



880 FLEMING STREET

Parking Study

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1.0 INTRODUCTION

Watt Consulting Group (WATT) was retained by Method Build Homes (1237932 BC LTD.) to conduct a parking study for a proposed multi-family residential building with a mix of housing tenures including: market rate, below market, and housing income limit (HIL) units at 880 Fleming Street in the Township of Esquimalt, BC. The purpose of this study is to determine the total parking demand for the subject site.

1.1 SUBJECT SITE

The proposed development site is 880 Fleming Street in the Township of Esquimalt, BC (see **Figure 1**). It is currently zoned as RS-1 Single-Family Residential; however, an application for rezoning has been submitted.



Figure 1. Subject Site: 880 Fleming Street



1.2 SITE CHARACTERISTICS AND POLICY CONTEXT

The following provides information regarding services and transportation options in proximity to the subject site. In addition, the Township of Esquimalt's Official Community Plan (OCP) and other community policies pertaining to sustainable transportation and parking management are summarized.

COMMUNITY POLICIES



The Township of Esquimalt's Official Community Plan (OCP) contains policies that provide direction on future planning and land use management.¹ Per Schedule B of the OCP (Proposed Land Use Designations), the subject site is designated as 'Medium Density Residential.' Section 5.3 of the OCP (Medium/High Density Residential Development) outlines the Township's support of compact, efficient medium density residential developments that integrate with the local neighbourhood. Additionally, section 5.3 outlines the Township's prioritisation of proposed medium and high density residential developments that:

1. Reduce single occupancy vehicle use;
2. Support transit services;
3. Are located in proximity to employment centres; and
4. Accommodate young families

Sections 11 (Transportation) and 13 (Environment, Energy, & Climate Change) of the Esquimalt OCP, contain policies focused on promoting multi-modal and low-carbon transportation such as:

- Support densification along frequent and regional transit routes;

¹ Township of Esquimalt (2018). Corporation of the Township of Esquimalt Official Community Plan. Available online at: https://www.esquimalt.ca/sites/default/files/docs/business-development/OCP/Esquimalt_OCP_2020-01-09.pdf



- Consider improving and expanding cycling infrastructure to an All Ages and Abilities standard to encourage cycling as a healthy form of transportation; and
- Prioritise walking, cycling and public transit as preferred modes of transportation in infrastructure improvements.



SERVICES

Within 400m of the subject site there are many commercial, recreational, and institutional amenities including Gorge Vale Golf Club, several small-scale restaurants, a thrift store, Lampson Park, and Esquimalt High School.

- Tillicum Centre is located around two kilometres north of the subject site containing multiple amenities including a grocery store, drug store, movie theatre, recreation centre, many small-scale restaurants, a medical clinic and other amenities.
- The site is also located about 1.5 kilometres north of Esquimalt Plaza on Esquimalt Road, where there is a grocery store, a liquor store, and several small-scale restaurants.
- Lastly, the proposed development is located around three kilometres (10-minute transit ride, 15-minute bike ride, and 45-minute walk) from downtown Victoria, where even more services and amenities are available.



TRANSIT

The site has access to transit within walking distance. There are stops along Craigflower Road—servicing Route 14—that are within 200m (2-minute walk) from the site. There are also bus stops on Tillicum Road within 450 m of the site that are serviced by Route 26 (See [Figure 2](#)).



Route 14 | Vic General/UVic travels west to Victoria General Hospital and east to Downtown Victoria, then north to the University of Victoria (UVic). This route is classified as a Frequent Transit Route.

- Weekday service starts at ~5:45am and continues until midnight, except on Fridays when the service runs later.
- Service runs at a 15-minute frequency between 7am and 10pm, before and after which it runs at 20-minute frequency.

Route 26 | Dockyard/UVic is also a Frequent Transit Route that connects Esquimalt to UVic via Uptown Mall. It travels along the Tillicum Road and Lampson Street.

- Weekday service starts at 6am and ends slightly past midnight.
- This route runs at a 15-minute frequency most of the day except early mornings and late nights when frequency is reduced to 20 minutes.



WALKING

According to Walk Score, the development has a score of 54, suggesting that it is somewhat walkable.² This means that some errands may be accomplished on foot. Each of the adjacent roads to Fleming Street (Craigflower Road, Colville Road, and Lampson Street) have sidewalks on both sides allowing good walking access to the local neighbourhood. There are also multiple parks within 250m; despite this, there are few additional amenities within walking distance. Walk Score is a useful tool in determining the current walkability of a location; additionally, as areas develop and new amenities are added, Walk Score ratings may change.

² Walk Score (2021), More information about the site's walk score is available online at: <https://www.walkscore.com/score/880-fleming-st-victoria-bc-canada>



CYCLING

The site is within 150m of via a connector pathway. Craigflower Road has unbuffered bike lanes on both sides of the street providing a connection to downtown Victoria. The site is also within 800m of the E&N Rail Trail, which may be accessed via local streets with low traffic volumes. The E&N Rail Trail provides access to Downtown Victoria, the Western Communities, as well as the Galloping Goose Regional Trail. The Township is also undertaking an Active Transportation Network Plan. The draft Plan Summary document identifies a future protected bicycle lane on Lampson Street from Craigflower Road to Esquimalt Road and a protected bike facility on Tillicum Road from Craigflower Road to the Gorge Bridge. These proposed improvements, if implemented, are anticipated to improve north-south cycling connectivity—and safety—for future residents of 880 Fleming Street.



