



# F

## Roundhouse at Bayview Rezoning

File No: REZ00729

Final Submission

September 9, 2022

## Appendix F: Transportation and Mobility

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## 1.0 INTRODUCTION

This traffic impact assessment is for the rezoning application for the north portion of the Roundhouse at Bayview. The Bayview development is a 20 acres site consisting of the Bayview Place Hillside (10 acres) and Roundhouse (10 acres). The Roundhouse site is composed of two areas: the north and the south. For the purposes of this study transportation will be reviewed for the entire Roundhouse site. See **Figure 1** for the Bayview Place Hillside and Roundhouse.



Source: Roundhouse Resubmission Summary June 9, 2022

**Figure 1: Site Context Map**

## 1.1 STUDY AREA

The study area for the project includes Victoria West from Bay Street to Harbour Road and to Kimta Road. A total of 10 key intersections are included in the study area. See **Figure 2** for the study area and key intersections.





Figure 2: Study Area and Key Intersections

Roundhouse at Bayview  
 Traffic Impact Assessment and Management Study



## 2.0 EXISTING CONDITIONS

### 2.1 TRANSPORTATION SYSTEMS

#### 2.1.1 ROAD NETWORK

The following are the key roads within the study area:

**Esquimalt Road:** is a three to four lane arterial roadway that connects Esquimalt and Victoria West to downtown Victoria. East of Tyee Road Esquimalt Road is two lanes westbound, one lane eastbound with a fourth lanes used for left turns. West of Tyee Road, Esquimalt Road becomes one lane in each direction with the middle lanes consisting of raised medians / left turn lanes.

**Catherine Street/Kimta Road:** is a two lane collector roadway that currently has on street parking on both sides of the road; however, this will be modified slightly with the City's AAA facility added on Kimta Road.

**Catherine Street / Bay Street:** is a two to three lane arterial road. South of Wilson Street Catherine/Bay is two lanes, while north to Tyee Road there are three lanes (one per direction plus left turn). There is a short section where there is on-street parking on the east side of Bay Street.

**Tyee Road:** is a two to three lane collector roadway. South of Wilson Road to Esquimalt Road the road is one lane per direction with on-street parking on both sides of the road. South of Esquimalt Road Tyee Road is a two lane road with on-street parking on both sides. North of Wilson Road there is an additional lane used for centre median or left turn lanes. In this section on-street parking is provided on the east side only.

**Harbour Road / Sitkum Road:** are both two lane local roads with on-street parking.



### 2.1.2 PEDESTRIAN NETWORK

There are sidewalks around the entire Bayview development on both side of the roads.

There are crosswalks at the following locations:

- Catherine Street / Esquimalt Road on all four legs (signal)
- Mid-block special crosswalk (overhead flashers, internally illuminated signs overhead, offset pedestrian refuge island) across Esquimalt Road approximately 90m from Sitkum Road
- Tyee Road / Esquimalt Road on all four legs (signal)
- Harbour Road / Esquimalt Road on all four legs (signal)
- Mid-block crosswalk at 356 Harbour Road
- Mid-block crosswalk at Galloping Goose Connection on Harbour Road
- Mid-block crosswalk at Johnson Street Bridge Multi-use Path on Harbour Road
- Across Tyee Road at Wilson Road
- Harbour Road / Tyee Road on all three legs (signal)
- Bay Street / Tyee Road on all four legs (signal)
- Wilson Street / Bay Street on all four legs (signal)

### 2.1.3 CYCLING NETWORK

The E&N Trail approaches the site from the west; however, is discontinued at Russell Street. The City is working to extend E&N Trail to Catherine Street where cyclists will cross Catherine Street to a two way protected bike lane on the north side of Kimta Road. This connection and Kimta Road upgrade are planned for 2022. This connection will extend to Harbour Road where it will connect to the Galloping Goose and Johnson Street multi-use pathway.

Painted bicycle lanes are currently provided on Esquimalt Road, Catherine Street/Bay Street, Tyee Road, and portions of Harbour Road. Harbour Road also as a new two-way cycle track from the Johnson Street multi-use path to the Galloping Goose. There are no separate bicycle facilities on Wilson Street.



### 2.1.4 TRANSIT NETWORK

There is currently good transit service to this portion of Victoria West. There are a total of five routes that travel within the study area including:

- **Route 10 – James Bay / Royal Jubilee:** which travels through James Bay, past the Legislature, along Esquimalt Road to Bay Street to Royal Jubilee Hospital with headways of 25 to 30 minutes. The closest stop for this route is along the development frontage on Esquimalt Road.
- **Route 14 – Vic General / UVic:** which travels from Victoria General Hospital, Helmcken, Island Highway/Craigflower/Skinner to Tyee through Downtown to Richmond Road, Cedar Hill X to UVic every 15 to 20 minutes. The closest stops for this route are on Esquimalt Road at Harbour Road or on Tyee Road near Wilson Street.
- **Route 15 – Esquimalt / UVic:** which travels from HMC Dockyards, along Esquimalt Road, through Downtown to Foul Bay / Henderson to UVic on 15 minute headways. The closest stop is along the development frontage on Esquimalt Road.
- **Route 24 - Cedar Hill / Admirals Walk:** travels along Wilson Road to Tyee Road to Esquimalt Road to downtown Victoria to Shelbourne/McKenzie every 30 minutes to 1 hour. The closest stops for this route are on Esquimalt Road at Harbour Road or on Tyee Road near Wilson Street.
- **Route 25 – Maplewood/Admirals Walk:** which travels between Admirals Walk, through Esquimalt, Downtown Victoria and along Cook/Maplewood to Quadra/McKenzie. Route 25 is a frequent transit service with 5 to 15 minute headways. The closest stop for this route is along the development frontage on Esquimalt Road.

### 2.1.5 RAILWAY CORRIDOR

Although trains are not currently utilizing the E&N Railway line there is an existing railway line that crosses Catherine Street, immediately south of Esquimalt Road and then travels through the middle of the Roundhouse site, across Sitkum Road, and along the south edge of Bayview Hillside. The E&N rail line enters the Roundhouse site as a





single track and then adds a second track within the site. Two sets of tracks continue to the east along Bayview Hillside. There are additional spur lines on the Roundhouse site that were historically used to move trains in/out of the Roundhouse.

## 2.2 TRAVEL MODE SPLIT

The CRD's 2017 Origin Destination Survey has Victoria West as part of the 'Victoria North' District of the survey. The mode splits for Victoria North outlined in Table 1 for the AM, PM and 24 hour periods.

**TABLE 1: MODAL SPLITS FOR VICTORIA NORTH**

Mode	AM (0600-0900)			PM (1500-1800)			24 Hour		
	From	To	Internal	From	To	Internal	From	To	Internal
Auto Driver	46%	67%	30%	64%	49%	45%	58%	58%	40%
Auto Passenger	11%	13%	8%	16%	15%	8%	16%	15%	9%
Transit	17%	8%	3%	8%	14%	3%	10%	10%	2%
Bicycle	16%	7%	10%	6%	11%	7%	7%	7%	5%
Walk	9%	5%	47%	6%	10%	36%	7%	8%	44%
Other	1%	0%	1%	1%	1%	1%	1%	1%	1%

As Table 1 illustrates a significant portion of the trips to, from, and within Victoria North are made by walking. Transit and bicycle use are also well utilized modes of transportation in this area of the region.

## 2.3 COLLISION DATA

Collision data was collected from ICBC's statistics website. The data is for the five years from 2015 to 2019. See **Table 2** for historical collision data in the study area.



TABLE 2: COLLISION DATA FROM 2015 TO 2019

Intersection	Vehicle Collisions	Involving Ped + Bike
Esquimalt / Harbour	22	5
Esquimalt / Tye	54	7
Esquimalt / Sitkum	10	4
Esquimalt / Catherine	55	10
Kimta / Sitkum / Cooperage	1	0
Tye / Wilson	18	0
Tye / Harbour	11	2
Tye / Bay	89	4
Bay / Wilson	21	1
Catherine / Bay / Dunas	2	1

The intersection of Catherin Street / Esquimalt Road has the highest number of pedestrian / bicycle collision in the past five years with an average of two per year. Without additional data the cause / contributing factors for these collisions is not known; however, may be contributed to the railway crossing, which is at a skewed angle, located in close proximity to the Esquimalt Road / Catherine Street intersection.

