



960 Foul Bay Road Traffic Impact Assessment

Holland Planning Innovations



WATT CONSULTING GROUP
January 4, 2023

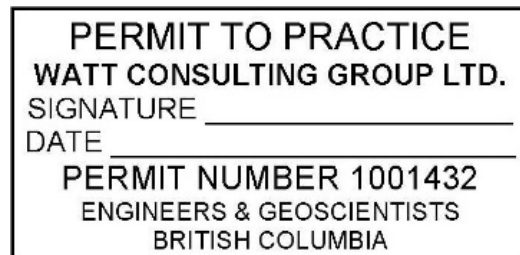
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960 FOUL BAY ROAD

Traffic Impact Assessment

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TABLE OF CONTENTS

| | | |
|------------|-------------------------------------------------|-----------|
| 1.0 | INTRODUCTION | 4 |
| 1.1 | Study Area..... | 4 |
| 2.0 | EXISTING CONDITIONS | 5 |
| 2.1 | Land Use..... | 5 |
| 2.2 | Road Network..... | 5 |
| 2.3 | Traffic Modelling – Background Information..... | 6 |
| 2.4 | Existing Traffic Conditions (2022)..... | 6 |
| 3.0 | POST DEVELOPMENT | 7 |
| 3.1 | Site Access..... | 7 |
| 3.2 | Site Distance at Access..... | 8 |
| 3.3 | Trip Generation..... | 9 |
| 3.4 | Trip Assignment..... | 9 |
| 3.5 | Opening (2024) Conditions..... | 10 |
| 3.5.1 | 2024 Background Conditions..... | 10 |
| 3.5.2 | 2024 Post Development Conditions..... | 11 |
| 3.6 | Long Term (2034) Conditions..... | 12 |
| 3.6.1 | 2034 Background Conditions..... | 12 |
| 3.6.2 | 2034 Post Development Conditions..... | 13 |
| 4.0 | ALTERNATIVE TRANSPORTATION MODES | 15 |
| 4.1 | Pedestrians Network..... | 15 |
| 4.2 | Cycling Network..... | 15 |
| 4.3 | Transit Network..... | 17 |
| 5.0 | CONCLUSIONS | 19 |
| 6.0 | RECOMMENDATIONS | 19 |

LIST OF FIGURES

| | |
|-----------------------------------------------------------|----|
| Figure 1: Study Area..... | 4 |
| Figure 2: Existing Road Network..... | 6 |
| Figure 3: Existing 2022 Volume – AM (PM)..... | 7 |
| Figure 4: Proposed Site Plan..... | 8 |
| Figure 5: Trip Assignment – AM (PM) Peak Hours | 10 |
| Figure 6: 2024 Background Conditions – AM (PM)..... | 11 |
| Figure 7: 2024 Post Development Conditions – AM (PM)..... | 12 |
| Figure 8: 2034 Background Conditions – AM (PM)..... | 13 |
| Figure 9: 2034 Post Development Conditions – AM (PM)..... | 14 |
| Figure 10: Existing Cyclist Network..... | 16 |
| Figure 11: Existing Transit Network..... | 18 |

LIST OF TABLES

| | |
|---------------------------------------------------------------------------|----|
| Table 1: 2022 Existing Conditions – AM (PM)..... | 7 |
| Table 2: Proposed Development Trip Generation – AM and PM Peak Hours..... | 9 |
| Table 3: 2024 Background Conditions – AM (PM)..... | 11 |
| Table 4: 2024 Post Development Conditions – AM (PM)..... | 12 |
| Table 5: 2034 Background Conditions – AM (PM)..... | 13 |
| Table 6: 2034 Post Development Conditions – AM (PM)..... | 14 |
| Table 7: Transit Route Summary | 17 |

APPENDICES

Appendix A: Synchro Background

1.0 INTRODUCTION

Watt Consulting Group was retained by Holland Planning Innovations to undertake a traffic impact assessment for the proposed development at 960 Foul Bay Road in the District of Oak Bay. The proposed development is to include 16 townhouses and a renovated heritage home with eight units. 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. A review of the active transportation accommodations is also provided in this report.

1.1 Study Area

The development site is located on the southwest corner of the Foul Bay Road / Brighton Avenue intersection. The study area includes the following intersections:

- Foul Bay Road / Brighton Avenue.
- Brighton Avenue / Brighton Crescent / Amphion Street.

