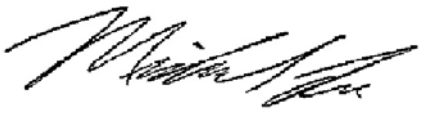
9899 BEACON AVENUE

Access Review



Author: Michael Lee, AScT

2021-02-18

Reviewer: Nathan Carswell, P.Eng.

#501-740 Hillside Avenue
Victoria, BC V8T 1Z4
T 250.388.9877

February 18, 2021
File No. 2991.B01

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

Watt Consulting Group was retained by Eagle Builders to conduct an access review for a proposed development within the Town of Sidney / Victoria Airport Authority area. The proposed development is to be an industrial warehouse / distribution facility.

This report examines the safety and operations at the proposed access locations as well as a review of the transit, pedestrian, and cycling accommodations. A summary of a concurrent study for the surrounding road network is also provided.

1.1 Study Area

The site for the proposed development is bounded by Beacon Avenue, McDonald Park Road, and Galaran Road. See **Figure 1** for the site location.

Figure 1: Site Location

2.0 SUMMARY OF BEACON WEST TRAFFIC STUDY

Watt Consulting Group is currently working on the Beacon Avenue West Traffic Study for traffic operations on the surrounding road network. This section summarizes relevant information in proximity to the proposed development site. See Appendix A for background information on level of service (LOS) and the traffic operation analysis software.

The traffic operations at the Galaran Road / Beacon Avenue intersection are the most relevant to the development site. During the existing AM peak hour of travel the left turns from Galaran Road onto Beacon Avenue are at LOS C while the right turns onto Beacon Avenue are at LOS B. All other operations during the AM peak hour operate at LOS A. During the existing PM peak hour the left turns drop to LOS D while all other movements operate at LOS A/B. As the traffic volumes on Beacon Avenue continue to increase it is not long before the southbound left at Galaran Road / Beacon Avenue drop to failing levels of service (LOS E/F).

The northbound left at the adjacent Stirling Way / Beacon Avenue intersection is already at LOS F. Due to the proximity of the Stirling Way intersection to Highway 17 along Beacon Avenue signalizing the intersection is not recommended. Therefore, the Beacon West Traffic Study is recommending that Stirling Way be realigned to Galaran Road and the intersection be upgraded to a roundabout.

A roundabout at Galaran Road / Beacon Avenue is beneficial to the proposed development site as southbound lefts onto Beacon Avenue during peak travel times will soon be at LOS E/F and the roundabout will significantly improve this operation. The roundabout will allow the development traffic to access Beacon Avenue at a controlled intersection through the lower volume Galaran Road. A dual lane roundabout at Galaran Road / Stirling Way / Beacon Avenue will operate at LOS C/D at the 2040 horizon. It is recommended that the developer work with the Town of Sidney to help realize the roundabout at Galaran Road / Beacon Avenue.

3.0 PROPOSED SITE ACCESSES

The proposed development will be a multi storey distribution centre. There are four accesses proposed for the site. **Figure 2** shows the site layout and accesses.

Figure 2: Site Plan

Larger commercial vehicles / trucks will be using Access 1 on McDonald Park Road for nighttime deliveries. Larger commercial vehicles are not anticipated to access the site during the day. Smaller commercial / company vehicles and employee vehicles will use Access 2 on Beacon Avenue and the two accesses on Galaran Road (Access 3 and 4).

The two site accesses on Galaran Road are slightly offset from the existing roadways. Offset intersections are often avoided due to the increase in conflict points, increase in conflict area, and more difficult maneuvering. The offset intersection nature of these accesses / roads may create a conflict if vehicles were wanting to turn left off Galaran at the same time. The left turns are put into direct cross conflict with each other. However, the volume at the proposed accesses along Galaran is expected to be relatively low as is the volume of left turners into the existing side roads. If possible reducing or eliminating the offset is desirable.

All four accesses are proposed to be stop controlled on the access and free flow on the road. The sight distance for each access was measured to ensure vehicles can safely access / egress from the site. **Figures 3 to 6** show the available site distances for each access.