## 2.4 TRAFFIC CONDITIONS

### 2.4.1 EXISTING VOLUMES

The traffic data for the key intersections was provided by the City. The existing AM and PM peak hour volumes are shown in **Figures 3 and 4**.

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## 2.4.2 TRAFFIC MODELLING – BACKGROUND INFORMATION

Analysis of the traffic conditions at the study intersections was undertaken using Synchro Studio (Version 9). 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**. Synchro was used to determine the LOS and delays of each intersection while SimTraffic was used to determine the 95<sup>th</sup> percentile queue lengths.

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.

For signalized intersections, the methodology considers the intersection geometry, traffic volumes, the traffic signal phasing / timing plan, and pedestrian/bicycle volumes. The average delay for each lane group is calculated, as well as the delay for the overall intersection.

## 2.4.3 ANALYSIS RESULTS

The existing volumes were analyzed in Synchro / SimTraffic (version 9/10) to determine the existing conditions during the AM and PM peak hours. Synchro was used to determine the LOS and delays of each intersection while SimTraffic was used to determine the 95<sup>th</sup> percentile queue lengths. The analysis results are summarized in **Table 3**.



TABLE 3: EXISTING CONDITIONS – AM AND PM PEAK HOUR

Intersection (EW / NS)	Movement	Existing Conditions – AM Peak			Existing Conditions – PM Peak		
		LOS	Delay (s)	95 <sup>th</sup> % Queue (m)	LOS	Delay (s)	95 <sup>th</sup> % Queue (m)
Esquimalt Rd / Harbour Rd (signalized)	EBL	A	6.1	33.1	A	9.8	17.4
	EB T/R	D	35.6	140.4	C	24.7	112.3
	WBL	A	8.4	9.8	A	9.6	20.9
	WB T/R	A	6.0	41.1	B	12.4	61.2
	NB L/T/R	B	17.2	11.5	B	10.1	12.5
	SB L/T/R	B	12.9	17.0	B	15.0	25.5
Esquimalt Rd / Tye Rd (signalized)	EBL	B	14.6	18.5	A	9.3	15.9
	EB T/R	B	18.0	60.5	B	11.9	56.6
	WBL	B	14.7	17.2	A	9.5	28.6
	WBT	B	15.2	49.5	B	11.5	69.6
	WBR	A	3.0	0.0	A	2.0	12.6
	NBL	C	27.7	5.5	C	27.6	7.9
	NB T/R	C	26.2	29.6	C	29.7	28.4
	SBL	C	27.2	43.0	<b>E</b>	<b>70.5</b>	44.6
SB T/R	A	6.5	73.4	B	15.7	83.2	
Esquimalt Rd / Sitkum Rd (stop control)	EBL	A	7.9	3.6	A	8.5	2.3
	EB T/R	A	0.0	0.0	A	0.0	0.8
	WBL	A	8.2	6.5	A	8.5	7.6
	WB T/R	A	0.0	0.0	A	0.0	0.0
	NB L/T/R	B	13.5	11.7	C	15.4	10.9
	SB L/T/R	C	17.1	10.0	C	18.4	9.7
Esquimalt Rd / Catherine St (signalized)	EBL	B	10.5	39.3	A	8.1	43.0
	EB T/R	A	7.9	50.6	A	7.1	51.8
	WBL	B	11.4	6.7	B	11.8	12.4
	WB T/R	B	19.3	56.5	B	178	88.6
	NB L/T/R	B	18.0	17.2	<b>E</b>	<b>57.2</b>	40.9
	SB L/T	C	20.1	22.7	D	46.3	44.6
	SBR	A	6.5	27.0	A	9.4	45.8
Kimta Rd / Sitkum Rd / Cooperage Pl (stop control)	EB L/T/R	A	2.0	2.1	A	1.0	4.7
	WB L/T/R	A	0.3	0.0	A	0.4	1.8
	NB L/T/R	A	9.6	7.5	B	10.0	7.2
	SB L/T/R	A	9.2	8.8	A	9.8	11.8



**TABLE 3: EXISTING CONDITIONS – AM AND PM PEAK HOUR (CONTINUED)**

Intersection (EW / NS)	Movement	Existing Conditions – AM Peak			Existing Conditions – PM Peak		
		LOS	Delay (s)	95 <sup>th</sup> % Queue (m)	LOS	Delay (s)	95 <sup>th</sup> % Queue (m)
Wilson St / Tye Rd (stop control)	EB L/R	C	20.1	19.9	C	17.2	30.5
	NBL	A	8.7	15.1	A	8.5	20.3
	NBT	A	0.0	3.2	A	0.0	2.7
	SB T/R	A	0.0	9.9	A	0.0	5.0
Harbour Rd / Tye Rd (stop control)	WB L/R	B	13.0	5.5	C	17.2	13.9
	NB T/R	A	0.0	5.1	A	0.0	29.0
	SBL	A	8.0	0.9	A	8.6	6.1
	SBT	A	0.0	9.6	A	0.0	0.0
Bay St / Tye Rd (signalized)	EBL	B	19.2	9.7	A	9.7	26.3
	EB T/R	C	27.0	67.7	B	12.7	66.4
	WB L/T	C	26.7	102.6	C	27.1	579.4
	WBR	A	5.5	47.7	A	6.8	49.1
	NBL	C	29.2	13.6	C	29.7	16.1
	NBT	C	29.9	37.2	<b>E</b>	<b>57.3</b>	191.1
	NBR	A	7.3	9.0	A	7.5	112.1
	SBL	B	17.8	59.7	D	53.8	58.7
Wilson St / Bay St (signalized)	SB T/R	B	18.2	68.2	C	20.9	54.3
	EB L/T/R	D	41.5	55.6	<b>E</b>	<b>63.9</b>	84.3
	WB L/T	C	28.3	29.7	D	51.4	65.9
	WBR	A	1.0	21.2	A	2.1	22.9
	NBL	C	26.2	6.0	C	21.4	10.0
	NB T/R	D	45.7	47.7	C	31.1	57.4
	SBL	C	24.4	29.3	B	17.6	37.5
Catherine St / Bay St (stop control)	SB T/R	C	32.1	32.2	B	16.4	59.9
	EB L/R	B	10.9	19.0	B	11.9	14.2
	NBL	A	7.8	9.6	A	8.6	14.9
	NBT	A	0.0	2.2	A	0.0	9.3
	SB T/R	A	0.0	0.0	A	0.0	7.8

Overall, the traffic operations in the Songhees area of Victoria West are at a LOS D or better for the majority of the study area. However, there are four existing movements that have poor operations (LOS E/F) during the PM peak hour.



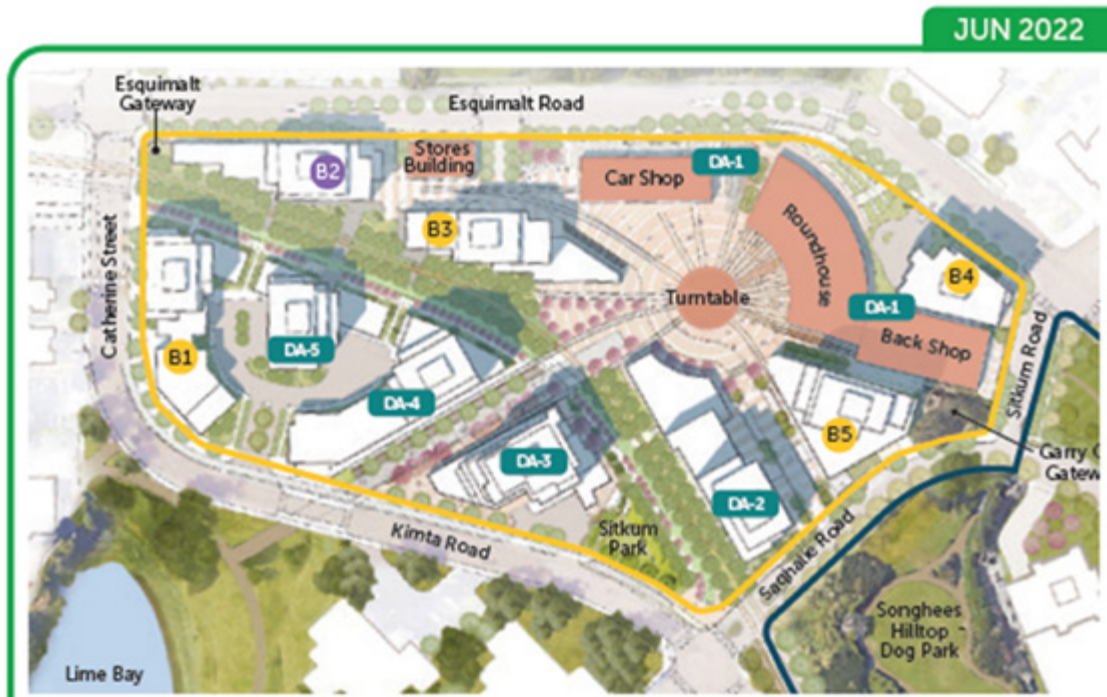
These include:

- Southbound Left at Tye Road/Esquimalt Road
- Southbound Left at Catherine Street/Esquimalt Road
- Northbound Through at Tye Road/Bay Street
- Eastbound movement at Bay Street/Wilson Street

### 3.0 PROPOSED DEVELOPMENT

#### 3.1 LAND USE

The land use, utilized for this study, is for the Roundhouse portion of Bayview Place. The Roundhouse site consists of the two areas separated by the E&N Railway line. The north area consists of four buildings (B2 to B5), DA-2, and the DA-1 historical buildings (Stores, Carshop, Roundhouse, and Backshop). The south area consists of Building 1, DA-3, DA-4, and D-5. See **Figure 5** for placement of buildings/lots on the parcels.



**Figure 5: Site Plan**

The land use for the north parcels consists of condominium / hotel, rental apartments, affordable housing, and commercial retail space. The south parcel consists of





condominium / hotel units, and commercial retail space. Tables 4 and 5 outline the land use by building.

**TABLE 4: LAND USE BY BUILDING/LOT**

Building	Land Use	Units
1	Condominium	204 units
2	Affordable Housing	156 units
	Commercial	2,000 sq. ft.
3	Apartment (Rental)	151 units
	Commercial	8,450 sq. ft.
4	Condominium	166 units
5	Apartment	224 units
	Commercial	4,250 sq. ft.
DA-1 (historic buildings)	Commercial	35,733 sq. ft.
DA-2	Condominium	308 units
	Commercial	8,370 sq. ft.
DA-3 (E&N Building)	Condominium	199 units
	Commercial	8,611 sq. ft.
DA-4	Condominium	276 units
	Commercial	8,600 sq. ft.
DA-5	Condominium	218

**TABLE 5: LAND USE SUMMARY**

Location on Site	Land Use	Total
North of Railway	Apartment / Affordable Housing	307 units
	Condominium / Hotel	698 units
	Commercial	59,133 sq. ft.
South of Railway	Condominium / Hotel	897 units
	Commercial	17,211 sq. ft.



### 3.2 SITE ACCESSES

The E&N railway line creates a barrier for having internal vehicle travel between the North Parcel and the South Parcel. Vehicle access for the North Parcel will be via a main intersection located between the Stores Building and the Carshop. This will be a full movement signalized intersection. The second access point for the North area is off Sitkum Road between the railway crossing and Saghalie Road. Internally the main access road travels east through the site to the Sitkum Road access.

The access for B4 will be located off Esquimalt Road across from the driveway to 222 Esquimalt Road. The access will utilize the existing two way left turn lane to accommodate full movement access. The location of this access will only be for B4's parking. The minimum stopping sight distance at 30km/h (35m) is met for an access at this location. For vehicles turning left or right from the access 65m of sight distance can be provided which meets the 30km/h turning sight distance from a turn; however, it requires drivers see along the sidewalk / boulevard space to achieve the 65m.

An access to B4 from Sitkum Road is not practical due to two primary reasons: given the close proximity to the intersection of Esquimalt it is difficult to accommodate a driveway at this location, and Sitkum Road is elevated from the site making an access driveway down to grade and parking below the building impractical. The provision of parking under the Backshop and Roundhouse to connect to B4 is no longer planned to avoid disturbing the heritage structures.

For the South portion of the site two accesses are proposed: one for DA-3 and a shared access for Building 1, DA-4 and DA-5. Both accesses are located on Kimta. See **Figure 6** for the proposed access points and internal road network.

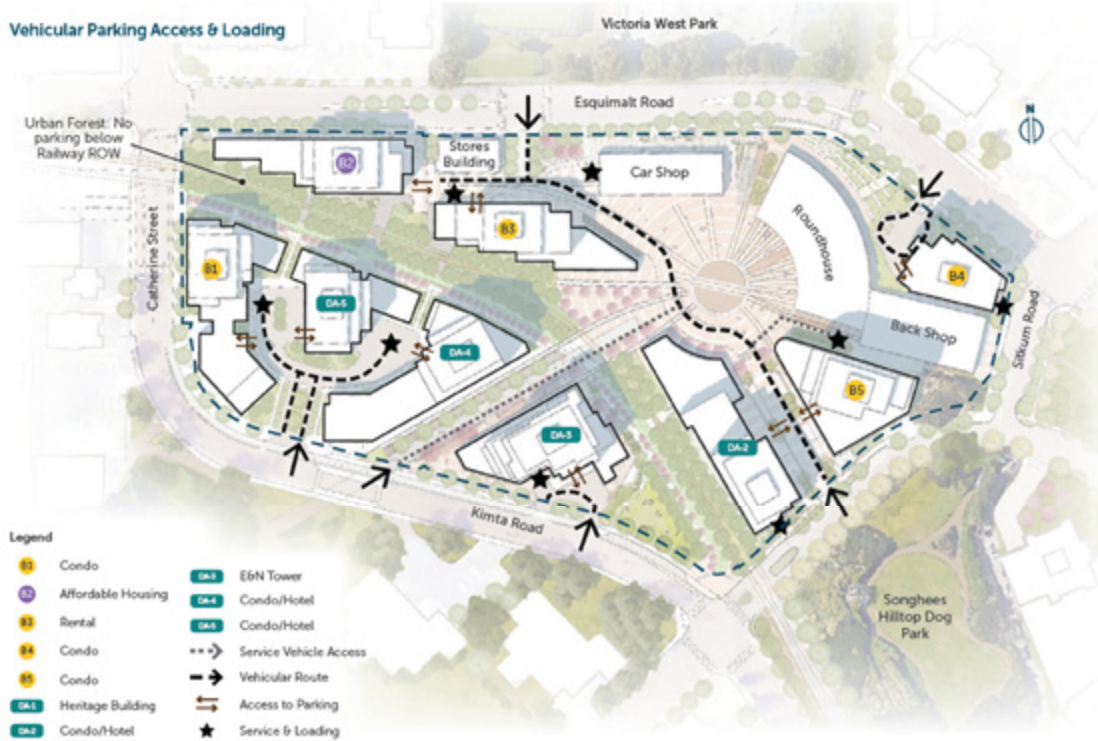


Figure 6: Site Accesses

### 3.3 TRIP GENERATION

#### 3.3.1 SITE SPECIFIC RATES

A trip generation rate study was conducted to determine trip rates that would be applicable to the Roundhouse since the area is known for being having high use of transit, walking, and cycling that could impact the standard Institute of Transportation Engineers (ITE) trip generation rates.

Observations of four residential sites in Victoria West with similar contexts (size, location, context) was undertaken to determine a residential trip rate for the residential portion of the proposed development. Observations of the Westside Village Shopping Centre were also conducted to review the commercial trip generation rate for the commercial component.



### Residential Observation Results

The observed residential trip generation and trip rate calculation results are summarized in **Table 6**.

