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1920 Oak Bay Avenue TRANSPORTATION STUDY

Prepared for Jawl Residential

April 24 2019

File no. 4669.0001.01

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1.0 Introduction

Urban Systems Ltd has been retained by Jawl Residential to complete a transportation study of the proposed redevelopment of the 1908-1920 Oak Bay Avenue properties on the northwest corner of the Oak Bay Avenue / Redfern Street intersection. The study is a comprehensive review of the potential transportation impacts on the surrounding community, with specific consideration of the following:

- The Oak Bay Avenue / Redfern Street intersection performance and potential impacts on the surrounding road network, including on nearby local streets;
- The proposed parking supply and expected parking demand associated with the site redevelopment;
- On-street parking conditions and neighbourhood parking management; and
- Opportunities to limit parking and traffic impacts through transportation demand management ("TDM").

1.1 Location

The subject site is located on the 1908-1920 Oak Bay Avenue properties, on the northwest corner of the Oak Bay Avenue / Redfern Street intersection. See **Figure 1**.



FIGURE 1. STUDY AREA



1.2 Context

1.2.1 Land Use

The site is within the City of Victoria, approximately 180m (two blocks) west of the boundary with the District of Oak Bay (at Foul Bay Road).

The Official Community Plan ("OCP") identifies the site as **Small Urban Village** (the Oak Bay Avenue Village). See **Figure 2**. Areas designated Small Urban Village consist of commercial and community services primarily serving the surrounding residential area, in low-rise, ground-oriented multi-unit residential and mixed-use buildings generally up to four storeys in height along arterial and secondary arterial roads and three storeys in height in other locations, serving as a local transit service hub¹.



FIGURE 2. URBAN PLACE DESIGNATIONS, VICTORIA OCP

¹ City of Victoria, Official Community Plan, Section 6.1.7, pg 35. Available online: www.victoria.ca/assets/Departments/Planning~Development/Community~Planning/OCP/OCP_Sec6_Jan2019_web.pdf



1.2.2 Travel Options

The following is an overview of the transportation infrastructure / services in proximity to the site and the travel options available that would be available to site residents, employees, and customers.

Walking The subject site is located on Oak Bay Avenue at the centre of the Oak Bay Avenue Village identified in the OCP. The area of Oak Bay Avenue within a 3-minute walk (200m) includes grocery, hardware and other retail uses, restaurants and cafes, and a variety of personal and professional services (i.e., medical, dental, fitness, tailors, etc).

The subject site is also approximately a 3-minute walk (200m) from Redfern Park and within a 10-minute walk (800m) of two Large Urban Villages (Jubilee Village, Stadacona Village), Royal Jubilee Hospital, and Oak Bay Recreation Centre. The Oak Bay Village - identified in the District of Oak Bay's OCP as it's primary commercial centre - is also within a 10-minute walk of the site.

The subject site's WalkScore is 89 ("very walkable, most errands can be accomplished on foot")², indicating a high level of walkability.

Sidewalks are provided on the both sides of all streets in the vicinity of the site. Sidewalks on Oak Bay Avenue generally exceed 2.0m in width. Certain local streets (including Redfern Street) have a boulevard with street trees between the sidewalk and street.

Leighton Road and Davie Street / Lee Avenue are identified in the OCP as People Priority Greenways, meaning they are located on secondary and traffic-calmed streets and designed specifically for pedestrians, bicycles and other non-motorized rolling traffic³.

Cycling The subject site is approximately 3.0-km from downtown Victoria, 2.5-km from Camosun College (Lansdowne Campus) and 4.0-km from the University of Victoria (4.0-km), all within comfortable cycling distance for most.

Cycling is facilitated by conventional bicycle lanes on Fort Street, Cadboro Bay Road and Richmond Road to the north, west and east of the subject site. Recent buffered and protected bicycle lane improvements on Fort Street, Pandora Avenue and Begbie Street facilitate cycling to/from downtown Victoria. Future cycling infrastructure improvements are anticipated on either Oak Bay Avenue and/or Leighton Road that would better connect the Jubilee neighbourhood to downtown Victoria.

² More information on the site's WalkScore is available online at: <u>www.walkscore.com/score/210-wilson-st-victoria-bc-canada</u>

³ City of Victoria, Official Community Plan, Section 7.1.5, pg 62. Available online: www.victoria.ca/assets/Departments/Planning~Development/Community~Planning/OCP/Replaced/OCP_Sec7_Jul2017_web.pdf



PublicTransit routes that can be accessed from bus stops (100502, 100512) on Oak Bay AvenueTransitimmediately adjacent the subject site are as follows:

- No.2 James Bay / South Oak Bay / Willows provides service to/from James Bay via downtown Victoria; and
- No.8 Interurban / Tillicum Mall / Oak Bay provides service to/from Camosun College (both campuses) and both Hillside and Mayfair Shopping Centres.

Transit routes that can be accessed from bus stops (100517, 100522) on Foul Bay Road approximately 200m from the subject site are as follows:

- No.3 James Bay / Royal Jubilee provides service to downtown Victoria via the Fairfield / Gonzalez neighbourhood; and
- No.7 Uvic / Downtown provides service to downtown Victoria and the University of Victoria via Foul Bay Road and Fairfield Road.

Transit routes that can be accessed from bus stops (100498, 100515) on Fort Street approximately 500m from the subject site are as follows:

- No.11 Tillicum Mall / UVic provides service between to the University of Victoria, downtown Victoria and Tillicum Mall.
- No.15 Esquimalt / UVic is an identified Regional Route that provides frequent service to the University of Victoria, Camosun College (Lansdowne campus), downtown Victoria and the Esquimalt Dockyard.

Other transit routes that can be accessed within a 10-minute walk (800m) of the subject site include the 1 – South Oak Bay / Downtown, 10 – James Bay / Royal Jubilee, and 14 – Vic General / UVic (Frequent Services, 15-munites or better).

The Victoria Region Transit Future Plan⁴ identifies Oak Bay Avenue, Foul Bay Road and Fort Street as corridors in the Frequent Transit Network that will have a service frequency of 15 minutes or better between 7:00am to 10:00pm, 7 days a week. Access to these three corridors within 500m of the subject site will support transit use among residents, employees and customers. Further, a transit exchange is identified at the Royal Jubilee Hospital that will facilitate transfer between routes.

⁴ BC Transit, Transit Future Plan Victoria Region: Executive Summary, 2011. Available online at: <u>www.bctransit.com/victoria/transit-future</u>



Carshare The most prevalent local two-way carshare service is Modo, with approximately 70 vehicles in the Capital Region (as of January 2019)⁵. Members can access any vehicle within the fleet and pay usage based on the length of time and distance of their trip.

Four vehicles are located within a 5- to 10-minute walk of the site:

- Bouchier Street near Amphion Street (approx. 400m);
- Jubilee Avenue at Oak Bay Avenue (500m);
- Bee Street opposite Oak Bay Recreation Centre (625m); and
- Monterrey Avenue at Monterrey Recreation Centre (700m)

1.3 Proposed Redevelopment

1.3.1 Land Use

The site is currently occupied by two distinct retail uses (garden store at 1908 Oak Bay Ave, picture framing business at 1920 Oak Bay Ave).