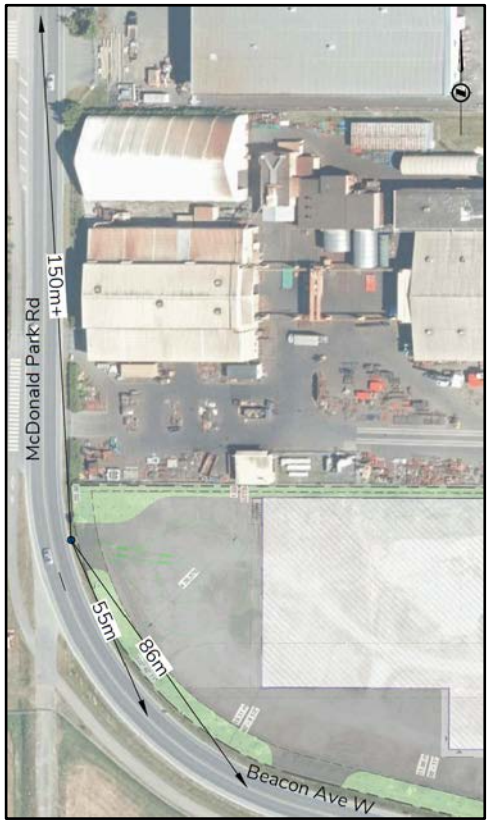


Figure 3: Access 1 Sight Distance

Figure 4: Access 2 Sight Distance

Figure 5: Access 3 Sight Distance

Figure 6: Access 4 Sight Distance

The posted speed limit on all roads in the study area is 50km/h except on the curve where Beacon Avenue transitions into McDonald Park Road. This curve has warning signage posted advising vehicles to travel at 30km/h. The Transportation Association of Canada (TAC) requires a minimum stopping sight distance of 65m for a 50km/h roadway and 35m for a 30km/h roadway. The minimum stopping sight distance is achieve on all approaches to the proposed accesses. TAC also requires an unobstructed sight distance of 105m for a 50km/h road and 65m for a 30km/h road when turning from an access onto a roadway. **Table 1** summarizes the sight distances requirements and the actual sight distances for the stop-controlled accesses.

Table 1: Sight Distances at the Proposed Accesses

Access	Direction	Posted Speed	Required Turning Sight Distance (m)	Actual Sight Distance (m)	Achieved
Access 1 (McDonald Park Rd)	NB	50km/h	105m	Over 150m	Yes
	SB	30km/h	65m	86m	Yes*
Access 2 (Beacon Ave)	WB	30km/h	65m	92m	Yes*
	EB	50km/h	105m	Over 150m	Yes
Access 3 (Galaran Rd)	NB	50km/h	105m	Over 150m	Yes
	SB		105m	65m	No**
Access 4 (Galaran Rd)	NB	50km/h	105m	Over 150m	Yes
	SB		105m	106	Yes

**Sight distance achieved if the site frontage is kept clear of obstructions (See Figure 7).*

***Sightline limited in proximity to Galaran Road / Beacon Avenue intersection.*

Figure 7: Sightline Obstruction Zone

The sight distance (looking south at Access 1 and looking north at Access 2) is achieved if the zone identified in red in **Figure 7** is kept clear of obstructions. If this zone is not kept clear of obstructions, then Access 1 will have a sight distance of 55m and not meet the TAC minimum stopping sight distance requirement of 65m. Access 2 will just reach the TAC requirement of 65m even if the zone is obstructed; however, this access would benefit from the area indicated in red to be kept clear.

The sightline from Access 3 looking south does not meet the TAC sight distance requirement for a 50km/h road; however, vehicles travelling northbound on Galaran Road towards Access 3 will be travelling slower than the posted 50km/h due to the proximity of the Beacon Avenue intersection. Travelling from Beacon Avenue to Galaran Road the right turn has a radius of 30m and the left turn has a radius under 20m. A 30m radius corresponds to a design speed of approximately 30km/h according to TAC's *Geometric Design Guide for Canadian Roads Figure 3.2.4*. Access 3 meets the sight distance requirement for a 30km/h design speed when looking south.

4.0 SITE ACCESS TRAFFIC OPERATIONS

4.1 Trip Generation

Site trips were estimated from three different sources: Institute of Transportation Engineers' (ITE) *Trip Generation Manual (10th Edition)*, projected site-specific data, and an average value for similar delivery stations locations. The ITE *Trip Generation Manual* provides trip rates for a wide variety of land uses gathered from actual sites across North America over the past 35 years. The site-specific volumes are based current delivery rates in the region. The average value is based on a study of eleven similar delivery station locations across North America. The data for the average trip generation value was collected during the COVID-19 pandemic and may provide a conservative or higher than typical value due to an increase in on-line shopping during this timeframe. **Table 2** summarizes the trip generation for the proposed development during the PM peak hour.

Table 2: Trip Generation during the PM Peak Hour

ITE Data		Area (ft^2)	Trip Rate	Total Trips	Trips In	Trips Out
Code	Land Use					
150	Warehousing	244,458	0.19 trips/1000 ft^2	47	13	34
710	Office	13,600	1.15 trips/1000 ft^2	16	3	13
			ITE Total	63	16	47
Site Specific Data				Total Trips	Trips In	Trips Out
Projected Site-Specific Data for Sidney Location				56	27	29
Average N. America Data		Area (ft^2)	Trip Rate	Total Trips	Trips In	Trips Out
Delivery Station*		258,058	0.53 trips/1000 ft^2	137	66	71

Average rate for delivery stations based on study from eleven similar locations across North America.

The estimated volumes from the ITE and site-specific data are similar in total trips; however, the average rate for delivery stations across North America was used as a worst-case result.

4.2 Beacon Avenue / McDonald Park Road Site Accesses

The site accesses were analyzed for traffic operations at the 2040 horizon year during the PM peak hour of travel. The left turns out of the site onto Beacon Avenue or McDonald Park Road during the PM peak will operate at LOS F while all other movements operate at LOS B or better. Left turns out of the site on Beacon Avenue will be possible outside of peak travel times; however, during peak travel times development traffic will need to make a right turn onto Beacon Avenue or use the Galaran Road accesses.