**TABLE 6: RESIDENTIAL OBSERVATIONS & TRIP RATES**

Observation Site	Units	AM Peak Hour				PM Peak Hour			
		Trips In	Trips Out	Total Trips	Trip Rate	Trips In	Trips Out	Total Trips	Trip Rate
Encore	134	5	16	21	0.16	19	5	24	0.18
Promontory / Bayview One	318	8	33	41	0.13	51	36	87	0.27
Balance (Dockside)	172	3	13	16	0.09	24	8	32	0.19
Shutters	185	1	21	36	0.19	30	12	42	0.23
<b>Average (AM):</b>					<b>0.14</b>	<b>Average (PM):</b>			<b>0.22</b>

These rates are lower than ITE's multi-family residential (high-rise) rates but are considered to be reflective of this neighbourhood of Victoria West. Therefore, these rates will be utilized for the residential (apartment and condominium) land uses.

### Commercial Observation Results

Although the Westside Village Shopping Centre would be of similar overall size to the commercial at Roundhouse the Westside Village Shopping Centre is anchored by Save-on-Foods which is in the range of 40 to 50% of the Westside Village Shopping Centre land use. Grocery stores have an approximately 2.5 times higher trip generation than general retail space. Based on the results of the observations the Westside Village Shopping Centre had a rate that was higher than ITE's retail (shopping) rate, but lower than the grocery store rate which is what would be expected. Since the Roundhouse development commercial is expected to be made up of smaller retail units and possibility a much smaller grocery store (5% of the commercial land use rather than





50%). Therefore, the ITE trip generation rate for a Shopping Centre land use (ITE Code 820) from the ITE Trip Generation Manual (10<sup>th</sup> Editions) will be used.

### 3.3.2 SITE TRIP GENERATION

The peak hour trip generation results are summarized in **Tables 7 to 10**. Internal trips were calculated using NCHRP and ITE methodologies. As a worst case scenario all commercial trips were assigned as new primary trips to the road network.

**TABLE 7: AM PEAK HOUR TRIP GENERATION – NORTH ACCESSES**

Building	Land Use	Units	Trip Rate	Trips In	Trips Out	Total Trips
2	Multi-family	156 units	0.14 / unit	5	17	22
	Commercial	2,000 sq. ft.	0.94 / 1000 sq. ft.	1	1	2
3	Multi-family	151 units	0.14 / unit	5	16	21
	Commercial	8,450 sq. ft.	0.94 / 1000 sq. ft.	5	3	8
4	Multi-family	166 units	0.14 / unit	6	17	23
5	Multi-family	224 units	0.14 / unit	7	24	31
	Commercial	4,250 sq. ft.	0.94 / 1000 sq. ft.	2	2	4
DA-2	Multi-family	308 units	0.14 / unit	10	33	43
	Commercial	8,700 sq. ft.	0.94 / 1000 sq. ft.	5	3	8
DA-1	Commercial	35,733 sq. ft.	0.94 / 1000 sq. ft.	21	13	34
<b>Total North Trips (AM Peak Hour):</b>				<b>67</b>	<b>129</b>	<b>196</b>
Internal Trips:				2	2	4
External Trips:				<b>65</b>	<b>127</b>	<b>192</b>



TABLE 8: AM PEAK HOUR TRIP GENERATION – SOUTH ACCESSES

Building	Land Use	Units	Trip Rate	Trips In	Trips Out	Total Trips
DA-3	Multi-family	199 units	0.14 / unit	7	21	28
	Commercial	8,611 sq. ft.	0.94 / 1000 sq. ft.	5	3	8
DA-4	Multi-family	276 units	0.14 / unit	9	30	39
	Commercial	8,600 sq. ft.	0.94 / 1000 sq. ft.	5	3	8
DA-5	Multi-family	218 units	0.14 / unit	7	24	31
1	Multi-family	2004 units	0.14 / unit	7	22	29
<b>Total South Trips (AM Peak Hour):</b>				<b>40</b>	<b>103</b>	<b>143</b>
Internal Trips:				2	2	4
External Trips:				<b>38</b>	<b>101</b>	<b>139</b>

TABLE 9: PM PEAK HOUR TRIP GENERATION – NORTH ACCESSES

Building	Land Use	Units	Trip Rate	Trips In	Trips Out	Total Trips
2	Multi-family	156 units	0.22 / unit	21	13	34
	Commercial	2,000 sq. ft.	3.81 / 1000 sq. ft.	4	4	8
3	Multi-family	151 units	0.22 / unit	20	13	33
	Commercial	8,450 sq. ft.	3.81 / 1000 sq. ft.	15	17	32
4	Multi-family	166 units	0.22 / unit	23	14	37
5	Multi-family	224 units	0.22 / unit	30	19	49
	Commercial	4,250 sq. ft.	3.81 / 1000 sq. ft.	8	8	16
DA-2	Multi-family	308 units	0.22 / unit	41	27	68
	Commercial	8,700 sq. ft.	3.81 / 1000 sq. ft.	16	17	33
DA-1	Commercial	35,733 sq. ft.	3.81 / 1000 sq. ft.	65	71	136
<b>Total North Trips (PM Peak Hour):</b>				<b>243</b>	<b>203</b>	<b>446</b>
Internal Trips:				41	41	82
External Trips:				<b>202</b>	<b>162</b>	<b>364</b>



**TABLE 10: PM PEAK HOUR TRIP GENERATION – SOUTH ACCESSES**

Building	Land Use	Units	Trip Rate	Trips In	Trips Out	Total Trips
DA-3	Multi-family	199 units	0.22 / unit	27	17	44
	Commercial	8,611 sq. ft.	3.81 / 1000 sq. ft.	16	17	33
DA-4	Multi-family	276 units	0.22 / unit	37	24	61
	Commercial	8,600 sq. ft.	3.81 / 1000 sq. ft.	16	17	33
DA-5	Multi-family	218 units	0.22 / unit	29	19	48
1	Multi-family	2004 units	0.22 / unit	27	18	45
<b>Total South Trips (PM Peak Hour):</b>				<b>152</b>	<b>112</b>	<b>264</b>
<i>Internal Trips:</i>				12	12	24
<b>External Trips:</b>				<b>140</b>	<b>100</b>	<b>240</b>

The above trip generation is based on the current plans for the site. However, the following volumes and analysis are based on 154 more multi-family units and 21,056 sq. ft. more commercial space than outlined above. Overall, the difference in site trip generation between the above trip generation and the trip generation utilized in the analysis is 36 less trips in the AM peak hour and 85 less trips in the PM peak hour. The difference in trip generation is 10-12% less than in the analysis. Therefore, the results of the analysis are generally reflective of the current land use and the analysis is a worst case scenario.

### 3.4 TRIP ASSIGNMENT

The trips generated by the proposed development were distributed and assigned based on the existing traffic patterns and key origins and destinations for traffic in the area. Separate trip distributions were used for the residential and commercial components of the development. The distribution percentages are summarized in **Table 11**. The resulting trip assignments are shown in **Figures 7 and 8**.



TABLE 11: TRIP DISTRIBUTION

Origin / Destination	AM Peak Hour				PM Peak Hour			
	Inbound		Outbound		Inbound		Outbound	
	Res.	Comm.	Res.	Comm.	Res.	Comm.	Res.	Comm.
North	45%	15%	40%	15%	40%	15%	40%	15%
East	35%	50%	50%	50%	50%	50%	40%	50%
West	20%	35%	10%	35%	10%	35%	20%	35%






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 DATE: 2022-09-09 10:25 AM

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PROJECT NO: 2762.B01	DRAWING NO:		
DATE: NOV 5-2020	REVISION:		

TITLE: TRIP ASSIGNMENT - AM PEAK  
 ROUNDHOUSE @ BAYVIEW PLACE  
 TRAFFIC STUDY



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	2762.B01			
DATE:	NOV 5-2020			

TITLE: TRIP ASSIGNMENT - PM PEAK  
 ROUNDHOUSE @ BAYVIEW PLACE  
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### 3.5 VOLUMES

The trips generated by the proposed development were added to the existing volumes to determine the post development volumes. The post development volumes are shown in **Figures 9 and 10** for the AM and PM peak hour.