The redevelopment proposal is for a four-storey mixed-use building consisting of approximately 7,700 sqft (715m²) of ground-floor commercial uses with 35 multi-family residential units on the upper floors. All residential units will be condominium units subject to strata title. The ground-floor commercial tenants are unknown and - based on direction provided by the applicant - a mix of restaurant and retail uses is assumed for the purposes of this study.

1.3.2 Parking

The proposal includes a total of 58 parking spaces. The underground parking facility consists of 47 spaces and a surface parking area concealed at the back of the building consists of 11 spaces.

1.3.3 Access

Site access is proposed via Redfern Street approximately 30m north of Oak Bay Avenue. See Figure 3.

⁵ Count based on Modo "Car Map", available online at: <u>www.modo.coop/map</u>





FIGURE 3. PROPOSED GROUND FLOOR PLAN⁶

⁶ Site plan provided by Jawl Residential by email, February 11 2019



2.0 Traffic + Road Network

Background and post-development intersection performance has been assessed for the Oak Bay Avenue / Redfern Street intersection. The results are presented below.

2.1 Background Conditions

2.1.1 Road Network

Oak Bay Avenue is a two-lane undivided road and classified as a Secondary Arterial⁷. On-street parking is available along much of Oak Bay Avenue in the vicinity of the site (refer to Section 4.0 for a detailed account of on-street parking).

Redfern Street is a two-lane undivided road and classified as a Local Road⁸ with on-street parking on both sides. Redfern Street intersects Oak Bay Avenue in an off-set configuration, with the south leg approximately 20m east of north leg.

2.1.2 Traffic Volumes

Intersection turning movement counts were collected for the Oak Bay Avenue / Redfern Street intersection on Tuesday March 5, 2019 from 7:00 to 9:00am and 3:00 to 6:00pm. **Figure 4** illustrates the background traffic volumes during the morning (8:00-9:00am) and afternoon (3:45-4:45pm) peak hours.

⁷ Road Classification Map, <u>https://www.victoria.ca/EN/main/residents/transportation/transportation-reference-documents.html</u>

⁸ Ibid.



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FIGURE 4. BACKGROUND AM (PM) PEAK HOUR TRAFFIC VOLUMES

Intersection turning movement counts were also collected on Leighton Street at the Redfern Street, Lee Avenue and Davie Street intersections on Tuesday March 26, 2019 during the morning (8:00-9:00am) and afternoon (3:45-4:45pm) peak hours⁹. See **Figure 5**.

FIGURE 5. AM (PM) PEAK HOUR TRAFFIC VOLUMES, LEIGHTON STREET INTERSECTIONS



Pedestrian counts were also collected during the count periods. At Davie Street intersection and Lee Avenue intersection, the number of pedestrian crossing Leighton Road were no more than five pedestrians per hour. At Redfern Street, approximately 20 to 35 pedestrians crossing Leighton Road were observed during the morning and afternoon peak hours.

⁹ The Leighton Street intersection counts were completed at the request of the applicant based on feedback received during the March 2019 Community and Land Use Committee (CALUC) meeting. The focus of the traffic analysis in this study is the Oak Bay Avenue / Redfern Street intersection and the Leighton Street intersections have not been analyzed further.



2.1.3 Intersection Performance

Synchro v10.1 was used to evaluate the traffic operational performance under the existing condition. Key traffic measures including Level of Service (LOS), delay, volume-to-capacity (v/c), and queue length are summarized in **Table 1**. Detailed Synchro reports are provided in **Appendix A**.

Road	Approach	Control Type	Movement	LOS	V/C	Delay (sec/veh)	95th Queue (m)	
Oak Bay Avenue + Redfern Street (West)								
	FD	Free	L	A (A)	0.01 (0.02)	0.1 (0.2)	0.2 (0.4)	
Oak Bay	EB	Free	Т	A (A)	0.01 (0.02)	0.2 (0.4)	0.2 (0.4)	
Ave		Free	Т	A (A)	0.33 (0.34)	0 (0)	0 (0)	
	VVB	Free	R	A (A)	0.33 (0.34)	0 (0)	0 (0)	
	SB	Stop	L	B (B)	0.04 (0.06)	14.4 (14.2)	1 (1.4)	
Regien St		Stop	R	B (B)	0.04 (0.06)	14.4 (14.2)	1 (1.4)	
Overall Inters	ection			A (A)	-	0.3 (0.5)	-	
Oak Bay Ave	enue + Redfe	ern Street ((East)					
	EB	Free	Т	A (A)	0.33 (0.34)	0 (0)	0 (0)	
Oak Bay		Free	R	A (A)	0.33 (0.34)	0 (0)	0 (0)	
Ave		Free	L	A (A)	0.01 (0.04)	0.2 (0.5)	0.3 (0.9)	
	VVB	Free	Т	A (A)	0.01 (0.04)	0.3 (1)	0.3 (0.9)	
Dodforn St	ND	Stop	L	C (C)	0.1 (0.21)	16.2 (20.7)	2.5 (5.8)	
Regien St	IND	Stop	R	C (C)	0.1 (0.21)	16.2 (20.7)	2.5 (5.8)	
Overall Intersection				A (A)	-	0.7 (1.5)	-	

TABLE 1. BACKGROUND AM (PM) SYNCHRO RESULTS, OAK BAY AVENUE / REDFERN STREET

The model results indicate that under the existing condition, the staggered intersection operates at LOS "A" at the intersection level with minimal delay. Oak Bay Avenue generally operates at free flow condition minimal delay and the delay on Redfern Street is up to approximately 20 seconds. The 95th percentile queue lengths on all approaches appear to be minimal to moderate.



2.2 Post-Development Conditions

2.2.1 Trip Generation

Trip generation refers to the number of new trips that will be generated by the proposed land use. Trip generation rates and directional split (% in/out) are based on the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, *10th Edition*. The trip rate for residential uses is based on the Multi-Family (221) rate, while the trip rate for retail and restaurant uses is based on the average rate for a number of related uses. The full description of the retail and restaurant trip generation is described in **Appendix B**.

The proposed development is anticipated to generate 34 trips (17 in, 17 out) in the AM peak hour and 81 trips (47 in, 34 out) in the PM peak hour. See **Table 2**.

Land Use	Trip Rate	Quantity	Unit	Total Trips	In%	Out%	Trips In	Trips Out
AM								
Residential	0.36	35	DU	13	26%	74%	3.3	9.3
Retail	1.4	3.85	KSF	5	68%	32%	3.6	1.7
Restaurant	4.2	3.85	KSF	16	61%	39%	10.0	6.4
			Total	34			17	17
РМ								
Residential	0.44	35	DU	15	61%	39%	9	6
Retail	6.6	3.85	KSF	25	50%	50%	13	13
Restaurant	10.6	3.85	KSF	41	61%	39%	25	16
			Total	81			47	34

TABLE 2. SUMMARY OF POST-DEVELOPMENT TRIP GENERATION (WEEKDAY)



2.2.2 Trip Distribution + Assignment

Site access is proposed via Redfern Street approximately 30m north of Oak Bay Avenue (Redfern Street is the more minor street, consistent with the requirement of the City's *Highway Access Bylaw*). The trip distribution was based on the peak hour traffic directional split on the Redfern Street, where northbound traffic represents 40% and southbound traffic represents 60% of the total two-way volume. See **Table 3**.

