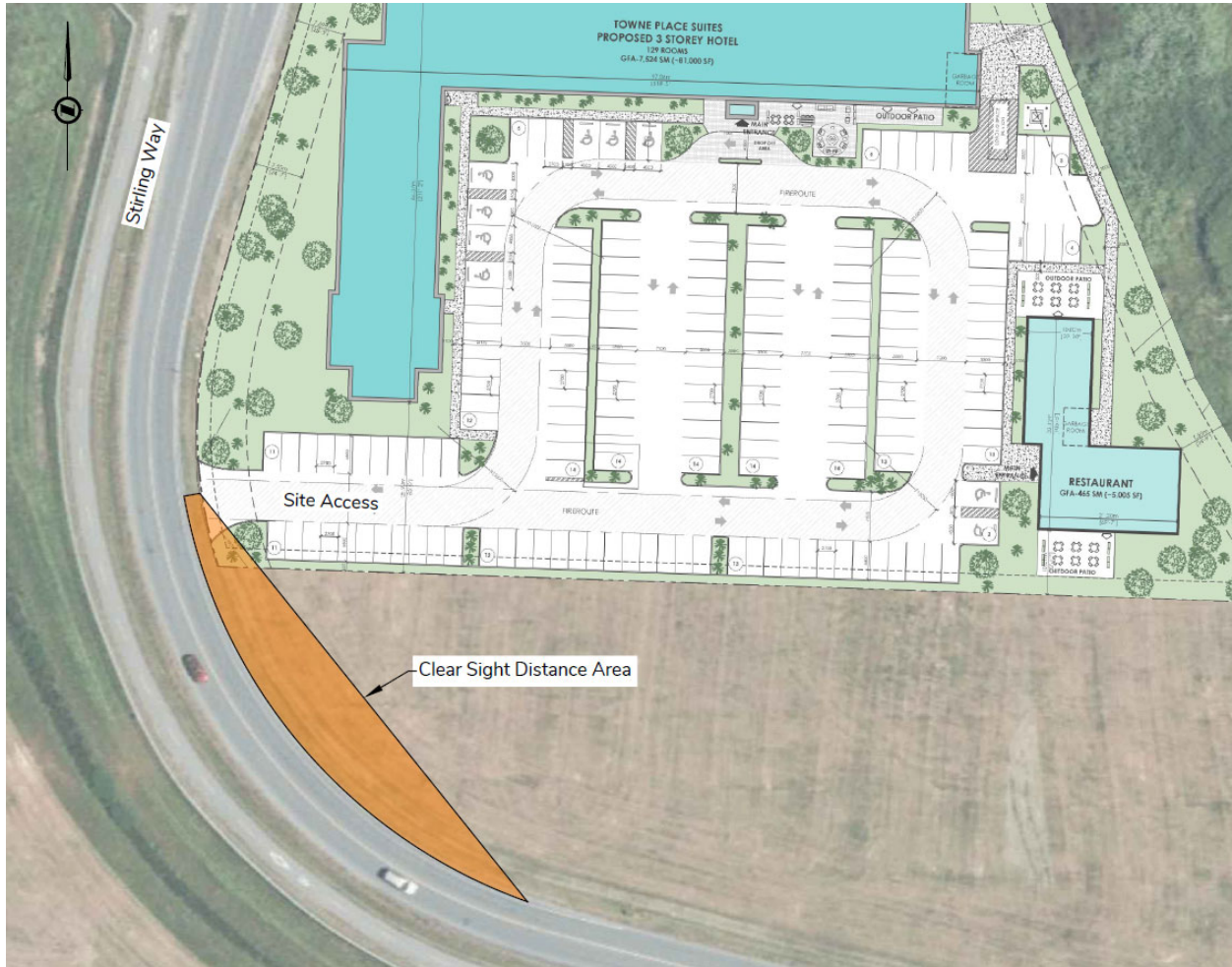


Figure 4: Clear Site Distance Area

When the exact site access location is known, sight distances should be confirmed in the field to ensure that no visual obstructions are installed or allowed to grow above 1.0m in height south of the access that could obscure and /or limit sight distance to an exiting driver's left.

3.3 Trip Generation

Site trips were estimated from the Institute of Transportation Engineers' (ITE) *Trip Generation Manual* (10th Edition). The *Trip Generation Manual* provides trip rates for a wide variety of land uses gathered from actual sites across North America over the past 40 years.

The proposed developments will generate 120 trips (66 inbound / 54 outbound) during the PM peak hour. The trip generation results for the proposed development are summarized in **Table 2**. This is a conservative estimate as a portion of the restaurant trips may be included in the hotel trip generation rate.

Table 2: Proposed Development Trip Generation – PM Peak Hours

ITE Code	Land Use	Units	Trip Rates	Trips In	Trips Out	Total Trips
310	Hotel	125	0.59	38	36	74
932	Restaurant	5,005 ft ²	9.05	28	18	46
Total				66	54	120

3.4 Trip Assignment

The development trips were assigned to the study area intersections based on existing traffic movements and expected hotel client origins and destinations. Hotels by nature are tourist and business travel oriented. As such, the site is expected to draw traffic predominantly to / from the airport, the Swartz Bay Ferry Terminal and to the south (Butchart Gardens, downtown Victoria, etc.). A small percentage of site trips are also expected to travel to/from destinations to the east and west including downtown Sidney and tourist attractions along West Saanich Road. The trips generated by the proposed development during the PM peak hour were assigned using the following distribution pattern:

- 50% to / from south using Highway 17.
- 25% to / from north (Swartz Bay) using Highway 17.
- 15% to / from east (downtown Sidney).
- 5% to / from south using Stirling Way.
- 5% to / from northwest using Beacon Avenue.