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

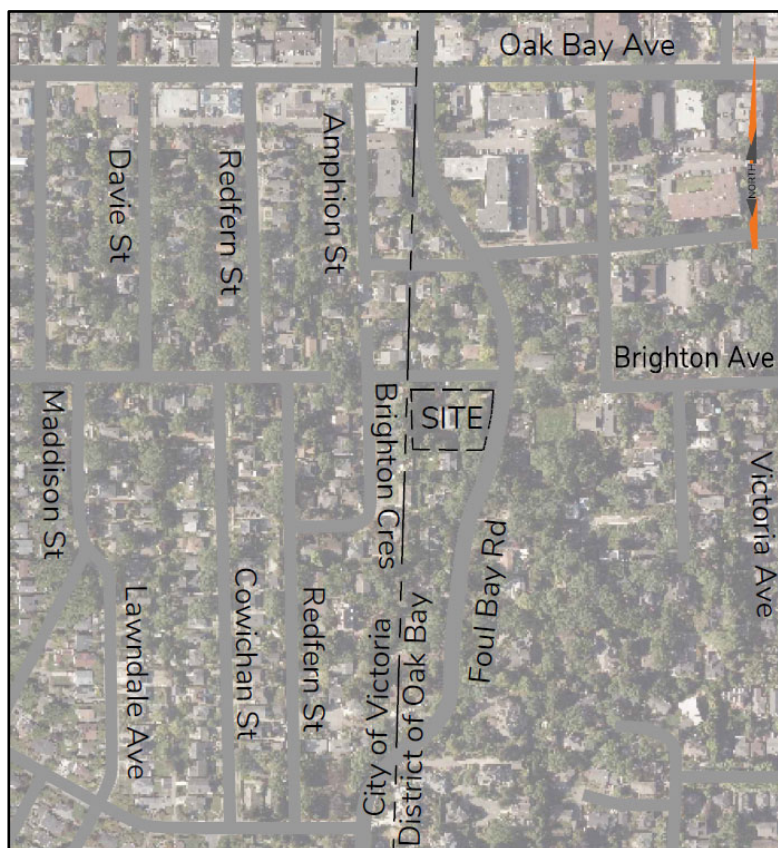


Figure 1: Study Area

2.0 EXISTING CONDITIONS

2.1 Land Use

The site currently contains one house and is zoned as One-Family Residential Use (RS-4). The surrounding land use is comprised of One-Family Residential Use (RS-4 and RS-5).

2.2 Road Network

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

- **Foul Bay Road** is an undivided, two-lane, arterial road that runs north / south within the study area. Foul Bay Road is within the District of Oak Bay's jurisdiction.
- **Brighton Avenue** is an undivided, two-lane, local road that runs east / west within the study area. Brighton Avenue changes from the District of Oak Bay's jurisdiction to the City of Victoria's jurisdiction just west of the site.
- **Brighton Crescent** is an undivided, two-lane, local road that runs north / south within the study area. Brighton Crescent is within the City of Victoria's jurisdiction.
- **Amphion Street** is an undivided, two-lane, local road that runs north / south within the study area. Amphion Street is within the City of Victoria's jurisdiction.

The posted speed limit on Foul Bay Road within the study limits is 30 km/h. The posted speed limit is 50 km/h on all other roads within the study area. Two key intersections were identified within the study area:

- **Foul Bay Road / Brighton Avenue** is a three-leg, unsignalized intersection with a stop on the west leg and free flow on the north / south legs. There are no auxiliary lanes at this intersection. There is a crosswalk on the south leg of Foul Bay Road. Foul Bay Road / Brighton Avenue is within the District of Oak Bay.
- **Brighton Avenue / Brighton Crescent / Amphion Street** is a three-leg, uncontrolled intersection. The north leg (Amphion Street) is a no through road and ends approximately 25 metres north of the intersection and there is no west leg of Brighton Avenue. This intersection is within the City of Victoria.

See **Figure 2** for the existing road network.



Figure 2: Existing Road Network

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 (2022)

Traffic data has started to normalize with the status of the Covid pandemic. While the pandemic may have affected some traffic patterns the overall volumes are now reaching pre-pandemic (normalized) levels; therefore, no Covid factor was applied to the traffic volumes for this study. Traffic counts were conducted by Watt Consulting Group on September 8, 2022 during the AM and PM peak hours. The AM and PM peak hour traffic volumes were modelled using Synchro. See **Table 1** and **Figure 3** for the existing AM and PM peak hour traffic volumes and traffic conditions.



Figure 3: Existing 2022 Volume – AM (PM)

Table 1: 2022 Existing Conditions – AM (PM)

| Intersection | Movement | LOS | Delay (s) | 95 th % Queue (m) |
|------------------------------------------------------|----------|-------|-------------|------------------------------|
| Foul Bay Road / Brighton Avenue | EB | B (B) | 14.7 (13.2) | 6.8 (4.7) |
| | NB | A (A) | 7.9 (0.0) | 9.0 (3.7) |
| | SB | A (A) | 0.0 (0.0) | 5.9 (2.3) |
| Brighton Avenue / Brighton Crescent / Amphion Street | WB | A (A) | 1.6 (1.8) | 0.0 (1.3) |
| | NB | A (A) | 0.4 (0.5) | 0.0 (0.0) |
| | SB | A (A) | 1.4 (1.4) | 1.3 (0.0) |

All movements at the two intersections operate at LOS A except for the eastbound movements at Foul Bay Road / Brighton Avenue which operates at LOS B. The 95th percentile queues do not interfere with any surrounding intersections.

