TRANSPORTATION PLANNERS AND ENGINEERS

bunt & associates

Cape Roger Curtis

Transportation Impact Assessment

Version 4

Prepared for

Metro Vancouver

Date

July 06, 2023

Project No.

04-22-0272

July 06, 2023
04-22-0272

Jeffrey Fitzpatrick
Division Manager, Regional Parks, Design, and Development
Parks and Environment
Metro Vancouver

Dear Jeffrey:

Re: Cape Roger Curtis
Transportation Impact Assessment (TIA) – Version 4

This Transportation Impact Assessment has been prepared to support Meto Vancouver with the rezoning application for Cape Roger Curtis Regional Park on Bowen Island.

Our strategy focuses on the analysis of the ferry service impacts, and traffic analysis of the intersections within the study area whilst explaining the measure Metro Vancouver are seeking to achieve a reduced level of access via private vehicle.

We trust the outputs from this study can positively move forward the planning work of Cape Roger Curtis Regional Park whilst also assisting in providing an understanding of the overall impacts of the proposals.

Yours truly,

Bunt & Associates

Joseph Chow, P. Eng
Transportation Engineer

Hugo Johnston, B. Sc
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cc: Lydia Mynott – Landscape Architect, MetroVancouver

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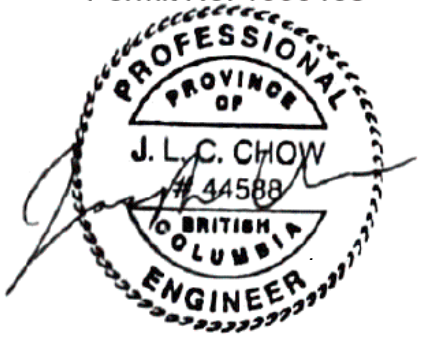

2023-07-06

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1. INTRODUCTION

1.1 Study Purpose & Objectives

Bunt and Associates Engineering Ltd (Bunt) has been retained by Metro Vancouver to provide transportation consulting services to Metro Vancouver for the proposed Regional Park including day and overnight use, at Cape Roger Curtis (CRC) on Bowen Island. The proposed park is located in the southwest region of Bowen Island, British Columbia.

Metro Vancouver is currently in the preliminary design process of the park and the municipality requires that the current site is rezoned before approving the proposed park. As part of this rezoning process, Bowen Island Municipality (BIM) identified a Transportation Impact Assessment (TIA) as a requirement to support the application.

The key objectives of a TIA may include the following:

- Forecast the future traffic demand from the proposed development in addition to future background traffic.
- Determine if onsite and off-site improvements are needed to accommodate background traffic and the traffic from a proposed development.
- Demonstrate the traffic generation in accordance with the land uses.
- Review Parking and Loading requirements.
- Conduct a site design review assessing vehicle turning movements.
- Develop a transportation demand measures plan to support the reduction of single occupancy vehicular trips.

Given the purpose of the development, it will see its primary operational months within the summer peak. Therefore, the worst-case scenario has been analyzed, ensuring that when every service, ferry, traffic, and bus is at peak operational demand, the proposals should still operate with minimal impact on the residents and visitors to Bowen Island.

Appendix A includes the study's Terms of Reference which was approved by the municipality.

1.2 Study Outline

This study structure covers the following key components:

- **Section 2** describes the CRC's context within Bowen Island and the overall context of the nearby streets.

- **Section 3** assesses CRC's existing multi-modal accessibility.

- **Section 4** explains the proposed CRC development.
- **Section 5** estimates CRC's visitor arrival and travel patterns.
- **Section 6** examines the future impact on travel caused by the proposed CRC.
- **Section 7** undertakes a preliminary review of the access options for the proposed CRC site, including the day-use parking provision on-site.
- **Section 8** identifies Transportation Demand Management measures that could be implemented at the site to improve the connectivity and reliance on private vehicles. This includes the provision of a shuttle bus service to and from Snug Cove.
- **Section 9** summarizes the study's findings and provides recommendations.

1.3 Proposed Park

Metro Vancouver Board approved the purchase of 24 lots on April 29th, 2023. The first reading for the OCP Amendment was undertaken by BIM on April 24, 2023, under Bylaw No. 608. The OCP Amendment proposed to alter the wording to include the following:

'Objective 69 To support the creation of a Regional Park at Cape Roger Curtis that may include supervised overnight camping.'

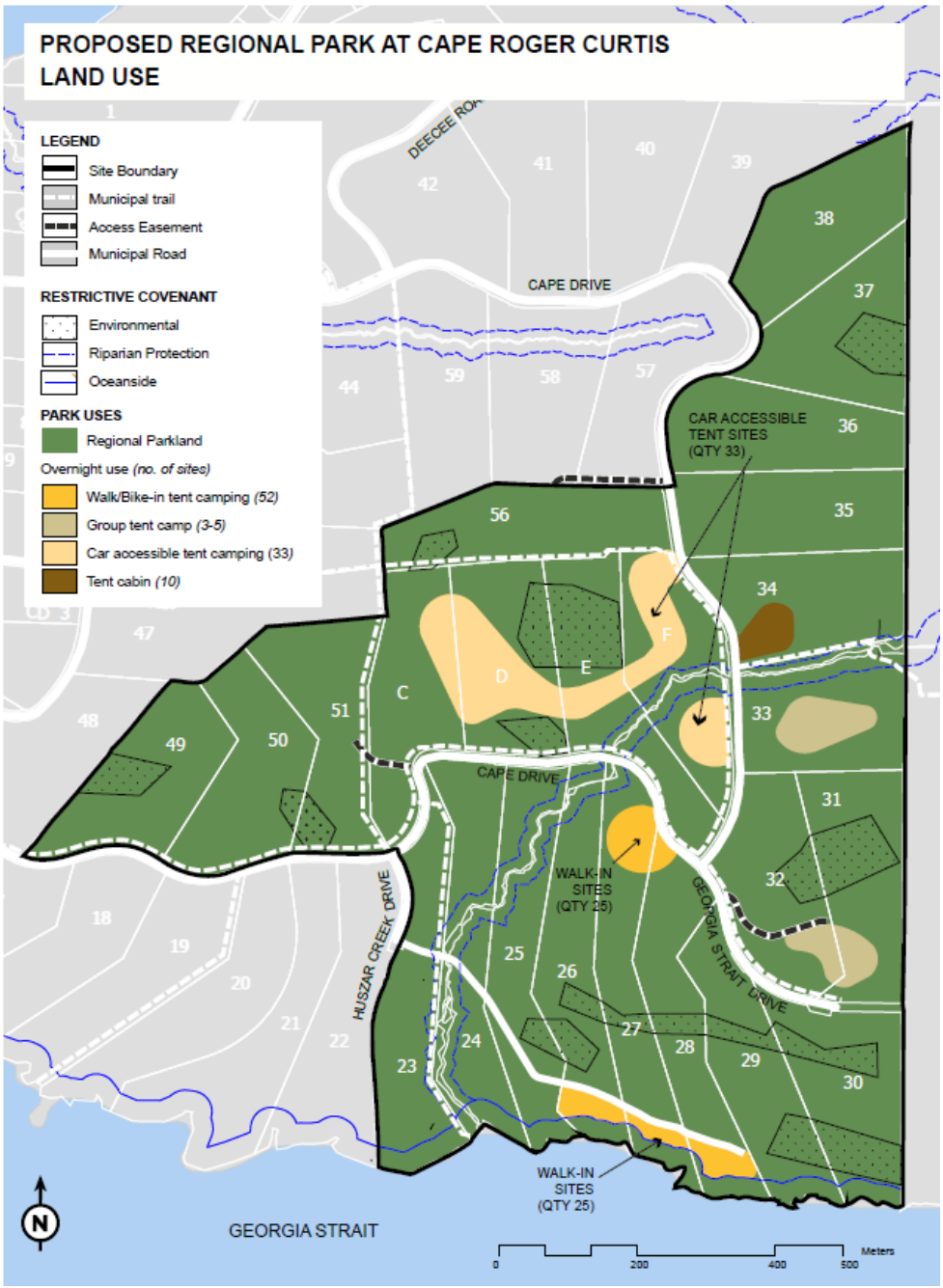
The lots purchased by Metro Vancouver are located to the east and southeast of Cape Roger Curtis, with a few lots facing the waterfront but it is yet to be determined if waterfront access is possible. Further to the east of the site is Fairy Fen Nature Reserve. There is no vehicle access through to Cowan Point and the Seymour Landing and the southeast of the island, from this location. Drivers would have to travel via Whitesails Drive.

Metro Vancouver has proposed to provide a total of 100 campsites, as outlined in **Table 1.1**. The overall park footprint is proposed to be approximately 97 Acres. The proposed land use plan of the complete site is set out in **Figure 1.1.**

Table 1.1: Proposed Land Uses

LAND USE	UNITS
Group Camping	5
Vehicle-accessible camping	35
Walk-In / Bike-In	50
Tent Cabins	10
Day-Use	97 Hectares
Total	100

Figure 1.1: Proposed Regional Park Masterplan



2. SITE CONTEXT

2.1 Context

The land use to which the Park will be situated, is currently zoned as rural residential, or RR1 (Rural Residential 1), with a minimum lot size of 4.0 hectares. The rezoning and Official Community Plan (OCP) amendment propose a park, with a variance to allow for supervised tent camping. This land use designation will allow for the creation of a regional park complete with conservation areas, and day-use amenities such as trails, picnic areas, viewpoints, tent camping, day-use amenities including trails, open space and interpretation areas will also be included in the park.

These amenities are not part of the rezoning and OCP amendment application and will be proposed following the rezoning process. Metro Vancouver will focus on day-use access through the proposed park shuttle, trail, and greenway connections, with some limited car parking areas.

Rural Residential 1 rezoning allows for the development of the following land uses:

- Dwellings
- Agriculture
- Horticulture
- Domestic Agriculture
- Stable; and
- Kennel.

Accessory uses of land, buildings, and structures for RR1 are as follows:

- Home Occupation – Five guest bedrooms on lots 2ha or greater
- Bed and Breakfast (BnB) use – No separate kitchens
- Portable Sawmill
- Mini storage; and
- Dwellings with a secondary suite.

The 24 lots included in the proposed Regional Park by Metro Vancouver are currently vacant. The site location is shown in **Exhibit 2.1**.

Within the vicinity of the site, spread across the 32 privately owned lots, there are several single-family residential dwellings with the potential for Airbnb additional units, a distributed learning school and several trails and beach fronts. Further to the northwest of the site is Tunstall Bay, which has beach access, public sports facilities, and BnBs.

The 24 lots included in the proposed Regional Park by Metro Vancouver are currently vacant.

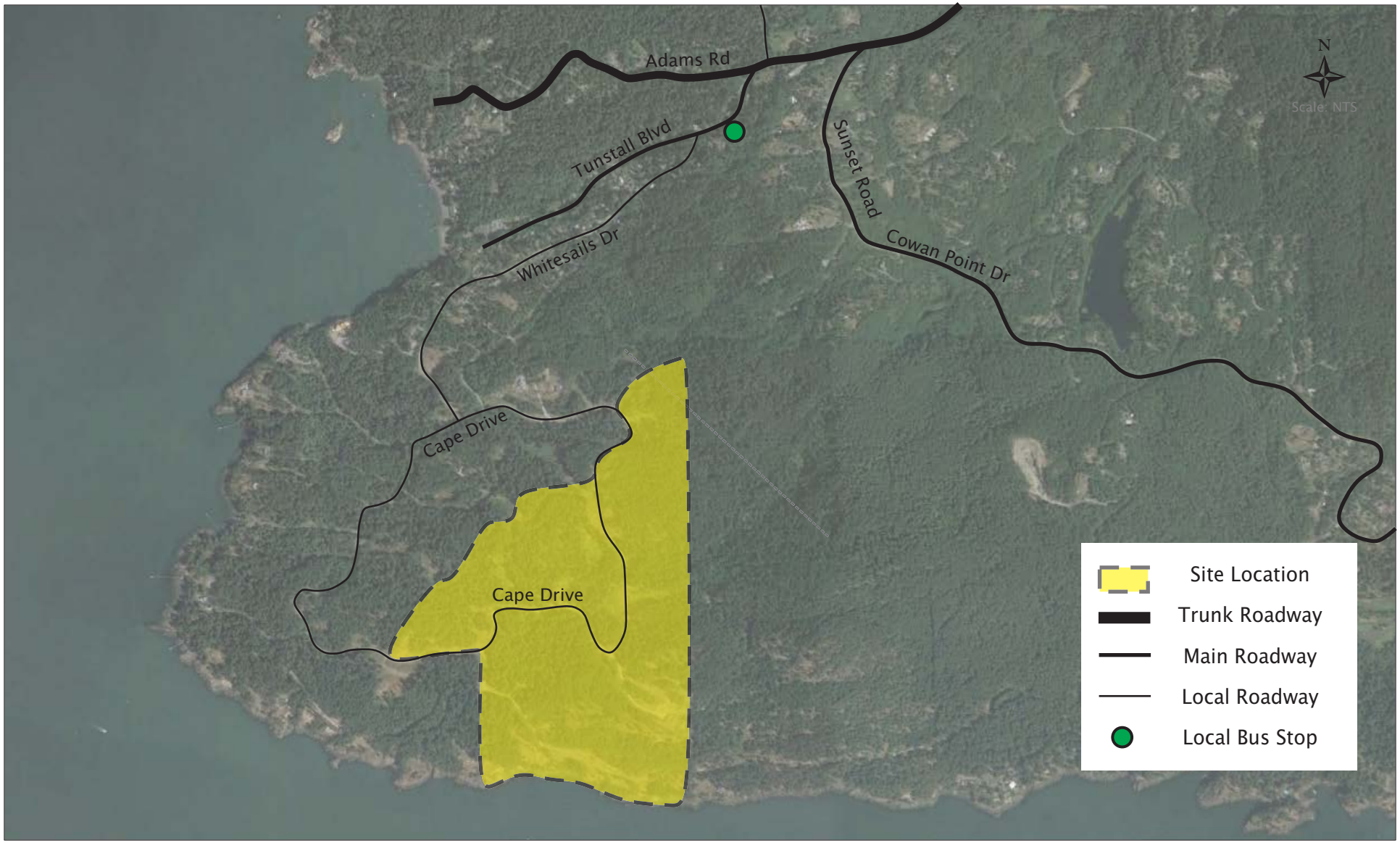


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Exhibit 2.1
Site Plan

04-22-0272

Cape Roger Curtis
June 2023

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2.2 Cape Roger Curtis

The Cape Roger Curtis Comprehensive Development Area is in the southwest corner of Bowen Island. The location of the park is set out in **Figure 2.1**.

Figure 2.1: Cape Roger Curtis

The full Cape Roger Curtis masterplan area is comprised of 59 lots. A breakdown of the lot ownership and use is set out in **Table 2.1**.

As presented in the table below, Metro Vancouver has purchased 24 of the 59 lots. The remaining 35 lots, which are not included in the Metro Vancouver purchase agreement, include 14 developed lots, 3 lots used as a nature park, and 18 lots privately sold but undeveloped. The subject proposal will only have an impact on the 24 lots within Metro Vancouver's control.

Table 2.1: Masterplan Lot Breakdown

OWNERSHIP	NUMBER OF LOTS
Developed Lots	14 lots
Sold Lots (undeveloped or under development)	18 lots
Wildcoast Nature Refuge (nature park and sanctuary)	3 lots
Proposed Metro Vancouver Regional Park	24 lots
Total CRC RR1 Zone	**59 Lots**

Day-use amenities including trails, open space, and interpretation areas will also be included in the park. The day-use amenities currently exist within Bowen Island; therefore, the day-use will be considered as an existing operation, only generating trips from those visitors already located on Bowen Island. Metro Vancouver will focus on day-use access through the proposed park shuttle, trail, and greenway connections, with some limited car access.

3. EXISTING CONDITIONS

3.1 Existing Transportation Network

3.1.1 Road Network

As previously shown in **Figure 1.1**, the site is accessed via Cape Drive, a circular route travelling around the interior of CRC, that connects to Whitesails Drive to the north via a stop control T junction. Cape Drive provides access to some residential units within CRC. All roads within the vicinity of the site have a single lane of travel in each direction. The road network within the vicinity of the site is set out in **Exhibit 3.1A & B**.

Further north, Whitesails Drive is a residential road that connects Tunstall Blvd, it is subject to a 30km/h restriction with the southern section, connecting to Cape Drive, increasing to 40km/h. No on-street parking is provided alongside either road. However, there are no restrictions situated on Whitesails Road, which results in a number of people parking on the apron of the roadway. Tunstall Blvd, also restricted to 30kph accesses Tunstall Bay and the public tennis facilities to the west and Adams Road to the east. A bus stop is located on Tunstall Blvd and is closest to the site.

Adams Road, which travels east-west across the island, merges with Grafton Road and ultimately provides access to Snug Cove. Snug Cove is the location of the BC Ferry terminal and retail/restaurant facilities. Local roads within the vicinity of the site have been set in **Table 3.1**.

Table 3.1: Existing Street Characteristics

STREET	CLASSIFICATION	NUMBER OF TRAVEL LANES	POSTED SPEED	PARKING FACILITIES
Cape Drive	Residential	2	30 kph	N/A
Whitesails Drive	Residential	2	30 kph	N/A
Tunstall Blvd	Main Roadway	2	40 kph	N/A
Adams Road / Grafton Road	Trunk Roadway*	2	40 kph	N/A

Source: Bowen Island Municipality Subdivision and Development Servicing – Bylaw No. 447, 2017

3.2 Existing Traffic Volumes

3.2.1 Traffic Data Collection Program

Intersection traffic counts were undertaken by Bunt & Associates for the study area on May 19th (Friday) & 20th (Saturday), 2023. The study area has been set out in **Exhibit 3.2 A & B** with the turning count movements. **Table 3.2** provides a summary of the traffic count data program and the peak hours associated with each period.

It should be noted that on May 20th, there was a disruption to BC Ferries' schedule, both in and out of Snug Cove. The cancellations of ferries started at 3:30 PM and therefore, could have caused a minimal impact on the levels of traffic witnessed on the island during the Saturday peak. However, it is not deemed to be a significant issue for the intersections within the eastern study network.

Counts were undertaken during the Victoria Day long weekend on Friday and Saturday to represent summer weekday and weekend traffic conditions when traffic is expected to be highest more closely for the proposed campgrounds and park. Developments are typically observed against the typical weekday traffic. However, due to the project site characteristics and as agreed with Metro Vancouver, this time frame has been selected to represent the peak traffic conditions during a summer month, and therefore, seen as a worst-case scenario. At the request of BIM, MV also commissioned additional traffic surveys throughout the summer of 2023, which will survey as a future comparison to this report.

Table 3.2: Summary of Available and Counted Traffic Data

INTERSECTION	SOURCE	DATE OF COUNT	PEAK HOURS	
			Friday PM	Saturday
Tunstall Blvd / Whitesails Drive	Bunt	May 19th & 20th	2:30 PM - 3:30 PM	12:45 PM - 1:45 PM
Tunstall Blvd / Adams Road	Bunt	May 19th & 20th	2:30 PM - 3:30 PM	1:15 PM - 2:15 PM
Adams Road / Bowen Bay Road	Bunt	May 19th & 20th	12:00 PM - 1:00 PM	1:15 - 2:15 PM
Bowen Island Trunk Road / Dorman Rd / Miller Road	Bunt	May 19th & 20th	12:30 PM - 1:30 PM	11:15 AM - 12:15 PM
OVERALL STUDY PEAK			2:30 PM - 3:30 PM	1:15 PM - 2:15 PM

The PM peak hour was found to occur between 2:30 PM - 3:30 PM for all study intersections. The overall Saturday peak was found to occur between 1:15 PM - 2:15 PM. Individual peaks of each intersection in the PM were more varied due to the busier study intersection of Bowen Island Trunk Road / Dorman Road / Miller Road, which was most likely due to the ferry demand for returning commuter traffic.

3.2.2 Peak Hour Vehicle Traffic Volumes

The peak hour vehicle volumes are presented in **Exhibit 3.2 A & B**.

Table 3.3 presents a summary of the two-way peak-hour movements for the streets in the study area. This is based on the highest two-way location along each road link during the PM peak and Saturday peak hours, rounded to the nearest ten.

Table 3.3: Existing Peak Hour Roadway Link Volumes

ROAD LINK	TWO-WAY LINK VOLUMES (VEH/HR)	
	Friday PM Peak Hour	Saturday Afternoon Peak Hour
Whitesails Drive	85	60
Tunstall Blvd	110	125
Adams Road	140	155
Bowen Bay Road	110	115
Grafton Road	210	230
Bowen Island Trunk Road	330	495

Two-way traffic volume along Whitesails Drive was observed to be 85 and 60 vehicles in the Friday PM and Saturday peak hours, respectively. Along Tunstall Blvd, two-way traffic volumes were found to be 110 and 125 in the Friday PM and Saturday peak hours, respectively, observed to the east of the intersection of Whitesails Road.

The roadway link volumes are generally higher during Saturday peak hour except for on Whitesails Drive. The higher volumes on Bowen Island Trunk Road, about 500 trips per hour, are likely due to the weekend traffic arriving from the ferry service in Snug Cove.

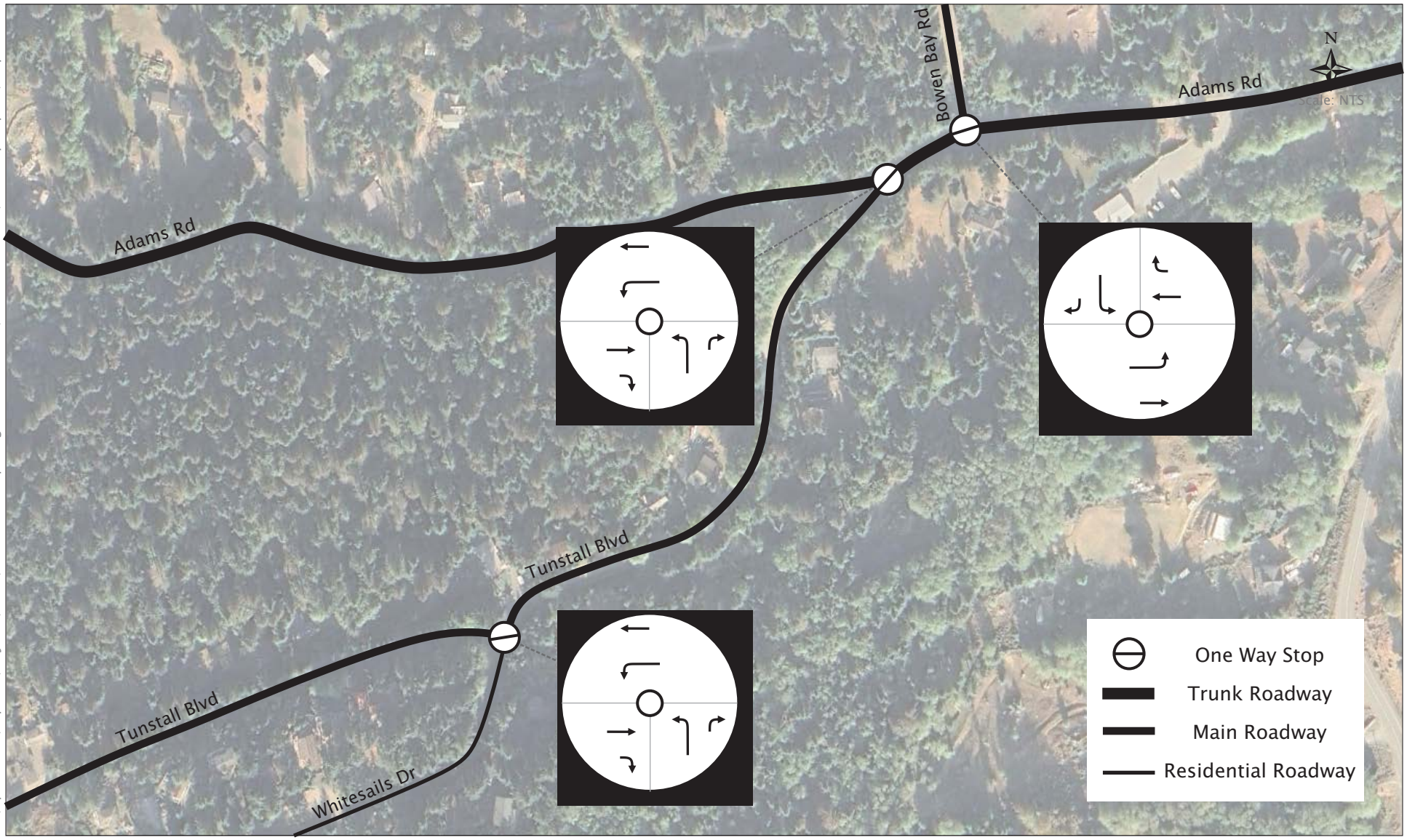

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Exhibit 3.1A

Existing Road Network - West

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Cape Roger Curtis
June 2023

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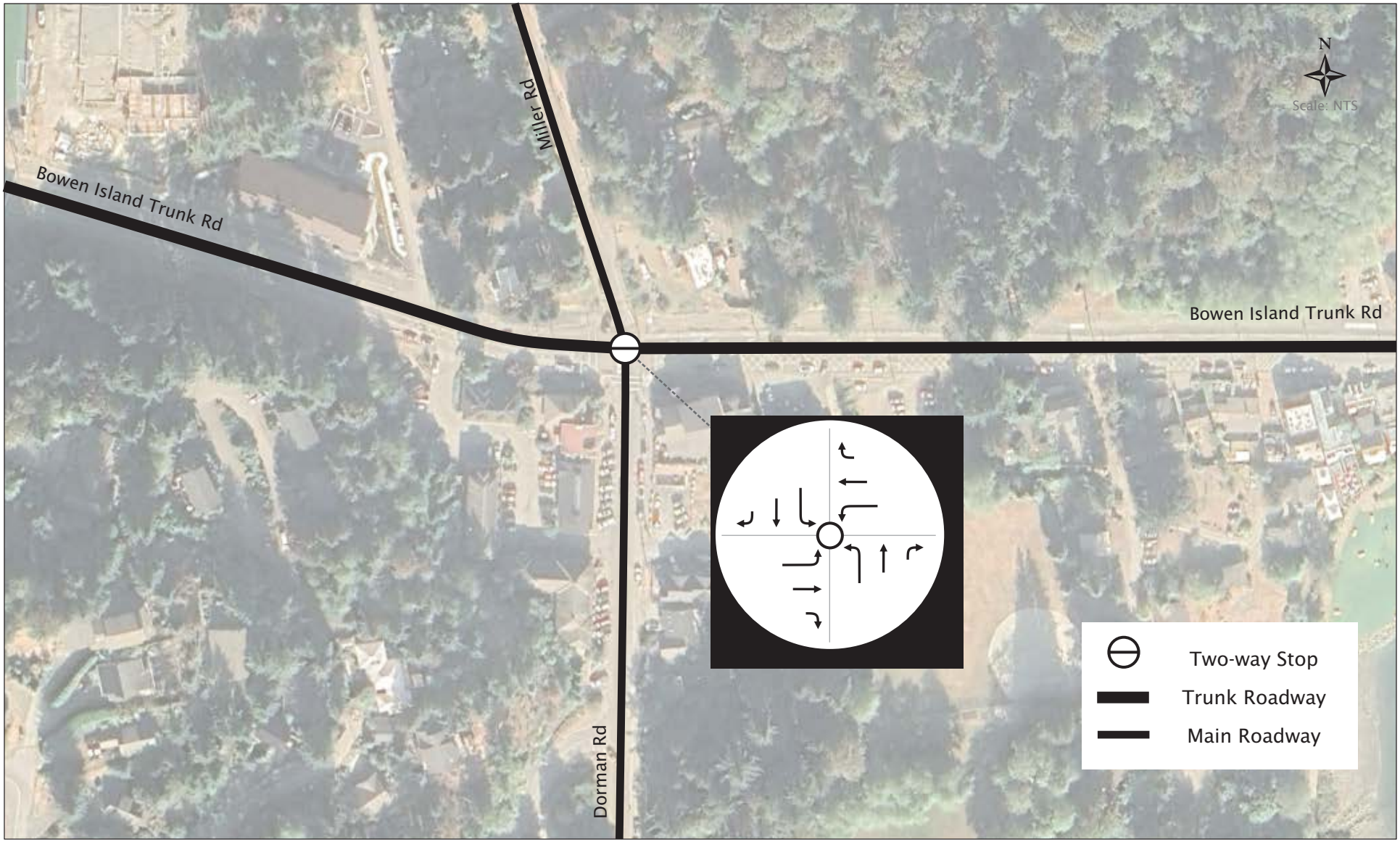