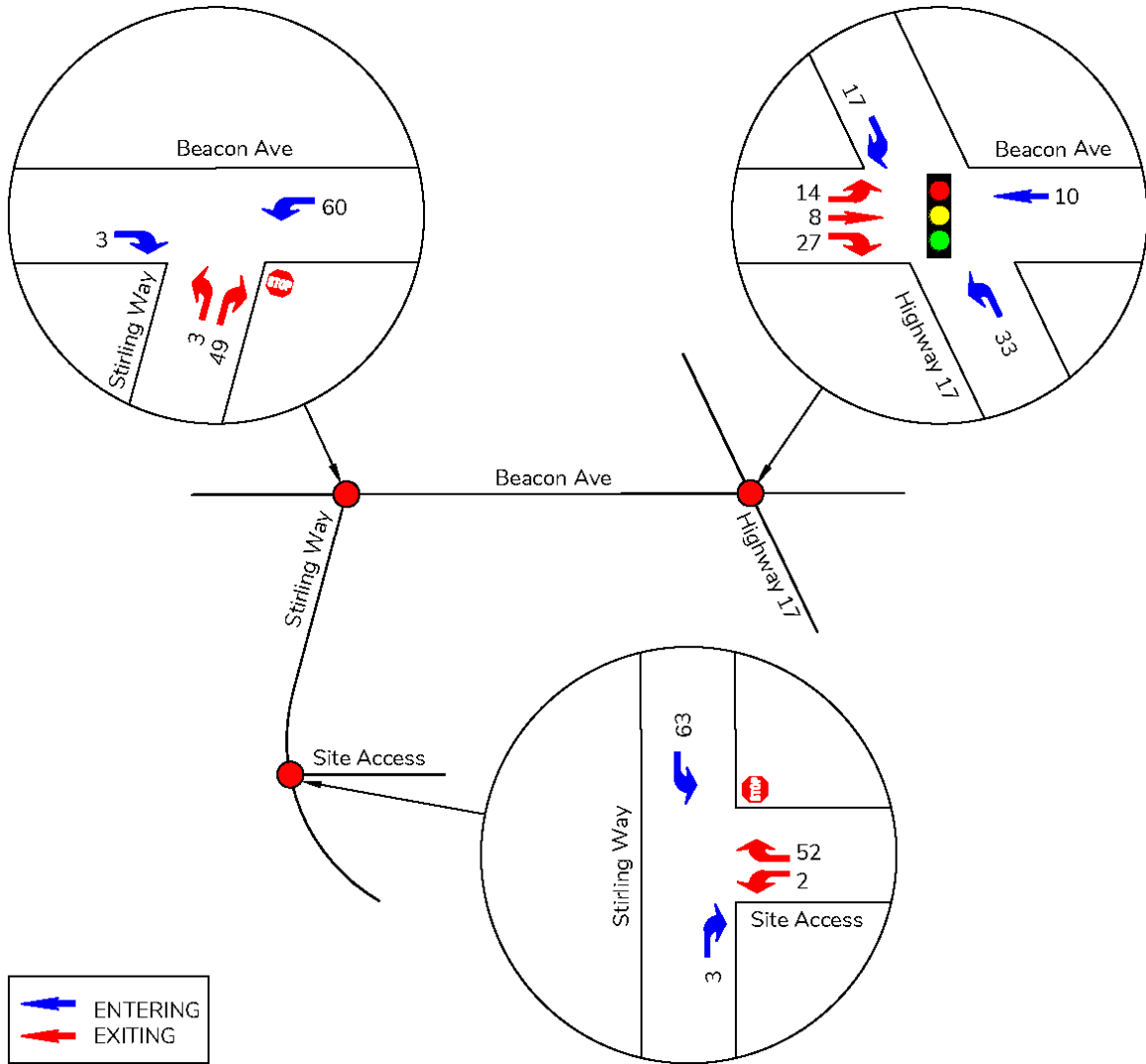


Figure 5: Trip Assignment – PM Peak Hour

3.5 Opening Day Conditions

3.5.1 2023 Background Conditions

A linear growth was applied to obtain the background volumes, as per **Section 2.4**. The background traffic also includes the traffic for the recently approved distribution centre located at Beacon Avenue / Galaran Road. The 2023 background conditions were analyzed during the PM peak hour within the study area. See **Figure 6** and **Table 3** for the 2023 background PM peak hour traffic conditions.