TABLE 3. TRIP DISTRIBUTION

	Distribution	AM	PM
North via Redfern Street	40%	14	33
South via Oak Bay Avenue / Redfern Street	60%	21	49
	Total	34	81

The current intersection turning movement volumes at Oak Bay Avenue / Redfern Street were used in assigning developed trips at the intersection. The distributions are summarized in **Table 4**. New trips were assigned to the network as shown in **Figure 6**. Total post-development traffic volumes (background + development) are shown in **Figure 7**.

TABLE 4. TRIP DISTRIBUTION, OAK BAY AVENUE / REDFERN STREET INTERSECTION

	АМ			PM		
	West	East	Total	West	East	Total
In Trips	67%	33%	100%	67%	33%	100%
Out Trips	57%	43%	100%	92%	8%	100%







2.2.3 Intersection Performance

A summary of post-development Oak Bay Avenue / Redfern Street intersection performance is provided in **Table 5**. The analysis indicates that the intersection is expected to operate at a similar level of service compared to today's condition, with approximately 20 seconds of delay on Redfern Street. The 95th percentile queue lengths in all approaches are expected to remain as moderate.

Road	Approach	Control Type	Movement	LOS	V/C	Delay (sec/veh)	95th Queue (m)	
Oak Bay Avenue + Redfern Street (West)								
	FD	Free	L	A (A)	0.02 (0.04)	0.2 (0.6)	0.4 (1)	
Oak Bay	EB	Free	Т	A (A)	0.02 (0.04)	0.5 (1.1)	0.4 (1)	
Ave		Free	Т	A (A)	0.34 (0.36)	0 (0)	0 (0)	
	VVB	Free	R	A (A)	0.34 (0.36)	0 (0)	0 (0)	
Dodforn St	SB	Stop	L	C (C)	0.11 (0.17)	15.5 (16.2)	2.7 (4.5)	
Regiern St		Stop	R	C (C)	0.11 (0.17)	15.5 (16.2)	2.7 (4.5)	
Overall Inters	ection			A (A)	-	0.8 (1.3)	-	
Oak Bay Ave	enue + Redfe	ern Street ((East)					
	EB	Free	Т	A (A)	0.33 (0.34)	0 (0)	0 (0)	
Oak Bay		Free	R	A (A)	0.33 (0.34)	0 (0)	0 (0)	
Ave	\\/D	Free	L	A (A)	0.01 (0.04)	0.2 (0.5)	0.3 (0.9)	
	VVD	Free	Т	A (A)	0.01 (0.04)	0.3 (1)	0.3 (0.9)	
Podforn St	ND	Stop	L	C (C)	0.1 (0.21)	16.3 (21)	2.6 (5.9)	
Reulein St	IND	Stop	R	C (C)	0.1 (0.21)	16.3 (21)	2.6 (5.9)	
Overall Inters	Overall Intersection				-	0.7 (1.5)	-	

TABLE 5. POST-DEVELOPMENT AM (PM) SYNCHRO RESULTS, OAK BAY AVE / REDFERN ST

Based on the traffic analysis, it was concluded that the increase in traffic resulting from the proposed development will not tangibly impact conditions at the study intersection. Since the study intersection operates at acceptable condition with no significant operational issues, intersection improvement is not required.



2.3 Crosswalk Review

A new crosswalk has been requested on Oak Bay Avenue between the Redfern Street north and south legs. See **Figure 8**. Currently there is no marked crosswalk at this location. A crosswalk currently exists on Oak Bay Avenue at Davie Street approximately 95m to the west (which aligns with the north-south greenway identified in the OCP). Crossing is also facilitated at the Foul Bay Road signalized intersection approximately 150m east of the requested crossing location.

Redfern Park one-block north of the intersection location is a popular pedestrian destination for the neighbourhood. The redevelopment of the properties on Oak Bay Avenue immediately south of this location to include major grocery and hardware stores have increased pedestrian activity in the area in recent years. The redevelopment of the property on the intersection northeast corner (1928 Oak Bay Avenue, under construction) and the potential redevelopment of the subject site is expected to further intensify pedestrian activity on this intersection.



FIGURE 8. OAK BAY AVENUE / REDFERN STREET INTERSECTION CROSSING LOCATION



2.3.1 Traffic Signal Warrant

A traffic signal warrant was completed using the *TAC Traffic Signal Warrant Handbook (2007)* to determine if a traffic signal is required at this location (which would facilitate pedestrian crossing). The warrant concluded that a traffic signal is not warranted at this intersection. These findings are consistent with the conclusion of Section 2.2, above.

2.3.2 Pedestrian Crossing Warrant

The Transportation Association of Canada's (TAC) *Pedestrian Crossing Control Guide*, *2018* was used to determine if a crosswalk is warranted at the Oak Bay Avenue / Redfern Street intersection and to select the appropriate crosswalk treatment. The TAC pedestrian crossing decision support tool relies on the following characteristics in determining whether a location is a candidate for pedestrian crossing control:

- Number of Travel Lanes **Two-Lanes**
- Posted Speed Limit 50 km/h
- Hourly Pedestrian Volume 21 (126 pedestrians over a 6-hour period)¹⁰
- Average Daily Traffic 10,000¹¹
- Distance from Other Traffic Control **95m** (crosswalk at Oak Bay Avenue / Davie Street)

The candidate location meets or exceeds all conditions in the TAC guide required for a basic crosswalk installation with the exception of spacing to the adjacent crosswalk at Oak Bay Avenue / Davie Street. The TAC guide suggests that spacing should be at least 100 to 200m, depending on the jurisdiction, and the spacing to the crosswalk at Oak Bay Avenue / Davie Street is 95m.

The TAC guide, however, indicates that pedestrian crossing control may still be appropriate where the location is on a pedestrian desire line due to the presence of key pedestrian generators on either side of the road. The existing commercial uses on the south side of this location are some of the highest generating uses on Oak Bay Avenue. The TAC guide defines high pedestrian volume as 25 pedestrians per hour for at least four hours of a typical day. Since the observed data showed an average of 21 pedestrians over a 6-hour period with more than 25 pedestrians for two consecutive hours, the pedestrian activity is considered to be medium to high. The additional commercial uses of the subject site and adjacent site under construction will further increase the pedestrian activity in the area.

Based on the above conditions, a marked crosswalk with side mounted signs is installed is recommended at this location. The detailed pedestrian crossing control warrant is included in **Appendix C**. The City may study the Redfern Street and Davie Street locations more comprehensively, including completing pedestrian counts at both locations, if there is concern that the crossing locations are too closely spaced. Pedestrian counts on Leighton Road – one block north of Oak Bay Avenue – found a significantly greater number of crossings at Redfern Street compared to streets immediately west (Lee Avenue, Davie Street).

¹⁰ Pedestrian crossing volumes were observed over a 6-hour period from 10:00am to 2:00pm and 4:00 to 6:00pm on Tuesday, March 05 2019.

¹¹ Average daily traffic was estimated by applying a factor of 10 to the PM peak hour traffic volume (a typical factor applied in a urban environment). For comparison, the City's online mapping system ("VicMap") indicates two-way daily traffic volumes on Oak Bay Avenue to be 12,702 based on a 2018 count.



3.0 Site Parking Demand

3.1 Parking Requirement

The required off-street parking supply is determined through the City's Zoning Bylaw no.80-159, Schedule C: Off-Street Parking Requirements¹². The site parking requirement is 76 spaces, as shown in **Table 6**.