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Exhibit 3.1B

Existing Road Network - East

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Cape Roger Curtis
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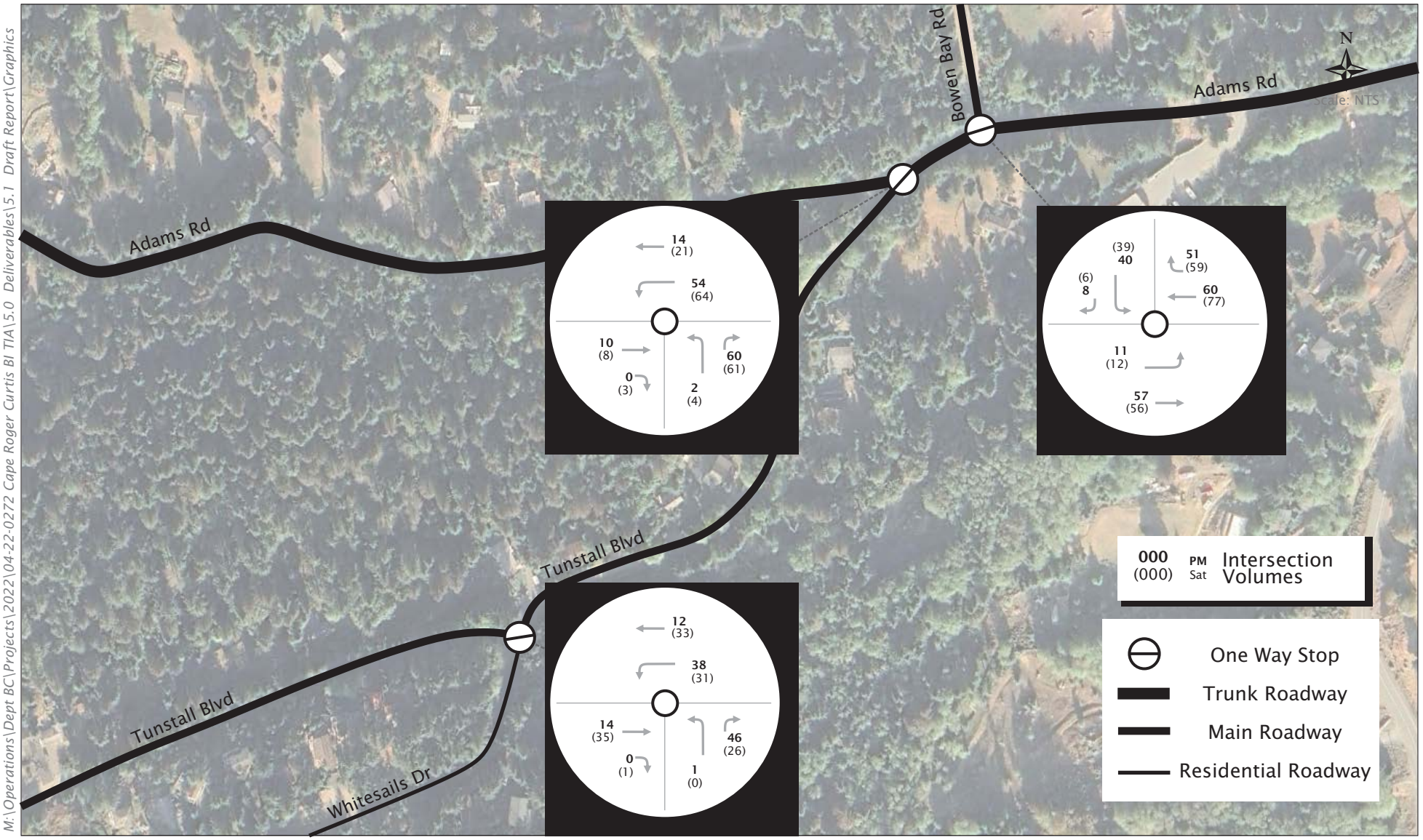

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Exhibit 3.2A

Existing Peak Hour Vehicle Traffic Volumes (West)

04-22-0272

Cape Roger Curtis
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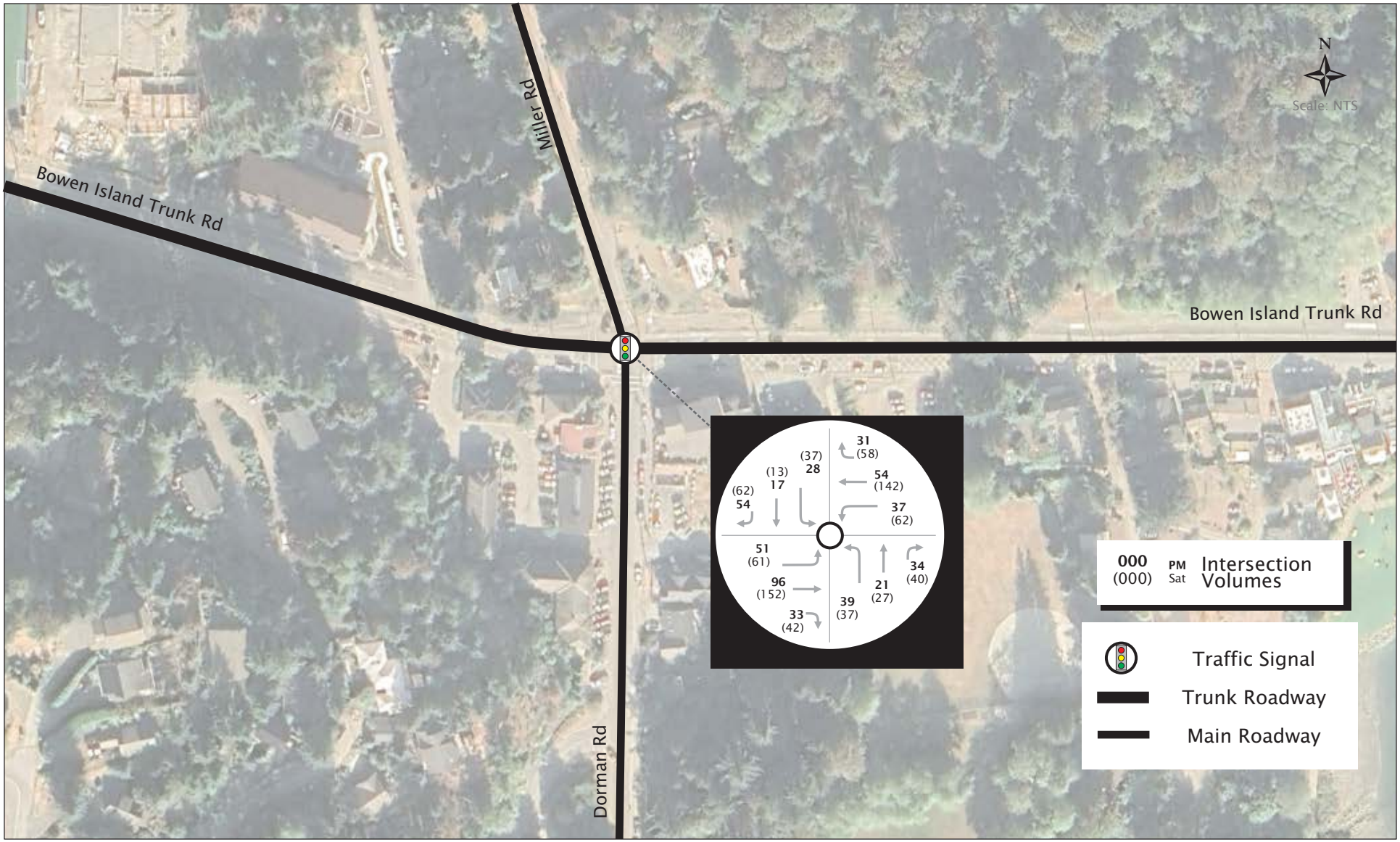

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Exhibit 3.2B

Existing Peak Hour Vehicle Traffic Volumes (East)

04-22-0272

Cape Roger Curtis
June 2023

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3.3 Existing Operations

3.3.1 Performance Thresholds

The existing operations of study area intersections and access points were assessed using the methods outlined in the 6th edition of the Highway Capacity Manual (HCM), using Synchro 11 & SimTraffic 11 analysis software. The traffic operations were assessed using the performance measures of Level of Service (LOS) and 95th percentile queues.

The LOS rating is based on average vehicle delay and ranges from "A" to "F" based on the quality of operation at the intersection. LOS "A" represents optimal, minimal delay conditions while LOS "F" represents an over-capacity condition with considerable congestion and/or delay. Delay is calculated in seconds and is based on the average intersection delay per vehicle.

Table 3.4 below summarizes the LOS thresholds for the six Levels of Service, for both signalized and unsignalized intersections.

Table 3.4: Intersection Level of Service Thresholds

LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)	
	SIGNALIZED	UNSIGNALIZED
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

Source: Highway Capacity Manual

The performance thresholds that were used to trigger consideration of roadway or traffic control improvements to support roadway or traffic control improvements employed in this study are listed below:

Unsignalized Intersections and Roundabouts:

- Individual movement Level of Service = LOS E or better unless the volume is very low, in which case LOS F is acceptable.

In interpreting the analysis results, note that the HCM methodology reports performance differently for various types of intersection traffic control. In this report, the performance reporting convention is as follows:

- For unsignalized intersections: For ease of reference, HCM 6 LOS, and 95th Percentile Queues (meters) are reported for critical lanes only. HCM 6 reports 95th percentile queues in units of vehicles for

unsignalized intersections and these have been converted to meters for consistency with signalized intersections assuming a Synchro standard of 7.6m per vehicle.

The performance reporting conventions noted above have been consistently applied throughout this document and the detailed outputs are provided in **Appendix B**.

3.3.2 Existing Conditions Analysis Assumptions

All the intersections within the study zones are unsignalized and therefore, no signal plans were required.

Synchro / SimTraffic Parameters

- Peak Hour Factor: Existing peak hour factors were informed by available counts.
- Pedestrian Volumes: pedestrian crossing demands were entered as per Bunt's counts.
- Heavy Vehicle Percentages: Most intersections use heavy vehicle percentages informed by existing counts, with low-volume intersections assuming a Synchro default of 2%.

3.3.3 Existing Operational Analysis Results

Table 3.5 summarizes the operational analysis for existing traffic conditions in the study area. Note that only critical movements are reported for unsignalized intersections. Results that exceed the thresholds noted in Section 3.3.1 are bolded.

Table 3.5: Existing Traffic Operations

INTERSECTION / TRAFFIC CONTROL	MOVEMENT	FRIDAY PM PEAK		SAT AFTERNOON PEAK	
		LOS	95TH Q (M)	LOS	95TH Q (M)
Whitesails Drive / Tunstall Blvd – *Unsignalized Stop Control*	EBRT	A	0	A	0
	WBLT	A	5	A	5
	NBLR	A	10	A	10
Tunstall Blvd / Adams Road – *Unsignalized Stop Control*	EBRT	A	10	A	10
	WBLT	A	0	A	0
	NBLR	A	0	A	0
Adams Road / Bowen Bay Road – *Unsignalized Stop Control*	EBLT	A	0	A	5
	WBRT	A	0	A	0
	SBLR	A	15	A	15
Miller Road / Bowen Island Trunk Road / Dorman Road / Grafton Road – *Unsignalized Stop Control*	EBLRT	A	5	A	10
	WBLRT	A	10	A	15
	NBLRT	A	15	B	20
	SBLRT	A	15	A	30

The table above demonstrates that every intersection and movement operate without issue in either of the peak hours. The 95th queue rarely exceeds 3 vehicles on the Friday peak or 5 vehicles during the Saturday peak.

3.4 Transit Network

A bus stop is located approximately 3km to the north of the site and is located on Tunstall Blvd. The location of the bus stop is shown in **Exhibit 3.1A**. The bus stop is served by service 280, which travels towards Bluewater before travelling east towards Snug Cove. This service operates 6 services in the AM and PM peak. In addition, there are a further 6 services across the day during the weekends and on Public Holidays. The details of the bus stop located to the north of the site and the services operating at this stop have been set out in **Tables 3.6** and **3.7**.

Table 3.6: Transit Stops within 800m Walking Distance of Site

STOP LOCATION	DIRECTION	STOP #	AMENITY	ROUTES SERVICED	WALKING DISTANCE
Tunstall Blvd @ Whitesails Dr	Eastbound	58011	No facilities	280	3.4km

Table 3.7: Existing Transit Service Frequency

ROUTE		STOP	WEEKDAY SERVICE SPAN		HEADWAY (MIN.)				
#	DIRECTION		START	END	AM	MID-DAY	PM	EVENING	WEEKEND
280	Bluewater	58011	5:00 AM	7:55 PM	60-65	120	65-70	65-70	105
	Snug Cove		5:35 AM	7:35 PM	60-70	120	65-70	65-70	105

As can be seen, a limited service is provided connecting the site to Snug Cove.

3.5 Local Cycling Network

Whilst there are no off-road cycling routes within the vicinity of the site, most roads are considered to be quiet routes, with relatively low speeds that are cyclist friendly. There are 6 primary routes identified within the '*Explore Bowen Island by Bike Guidebook*' hosted on the Tourism of Bowen Island website. Two of the routes identified are located to the north of the site. The first route travels from the Roger Curtis Beaches in the west to Sung Cove, travelling via Cape Drive, and Whitesails Drive before continuing east on Adams Road before converging into Grafton Road. This route is approximately 18.6km in length with a varying slope. These gradients might not be suitable for all cyclists. The second route travels from Tunstall Bay towards Snug Cove, this route shares a similar direction to the Roger Curtis route. To the north of the site, Bowen Bay Road is considered acceptable for cyclists. Sunset Rd, travelling to Seymour Bay in the southeast, is also listed as a bicycle-friendly route.

3.6 Local Pedestrian Network

Walking is an everyday activity whether as a single-purpose journey or linked with transit and driving. Typically, people are willing to walk up to 10 minutes for certain activities (i.e., work, school, and recreational activities, which is circa 800m in distance. The pedestrian network surrounding the

development is primarily recreational routes with several routes dissecting the site and travelling in and around Cape Drive, with several travelling south towards the coastline, connecting east into the Fairy Fen Nature Reserve.

There are no pedestrian sidewalks provided alongside the local roads within the vicinity of the site. However, verges on the side of the roads are provided which provide a safe refuge for pedestrians to utilise. Due to the low number of pedestrians within the area, there are no crossing facilities required or provided throughout the site.

Walking and cycling facilities within the vicinity of the site have been set out within **Exhibit 3.3** and **Exhibit 3.4**, respectively**.**

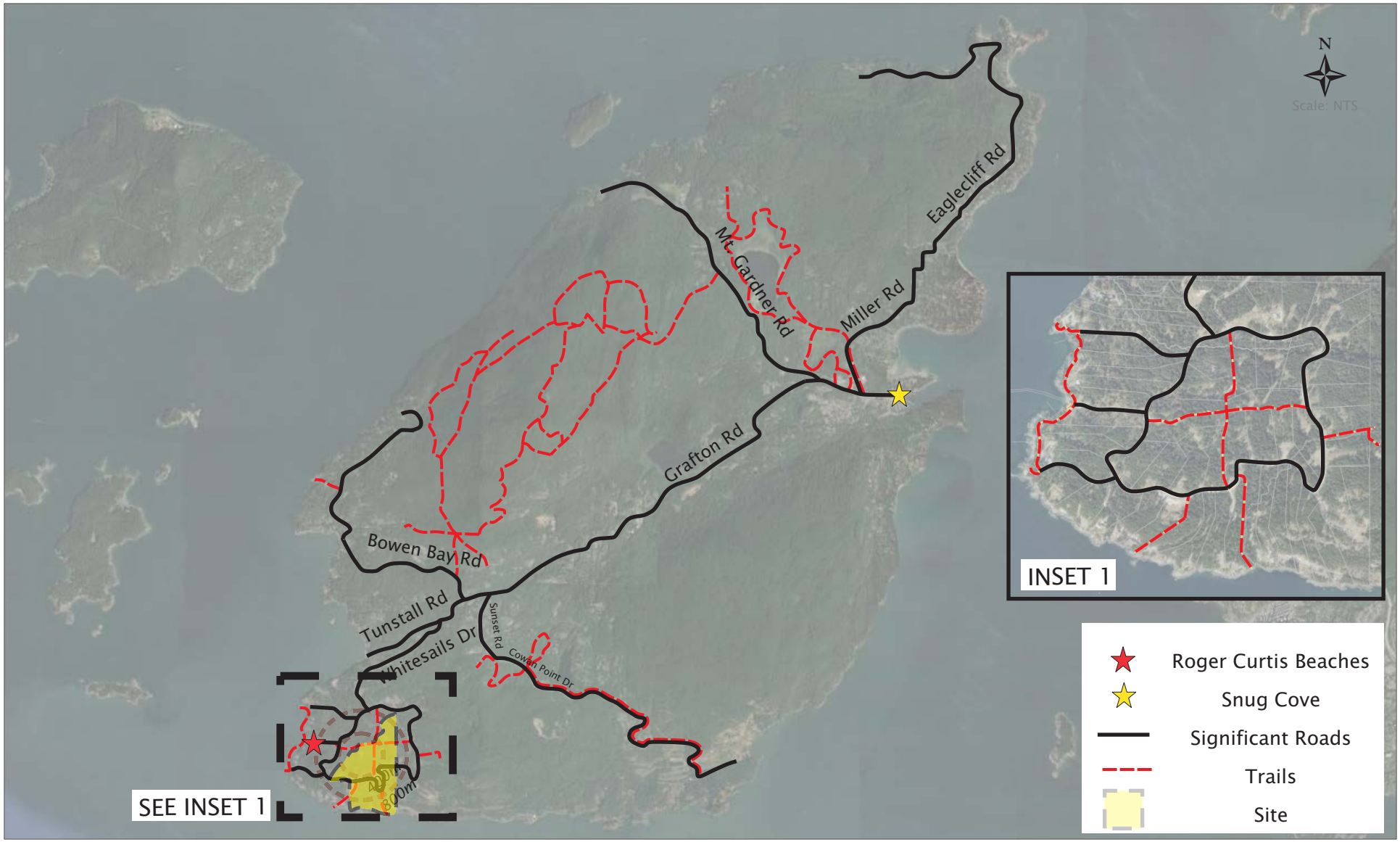

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Exhibit 3.3

Pedestrian Facilities

04-22-0272

Cape Roger Curtis
June 2023

bunt & associates

M:\Operations\Dept BC\Projects\2022\04-22-0272 Cape Roger Curtis BI TIA\5.0 Deliverables\5.1 Draft Report\Graphics

Exhibit 3.4

Cycling Facilities

04-22-0272

Cape Roger Curtis
June 2023

bunt & associates

3.7 Waterborne Access

3.7.1 BC Ferries

Currently, the only access to Bowen Island is via a BC Ferries service between Horseshoe Bay and Snug Cove. Snug Cove, located on the east coast of Bowen Island, is approximately 10km to the east of the site, accessed via Grafton Road / Bowen Island Trunk Road. The vessel operating on this route is the 'Queen of Capilano' which has a capacity of approximately 87 Automobile Equivalent Units (AEQ) or 427 passengers.

The Automobile Equivalent Unit (AEQ) is a way of balancing the number of vehicles that can board the vessel given the difference in size of each vehicle. In accordance with the BC Ferries calculation methodologies, the vehicle equivalents are as follows:

- 1 Bus = 3 AEQ.
- 1 Commercial Truck or Semi = 2.5 AEQ
- 1 Private Vehicle – Over Height = 1.5 AEQ; and
- 1 Private Vehicle – Under Height or Motorcycle = 1 AEQ.

One AEQ is 2.6 m X 6.1 m of deck space. It is not known which factor dictates the maximum capacity and this is not clear from the BC Ferries data. Therefore, in some circumstances more vehicles may be able to access the crossing if the number of larger vehicles is lower, therefore, more AEQ vehicles.

The weight is also a controlling factor, or the size of the car deck can also restrict the maximum capacity. The total number of passengers also includes those that travel in their private vehicles, they are not considered to be just made up of foot / cycling passengers. Another issue that BC Ferries are currently facing is staffing issues, this restricts the number of people that can access the services if there are fewer staff on board.

Several assumptions and calculations have been made utilising data obtained from BC Ferries, however, the operations of the ferries are not always clear and serval details such as traffic management and what determines capacity are not clear.

The duration of the voyage between Horseshoe Bay and Snug Cove is 20 minutes in length non-stop. The ferry service frequencies are set out in **Table 3.8**. A total of 16 services operate between Snug Cove to Horseshoe Bay with 15 services a day travelling in the other direction.

Table 3.8: Snug Cove - Horseshoe Bay Ferry frequency

ROUTE		WEEKDAY SERVICE SPAN		HEADWAY (MIN.)				
	DIRECTION	START	END	AM	MID-DAY	PM	EVENING	WEEKEND
Bowen Island to Vancouver	Snug Cove	5:50 AM	10:00 PM	60-70	65-70	65-70	60	60-75
	Horseshoe Bay	5:20 AM	10:30 PM	60-70	65-70	65-70	60	60-75

It should be noted that the services on Wednesday at 9:05 AM to Snug Cove and Wednesday at 4:00 PM to Horseshoe Bay are labelled for Dangerous Goods services, and vehicles carrying items such as propane tanks are required to use these services.

Passenger Volumes

Two Freedom of Information (FOI) requests for passenger volume information to BC Ferries were submitted by individuals of the public and Metro Vancouver. The requests were completed in June and October 2022 and sought to obtain the passenger/vehicle statistics from 2000 to 2022. One data request focused on July 2022, which was seen to be the most conservative period for BC Ferries as it combines the residents on the island and an increase in summer tourism.

The July 2022 data set out the overall passenger and vehicle capacity for each ferry service across the month for both routes. The passenger vehicle levels are inclusive of the number of passengers within the private motor vehicles; therefore, it is not possible to determine the levels of foot passengers only. The average passenger numbers for Horseshoe Bay to Snug Cove are in **Table 3.9** and Snug Cove to Horseshoe Bay in **Table 3.10**.