Figure 2. Transportation Context of Subject Site



2.0 PROPOSED DEVELOPMENT

2.1 LAND USE

The proposed development is a multi-family residential building comprising 14 market rental units, 3 strata-owned units, 14 below market units, and 14 housing income limited (HIL) rental units, for a total of 45-units, as shown in **Table 1**. Definitions for each tenure are as follows:

- Market Rental / Strata: is the market rental cost of an apartment without rental income restrictions or subsidies. This also includes units that will be in a strata.
- Below Market Rental: is 90% (or 10% below) that of the cost of a market rental unit of the same size.
- Housing Income Limit Rental: represent the maximum gross household income for eligibility in many affordable housing programs. The HILs are based on figures established by CMHC and are intended to reflect the minimum income required to afford appropriate accommodation in the private market. According to BC Housing’s 2021 Housing Income Limits, the maximum gross household income for a one-bedroom in Victoria was \$44,500.³

TABLE 1. SUMMARY OF HOUSING TENURE & UNIT DISTRIBUTION

Unit Type	1-Bedroom	2-Bedroom	3-Bedroom	Total
Market Rental / Strata	10	3	4	17
Below Market Rental	10	3	1	14
Housing Income Limit Rental	10	3	1	14
Total Units	30	9	6	45

³ BC Housing. (2021). 2021 Housing Income Limits. Available online at: <https://www.bchousing.org/publications/2021-Housing-Income-Limits-HILs.pdf>



2.2 PROPOSED PARKING SUPPLY

A total of 26 parking spaces are proposed, with 24 for residents (22 regular and two accessible parking spaces) a rate of 0.53 spaces per unit, as well as two parking spaces for visitors.

2.3 PROPOSED BICYCLE PARKING SUPPLY

A total of 45 bicycle parking spaces are proposed (a rate of 1.0 spaces per unit)

3.0 PARKING BYLAW REQUIREMENTS

Based on Part 5 – Table 1 of the Esquimalt Parking Bylaw, a RM-4 and RM-5 class building (Medium and High Density Apartment) is required to provide 1.3 spaces per dwelling unit. In addition to this, one of every four required parking spaces must be designated as a visitor space. By applying this rate to the proposed development, the required parking supply is 59 spaces (44 resident spaces, and 17 visitor spaces). This means that the development is 33 spaces short of the Township’s parking requirement.

4.0 EXPECTED PARKING DEMAND

Expected parking demand for this site was estimated in the following sections to determine if the proposed supply will adequately accommodate the parking demand. Expected demand is based on [a] parking observations collected from representative sites in the Township of Esquimalt, [b] vehicle ownership data obtained by local affordable housing providers, and [c] research based on previous parking studies.

4.1 MARKET, STRATA, AND BELOW MARKET RENTAL

4.1.1 REPRESENTATIVE SITES

Observations of parked vehicles were completed at 15 market rental buildings in the Township of Esquimalt representing a total of 598 units. A summary of the representative sites is outlined in **Table 2**. Even though all of the sites are market rental buildings, they were deemed to be representative of parking demand for market, strata, and below market rental housing. This judgment was based on past parking studies completed by WATT in Greater Victoria along with conversations with local housing



providers, which confirmed that parking demand for these housing tenures is similar. In some parking studies completed in Esquimalt, parking demand in strata condo buildings has been found to be slightly higher than demand in market rental buildings. However, when controlling for transit proximity, walk score, and proximity to amenities, the parking demand differences are even smaller. As such, observations of condo buildings were not conducted for this study.

Each representative site was chosen based of the following criteria:

- Proximity of Frequent Transit Network (FTN). The location of this proposed development is within 200m of bus stops on the FTN on Craigflower Road. The BC Transit Future Plan describes the FTN as receiving reliable and frequent service (every 15 minutes or better) between 7:00am and 10:00pm seven days a week. Representative sites were selected based on the criteria that they were either on the FTN or within 400m.
- Walk Score. This is a tool that ranks the walkability of a location based on its proximity to seven types of amenities: Dining and drinking, groceries, shopping, errands, parks, schools/education, and culture and entertainment. It is a useful tool for determining if a trip will require a vehicle, and may inform parking needs. The Walk Score of this development is 54, and the average Walk Score of the chosen representative sites is 60.5.
- Countable Parking Spaces. To accurately collect observational data, parking lots must be accessible to a data collector. Sites with gated or underground parking were ruled out as they prohibited data collection.
- Geography. To account for variations in parking that may be unique to the Township of Esquimalt, all representative sites fall within the geographical boundaries of the municipality with special consideration to sites that fell within 450m of the proposed development.



TABLE 2. SUMMARY OF REPRESENTATIVE SITES

Address	Units	Walk Score	Proximity to FTN
899 Craigflower Road	49	61	On FTN
827 Selkirk Avenue	23	63	240m
843 Craigflower Road	48	59	On FTN
830 Craigflower Road	31	55	On FTN
820 Craigflower Road	58	55	On FTN
831 Ellery Street	31	61	350m
837 Ellery Street	36	61	395m
734 Lampson Street	35	58	On FTN
801 Esquimalt Road	32	67	On FTN
885 Dunsmuir Road	77	56	210m
404 Dundas Street	19	70	65m
630 Head Street	30	63	145m
628 Head Street	22	63	125m
980 Wordsley Street	65	60	210m
464 Lampson Street	42	55	350m

4.1.2 OBSERVATIONS

Observations were conducted during the following periods:

- Tuesday, 26 January 2021, after 10:30pm
- Wednesday, 27 January 2021, after 10:30pm

Observations of parking utilisation were conducted at representative sites during peak period for residential land uses (typically weekday evenings). The peak observation for each site over the two observation periods was selected to calculate parking demand



(see **Table 3**). Average parking demand ranged from 0.50 vehicles per unit to 1.14 vehicles per unit. The average across the 15 sites was 0.79 vehicles per unit.