TABLE 6. SUMMMARY OF	OFF-STREET PARKING	REQUIREMENT	("OTHER AREA")

	Quantity	Minimum Parking Supply			
	Quantity	Rate	Total		
Condominium (greater than 70m ²)	21 units	1.45 per unit	30.5		
Condominium (between 45m ² and 70m ²)	14 units	1.0 per unit	14.0		
Visitor	35 units	0.1 per unit	3.5		
Subtotal			48		
Restaurant	357.5 m ²	1 per 20m ²	17.9		
Subtotal			18		
Retail	357.5 m ²	1 per 37.5m ²	9.5		
Subtotal			10		
		TOTAL	76		

The subject site is designated as a Small Urban Village in the OCP and is therefore subject to the minimum parking supply requirements applied to "other areas", as identified above. If the site were designated a Large Urban Village and the "Village / Centre" minimum parking requirements applied, the total requirement would be 64 parking spaces (12 less than is required).

¹² Available online at: <u>https://www.victoria.ca/assets/Departments/Planning~Development/Development~Services/Zoning/Bylaws/Schedule%20C.pdf</u>



3.2 Commercial Parking Demand

The proposed rezoning allows for a variety of commercial uses, although the exact tenants / business types are unknown at the time this report was produced. The applicant has indicated that a combination of restaurant and retail tenants are anticipated¹³. The following analysis assumes that the ground-floor commercial space (7,700 m²) will be 50% restaurant and 50% retail uses.

The anticipated parking demand for the site's commercial uses is based on data obtained through local observations as part of the 2016/2017 review of the City's off-street parking regulations, contained in Working Paper no.3¹⁴. The anticipated parking demand is 1.25 vehicles per 100m² for retail uses and 3.79 vehicles per 100m² for restaurant uses. Applied to the site land uses, the total commercial parking demand is anticipated to be <u>18 vehicles</u>. See **Table 7**. Full details are contained in **Appendix D**.

TABLE 7. SUMMMARY OF COMMERCIAL PARKING DEMAND

	Quantity	Parking Demand			
	Quantity	Rate	Total		
Retail	257 5m ²	1.25 vehicles per 100m ²	4		
Restaurant	307.501	3.79 vehicles per 100m ²	14		
Total			18		

¹³ Based on email correspondence received February 20 2019

¹⁴ Review of Zoning Regulation Bylaw Off-Street Parking Requirement (Schedule C), Working Paper No. 3: Parking Demand Assessment, prepared by Boulevard Transportation / Watt Consulting Group, September 2016.



3.3 Residential Parking Demand

The following section describes estimating residential parking demand using two methods - observations at representative sites and vehicle ownership data.

3.3.1 Residents, Observations of Representative Sites

Anticipated residential parking demand is estimated based on observations of parking demand at twelve multi-family residential sites nearby the subject site (representing 297 units). The average parking demand rate is 0.86 vehicles per unit for condominium sites and 0.71 vehicles per unit for all sites (including apartments). See **Table 8**. The condominium parking demand applied the proposed 35 units suggests resident parking demand will be <u>30 vehicles</u>.

TABLE 8. PARKING OBSERVATIONS AT REPRESENTATIVE MULTI-FAMILY RESIDENTIAL SITES¹⁵

Site	Building Type	No.	Observed Vehicles[2]	Parking Demand Rate
1505 Belcher Avenue	Apartment	33	17	0.52
1537 Belcher Avenue	Apartment	43	19	0.44
1540 Belcher Avenue	Condominium	9	6	0.67
1070 Chamberlain Street	Condominium	6	6	1.00
1520 Jubilee Avenue	Apartment	29	15	0.52
1741 Oak Bay Avenue	Condominium	5	5	1.00
1764 Oak Bay Avenue	Apartment	41	19	0.46
1792 Rockland Avenue	Condominium	15	13	0.87
1653 Oak Bay Avenue	Apartment	24	14	0.58
1665 Oak Bay Avenue	Condominium	25	19	0.76
1520 Richmond Avenue	Apartment	22	14	0.64
1555 Richmond Avenue	Apartment	45	47	1.04
		Avera	ge (Apartment)	0.60
	0.86			
			Average (All)	0.71

¹⁵ Observation undertaken on Thursday February 28, 2019 from 8:00 to 9:00pm.



3.3.2 Residents, Vehicle Ownership Data

Alternatively, anticipated resident parking demand is estimated below based on vehicle ownership data from representative sites in the City of Victoria. All referenced vehicle ownership data was provided by the Insurance Corporation of British Columbia (ICBC) through the *Vehicle Ownership Request* program, as contained in *Working Paper no.3* that was prepared in 2016 / 2017 as part of the City's review of off-street parking regulations¹⁶.

Anticipated parking demand for the residential units is based on vehicle ownership data for condominium sites in areas classified as a Large Urban Village or Town Centre in the OCP, which are thought to best represent the subject site location on Oak Bay Avenue immediately adjacent a variety of commercial and service uses and with good access to public transit. The average vehicle ownership rate for the nine sites surveyed (representing 382 units) is 0.83 vehicles per unit. See **Table 9**. Applied to the subject site, this suggests that resident parking demand will be approximately 29 vehicles and is consistent with the parking demand estimate based on local observations calculated in Section 3.3.1 (above).

		Owned Vehicles		
Site	No. Units	Total	Rate (vehicles / unit)	
1545 Pandora Avenue ^(a)	56	55	0.98	
1025 Hillside Avenue ^(a)	25	17	0.68	
755 Hillside Avenue ^(a)	34	17	0.50	
300 Waterfront Crescent ^(a)	29	33	1.14	
320 Menzies Street ^(a)	24	16	0.67	
240 Cook Street ^(a)	25	15	0.60	
1050 Park Boulevard ^(b)	27	28	1.04	
160 Wilson Street ^(c)	123	130	1.06	
225 Menzies Street ^(d)	39	30	0.77	
		Average	0.83	

TABLE 9. VEHICLE OWNERSHIP AT REPRESENTATIVE MULTI-FAMILY RESIDENTIAL SITES¹⁷

Note: Vehicle ownership data current as of March 31 2016 (a), December 31 2004 (b), April 30 2004 (c) and December 31 2013 (d).

¹⁶ Review of Zoning Regulations Bylaw Off-Street Parking Requirements (Schedule C), Working Paper No.3: Parking Demand Assessment, prepared by Boulevard Transportation / Watt Consulting Group, September 2016.

¹⁷ Based on data from Review of Zoning Regulations Bylaw Off-Street Parking Requirements (Schedule C), Working Paper No.3: Parking Demand Assessment, prepared by Boulevard Transportation / Watt Consulting Group, September 2016, <u>Appendix A</u>.



3.3.3 Residential Visitor Parking

Visitor parking demand rates have been demonstrated in the range of 0.05 to 0.07 vehicles per unit for multi- family residential¹⁸. More recent research completed as part of the City of Victoria review of offstreet parking requirements found peak visitor parking rates to be 0.1 vehicles per unit at condominium sites¹⁹. Applied to the subject site (35 units), this suggests visitor parking demand will be <u>three to four</u> <u>vehicles</u>.

3.4 Summary

The analysis contained in the previous section suggests that the site parking demand will be approximately <u>52 vehicles</u>. See **Table 10**. This is six fewer vehicles than the proposed parking supply and suggests that site parking demand will be accommodated without impacting neighbourhood parking.