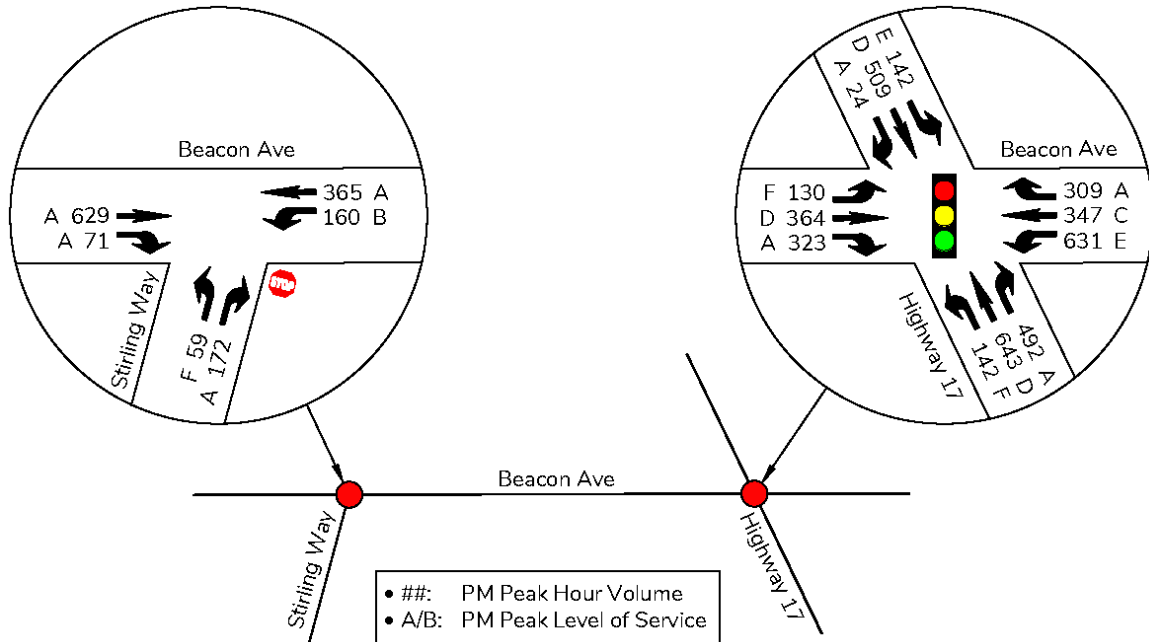


Figure 6: 2023 Background Conditions – PM Peak Hour

Table 3: 2023 Background Conditions – PM Peak Hour

Intersection	Movement	LOS	Delay (s)	95 th % Queue (m)
Highway 17 / Beacon Ave	EBL	F	118.8	65
	EBT	D	50.8	110
	EBR	A	0.4	30
	WBL	E	75.5	95
	WBT	C	26.0	160
	WBR	A	0.3	0
	NBL	F	111.1	65
	NBT	D	40.0	80
	NBR	A	0.6	40
	SBL	E	71.1	50
	SBT	D	52.1	60
	SBR	A	0.1	0
Beacon Ave / Stirling Way	EB	A	0.0	0
	WBL	B	11	10
	WBT	A	0.0	0
	NBL	F	178.9	45
	NBR	A	0.0	0

The left turns at Highway 17 / Beacon Avenue operate at LOS E / F and the southbound through is approaching the LOS D / E threshold during the PM peak hour. All other movements at this intersection operate at LOS D or better. The northbound left at Beacon Avenue / Stirling Way operates at LOS F and all other movements operate at LOS B or better during the PM peak hour.

3.5.2 2023 Post Development Conditions

The trips generated by the proposed development were added to the background volumes to determine the 2023 post development volumes. See **Figure 7** and **Table 4** for the 2023 post development PM peak hour traffic conditions.