### 3.6 ANALYSIS RESULTS

The AM and PM peak hour post development traffic volumes were analyzed using Synchro to determine the impacts due to the addition of the vehicle trips. **Table 12** summarizes the results of the traffic analysis. The intersection of Esquimalt Road / Main Site Access is analyzed as a signalized intersection due to the volumes expected from the access.





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DATE:	NOV 5-2020				

TITLE: <b>2020 POST DEVELOPMENT VOLUMES - AM                  ROUNDHOUSE @ BAYVIEW PLACE                  TRAFFIC STUDY</b>	
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PROJECT NO:	2762.B01
DRAWING NO:	
DATE:	NOV 5-2020
REVISION:	

TITLE:	
2020 POST DEVELOPMENT VOLUMES - PM	
ROUNDHOUSE @ BAYVIEW PLACE	
TRAFFIC STUDY	



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TABLE 12: POST DEVELOPMENT CONDITIONS – AM AND PM PEAK HOUR

Intersection (EW / NS)	Movement	AM Peak			PM Peak		
		LOS	Delay (s)	95 <sup>th</sup> % Queue (m)	LOS	Delay (s)	95 <sup>th</sup> % Queue (m)
Esquimalt Rd / Harbour Rd (signalized)	EBL	A	5.5	28.3	B	10.7	23.6
	EB T/R	E	<b>66.4</b>	172.1	D	50.4	188.0
	WBL	A	8.6	11.6	A	9.6	18.0
	WB T/R	A	5.5	43.0	B	15.0	77.4
	NB L/T/R	C	20.2	12.7	B	10.1	11.3
	SB L/T/R	B	15.1	18.9	B	17.0	28.7
Esquimalt Rd / Tye Rd (signalized)	EBL	B	16.7	27.2	B	14.4	28.7
	EB T/R	C	21.9	77.7	B	14.4	75.5
	WBL	B	17.5	25.4	B	12.5	33.8
	WBT	B	15.9	55.7	B	14.6	93.9
	WBR	A	3.0	0.0	A	2.0	15.5
	NBL	C	27.7	5.3	C	27.6	10.3
	NB T/R	C	25.7	28.8	C	34.2	34.1
	SBL	C	29.1	44.6	F	<b>93.4</b>	44.5
SB T/R	A	6.0	105.9	B	15.6	120.4	
Esquimalt Rd / Sitkum Rd (stop control)	EBL	A	8.0	3.0	A	8.8	3.7
	EB T/R	A	0.0	0.9	A	0.0	5.0
	WBL	A	8.6	12.4	A	9.3	20.0
	WB T/R	A	0.0	0.0	A	0.0	22.3
	NB L/T/R	C	16.1	17.3	D	28.5	22.7
	SB L/T/R	C	24.4	9.6	E	<b>37.0</b>	9.5
Esquimalt Rd / Catherine St (signalized)	EBL	B	14.9	39.4	B	11.5	48.8
	EB T/R	A	9.1	46.5	A	9.4	71.5
	WBL	B	13.1	11.8	B	13.3	22.5
	WB T/R	C	23.2	63.2	C	24.5	65.6
	NB L/T/R	C	22.9	26.3	F	<b>532.9</b>	102.0
	SB L/T	C	22.3	27.5	F	<b>148.0</b>	73.2
	SBR	A	6.1	27.1	A	8.5	53.3
Kimta Rd / Sitkum Rd / Cooperage Pl (stop control)	EB L/T/R	A	1.3	2.6	A	0.8	3.9
	WB L/T/R	A	0.2	1.2	A	0.3	2.5
	NB L/T/R	A	9.8	6.2	B	10.6	4.7
	SB L/T/R	A	9.2	10.9	B	10.1	11.7



**TABLE 12: POST DEVELOPMENT CONDITIONS – AM AND PM PEAK HOUR  
(CONTINUED)**

Intersection (EW / NS)	Movement	AM Peak			PM Peak		
		LOS	Delay (s)	95 <sup>th</sup> % Queue (m)	LOS	Delay (s)	95 <sup>th</sup> % Queue (m)
Wilson St / Tye Rd (stop control)	EB L/R	C	21.4	20.9	C	19.2	126.3
	NBL	A	8.7	17.0	A	8.7	33.4
	NBT	A	0.0	5.5	A	0.0	136.4
	SB T/R	A	0.0	9.0	A	0.0	4.7
Harbour Rd / Tye Rd (stop control)	WB L/R	B	13.6	6.1	C	18.8	14.0
	NB T/R	A	0.0	0.0	A	0.0	111.0
	SBL	A	8.0	10.0	A	8.7	6.3
	SBT	A	0.0	0.0	A	0.0	0.0
Bay St / Tye Rd (signalized)	EBL	C	26.3	24.2	B	16.2	45.1
	EB T/R	C	29.4	79.1	B	14.8	86.9
	WB L/T	C	28.8	101.4	C	33.8	598.1
	WBR	A	5.8	48.0	A	7.4	0.0
	NBL	C	29.4	14.6	C	33.6	23.6
	NBT	C	30.9	45.4	<b>E</b>	<b>64.7</b>	222.3
	NBR	A	7.3	5.2	A	9.3	119.3
	SBL	B	18.2	59.9	D	53.8	66.7
Wilson St / Bay St (signalized)	SB T/R	B	19.0	72.9	C	24.3	66.8
	EB L/T/R	D	41.5	52.7	<b>E</b>	<b>63.9</b>	82.7
	WB L/T	C	28.2	34.5	D	51.4	79.3
	WBR	A	1.0	22.0	A	2.2	22.9
	NBL	C	26.2	8.1	C	22.1	8.8
	NB T/R	<b>E</b>	<b>68.3</b>	69.6	D	36.7	73.5
	SBL	C	30.2	31.3	C	20.8	46.3
Catherine St / Bay St (stop control)	SB T/R	D	42.5	36.2	C	21.3	74.2
	EB L/R	B	11.2	18.7	B	12.9	16.4
	NBL	A	7.9	9.1	A	8.9	15.7
	NBT	A	0.0	3.7	A	0.0	10.5
	SB T/R	A	0.0	0.0	A	0.0	23.7



In the AM peak hour, the addition of the eastbound through traffic on Esquimalt Road at Harbour Road (one lane eastbound) due to the development drops the eastbound through movement to a LOS E due to the high volume of eastbound through traffic (west of Tyee Road) with the existing southbound left turn volume from Tyee Road. The combination of the higher eastbound through traffic with the high southbound left turn traffic as eastbound traffic at Harbour Road is above 1,000 vph which creates poor operations.

At the Catherine St / Esquimalt Rd intersection, the northbound and southbound movements drop to a LOS F during the PM peak hour. Signal timing optimization improves the southbound movement to LOS C and the northbound to LOS E, however the westbound through / right movement drops to LOS E as a result. Installation of a 15m northbound left turn lane improves the intersection operations to LOS D or better for all movements; however due to the existing alignment of laning on the north side of the intersection the implementation of a northbound left would require re-striping of the southbound laning to a left turn and a through / right. If the property on the northwest corner of the intersection develops the City may want to consider additional right-of-way from that property to allow for a separate southbound right turn in the future.

The northbound through / right movement at Bay Street / Wilson Street drops to LOS E during the AM peak with the addition of the development traffic. With optimization of the signal timing all movement operate at a LOS D or better.

The southbound queues at Building 1/DA-4/DA-5's access on Catherine Street is less than 10m (one vehicle) in length and therefore will not extend back to the railway since the access is located 50m from the railway crossing. The access does not require a separate southbound left turn lane.



#### 4.0 SUSTAINABLE TRANSPORTATION

The site is already well provided for in terms of sidewalks, bicycle facilities, and transit facilities within the area surrounding the site. As part of the development new crosswalks will be installed at the main site access with the signalization of the intersection. This will provide additional safe crossings across Esquimalt Road for pedestrians and cyclists.

The transit stop along the frontage of Roundhouse will be reviewed, in consultation with BC Transit, to ensure a fully accessible and furnished stop is provided. The current design for the Esquimalt stop is a bus bay and the installation of a right turn lane on the west side of the intersection could provide a queue jumper lane (shared with right turners) for this future BRT stop (current transit stop).