3.0 POST DEVELOPMENT

3.1 Site Access

The existing site has two site accesses: one on Foul Bay Road and one on Brighton Avenue. The proposed development eliminates the access on Foul Bay Road and retains access to the development on Brighton Avenue. The site access on Brighton Avenue is located approximately 25 metres west of Foul Bay Road. The proposed site plan including the site access is shown in **Figure 4**.



Figure 4: Proposed Site Plan

The Transportation Association of Canada's *Geometric Design Guide for Canadian Roads* (2017) recommends a minimum corner clearance of 15m on a local road. The proposed location of this development's access exceeds TAC's minimum recommendation for a local road.

3.2 Site Distance at Access

TAC identifies a minimum of 105m of sight distance for vehicles turning from a stop onto a road with a 50 km/h posted speed limit. The position of the access does not achieve the 105m required sight distance; however, this is due to the proximity of the adjacent intersections, both of which are T-intersections that do not continue through. The site access has a clear view of both intersections. Vehicles turning onto Brighton Avenue from these intersections will be travelling at slower speeds. There are no safety concerns due to the position of the site access.

3.3 Trip Generation

Trip generation for the proposed development was calculated using the Institute of Transportation Engineers' (ITE) *Trip Generation Manual (11th 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 development will generate 10 trips (2 entering and 8 exiting) during the AM peak hour and 13 trips (8 entering and 5 exiting) during the PM peak hour. The AM and PM peak hour trip generation results for the proposed development are summarized in **Table 2**.

Table 2: Proposed Development Trip Generation – AM and PM Peak Hours

| ITE Code | Peak Hour | Land Use | Units | Trip Rates | Trips In | Trips Out | Total Trips |
|----------|-----------|-------------------------|-------|-----------------|----------|-----------|-------------|
| 220 | AM | Multi-Family (Low-Rise) | 24 | 0.40 trips/unit | 2 | 8 | 10 |
| 220 | PM | Multi-Family (Low-Rise) | 24 | 0.51 trips/unit | 8 | 5 | 13 |

3.4 Trip Assignment

The trip assignment was based on the existing traffic patterns and key origin / destinations in the region. A majority of the trips are likely to travel straight to Foul Bay Road with only the occasional trip through Brighton Crescent. The trips generated by the proposed development during the peak hours were assigned using the following distribution pattern:

AM Peak Hour

Entering

- 50% from the north on Foul Bay Road.
- 50% from the south on Foul Bay Road.

Exiting

- 50% to the north on Foul Bay Road.
- 40% to the south on Foul Bay Road.
- 10% to the south on Brighton Crescent.

PM Peak Hour

Entering

- 50% from the north on Foul Bay Road.
- 40% from the south on Foul Bay Road.
- 10% from the south on Brighton Crescent.

Exiting

- 50% to the north on Foul Bay Road.
- 40% to the south on Foul Bay Road.
- 10% to the south on Brighton Crescent.

See **Figure 5** for the AM and PM trip assignments.