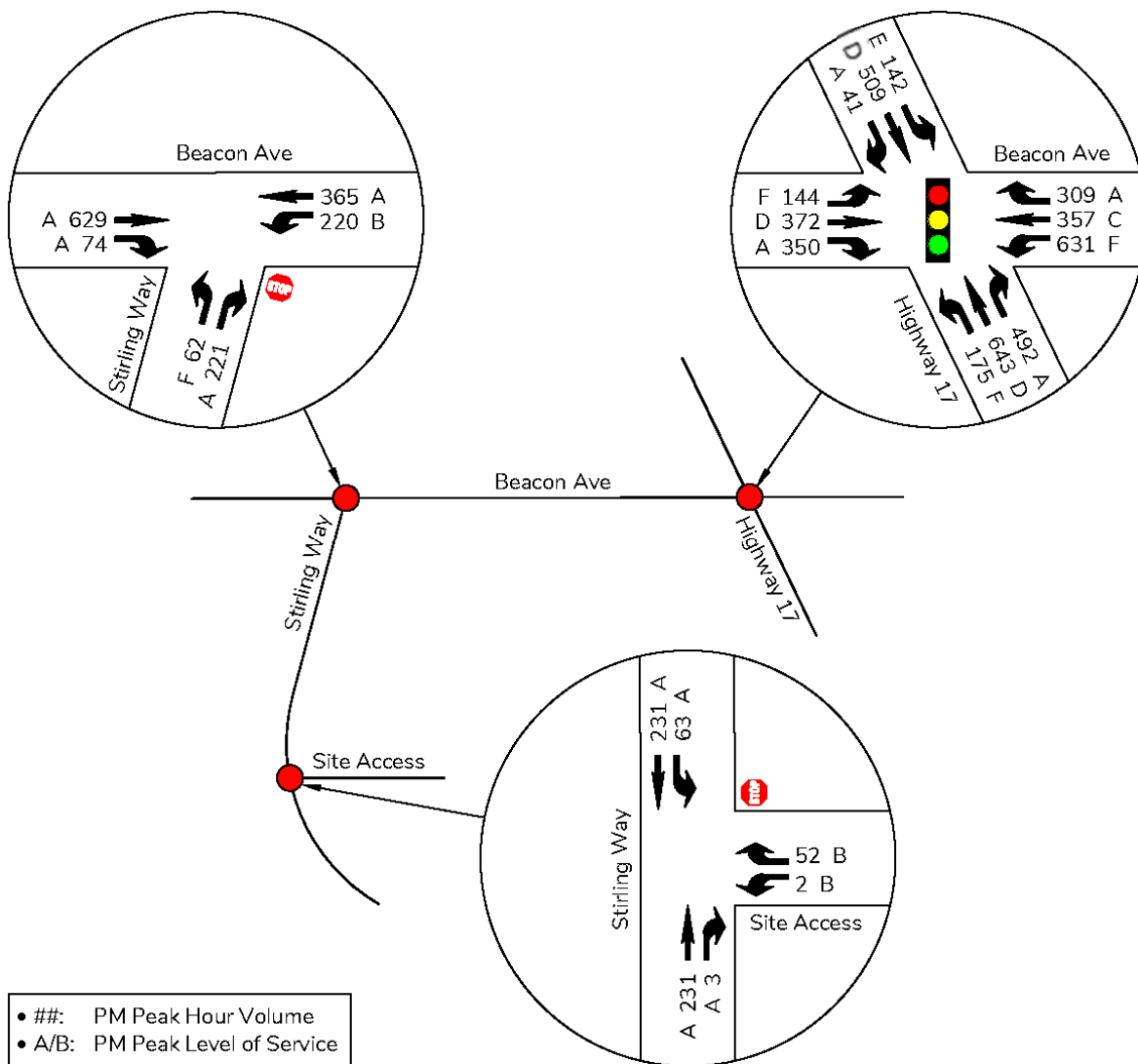


Figure 7: 2023 Post Development Conditions – PM Peak Hour

Table 4: 2023 Post Development Conditions – PM Peak Hour

Intersection	Movement	LOS	Delay (s)	95 th % Queue (m)
Highway 17 / Beacon Ave	EBL	F	117.8	65
	EBT	D	50.3	90
	EBR	A	0.4	30
	WBL	F	81.6	100
	WBT	C	27.0	200
	WBR	A	0.3	0
	NBL	F	212.8	85
	NBT	D	42.7	320
	NBR	A	0.6	0
	SBL	E	76.6	55
	SBT	D	52.1	65
	SBR	A	0.1	0
Beacon Ave / Stirling Way	EB	A	0.0	10
	WBL	B	11.8	30
	WBT	A	0.0	45
	NBL	F	378.9	30
	NBR	A	0.0	20
Stirling Way / Site Access	WB	B	10.6	65
	NB	A	0.0	90
	SB	A	8.0	30

The left turns at Highway 17 / Beacon Avenue continue to operate at LOS E / F during the PM peak hour. All other movements at this intersection operate at LOS D or better. Adjustments to the signal timing may improve queues and delays for some movements (eg. Northbound left and through) but would penalize other movements (eg. Southbound).

The northbound left at Beacon Avenue / Stirling Way operates at LOS F and all other movements operate at LOS B or better during the PM peak hour. The site access will operate at LOS B or better for all movements during the 2023 PM peak hour.

As the LOS deteriorates the relationship to increased traffic and delay time is not linear. A small amount of traffic will have minor or no effect when the LOS is good (LOS C or better); however, when the LOS is failing (LOS E / F) will be affected much more. There is very little development traffic added to the northbound left turn at Beacon Avenue / Stirling Way;

however, there is a significant increase in the delay time. This increase is not due to the proposed development but rather the existing LOS for this movement.

3.6 Long Term (2033) Conditions

3.6.1 2033 Background Conditions

A linear growth was applied to obtain the background volumes, as per **Section 2.4**. The background traffic also includes the traffic for the recently approved distribution centre located at Beacon Avenue / Galaran Road. The 2033 background conditions were analyzed during the PM peak hour within the study area. See **Figure 8** and **Table 5** for the 2033 background traffic conditions during the PM peak hour.