Table 3.9: Horseshoe Bay -> Snug Cove Passenger Numbers – (July 2022)

SERVICE	SUN	MON	TUES	WEDS	THURS	FRI	SAT
5:50:00 AM	2	13	12	8	14	11	7
6:50:00 AM	18	91	103	83	97	77	31
8:00:00 AM	60	123	126	124	123	135	108
9:05:00 AM	147	127	157	32	125	152	245
10:10:00 AM	255	160	164	262	240	217	371
11:15:00 AM	290	196	219	236	223	263	381
12:40:00 PM	263	144	183	179	170	242	341
1:55:00 PM	213	161	176	188	199	238	295
3:20:00 PM	200	176	169	189	202	223	238
4:40:00 PM	142	183	197	168	198	201	211
5:45:00 PM	113	176	182	163	183	205	150
6:50:00 PM	115	136	143	129	170	159	110
7:50:00 PM	68	83	102	83	114	117	
9:20:00 PM	59	67	102	85	98	88	104
10:20:00 PM	36	25	34	37	34	48	35

Table 3.10: Snug Cove -> Horseshoe Bay Passenger Numbers – (July 2022)

SERVICE	SUN	MON	TUES	WEDS	THURS	FRI	SAT
5:20:00 AM		49	54	42	46	33	20
6:20:00 AM	35	112	142	93	110	66	33
7:20:00 AM	56	149	189	134	159	105	49
8:35:00 AM	92	146	158	127	160	122	104
9:35:00 AM	161	153	154	160	162	139	142
10:40:00 AM	195	171	149	171	174	141	129
12:05:00 PM	220	177	155	169	169	118	146
1:15:00 PM	221	135	132	172	119	129	121
2:40:00 PM	247	171	218	255	234	211	219
4:00:00 PM	281	216	241	59	236	208	295
5:10:00 PM	305	129	225	298	210	187	328
6:15:00 PM	266	132	148	202	159	163	333
7:20:00 PM	230	76	75	118	82	122	
8:50:00 PM	127	56	63	83	90	96	327
9:50:00 PM	100	31	35	42	37	33	102
10:50:00 PM	24	9	12	13	10	25	37

This was compared to the overall capacity for ferry passengers and as demonstrated in **Tables 3.11** and **3.12** respectively.

Table 3.11: Passenger % demand - Horseshoe Bay to Snug Cove

SERVICE	SUN	MON	TUES	WEDS	THURS	FRI	SAT
5:50:00 AM	1%	3%	3%	2%	3%	3%	2%
6:50:00 AM	4%	21%	24%	20%	23%	18%	7%
8:00:00 AM	14%	29%	29%	29%	29%	32%	25%
9:05:00 AM	35%	30%	37%	8%	29%	36%	57%
10:10:00 AM	60%	37%	38%	61%	56%	51%	87%
11:15:00 AM	68%	46%	51%	55%	52%	62%	89%
12:40:00 PM	62%	34%	43%	42%	40%	57%	80%
1:55:00 PM	50%	38%	41%	44%	47%	56%	69%
3:20:00 PM	47%	41%	40%	44%	47%	52%	56%
4:40:00 PM	33%	43%	46%	39%	46%	47%	50%
5:45:00 PM	26%	41%	43%	38%	43%	48%	35%
6:50:00 PM	27%	32%	33%	30%	40%	37%	26%
7:50:00 PM	16%	19%	24%	19%	27%	27%	
9:20:00 PM	14%	16%	24%	20%	23%	21%	24%
10:20:00 PM	8%	6%	8%	9%	8%	11%	8%

As can be seen above, the highest observed passenger demands was observed on Saturday, with all services between 10:10 AM and 12:40 AM having at least 80% of the passenger capacity, the equivalent of a minimum of 341 passengers out of a possible 427. During the weekday period, the passenger demand did not surpass 60%. The services in the late afternoon/evening (beyond 3:20 PM) have a lower demand, with services rarely reaching 50% passenger capacity.

Table 3.12: Passenger % demand - Snug Cove to Horseshoe Bay

SERVICE	SUN	MON	TUES	WEDS	THURS	FRI	SAT
5:20:00 AM		11%	13%	10%	11%	8%	5%
6:20:00 AM	8%	26%	33%	22%	26%	15%	8%
7:20:00 AM	13%	35%	44%	31%	37%	25%	11%
8:35:00 AM	22%	34%	37%	30%	38%	29%	24%
9:35:00 AM	38%	36%	36%	37%	38%	33%	33%
10:40:00 AM	46%	40%	35%	40%	41%	33%	30%
12:05:00 PM	52%	41%	36%	40%	40%	28%	34%
1:15:00 PM	52%	31%	31%	40%	28%	30%	28%
2:40:00 PM	58%	40%	51%	60%	55%	49%	51%
4:00:00 PM	66%	51%	56%	14%	55%	49%	69%
5:10:00 PM	72%	30%	53%	70%	49%	44%	77%
6:15:00 PM	62%	31%	35%	47%	37%	38%	78%
7:20:00 PM	54%	18%	18%	28%	19%	29%	
8:50:00 PM	30%	13%	15%	20%	21%	22%	77%
9:50:00 PM	23%	7%	8%	10%	9%	8%	24%
10:50:00 PM	6%	2%	3%	3%	2%	6%	9%

Return services back to the mainland are seen to be busier in the PM peaks, with services in the AM peak and around midday, up until 1:55 PM, do not surpass 52% capacity demand. Again, the highest demand from passengers can be seen during the weekend peaks, with a maximum capacity of 78%, representing 22% spare passenger capacity. From these numbers, it can be assumed that the island sees a high number of day-trippers and weekend tourism.

This data is restricted, as mentioned, it includes the operators and passengers of private vehicles. Therefore, it is not possible to know if the passenger demand was limited due to the number of vehicles reaching capacity. However, it could be assumed that foot passengers and cyclists would probably be able to access all these services given there is at least 11% or more capacity on both routes and all services.

The passenger demand for the services in comparison to the overall provision is demonstrated in **Figures 3.1** and **3.2**, these provide a visual representation of the spare capacity for passengers on Friday, Saturday, and Sunday. The time periods are summarized as follows: Early Morning (5 am -7 am), Morning (7 am -11 am), noon (11 am – 3 pm), afternoon (3 pm – 7 pm), and evening (7 pm – 11 pm).

Figure 3.1: Horseshoe Bay -> Snug Cove Ferry Demand and Capacity – Passenger (July 2022)

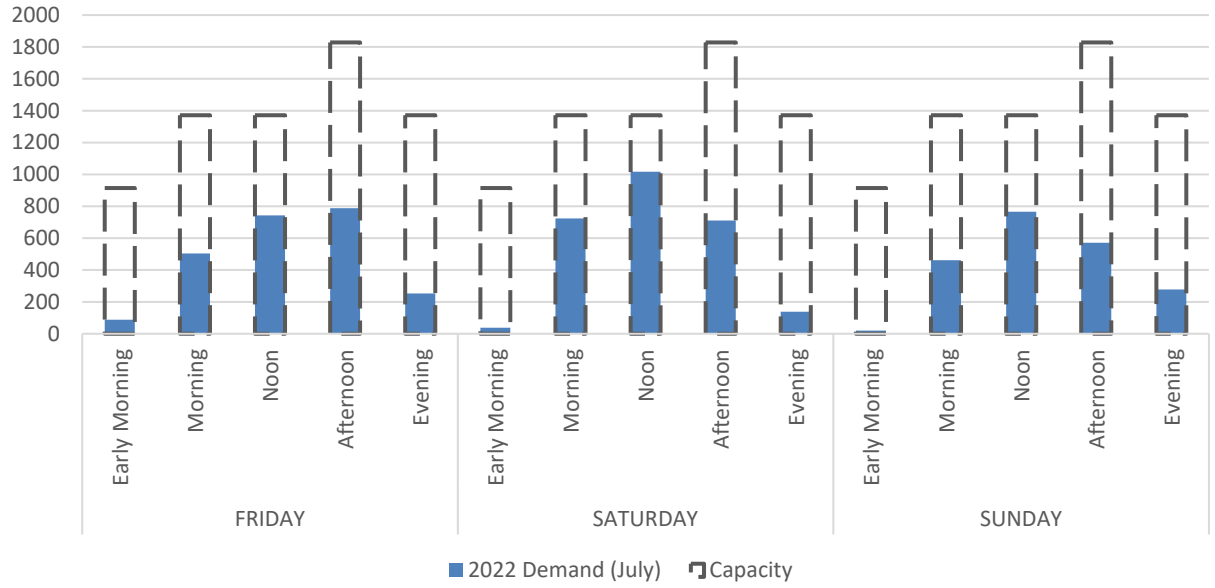
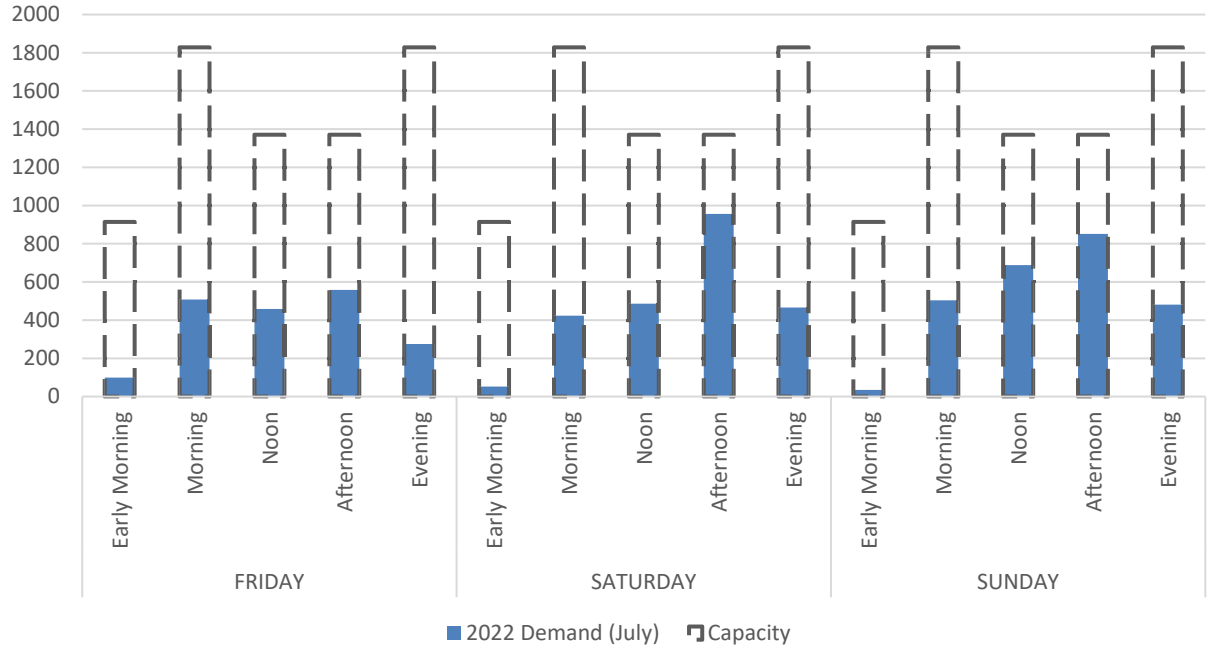


Figure 3.2: Snug Cove -> Horseshoe Bay Ferry Demand & Capacity - Passenger (2022 July)



As can be seen from the above chart, not one time period reaches the maximum available passenger capacity across the three days. As mentioned before, Saturday sees the greatest demand across the day, with Horseshoe Bay to Snug Cove busiest during the AM peak and Snug Cove to Horseshoe Bay in the PM peak. Given none of the services reach the peak capacity, this assumes that passenger capacity is far greater than demand and not restricted by space as much as vehicle capacities.

Vehicle volumes

As previously mentioned, the listed ferry capacity is 87 AEQ, however, as will be demonstrated below, there are several services that exceed this level.

The average vehicle demand for each service on the Horseshoe Bay to Snug Cove route for July 2002 is set out in **Table 3.13,** and the return service of Snug Cove to Horseshoe Bay is shown in **Table 3.14**.

Table 3.13: BC Ferries July 2022 Vehicle Demand Horseshoe Bay -> Snug Cove

SERVICE	SUN	MON	TUES	WEDS	THURS	FRI	SAT
5:50:00 AM	2	13	12	8	15	9	5
6:50:00 AM	9	71	80	63	72	53	15
8:00:00 AM	25	78	84	73	83	72	42
9:05:00 AM	42	53	72	15	64	59	70
10:10:00 AM	70	63	72	85	77	78	95
11:15:00 AM	77	74	81	80	81	89	94
12:40:00 PM	74	66	77	72	74	98	93
1:55:00 PM	72	74	70	79	89	95	94
3:20:00 PM	74	92	90	94	97	100	85
4:40:00 PM	60	97	99	91	99	92	87
5:45:00 PM	47	96	103	88	101	90	73
6:50:00 PM	48	70	77	71	91	75	48
7:50:00 PM	29	40	50	46	66	56	*
9:20:00 PM	29	37	50	44	55	45	48
10:20:00 PM	16	13	19	19	18	20	14

Table 3.14: BC Ferries July 2022 Vehicle Demand Snug Cove -> Horseshoe Bay

SERVICE	SUN	MON	TUES	WEDS	THURS	FRI	SAT
5:20:00 AM		32	33	29	30	24	11
6:20:00 AM	19	76	84	63	71	42	22
7:20:00 AM	30	92	99	81	95	56	29
8:35:00 AM	49	93	104	84	99	72	52
9:35:00 AM	72	94	89	92	99	76	67
10:40:00 AM	89	95	91	89	96	72	61
12:05:00 PM	92	93	98	94	90	64	62
1:15:00 PM	94	74	59	86	93	70	44
2:40:00 PM	90	62	89	97	87	79	54
4:00:00 PM	88	84	95	22	90	75	68
5:10:00 PM	88	79	81	97	94	61	72
6:15:00 PM	84	50	49	89	59	48	77
7:20:00 PM	76	31	25	40	27	29	
8:50:00 PM	47	22	21	29	24	28	86
9:50:00 PM	31	11	13	15	11	9	35
10:50:00 PM	9	3	3	5	4	8	9

The vehicle capacities for these routes have been set out in **Table 3.15** and **Table 3.16** for the Horseshoe Bay and Snug Cove routes respectively.

Table 3.15: Horseshoe Bay Vehicle Capacity % July 2022

	SUN	MON	TUES	WEDS	THURS	FRI	SAT
5:50:00 AM	2%	15%	13%	9%	17%	10%	6%
6:50:00 AM	10%	82%	92%	73%	83%	61%	18%
8:00:00 AM	29%	89%	96%	84%	96%	83%	48%
9:05:00 AM	48%	61%	83%	18%	73%	68%	80%
10:10:00 AM	81%	72%	83%	97%	89%	90%	109%
11:15:00 AM	89%	85%	93%	92%	93%	102%	108%
12:40:00 PM	85%	75%	88%	83%	85%	112%	107%
1:55:00 PM	83%	85%	80%	91%	102%	110%	108%
3:20:00 PM	86%	106%	103%	108%	111%	115%	98%
4:40:00 PM	69%	111%	113%	105%	113%	106%	100%
5:45:00 PM	54%	110%	118%	102%	116%	103%	84%
6:50:00 PM	55%	80%	88%	81%	105%	86%	56%
7:50:00 PM	34%	46%	57%	53%	76%	64%	
9:20:00 PM	33%	43%	57%	50%	64%	52%	55%
10:20:00 PM	18%	15%	21%	22%	20%	23%	16%

As can be seen from the above table, the capacity of services between 10:10 AM – 4:40 PM on Saturdays is all above 98%. There is capacity available during the AM and PM peak periods. Across the remainder of the week, the highest average capacity demand was 118%, which was observed on Tuesday at 5:45 PM.

The average capacity demand for all services between 3:20 PM -5:45 PM Monday to Friday was calculated at 98% or more. Therefore, with no spare capacity for vehicles. Typically, services, in the AM peak tend to have more vehicle capacity available.

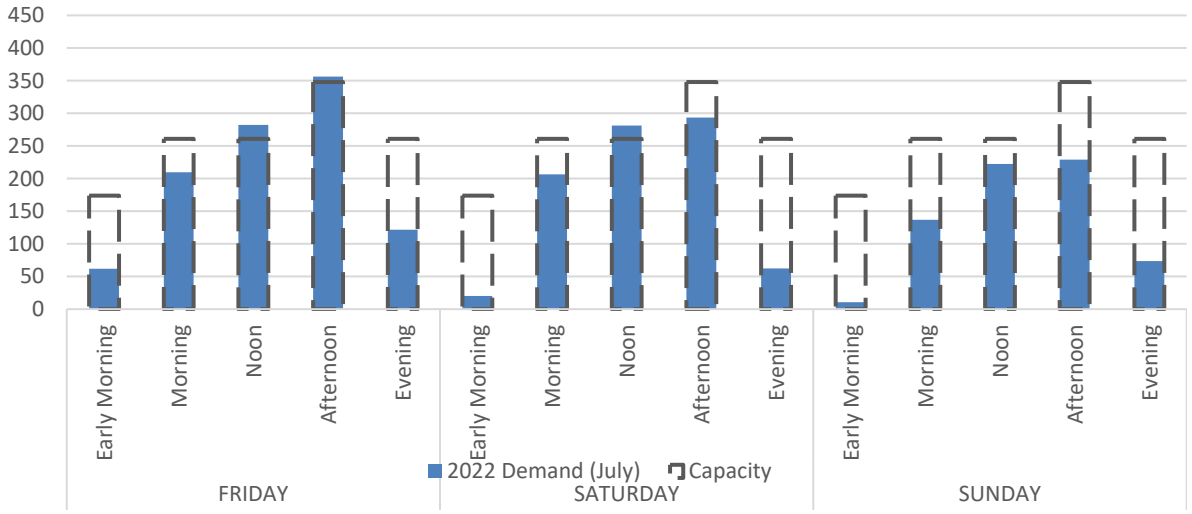
Table 3.16: Snug Cove Vehicle Capacity % July 2022

	SUN	MON	TUES	WEDS	THURS	FRI	SAT
5:20:00 AM		36%	38%	33%	34%	28%	13%
6:20:00 AM	22%	88%	97%	72%	81%	48%	25%
7:20:00 AM	35%	106%	114%	93%	109%	65%	33%
8:35:00 AM	56%	107%	120%	97%	114%	83%	59%
9:35:00 AM	82%	108%	102%	106%	113%	88%	77%
10:40:00 AM	102%	109%	105%	102%	110%	83%	70%
12:05:00 PM	105%	107%	113%	108%	104%	73%	71%
1:15:00 PM	108%	85%	68%	99%	107%	81%	50%
2:40:00 PM	103%	71%	103%	111%	100%	91%	62%
4:00:00 PM	101%	96%	109%	25%	103%	86%	79%
5:10:00 PM	101%	90%	93%	111%	108%	70%	83%
6:15:00 PM	97%	58%	56%	102%	68%	55%	88%
7:20:00 PM	87%	35%	28%	46%	32%	34%	
8:50:00 PM	54%	25%	24%	34%	28%	32%	98%
9:50:00 PM	36%	12%	14%	17%	12%	11%	40%
10:50:00 PM	11%	3%	3%	6%	4%	9%	10%

For services from Bowen Island to Horseshoe Bay, the busiest services are typically observed within the AM peaks, with a maximum demand of 120% at 8:35 AM. After 7:20 PM (except on a Saturday and Sunday) there is a minimum spare capacity of at least 50 % on all services. On Sunday, services between 10:40 AM – 5:10 PM, all services are above or at capacity, and there is between 13% to 89% spare capacity on all other Sunday services. No services on Friday are above capacity, with a minimum of 9% of spare capacity.

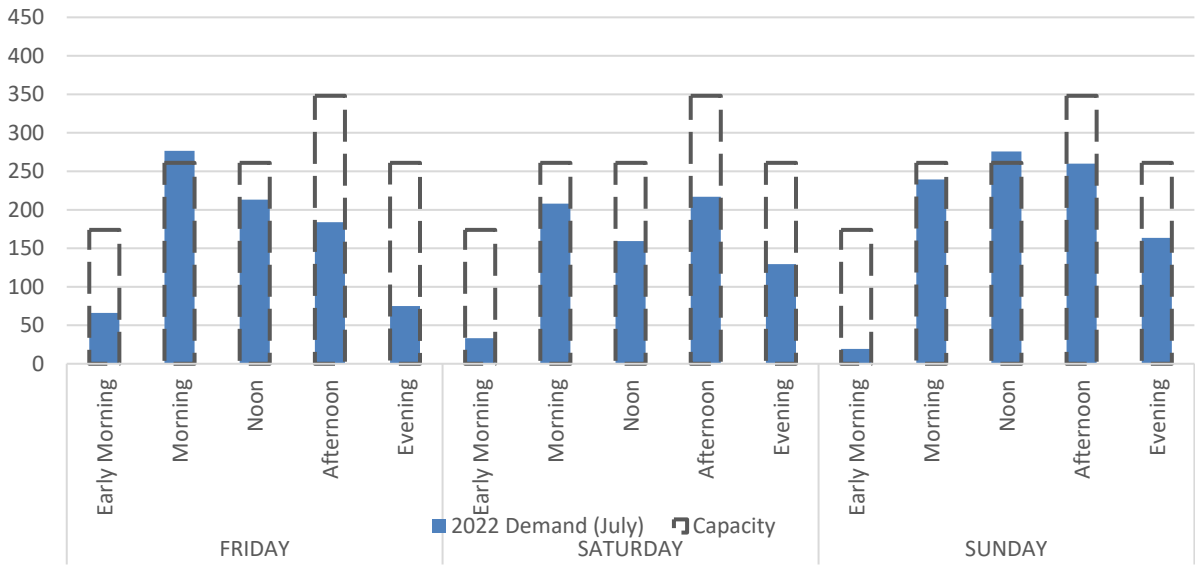
The graphs demonstrated in **Figure 3.3** and **Figure 3.4** show these demands against all the services during the peak times, Friday to Sunday. The time periods are summarized as follows: Early Morning (5 am -7 am), Morning (7 am -11 am), noon (11 am – 3 pm), afternoon (3 pm – 7 pm), and evening (7 pm – 11 pm).

Figure 3.3: Horseshoe Bay -> Snug Cove Ferry Demand and Capacity – Vehicles (July 2022)



As the figure demonstrates, there is spare capacity when looking at all the services provided across the month, with three time periods reaching capacity across all services.

Figure 3.4: Snug Cove -> Horseshoe Bay Ferry Demand and Capacity – Vehicles (July 2022)



Similarly, across all services in July, only two services are seen as overcapacity based on the AEQ methodology, on Friday morning and Sunday at noon. Saturday services are all under capacity.

Summary

The existing ferry demand demonstrates that whilst the ferry vehicle capacity is listed as 87 AEQs, there are several services that have AEQ levels above 87. This indicates that the demand during the midday Friday and Saturday services are all at or above capacity. However the backlog of demand is typically cleared by 7:00 PM. When observing the existing passenger demand, there is available capacity across all services, indicating the total number of passengers from vehicles and on foot or by bike are less than the maximum 427 capacity.

3.8 Current Relevant Policies & Plans

3.8.1 Bowen Island Parking Bylaw

The site is currently zoned RR1, which is included within BIM Land Use Bylaw 57, 2002 Section 5 of the off-street parking for motor vehicles and bicycles within Bowen Island. In addition, the bylaw sets out the requirements for the loading and unloading of motor vehicles and passengers.

Section 7 of the bylaw sets out The Cape Roger Curtis Development Permit Area, including all the required guidelines.

3.8.2 Bowen Island Municipality Official Community Plan

The Official Community Plan (OCP) was developed by BIM in 2010 and labelled as Bylaw No.282. Within the OCP, objective 40 focuses on Cape Roger Curtis Lands and Shoreline, defining the region as an area of sensitivity. Objective 68 is pertinent to Cape Roger Curtis Lands with the municipality promoting to the public the interest in CRC. Developments are encouraged to achieve the following:

- "conserve the majority of the coastline for eco-system protection, but especially the south-facing ecologically sensitive and unique coastal bluff.
- where there are no adverse ecological impacts, develop public, waterfront, walking trails along much of the coastline, connecting to the cross-island greenway.
- protect environmentally sensitive areas and rare species.
- cluster homes and any other structures in any new development to reduce land disturbance, maximize green space and the opportunity for trails, and facilitate transportation alternatives; and
- minimize and mitigate any negative impacts from Cape Roger Curtis development on the adjacent neighbourhoods and the island community as a whole."

As part of the objective, Policy 153 indicates that alterations/changes to the transportation accesses or rezoning requirements will require future master transportation planning exercises to be submitted to Bowen Island.

An OCP amendment submission and rezoning, of the 24 lots, was commenced with BIM in January 2023. The variant looked to rezone to Park Zone (Passive Park) 1 with overnight camping pitches.

3.8.3 Bowen Island Climate Action Strategy

Bowen Island is among many locations, cities, and municipalities around the world, and the Metro Vancouver region in declaring a climate emergency and committing to reduce pollution. The Climate Action Strategy was approved by BIM in 2020 which contained several big shifts to reduce Bowen Island's transportation-related carbon pollution including:

- **Promote a shift from single occupancy vehicles to alternatives:** Developing residential dwellings near transportation hubs and adding an E-Bike rental fleet.
- **Bowen Island's Transportation Plan:** Accelerating investments in active travel and increasing the accessibility to multi-use transport options.
- **Zero Emission Transportation:** Developing homes with electrical charging facilities and further implementation of fast charging stations on Bowen Islands.
- **Transportation requirement reductions:** Developing and providing facilities to residents that reduce the need to travel further afield.

3.9 Metro Vancouver Regional Parks – Crippen

In addition to the proposed park, Crippen Regional Park (CRP) is another park located approximately 6.5km to the northeast of CRC and in 2022 attracted just over 355,565 annual visitors. There are several access points to CRP, from Doman Road, Orchard Lane, and Bowen Island Trunk Road. 3 parking lots make up the vehicle parking provision for CRP for a total of 81 spaces, 46 accessed via Dorman Road Entrance, 17 at Killarney Lake Roadside, and a further 8 at the Miller Parking lot. The number of visitors accessing the park has been utilized to influence assumptions for CRC.