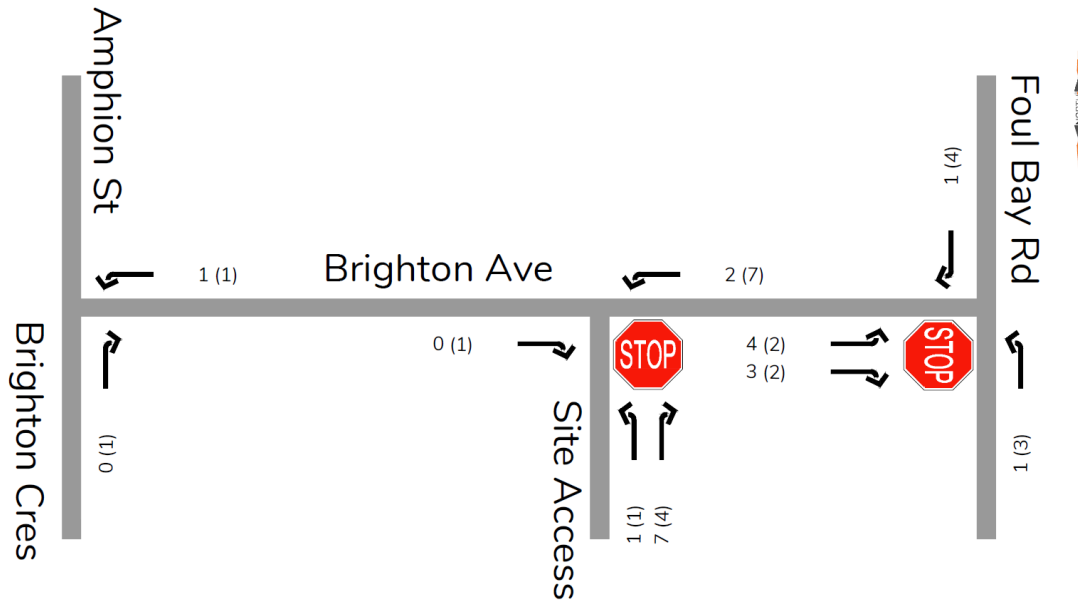


Figure 5: Trip Assignment – AM (PM) Peak Hours

3.5 Opening (2024) Conditions

3.5.1 2024 Background Conditions

Statistics Canada’s 2021 Census of Population results showed that Oak Bay had a negative growth rate of 0.6%; however, population growth does not always translate to vehicle growth. Therefore, a conservative 1.0% vehicle growth rate was applied to obtain the background traffic volumes. **Figure 6** and **Table 3** show the 2024 background AM and PM peak hour conditions.

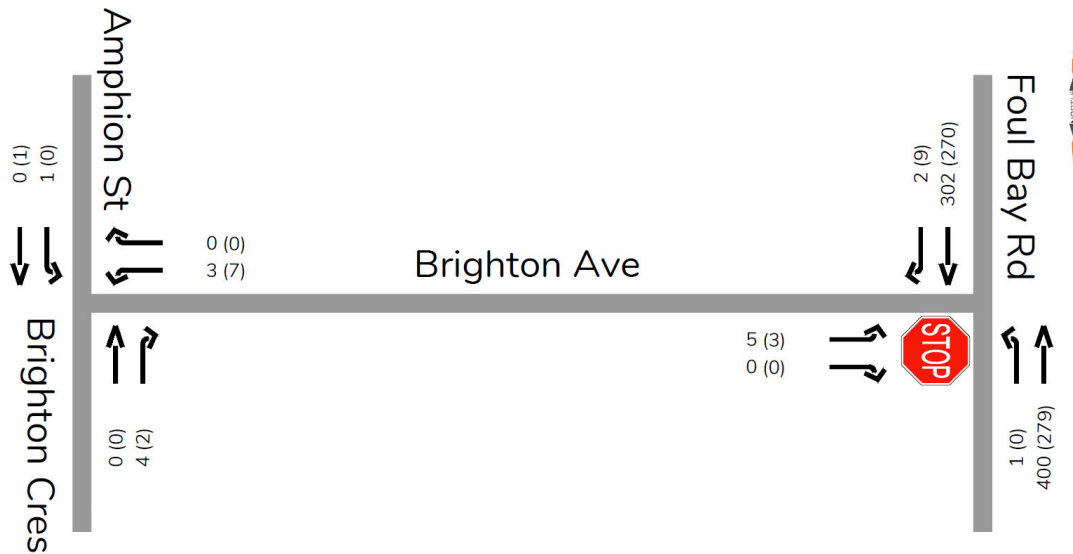


Figure 6: 2024 Background Conditions – AM (PM)

Table 3: 2024 Background Conditions – AM (PM)

| Intersection | Movement | LOS | Delay (s) | 95 th % Queue (m) |
|------------------------------------------------------|----------|-------|-------------|------------------------------|
| Foul Bay Road / Brighton Avenue | EB | B (B) | 14.9 (13.4) | 6.8 (4.7) |
| | NB | A (A) | 7.9 (0.0) | 9.6 (3.4) |
| | SB | A (A) | 0.0 (0.0) | 5.9 (4.1) |
| Brighton Avenue / Brighton Crescent / Amphion Street | WB | A (A) | 2.0 (1.7) | 0.0 (0.0) |
| | NB | A (A) | 0.4 (0.4) | 0.0 (0.0) |
| | SB | A (A) | 1.4 (1.9) | 1.3 (0.0) |

Both intersections operate at LOS B or better for all movements during the AM and PM peak hours of travel. The 95th percentile queues do not interfere with any surrounding intersections.

3.5.2 2024 Post Development Conditions

The development traffic was then added to the 2024 background volumes and analyzed in Synchro. See **Figure 7** and **Table 4** for the 2024 Post Development traffic conditions.