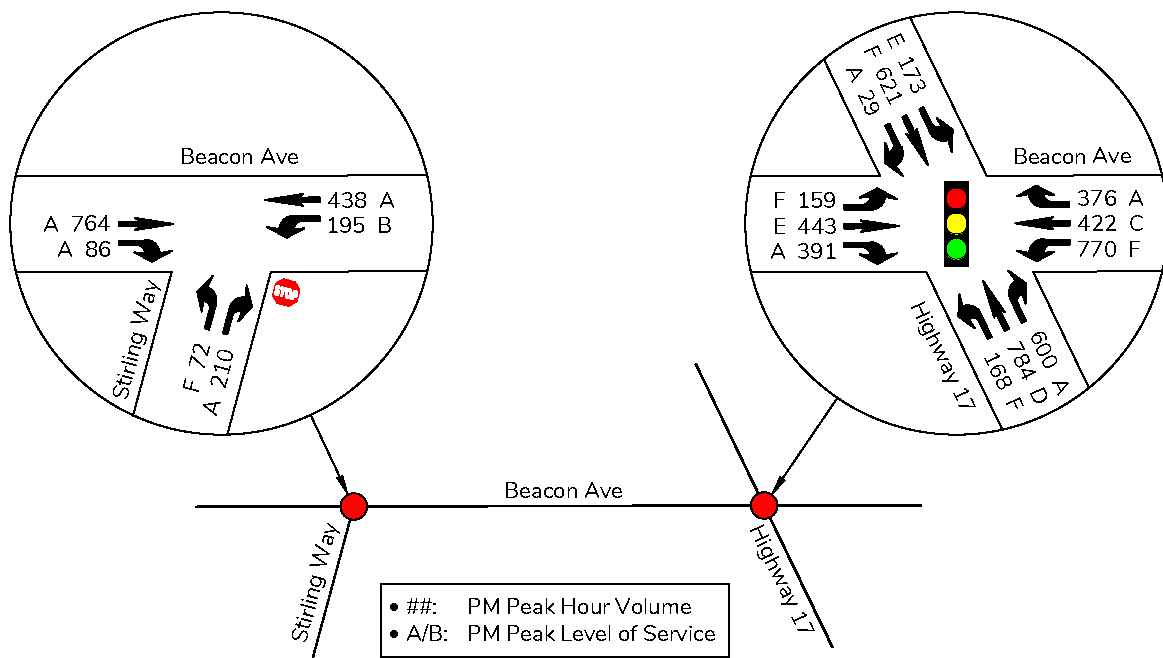


Figure 8: 2033 Background Conditions – PM Peak Hour

Table 5: 2033 Background Conditions – PM Peak Hours

Intersection	Movement	LOS	Delay (s)	95 th % Queue (m)
Highway 17 / Beacon Ave	EBL	F	162.6	90
	EBT	E	56.6	80
	EBR	A	0.4	0
	WBL	F	139.4	160
	WBT	C	30.5	115
	WBR	A	0.4	0
	NBL	F	162.1	100
	NBT	D	45.8	125
	NBR	A	0.7	0
	SBL	F	98.9	90
	SBT	F	92.2	85
	SBR	A	0.1	0
Beacon Ave / Stirling Way	EB T/R	A	0.0	0
	WBL	B	12.3	15
	WBT	A	0.0	0
	NBL	F	520.2	70
	NBR	A	0.0	0

The left turns at Highway 17 / Beacon Avenue continue to operate at LOS F during the PM peak hour. The eastbound through and the southbound through drop to LOS E / F during the 2033 PM peak background conditions. All other movements at this intersection operate at LOS D or better. The northbound left at Beacon Avenue / Stirling Way operates at LOS F and all other movements operate at LOS B or better during the PM peak hour with existing laning and traffic control.

The Beacon West Traffic Study outlines possible long term mitigation measure for the study area. See **Section 3.6.3** for improvement details.

3.6.2 2033 Post Development Conditions

The 2033 post development traffic conditions were analyzed during the PM peak hour within the study area. See **Figure 9** and **Table 6** for the 2033 post development PM peak hour traffic conditions. The signal timing at Beacon Avenue / Highway 17 was optimized as part of the post development analysis.