TABLE 3. OBSERVATIONS AT REPRESENTATIVE SITES

Address	Units	Peak Observed Vehicles	Parking Demand (Vehicles/Unit)
899 Craigflower Road	49	32	0.65
827 Selkirk Avenue	23	19	0.83
843 Craigflower Road	48	25	0.52
830 Craigflower Road	31	34	1.10
820 Craigflower Road	58	42	0.72
831 Ellery Street	31	21	0.67
837 Ellery Street	36	31	0.79
734 Lampson Street	35	22	0.63
801 Esquimalt Road	32	16	0.50
885 Dunsmuir Road	77	68	0.88
404 Dundas Street	19	15	0.79
630 Head Street	30	26	0.87
628 Head Street	22	25	1.14
980 Wordsley Street	65	63	0.97
464 Lampson Street	42	36	0.86
Average			0.79



4.1.3 ADJUSTMENT FACTORS

Observations are a useful method of assessing parking demand rates; however, there are limitations to this method. The main limitation is that resident vehicles may not be present at the time of observation. To mitigate this factor, observations were conducted after 10:30pm to maximise likelihood of residents being home. Observations were conducted during the global pandemic of COVID-19 and subsequent social and physical distancing orders from the Provincial Health Officer.⁴ There is still a chance that residents' vehicles may not be present for a multitude of other factors.

To address this potential discrepancy, a 5% adjustment was applied to the observational data in accordance with the Metro Vancouver Apartment Parking Study.⁵ The Metro Vancouver Apartment Parking Study recommends a 5% parking occupancy adjustment factor if observations are conducted after 10:30pm. This resulted in an adjusted parking demand ranging from 0.53 vehicles per unit to 1.19 vehicles per unit, with an average parking demand of 0.83 vehicles per unit as shown in **Table 4**.

⁴ BC CDC. (2020). COVID-19 – Common Questions: Physical Distancing, Available online at: <http://www.bccdc.ca/health-info/diseases-conditions/covid-19/common-questions>

⁵ Metro Vancouver. (2012). The Metro Vancouver Apartment Parking Study, Technical Report. Available online at: http://www.metrovancouver.org/services/regional-planning/PlanningPublications/Apartment_Parking_Study_TechnicalReport.pdf



TABLE 4. ADJUSTED PARKING DEMAND, OBSERVED REPRESENTATIVE SITES

Address	Units	Parking Demand (Vehicles/Unit)	Adjusted Parking Demand (Vehicles/Unit)*1.05
899 Craigflower Road	49	0.65	0.69
827 Selkirk Avenue	23	0.83	0.87
843 Craigflower Road	48	0.52	0.55
830 Craigflower Road	31	1.10	1.15
820 Craigflower Road	58	0.72	0.76
831 Ellery Street	31	0.67	0.70
837 Ellery Street	36	0.79	0.83
734 Lampson Street	35	0.63	0.66
801 Esquimalt Road	32	0.50	0.53
885 Dunsmuir Road	77	0.88	0.93
404 Dundas Street	19	0.79	0.83
630 Head Street	30	0.87	0.91
628 Head Street	22	1.14	1.19
980 Wordsley Street	65	0.97	1.02
464 Lampson Street	42	0.86	0.90
Average		0.79	0.83



4.1.4 PARKING DEMAND BY UNIT TYPE

Unit size type refers to the number of bedrooms provided within a residential unit. Research has shown that larger units will generally have more occupants or a family, therefore increasing the likelihood that additional vehicles will be owned by occupants and growing the parking demand.⁶ Parking data collected for this study was assessed to reflect unit type using the following steps:

- Parking demand was calculated and adjusted by 5%;
- Parking demand by unit type was calculated based on the demand ratios of bedrooms per unit at each site acquired from the Metro Vancouver Parking Study from 2018; and
- The assumed “ratio differences” (from 2018 Metro Vancouver Parking study) for parking demand between each site was applied to unit data and vehicle observations. These “ratio differences” are as follows.⁷
 - 1-Bedroom units’ parking demand rates will be 117% higher than studio unit rates;
 - 2-Bedroom units’ parking demand rates will be 26% higher than 1-Bedroom unit rates; and
 - 3-Bedroom units’ parking demand rates will be 23% higher than 2-Bedroom unit rates.

Table 5 illustrates the adjusted average parking demand by unit type.

⁶ Potoglou, D., & Kanaroglou, P.S. (2008). Modelling car ownership in urban areas: a case study of Hamilton, Canada. *Journal of Transport Geography*, 16(1): 42–54.