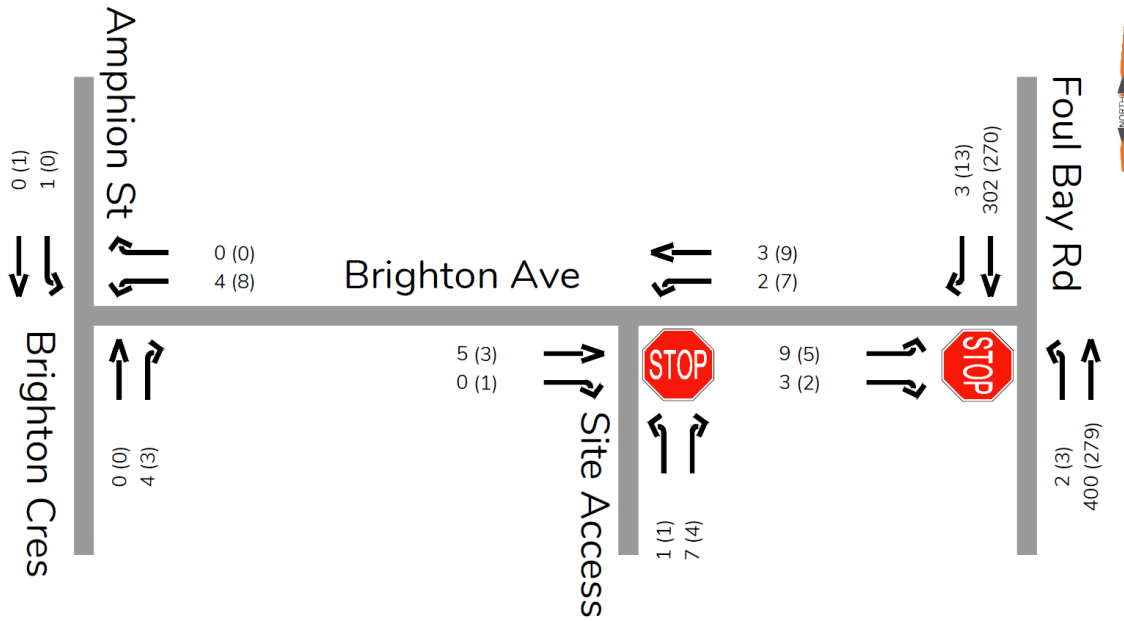


Figure 7: 2024 Post Development Conditions – AM (PM)

Table 4: 2024 Post Development Conditions – AM (PM)

| Intersection | Movement | LOS | Delay (s) | 95 th % Queue (m) |
|------------------------------------------------------|----------|-------|-------------|------------------------------|
| Foul Bay Road / Brighton Avenue | EB | B (B) | 14.1 (12.7) | 10.6 (7.7) |
| | NB | A (A) | 7.9 (7.9) | 6.9 (2.6) |
| | SB | A (A) | 0.0 (0.0) | 6.4 (3.6) |
| Brighton Avenue / Brighton Crescent / Amphion Street | WB | A (A) | 1.5 (1.9) | 0.0 (1.2) |
| | NB | A (A) | 0.5 (0.5) | 0.0 (0.0) |
| | SB | A (A) | 1.3 (2.2) | 0.0 (0.0) |
| Site Access / Brighton Avenue | EB | A (A) | 0.0 (0.0) | 0.0 (0.0) |
| | WB | A (A) | 7.4 (7.2) | 1.5 (0.0) |
| | NB | A (A) | 8.8 (8.4) | 8.1 (6.6) |

There is no change to the LOS for any movement within the study area after the additional of the development traffic during the AM and PM peak of opening day. There is minimal change to the 95th percentile queues with the addition of the development traffic.

3.6 Long Term (2034) Conditions

3.6.1 2034 Background Conditions

The 2034 background conditions were analyzed during the AM and PM peak hours within the study area. See **Figure 8** and **Table 5** for the 2034 background traffic conditions.