Larger commercial vehicles have been designated to travel in / out of the McDonald Park Road access. The traffic operations for the larger trucks will not have an issue with level of service as they will be operating at night or during off-peak hours.

4.3 Galaran Road Site Accesses

The traffic operations at the Galaran Road site accesses were also analyzed during the PM peak hour for the 2040 horizon year. It is likely that the development traffic will be spread out among the site accesses; however, all development traffic was assigned through one of the Galaran Road accesses to represent a worst-case result. The left turns out of the site onto Galaran Road will operate at LOS C during the PM peak hour and all other movements will operate at LOS A.

5.0 SUSTAINABLE TRANSPORTATION REVIEW

A sustainable transportation review was conducted to determine the pedestrian, cycling, and transit connections to the proposed development.

5.1 Pedestrian and Cycling Network

Galaran Road has an asphalt trail on the east side of the road between Beacon Avenue and Jahn Place but the rest of the road has no dedicated pedestrian facilities. Pedestrians must use the road or the gravel / vegetated shoulders on Galaran Road. The Beacon West Traffic Study, while still in draft form, identifies a need for 2m at-grade path on the west side of Galaran Road along this property. A sidewalk is recommended along the McDonald Park / Beacon frontage.

Beacon Avenue has bike lanes on both sides of the road within the study area but no pedestrian facilities; however, there is a multi-use path, the Flight Path Trail, on the west side of McDonald Park Road and south of Beacon Avenue. The closest crosswalks to access the Flight Path Trail are located at Stirling Way, approximately 270m west of the site, and at Henry Avenue, approximately 260m north of the site. The draft Beacon West Traffic Study recommends realigning Stirling Way be to be inline with Galaran Road. If Stirling Way is relocated, then a pedestrian / bicycle connection to the Flight Path Trail will be directly south of the site.

It is recommended that the developer work with the Town of Sidney to incorporate future pedestrian and bicycle facilities along the site frontages on Galaran Road and Beacon Avenue / McDonald Park Road.

5.2 Transit Network

There are two transit routes located in close proximity to the site: Route 83 (Sidney / Brentwood / Royal Oak) and Route 85 (North Saanich). Route 83 travels between the Royal Oak Exchange and downtown Sidney about seven times per direction a day during the week and about three to four times per direction a day on the weekend. Route 85 loops around the northern portion of North Saanich eight times a day during the week and three to four times a day on the weekend.

The closest bus stop on Galaran Road is located just north of the site. The closest bus stop on McDonald Park Road is located at Henry Road, approximately 260m north of the site. No transit facility upgrades are recommended for this site.

6.0 CONCLUSIONS

The proposed warehouse / distribution centre development is located on the south property bounded by Beacon Avenue, McDonald Park Road, and Galaran Road. There are four accesses proposed for this development: one on McDonald Park Road, one on Beacon Avenue, and two on Galaran Road. The level of service for the left turns from the site onto Beacon Avenue and McDonald Park Road will soon be operating at failing levels of service (LOS E/F) during the peak hours of travel. The Galaran Road accesses will operate at LOS C or better for all movements into the 2040 horizon year during the PM peak hour. Larger commercial vehicles are planned to access / egress from the site at the McDonald Park driveway during non-peak times.

The sight distances at all access location meet the Transportation Association of Canada's requirements if the site frontages are kept clear of obstructions. One location has a slightly reduced sight distance; however, due to the proximity of the Galaran Road / Beacon Avenue intersection the northbound traffic will be operating at lower speeds and therefore this sight distance is not an issue.

A study of the surrounding road network is being completed concurrently to this analysis. The draft Beacon West Traffic Study is suggesting that Stirling Way be realigned with Galaran Road and upgraded to a roundabout. This roundabout will help the development traffic access Beacon Avenue in the eastbound direction. A dual lane roundabout will operate at LOS C/D into the 2040 horizon year.

The multi-use Flight Path Trail is located south and west of the development site; however, the closest connections to the trail are some distance away. There are few other pedestrian facilities in the area and therefore a sidewalk should be planned for along the McDonald Park / Beacon frontage and a 2m at-grade path on the Galaran Road frontage. There are existing bike lanes on Beacon Avenue along the site frontage but no facilities on Galaran Road and no new bicycle facilities are required. There are two bus routes in proximity to the site, but no transit facility upgrades are recommended on the site frontage due to this development.

7.0 RECOMMENDATIONS

- Consider reducing the offset of the proposed accesses on Galaran with the opposing side streets.
- Work with the Town to help realize the dual roundabout at Galaran Road / Beacon Avenue.

- Work with the Town to incorporate future plans for pedestrian and bike facilities along the site 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 five times (five different random seedings of vehicle types, behaviours and arrivals) to obtain statistical significance of the results. SIDRA (Version 8) provides results using HCM 2010 methodology as well. SIDRA and Synchro use measures of effectiveness to return the results of the analysis.

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 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 – 20
C	> 15 – 25	> 20 – 35
D	> 25 – 35	> 35 – 55
E	> 35 – 50	> 55 – 80
F	> 50	> 80