⁷ Metro Vancouver. (2018). Regional Parking Study – Technical Report, pg. 18. Available online at: <http://www.metrovancouver.org/services/regional-planning/PlanningPublications/RegionalParkingStudy-TechnicalReport.pdf>



TABLE 5. ADJUSTED PARKING DEMAND BY UNIT SIZE

Site / Address	Adjusted Parking Demand	1-Bedroom	2-Bedroom	3-Bedroom
899 Craigflower Road	0.69	0.59	0.75	--
827 Selkirk Avenue	0.87	0.87		--
843 Craigflower Road	0.55	0.52	0.66	--
830 Craigflower Road	1.15	1.02	1.29	--
820 Craigflower Road	0.76	0.76	0.95	--
831 Ellery Street	0.70	--	0.70	--
837 Ellery Street	0.83	0.75	0.94	--
734 Lampson Street	0.66	0.66	--	--
801 Esquimalt Road	0.53	0.57	0.72	--
885 Dunsmuir Road	0.93	0.88	1.10	1.36
404 Dundas Street	0.83	0.83	--	--
630 Head Street	0.91	0.84	1.06	--
628 Head Street	1.19	1.18	1.49	--
980 Wordsley Street	1.02	0.95	1.20	--
464 Lampson Street	0.90	0.77	0.97	--
Average	0.83	0.80	0.99	1.21*

*Due to the limited number of observed 3-bedroom units the assumed ratio difference has been applied to the findings of the 2-bedroom rate.



4.2 HOUSING INCOME LIMIT

4.2.1 REPRESENTATIVE SITES

Vehicle ownership data was obtained from Pacifica Housing and the Greater Victoria Housing Society to gain insight into the parking demand of other buildings with units that are Rent Geared to Income and/or based on Housing Income Limits. These organisations provided information for 272 units. A summary of the representative sites is outlined in **Table 6**.

TABLE 6. SUMMARY OF HOUSING INCOME LIMITED REPRESENTATIVE SITES

Address	Units	Number of Stalls Rented	Parking Demand Rate (Vehicles/Unit)
1025 North Park Street	10	10	1.00
450 Superior Street	40	8	0.20
1130 Fort Street	21	22	1.05
3015 Jutland Road	21	45	2.14
3226 Alder Street	32	20	0.63
1253 Johnson Street	21	8	0.38
921 North Park Street	74	26	0.35
2993 Tillicum Road	53	27	0.51
Average			0.78

4.2.2 PARKING DEMAND BY UNIT TYPE

As above in **Section 4.1.4**, the parking demand data was adjusted to reflect the demand based on unit type. However, as the data collected is based on the number of rented parking stalls, and not based on observations, it was not adjusted by 5% the same way as the data from **Section 4.1**.



The following steps were followed for this analysis:

- Parking demand by unit type was calculated based on the demand ratios of the unit sizes for ‘Affordable Housing’ in the City of Victoria’s Off-Street Parking Regulations⁸ (Schedule C); and
- The assumed “ratio differences” for parking demand between each site was applied to the unit data and vehicle observations. These “ratio differences” are as follows.
 - 1-Bedroom units’ parking demand rates will be 86% higher than studio unit rates;
 - 2-Bedroom units’ parking demand rates will be 40% higher than 1-Bedroom unit rates; and
 - 3-Bedroom units’ parking demand rates will be 20% higher than 2-Bedroom unit rates.

Table 7 illustrates the average parking demand by unit type.

TABLE 7. PARKING DEMAND BY UNIT SIZE

Site / Address	Parking Demand	1-Bedroom	2-Bedroom	3-Bedroom
1025 North Park Street	1.00	0.75	1.05	1.26
450 Superior Street	0.20	0.15	0.21	0.25
1130 Fort Street	1.05	0.67	0.94	1.13
3015 Jutland Road	2.14	--	2.56	3.07
3226 Alder Street	0.63	0.44	0.61	0.73
1253 Johnson Street	0.38	--	0.35	0.42
921 North Park Street	0.35	0.27	0.38	0.46
2993 Tillicum Road	0.51	0.43	0.60	--
Average	0.78	0.45	0.84	1.04

⁸ City of Victoria. (2020). Zoning Regulation Bylaw (80-159) – Off Street Parking. Available online at: <https://www.victoria.ca/assets/Departments/Planning~Development/Development~Services/Zoning/Bylaws/Schedule%20C.pdf>



4.3 VISITOR PARKING

Observational visitor parking data was collected at six of the representative sites, showing a demand rate of 0.07 vehicles per unit (see **Table 8**). These observations are similar to the results from the Metro Vancouver study, which concluded visitor parking demand is typically less than 0.1 vehicles per unit.⁹ Findings from similar studies conducted by WATT Consulting Group have reported visitor parking in the range of 0.05 to 0.10 across different geographical regions including Greater Victoria and Nanaimo.

TABLE 8. VISITOR PARKING DEMAND AT REPRESENTATIVE SITES

Address	Units	Peak Observed Visitor Vehicles	Visitor Parking Demand (Vehicles/Unit)
899 Craigflower Road	49	4	0.08
801 Esquimalt Road	32	4	0.12
885 Dunsmuir Road	77	1	0.03
630 Head Street	30	3	0.13
980 Wordsley Street	65	2	0.03
464 Lampson Street	42	2	0.05
		Average	0.07

Based on the available research and observational data, a conservative rate of 0.1 is recommended for the subject site. With 45 units and applying a visitor demand rate of 0.1, the recommended visitor parking is five spaces (4.5, rounded).

⁹ Metro Vancouver. (2012). The Metro Vancouver Apartment Parking Study, Technical Report. Available online at: <http://www.metrovancouver.org/services/regional-planning/transportation/regional-parking-studies/Pages/default.aspx>



4.4 SUMMARY OF EXPECTED PARKING DEMAND

The expected parking demand for this building is 38 residential spaces and five visitor spaces, bringing the total demand to 43 parking spaces—17 greater than the proposed supply (see [Table 9](#)).