Internally a pedestrian / bicycle connection is proposed from the north to the south side of the property. This connection will extend across Kimta Road, with a proposed raised crosswalk to connect Lime Bay Park, Roundhouse, and Victoria West Park. Additional pedestrian connections through the site will be provided in the form of sidewalks and multi-use pathways. Ultimately an east-west multi-use pathway is proposed parallel to the E&N tracks to extend the E&N Trail through the site in place of the City's interim cycling facility that will be constructed on Kimta/Catherine (by the City).

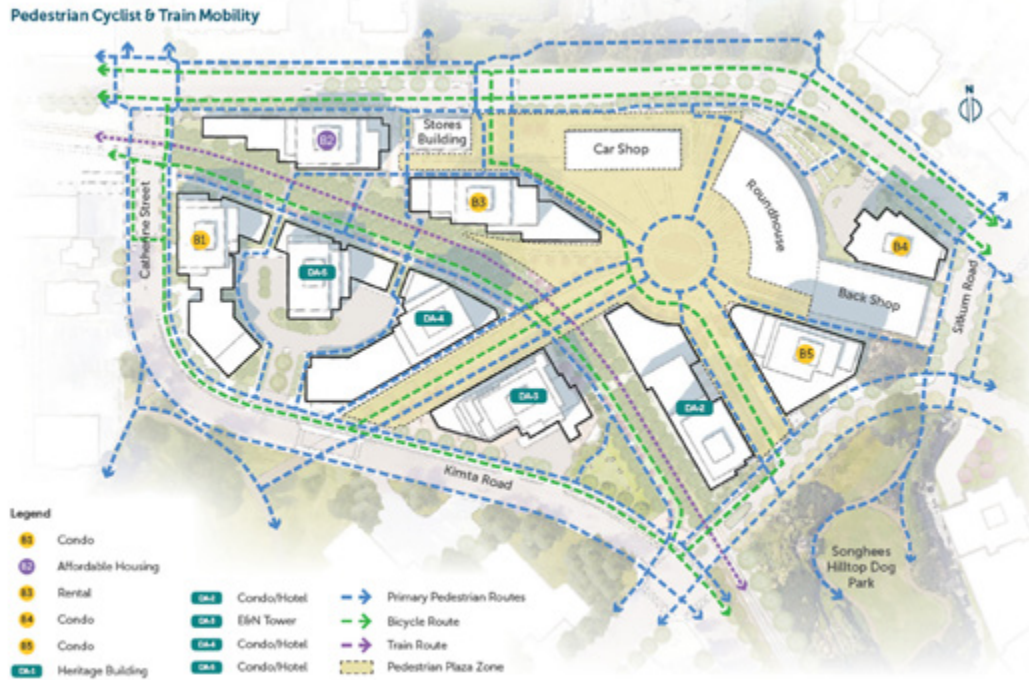


Figure 11: Pedestrian and Bicycle Routes

## 5.0 CONCLUSIONS

The Roundhouse at Bayview Place is comprised of two parcels: North and South. An assessment of existing residential trip generation of existing condominium units in the Victoria West neighbourhood found that vehicle trips are generated at a lower rate than typical (ITE). This is consistent with the highly walkable, bikeable, and high transit service nature of area and the existing mode splits in Victoria. The trip generation for the site is based on site specific residential rate for Victoria West and ITE for the commercial land use. The traffic volumes analyzed are based on 154 more multi-family units and 21,056 sq. ft. more commercial than is identified in the trip generation tables which translates to 36 to 85 less vph expected on the network than was analyzed. The difference in trips does not change the required mitigations.

The existing road network operates at a LOS D or better in the AM peak hour. The addition of the development adds delays; however, only the eastbound direction on





Esquimalt Road at Harbour Road drops in LOS (from D to an E). This is due to the high volume of traffic heading into downtown Victoria in the AM. The segments of Esquimalt Road west of Tye Road are not impacted; however, the combination of the high eastbound through volumes and the existing high southbound left turn volume off Tye Road in the AM creates volumes above 1,000 vph which exceeds a single lane of traffic's capacity at Harbour Road.

In the PM peak hour there are four existing movements that operate at a LOS E/F. The addition of the development traffic impacts movements at Wilson Street / Bay Street; however, with adjustments in signal timing all movements will be at a LOS D or better. At Esquimalt Road/Sitkum Road the southbound movements (from the condominium driveway) will drop to a LOS E due to increased traffic on Esquimalt Road which reduces gaps for left turning traffic from the driveway. At Catherine Street in the PM peak hour, the northbound left turn drops from a LOS E to LOS F (with significant delays) as well as the southbound movement drops to a LOS F. These poor movements are mitigated with the addition of a northbound left turn lane on Catherine Street and adjusted signal timing; however, since this would create an offset alignment through the intersection a northbound right turn lane should be added. The configuration of a northbound left/through and northbound right turn operates at a LOS E (northbound) and LOS D (southbound) which is the same as existing conditions and not as much of an improvement as the northbound left. However, until property can be obtained on the northside of the intersection a separate left turn lane can't be provided.

The other site accesses on Catherine Street / Kimta Road will operate at good LOS in the long term. A review of the southbound left turn queues at the Building1/DA-4/DA-5 access (closest to the Catherine Street crossing) found that the 95<sup>th</sup> queues are less than 10m in length and won't impact the railway crossing (located 50m away).

A full movement access, that aligns with the 222 Esquimalt Road driveway will operate at a LOS B or better. The grades from Sitkum Road to the site are prohibitive to accommodating a driveway under B4 as well as the parcel frontage is limited to less than 15m due to the Backshop (heritage building) which would make exiting towards



Esquimalt Road difficult. The location of a driveway on Sitkum Road is not recommended due to the spacing from the intersection and the challenge motorists will have making a left turn out of the site. A parking facility under the heritage buildings is not planned which makes utilizing a Saghalie Road access for B4 not possible.

The site is well situated for pedestrian facilities, bicycle facilities, and transit service. The transit stop along the Esquimalt Road frontage will be relocated to the far side of the main access and be provided with a queue jumper lane / right turn into the site and a receiving bus bay. New crosswalks at the Main Access intersection will provide additional crossing opportunities between Victoria West Park and the Roundhouse site. Internal pedestrian connections are planned to allow for movement of pedestrians through all frontages / portions of the site. A key corridor will connect the Roundhouse building to Lime Bay Bay. A new raised crosswalk is proposed to extend this corridor across Kimta Road.



## 6.0 RECOMMENDATIONS

The developer is recommended to implement the following as part of the development of the Roundhouse at Bayview Place:

- Signalize the intersection of Esquimalt Road / Main Site Access (between Stores Building and Carshop) including crosswalks on all approaches
- Provide a full movement access for B4 on Esquimalt Road
- Add an eastbound right turn at Esquimalt Road / Main Site Access that could be a shared right turn into the site and a queue jumper lane for transit accessing the new far side stop.
- Relocate that bus bay on Esquimalt Road, eastbound, to a far side bus bay at the Main Site Access
- Add a northbound northbound left turn on Catherine Street at Esquimalt Road and optimize the signal timing. [City will re-stripe the north side to have a southbound left and through/right lane to align the left turn lanes.]
- Adjust the signal timing at Wilson Street / Bay Street
- Install a raised crosswalk across Kimta Road to connect Lime Bay Park with the internal roundhouse pedestrian/bicycle corridor.



## APPENDIX A: SYNCHRO INFORMATION



## SYNCHRO MODELLING SOFTWARE DESCRIPTION

The traffic analysis was completed using Synchro and SimTraffic traffic modeling software. Results were measured in delay, level of service (LOS) and 95<sup>th</sup> percentile queue length. 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.