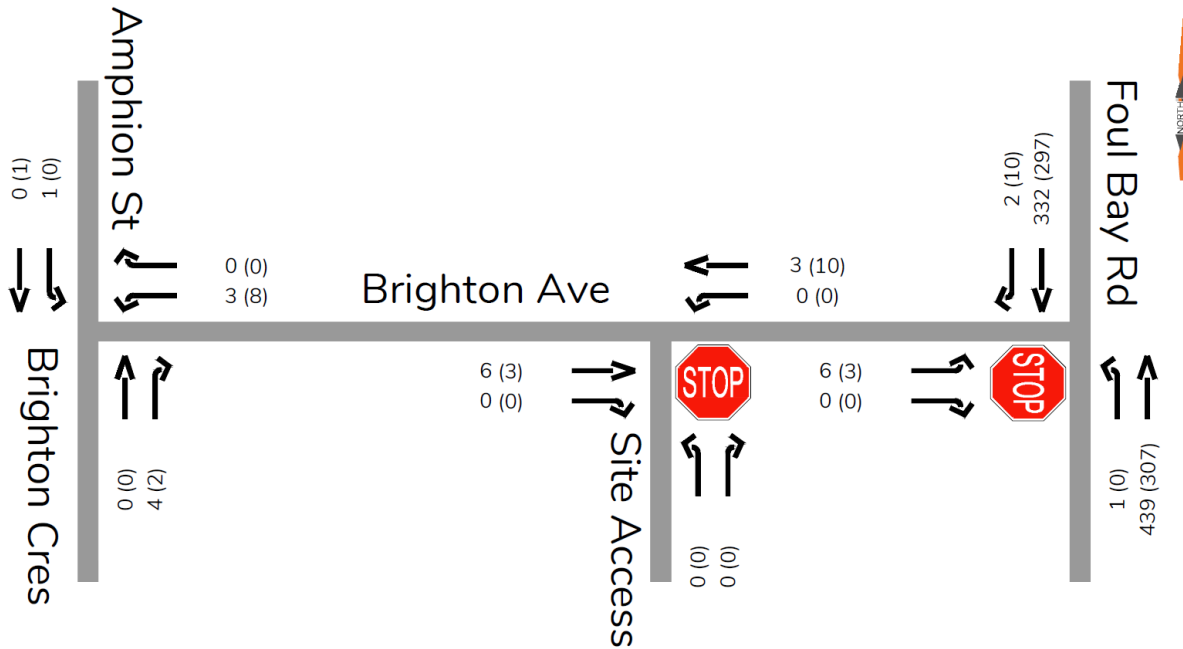


Figure 8: 2034 Background Conditions – AM (PM)

Table 5: 2034 Background Conditions – AM (PM)

| Intersection | Movement | LOS | Delay (s) | 95 th % Queue (m) |
|-----------------------------------------------------|----------|-------|-------------|------------------------------|
| Foul Bay Road / Brighton Avenue | EB | C (B) | 16.0 (14.1) | 7.9 (5.9) |
| | NB | A (A) | 8.0 (0.0) | 12.4 (2.6) |
| | SB | A (A) | 0.0 (0.0) | 6.9 (3.6) |
| Brighton Avenue / Brighton Crescent / Amphin Street | WB | A (A) | 1.5 (1.7) | 0.0 (1.3) |
| | NB | A (A) | 0.4 (0.5) | 0.0 (0.0) |
| | SB | A (A) | 0.8 (1.2) | 0.0 (0.0) |

The eastbound movement at Foul Bay Road / Brighton Avenue with the 2034 background traffic operates at LOS C for the AM peak and LOS B for the PM peak. All other movements within the study area operate at LOS A during both peak hours. The 95th percentile queues do not interfere with any surrounding intersections.

3.6.2 2034 Post Development Conditions

The development traffic was then added to the 2024 background volumes and analyzed in Synchro. See **Figure 9** and **Table 6** for the 2034 post development traffic conditions.

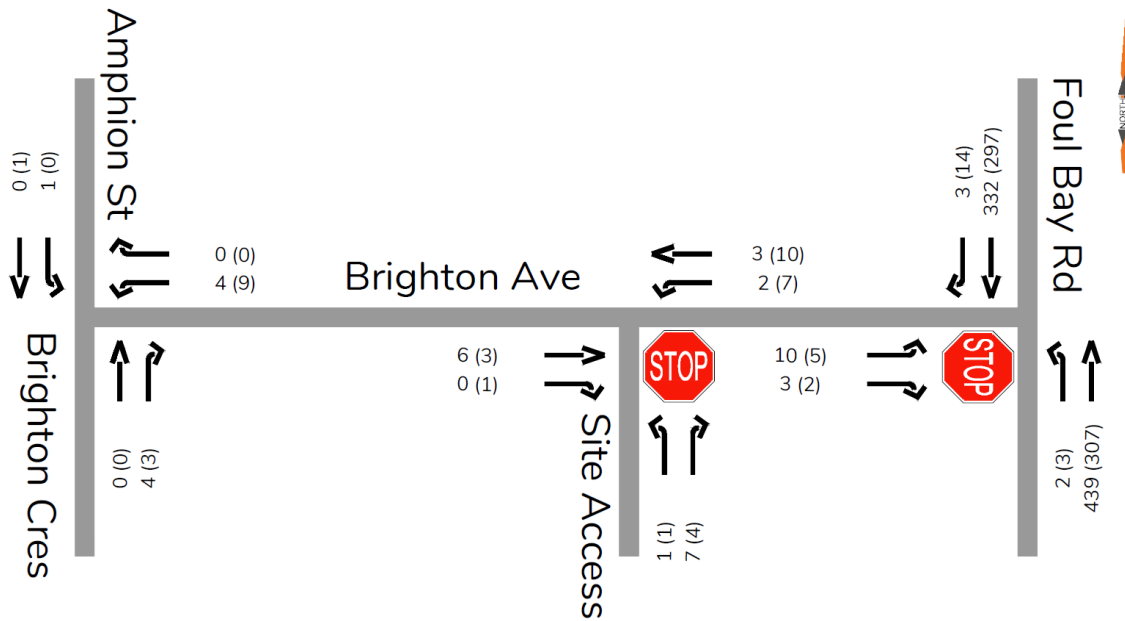


Figure 9: 2034 Post Development Conditions – AM (PM)