TABLE 9. SUMMARY OF TOTAL EXPECTED PARKING DEMAND

Housing Tenure	Unit Type	Units	Demand Rate	Rounded Totals
Market Rental / Strata	1-Bedroom	10	0.8	8
	2-Bedroom	3	0.99	3
	3-Bedroom	4	1.21	5
Below Market Rental	1-Bedroom	10	0.8	8
	2-Bedroom	3	0.99	3
	3-Bedroom	1	1.21	2
Housing Income Limit	1-Bedroom	10	0.45	5
	2-Bedroom	3	0.84	3
	3-Bedroom	1	1.04	1
Visitor Parking		45	0.10	5
Total Parking Demand (Spaces)				43



5.0 ON-STREET PARKING ASSESSMENT

An on-street parking analysis was conducted in the area surrounding the subject site. A total of 105 on-street spaces were observed. Two counts were completed after 9:30pm on the 2nd and 3rd of February 2021. Counts were completed on the following street segments:

- Fleming Street – Colville Rd to End
- Colville Road – Lampson Street to Fleming Street
 - Note: there are four spaces from 908 Colville Road to Fleming Street that are denoted as 'Resident Parking Only'.
- Colville Road – Fleming Street to Phoenix Street
- Lampson Street – Craigflower to Transfer Street

The on-street counts were intended to capture the peak parking conditions for residential parking conditions when residents (particularly on Fleming Street) are most likely to be home.

The peak parking demand was 55 vehicles (105 spaces) for a maximum utilisation of 53% (65% on Fleming Street, 81% on Lampson Street, and 44% on Colville Road). See **Table 10**. These data indicate that the surrounding on-street parking conditions are generally not busy during the peak time.



TABLE 10. SUMMARY OF ON-STREET PARKING DEMAND

Street	Segment	Side	Available Spaces	Observed	% Occupied
Lampson Street	Craigflower - Transfer Street	W	16	13	81.25%
Colville Road	Lampson Street - 908 Colville Rd	N	16	6	37.50%
	908 Colville Rd - Fleming Street	N	4	0	0.00%
	Lampson Street - Fleming Street	S	25	4	16.00%
	Fleming Street - Phoenix Street	N	9	9	100.00%
		S	17	11	64.71%
Fleming Street	Colville Road - End	E	8	4	50.00%
		W	10	8	80.00%
Total			105	55	53%



6.0 TRANSPORTATION DEMAND MANAGEMENT

Transportation demand management (TDM) is the application of strategies and policies to influence individual travel choice, most commonly to reduce single-occupant vehicle travel. TDM measures typically aim to encourage sustainable travel, enhance travel options and decrease parking demand. The following sections present a number of TDM measures that the applicant could pursue to reduce the amount of vehicle parking required for the development. All of the TDM measures are recommended but the applicant will ultimately need to decide what they will commit to. For all of the TDM measures, an approximate reduction in parking demand is provided.

6.1 PROVISION OF ELECTRIC BICYCLES

6.1.1 OVERVIEW

Electric bicycles (e-bikes) are bicycles with an electric motor of 500 watts or less, and functioning pedals. The e-bike will assist a rider pedalling up to a top speed of 32 km/h at which point the electric motor will no longer assist the rider. In other words, it is possible to achieve speeds greater than 32 km/h on an e-bike—such as when going downhill, similar to what is possible on a conventional bicycle—but the electric mechanism will no longer assist the rider above 32 km/h and at that point the rider can still pedal but without benefit of the electric motor.

Electric bicycles make cycling more attractive for a greater diversity of the population, particularly for seniors, women, and people with disabilities, as they increase the maximum length of bicycle trips, minimize the impact of hills and other terrain challenges, and allow people to bike with heavier cargo loads. Further, electric bicycles can help communities achieve their GHG emission reduction targets. With supportive cycling infrastructure in place, e-bikes have the potential to substitute for, or completely replace, almost all trips taken by a gasoline powered car, which could address congestion issues within urban areas.



Recent research on e-bikes has reported the following impacts on vehicle ownership:

- A 2020 scoping review looked at 76 studies that have been published to date on electric bikes. It found that the proportion of car journeys substituted following acquisition of an e-bike ranged from 20% to 86%, with three studies reporting the substitution of short car journeys with the e-bike.¹⁰
- A 2020 study found that people who purchased an e-bike increased their bicycle use from 2.1 to 9.2 km per day on average.¹¹
- A 2019 study found that approximately 39 kilometres of driving per week is displaced by the average e-bike adopter along with 14 kilometres of travel by conventional bicycle.¹²
- A 2018 study presented results of a North American survey of electric bike owners. The study reported that 62% of e-bike trips replaced trips that otherwise would have been taken by car. Of these trips previously taken by car, 45.8% were commute trips to work or school, 44.7% were other utilitarian trips (entertainment, personal errands, visiting friends and family, or other), and 9.4% were recreation or exercise trips. The average length of these previous car trips was 15 kilometres.¹³

Based on travel data from the 2017 CRD Origin Destination Household Travel Survey, the majority of trips from the Township are for work and shopping, which could both be completed on an electric bike. Further, within the Capital Region, the average bike trip is 3 kilometres and the average car trip is 6 kilometres. A 2019 study found that e-bike

¹⁰ Bourne, J.E., Cooper, A.R., Kelly, P., Kinnear, F.J., England, C., Leary, S., and A. Page. (2020). The impact of e-cycling on travel behaviour: A scoping review. *Journal of Transportation Health*, 19.