Land Use		Anticipated Parking Demand
Commercial	Retail	4
Commercial	Restaurant	14
Pagidantial	Residents	30
Residential	Visitors	4
Total		52

TABLE 10. SUMMMARY OF ANTICIPATED PARKING DEMAND

¹⁸ Based on observations of visitor parking from the 2012 Metro Vancouver Apartment Parking Study (Table 31, pg50) available at: www.metrovancouver.org/services/regionalplanning/PlanningPublications/Apartment_Parking_Study_TechnicalReport.pdf

¹⁹ Based on data from Review of Zoning Regulations Bylaw Off-Street Parking Requirements (Schedule C), Working Paper No.3: Parking Demand Assessment, prepared by Boulevard Transportation / Watt Consulting Group, September 2016, <u>Appendix E</u>.



4.0 Off-Site Parking

Off-site parking conditions were reviewed to determine the availability of on-street parking nearby the subject site.

4.1.1 Neighbourhood Parking Inventory

An on-street parking inventory was developed for an approximately one-black radius surrounding the subject site. The focus of the inventory is on nearby parking restricted for short-term parking, as well as resident parking immediately adjacent the site on Redfern Street. See **Figure 9**. The inventory includes a total of <u>92 on-street parking spaces</u>. There are no public off-street parking spaces in the studied area.

Approximately 45% of the on-street parking supply is restricted as resident parking only, while the other 55% is available to all vehicles with time restrictions.

FIGURE 9. ON-STREET PARKING INVENTORY





4.1.2 Off-Site Parking Utilization

On-street parking utilization was assessed for the approximately one-black radius surrounding the subject site. Observations were completed on the following dates / times:

- 1. Thursday, February 21 2019 @ 1:00pm
- 2. Thursday, February 28 2019 @ 9:00pm
- 3. Friday, March 01 2019 @ 2:00pm

The review concluded that on-street parking in the area was approximately 65% to 70% occupied during the weekday daytime, and as low as to approximately 35% during nighttime. Short-term parking spaces (i.e., all spaces excluding resident parking only) were observed at approximately 80% occupied during the weekday daytime observations.

The areas most immediately adjacent the subject site where any site parking spillover would be concentrated are Redfern Street (Oak Bay Ave to Leighton St) and Oak Bay Avenue (Redfern St to Davie St, north side). Parking along the Oak Bay Avenue site frontage includes seven spaces that were observed occupied with six (86%) and four (57%) vehicles during the weekday daytime observations, and empty during the weekday evening observation. The resident parking area on Redfern Street includes 37 spaces that were observed at no higher than 55% occupied during the weekday daytime observations and approximately 67% occupied during the weekday evening observation.

The full results are summarized in Table 11.



				Observed Vehicles							
Street Segmen	t		Restriction	Parking Supply	Thurs, 1:00	Feb 21 Opm	Thurs, Feb 28 9:00pm		Fri, N 2:0	1ar 01 0pm	
	Fell St to Davie St	Ν	90 min	5	3	60%	0	0%	4	80%	
	Chamberlain St to	c	90 min	3	2	67%	0	0%	3	100%	
	Davie St	5	Loading	3	1	33%	0	0%	1	33%	
Oak Bay Ave	Davie St to	Ν	00 min	7	6	86%	1	14%	4	57%	
	Redfern St	S	90 11111	9	8	89%	0	0%	8	89%	
Redfern St to	Ν	00 min	5	5	100%	0	0%	5	100%		
	Amphion St	S	90 11111	-	-	-	-	-	-	-	
	Oak Bay Ave to Leighton Rd St	W	n/a	-	-	-	-	-	-	-	
Davia St		Е	Pass.	2	0	0%	0	0%	2	100%	
Davie St		W	90 min	3	2	67%	0	0%	2	67%	
	Brighton Ave	Е	Unrestricted	2	2	100%	1	50%	2	100%	
		14/	90 min	3	3	100%	0	0%	2	67%	
	Oak Bay Ave to	vv	RPO	17	11	65%	12	71%	6	35%	
Podforn St	Leighton Rd	E	90 min	2	2	100%	2	100%	2	100%	
Realem St			RPO	20	9	45%	13	65%	9	45%	
	Oak Bay Ave to	W	90 min	3	3	100%	0	0%	2	67%	
	Brighton Ave	Е	n/a	-	-	-	-	-	-	-	
	Oak Bay Ave to	W	1hr	3	3	100%	0	0%	3	100%	
Amphion St	Leighton Rd	Е	1hr	4	3	75%	0	0%	4	100%	
Amphion 3t	Oak Bay Ave to	W	n/a	-	-	-	-	-	-	-	
	Brighton Ave	Е	2hr	1	1	100%	0	0%	1	100%	
Total				92	64	70%	29	32%	60	65%	

TABLE 11. SUMMARY OF ON-STREET PARKING UTILIZATION

Restriction Codes:

RPO – "Residential Parking Only" 1hr – 1 hr, 8am – 6pm, Mon – Sat 90 min – 90 minutes, 8am – 6pm, Mon – Sat 2hr – 2hr, 8am – 6pm, Mon – Sat Loading – Loading Zone Pass. – Passenger Zone, 8am – 6pm, Mon - Sat



5.0 Transportation Demand Management

Transportation demand management ("TDM") refers to the use of policies, programs, services and products to influence whether, why, when, where and how people travel²⁰. Most commonly TDM is employed to encourage walking, cycling, public transit and other sustainable travel modes to reduce parking demand and traffic congestion. The opportunities to reduce the site's traffic and parking demand through TDM are considered in the following sections.

5.1 Carshare

The most prevalent local two-way carshare service is Modo, with approximately 70 vehicles in Greater Victoria (as of January 2019)²¹. Members may access any vehicle within the fleet and pay based on the length of time and distance of their trip. Four vehicles are located within an approximately 5- to 10-minute walk (400m - 700m) of the site - Bouchier Street near Amphion Street (400m), Jubilee Avenue at Oak Bay Avenue (500m), Bee Street opposite Oak Bay Recreation Centre (625m), Monterrey Avenue at Monterrey Recreation Centre (700m).

The absence of a carshare vehicle stationed immediately nearby the subject site and the relatively high density of residential uses in close proximity suggests that Modo may be supportive of a new carshare vehicle in this location. A vehicle could be stationed on the site in the rear surface parking area or on Redfern Street adjacent the site. The applicant may also consider purchasing a non-refundable Modo membership for each residential unit to facilitate carsharing among site residents.

5.2 Bus Stops

The many transit routes and bus stops within walking distance of the subject site are introduced in *Section 1.2.* Consideration may be given to contributing to bus stop improvements in the vicinity of the site to support transit use among site residents and employees.

²⁰ Transport Canada, Transportation Demand Management for Canadian Communities: A Guide to Understanding, Planning and Delivering TDM Programs, March 2011. Available online: <u>http://publications.gc.ca/collections/collection_2011/tc/T22-206-2011-eng.pdf</u>

²¹ Count based on Modo "Car Map", available online at: www.modo.coop/map



6.0 Summary

The proposed development of the 1908-1920 Oak Bay Avenue properties on the northwest corner of the Oak Bay Avenue / Redfern Street intersection includes a four-storey mixed-use building consisting of approximately 7,700 sqft (715m²) of ground-floor commercial uses with 35 multi-family residential units on the upper floors and 58 off-street parking spaces (47 underground, 11 surface).

Pre-and post-development traffic conditions were assessed for the Oak Bay Avenue / Redfern Street intersection. The results indicate that the intersection will continue to operate at a good level of service with the additional traffic generated by the proposed development and mitigation is not required.