Table 6: 2034 Post Development Conditions – AM (PM)

| Intersection | Movement | LOS | Delay (s) | 95 th % Queue (m) |
|------------------------------------------------------|----------|-------|-------------|------------------------------|
| Foul Bay Road / Brighton Avenue | EB | C (B) | 15.2 (13.3) | 10.7 (8.4) |
| | NB | A (A) | 8.0 (8.0) | 9.0 (3.7) |
| | SB | A (A) | 0.0 (0.0) | 6.2 (1.9) |
| Brighton Avenue / Brighton Crescent / Amphion Street | WB | A (A) | 1.4 (1.5) | 0.0 (0.0) |
| | NB | A (A) | 0.8 (0.5) | 1.8 (0.0) |
| | SB | A (A) | 0.8 (2.4) | 0.0 (0.0) |
| Site Access / Brighton Avenue | EB | A (A) | 0.0 (0.0) | 0.0 (0.0) |
| | WB | A (A) | 7.4 (7.2) | 0.0 (0.0) |
| | NB | A (A) | 8.8 (8.4) | 7.7 (6.8) |

There is no change to the LOS for any movement within the study area after the additional of the development traffic into the long-term horizon (2034). There is minimal change to the 95th percentile queues with the addition of the development traffic.

4.0 ALTERNATIVE TRANSPORTATION MODES

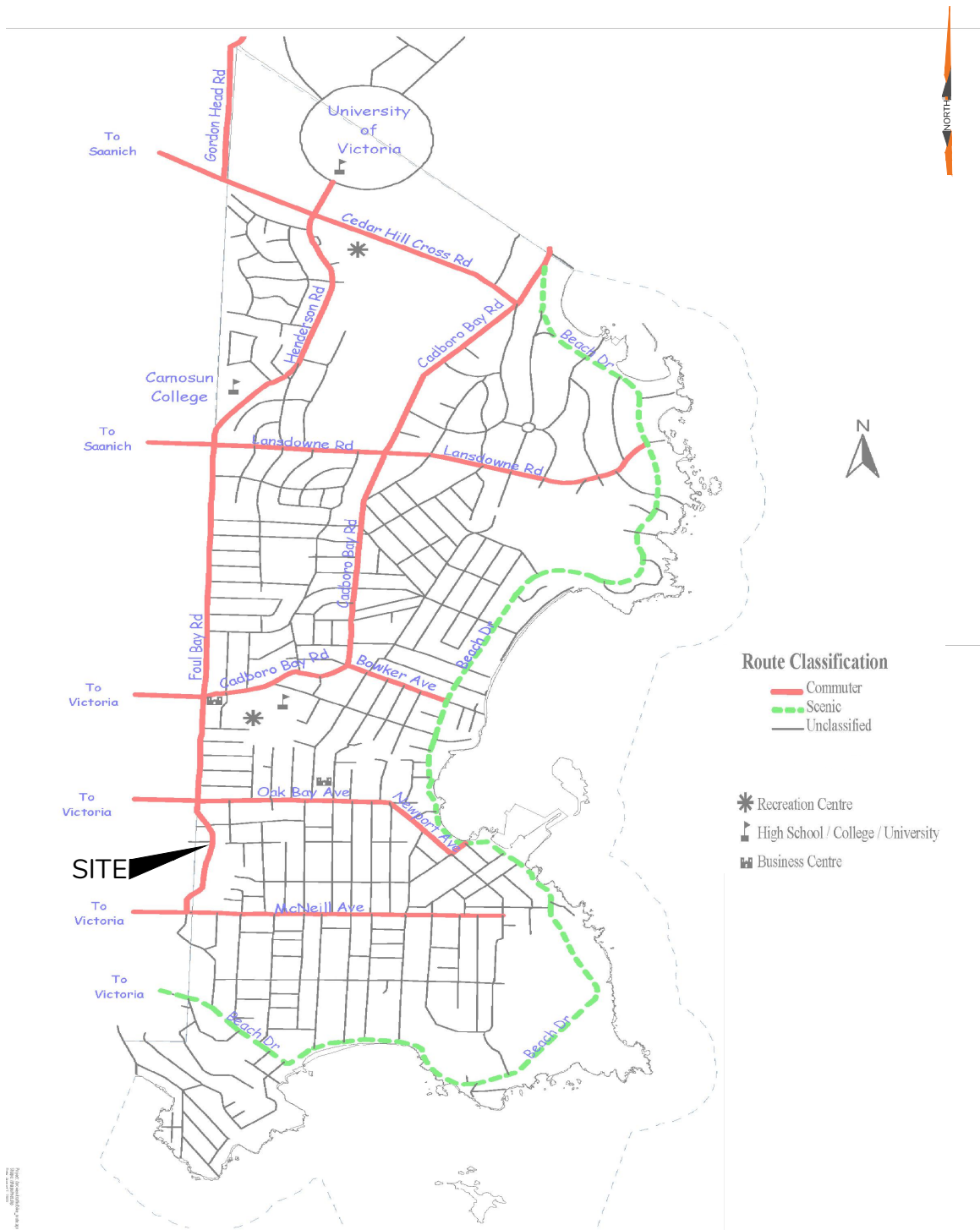
4.1 Pedestrians Network

There is an existing sidewalk on the east side of Foul Bay Road and a crosswalk on the south leg of Foul Bay Road / Brighton Avenue. There are no sidewalks on Brighton Avenue or Brighton Crescent. There is a high number of pedestrians travelling east / west along Brighton Avenue between Foul Bay Road and Brighton Crescent. There were 43 pedestrians counted during the AM peak hour and 12 pedestrians counted during the PM peak hour.

The City's *Complete Streets Handbook (2015)* and *Subdivision Bylaw (Bylaw 3378)* both outline that a sidewalk is to be included on at least one side of all streets. It is recommended that a sidewalk be included on the site frontage of Brighton Avenue that will allow pedestrians to access the existing crosswalk on Foul Bay Road.

4.2 Cycling Network

Foul Bay Road is part of the City's Commuter Route; however, there are no separate bike lanes south of Cadboro Bay Road. Foul Bay Road within the study area is a low-speed street where bikes are expected to share the lane with vehicles. Brighton Avenue and Brighton Crescent are low volume local roads which do not need separate bike facilities. See **Figure 10** for the existing cycling network. No cycling infrastructure upgrades are recommended due to this development.



4.3 Transit Network

There are five bus routes in relative proximity to the site. **Table 7** summarizes the four transit routes.

Table 7: Transit Route Summary

| Route | Destination | Daily Trips Weekday / Sat / Sun | Frequency |