Metro Vancouver undertook park visitor surveys in 2013, 2019, and 2022 to understand the travel patterns of visitors to Crippen Park. These surveys have formed the basis of visitor projections and modal splits for CRC.

4. PROPOSED DEVELOPMENT

This section will set out the proposed development characteristics and anticipated access proposals for each element of the site, the location of the proposed parking lots, and sustainable access provisions.

Primary access to the campgrounds and day-use will be retained as per the existing scenario, with Cape Drive continuing through the site. Other municipal roads already provided, such as Huszar Creek Drive and Georgia Strait Drive will all be retained as part of the proposals. No additional connections will be provided, and all traffic will be required to travel through Whitesails Drive. The proposed land use plan of the complete site is set out in **Figure 1.1**.

4.1 Day Use

Across the 24 lots, the majority will be retained as regional parkland, with several municipal trails and access easements throughout. Sections of the proposed parkland will be restricted by environmental covenants. Visits to the park are typically from those residing or visiting the island as part of their wider plans. It is not seen as an attraction or destination for those living outside of Bowen Island.

4.1.1 Vehicle Parking

Two or three parking lots will be provided as part of the day-use provisions, the first will be located to the north of the site, in Lot 56, close to the access of the vehicle campgrounds and one of the municipal trails, this parking lot will be accessible to the west of Cape Drive.

The second parking lot will be in Lot 24, this parking lot will be accessible to the south of Cape Drive via Huszar Creek Drive. This lot will be located the alongside the driveway, in the centre of Lot 24, adjacent to the municipal trails and water source. The parking lot will be outside of the riparian protection area.

The total number of vehicle parking spaces will be provided in **Section 7** below. This will include a couple of accessible spaces as well.

4.1.2 Bicycle Parking

As part of the proposed development, short-stay cycle stands will be provided. The total number has yet to be determined but will be in line with anticipated demand. These will be in a visible and covered area to encourage visitors to the park to arrive by bicycle.

4.2 Campground

As previously mentioned, the campground will contain 100 campsites, including 5 group campsites provided across 12 of the 24 lots purchased by Metro Vancouver. The breakdown of campsites has been set out in **Table 4.1**. The campsites will be available by reservation only with campground facilities provided, such as toilet blocks and waste collection.

Table 4.1: Metro Vancouver's Proposed Camping Program

TYPE	# SITES	ACCESS TYPE
Walk-In/Bike-In	52	Bike/hike/shuttle
Group	**5**	**Shuttle/Van**
Tent Cabin	10	5 vehicles, 5 bike/hike/shuttle
Vehicle-Accessible Camp	33	1 vehicle per site
Total	**100**	

As demonstrated in the masterplan, Figure 1.1, the camping program will be broken down as follows:

- 52 Walk-in/Bike-in Campsites- These pitches will be accessible by sustainable modes only (Walk, Bike, or Shuttle Bus). The 52 Walk-in / Bike-in sites will be split equally between two locations. The first half (26 spaces) will be located to the south of Cape Drive within lots 27 & 28. The second group of 26 campsites will be located to the south of the overall site and accessed via Huszar Creek Drive. These campsites will be spread across Lots 26, 27, & 28 adjacent to the Georgia Strait coastline.

- 33 Standard Car campsites - Accessible by all modes, including private vehicles. These campsites will be split across two locations, within lots C, D E & F. F. Both locations from Cape Drive and the primary campsite will be in the northern section, with a small campground located to the south of the creek running through the site. The split of the campsites across the two lots has not been defined.

- 5 Group Campsites – These pitches are split across two locations, the first is within Lot 33, to the east of Cape Drive, and a second area for group campsites will be split across Lots 32 and 31. An access easement from Georgia Strait Drive will be provided.

- 10 Tent Cabins - Located in Lot 34 and to the north of the creek. It is located to the east of Cape Drive.

As can be seen, a total of 100 camp pitches will be provided across 7 different campgrounds. Half of the tent cabins will also be accessible by private vehicles, therefore, resulting in 38 vehicle-accessible spaces. Access to the campsite will be restricted by gates during the evening and will be monitored by Metro Vancouver staff throughout the PM and evening peaks.

4.2.1 Vehicle Parking

No visitor parking will be provided as part of the campsite, those guests with a vehicle-accessible pitch will be able to accommodate their vehicle on their camp pitch, but no other vehicles will be able to access the campgrounds.

It is assumed that each standard campsite will accommodate one vehicle, while group pitches will have space for two vehicles.

4.2.2 Bicycle Parking

As several sites will be walk-in / bike-in only, secure bike parking will be required and anticipated on a number of the campsites. These spaces will accompany each of the campsites.

5. CAPE ROGER CURTIS PARK PROJECTED VISITOR PROFILE

This section will set out the anticipated number of visitors to the site, both for the day-use and campground facilities. Due to the different land uses, two different methodologies have been utilized to calculate the anticipated trip demand. As part of the analysis, the day-use visitors and campground visitors will be combined to generate a total number of visitors to the overall site. This is to determine the overall visitors and trips that will be generated by all aspects of the site.

A memorandum demonstrating the comparison between the existing land use, potential buildout and the potential future development was submitted to BIM in March 2023.

5.1 Trip Generation

5.1.1 Day Use

Projected Visits

The estimated number of park visits to Cape Roger Curtis was generated by MV and is set out in **Table 5.1.** As described previously in **Section 2.2**, the day-use amenities currently exist within Bowen Island; therefore, the day-use will be considered as an existing operation, only generating trips from those visitors already located on Bowen Island. Metro Vancouver will focus on day-use access through the proposed park shuttle, trail, and greenway connections, with some limited car access. It is not anticipated that the day-use will generate any additional visits from off-island residents, in so doing, not impacting the BC Ferries patronage.

Table 5.1: Estimated Monthly Visits to CRC

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
4,167	5,009	5,331	5,578	6,827	7,117	8,836	8,741	7,331	6,262	4,615	3,478	73,291

As shown above, July and August represent the peak months, with a total of 8,836 visits estimated in the peak month. The annual projected visits to the park day-use facilities are estimated to be 73,291 visits. It should be noted that a visitor can undertake more than one visit in a day.

The day-use visitation estimates for the proposed park do not consider phased implementation. Additionally, estimates do not distinguish between Bowen Island Residents and off-island visitors. Based on Metro Vancouver visitor survey data and factoring in the location of the proposed regional park (8km from the Snug Cove ferry terminal).

Table 5.2: Estimated Weekday Daily Visits

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
134	179	172	186	220	237	**285**	282	244	202	154	112

When looking at the daily numbers, this represents an average peak weekday of 285 visits a day. The park is anticipated to be operational between 7:00 AM - 8:00 PM, a 13-hour opening period. This equates to approximately 22 visits per hour. It is understood that weekends would attract more visits than during the weekday. The above tables set out the daily visitors during the weekday.

A weekend increase of 26% has been applied to understand the number of visits anticipated. The weekend factor was calculated based on daily visitation counts to Crippen through July 2022. The difference between the average day (an average of 1,388 per day) and weekends (an average of 1,742 per day) for all days in July (seen as the peak month at Crippen Regional Park) produced a weekend factor of 1.26. This factor was applied to the July and August weekday visits.

Table 5.3: Weekend Peak Daily Visits

JUL	AUG
358	354

The peak weekend daily visits are anticipated to be 358 trips during July.

Method of Travel

Based on surveys conducted in 2013, 2019, and 2022 for Crippen, a method of travel to the parks was calculated. This was utilized as the only available data for an operational park that is similar. This method of travel was then estimated for Cape Roger Curtis. The method of travel was then weighted to account for the those travelling to visit the proposed CRC site. The overall mode split has been set out in **Table 5.4.**

Table 5.4: Estimated CRC visits Modal Split

	WEIGTHED AVERAGE
Private vehicle	37%
Walked the whole way	21%
Bike	4%
Public Transit	38%
Total	100%

The table above demonstrates that it is anticipated that 37% of the internal visits will be undertaken by car, with 38% of those utilizing public transit. It is anticipated that all trips will be undertaken via active modes of transportation, with 25% either travelling on foot or by bicycle.

Furthermore, as part of the Crippen survey, the average car occupancy per visit was 1.9 passengers per private vehicle. Therefore, 37% of private car visits will be reduced to account for vehicle occupancy. This has been applied to the number of visits.

The estimated daily visits for both the weekday and weekend have been applied to the above mode share and are set out in **Table 5.5**.

Table 5.5: Weekday and Weekend Daily Visitor Modal Split

MODE	FRIDAY TOTAL	SATRUDAY TOTAL
Private vehicle	55	69
Walk	61	76
Bike	12	15
Public Transit	107	135
Total	235	295

It is anticipated that the total daily vehicle demand trip demand during the Saturday peak would be 69 trips. The total number of trips to the existing day-use is anticipated to be 295 trips.

Daily and Peak Hour Trip Generation

To determine the anticipated daily visitor rate, the visitor profile from an existing Metro Vancouver Park, Minnekhada, was utilized as this was the only available data owned by Metro Vancouver. Minnekhada is a regional park, approximately 200 acres in size, located in the City of Coquitlam. The regional park has two small car parking lots, similar to what is proposed at CRC. During a 2021 survey the number of visitors arriving at the park between 7:00 AM – 6:00 PM on Friday, Saturday, and Sunday. A visitor profile rate throughout the day was calculated by using vehicle access numbers. Visitor profiles are shown in **Table 5.6**.

Table 5.6: Friday and Saturday visitor profile – Minnekhada

TIME	FRIDAY	SATURDAY
7:00 AM	3%	1%
8:00 AM	7%	2%
9:00 AM	8%	4%
10:00 AM	11%	9%
11:00 AM	8%	8%
12:00 PM	13%	11%
1:00 PM	11%	14%
2:00 PM	11%	13%
3:00 PM	10%	13%
4:00 PM	9%	11%
5:00 PM	6%	8%
6:00 PM	3%	5%

The Friday peak profile was seen at noon, whilst the Saturday peak was observed at 1:00 PM, with 14% of all trips. It is acknowledged that there might be trips outside of the daily profile, but no data is available for these periods, therefore, it is not possible to calculate the number and this outside of the peak hours.

Table 5.7 demonstrates the Friday modal profile and **Table 5.8** sets out the Saturday trips by mode.

Table 5.7: Friday Trips profile by mode

TIME	PROFILE	PRIVATE	WALK	BIKE	TRANSIT	Total
7:00 AM	3%	2	2	0	4	8
8:00 AM	7%	4	4	1	7	16
9:00 AM	8%	5	5	1	9	20
10:00 AM	11%	6	6	1	11	25
11:00 AM	8%	5	5	1	9	20
12:00 PM	**13%**	7	8	1	13	29
1:00 PM	11%	6	7	1	12	26
2:00 PM	11%	6	6	1	11	25
3:00 PM	10%	5	6	1	10	23
4:00 PM	9%	5	6	1	10	22
5:00 PM	6%	3	4	1	7	14
6:00 PM	3%	2	2	0	4	8
Total		**55**	61	12	107	235

The peak (12:00 PM) number of trips is generated at noon where 13% of all trips are anticipated with a maximum of 7 vehicle trips and 13 transit trips.

Table 5.8: Saturday Trips Profile by Mode

TIME	PROFILE	PRIVATE	WALK	BIKE	TRANSIT	Total
7:00 AM	1%	2	3	0	4	10
8:00 AM	2%	5	5	1	9	19
9:00 AM	4%	6	6	1	11	25
10:00 AM	9%	7	8	2	14	31
11:00 AM	8%	6	6	1	11	25
12:00 PM	11%	9	10	2	17	37
1:00 PM	**14%**	8	9	2	15	33
2:00 PM	13%	7	8	2	14	31
3:00 PM	13%	7	7	1	13	29
4:00 PM	11%	7	7	1	13	28
5:00 PM	8%	4	5	1	8	18
6:00 PM	5%	2	3	0	4	10
Total		69	76	15	135	295

The Saturday peak period (1:00 PM) is anticipated at 14% of daily visitor trips, which equates to 9 private vehicle trips, 17 transit trips, and 12 trips by active mode.

Vehicle Trips Arrival and Departure

Based on ticket sales collected by Metro Vancouver at Lynn Valley Regional Park and Belcarra Regional Park from March to October and April to September, respectively, visitors typically stay at the parks for an average period of approximately 2.7 hours, or 162 minutes. Based on this analysis, the vehicle trip departures have been sperate across two hours to account for the duration of stay, this is demonstrated in **Table 5.9** and will provide the foundation of the total vehicle trip generation profile. The departures have been split in a very conservative 50/50 split, which means after 2 hours 50% of the hourly arrivals will depart, then the following hour, the remaining 50% will depart This crude calculation has been undertaken based on the limited accessible data.

Table 5.9: Vehicle Arrival and Departure Trip Generation

TIME	FRIDAY			SATURDAY		
	Arrival	Departure	Total	Arrival	Departure	Total
7:00 AM	2	0	2	1	0	1
8:00 AM	4	0	4	2	0	2
9:00 AM	5	1	6	3	0	3
10:00 AM	6	3	9	6	1	7
11:00 AM	5	4	9	5	2	8
12:00 PM	7	5	12	8	5	12
1:00 PM	6	5	11	10	6	16
2:00 PM	6	6	12	9	6	16
3:00 PM	5	7	12	9	9	18
4:00 PM	5	6	11	8	10	17
5:00 PM	3	6	9	6	9	15
6:00 PM	2	5	7	3	8	12
Total	**55**	**47**	**103***	**69**	**56**	**126***

*Any discrepancies are caused by rounding

As shown in the table above, the Friday peak would result in 12 two-way vehicle trips in the peak period, while the Saturday peak would result in a maximum of 18 two-way trips. The traffic impact on the network is anticipated to be limited.

5.1.2 Campground

Campgrounds typically reach peak occupancy during the PM and evening hours, with a lower turnover than the day-use would see per the Institute of Transportation Engineers (ITE) trip generation guidelines, where the weekend peak hour rates are not provided. However, with the locale for this site, it is anticipated that the PM peak hour occupancy would translate into weekend use. Check-out for most campgrounds is typically before 11:00 AM on the final day of a reservation, while check-in for those arriving is normally after 1:00 PM. Therefore, campgrounds have a defined arrival and departure profile.

The following assumptions have been assumed, with the trip rates set out within **Table 5.10**:

- All campsites are reserved and/or occupied during the peak periods – i.e., summer weekends.
- Vehicle(s) per standard campsite is 1 vehicle and 2 vehicles per group campsite.

- Trip rates for the vehicle campsites have been obtained from the ITE manual for occupied sites. The PM peak (and assumed weekend peak) arrival rate was 0.75 vehicle trips per occupied site when comparing the average and fitted curve rate.

Table 5.10: Vehicle Trip Generation Rates

USE	SOURCE	PARAMETER	PM VEHICLE TRIP RATES			DAILY VEHICLE TRIP RATES		
			In	Out	Total	In	Out	Total
Standard Campsites	ITE LUC 416	Camp pitches	0.75	-	0.75	0.75	0.50	1.25
Group Site	Metro Vancouver Data	# of group sites	1.60	-	1.60	1.60	1.0	2.60

Application of these vehicle trip rates to the proposed camping provision is outlined in **Table 5.11** to estimate the anticipated number of vehicle trips generated by the proposed campgrounds.

Table 5.11: Vehicle Trip Generation

USE	DENSITY	PM VEHICLE TRIPS			DAILY VEHICLE TRIPS		
		In	Out	Total	In	Out	Total
Campground (Vehicle Accessible)	38-vehicle accessible - campsites	29	-	29	29	19	48
Campground (Group Site)	5 Group Sites	8	-	8	8	5	13
TOTAL CAMPGROUND		37	0	37	37	24	61

As can be seen, the proposed site will generate around 37 vehicle trips in the PM peak for the full site. The anticipated peak day trips would generate 61 total two-way vehicle trips across a 24hr period. For the Saturday peak, a reduced number of arrivals are anticipated, most people camp for more than two days and will remain on-site during the full day. Some people might depart on a Saturday, but this is unlikely. As reservations are required for all sites, this will ensure that vehicle numbers are limited, and that people will not be able to arrive in the hope of getting a campsite.

It is recognised that all inbound trips occur in the PM peak given the check-in times, typically, campsites see a wider spread of inbound over the PM. However, for a more conservative approach and due to a lack of data, all PM peaks have been analysed as arriving at once. As demonstrated, the PM peak will see a total of 37 inbound trips, with no outbound trips. This equates to fewer than 1 vehicle per minute.

5.2 Potential Build-Out Comparison

To assist Metro Vancouver, a memorandum regarding trip generation was provided to BIM in March 2023. This memo was created to make a comparison between the potential build-out of the 24 lots, this was based on the RR1 zoning of the lots and then a future trip generation for the proposed park. The memo is attached in **Appendix C**.

As part of the memo, a trip rate for 24 single detached dwellings was utilized as a low range scenario, this was based on a resident's rate of 3.6 residents per dwelling. BIM indicated that on the island, residency for each dwelling is typically 2.5 residents per dwelling. Therefore, a new trip generation for the 24 lots was calculated and has been compared to the campground program trip generation, as this is considered as the new trips within the lots. The potential-build out trips in comparison to the campground trip generation is demonstrated in **Table 5.12**.

Table 5.12: Potential Build-Out Trip Generation Comparison

USE	DENSITY	PM VEHICLE TRIPS			SATURDAY DAILY VEHICLE TRIPS		
		In	Out	Total	In	Out	Total
Potential Build-Out (Detached Housing)	2.5 residents per dwelling (60 Total)	11	6	17	75	75	149
Campground (vehicle accessible / group camping)	38- Accessible & 5 Group Sites	37	0	37	37	24	61
TRIP GENERATION COMPARION		+26	-6	+20	-38	-51	-88

As can be seen, the campground generates more trips within the Weekday PM peak, with a total of 20 more two-way trips when compared to the potential build-out of the 24 lots. However, when compared to the total daily two-way trips, the campground will generate 88 two-way trips fewer than the potential 24 lots overall.

Overall, the campground will generate significantly fewer trips across the day on both weekdays and weekends, with the exception being the PM peak, which sees a higher number of trips when compared to single-family dwellings. The campground will be kept for all the remaining analysis.

5.3 Total Site Traffic

The combined vehicle trip generation for both land uses, day-use and campground has been set out within **Table 5.13**.

Table 5.13: Combined Vehicle Trip Generation – Day Use (Internal) & Campground

TIME	FRIDAY			SATURDAY		
	Arrival	Departure	Total	Arrival	Departure	Total
7:00 AM	2	0	2	1	0	1
8:00 AM	4	0	4	2	0	2
9:00 AM	5	1	6	3	0	3
10:00 AM	6	15	21	6	13	19
11:00 AM	5	16	21	5	14	20
12:00 PM	7	5	12	8	5	12
1:00 PM	6	5	11	10	6	16
2:00 PM	42	6	48	46	6	52
3:00 PM	5	7	12	9	9	18
4:00 PM	5	6	11	8	10	17
5:00 PM	3	6	9	6	9	15
6:00 PM	2	5	7	3	8	12
Total	**92**	71	**163**	**106**	**80**	**186**

The Friday PM peak is seen at 2:00 PM, with a total 48 vehicle two-way trips, this represents a trip to all parts of the site every minute. The largest portion of the trips are the inbound campground arrivals, which as previously mentioned is a conservative approach and 37 of the trips would be more likely to spread through the PM period.

The Saturday peak is at 2:00 PM, and a total of 52 two-way trips are anticipated, this represents less than 1 trip every minute. In the peak period, there will be a vehicle arriving at the site every minute.

The total vehicle trips anticipated in a worst-case scenario are anticipated to be between 160 and 190 two-way trips across 12 hours. This represents 1 car every 2-3 minutes during the weekday and 1 trip rough every 3 minutes on the weekend.

6. FUTURE TRAVEL CONDITIONS

Future traffic conditions were developed based on a combination of existing traffic, background growth (made up of significant development site trips generated within Cape Roger Curtis 24 undeveloped lots), and the development-generated site trips based on the full build-out of the proposed Campground. A traffic impact will be undertaken initially before any modelling results, understanding the percentage impact of the additional traffic associated with the site.

6.1 Study Horizons

A single horizon year was agreed to with the terms of reference for future analysis, which corresponds to the opening day of the proposed development. The scenarios analysed are as follows:

- Opening Day Background (2030): Existing + 7 years growth; and
- Opening Day Total: Background + MV Campground site traffic generation

6.2 Traffic Forecasts

6.2.1 Background Traffic Forecasts

Background traffic is traffic that would be present on the road network if the project site was not developed, with a 7-year growth rate it is understood that will represent a full buildout of all the remaining 18 vacant lots within Cape Roger Curtis which are not part of the 24 lots that are owned and operated by Metro Vancouver. An annual growth rate of 1% linear growth has been applied, therefore, providing an increase of approximately 7% from 2023 to 2030. 2030 represents the anticipated completion and opening day of the full campground build out. Whilst aspects will be open prior to this date, the full park will open in phases that are yet to be determined. The flows are set out in **Exhibit 6.1**.

6.2.2 Site Traffic

The site total vehicle trip generation was set out within **Table 5.12,** above**,** and will generate 275 two-way trips in the PM peak and 412 two-way trips in the Saturday peak. This equates to 1 vehicle every 2-3 vehicles arriving or leaving the site (combined uses) every minute across the site's multiple access.

6.2.3 Trip Distribution and Assignment

Vehicle trip generation has been split into different land uses as they have very differing distributions. The camping distribution will be all direct to and from the ferry at Snug Cove.

Day-use will have a differing distribution that will be based on an analysis of the existing traffic flow patterns across the study area road network. The trip assignment was based on observed travel patterns and directional splits as well as engineering judgement, considering logical routing from site access points to the study's external origins and destinations. The trip distribution used to assign the existing traffic generated by the day-use and the proposed park is summarised in **Table 6.1 A & B.**

Table 6.1: Estimated Trip Distribution

ORIGIN / DESTINATION	CAMPGROUND				DAY USE			
	FRIDAY PM PEAK HOUR		SATURDAY PEAK HOUR		FRIDAY PM PEAK HOUR		SATURDAY PEAK HOUR	
	IN (%)	OUT (%)	IN (%)	OUT (%)	IN (%)	OUT (%)	IN (%)	OUT (%)
Cape Roger Curtis	0	0	0	0	5%	5%	5%	5%
Tunstall Bay	0	0	0	0	5%	5%	5%	5%
Adams Road	0	0	0	0	5%	5%	5%	5%
Bowen Bay	0	0	0	0	20%	20%	20%	20%
Seymour Landing	0	0	0	0	10%	10%	10%	10%
Snug Cove	100%	100%	100%	100%	25%	25%	25%	25%
North Island	0	0	0	0	30%	30%	30%	30%
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%

The trip distribution for the campground has been calculated based on the assumption that all vehicle traffic will arrive via BC Ferries, no visitors from Bowen Island are anticipated to visit the proposed parking by car. The day-use distribution has been calculated based on the distribution of residential dwellings across the island and assisted by the traffic data collected.

Based on the trip generation and distribution shown above, the trips were assigned to the road network for both the weekday PM and weekend peak hours. The distribution of the site-generated vehicle traffic is highlighted in **Exhibit 6.2 A & B.**

6.2.4 Total Traffic

The future total traffic volumes were forecasted by adding the new site trips to the background traffic volumes. No major roadway network changes were assumed the analysis. The total traffic volumes are summarized in **Exhibit 6.3 A & B**.