A pedestrian crosswalk was reviewed for Oak Bay Avenue at Redfern Street. The review concluded that the level of pedestrian activity at this location warrants a new crosswalk and that the preferred treatment is a marked crosswalk with side-mounted signs.

The site's expected parking demand was calculated based on observations from similar sites, as well as using vehicle ownership data from representative sites in the City of Victoria. Based on the analysis, the anticipated site parking demand is 52 vehicles – 18 for commercial uses, 30 resident, 4 visitor.

Transportation demand management (TDM) options were identified for the applications consideration that would help reduce site traffic and parking demand. Options include a new carshare vehicle and Modo carshare memberships for each residential unit, as well as contributions to improve area bus stops.

6.1 Recommendations

The following are the recommendations of this study:

- 1. The proposed development will not negative impact neighbourhod traffic conditions and no mitigation is recommended.
- 2. The proposed parking supply meets the anticipated site parking demand and it is recommended that the City grant the requested parking variance.
- 3. A marked crosswalk with side mounted signs is recommended on Oak Bay Avenue at Redfern Street to facilitate pedestrian crossing.

APPENDIX A.

Synchro Traffic Model Reports

	۶	-	-	•	5	∢
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		र्स	4Î		- Y	
Traffic Volume (veh/h)	6	478	519	3	3	4
Future Volume (Veh/h)	6	478	519	3	3	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.75	0.92	0.92	0.75	0.75	0.33
Hourly flow rate (vph)	8	520	564	4	4	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	568				1102	566
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	568				1102	566
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	98
cM capacity (veh/h)	1004				232	524
Direction Lane #	FR 1	WR 1	SR 1			
Volume Total	528	568	16			
	J20 Q	000	10			
Volume Pight	0	1	4			
	1004	1700	300			
Volume to Canacity	0.01	0.33	0.04			
Queue Length 95th (m)	0.01	0.55	1.0			
Control Delay (s)	0.2	0.0	1/ /			
	0.2	0.0	14.4 R			
Approach Delay (s)	0.2	0.0	1/ /			
Approach LOS	0.2	0.0	R			
			U			
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utiliza	ation		39.9%	IC	CU Level	of Service
Analysis Period (min)			15			

	->	\rightarrow	1	-	▲	1	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	4			र्स	- M		
Traffic Volume (veh/h)	467	14	8	513	9	17	
Future Volume (Veh/h)	467	14	8	513	9	17	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.88	0.58	0.67	0.86	0.75	0.71	
Hourly flow rate (vph)	531	24	12	597	12	24	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None			None			
Median storage veh)							
Upstream signal (m)							
pX. platoon unblocked							
vC. conflicting volume			555		1164	543	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			555		1164	543	
tC, single (s)			4.1		6.4	6.2	
tC. 2 stage (s)							
tF (s)			2.2		3.5	3.3	
p0 queue free %			99		94	96	
cM capacity (veh/h)			1015		212	540	
Direction Lane #	ER 1	\//R 1	NR 1				
Volumo Total	555	600	36				
	000	10	10				
Volume Leit		12	0/				
	1700	1015	24				
Volume te Conseitu	0.22	1015	0.10				
Volume to Capacity	0.33	0.01	0.10				
Queue Length 95th (m)	0.0	0.3	2.5				
Control Delay (s)	0.0	0.3	16.2				
Lane LUS	0.0	A	16.0				
Approach Delay (s)	0.0	0.3	16.2				
Approach LOS			U				
Intersection Summary							
Average Delay			0.7				
Intersection Capacity Utiliz	zation		43.4%	IC	CU Level	of Service	
Analysis Period (min)			15				

	≯	-	-	•	5	~
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		र्स	t,		- Y	
Traffic Volume (veh/h)	12	515	519	6	1	12
Future Volume (Veh/h)	12	515	519	6	1	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.75	0.92	0.92	0.30	0.25	0.60
Hourly flow rate (vph)	16	560	564	20	4	20
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)		-	-			
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	584				1166	574
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	584				1166	574
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				98	96
cM capacity (veh/h)	991				211	518
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	576	584	24			
Volume Left	16	0	4			
Volume Right	0	20	20			
cSH	991	1700	417			
Volume to Capacity	0.02	0.34	0.06			
Queue Length 95th (m)	0.4	0.0	1.4			
Control Delay (s)	0.4	0.0	14.2			
Lane LOS	A		В			
Approach Delay (s)	0.4	0.0	14.2			
Approach LOS			В			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization	tion		46.7%	IC	U Level	of Service
Analysis Period (min)	-		15			

	-	\rightarrow	1	+	1	1	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	1.			4	¥.		
Traffic Volume (veh/h)	496	20	30	512	13	25	
Future Volume (Veh/h)	496	20	30	512	13	25	
Sign Control	Free	_•		Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.89	0.83	0.83	0.88	0.46	0.78	
Hourly flow rate (vph)	557	24	36	582	28	32	
Pedestrians						-	
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None			None			
Median storage veh)							
Upstream signal (m)							
pX. platoon unblocked							
vC. conflicting volume			581		1223	569	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			581		1223	569	
tC. single (s)			4.1		6.4	6.2	
tC. 2 stage (s)							
tF (s)			2.2		3.5	3.3	
p0 queue free %			96		85	94	
cM capacity (veh/h)			993		191	522	
Direction Lane #		\//R 1	NR 1				
Volumo Total	CD 1	610					
	0	010	00				
Volume Leit	0	30	20				
	24 1700	002	32				
	1700	993	200				
Volume to Capacity	0.34	0.04	0.21				
Queue Length 95th (m)	0.0	0.9	5.8				
Control Delay (s)	0.0	1.0	20.7				
Lane LOS	0.0	A	00 7				
Approach Delay (s)	0.0	1.0	20.7				
Approach LOS			C				
Intersection Summary							
Average Delay			1.5				
Intersection Capacity Utiliz	zation		61.5%	IC	U Level	of Service	
Analysis Period (min)			15				

	۶	-	-	•	1	1
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		र्स	4		- Y	
Traffic Volume (veh/h)	13	478	519	6	8	10
Future Volume (Veh/h)	13	478	519	6	8	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.75	0.92	0.92	0.75	0.75	0.33
Hourly flow rate (vph)	17	520	564	8	11	30
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	572				1122	568
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	572				1122	568
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				95	94
cM capacity (veh/h)	1001				224	522
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	537	572	41			
Volume Left	17	0	11			
Volume Right	0	8	30			
cSH	1001	1700	385			
Volume to Capacity	0.02	0.34	0.11			
Queue Length 95th (m)	0.4	0.0	2.7			
Control Delay (s)	0.5	0.0	15.5			
Lane LOS	A		С			
Approach Delay (s)	0.5	0.0	15.5			
Approach LOS			С			
Intersection Summary						
Average Delay			0.8			
Intersection Canacity Litilizat	tion		45.6%	IC		of Service
Analysis Period (min)			15			