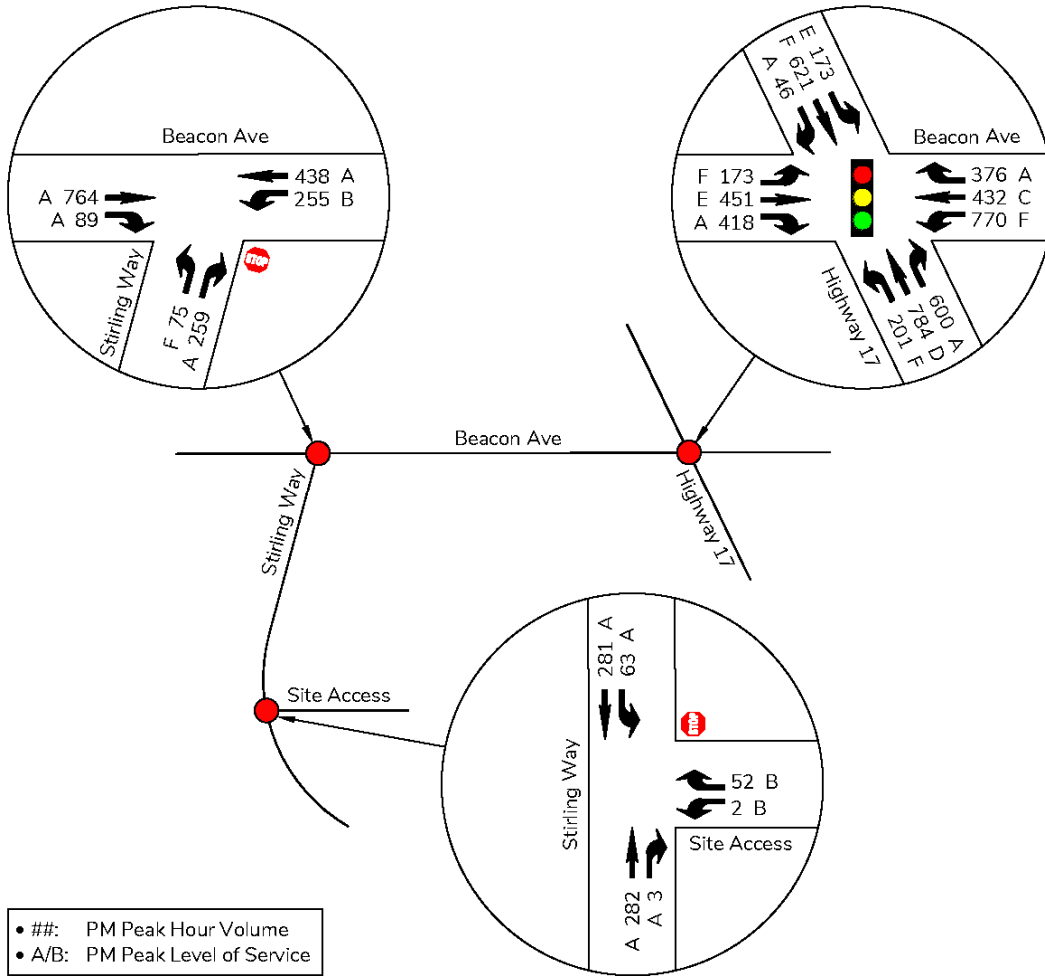


Figure 9: 2033 Post Development Conditions – PM Peak Hour

Table 6: 2033 Post Development Conditions – PM Peak Hours

Intersection	Movement	LOS	Delay (s)	95 th % Queue (m)
Highway 17 / Beacon Ave	EBL	F	201.0	100
	EBT	E	57.4	80
	EBR	A	0.5	0
	WBL	F	183.6	165
	WBT	C	33.0	125
	WBR	A	0.4	0
	NBL	F	196.6	115
	NBT	D	42.3	125
	NBR	A	0.7	0
	SBL	F	98.9	90
	SBT	F	82.8	85
	SBR	A	0.2	0
Beacon Ave / Stirling Way	EB T/R	A	0.0	0
	WBL	B	13.6	20
	WBT	A	0.0	0
	NBL	F	963.8	85
	NBR	A	0.0	0
Stirling Way / Site Access	WB L/R	B	11.1	5
	NB T/R	A	0.0	0
	SB L/T	A	8.2	5

The left turns and eastbound / southbound through movements at Highway 17 / Beacon Avenue continue to operate at LOS E / F during the PM peak hour. All other movements at this intersection operate at LOS D or better. The northbound left at Beacon Avenue / Stirling Way operates at LOS F and all other movements operate at LOS B or better during the PM peak hour. The site access will operate at LOS B or better for all movements during the 2033 PM peak hour. See **Section 3.6.3** for long-term mitigation measure for the area.

3.6.3 Beacon West Catchment Area Improvements

The Beacon West Traffic Study (Apr 21, 2021) has identified road and intersection upgrades to mitigate short- and long-term operational issues in the area. This report incorporates input from the Town of Sidney, District of North Saanich, the Victoria Airport Authority, and the Ministry of Transportation and Infrastructure. There are two main improvements that could have an impact on this development: Highway 17 / Beacon Avenue upgrades and Stirling Way realignment. Highway 17 / Beacon Avenue identified that short term improvements (dual

northbound, southbound, and eastbound left turn lanes and a second westbound through lane) would maintain operations in the short term (less than 5 years). However, the longer term improvement for this intersection is an interchange. The timing of a future interchange is unknown.

The Beacon West report also identified Stirling Way be realigned to the west and lining up with Galaran Road at a new roundabout. This roundabout is planned to be implemented in the short term; however, the timing of the re-alignment of Stirling Way has not been identified. The re-alignment may occur separately from the roundabout.

3.6.4 Post Development after Beacon West Catchment Area Improvements

The 2033 post development traffic conditions were analyzed during the PM peak hour with the short / long-term mitigation measures discussed in **Section 3.6.3**. See **Figure 10** and **Table 7** for the 2033 post development PM peak hour traffic conditions with the short / long-term mitigation measures.