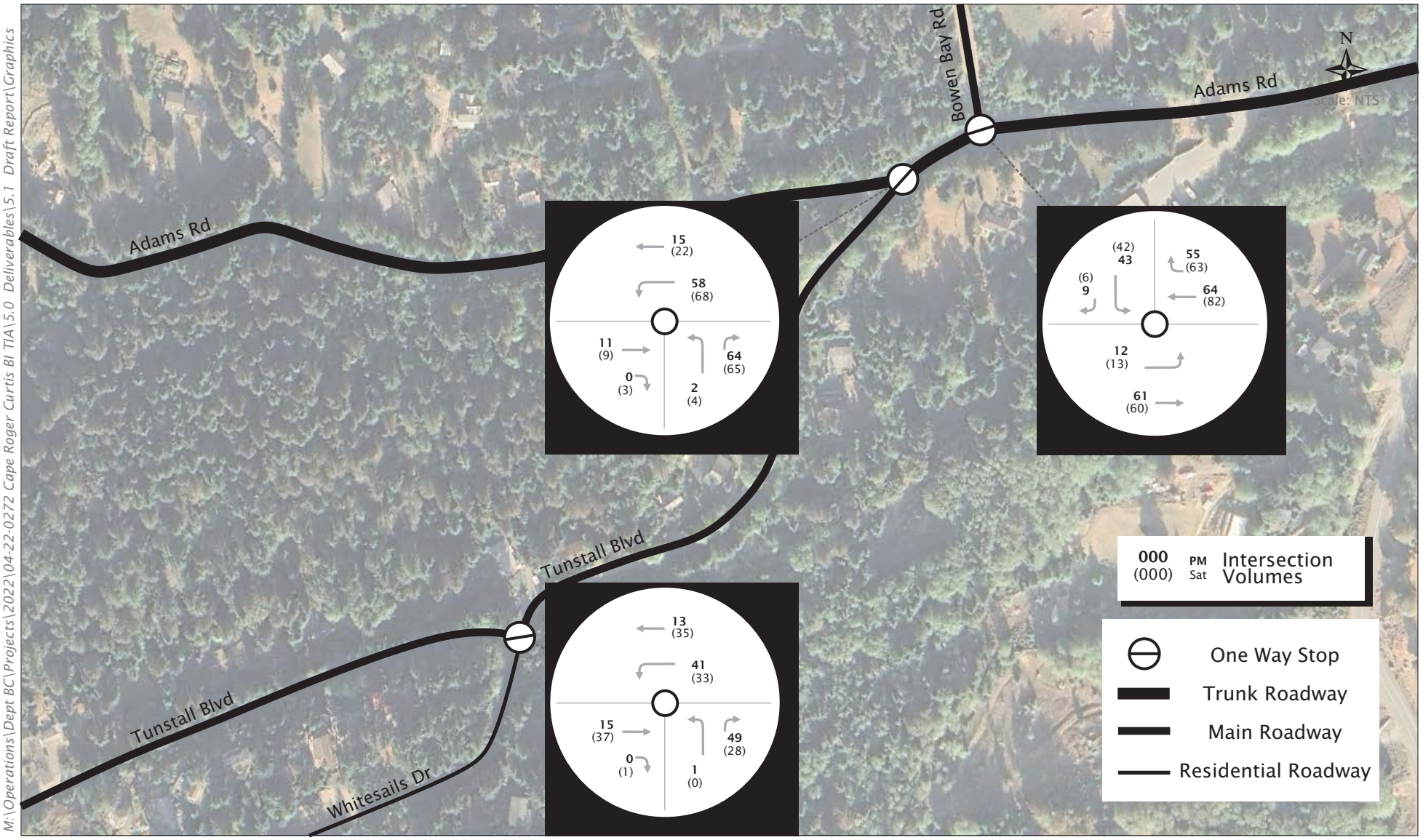


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Exhibit 6.1

Opening Day Background 2030 Traffic Volumes (West)

04-22-0272

Cape Roger Curtis
June 2023

bunt & associates

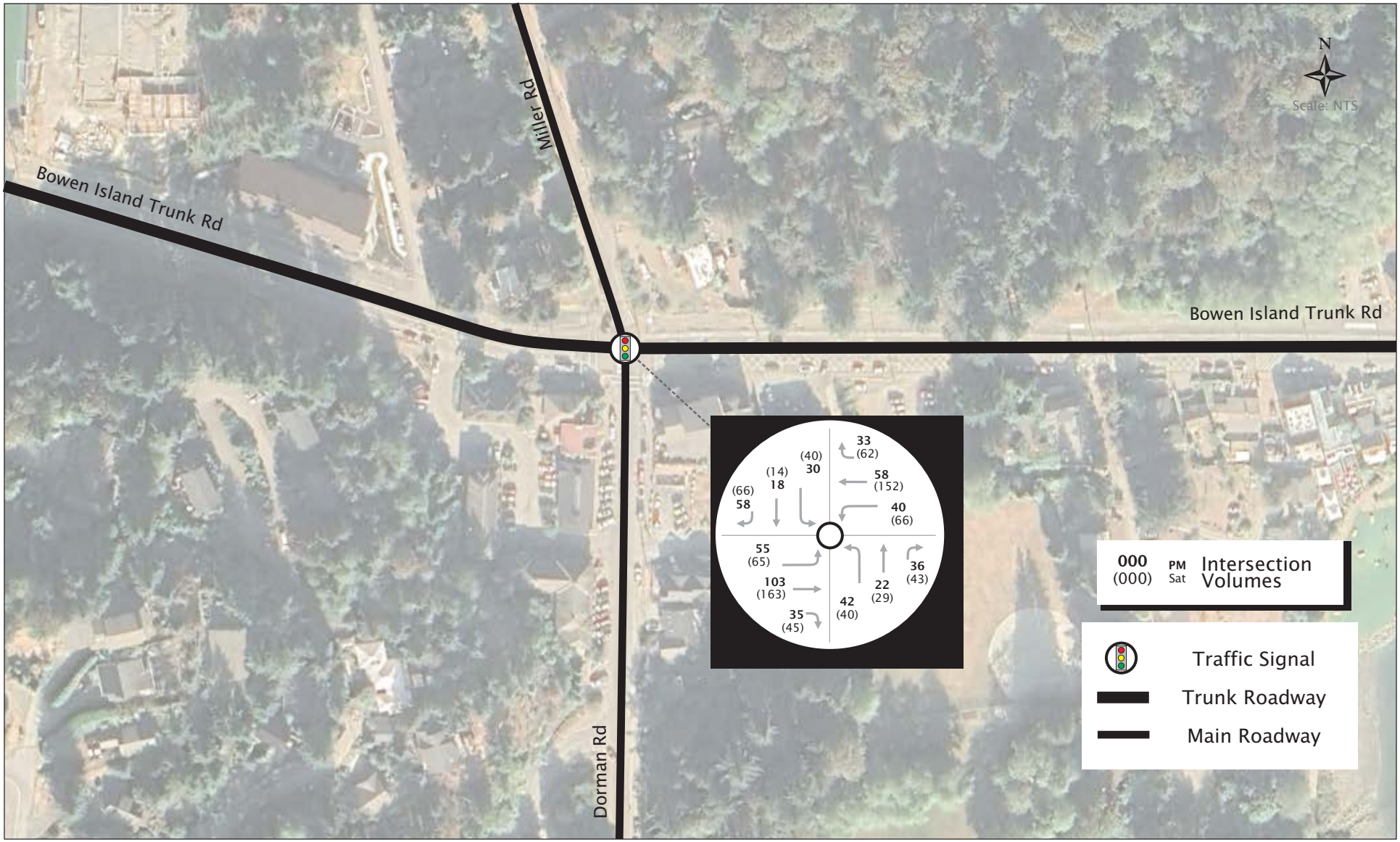

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Exhibit 6.2B

Opening Day Background 2030 Traffic Volumes (East)

04-22-0272

Cape Roger Curtis
June 2023

bunt & associates

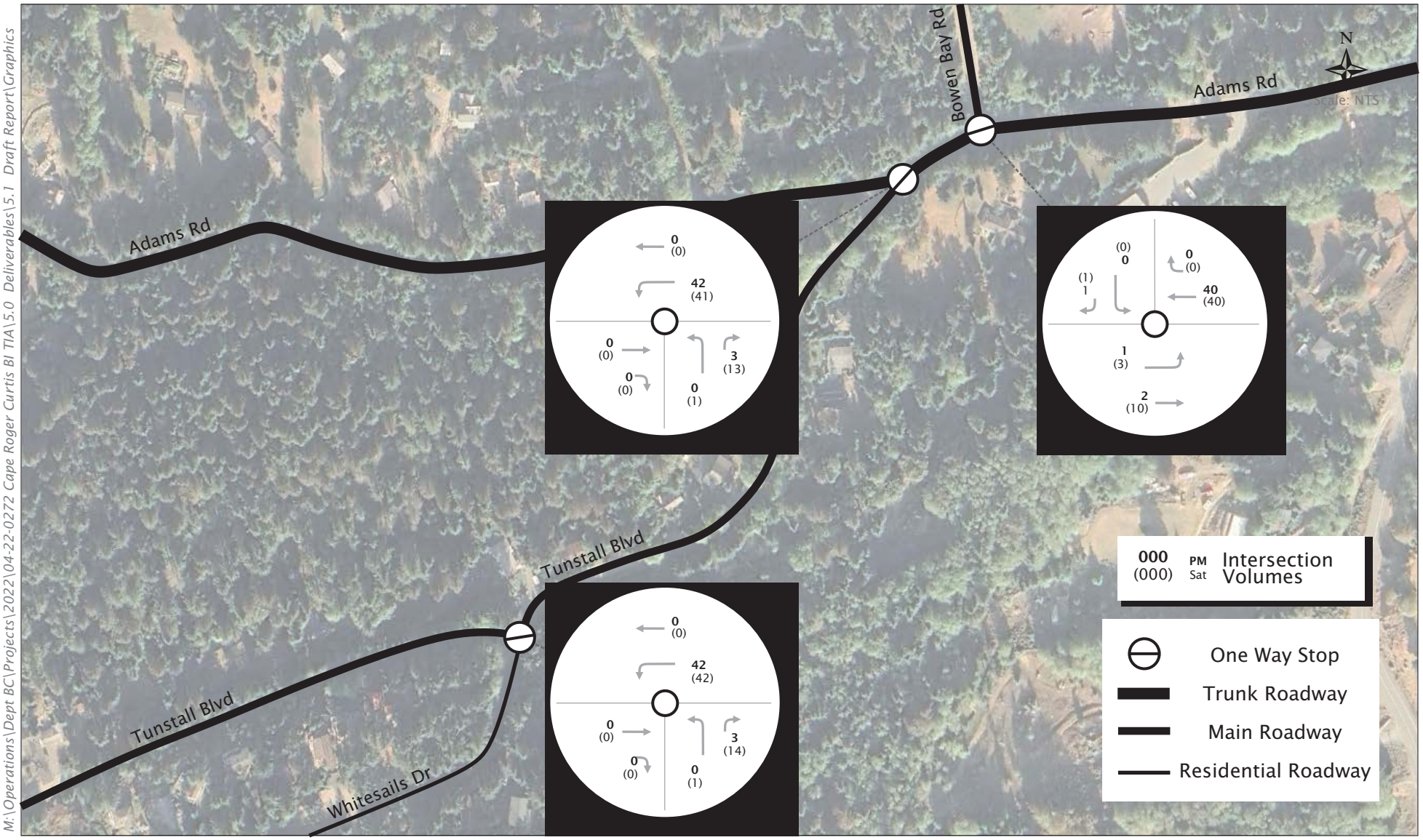

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Exhibit 6.3

Site Traffic Distribution and Site Traffic Volumes (West)

04-22-0272

Cape Roger Curtis
June 2023

bunt & associates

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Exhibit 6.4B

Site Traffic Distribution and Site Traffic Volumes (East)

04-22-0272

Cape Roger Curtis
June 2023

bunt & associates

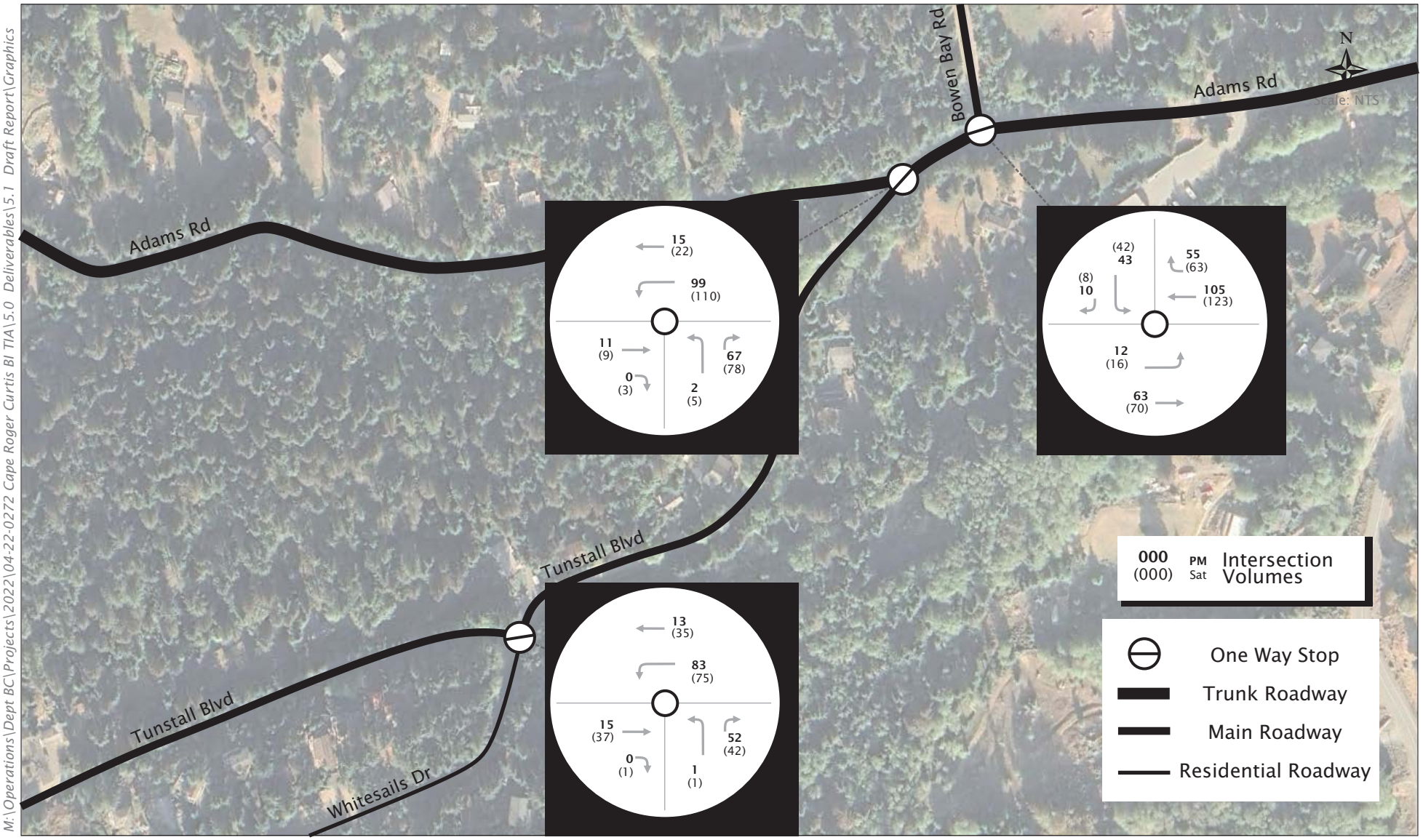

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Exhibit 6.5

Total Day Peak Hour Vehicle Traffic Volumes (West)

04-22-0272

Cape Roger Curtis
June 2023

bunt & associates

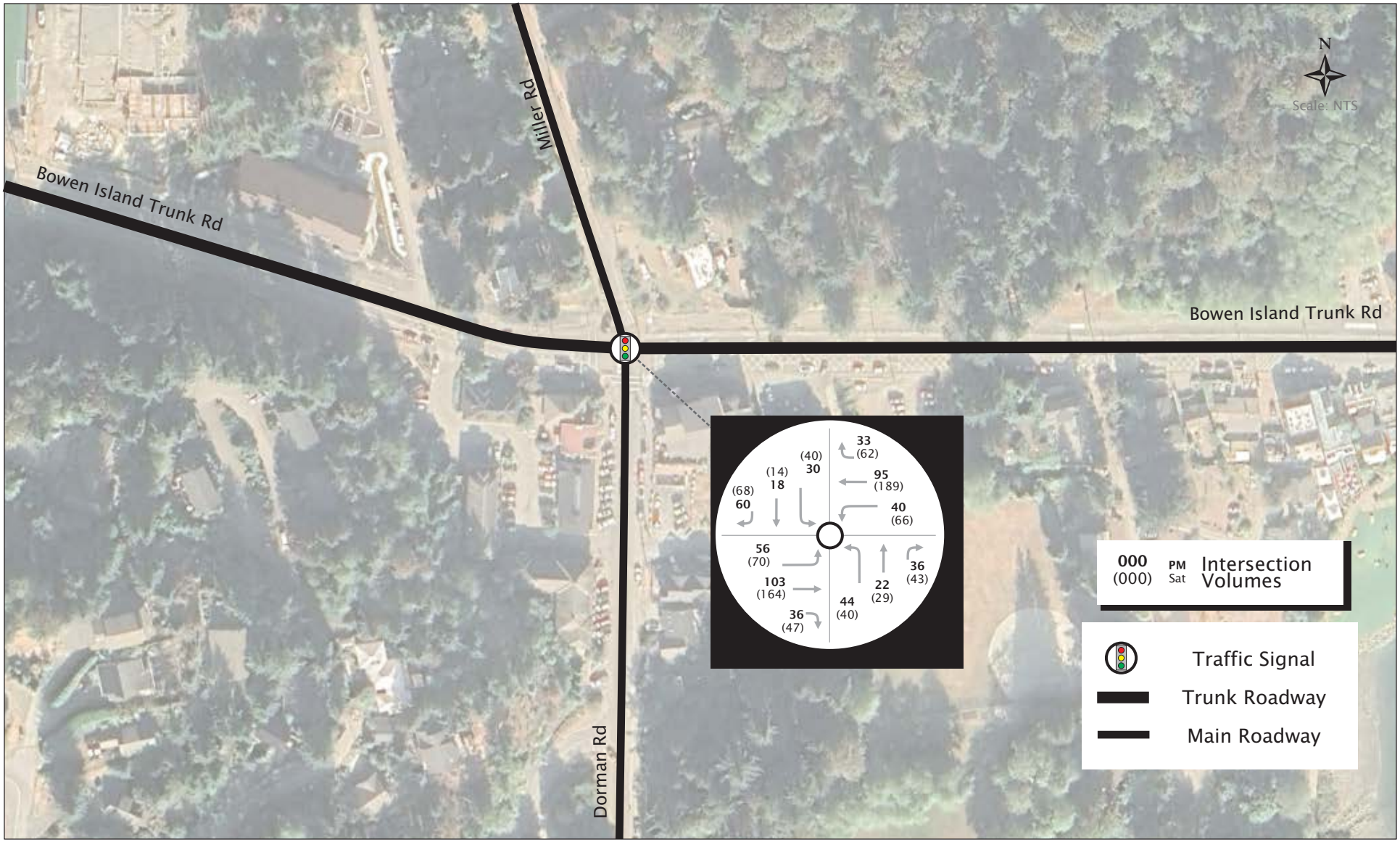

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Exhibit 6.6B

Total Day Peak Hour Vehicle Traffic Volumes (East)

04-22-0272

Cape Roger Curtis
June 2023

bunt & associates

6.3 Future Traffic Operations and Impact Assessment

6.3.1 Future Background Impact Assessment

Table 6.2 summarizes the operational analysis for existing traffic conditions in the study area. Traffic operations that exceed the performance thresholds have been bolded.

Table 6.2: Opening Day Background Traffic Operations

INTERSECTION / TRAFFIC CONTROL	MOVEMENT	FRIDAY PM PEAK		SAT AFTERNOON PEAK	
		LOS	95TH Q (M)	LOS	95TH Q (M)
Whitesails Drive / Tunstall Blvd	EBRT	A	0	A	0
	WBLT	A	5	A	5
	NBLR	A	15	A	10
Tunstall Blvd / Adams Road	EBRT	A	10	A	10
	WBLT	A	0	A	0
	NBLR	A	0	A	0
Adams Road / Bowen Bay Road	EBLT	A	0	A	5
	WBRT	A	0	A	0
	SBLR	A	15	A	15
Miller Road / Bowen Island Trunk Road / Dorman Road / Grafton Road	EBLRT	A	5	A	10
	WBLRT	A	10	A	15
	NBLRT	A	20	C	25
	SBLRT	A	15	C	25

The additional growth from the additional lots and development within the vicinity of the area results in minimal impacts at several intersections and movements in the network. As can be seen, the only intersection impacted by the increase in background traffic is Miller Road / Bowen Island Trunk Road / Dorman Road / Grafton Road during the Saturday peak hour. Whilst the LOS deteriorates to LOS C on the north and southbound movements of Miller Rd / Bowen Island Trunk Road / Dorman Road / Grafton Road, this is still considered to operate within the capacity of the intersection. The difference in 95th queue is minimal at a maximum increase of one vehicle and this change is considered negligible.

6.3.2 Future Total Traffic Operations

Table 6.3 demonstrates the distribution of traffic across the network, while **Table 6.4** examines the % impact of the additional site traffic in comparison to the background traffic. This shows the increase in traffic generated by the development and how this will be spread across the Bowen Island road network.

Table 6.3: Peak Hour Vehicle Trips

ORIGIN / DESTINATION	TOTAL TRIPS			
	FRIDAY PM PEAK HOUR		SATURDAY AFTERNOON PEAK HOUR	
	INBOUND	OUTBOUND	INBOUND	OUTBOUND
Tunstall Bay	0	0	0	1
Adams Road	0	0	0	1
Bowen Bay	2	1	1	3
Seymour Landing	1	0	1	2
Snug Cove	37	1	38	4
North Island	2	1	2	5
Total Cape Roger Curtis	**42**	**3**	**42**	**15**

As can be seen, most of the traffic generated by the site travels towards Snug Cove. The remainder of the trips are distributed across the island.

The increase in traffic generated by the site has been compared to the anticipated background 2030 traffic at each intersection to determine how the proposed site will increase the traffic.

The percentage increase for both the Friday AM and Saturday peak has been set out in **Table 6.4**.

Table 6.4: 2030 Site Traffic Impact Assessment Weekday and Weekend Peaks

INTERSECTION	FRIDAY	SATURDAY
Whitesails Drive / Tunstall Blvd	+45 (27%)	+57 (30%)
Tunstall Blvd / Adams Road	+45 (23%)	+56 (25%)
Adams Road / Bowen Bay Rd	+45 (16%)	+55 (17%)
Bowen Island Trunk Rd / Dorman Rd / Miller Rd	+41 (7%)	+49 (6%)

Given the low traffic flows observed in the existing and background traffic scenarios, the additional traffic generated by the proposed site will result in an increase of approximately 27% and 30% in the PM and Saturday peak scenarios respectively. This increase may look significant; however, it represents an increase from 135 to 192 on all movements at Whitesails Drive / Tunstall Blvd, this is approximately 3 vehicles per minute travelling through the intersection.

Table 6.5 summarises the intersection operation results for the PM and Saturday peak for the Opening Day Total scenario.

Table 6.5: Opening Day Total Traffic Operations

INTERSECTION / TRAFFIC CONTROL	MOVEMENT	FRIDAY PM PEAK HOUR		SAT AFTERNOON PEAK HOUR	
		LOS	95TH Q (M)	LOS	95TH Q (M)
Whitesails Drive / Tunstall Blvd	EBRT	A	0	A	0
	WBLT	A	5	A	10
	NBLR	A	10	A	10
Tunstall Blvd / Adams Road	EBRT	A	10	A	10
	WBLT	A	0	A	0
	NBLR	A	0	A	5
Adams Road / Bowen Bay Road	EBLT	A	5	A	5
	WBRT	A	0	A	0
	SBLR	A	15	A	15
Miller Road / Bowen Island Trunk Road / Dorman Road / Grafton Road	EBLRT	A	5	A	10
	WBLRT	A	10	A	15
	NBLRT	A	15	C	30
	SBLRT	A	20	C	25

The addition of site traffic to the network was shown to have no negligible impact on any intersection within the study area. All intersections continue to operate within capacity and are operational with the proposed level of traffic. There is a slight increase in the 95th percentile queue, from approximately 4 vehicles to 5 vehicles in the Saturday peak hour.

6.4 Future Ferry Impact

As discussed in **Section 3.7,** based on existing BC Ferries data (July 2022), vehicle demand has shown to surpass ferry service vehicle capacity during peak service hours during the summer. Vehicle demand over capacity percentages (87 AEQ per ferry) range between 102% to 115% during peak service hours and direction from 11 am to 5 pm on Friday and Saturday from Horseshoe Bay to Snug Cove, based on the Automobile Equivalent Units (AEQs) methodology in estimating vehicle demand but could still be a total of 87 physical vehicles.

However, it has also been shown there is available ferry passenger capacity as passenger demand is below ferry passenger capacity (427 passengers per ferry) which ranges between 47% to 89% during the same time peak service time-period and route as above.

This section provides a high-level assessment of the potential increase in ferry vehicles and passenger demand due to the proposed park and campground access. This assessment:

- focuses on summer Friday, Saturday, and Sunday in which park and campground activities are expected to be the highest.
- focuses on the horizon year 2030 (opening day).
- factors in existing ferry demand increases based on the BC Ferries forecast provided.

- assumes the BC Ferry capacity for the Horseshoe Bay to/from Snug Cove routes remains unchanged from the current schedule; and
- focuses only on analysis periods for this assessment rather than individual services due to the nature of forecasting assumptions and data limitations. The time periods are broken down as follows: Early Morning (5 am -7 am), Morning (7 am -11 am), noon (11 am – 3 pm), afternoon (3 pm – 7 pm), and evening (7 pm – 11 pm).

Passenger Volumes

As discussed in **Section 3.7**, the existing ferry passenger count from July 2022 set out the overall passenger and vehicle capacity for each ferry service across the month for both inbound and outbound Bowen Island routes and it is utilized as the basis for the ferry demand forecast. The passenger vehicle levels are inclusive of the number of passengers within the private motor vehicles, it is not possible to determine the level of foot passengers only. An annual growth rate of 1.2% is assumed based on the ferry demand forecast from September 2022.

Figure 6.1 and **Figure 6.2** show the projected ferry passenger demand which includes the predicted campground users against current ferry capacity and schedule. It is seen that there is available ferry passenger capacity across Friday, Sunday, and most of Saturday for either direction of the ferry route. However, the peak demand during Saturday noon services is shown to surpass ferry capacity as peak activity for existing ferry users, campground, and park day-use users coincide.