	-	\rightarrow	1	+	1	1
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4			र्स	- Y	
Traffic Volume (veh/h)	472	14	8	516	9	17
Future Volume (Veh/h)	472	14	8	516	9	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.58	0.67	0.86	0.75	0.71
Hourly flow rate (vph)	536	24	12	600	12	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)				110110		
Unstream signal (m)						
nX nlatoon unblocked						
vC. conflicting volume			560		1172	548
vC1_stage 1 conf vol			500		1112	0-10
vC2 stage 2 conf vol						
			560		1172	548
tC single (s)			/ 1		64	6.2
tC, $3 \operatorname{Hyle}(3)$			7.1		0.4	0.2
$t \in (a)$			2.2		35	33
n^{0} and n^{0}			2.2		0.0	0.0
oM canacity (vob/b)			1011		94 210	536
civi capacity (veri/ii)			1011		210	550
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	560	612	36			
Volume Left	0	12	12			
Volume Right	24	0	24			
cSH	1700	1011	353			
Volume to Capacity	0.33	0.01	0.10			
Queue Length 95th (m)	0.0	0.3	2.6			
Control Delay (s)	0.0	0.3	16.3			
Lane LOS		A	С			
Approach Delay (s)	0.0	0.3	16.3			
Approach LOS			С			
Intersection Summery						
			0.7			
Average Delay	- ation		0.7			of Comiles
Analysis Daried (min)	zation		43.0%	IC	U Level	OF SELVICE
Analysis Period (min)			15			

	٦	-	-	•	1	4
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		र्स	ef 👘		Y	
Traffic Volume (veh/h)	31	515	519	15	3	31
Future Volume (Veh/h)	31	515	519	15	3	31
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.75	0.92	0.92	0.30	0.25	0.60
Hourly flow rate (vph)	41	560	564	50	12	52
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	614				1231	589
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	614				1231	589
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				94	90
cM capacity (veh/h)	965				188	508
Direction. Lane #	EB 1	WB 1	SB 1			
Volume Total	601	614	64			
Volume Left	41	0	12			
Volume Right	0	50	52			
cSH	965	1700	385			
Volume to Canacity	0.04	0.36	0 17			
Queue Length 95th (m)	10	0.00	4 5			
Control Delay (s)	1.0	0.0	16.2			
Lane LOS	Δ	0.0	C.			
Approach Delay (s)	11	0.0	16.2			
Approach LOS	1.1	0.0	C.			
			Ū			
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utiliz	ation		62.5%	IC	CU Level	of Service
Analysis Period (min)			15			

	-	\rightarrow	1	+	1	1		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	f,			र्स	Y		_	
Traffic Volume (veh/h)	498	20	30	521	13	25		
Future Volume (Veh/h)	498	20	30	521	13	25		
Sign Control	Free			Free	Stop			
Grade	0%			0%	0%			
Peak Hour Factor	0.89	0.83	0.83	0.88	0.46	0.78		
Hourly flow rate (vph)	560	24	36	592	28	32		
Pedestrians								
Lane Width (m)								
Walking Speed (m/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None			None				
Median storage veh)								
Upstream signal (m)								
pX, platoon unblocked								
vC, conflicting volume			584		1236	572		
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol			584		1236	572		
tC, single (s)			4.1		6.4	6.2		
tC, 2 stage (s)								
tF (s)			2.2		3.5	3.3		
p0 queue free %			96		85	94		
cM capacity (veh/h)			991		187	520		
Direction Lane #	EP 1		NP 1			-		
Volumo Totol	ED I	600						
	504	020	00					
Volume Dight	0	30	20					
	4700	001	32					
COFI Volume to Conseitu	0.24	991	204					
Volume to Capacity	0.34	0.04	0.21					
Queue Length 95th (m)	0.0	0.9	5.9					
Control Delay (s)	0.0	1.0	21.0					
Lane LOS	0.0	A	01.0					
Approach Delay (s)	0.0	1.0	21.0					
Approach LOS			U					
Intersection Summary								
Average Delay			1.5					
Intersection Capacity Utiliz	zation		61.9%	IC	CU Level	of Service		
Analysis Period (min)			15					

APPENDIX B.

Detailed Trip Generation Rates

Trip Generation Rate								
			AM		PM			
RESIDENTIAL LAND USE	Unit	Enter (%)	Exit (%)	Rate	Enter (%)	Exit (%)	Rate	
Multi-Family (221)	DU	26	74	0.36	61	39	0.44	
RETAIL LAND USE	Unit	Enter (%)	Exit (%)	Rate	Enter (%)	Exit (%)	Rate	
Variety Store (814)	KSF	57	43	3.18	52	48	6.84	
Hardware/Paint Store (816)	KSF	54	46	1.08	47	53	2.68	
Sporting Goods Superstore (861)	KSF	80	20	0.34	48	52	2.02	
Toy/Children's Superstore (864)	KSF				50	50	5	
Pet Supply Superstore (866)	KSF				50	50	3.55	
Office Supply Superstore (867)	KSF				51	49	2.77	
Book Superstore (868)	KSF			1.27	52	48	15.83	
Apparel Store (876)	KSF	80	20	1	51	49	4.12	
Liquor Store (899)	KSF				50	50	16.37	
AVERAGE		68	32	1.4	50	50	6.6	
RESTAURANT USE	Unit	Enter (%)	Exit (%)	Rate	Enter (%)	Exit (%)	Rate	
Fast Casual Restaurant (930)	KSF	67	33	2.07	55	45	14.13	
Quality Restaurant (931)	KSF			0.73	67	33	7.8	
High-Turnover (Sit Down) Restaurant (932)	KSF	55	45	9.94	62	38	9.77	
AVERAGE		61	39	4.2	61	39	10.6	

APPENDIX C.

Pedestrian Crossing Control Device Warrant

Intersection Location:	Oak Bay Ave & Redfern St		
Decision Support Tool Questions	Value	Values to Enter	
Is a traffic signal warranted at this location?	Ν	Y or N	
Average Hourly Pedestrian Volume (EAUs)	21	volume in EAUs	
Vehicular Volume (veh/day)	10,000	volume in veh/day	Assume 10 for pm volume factor
Distance from another traffic control device (m)	95	distance in metres	
d value for jurisdiction (100 - 200 m)*	100	distance in metres	
Is this location on a pedestrian desire line or is there requirement for system connectivity?	Y	Y or N	
Does the estimated latent crossing demand at this location exceed 100 EAUs over a 7-hour period?	у	Y or N	Already exceeding 100 EAUs over 7-hours

Ν

Y

Y

γ

γ

Y

Is a traffic signal warranted at this location?
Is average hourly ped volume >= 15 EAUs?
AND vehicular volume >= 1,500 veh/day
Is this site < d from another traffic control device?*
Is this location on pedestrian desire line or is there requirement for system connectivity?
Is latent pedestrian crossing demand expected at this location?

val	uation	

* **d** is any distance between 100 and 200 metres. Each jurisdiction should decide what value of d best suits its needs. This decision depends on road type, traffic volume, expected queue length, pedestrian volume, and characteristics of pedestrians expected to use the facility.

Site is a candidate for pedestrian crossing control

Treatment Selection (Only proceed to this step if the site is a candidate for Pedestrian Crossing Control)

Treatment Selection Tool Questions	Value	Values to Enter
What is the vehicular volume?	9000 < ADT ≤ 12000	veh/day
What is the speed limit?	≤50	km/h
How many lanes?	1 or 2 lanes	include all types of lanes
		include un types of func.
^ The total number of lanes is representative of crossing distance.	The width of these lanes is assumed to be b	etween 3.0 and 3.7 m

according to TAC Geometric Design Guide for Canadian Roads (Table 2.2.2.3). A cross-sectional feature (e.g., a bike lane) that extends the average crossing distance per lane beyond this range of lane widths may need to be considered as an additional lane in this table.