### 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.

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	Unsignalized Intersection Average Vehicle Delay (sec/veh)	Signalized Intersection Average Vehicle Delay (sec/veh)
A	Less than 10	Less than 10
B	10 to 15	11 to 20
C	15 to 25	20 to 35
D	25 to 35	35 to 55
E	35 to 50	55 to 80
F	More than 50	More than 80

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**Roundhouse at Bayview**  
Traffic Impact Assessment and Management Study



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# MEMORANDUM

**To:** Focus Equities

**From:** Nadine King, P.Eng., PTOE & Filippos Gkekas, MCIP, RPP

**Our File #:** 2762.B01

**Project:** Roundhouse @ Bayview Place

**Date:** September 8, 2022

**RE:** Vehicle Parking & TDM Assessment

---

## 1.0 INTRODUCTION

The purpose of this memo is to provide an overview of bylaw and zoning vehicle parking requirements for the proposed Roundhouse development and identify minimum parking requirements for the site based on current best practices and a suitable range of TDM options for the site.

The following table represents the land uses per building that were used to calculate the parking demand rates and supply.



TABLE 1: LAND USE BREAKDOWN

Building	Residential (units)			Commercial (m <sup>2</sup> )		
	Condo	Rental	Affordable	Retail	Restaurant	Grocery
DA-6	204	-	-	-	-	-
DA-7	-	-	156	186	-	-
DA-8	-	151	-	785	-	-
DA-9	166	-	-	-	-	-
DA-2a	224	-	-	395	-	-
DA-2b	308	-	-	808	-	-
DA-3	199	-	-	295	505	-
DA-4	276	-	-	-	799	-
DA-5	218	-	-	-	-	-
DA-1 (Stores Building)	-	-	-	272	-	-
DA-1 (Roundhouse)	-	-	-	-	-	1,630
DA-1 (Carshop)	-	-	-	-	738	-
DA-1 (Backshop)	-	-	-	680	-	-
<b>Total</b>	<b>1,595</b>	<b>151</b>	<b>156</b>	<b>2,741</b>	<b>2,042</b>	<b>1,630</b>

## 2.0 BYLAW & ZONING REQUIREMENTS

Currently the vehicle parking requirements for the site are set out in CD-12 Zone. The CD-12 Zone was established in 2008 when the City utilized a previous version of Schedule C – Off-Street Parking Regulations which had higher parking requirements. The CD-12 Zone parking requirements were based on best practice understanding of parking demand as of 2008 as well as a package of TDM measures. The TDM measures in the 2008 Roundhouse MDA were:

- Facilities for bicycle storage,
- Pedestrian and cyclist amenity through the Multi-Purpose Pathway,
- Residential + Commercial Transit Passes fully subsidized for a minimum of 3 years,
- Community Shuttle for a minimum of 2 years,
- Four (4) Carshare vehicles + memberships,

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- Exceed City of Victoria bicycle requirements by 20%,
- End of trip cycling facilities, and
- TDM coordinator for a minimum of 1 year.

Since 2008, the City undertook an extensive update of Schedule C – Off-Street Parking Regulations to reflect parking demand within the City of Victoria. This update to Schedule C puts the parking demand rates more in line with the CD-12 Zone requirements which included TDM. The current Schedule C rates are 8.4% (169 stalls) higher than the CD-12 Zone requirements. Table 2 and 3 outlines the required parking based on Schedule C (2018) and CD-12 Zone.

**TABLE 2: SCHEDULE C VEHICLE PARKING REQUIREMENTS**

Building	Residential				Commercial			Total
	Condo	Rental	Affordable	Visitor	Retail	Restaurant	Grocery	
DA-6	191	-	-	20	-	-	-	211
DA-7	-	-	68	16	2	-	-	86
DA-8	-	119	-	15	10	-	-	144
DA-9	150	-	-	17	-	-	-	167
DA-2a	206	-	-	22	5	-	-	233
DA-2b	300	-	-	31	10	-	-	341
DA-3	195	-	-	20	4	13	-	232
DA-4	251	-	-	28	-	20	-	299
DA-5	207	-	-	22	-	-	-	229
DA-1 (Stores Building)	-	-	-	-	3	-	-	3
DA-1 (Roundhouse)	-	-	-	-	-	-	33	33
DA-1 (Carshop)	-	-	-	-	-	18	-	18
DA-1 (Backshop)	-	-	-	-	8	-	-	8
<b>Total</b>	<b>1,500</b>	<b>119</b>	<b>68</b>	<b>191</b>	<b>42</b>	<b>51</b>	<b>33</b>	<b>2,004</b>

TABLE 3: CD-12 ZONE VEHICLE PARKING

Building	Residential				Commercial			Total
	Condo	Rental	Affordable	Visitor	Retail	Restaurant	Grocery	
DA-6	164	-	-	20	-	-	-	184
DA-7	-	-	109	16	2	-	-	127
DA-8	-	128	-	15	10	-	-	153
DA-9	126	-	-	17	-	-	-	143
DA-2a	173	-	-	22	5	-	-	200
DA-2b	258	-	-	31	10	-	-	299
DA-3	168	-	-	20	4	13	-	205
DA-4	211	-	-	28	-	20	-	259
DA-5	181	-	-	22	-	-	-	203
DA-1 (Stores Building)	-	-	-	-	3	-	-	3
DA-1 (Roundhouse)	-	-	-	-	-	-	33	33
DA-1 (Carshop)	-	-	-	-	-	18	-	18
DA-1 (Backshop)	-	-	-	-	8	-	-	8
<b>Total</b>	<b>1,281</b>	<b>128</b>	<b>109</b>	<b>191</b>	<b>42</b>	<b>51</b>	<b>33</b>	<b>1,835</b>

### 3.0 TDM STRATEGIES

Many of the strategies from the 2008 MDA remain relevant today; however, a number of the strategies (transit passes for 3 years, TDM coordinator) would only be available for the short term (less than three years). Since a portion of the previous TDM strategies would not be available long term, the demand for parking could increase once those measures were no longer available and new owners / tenants moved to the site. In 2008, transit service in the vicinity of Roundhouse was limited and was planned to be supplemented by the Community Shuttle for two years; however, the number and frequency of transit routes along Esquimalt Road has substantially increased in the past 13 years and is expected to continue to improve. Therefore, since the shuttle was a short term measure and access to reliable transit service is now available the shuttle is no longer an appropriate TDM strategy for the site.

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The development's goal is to continue to support best transportation practices and reduce vehicle trips and parking demand to reduce the impact on the environment. Therefore, a new TDM package, identified by building, has been developed. The following tables (4 to 12) outline the TDM measures per building that will allow for a parking supply rate below the City's Schedule C (2018) requirements. The percentage reductions, identified in the tables, are based on the existing Schedule C (2018) requirements. The parking rates for Roundhouse are based on the 2018 Schedule C rates with the adjustments to the vehicle parking rates due to the implementation of the identified TDM strategies. For the bicycle parking supply, the identified increase in bicycle parking supply is based on Schedule C (2018) requirements and the bicycle parking is not to be based on an updated / newer Schedule C (in the future), which may be in place at the time of a building's development permit application.

It should be noted that some of the TDM measures presented per building have the potential to be shared between buildings. For example, it is expected that a site-wide bike share program will be administered by the developer which will allow residents of the site to have access to a larger fleet as well as allow the developer to more easily administer the program. End of trip facilities and long-term bike parking could be shared between buildings if they share parkades. The developer could also consider providing some of the cycling end of trip facilities (repair station) in a public space to allow for them to be utilized as a public amenity adjacent to short-term (visitor) bicycle parking spaces.

In addition to the TDM measures identified on a per building basis, it is assumed that the overall site will be providing the following TDM measures site-wide:

- Multimodal Wayfinding Signage
- TDM Marketing & Promotion
- Carpool Information
- Captive Market (people parking once and going to multiple locations on-site)

Shared parking between buildings has not been included in the assessment of TDM and parking minimums at this stage (rezoning). If shared parking between buildings is planned, in the future, further reduction in supply may be possible due to sharing of residential visitor and commercial stalls.

The following tables outline the TDM package committed to for the site, by building.