Figure 6.1: Horseshoe Bay -> Snug Cove Ferry Demand and Capacity – Passenger (Opening Day)

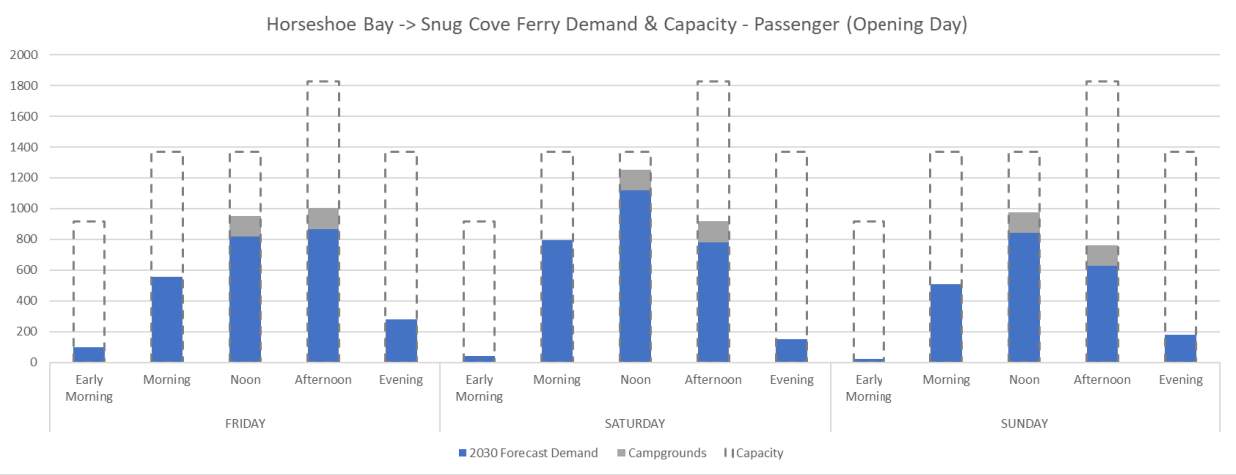
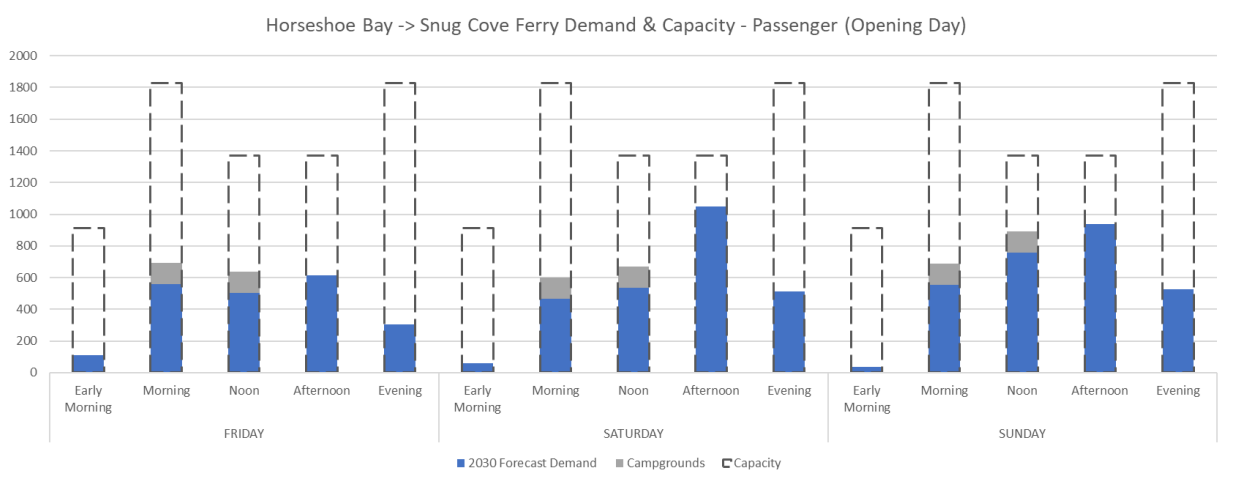


Figure 6.2: Snug Cove-> Horseshoe Bay Ferry Demand & Capacity - Passenger (Opening Day)



Vehicle volumes

As discussed in **Section 3.7,** the ferry vehicle capacity is listed as 87 vehicles, to differentiate the size of the vehicles, each vehicle is assigned an Automobile Equivalent Unit (AEQ), in accordance with the BC Ferries calculation methodologies these are as follows:

- 1 Bus = 3 AEQ.
- 1 Commercial Truck or Semi = 2.5 AEQ.
- 1 Private Vehicle – Over Height = 1.5 AEQ; and
- 1 Private Vehicle – Under Height or Motorcycle = 1 AEQ.

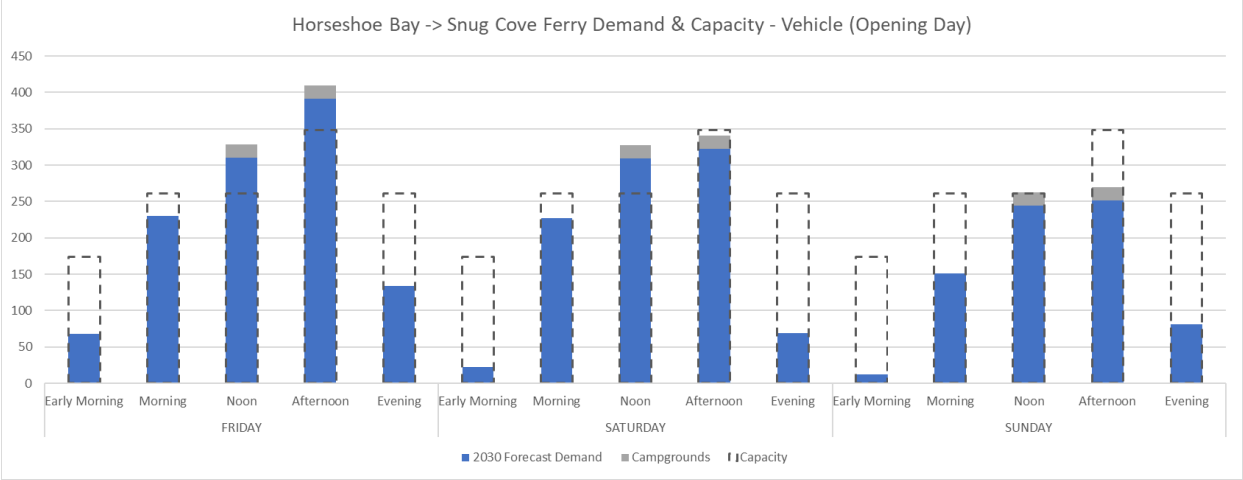
The projected vehicle demand (as AEQs) for the services in comparison to the overall provision has been demonstrated in **Figures 6.3 and 6.5**, for Friday, Saturday, and Sunday.

In line with Metro Vancouver's expectations, all visitors to the day-use facilities will be island residents or visitors that are already visiting the island and include a stop in CRC as part of their trip, Therefore, it will not generate any vehicle trips that will require the utilization of the ferry. This will be assisted via extensive TDM measures and no advertisement for parking facilities.

In the Horseshoe Bay to Snug Cove ferry direction, Friday noon and afternoon and Saturday noon periods will continue to increase in demand due to ferry demand increases based on BC Ferries forecast. However, additional vehicle demand from campground arrivals will coincide with this peak period surpassing ferry capacity. In addition, increases in vehicle demand also caused other periods including Saturday and Sunday noon periods to be near or at capacity. To assist in offsetting this, as part of the TDM measures, Metro Vancouver will explore options to move campground check-in and check-out times to persuade people to utilize off-peak ferry services.

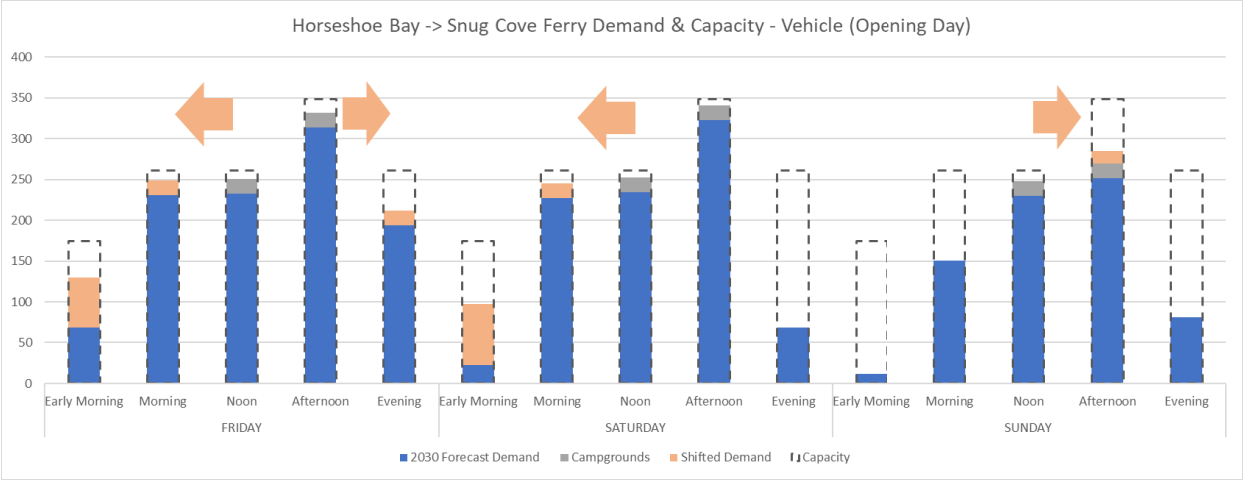
There may be effects of "peak spreading" not captured in this analysis as ferry users travelling to Bowen Island may consider travelling just outside of the current peak demand hours due to availability in vehicle capacity in other time periods.

Figure 6.3: Horseshoe Bay -> Snug Cove Ferry Demand and Capacity – Vehicles (2030 Opening Day)



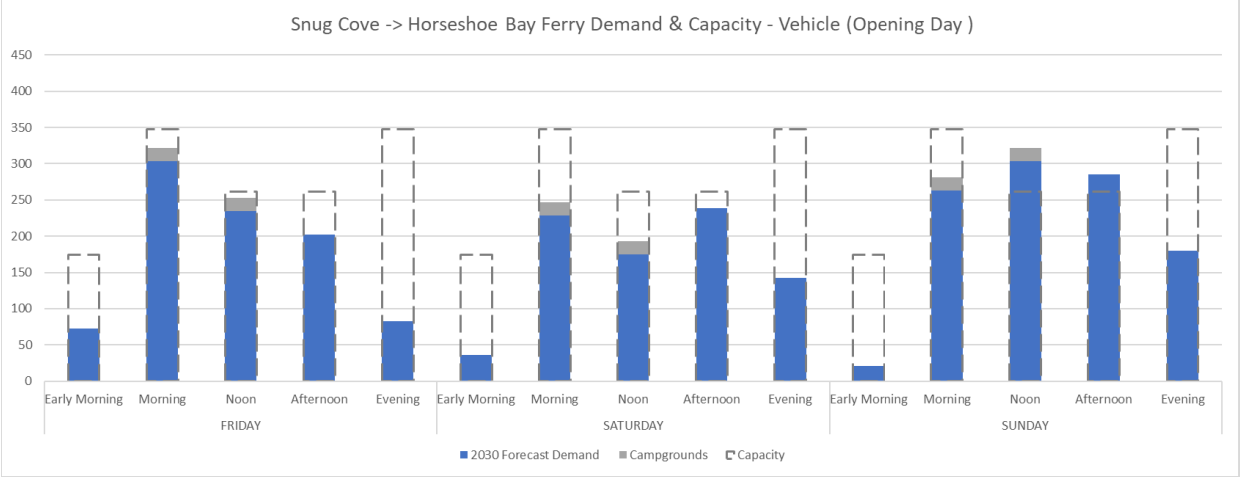
Services from Horseshoe Bay will be reaching peak typically around noon with the addition of the camping demand. As can be seen, Friday has the highest demand, with both noon and afternoon services all reaching maximum capacity. **Figure 6.4** demonstrates that these vehicles can be accommodated when spread across the remaining services throughout the day.

Figure 6.4: Horseshoe Bay -> Snug Cove Ferry Demand and Alternative Service – Vehicles (2030 Opening Day)



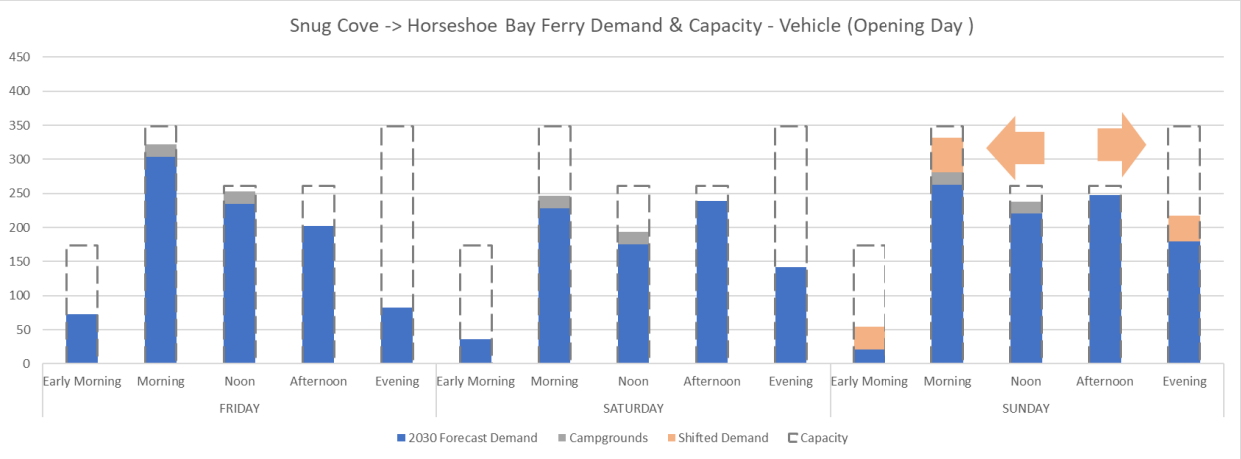
Whilst there is still high demand for the noon and afternoon services on Friday and Saturday, both periods are now below the peak capacity of the ferries, demonstrating that there is sufficient capacity for all services to accommodate the additional demand generated by the camping.

Figure 6.5: Snug Cove -> Horseshoe Bay Ferry Demand and Capacity – Vehicles (2030 Opening Day)



In the Snug Cove to Horseshoe Bay direction, vehicles are shown to be under capacity on both Friday and Saturday during the summer including users from the campgrounds. However, Sunday noon and afternoon periods surpass ferry vehicle capacity but there is considerable capacity available in the early morning, morning, and evening periods. To demonstrate there is sufficient capacity, the excess demand from those services has been moved onto other services that are not reaching capacity to demonstrate that there is sufficient capacity throughout the day, this is shown in **Figure 6.6**. The graph shows that some patrons will be required to wait on the island for the service.

Figure 6.6: Snug Cove -> Horseshoe Bay Ferry Demand Passenger Demand and Alternative Service - Vehicles (2030 Opening Day)



Any delays to visitors to the park will only increase the demand for the shuttle bus service. While people are waiting in their cars, the shuttle bus service will have direct access to the front of the queue and will drop off foot passengers and cyclists at the front of the queue.

6.5 Ferry Impact Mitigation

6.5.1 Off Peak Demand and Parking Regulations

To mitigate the impact of vehicle demand increases during peak ferry services due to campgrounds, there are potential measures to promote Bowen Island visitors to travel during non-peak ferry times or to use non-vehicle modes of transportation. These are listed below but will be further explained within section 8 (these measures may be applied during peak summer times only):

- Campground check-in & check-out times: enforce campground check-in and check-out times to campground users with vehicles to be outside of the ferry peak travel times.
- Consider options for a day-use reservation system for vehicle visits during peak periods.
- Consider restricting access to the day-use parking lots.
- Provide financial incentive to park day users (i.e., parking rebate for using park and ride facilities at Horse Bay terminal).
- Shuttle services directly to/from parks/campgrounds. Further discussed in **Section 8.**
- BC ferries off pricing schemes: increase ferry pricing during ferry sailing times (offer discount to Bowen Island residents at pay booth).
- Other TDM measures as discussed in **Section 8.**

Such potential measures are theoretical in the current stage and concrete discussions with Metro Vancouver and BC Ferries are needed in the next steps of the project to ensure optimal user experience for local residents and Bowen Island travelers.

6.5.2 GreenLine Ferries

GreenLine Ferries are currently exploring the opportunities of starting a passenger-only (bicycles and pedestrians) service from downtown Vancouver to Bowen Island. The location of the terminus at Bowen Island and downtown Vancouver has not been decided but GreenLine ferries are proposing to have a service operational within the coming years. This service, as mentioned, will not be available for vehicles and therefore will improve the modal split for visitors.

6.6 Improved Cycling Facilities

As part of BIMs Transportation Plan 2018-2038, it is proposed that a cross-island multi-use pathway (MUP) will be developed from Snug Cove to Tunstall Bay. A portion of this MUP from Snug Cove has already been developed but the remaining cross island section is yet to be implemented. Several other phases have also been identified in Metro Vancouver's Regional Greenway Network, Transport 2050: Regional cycling network, and BIMs Transportation Plan' 2018-2038.

7. SITE DESIGN

The site design has not been finalised at the current time but will be produced before the development permit application. However, this section will provide a brief description of the proposed parking supply, access, and servicing operations.

7.1 Day Use Parking Provisions

No parking bylaw is provided for day-use. The day-use parking supply has been calculated based on the arrival and departure rates of the proposed day-use. As has been set out in section 5, it demonstrated that vehicles would remain at the site for approximately 2.7hr. Resulting in an arrival and departure profile and a maximum parking accumulation of 64, as shown in **Table 7.1.**

Table 7.1: Vehicle Parking

	FRIDAY			SATURDAY		
	DAY-USE VEHICLE ARRIVAL	DEPARTURE	TOTAL ACCUMULATION	DAY-USE VEHICLE ARRIVAL	DEPARTURE	TOTAL ACCUMULATION
7:00 AM	2	0	2	1	0	1
8:00 AM	4	0	5	2	0	2
9:00 AM	5	1	9	3	0	5
10:00 AM	6	3	12	6	1	10
11:00 AM	5	4	13	5	2	13
12:00 PM	7	5	14	8	5	16
1:00 PM	6	5	15	10	6	20
2:00 PM	6	6	16	9	6	23
3:00 PM	5	7	14	9	9	23
4:00 PM	5	6	13	8	10	21
5:00 PM	3	6	11	6	9	18
6:00 PM	2	5	8	3	8	13

As demonstrated above, the day-use would require a maximum peak of 23 vehicles. This would be split across 2-3 parking lots in different locations, it is not clear at this stage whether the parking will be an even split or will be dependent on the available space. To allow for a small buffer whilst people are maneuvering around the site and the overlap between those departing and arriving it is recommended that a buffer is considered to ensure that an efficient parking strategy is in place. Therefore, an additional 10% is proposed on top of the total accumulation, for a total demand of 26 spaces. As mentioned, these 26 spaces are to be split across two or three parking lots.

7.2 Campground Parking Provisions

As previously mentioned, there are no parking bylaw requirements provided by Bowen Island. Therefore, as proposed, each vehicle-accessible campsite will have a space for a vehicle, and no additional parking capacity will be available.

7.3 Parking Layout & On-Site Vehicle Circulation

The layout of the campsites and accesses will be finalised prior to the Development Permit submission. However, it will be recommended that all laneways are provided with sufficient width to accommodate vehicles travelling around the site. A minimum width of 3.5m carriageways. The orientation of the roadway has been discussed but where possible single direction routing will be provided.

The current Cape Drive is in good condition and does not require any alterations to it.

7.4 Service Vehicle Operations

The servicing program for the site has yet to be formalised, currently, the only vehicles that will be required to access the site will be waste collection.

Refuse collection will be in a central location and will be easily accessible. All waste requirements will be confirmed with a waste management company.

The cleaning requirements for the washroom facilities and emergency vehicle access are to be confirmed.

8. TDM & ACTIVE MODES

8.1 Definition

Transportation Demand Management (TDM) is defined as the "application of strategies and policies to reduce travel demand (specifically that of single-occupancy private vehicles), or to redistribute this demand in space or in time". A successful TDM program can influence travel behaviour away from Single Occupant Vehicle (SOV) travel during peak periods towards more sustainable modes such as High Occupancy Vehicle (HOV) travel, transit, cycling or walking. The responsibility for the implementation of TDM measures can range across many groups, including regional and municipal governments, transit agencies, private developers, residents/resident associations, or employers.

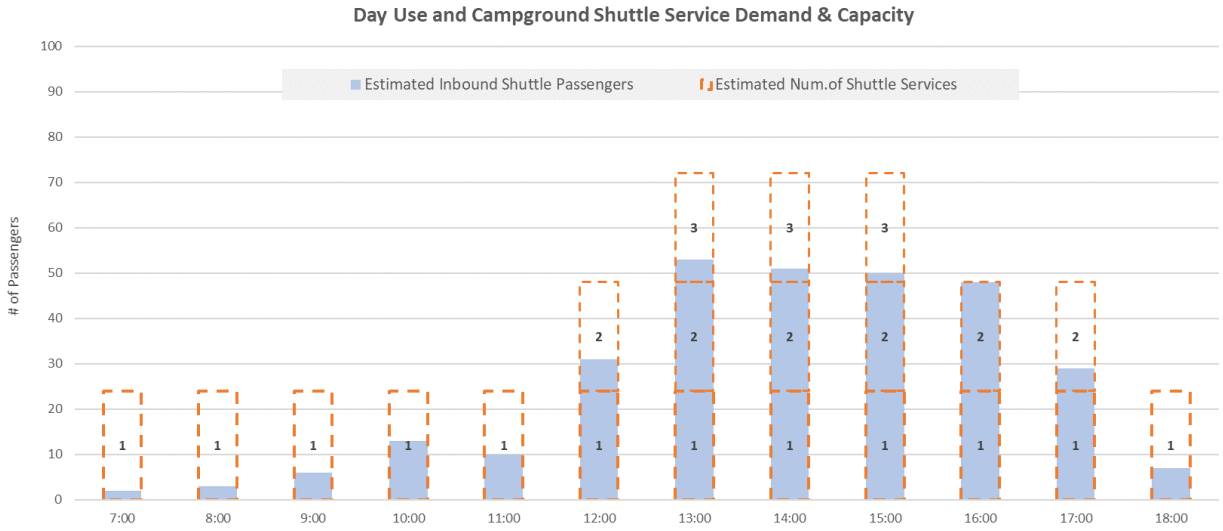
8.2 Shuttle Bus provision

Metro Vancouver has committed to providing a shuttle bus service that will travel between the site and Snug Cove from May to September. The Shuttle bus offers an alternative form of transport for those arriving for both camping and day-use visitors. All those arriving at the ferry by foot or from public transit will be able to utilize the ferry, but the bus service will be primarily aimed at private car travelers who will be looking to visit the park and campgrounds but provide an alternative.

The details regarding the number of services and location of pick and drop-off are yet to be confirmed. However, the proposals are that the shuttle service would operate a 7-hour work schedule and coincide the arrival and departure of the shuttle service with that of the ferry service. MV will collaborate with TransLink around shared objectives to access nature using sustainable transportation.

Through a successful TDM program, there will be approximately 303 passengers that will potentially utilize the shuttle bus to access the proposed campground and park. Based on the total shuttle capacity of 24 passengers (typical TransLink Shuttle / Mini-Bus), it is estimated that during peak hours, the capacity equating to three shuttle services per hour is needed to meet arriving passenger demand from the Ferry. The hourly profile is shown in **Figure 8.1** below.

Figure 8.1: Day Use and Campground Shuttle Service Demand & Capacity



8.3 Potential Measures

Table 8.1 below summarizes possible suites of measures for non-residential land uses that, based on Bunt's research, may be appropriate for this site. The strategy is identified in the left column, and the measure in the centre column. The right column on the table shows which parties would be responsible for administering and managing each initiative. While this is a comprehensive listing of all possible measures, the site developer's potential role in TDM for the site would be limited to those items identified as "Site Developer" on the far right of this table.

Table 8.1: Potential TDM Strategies Summary Table: Proposed Park

STRATEGY	MEASURE	RESPONSIBILITY FOR IMPLEMENTATION
TDM Site Coordinator & Monitoring Program	Appoint a Site TDM Coordinator, responsible for developing, implementing, and maintaining the TDM program	Site Developer/Operator
	Establish mode split targets, monitoring methods and surveys and reporting	Site Operator/
Marketing & Promotion	Provide wording on the Metro Vancouver website to deter visitors to travel by car, this could be via listening access by car last on the website etc.	Site Developer/Site Operator
	Participation in Bike to Work Week and other community and regional promotions/events for sustainable transportation	Regional Transportation Authority/Municipality/Site Operator
	Cheaper rates are provided to those who travel by sustainable forms of travel	Site Developer
Cycling Infrastructure Improvements	Provide cycling facilities leading to, adjacent to and on the site	Site Developer, Municipality
	Provide safe, marked cycling lanes alongside the roadway surrounding the site	Municipality
Cycling Amenities	Provide bicycle maps and way-finding signage throughout the site	Site Developer
	Provide a bicycle repair station	Site Developer
End of Trip Cycling Facilities	Provide long-term secure and convenient bicycle storage facilities for employees	Site Developer
	Provide short-term bicycle rack parking at all building entrances (well-lit and protected, within view of lobbies for residential visitors and patrons)	Site Developer
Pedestrian Infrastructure Improvements	Provide an off-street pathway system to minimize walking distances; provide sidewalks on both sides of all site and site-fronting streets with boulevard improvements to buffer pedestrians from moving traffic	Site Developer
Pedestrian Amenities	Provide amenities such as benches, fountains, etc. on the site and along the site frontages	Site Developer
Transit	Provide funding for improvements to adjacent bus stops, such as benches and shelters at existing bus stops adjacent to the site	Site Developer
	Provide subsidized transit passes to employees	Site Developer/Operator
	Provide a private shuttle service for residents to nearby key destinations	Site Developer/Operator

8.3.1 Marketing & Promotion

Marketing of the site will be one of the key strategies used to assist in reducing the level of private vehicles anticipated to access the site. This could be achieved through several measures, such as:

- Promote transit and active modes when booking a vehicle-accessible camp pitch. This would be undertaken throughout the booking process, with remainders of limited ferry capacity, the proximity of the island to downtown Vancouver and the alternative transit options in place.
- Market day-use by active transportation and park shuttle/transit only.
- Provide accessibility options in the booking confirmation, including bicycle maps, transit timetables etc.
- Promote the shuttle bus timetable accessible and easy to find and provide the option to book a slot on the shuttlebus (Free) immediately before or after booking a pitch.
- Work with BC Ferries, MoTI and BIM on a signage strategy to communicate that bookings are required to access the proposed campgrounds.