|-------------|---------------------------------------------|------------------------------------|-------------|
| Route 2 / 5 | James Bay to / from South Oak Bay / Willows | 58 / 47 / 42 | 15 – 30 min |
| Route 3 | James Bay / Royal Jubilee | 31 / 29 / 25 | 30 min |
| Route 7 | UVic / Downtown | 57 / 35 / 30 | 20 – 30 min |
| Route 8 | Interurban / Tillicum Centre / Oak Bay | 25 / 16 / 12 | 20 – 45 min |

Routes 2, 5, and 8 can be accessed at bus stops on Oak Bay Avenue which is approximately 260m north of the proposed development site. The closest bus stops on Foul Bay Road are approximately 130 metres north of the site and 220 metres south of the site which accommodate Routes 3 and 7. See **Figure 11** for the existing traffic network. No transit upgrades are recommended due to this development.



960 Foul Bay Road
Traffic Impact Assessment

Figure 11
Existing Transit Network

5.0 CONCLUSIONS

A 16-unit townhouse development and a renovated heritage home with eight units are proposed for 960 Foul Bay Road in the District of Oak Bay. The development is to close the existing access on Foul Bay Road and only include one access on Brighton Avenue. There are no safety concerns with the location of the proposed access.

Traffic operations were analyzed in the study area in the short-term and ten-year horizons for both the AM and PM peak hours. There were no changes to the LOS at either intersection after the addition of the development traffic.

A high number of pedestrians were observed travelling east / west on Brighton Avenue. There are no existing pedestrian facilities on this road until the Foul Bay Road / Brighton Avenue intersection. It is recommended that a sidewalk be included on the site frontage of Brighton Avenue to help facilitate pedestrians in the area.

Foul Bay Road has existing shared bike facilities within the study area. All other road in the study area are local roads and do not require special bike facilities. No cycling infrastructure upgrades are recommended due to this development.

There are a number of busing options in the area located on Foul Bay Road and Oak Bay Road all within approximately 200m. No transit upgrades are recommended due to this development.

6.0 RECOMMENDATIONS

- Developer to install sidewalk along the Brighton Avenue 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 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 – 20 |
| C | > 15 – 25 | > 20 – 35 |
| D | > 25 – 35 | > 35 – 55 |
| E | > 35 – 50 | > 55 – 80 |
| F | > 50 | > 80 |