¹¹ Fyhri, A & H.B. Sundfor. (2020). Do people who buy e-bikes cycle more? *Transportation Research Part D*, 86, 1-7.

¹² Bagasse, A & E Borgesian. (2019). *Electric Bicycles: Can they reduce driving and emissions in Canada*. Plan Canada Fall 2019.

¹³ MacArthur, J., Harpool, M., & D. Scheppke. (2018). *A North American Survey of Electric Bicycle Owners*. National Institute for Transportation and Communities, NITC-RR-1041.



trips in North American and Europe are 6 kilometres on average, which indicates that e-bikes have considerable potential to displace vehicle trips in the CRD.¹⁴

Based on the data and research above, e-bikes can be a suitable TDM strategy for the subject site.

6.1.2 RECOMMENDATION

The applicant is considering the provision of electric bicycles as part of the proposed development. According to research completed in Greater Victoria, the cost of an electric bike is the largest barrier preventing purchases of e-bikes.¹⁵ The price of an electric bike ranges considerably depending on the model and brand. However, the price is typically in the range of \$2,000-\$10,000.

As such, the provision of an electric bike can make e-bike ownership possible for future residents. It is recommended that the applicant provide an e-bike to all 14 units that qualify for the Housing Income Limit Rental. Tenants in these units will have a gross household income that does not exceed \$44,500. The provision of an e-bike to these units will provide residents with greater transportation choice and further disincentivize vehicle ownership. To create more flexibility and suit residents' needs, it is recommended that the applicant, as part of the tenant selection process, work with future residents to determine which electric bike is most suitable for their needs.

A parking demand reduction of 20% is supported for the proposed development if an electric bicycle is provided to each HIL unit.

¹⁴ Berjisian, E & A Bigazzi. (2019). Summarizing the Impacts of Electric Bicycle Adoption on Vehicle Travel, Emissions, and Physical Activity. React Lab, UBC. Available online at: http://civil-reactlab.sites.olt.ubc.ca/files/2019/07/BerjisianBigazzi_ImpactsofE-bikes_Report_July2019.pdf

¹⁵ WATT Consulting Group. (2018). Capital Region Local Government Electric Vehicle + Electric Bike Infrastructure Backgrounder. Available online at: https://www.crd.bc.ca/docs/default-source/climate-action-pdf/reports/electric-vehicle-and-e-bike-infrastructure-backgrounder-sept-2018.pdf?sfvrsn=a067c5ca_2



6.2 SHARED ELECTRIC BIKE PROGRAM

6.2.1 OVERVIEW

The applicant is considering the provision of a shared electric bike program in the proposed development, which will make cycling more attractive for residents and help them complete a variety of trips that would otherwise require a car, transit, or another mode. The program would be open to all residents but be intended for the residents living in the market rental and below market rental units.

6.2.2 RECOMMENDATION

As the applicant continues to determine the operational and logistical details for the proposed shared e-bike program, it is recommended that they consider the following:

- A minimum of five electric bicycles should be provided (just over 10% of the total units).
- To create more flexibility and suit tenant needs, it is recommended that the applicant provide different types of electric bikes. For example, a young family looking to rent a three-bedroom unit may be more interested in an electric cargo bike, which are better for transporting children and heavier items such as groceries.
- The e-bikes should be owned and maintained by the property manager.
- The cost to use (i.e., reserve) an e-bike should be determined by the property manager.
- The process to reserve an e-bike will most likely be on a first come first serve basis but will ultimately need to be determined by the property manager.
- Overall e-bike utilization should be carefully monitored in the first year. If demand is consistently high, consideration should be given to adding more e-bikes to the fleet after year 1.
- Building tenants should be discouraged from using the e-bikes for work trips. The e-bikes should be intended for various trip purposes including errands, shopping, appointments, etc., which are all shorter duration trips and would allow the e-bikes to be more available to the site for other residents.

With the provision of a shared electric bike program, a 10% reduction in resident parking demand is supported.



6.3 ELECTRIC BIKE PARKING

6.3.1 OVERVIEW

To support the provision of shared electric bicycles in the proposed development, it is recommended that the applicant provide adequate e-bike parking. According to research completed in Greater Victoria, one of the top barriers facing prospective e-bike users is the fear that their bicycle might be stolen.¹⁶ Further this research showed that users would feel more comfortable if they could park their bicycle in a locked or supervised area.

The Capital Region Local Government Electric Vehicle + Electric Bike Infrastructure Planning Guide¹⁷ includes e-bike parking design guidelines to help address the concerns of current and prospective e-bike owners as well as to increase overall e-bike ownership in the Capital Region. The guide recommends that new developments provide 50% of the long-term bicycle parking with access to an 110V wall outlet. Further, 10% of the long-term spaces are recommended to be provided as cargo racks to accommodate e-bikes.