8.3.2 Cycling Parking and Provisions

- Offer free shower facilities to any users that turn up by bike for both the campground and the day-use.
- Improve the cycle parking security, each campsite has a secure stand with a shelter to protect from the elements at each campsite.
- Increase the provision of Class B (short style) cycle spaces at the day-use, making these spaces as secure and visible as possible to any staff on-site.
- Provision of funding for the proposed cycling network.

8.3.3 Pricing Strategies

- Provide financial incentive to park day users (i.e., parking rebate for using park and ride facilities at Horse Bay terminal).
- Metro Vancouver to explore options to negotiate with BC ferries to offer off pricing schemes to visitors: increase ferry pricing during peak ferry sailing times (offer discount to Bowen Island residents at pay booth).
- Charging higher fees if booking a camp pitch with a vehicle, this will be undertaken in the booking system for the site.

8.3.4 Off-Site Park and Ride

As part of future considerations, Metro Vancouver are looking into ways to reduce the number of people arriving at the ferry in a private vehicle. MetroVancouver to explore partnerships to provide staging for the park at locations with North and West of Vancouver.

8.3.5 Wayfinding

The provision of wayfinding for cyclists and pedestrians from Snug Cove to the site will improve the accessibility of the park. Similarly, wayfinding should be provided throughout the park to ensure that users are able to access the day-use areas as best as possible.

8.3.6 Other Measures

Ideas for other measures that could be undertaken are:

- Do not allow additional vehicles on the site.
- Provide real time information about ferry capacities on the website so that people can determine prior to travel if they are likely to make it onto a service, or if another form of travel would be beneficial.
- Implement a parking sticker or ticket that can be displayed to indicate resident, whilst enforcing the parking fines on non-residential cars.
- BC Parks reservation system for non-Bowen Island residents: reservation to specific park entrance time and to be allocated outside the ferry peak time periods.
- Campground check-in & check-out times: synchronize campground check-in and check-out times to be outside of the ferry peak travel times. Look at bringing the check-out time to 10am to get guests to use the earlier services.
- Partner with BIM on active transportation connections within and to the proposed park.

9. CONCLUSIONS & RECOMMENDATIONS

Bunt's conclusions and recommendations are presented in the sections below.

9.1 Conclusions

Existing Conditions

- The proposed park will be located within the Cape Roger Curtis region of Bowen Island, accessed by Cape Drive. The lots are currently vacant.
- The site has very limited access to public transit, with one service, the 280, located approximately 3km to the north of the site. Many pedestrian walking trails are set out across the site and within the vicinity. There are no dedicated cycle lanes on the surrounding road network, but it is acknowledged that traffic speeds are low and therefore, accessible for cyclists.
- Traffic surveys were conducted in May 2023 to understand the existing traffic volumes. Existing ferry capacity data for July 2022 was obtained from BC Ferries and demonstrated that there was remaining capacity on several services within the early mornings and evening services during the weekday peak.
- All intersections within the study area reported acceptable performances, significantly under the thresholds, the 95th percentile queues anticipated were a maximum of 5 vehicles on certain movements.

Proposed Site

- A total of 24 lots were purchased by Metro Vancouver, with the proposal to develop a total of 100 camping pitches, made up of 52 walk-in-in/bike-in sites, 33 vehicle-accessible sites, 5 group sites, and 10 tent cabin sites.
- Day-use facilities will be the number of hiking routes across the Regional Park, with limited access to the coastline.
- No parking is provided for the campsites, except for accommodating a vehicle on the vehicle-accessible sites. The day-use will have two parking lots for a total of 26 spaces.

Future Traffic and Ferry Conditions

- The proposed development is forecast to generate between 45 to 55 vehicle trips in the Weekday PM and Saturday peak hours, respectively. This is anticipated to be the worst-case scenario, with all calculations based on the summer peak occupancy, during the remainder of the year, the number of trips will decrease.

- A background growth of 7 years was included to account for the remaining lots that are undeveloped within Cape Roger Curtis. The 2030 horizon also represents the full buildout and operation of the campground program.

- An increase in growth on ferry services between Horseshoe Bay and Snug Cove of 1.2% was applied, whilst also adding all bicycles, transit, and foot passengers onto the passenger numbers of the anticipated demand. The additional vehicle demand would be generated by campground sites only. With a maximum of 61 two-way daily trips, 37 inbound (Horseshoe Bay – Snug Cove) and 24 outbound (Snug Cove - Horseshoe Bay) services spread across the available ferry services.

- The increased traffic volumes at the intersections within the study area during the future total scenario result in a negligible difference in the delays and the 95th percentile queue lengths. With results showing a maximum increase of 2 vehicles in the vehicle queues.

TDM and Shuttle Bus Improvements

- To ensure the site maintains a low level of vehicle demand, several TDM measures are being proposed, including the provision of a shuttle bus and marketing materials.

- A shuttle bus would operate between Snug Cove and the site. The operational details of the shuttle have yet to be determined, with the number of services, operational hours, and size of the service to be determined at the development permit stage.

- The analysis indicated that a maximum of 53 passengers would potentially require shuttle bus services, when considering all day-use and campground active travellers that may wish to utilise the site.

9.2 Recommendations

Based on the findings:

- Produce a significant and tangible TDM plan that will target users of the parks to achieve a reduction in vehicle traffic where possible.

- Explore further opportunities to develop a concrete plan of how to reduce the number of visitors arriving by car.

- Provide a shuttle bus service that will be operated to a similar timetable to that of the ferry schedule.

- Partner with BIM to implement the cross-island MUP part of the regional greenways network.

APPENDIX A

Terms of Reference

May 5th, 2023
04-22-0272

Jeffrey Fitzpatrick, MCIP, BCSLA
Division Manager, Regional Parks, Design and Development Parks and Environment
MetroVancouver
VIA E-MAIL: jeffrey.fitzpatrick@metrovancouver.org

Dear Jeffrey,

Re: Cape Roger Curtis
Terms of Reference – Transportation Impact Assessment (TIA)

We have prepared the following Terms of Reference (ToR) for Bunt & Associates Engineering Ltd. (Bunt) to undertake a Transportation Impact Assessment (TIA) for the rezoning application for 24 lots operated by MetroVancouver (MV) within the Cape Roger Curtis area of Bowen Island. This ToR incorporates guidance from within schedule C6 – Transportation. As part of this Rezoning Application submission, Bunt will provide the required transportation planning and engineering documents, anticipated at this time to be a TIA with a Transportation Demand Management (TDM) Plan for the site, including shuttle bus provisions.

This ToR is based on our previous involvement and understanding of the project scope, the surrounding road network and previous submissions to municipality staff regarding the anticipated trip generation at a high level and existing ferry impact. We anticipate that our involvement will be focused on current and future traffic analysis for the campsite and day use, the anticipated ferry impact, including a TDM Plan. Furthermore, we also anticipate that our services will be required for the site design review and to provide commentary / guidance on the parking and loading access, supply, and operation.

'The terms of reference is provided for coordination with Bowen Island Municipality. Upon confirmation that Metro Vancouver and Bowen Island Municipality and in agreement with the Terms of Reference, we will proceed with the proposed work. Should Metro Vancouver or Bowen Island Municipality have any questions or proposed adjustments to Terms of Reference we are available to meet to discuss.'

Yours truly,
Bunt & Associates

Hugo Johnston, B.Sc
Transportation Planner

Joseph Chow, P.Eng
Senior Transportation Engineer

1. SCOPE OF WORK

The following items will all be included within a Traffic Impact Assessment (TIA) report to be provided to the municipality.

1.1 Existing Network

- *Existing Network – Identify vehicle, transit, pedestrian and cycling facilities near the site.*
- *Ferry Use – Review the existing level of use by residents and tourists on the ferry route between Snug Cove and Horseshore Bay. Using data received within the 2000-2022 Snug Cove Route (FOI-2023-005 – BC Ferries) and more data from the July 2022 sailing data (FOI-2023-012 – BC Ferries).*
- *Development Plan Review – Outline the proposed development plan and statistics. Define the uses proposed on the site.*
- *Policies – Review any relevant policies or plans from the municipality, including the adopted rezoning statement.*
- *Existing Use – The current site is vacant and therefore, any future trip will be considered as a new trip.*

It is not anticipated that any existing traffic analysis will be undertaken.

1.2 Initial Site Design

- *AutoTurn – A review of the internal access roads of the park, the day use access, loading layout (inc toilet block cleaning) and waste collection will all be undertaken. This review will be high level and based on the initial site design.*
- *Exhibits – All the AutoTurn analysis will be displayed in PDF exhibits within the TIA.*

1.3 Future Conditions

- *Trip Generation – Calculate a trip generation for the proposed campgrounds and the day use trip generation. The trip rates, based on ITE campsites were included within the Trip Generation Memo. The trip rates are set out in **Table 1**.*

Table 1: Proposed Campground and Day use Trip Generation

USE	SOURCE	PARAMETER	PM VEHICLE TRIP RATES			DAILY VEHICLE TRIP RATES		
			In	Out	Total	In	Out	Total
Standard Campsites	ITE LUC 416	Camp pitches	0.75	-	0.75	0.75	0.50	1.25
Group Site	Metro Vancouver Data	# of group sites	1.60	-	1.60	1.60	1.0	2.60
Day Use		Per Hectare	-	-	-	-	-	2.94

The day-use AM and PM peaks will be outside of the campground peak; therefore, a daily total will be used for this study.

The anticipated trip generation is anticipated to be below 100 two-way trips in either of the peak periods. This is typically below the requirements for a full TIA modelling study as per several municipalities within Greater Vancouver.

1.4 Proposed Shuttle Bus Service

- *Shuttle Bus Requirements – Calculate the number of shuttle buses will be required to support the proposed modal split.*
- *Starting Point – Determine the starting point of the shuttle bus service, whether it collects campers from Snug Cove to increase the reduction in car use on the Ferry service.*

The size of the shuttle bus has yet to be determined. However, a few rows of seats will be removed to allow for luggage capacity.

1.5 Future Ferry Usage

- *Discussions – Organise a meeting with BC Ferries to co-ordinate the study approach, determining the capacity levels and how best to calculate requirements against the capacity.*
- *Ferry Demand – Determine the level of trips that will require the use of the ferry service based on the trip generation. To determine the future background levels a growth rate will be applied to the 2022 levels. The growth has been provided by BC Ferries and will be between 0.4-0.2% annually.*
- *Capacity – Utilising the proposed trip generation and information attained via freedom of information analysis will be undertaken to which services have spare capacity to accommodate the required levels.*
- *Transportation Demand Management (TDM) Reductions - With the provision of a shuttle bus service and other TDM measures, determine the level of reduction in private vehicle demand and how this will impact capacity.*
- *Methodology – Ferry capacity analysis will be based on the capacity of the Queen of Capilano, with 100 vehicle capacity, 457 passenger & crew members. A bus/coach represents 2.5 passenger vehicles.*

1.6 Transportation Demand Management (TDM) Strategy

- *Measures – In consultation with the applicant and the Municipality of Bowen Island, develop an appropriate TDM strategy, including the provision of a shuttle bus, that would provide alternatives to campsite visitors and reduce the number of private car users.*

1.7 Reporting

- *TIAs – Summarise findings, recommendations, and conclusions in a Draft TIAs report to be submitted to the municipality staff for review and comment.*
- *2nd Reading – Respond to the municipality staff comments and submit the finalised TIAs report.*

Bunt will continue to support MetroVancouver Park as part of the application process – providing transportation consultation services and response on transportation issues, where necessary.

cc. Lydia Mynott, MetroVancouver
Jeffrey Fitzpatrick, MetroVanouver

The attached information is provided to support the agency's review process and shall not be distributed to other parties without written consent from Bunt & Associates Engineering Ltd.

APPENDIX B

SimTraffic Reports

4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	2.0	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1
Total Del/Veh (s)	1.7	0.7	0.9	1.5	0.2	0.2	5.6	6.4	4.0	5.4	6.2	2.9

4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	2.4

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	2.9

Intersection: 4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	6.3	5.1	8.4	0.6	17.1	15.4
Average Queue (m)	1.0	0.5	1.8	0.1	10.4	9.4
95th Queue (m)	5.2	4.3	7.5	1.2	17.4	15.5
Link Distance (m)		320.6	308.4	308.4	119.7	316.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	6.0					
Storage Blk Time (%)	1	0				
Queuing Penalty (veh)	1	0				

Network Summary

Network wide Queuing Penalty: 1

1: Tunstall Blvd & Adams Rd Performance by movement

Movement	EBT	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.2	0.0	0.0		0.0	0.0
Total Del/Veh (s)	6.7	0.1	0.2		0.1	0.7

2: Adams Rd & Bowen Bay Rd Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.2	0.1	0.1	0.1
Total Del/Veh (s)	1.6	0.5	0.3	0.2	4.4	2.8	1.1

3: Sunset Rd & Adams Rd Performance by movement

Movement	EBT	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.3	0.4

5: Whitesails Dr & Tunstall Blvd Performance by movement

Movement	EBT	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.0	0.0		0.1	0.1
Total Del/Veh (s)	0.0	1.1	0.0		2.4	1.3

Total Network Performance

Denied Del/Veh (s)	0.1
Total Del/Veh (s)	2.6

Intersection: 1: Tunstall Blvd & Adams Rd

Movement	EB
Directions Served	TR
Maximum Queue (m)	9.1
Average Queue (m)	3.5
95th Queue (m)	11.1
Link Distance (m)	91.8
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Adams Rd & Bowen Bay Rd

Movement	SB
Directions Served	LR
Maximum Queue (m)	10.4
Average Queue (m)	7.6
95th Queue (m)	13.6
Link Distance (m)	51.6
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Sunset Rd & Adams Rd

Movement	
Directions Served	
Maximum Queue (m)	
Average Queue (m)	
95th Queue (m)	
Link Distance (m)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Whitesails Dr & Tunstall Blvd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	3.9	10.8
Average Queue (m)	0.6	6.0
95th Queue (m)	5.1	12.1
Link Distance (m)	105.8	58.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	2.2	0.3	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1
Total Del/Veh (s)	2.6	1.1	0.9	2.4	0.8	0.5	7.9	13.3	6.4	9.9	9.4	7.9

4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	3.5

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	4.1

Intersection: 4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	7.8	3.0	11.4	5.3	18.4	24.4
Average Queue (m)	2.4	0.6	4.8	0.9	12.0	13.6
95th Queue (m)	7.7	4.5	13.4	5.4	20.2	27.9
Link Distance (m)		320.6	308.4	308.4	119.7	316.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	6.0					
Storage Blk Time (%)	2	0				
Queuing Penalty (veh)	4	0				

Network Summary

Network wide Queuing Penalty: 4

1: Tunstall Blvd & Adams Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0		0.0	0.0
Total Del/Veh (s)	5.3	2.9	0.2	0.2	0.1		0.1	0.5

2: Adams Rd & Bowen Bay Rd Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.2	0.1	0.1	0.1
Total Del/Veh (s)	1.9	0.3	0.3	0.2	4.2	2.3	1.0

3: Sunset Rd & Adams Rd Performance by movement

Movement	EBT	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.3	0.3

5: Whitesails Dr & Tunstall Blvd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBR	All
Denied Del/Veh (s)	0.1		0.0	0.0	0.1	0.1
Total Del/Veh (s)	0.0		1.0	0.0	2.3	0.7

Total Network Performance

Denied Del/Veh (s)	0.1
Total Del/Veh (s)	2.0

Intersection: 1: Tunstall Blvd & Adams Rd

Movement	EB	WB
Directions Served	TR	LT
Maximum Queue (m)	9.2	0.9
Average Queue (m)	2.9	0.1
95th Queue (m)	9.8	1.9
Link Distance (m)	91.8	35.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Adams Rd & Bowen Bay Rd

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	3.6	10.6
Average Queue (m)	0.5	6.9
95th Queue (m)	4.0	13.6
Link Distance (m)	35.3	51.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Sunset Rd & Adams Rd

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 5: Whitesails Dr & Tunstall Blvd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	4.3	8.5
Average Queue (m)	0.7	4.1
95th Queue (m)	5.1	11.1
Link Distance (m)	105.8	58.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	2.2	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1
Total Del/Veh (s)	1.7	0.9	1.0	1.8	0.4	0.2	5.6	8.1	4.5	5.9	6.5	3.1

4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	2.5

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	3.0

Intersection: 4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	7.4	4.7	8.5	0.6	18.0	16.0
Average Queue (m)	1.2	0.4	2.2	0.1	10.9	10.0
95th Queue (m)	5.7	3.4	8.3	1.2	19.0	16.5
Link Distance (m)		320.6	308.4	308.4	119.7	316.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	6.0					
Storage Blk Time (%)	1	0				
Queuing Penalty (veh)	1	0				

Network Summary

Network wide Queuing Penalty: 1

1: Tunstall Blvd & Adams Rd Performance by movement

Movement	EBT	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.0	0.0		0.0	0.0
Total Del/Veh (s)	5.6	0.1	0.2		0.1	0.7

2: Adams Rd & Bowen Bay Rd Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.2	0.1	0.1	0.1
Total Del/Veh (s)	1.3	0.5	0.4	0.2	4.3	3.1	1.1

3: Sunset Rd & Adams Rd Performance by movement

Movement	EBT	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.4	0.4

5: Whitesails Dr & Tunstall Blvd Performance by movement

Movement	EBT	WBL	WBT	NBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.2	0.1
Total Del/Veh (s)	0.0	1.1	0.0	2.4	1.4

Total Network Performance

Denied Del/Veh (s)	0.1
Total Del/Veh (s)	2.6

Intersection: 1: Tunstall Blvd & Adams Rd

Movement	EB
Directions Served	TR
Maximum Queue (m)	9.3
Average Queue (m)	3.7
95th Queue (m)	11.1
Link Distance (m)	91.8
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Adams Rd & Bowen Bay Rd

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	0.9	10.5
Average Queue (m)	0.1	8.1
95th Queue (m)	1.9	13.3
Link Distance (m)	35.3	51.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Sunset Rd & Adams Rd

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 5: Whitesails Dr & Tunstall Blvd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	6.2	12.2
Average Queue (m)	0.9	6.6
95th Queue (m)	7.1	12.6
Link Distance (m)	105.8	58.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	2.2	0.3	0.3	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total Del/Veh (s)	3.1	1.3	1.0	3.3	0.8	0.4	12.8	17.7	9.5	13.0	17.7	6.8

4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	4.5

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	5.0

Intersection: 4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	8.7	10.8	11.9	4.8	24.0	23.4
Average Queue (m)	3.5	1.8	4.9	1.2	14.7	13.9
95th Queue (m)	9.1	8.9	12.9	6.4	26.0	24.4
Link Distance (m)		320.6	308.4	308.4	119.7	316.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	6.0					
Storage Blk Time (%)	3	0				
Queuing Penalty (veh)	6	0				

Network Summary

Network wide Queuing Penalty: 6

1: Tunstall Blvd & Adams Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.1		0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	5.1		0.1	0.2	0.3	0.1	0.1	0.4

2: Adams Rd & Bowen Bay Rd Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.2	0.2	0.1	0.1
Total Del/Veh (s)	2.0	0.4	0.3	0.2	4.3	2.3	1.0

3: Sunset Rd & Adams Rd Performance by movement

Movement	EBT	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.3	0.3

5: Whitesails Dr & Tunstall Blvd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBR	All
Denied Del/Veh (s)	0.1		0.0	0.0	0.1	0.1
Total Del/Veh (s)	0.0		1.0	0.1	2.3	0.7

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	2.0

Intersection: 1: Tunstall Blvd & Adams Rd

Movement	EB
Directions Served	TR
Maximum Queue (m)	8.2
Average Queue (m)	2.5
95th Queue (m)	9.2
Link Distance (m)	91.8
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Adams Rd & Bowen Bay Rd

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	6.7	10.6
Average Queue (m)	1.0	7.5
95th Queue (m)	6.3	14.2
Link Distance (m)	35.3	51.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Sunset Rd & Adams Rd

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 5: Whitesails Dr & Tunstall Blvd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	3.4	8.5
Average Queue (m)	0.6	3.9
95th Queue (m)	4.6	10.5
Link Distance (m)	105.8	58.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	2.0	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2
Total Del/Veh (s)	2.1	0.9	0.9	1.6	0.4	0.2	6.7	7.2	4.2	6.8	7.2	3.5

4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	2.6

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	3.1

Intersection: 4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	8.2	5.2	9.2	2.3	16.6	16.2
Average Queue (m)	1.7	0.5	2.5	0.3	10.7	10.8
95th Queue (m)	6.8	4.7	9.1	3.6	17.2	17.5
Link Distance (m)		320.6	308.4	308.4	119.7	316.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	6.0					
Storage Blk Time (%)	1	0				
Queuing Penalty (veh)	2	0				

Network Summary

Network wide Queuing Penalty: 2

1: Tunstall Blvd & Adams Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1		0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	5.7		0.2	0.2	0.6	0.1	0.5

2: Adams Rd & Bowen Bay Rd Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.2	0.1	0.2	0.1
Total Del/Veh (s)	1.6	0.4	0.5	0.2	4.6	3.6	1.1

3: Sunset Rd & Adams Rd Performance by movement

Movement	EBT	EBR	WBT	NBL	All
Denied Del/Veh (s)	0.0		0.1	0.1	0.0
Total Del/Veh (s)	0.3		0.0	1.9	0.3

5: Whitesails Dr & Tunstall Blvd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	0.0	0.0	1.0	0.1	3.6	2.3	1.3

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	2.6

Intersection: 1: Tunstall Blvd & Adams Rd

Movement	EB	NB
Directions Served	TR	LR
Maximum Queue (m)	9.2	0.9
Average Queue (m)	3.0	0.1
95th Queue (m)	10.0	1.9
Link Distance (m)	91.8	63.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Adams Rd & Bowen Bay Rd

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	2.7	10.6
Average Queue (m)	0.6	7.5
95th Queue (m)	4.1	13.8
Link Distance (m)	35.3	51.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Sunset Rd & Adams Rd

Movement	NB
Directions Served	LR
Maximum Queue (m)	0.8
Average Queue (m)	0.1
95th Queue (m)	0.7
Link Distance (m)	146.2
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Whitesails Dr & Tunstall Blvd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	4.5	10.0
Average Queue (m)	0.5	7.1
95th Queue (m)	4.0	12.4
Link Distance (m)	105.8	58.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	2.1	0.3	0.3	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.3	0.2
Total Del/Veh (s)	2.7	1.2	1.0	2.5	1.0	0.8	13.9	18.6	9.7	13.9	17.3	6.5

4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	4.5

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	5.0

Intersection: 4: Dorman Rd/Miller Rd & Bowen Island Trunk Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	6.6	4.4	12.1	8.6	25.7	25.2
Average Queue (m)	2.8	0.5	5.5	1.3	15.7	14.9
95th Queue (m)	7.7	4.8	14.1	7.4	28.6	26.1
Link Distance (m)		320.6	308.4	308.4	119.7	316.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	6.0					
Storage Blk Time (%)	2	0				
Queuing Penalty (veh)	5	0				

Network Summary

Network wide Queuing Penalty: 5

1: Tunstall Blvd & Adams Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.0	0.0		0.0	0.0
Total Del/Veh (s)	8.9	3.2	0.2	0.3	1.4		0.2	0.5

2: Adams Rd & Bowen Bay Rd Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.1	0.1	0.1	0.1
Total Del/Veh (s)	2.1	0.3	0.5	0.4	4.9	3.4	1.1

3: Sunset Rd & Adams Rd Performance by movement

Movement	EBT	EBR	WBT	NBL	All
Denied Del/Veh (s)	0.0		0.1	0.1	0.0
Total Del/Veh (s)	0.4		0.1	2.7	0.3

5: Whitesails Dr & Tunstall Blvd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0		0.1	0.0
Total Del/Veh (s)	0.0	0.0	1.1	0.3		2.3	1.1

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	2.6

Intersection: 1: Tunstall Blvd & Adams Rd

Movement	EB	NB
Directions Served	TR	LR
Maximum Queue (m)	8.2	1.8
Average Queue (m)	3.1	0.3
95th Queue (m)	10.5	2.8
Link Distance (m)	91.8	63.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Adams Rd & Bowen Bay Rd

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	5.0	0.7	10.6
Average Queue (m)	0.8	0.1	7.8
95th Queue (m)	6.1	1.4	13.7
Link Distance (m)	35.3	338.0	51.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Sunset Rd & Adams Rd

Movement	NB
Directions Served	LR
Maximum Queue (m)	0.8
Average Queue (m)	0.1
95th Queue (m)	0.8
Link Distance (m)	146.2
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Whitesails Dr & Tunstall Blvd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	7.0	10.0
Average Queue (m)	1.4	6.6
95th Queue (m)	7.5	12.2
Link Distance (m)	105.8	58.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

The attached information is provided to support the agency's review process and shall not be distributed to other parties without written consent from Bunt & Associates Engineering Ltd.

APPENDIX C

Trip Generation Memorandum

MEMO

DATE:	March 28, 2023
PROJECT NO:	04-22-0272
PROJECT:	**Cape Roger Curtis Park / Campsite – Bowen Island**
SUBJECT:	**Trip Generation Review (Preliminary Memo)**
TO:	Lydia Mynott, Landscape Architect MetroVancouver
PREPARED BY:	Hugo Johnston, B. Sc, Transportation Planner Joseph Chow, P. Eng, Transportation Engineer
REVIEWED BY:	Daniel Fung, M. Sc, P. Eng, Principal

1. INTRODUCTION

Metro Vancouver has retained Bunt & Associates Engineering Ltd. to provide transportation planning advice regarding a proposed park/campground at Cape Roger Curtis (CRC), Bowen Island, BC. Metro Vancouver has an agreement to purchase 24 parcels of land on the southwest tip of Bowen Island at Cape Roger Curtis, totalling 97 hectares that Metro Vancouver proposes to a new regional park that will incorporate both day-use and overnight camping areas.