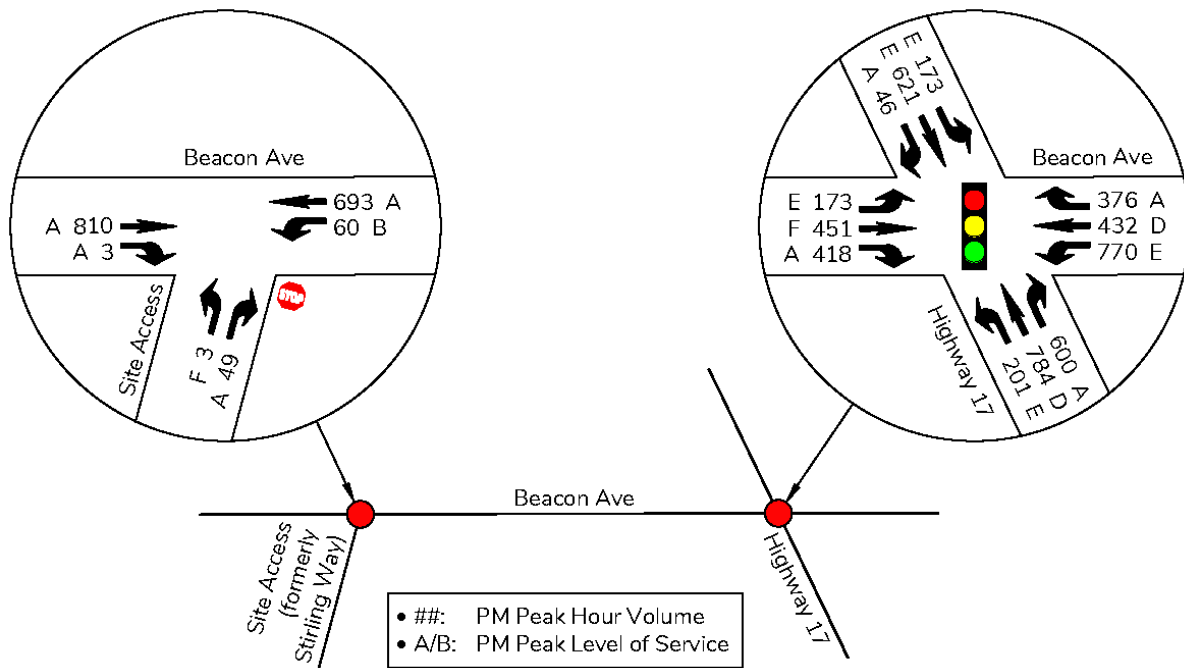


Figure 10: 2033 Post Development Conditions after Improvements – PM Peak Hour

Table 7: 2033 Post Development Conditions after Improvements – PM Peak Hours

Intersection	Movement	LOS	Delay (s)	95 th % Queue (m)
Highway 17 / Beacon Ave	EBL	E	60.7	75
	EBT	F	105.6	100
	EBR	A	0.5	0
	WBL	E	71.5	140
	WBT	D	38.4	65
	WBR	A	0.4	0
	NBL	E	72.3	70
	NBT	D	37.5	120
	NBR	A	0.7	0
	SBL	E	70.2	40
	SBT	E	79.0	85
SBR	A	0.2	0	
Beacon Ave / Site Access (formerly Stirling Way)	EB T/R	A	0.0	0
	WBL	B	10.1	5
	WBT	A	0.0	0
	NBL	F	53.6	5
	NBR	A	0.0	0

The delay and queue lengths improve with the Highway 17 / Beacon Avenue improvements discussed in the *Beacon West Traffic Study*; however, even with the mitigation measures the intersection still has many movements at LOS E / F in the 2033 horizon during the PM peak hour with or without the proposed development. The improvements do help to provide storage for the expected queues.

The south leg of the former Stirling Way / Beacon Avenue intersection will have significantly reduced volumes after the realignment of Stirling Way. The northbound left at this intersection would still operate at LOS F if the existing Stirling Way remained along with the re-aligned section; however, all other movements operate at LOS A / B. Removing the northbound right turn from Beacon Avenue / Stirling Way would improve the operations at the intersection.

If the Highway 17 / Beacon Avenue intersection improvements go ahead additional storage space will be required for the eastbound left lanes. The eastbound left lanes require 75m of storage after the highway improvements. The westbound left on Beacon Avenue at the current Stirling Way intersection would require the minimum 15m of storage. TAC's *Geometry Design Guide for Canadian Roads (2017)* recommends a minimum approach taper of 26.4m for a left

turn lane with a 3.3m width. There is currently just over 130m between the eastbound left stop bar at Highway 17 / Beacon Avenue and the westbound left stop bar at Beacon Avenue / Stirling Way. Both required storage lengths and the approach taper total just under 120m. Therefore, the westbound left turn could remain on Beacon Avenue at the current Stirling Way. It is recommended that the section of Stirling Way south of the site access be disconnected once Stirling Way is re-aligned and connected to the Galaran Road roundabout. See **Figure 11** for a conceptual representation.

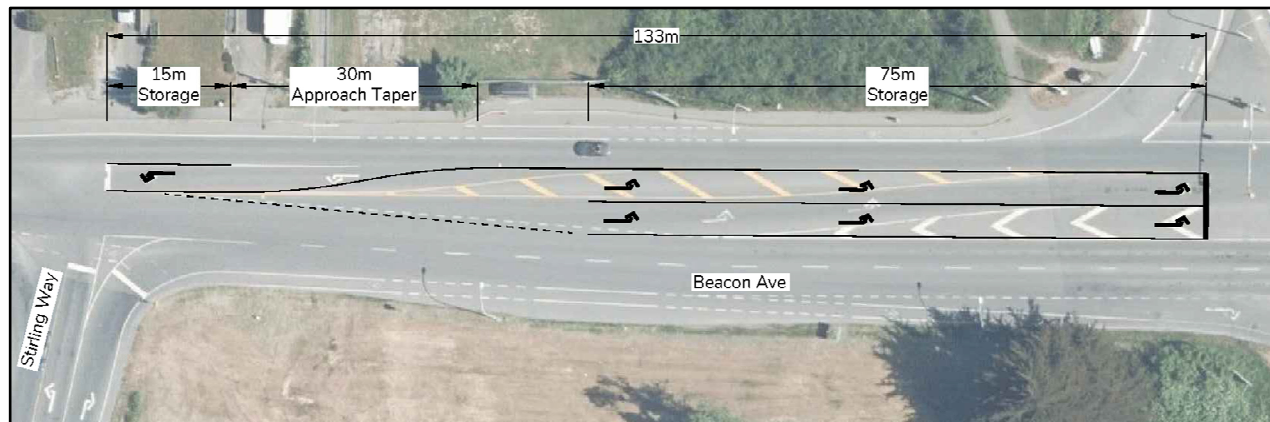


Figure 11: Conceptual Left Turn Storage

4.0 ACTIVE TRANSPORTATION

4.1 Pedestrians and Cyclists

To improve pedestrian connectivity near the site, a new sidewalk on Beacon Avenue along the site frontage is recommended for installation. This sidewalk will provide an improved pedestrian connection to the existing bus stop on the Beacon Avenue frontage.