6.3.2 RECOMMENDATION

It is recommended that the applicant commit to the following:

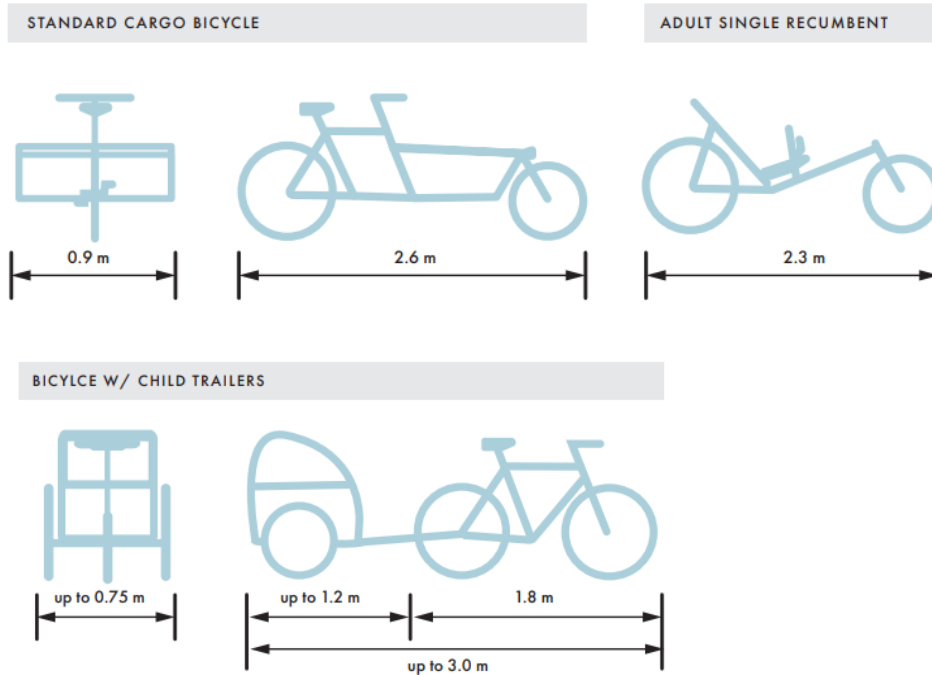
- **Cargo Bike Parking** | Design 10% of the long-term bicycle parking spaces (approximately five spaces) to accommodate cargo bicycles. Cargo bikes are typically longer than regular bicycles because they can carry cargo and/or multiple passengers and can be a popular option for young families. The spaces should be designed to be a minimum of 3.0 metres in length and 0.9 metres wide. They should also be provided as ground anchored racks.
- **Access to Charging** | Provide at least 50% of the long-term bicycle parking spaces with direct access to an 110V wall outlet to help facilitate charging for e-bike owners and/or prospective e-bike owners.

¹⁶ WATT Consulting Group. (2018). Capital Region Local Government Electric Vehicle + Electric Bike Infrastructure Backgrounder. Available online at: https://www.crd.bc.ca/docs/default-source/climate-action-pdf/reports/electric-vehicle-and-e-bike-infrastructure-backgrounder-sept-2018.pdf?sfvrsn=a067c5ca_2

¹⁷ Ibid.



- **Secured Location** | Ensure that all long-term bike parking spaces will be in a secure access-controlled location, which is especially important for e-bike users to minimize bike theft.



Typical dimensions for cargo and longer bicycles. Source: BC Active Transportation Design Guide

With the provision of electric bike parking, a 5% reduction in resident parking demand is supported.



6.4 PROVISION OF A CARSHARE PROGRAM

6.4.1 OVERVIEW

Carshare is a form of car rental where people can book vehicles for varying lengths of time. They are usually co-operative and users must sign up as a member to be able to use the vehicles and pay the costs associated with it. An external carshare program could be considered for the site, as carsharing can be a viable option for those who sometimes need access to a vehicle but may not want to or be able to pay the costs associated with owning a vehicle (or second vehicle). The external carshare program would be through Modo, which is the largest carsharing company in the Greater Victoria area. Modo is a co-operative, and this means that the vehicles would not be reserved exclusively for employees at the site as other Modo members in the area could also use the vehicle(s).

At the time of writing this report, there are currently four Modo carshare vehicles in Esquimalt according to their website.¹⁸ Even though four vehicles may seem trivial for a population of 19,000 people, the data indicate that prior to COVID-19, Modo membership was growing in the Capital Region and will likely continue to do so following the pandemic. Further, according to the 2017 CRD Regional Household Travel Survey, Esquimalt has one of the highest shares of households in the region with one vehicle (54%), which can make carsharing an even more viable option for families who may require a vehicle for only select trips.¹⁹

Part of the reason why carsharing is expanding locally and being supported by municipalities is because of its ability to reduce household vehicle ownership and parking demand. A recent 2018 study from Metro Vancouver analyzed 3,405 survey respondents from carsharing users in the region and found that users of Car2go and Modo reported reduced vehicle ownership after joining a carsharing service. The impact

¹⁸ More information about Modo carshare vehicle location is available online at: <https://modo.coop/car-map>

¹⁹ Capital Regional District. (2017). CRD Origin-Destination 2017 Household Travel Survey, pg. 105. Available online at: https://www.crd.bc.ca/docs/default-source/regional-planning-pdf/transportation/crd-2017-od-survey-report-20180622-sm.pdf?sfvrsn=4fcbe7ca_2



was larger for Modo users; households joining Modo reduced their ownership from an average of 0.68 to 0.36 vehicles. Further, Modo members were close to five times more likely to reduce car ownership compared to Car2go users. Additional research has found the following:

- A 2016 study in San Francisco reported that the potential for carsharing to reduce vehicle ownership is strongly tied to the built environment, housing density, transit accessibility, and the availability of parking.²⁰
- A 2013 study from the City of Toronto looked at the relationship between the presence of carsharing in a residential building and its impact on vehicle ownership. The study surveyed residents of buildings with and without dedicated carshare vehicles. The study found that the presence of dedicated carshare vehicles had a statistically significant impact on reduced vehicle ownership and parking demand. Specifically, 29% of carshare users gave up a vehicle after becoming a member and 55% of carshare users forgone purchasing a car as a result of carsharing participation.²¹

While a study has not yet been completed in Greater Victoria to understand the impacts of carsharing on vehicle ownership, the results would likely be similar especially for households living in more urban areas such as Esquimalt and Victoria where there is greater access to multiple transportation options.