1.1 Background

The land use is currently zoned as rural residential, or RR1 (Rural Residential 1), with a minimum lot size of 4.0 hectares. The rezoning and Official Community Plan (OCP) amendment propose a park, with a variance to allow for supervised tent camping. This land use designation will allow for the creation of a regional park complete with conservation areas, and day-use amenities such as trails, picnic areas, viewpoints, and tent camping.

The proposed regional park would preserve a significant area of ecological importance and sensitive ecosystems; and also provide opportunities for residents of the region, including the Bowen Island community, to connect with nature. Metro Vancouver has submitted a rezoning and (OCP) amendment application to Bowen Island Municipality for the proposed regional park.

Metro Vancouver will prioritize non-vehicular access to the park. Strategies include a seasonal park shuttle, improved trail and greenway connections to the park, and a focus on providing

walk/cycle/shuttle access tent camping opportunities. Some vehicular access will be provided to support accessibility and day-use.

1.2 Purpose and Methodology

The purpose of this preliminary analysis focuses on estimating and comparing the potential number of vehicle trips generated from the existing and proposed land use on the 24 undeveloped lots purchased by Metro Vancouver. These scenarios include:

- Potential Build-out (Low): 24 Single Detached House
- Potential Build-out (High): 15 Single Detached Houses, 6 Single detached homes with 6 additional suites, and 3 five bed Airbnb's
- Campground Trip Generation (incl. 50 Walk-in, 5 Group Sites, 10 Tent Cabins, and 35 vehicle-accessible camps)

Two scenarios have been assumed for the existing rural residential land use as the specificity is not known at the time of this analysis which would impact the number of vehicles generated. These two scenarios represent the high and low range of the anticipated vehicle trip generations. In addition, it is acknowledged that some of the detached single family might have additional land uses attached, such kennels or stables, however, there is a lack of data available to calculate these land uses. Therefore, the high range will be more conservative than the potential build out could result in.

This memorandum summarises the methodology and findings of a trip generation comparison analysis between the allocated/zoned future development at CRC and the trips generated by the CRC proposal taking into account:

- Land uses effected;
- Trip generation information from Metro Vancouver;
- Trip generation information from the Institute of Transportation Engineers (ITE) 11th Edition trip generation database; and
- High-level BC Ferries capacity impact was also reviewed.

This preliminary trip generation estimate for the park/campground does not consider the characteristics for the proposed park/campground such as the ferry access and proximity to the City of Vancouver. Furthermore, the analysis does not account for mitigating factors such as modal splits or highway connections. This analysis has been undertaken to represent the peak day and peak hours for the busiest day of the year, likely impacted by tourism, for example, a weekend in August.

As mentioned, the park will include day-use activities. For this exercise, it is proposed that the park will be ancillary to the campgrounds. The rezoning application will not consider day-use parking and will focus on the provision of camping activities.

1.3 Report Structure

The structure of the report will be as follows:

- Section 2 – Site Description – a brief overview of the site location
- Section 3 – Existing Ferry Capacity – Initial review of the BC Ferry usage data
- Section 4 – Potential Build-out (non-Park/Campground) Vehicle Trip Generation – A calculation of the potential trip generation based on the zoning land use category that the site is allowed to be developed.
- Section 5 – Proposed Park / Campground Vehicle Trip Generation – Proposed campground vehicle trip generation.
- Section 6 – Transportation Demand Management (TDM) – Potential TDM Shuttle Bus Service
- Section 7 – Summary

2. SITE DESCRIPTION

2.1 Cape Roger Curtis Masterplan Area

The Cape Roger Curtis Comprehensive Development Area is in the southwest corner of Bowen Island. The full Cape Roger Curtis masterplan area is comprised of 59 lots, a breakdown of the lot ownership is set out in **Table 2.1**.

As the below table demonstrates, Metro Vancouver has a purchase agreement for 24 of the 59 lots. The remaining 35 lots, not included within Metro Vancouver purchase agreement, but within CRC RR1 Zoning Bylaw are made up of 14 developed lots, 3 lots are used as a nature park and 18 privately sold but undeveloped. The subject proposal will only have an impact on the 24 lots within Metro Vancouver's control.

Table 2.1: Masterplan Lot Breakdown

OWNERSHIP	NUMBER OF LOTS
Developed Lots	14 lots
Sold Lots (as yet undeveloped or underdevelopment)	18 lots
Wildcoast Nature Refuge (nature park and sanctuary)	3 lots
Proposed Metro Vancouver Regional Park	24 lots
TOTAL CRC RR1 ZONE	**59 LOTS**

Day-use amenities including trails, open space and interpretation areas will also be included in the park. These amenities are not part of the rezoning and OCP amendment application and will be proposed following the rezoning process. Metro Vancouver will focus on day-use access through the proposed park shuttle, trail, and greenway connections, with some limited car parking areas.

2.2 Bowen Island Accessibility

Bowen Island is a small coastal island within the Strait of Georgia, in the northwest of the Metro Vancouver area. Currently, the island is only accessible by water transport; primarily provided by BC Ferries via the ferry, between the Snug Cove (Bowen Island) and Horseshoe Bay (West Vancouver) Terminals, which depart approximately every hour from 05:00 to 23:00.

There is only one route to CRC from the Snug Cove Ferry Terminal. Grafton Road travels southeast from Snug Cove from the Ferry Terminal before merging into Adams Road halfway along the route. Adams Road continues southeast towards Tunstall Bay and provides connections to several local roads within the vicinity of the site, including Whitesails Drive. Whitesails Drive is a residential road that connects Tunstall Blvd and Cape Drive to the south. Cape Drive travels around the interior of CRC and will provide primary access to the site. All roads within the vicinity of the site are two-way municipal roads.

Currently, there are no transit options to CRC. The nearest route is the #280 bus which runs approximately every hour from the Snug Cove Terminal to the northwest corner of the Island via Grafton Road and Adams Road but does not continue onto Whitesails Road and towards CRC.

2.3 Proposed Campsite Breakdown

CRC is proposing a rezoning and OCP amendment application for approximately 100 campsites, as outlined in **Table 2.1**. The overall park footprint is proposed to be approximately 250 Acres and will be located within the 24 lots with a purchase agreement from Metro Vancouver.

Table 2.1: Proposed Campground Park Program

CAMP PITCH TYPE	NUMBER OF SITES
Group Camping	5
Vehicle-accessible camping	35
Walk-In / Bike In	50
Tent Cabins	10
Total	**100**

3. EXISTING FERRY CAPACITY

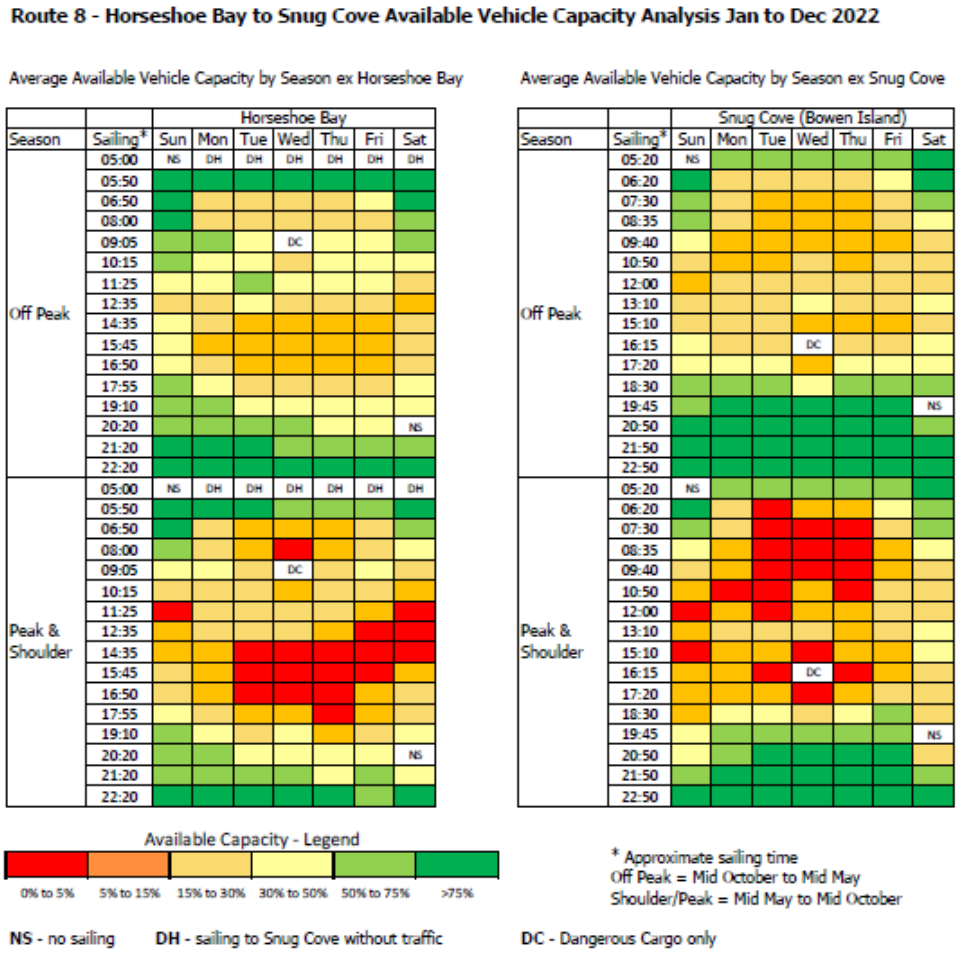
As Bowen Island is served via ferry externally, it is important to understand Ferry operations to consider the potential effects of the trip generation on the island regardless of existing or future conditions. This section reviews the existing ferry service.

The BC Ferries's average capacity tables for 2022 were provided to Metro Vancouver, dated February 28th, and as seen in **Figure 3.1**, demonstrate the existing vehicle capacity on BC Ferries across the year in 2022. It is assumed that the 14 developed lots (Table 1.1) have been included within that

dataset. The remaining 47 lots, 18 sold / undeveloped lots, 3 lots used a nature refuge and the 24 Metro Vancouver lots are not considered to be included in the 2022 data.

Route 8 between Horseshoe Bay and Snug Cove is operated by BC Ferries. The ferry that travels the route is called 'Queen of Capilano', with a capacity of 85 vehicles and approximately 451 people (including staff).

Figure 3.1: BC Ferries's average weekly average capacity



As can be seen, the majority of services within the midday period of the peak & shoulder season are 5% from capacity or fully occupied between Horseshoe Bay to Snug Cove. On Sunday and Monday, there is a 15% or more capacity. Earlier and later services on this leg typically see capacity available, with frequently more than 30% capacity available across the week.

The Snug Cove to Horseshoe Bay sees most of the busiest services towards the end of the weekends or within the early part of the week. Services from 07:30 to 10:50 are frequently at 95% capacity or fully occupied. Services later than 18:30 typically have 30% spare capacity or more.

Further analysis of the BC Ferry services will be undertaken within a full Transportation Impact Assessment (TIA) as part of the next steps of the project scope.

4. POTENTIAL BUILD-OUT VEHICLE TRIP GENERATION

This section summarises the existing land use trip generation (based on non-Park/Campground zoning) for the 24 lots included within the purchase agreement with Metro Vancouver.

4.1 Existing Lot Vehicle Trip Generation

An estimated number of two-way trips (arrival and departures) to be generated by the existing lots with potential zoning built-out lots include as part of the proposed Regional Park by Metro Vancouver was calculated. As previously mentioned, Metro Vancouver has an agreement to purchase a total of 24 lots which are currently zoned as Rural Residential 1 (RR1), as are the remaining lots within CRC.

Rural Residential 1 rezoning allows for the development of the following land uses:

- Dwellings
- Agriculture
- Horticulture
- Domestic Agriculture
- Stable; and
- Kennel.

Accessory uses of land, buildings and structures for RR1 are as follows:

- Home Occupation – Five guest bedrooms on lots 2ha or greater
- Bed and Breakfast use – No separate kitchens
- Portable Saw Mill
- Mini-storage; and
- Dwellings with a secondary suite.

The 24 lots included in the proposed Regional Park by Metro Vancouver are currently vacant. However, any of the above land-use could be developed on these lots should the ownership change. Therefore, to determine the potential trip generation of these lots, two scenarios have been assumed based on direction as provided by Metro Vancouver. These assumptions are:

- Low Range - Single Family / Detached Residential Units – 24 rural residential dwellings have been anticipated, with no secondary units assumed. The residential trip rates will be calculated based on vehicle movements. From the ITE trip generation manual, this review is based on the averages of 3.6 residents per dwelling unit and 1.5 vehicles per dwelling unit from 30 surveys. With a PM two-way vehicle trip rate of 0.94 (veh/unit) and two-way all-day trip rate of 9.43 (veh/unit)

- High Range – Potential - Single Family / Detached Residential Units with accessory uses of land and building. This includes:

    - 12 of the lots will likely have single detached family dwellings. Using the same trip rate as those used in the low range.

    - 6 of the lots will be made up of single family detached homes with an additional unit attached. As no such rates exist for residential units with a secondary unit in ITE, an assumption has been made that the units will be calculated as single detached family dwellings with a multifamily-low rise apartment on the ground floor, this is seen as a conservative estimate.

    - Furthermore, MetroVancouver anticipate that 3 of the lots will be used by single detached family units with additional land uses associated, such as a kennel or stables. Unfortunately, due to a lack of data, these units have been considered as just single-family units. Further to this, the peak hours of the kennels and stables may not be consistent with the peaks of a park/campground.

    - Finally, 3 x 5-bedroom B&B with no individual kitchens will occupy the remaining 3 lots. Each unit with the B&B will not have separate access to communal facilities such as kitchens and some shower facilities. Due to limited data, a motel trip rate is assumed as the representative land use to represent a B&B land use. These sites typically provide sleeping accommodations with few additional facilities. A two-way daily vehicle trip rate of 3.35 (veh/room) was used, with 0.36 (veh/room) two-way vehicle trip rate in the PM peak.

    - Therefore, for vehicle trip generation purposes, a total of 21 family detached homes, 6 secondary suites, and 3 five bedroom B&B is assumed.

The highest trip generation scenario that could be observed within the 24 lots would be for all 24 lots to develop multiple room BnB accommodation, this would generate a significant level of traffic during the summer peak but is deemed to be unrealistic.

Presented in **Table 4.1** are the vehicle trip rates applicable to the proposed development based on the 'ITE Trip Generation Manual 11th Edition + Supplement'. For both residential and B&B land uses, 'Rural or General Suburban' settings were applied to extract the vehicle trip rate estimate.

The AM vehicle trip rates and vehicle trip generation was not analysed as it generates a low level of trips in comparison to the PM and daily rates. Furthermore, the proposed use does not have sufficient AM peak generation data available to compare to the potential build-out trip generations.

Table 4.1: Vehicle Trip Generation Rates

ITE CLASS USE	SOURCE	PARAMETER	WEEKDAY PM PEAK			WEEKDAY		
			Average Vehicle Trip Rate	% Entering	% Exiting	Average Vehicle Trip Rate	% Entering	% Exiting
Single Family Scenario - Detached Residential Dwellings	ITE Land Use Code 210	Dwelling Units	0.94	63%	37%	9.43	50%	50%
Secondary Unit - Multifamily House (Low-Rise)	ITE Land Use Code 220	Dwelling Units	0.51	63%	37%	6.72	50%	50%
5-bed B&B - Motel	ITE Land Use Code 320	Dwelling Units	0.36	54%	46%	3.35	50%	50%

Application of these vehicle trip rates to the existing land use zoning is outlined in **Table 4.2** to estimate the potential number of vehicle trips should each of the 24 lots be developed per the current zoning allocation.

Table 4.2: Vehicle Trip Generation

USE	DENSITY	WEEKDAY PM PEAK			WEEKDAY		
		In	Out	Total	In	Out	Total
Low Range Scenario							
Detached Residential dwellings	24 x Single Family Homes	14	8	23	113	113	226
	Low Range Total	*14*	*8*	*23*	*113*	*113*	*226*
High Range Scenario							
Detached Residential dwellings	21 x Single Family Homes	12	7	20	99	99	198
Multifamily House (Low-Rise)	6 x Secondary Suites	2	1	3	20	20	40
Motel	3 x 5 bedrooms B&Bs	3	2	5	25	25	50
	High Range Total	*17*	*11*	*28*	*144*	*144*	*289*

The existing land use zoning could generate around 23 vehicles in the PM peak for the large residential units. The anticipated weekday trips could generate 226 total two-way trips across a

24hr period. In comparison, should the 24 lots be developed as mixed uses including single family homes, secondary suites, and B&B, the existing lots would generate 289-weekday trips two-way trips across a 24hr period and 28 PM Peak hour trips.

5. PROPOSED LAND USE VEHICLE TRIP GENERATION - CAMPGROUND

This section presents the approach to assess the anticipated number of new vehicle movements that the development project could potentially generate.

5.1 Campground Vehicle Trips

Campgrounds typically reach peak occupancy during the PM and evening hours, with a lower turnover than the day-use would see per the Institute of Transportation Engineers (ITE) trip generation guidelines where the weekend peak hour rates are not provided. However, with the locale for this site, we suspect the PM evening hour peak occupancy would translate into weekend use. Checking out for most campsites is typically before 11:00 on the final day of a reservation, while check-in for those arriving is normally after 13:00.

As previously mentioned, a campground containing 100 campsites, including 5 group campsites provided across 11 of the 24 lots purchased by Metro Vancouver. The campsites will be available by reservation only with campground facilities provided, such as toilet blocks and waste collection. 55 (50 Walk-in/Bike-in and 5 Tent cabins) of the proposed sites are to be accessible by sustainable modes only (Walk, Bike or Shuttle Bus). These will have no car trips associated with them. For this study, only 35 standard campsites, 5 Group sites and 5 Tent campsites are proposed to have vehicle access. The following assumptions were provided by Metro Vancouver as input for the group camp pitches and are set out in **Table 5.1**.

Table 5.1: Metro Vancouver's Proposed Camping Program

TYPE	# SITES	ACCESS TYPE
Walk-In/Bike-In	50	Bike/hike/shuttle
Group	**5**	**Shuttle/Van**
Tent Cabin	10	5 vehicles, 5 bike/hike/shuttle
Vehicle-Accessible Camp	35	1 vehicle per site
Total	**100**	

And as with the previous campground trip generation calculations, the following assumptions have been assumed, with the trip rates set out within **Table 5.2**.:

- All campsites are reserved and/or occupied during the peak periods.
- Vehicles per standard campsite is 1 vehicle and 2 vehicles per group campsite. (Group campsites are booked as one but can accommodate up to 5 tents/vehicles).

- Trip rates for the vehicle campsites have been obtained from the ITE manual for occupied sites. The PM peak (or assumed weekend peak) arrival rate was 0.40 vehicle trips per occupied site.
- Whilst day-use parking is being provided, it is not being considered as part of this memorandum.

Table 5.2: Vehicle Trip Generation Rates

USE	SOURCE	PARAMETER	PM VEHICLE TRIP RATES			DAILY VEHICLE TRIP RATES		
			In	Out	Total	In	Out	Total
Standard Campsites	ITE LUC 416	Camp pitches	0.75	-	0.75	0.75	0.50	1.25
Group Site	Metro Vancouver Data	# of group sites	1.60	-	1.60	1.60	1.0	2.60

Application of these vehicle trip rates to the proposed camping provision is outlined in **Table 5.3** to estimate the anticipated number of vehicle trips generated by the proposed campgrounds.

Table 5.3: Vehicle Trip Generation

USE	DENSITY	PM VEHICLE TRIPS			DAILY VEHICLE TRIPS		
		In	Out	Total	In	Out	Total
Campground (Vehicle Accessible)	40-vehicle accessible - campsites	30	0	30	30	20	50
Campground (Group Site)	5 Group Sites	8	0	8	8	5	13
TOTAL CAMPGROUND		38	0	38	38	25	63

As can be seen, the proposed site will generate around 38 vehicle trips in the PM peak for the full site. The anticipated peak day trips would generate 63 total two-way vehicle trips across a 24hr period.

5.2 Day Use

The focus of this study is traffic associated with the proposed campground park use. Which is the subject of the Bowen Island Municipality rezoning and OCP amendment process. Future park day-use access will be focused on sustainable modes such as the proposed park shuttle, trail, and greenway connections. It is anticipated that some day-use parking will be required for accessibility and to support local resident access. Day use parking supply will be determined and managed to avoid impacts to local residents and will be included in the complete Transportation Impact Assessment that is underway for the project but is not considered for the land use comparison.

5.3 Net Trip Generation

As the campground will replace the existing zoning bylaw on the 24 lots purchased by Metro Vancouver, a comparison in the number of trips generated by the existing land use allocation

against the proposed campgrounds has been undertaken. The comparison is demonstrated in **Table 5.4.** Both land uses set out in Table 4.2 have been compared against the proposed campground to demonstrate the worst-case and the most realistic situation.

The net trip rates demonstrate the level of the difference the proposed campground will have compared to the zoning bylaw.

Table 5.4: Net Vehicle Trip Generation

USE	DENSITY	PM VEHICLE TRIPS			DAILY VEHICLE TRIPS		
		In	Out	Total	In	Out	Total
Low range scenario (detached housing)	24 homes	14	8	23	113	113	226
High range scenario (mixed of detached homes, secondary suites, secondary uses, and B&B)	12 homes 6 secondary suits 3 secondary uses 3 x 5 room B&B	17	11	28	144	144	289
Park / Campground	40 vehicle accessible campsites + 5 Group Sites	38	0	38	38	25	63
Net – low range scenario		**24**	**-9**	**15**	**-75**	**-88**	**-163**
Net – high range scenario		**21**	**-11**	**10**	**-106**	**-119**	**-226**

As is demonstrated, the net impact of the proposed campground against the potential detached residential units will result in a reduction of 163 vehicle trips during the peak day but an increase of 15 vehicle trips in the PM peak. As mentioned, the proposed day use has not been considered within the trip generation exercise above, however, it will form part of the rezoning application.

When the proposed campground is compared to the potential high range mixed-use scenario, it will result in a decrease in a total of 226 two-way vehicles during the peak day and an increase of 10 two-way vehicle trip in the PM peak.

Overall, the campground would result in a reduced trip rate in the Peak day two-way trips when compared to both the potential land uses accepted within the bylaw.

Therefore, any campsite developed will result in a reduction in trips when compared to the land use currently accepted within the zoning bylaw.

5.4 Potential Ferry Impact

The 63 peak-day two-way campground vehicle trips represent a 72% reduction when compared to the potential impact generated by the single-family units and 78% in comparison to the high range potential build-out. A significant reduction on the capacity demands of the potential build-out impact of the ferry services.

The daily outbound trips for the proposed campsite would be 25-30 trips, 29-35% of the ferry capacity and 35-40 inbound trips, approximately 35 - 47% of the capacity. In each direction, 3-5 services are indicating they have above 30% spare capacity outside of the peak crossing times.

When visitors to the campground book their campsite, they will be directed to sailing on off-peak ferries, outside of 10:00-18:00 as part of their travel to Bowen Island.

As previously mentioned, a detailed review of the BC Ferry capacities will be produced within the TIA report.

6. TRANSPORTATION DEMAND MEASURES

As part of the rezoning application, a Transportation Demand Management Plan (TDM) is to be included. Within, a detailed list of the measure will be set out with additional details about how the TDM will be implemented and maintained. The purpose of the TDM plan will be to reduce the number of vehicle trips generated by the site and ensure that sustainable transportation options are widely accessible.

One such TDM measure that has already been proposed by Metro Vancouver is the provision of a shuttle bus. The ferry service pick-up location has yet to be confirmed, whether this will take place at Snug Cove or Horseshoe Bay. These details will be finalised through conversations with stakeholders, Metro Vancouver and BC Ferries.

The shuttle bus service will encourage campers to arrive on the island by sustainable non-private motorised vehicles. Pedestrians can use travel on the ferry as foot passengers before travelling to CRC.

7. SUMMARY

The following summarizes the potential and anticipated vehicle trip generated based on various land use options for the 24 undeveloped CRC lots.

- The masterplan area of CRC is made up of 53 lots, Metro Vancouver has a purchase agreement on 24 of these lots, all currently zoned as RR1 – Rural Residential 1 bylaw. The anticipated vehicle trip generated based on the current zoning bylaw for the 24 lots in the purchase agreement with by Metro Vancouver has been evaluated as two potential scenarios:

  i. Low range scenario: 24 single family homes or

  ii. High range scenario: mixed uses including 12 single family homes, 6 single family homes with secondary suite, 3 single-family homes with secondary uses (stable/kennel), and 3 five room B&B.

- The potential development assumed under the current zoning of the low range scenario is estimated to generate 23 two-way vehicle trips in the PM peak hour and 226 two-way vehicle trips on a weekday. The anticipated trip generation for the high range scenario is estimated to generate approximately 28 to-way vehicle trips in the PM peak hour and 289 two-way vehicle trips on the weekday.
- The vehicle trip generation for the proposed campground is 38 vehicle trips in the PM peak hour and 63 weekday vehicle trips. The net impact of the campsite results in a reduction of 163 and 226 total two-way trips when compared to the potential low range and high range scenarios, respectively.
- The net impact trips generated by the proposed campsite can be spread across the ferry as current data has shown ferry capacity outside of the peak periods. Further traffic and capacity analysis will be completed as part of the next steps of the project.

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