Recommended Treatment:

Crosswalk with side-mounted signs

APPENDIX D.

Detailed Parking Demand Rates

Restaurant													
Average Demand Rate	3.79	vehicles per	- 100m2										
Site			Parking Supp	Ŋ	Wedne	esday March 09), 6:00pm	Ŀ	riday March 11,	6:00pm	ĊŎ	aturday April 02,	6:00pm
		Total Spaces	Sup	ply Rate	Vehicles Observed	Dem	and Rate	Vehicles Observed	Der	nand Rate	Vehicles Observed	Der	nand Rate
1028 Hillside Avenue "5th Street Bar and Grill"	550	31	5.64	vehicles per 100m ²	31	5.64	vehicles per 100m ²	31	5.64	vehicles per 100m ²	26	4.73	vehicles per 100m ²
2900 Douglas Street "ABC Country Restaurant"	350	17	4.86	vehicles per 100m ²	10	2.86	vehicles per 100m ²	4	3.14	vehicles per 100m ²	6	2.57	vehicles per 100m ²
1739 Fort Street "Christie's Carriage House Pub"	006	30	3.33	vehicles per 100m ²	53	2.44	vehicles per 100m ²	25	2.78	vehicles per $100m^2$	27	3.00	vehicles per 100m ²
405 Craigflower Road "Crown Palace Chinese Restaurant"	200	8	4.00	vehicles per 100m ²	с	1.50	vehicles per 100m ²	4	2.00	vehicles per 100m ²	5	2.50	vehicles per 100m ²
607 Oswego Street "Harbour House Restaurant"	200	7	3.50	vehicles per 100m ²	с	1.50	vehicles per $100m^2$	5	2.50	vehicles per 100m ²	9	3.00	vehicles per 100m ²
980 Pandora Avenue "McDonald's"	550	40	7.27	vehicles per 100m ²	17	3.09	vehicles per 100m ²	22	4.00	vehicles per 100m ²	19	3.45	vehicles per 100m ²
1150 Cook Street "Pluto's"	250	16	6.40	vehicles per 100m ²	7	2.80	vehicles per 100m ²	80	3.20	vehicles per 100m ²	11	4.40	vehicles per 100m ²
308 Catherine Street "Spinnaker's Gastro Brewpub"	1000	39	3.90	vehicles per 100m ²	36	3.60	vehicles per 100m ²	38	3.80	vehicles per 100m ²	37	3.70	vehicles per 100m ²
1871 Fort Street "Whitespot (Jubilee)"	250	24	9.60	vehicles per 100m ²	21	8.40	vehicles per 100m ²	22	8.80	vehicles per 100m ²	20	8.00	vehicles per 100m ²
720 Caledonia Avenue Whitespot (Douglas)"	550	55	10.00	vehicles per 100m ²	25	4.55	vehicles per 100m ²	30	5.45	vehicles per 100m ²	33	6.00	vehicles per 100m ²
2706 Government Street "Chiba Sushi"	750	24	3.20	vehicles per 100m ²	12	1.60	vehicles per 100m ²	15	2.00	vehicles per 100m ²	17	2.27	vehicles per 100m ²
					Average	3.45		Average	3.94		Average	3.97	

Retail													
Average Demand Rate	1.25	vehicles po	er 100m2										
Site	Ebor Area (m ²)		Parking Supp	ly	Wedn	esday March 0	9, 1:00pm	Sati	urday March 12,	1:30 pm	S	aturday April 6,	1:30pm
		Total Spaces	Sup	ply Rate	Vehicles Observed	Den	nand Rate	Vehicles Observed	Dem	and Rate	Observed	Der	and Rate
775 Finlayson St, 3080 Blanshard St "Bed Bath Beyond / Pennington's"	3800	83	2.18	vehicles per 100m2	99	1.74	vehicles per 100m2	70	1.84	vehides per 100m2	75	1.97	vehicles per 100m2
1720 Cook Street "Cook Street Castle"	1550	14	06.0	vehicles per 100m2	12	0.77	vehicles per 100m2	11	0.71	vehicles per 100m2	12	0.77	vehicles per 100m2
1136 Hillside Avenue "Courtside Sports"	200	ø	4.00	vehicles per 100m2	ß	2.50	vehicles per 100m2	4	2.00	vehicles per 100m2	4	2.00	vehicles per 100m2
715 Finlayson Street "Dodd's Furniture"	2350	35	1.49	vehicles per 100m2	14	0.60	vehicles per 100m2	19	0.81	vehicles per 100m2	17	0.72	vehicles per 100m2
408 John Street "Fawcett Mattress"	350	12	3.43	vehicles per 100m2	7	2.00	vehicles per 100m2	5	1.43	vehicles per 100m2	ø	2.29	vehicles per 100m2
3029 Nanaimo Street "Hillside Printing"	600	ø	1.33	vehicles per 100m2	4	0.67	vehicles per 100m2	5	0.83	vehicles per 100m2	9	1.00	vehicles per 100m2
483 Burnside Road East "Lordco Autoparts"	1700	34	2.00	vehicles per 100m2	25	1.47	vehicles per 100m2	22	1.29	vehicles per 100m2	21	1.24	vehicles per 100m2
3030 Juttand Road "Pacific Cabinets"	1000	12	1.20	vehicles per 100m2	11	1.10	vehicles per 100m2	8	0.80	vehicles per 100m2	10	1.00	vehicles per 100m2
755 Finlayson Street "Pier 1 Imports"	800	38	4.75	vehicles per 100m2	17	2.13	vehicles per 100m2	20	2.50	vehicles per 100m2	24	3.00	vehicles per 100m2
2135 Government Street "Sherwin-Williams Paint"	1450	7	0.48	vehicles per 100m2	4	0.28	vehicles per 100m2	5	0.34	vehicles per 100m2	5	0.34	vehicles per 100m2
2835 Douglas Street "The Brick"	1650	23	1.39	vehicles per 100m2	4	0.24	vehicles per 100m2	7	0.42	vehicles per 100m2	ø	0.48	vehicles per 100m2
2550 Turner Street "Torbram Electrical Supply"	1000	11	1.10	vehicles per 100m2	9	09.0	vehicles per 100m2	9	09.0	vehicles per 100m2	5	0.50	vehicles per 100m2
338 Catherine Street "Trek Bicycle Store"	300	80	2.67	vehicles per 100m2	5	1.67	vehicles per 100m2	9	2.00	vehicles per 100m2	9	2.00	vehicles per 100m2
1058 Pandora Avenue "Wellburn's Food Market"	1850	48	2.59	vehicles per 100m2	21	1.14	vehicles per 100m2	25	1.35	vehicles per 100m2	29	1.57	vehicles per 100m2
1031 Hillside Avenue "Pacific Paint"	150	4	2.67	vehicles per 100m2	ю	2.00	vehicles per 100m2	2	1.33	vehicles per 100m2	ы	2.00	vehicles per 100m2

 9
 0.86
 vehicles per 100m2
 6
 0.57
 vehicles per 100m2
 5
 0.48
 vehicles per 100m2
 7
 0.67
 vehicles per 100m2

 Average
 1.22
 Average
 1.22
 Average
 1.17
 Average
 1.35

1050

650 Hillside Avenue "Russ Hay's The Bicycle Shop"