²⁰ Clewlow, R.R. (2016). Carsharing and sustainable travel behaviour: Results from the San Francisco Bay Area. *Transport Policy*, 51, 158-164.

²¹ Engel-Yan, D., & D. Passmore. (2013). Carsharing and Car Ownership at the Building Scale. *Journal of the American Planning Association*, 79(1), 82-91.



6.4.2 RECOMMENDATION

Given the location of the site and the proposed housing tenure, it is recommended that the applicant approach Modo to determine whether they would be supportive of providing a vehicle at the subject site. Based on previous correspondence with Modo, the provision of a Modo vehicle would include the following conditions:

- The applicant would provide, at no cost to Modo, one designated parking space at the proposed development, compliant with Modo Construction Standards For Shared Vehicle Parking Space and accessible to all Modo members on a 24 hour basis every day of the year;
- The applicant would provide to Modo a one-time financial contribution of approximately \$31,500 including taxes and fees to be used for the purchase of one new shared vehicle to be located in the parking space designated for carsharing;
- Modo would provide the applicant with a Partnership Membership in Modo with a public value of \$31,500, valid for the lifetime of the development and allowing a maximum of 63 units²² of the development to benefit at any given time from Modo membership privileges and lowest usage rates without the need to themselves pay a \$500 membership fee; and
- Modo would provide a promotional incentive worth \$100 of driving credits to each resident of the development joining Modo for the first time.

A 15% reduction would be supported if the applicant purchases a vehicle and locates it on-site or adjacent to the site.

²² \$31,500 divided by \$500, rounded down to the closest whole number.



6.5 TDM SUMMARY

A summary of the proposed TDM measures and parking reductions is provided below. **Table 11** presents the recommended TDM package, which includes carshare vehicle + memberships, the provision of electric bicycles for the HIL units, a shared e-bike program, and e-bike parking. This would result in a resident parking reduction of 50%. This represents a reduction in the estimated parking demand by 19 spaces, resulting in a parking demand of 24 spaces (19 resident, 5 visitor), which is two spaces less than the proposed supply.

TABLE 11. SUMMARY OF ESTIMATED PARKING DEMAND WITH TDM

TDM Measure	Parking Demand / Reduction
Resident Parking requirement per Bylaw	59 spaces
Estimated Resident Parking Demand, Baseline	38 spaces (per Table 9)
Total Parking Demand Reduction	-50%
Provision of Electric Bicycles	-20%
Shared Electric Bike Program	-10%
Electric Bicycle Parking	-5%
Carsharing Vehicle (includes memberships)	-15%
Total Parking Demand Reduction	19 spaces
Estimated Resident Parking Demand with TDM	19 spaces
Total Site Parking Demand with TDM (including 5 visitor)	24 spaces (19 + 5)
Proposed Parking Supply	26 spaces
Difference	+2



7.0 CONCLUSIONS

The proposed development at 880 Fleming Street is for a 45-unit multi-family rental building comprised of 14 market rental units, 3 strata-owned units, 14 below market units, and 14 housing income limited (HIL) rental units. The building includes 26 proposed parking spaces comprising 24 residential spaces (a rate of 0.53 spaces per unit), and two visitor. In addition, the applicant is proposing 45 long-term bicycle parking spaces, which results in 1.0 space per unit.

The peak parking demand is 43 spaces (38 resident, five visitor spaces), which exceeds the proposed supply by 17 spaces. Four TDM measures are recommended for the applicant's consideration. These include the provision of electric bicycles for each HIL unit, electric bicycle parking, a shared electric bicycle program, and a carshare program. If the applicant commits to all four TDM measures, a total resident parking reduction of 50% would be supported, which would lower the parking demand to 24 parking spaces, or two less than the supply.

8.0 RECOMMENDATIONS

Based on the conclusions of this study, it is recommended that the applicant commit to:

1. Provision of electric bicycles to each HIL unit.
2. Provision of a shared electric bike program with five e-bikes (11% unit coverage).
3. Provision of electric bike parking, which includes at least 50% of the long-term bicycle parking spaces having access to 110V electrical outlets along with 10% of the long-term spaces designed to accommodate cargo e-bikes.
4. Purchasing a Modo carshare vehicle for the site, which will provide a viable mobility option for residents and reduce dependency on vehicle ownership.
5. Pursuing a conversation with the Township of Esquimalt to determine whether visitors to the subject site could park on-street. The on-street parking assessment determined that there is available parking during the peak time (evenings), which can accommodate some spillover from the site. In their



conversation with the Township, the applicant could consider one of the following strategies:

- a. Explore whether a Residential Parking Only Zone or Residential Permit Zone could be created for Fleming Street. This would provide some flexibility to 880 Fleming Street and the future redevelopment of Esquimalt Lions Lodge (874 Fleming Street) to allow a select number of residents and/or visitors to park on-street.
- b. Explore whether a few on-street spaces on Fleming Street could be designated as limited time parking zones intended for visitors of 880 Fleming Street.