Currently, there are bike lanes on Beacon Avenue fronting the site as well as the Airport Flight Pathway on the west side of Stirling Way opposite the site. No other cycling facilities are recommended.

4.2 Pedestrians and Cyclists

The existing transit stop on the site frontage is a sign in the grass. It is recommended that the developer work with BC Transit to identify an upgrade to this bus stop. This stop may become a key future transfer point to north-south buses on Highway 17.

5.0 CONCLUSIONS

There are multiple existing movements at the Highway 17 / Beacon Avenue intersection that operate at LOS E / F in the PM peak hour. Without significant upgrades this intersection will continue to have multiple failing movements without this development. The Beacon Avenue / Stirling Way intersection operates at LOS A / B except for the northbound left which operates at LOS F into the 2033 horizon.

The proposed development does not contribute a significant amount of traffic to the area; however, due to the existing failing levels of service there are increases in the delay and queue lengths at Highway 17 / Beacon Avenue. The development does not change any of the LOS at the two intersections in the short term. Delay is exponential and therefore, as a movement has additional traffic added even a small change in traffic can have a larger impact on the delay.

Under 2033 PM post development conditions, all movements operate at the same LOS as PM background conditions. However, the 2033 PM post development conditions indicate substantial increases in delay for the northbound left turn movement at the Beacon Ave / Stirling Way intersection due to planned development in the Beacon West area (as per the Beacon West Local Area Plan). The increased northbound left turn delay is primarily the result of background traffic volume increases, not site generated trips. No changes to traffic control or laning are required to accommodate the site.

The recently completed *Beacon West Traffic Study* identifies short to long term transportation improvements in the area. The Highway 17 / Beacon Avenue intersection is recommended to include dual left turn lanes for all approaches and a second westbound through lane in the short to medium term. While these improvements helped provide space for the queued traffic there were still many movements operating at LOS E / F with or without the proposed development. The report also outlined Stirling Way to be realigned to meet Galaran Road with that intersection being upgraded to a roundabout. This realignment changes the use of the former Stirling Way into an access to the lands south of Beacon Avenue. This re-alignment would allow for the existing section of Stirling Way to become an extension of the site access. In the long term the intersection of Beacon Avenue / Stirling Avenue will need to remove the northbound left; however, there is sufficient space to provide a westbound left turn lane at the former Stirling Way intersection.

6.0 RECOMMENDATIONS

- The site access should be located on Stirling Way and designed to ensure that 85m to an existing driver's left is provided. The site access should be at least 35m from Beacon Avenue W.
- The Developer to install sidewalk Beacon Avenue frontage.
- The Developer to upgrade the transit stop on their Beacon Avenue frontage.

APPENDIX A: SYNCHRO BACKGROUND

SYNCHRO MODELLING SOFTWARE DESCRIPTION

The traffic analysis was completed using Synchro and SimTraffic traffic modelling software. Results were measured in delay, level of service (LOS), 95th percentile queue length and volume to capacity ratio. Synchro is based on the Highway Capacity Manual (HCM) methodology. SimTraffic integrates established driver behaviours and characteristics to simulate actual conditions by randomly “seeding” or positioning vehicles travelling throughout the network. The simulation is run ten times (ten different random seedings of vehicle types, behaviours and arrivals) to obtain statistical significance of the results.

Levels of Service

Traffic operations are typically described in terms of levels of service, which rates the amount of delay per vehicle for each movement and the entire intersection. Levels of service range from LOS A (representing best operations) to LOS E/F (LOS E being poor operations and LOS F being unpredictable/disruptive operations). LOS E/F are generally unacceptable levels of service under normal everyday conditions. A LOS C or better is considered acceptable operations, while D is considered to be on the threshold between acceptable and unacceptable operations. Highway operations will typically need to operate at LOS C or better for through movements and LOS E or better for other traffic movements with lower order roads.

The hierarchy of criteria for grading an intersection or movement not only includes delay times, but also takes into account traffic control type (stop signs or traffic signal). For example, if a vehicle is delayed for 19 seconds at an unsignalized intersection, it is considered to have an average operation, and would therefore be graded as an LOS C. However, at a signalized intersection, a 19 second delay would be considered a good operation and therefore it would be given an LOS B. The table below indicates the range of delay for LOS for signalized and unsignalized intersections.

Table A1: LOS Criteria, by Intersection Traffic Control

Level of Service (LOS)	Unsignalized Intersection Average Vehicle Delay (sec/veh)	Signalized Intersection Average Vehicle Delay (sec/veh)
A	0 – 10	0 – 10
B	> 10 – 15	> 10 – 15
C	> 15 – 25	> 15 – 25
D	> 25 – 35	> 25 – 35
E	> 35 – 50	> 35 – 50
F	> 50	> 50