**TABLE 4: TDM PACKAGE FOR BUILDING DA-6**

<b>Unadjusted Expected Parking Demand</b>	<b>211</b>
<b>TDM Measures</b>	
Cycling End-of-Trip Facilities (Repair Station, Bike Wash Station)	✓
E-bike share	✓
Carshare (Modo Vehicle + Memberships)	✓
<b>Maximum TDM Percentage Reduction</b>	<b>26%</b>
<b>Minimum Parking Supply</b>	<b>156</b> (0.76 spaces / unit)

**TABLE 5: TDM PACKAGE FOR BUILDING DA-7**

<b>Unadjusted Expected Parking Demand</b>	<b>86</b>
<b>TDM Measures</b>	
Cycling End-of-Trip Facilities (Repair Station, Bike Wash Station, Showers, Lockers)	✓
Additional Long Term Bicycle Spaces (20% more than Schedule C [2018])	✓
E-bike share	✓
Carshare (Modo Vehicle + Memberships)	✓
<b>Maximum TDM Percentage Reduction</b>	<b>30%</b>
<b>Minimum Parking Supply</b>	<b>60</b> (0.38 spaces / unit*)

\*Based on residential unit count but includes commercial stalls

Building DA-7 is planned to have 156 affordable housing units; however, an operator / developer for this site has not been identified at this time. The identified parking for this building is based on Schedule C (2018) with appropriate TDM measures; however, specific operators and the range of affordable rental housing provided may further reduce the required amount of parking for this building.



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TABLE 6: TDM PACKAGE FOR BUILDING DA-8

<b>Unadjusted Expected Parking Demand</b>	<b>144</b>
<b>TDM Measures</b>	
Cycling End-of-Trip Facilities (Repair Station, Bike Wash Station, Showers, Lockers)	✓
Additional Long Term Bicycle Spaces (20% more than Schedule C [2018])	✓
E-bike share	✓
Carshare (Modo Vehicle + Memberships)	✓
<b>Maximum TDM Percentage Reduction</b>	<b>31%</b>
<b>Minimum Parking Supply</b>	<b>99</b> (0.66 spaces / unit*)

\*Based on residential unit count but includes commercial stalls

TABLE 7: TDM PACKAGE FOR BUILDING DA-9

<b>Unadjusted Expected Parking Demand</b>	<b>167</b>
<b>TDM Measures</b>	
Cycling End-of-Trip Facilities (Repair Station, Bike Wash Station, Showers, Lockers)	✓
E-bike share	✓
Carshare (Modo Vehicle + Memberships)	✓
<b>Maximum TDM Percentage Reduction</b>	<b>26%</b>
<b>Minimum Parking Supply</b>	<b>124</b> (0.75 spaces / unit*)

\*Based on residential unit count but includes commercial stalls

**TABLE 8: TDM PACKAGE FOR BUILDING DA-2A**

<b>Unadjusted Expected Parking Demand</b>	<b>233</b>
<b>TDM Measures</b>	
Cycling End-of-Trip Facilities (Repair Station, Bike Wash Station, Showers, Lockers)	✓
E-bike share	✓
Carshare (Modo Vehicle + Memberships)	✓
<b>Maximum TDM Percentage Reduction</b>	<b>26%</b>
<b>Minimum Parking Supply</b>	<b>172</b> (0.77 spaces / unit*)

\*Based on residential unit count but includes commercial stalls

**TABLE 9: TDM PACKAGE FOR BUILDING DA-2B**

<b>Unadjusted Expected Parking Demand</b>	<b>341</b>
<b>TDM Measures</b>	
Cycling End-of-Trip Facilities (Repair Station, Bike Wash Station, Showers, Lockers)	✓
E-bike share	✓
Carshare (Modo Vehicle + Memberships)	✓
<b>Maximum TDM Percentage Reduction</b>	<b>26%</b>
<b>Minimum Parking Supply</b>	<b>253</b> (0.82 spaces / unit*)

\*Based on residential unit count but includes commercial stalls

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TABLE 10: TDM PACKAGE FOR BUILDING DA-4

<b>Unadjusted Expected Parking Demand</b>	<b>299</b>
<b>TDM Measures</b>	
Cycling End-of-Trip Facilities (Repair Station, Bike Wash Station, Showers, Lockers)	✓
E-bike share	✓
Carshare (Modo Vehicle + Memberships)	✓
<b>Maximum TDM Percentage Reduction</b>	<b>29%</b>
<b>Minimum Parking Supply</b>	<b>211</b> (0.76 spaces / unit)

\*Based on residential unit count but includes commercial stalls

TABLE 11: TDM PACKAGE FOR BUILDING DA-5

<b>Unadjusted Expected Parking Demand</b>	<b>229</b>
<b>TDM Measures</b>	
Cycling End-of-Trip Facilities (Repair Station, Bike Wash Station)	✓
E-bike share	✓
Carshare (Modo Vehicle + Memberships)	✓
<b>Maximum TDM Percentage Reduction</b>	<b>26%</b>
<b>Minimum Parking Supply</b>	<b>169</b> (0.78 spaces / unit)

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TABLE 12: TDM PACKAGE FOR BUILDING DA-1

Unadjusted Expected Parking Demand	62
TDM Measures	
Cycling End-of-Trip Facilities (Repair Station, Bike Wash Station, Showers, Lockers)	✓
Carshare (Modo Vehicle + Memberships + Evo Stalls)	✓
Maximum TDM Percentage Reduction	13%
Minimum Parking Supply	54

The implementation of an updated TDM package will allow for an overall reduction of 23% of the Schedule C parking requirements for the site.

TABLE 13: MINIMUM PARKING SUPPLY BY BUILDING

Building	Bylaw Required Parking	Minimum Parking Supply
Building DA-6	211	156
Building DA-7	86	60
Building DA-8	144	99
Building DA-9	167	124
Building DA-2a	233	172
Building DA-2b	341	253
Building DA-4	299	223
Building DA-5	229	169
Building DA-1	62	54
Building DA-3*	240	240
<b>Total</b>	<b>2,012</b>	<b>1,550</b>

\*TDM has not been applied to DA-3 as it has an approved building permit with an identified parking supply.

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#### 4.0 SUPPLEMENTAL TDM STRATEGY

For each of the proposed buildings the developer may add to the TDM strategy by increasing the size of 10% of the long term bicycle parking spaces to accommodate cargo bikes and providing electrical outlets for 50% of the total secure (long term) bicycle parking spaces. The oversized bicycle stalls are typically 1.2m longer and the same width as the City's standard stalls (3m L x 0.9m W). If this supplemental strategy is added to the identified TDM measures in the tables above an additional 5% reduction in vehicle parking supply for residential land uses can be achieved.

At the time of development (development permit (DP)) of an individual building the developer may choose to add this supplemental TDM strategy to the building. If this supplemental measure is added the minimum parking supply would be reduced as shown in Table 14.

**TABLE 14: MIN PARKING SUPPLY BY BUILDING WITH SUPPLEMENTAL TDM STRATEGY**

Building	Minimum Parking Supply
Building DA-6	146
Building DA-7	56
Building DA-8	93
Building DA-9	116
Building DA-2a	162
Building DA-2b	238
Building DA-4	211
Building DA-5	159
Building DA-1	54
Building DA-3*	240
<b>Total</b>	<b>1,475</b>

\*TDM has not been applied to DA-3 as it has an approved building permit with the identified parking supply.

A further reduction may occur if there is shared parkade where residential visitors and commercial visitors can share parking.



## 5.0 CONCLUSIONS

The revised TDM package for the Roundhouse development ensures that the TDM strategies are in line with best practices, latest transportation trends, and the fact that these strategies will be available for future tenants, visitors, and employees in perpetuity. The vehicle and bicycle parking rates for Roundhouse are expected to be based on the 2018 Schedule C rates with the adjustments due to the implementation of the identified TDM strategies. The proposed development can achieve a 23% reduction of the Schedule C – Off-Street Parking Regulations (2018) requirements by implementing the updated TDM plan. The developer may decide on a building by building case, to pursue the proposed supplemental TDM strategy (additional space for cargo bicycles and electrification of the stalls) that can achieve further reductions in vehicle parking demand. In addition, further reductions could potentially be achieved by sharing parking between various land uses and buildings. However, the amount of adjustment for shared parking will depend on the design of the spaces and which buildings allow sharing.

As part of the securing the proposed parking minimums the developer will provide the City with mechanisms to secure the TDM.

