



133, 135 Gorge Road Transportation Impact Assessment

Version 1

Prepared for
Intracorp

Date
August 30, 2023

Project No.
04-22-0138

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Matt Kolec
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Suite 600-550 Burrard Street
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Dear Matt:

**Re: 133, 135 Gorge Road, Transportation Impact Assessment
Report Version 1**

Bunt & Associates Engineering Ltd. (Bunt) has undertaken a Transportation Impact Assessment report for the proposed residential and commercial development at 133, 135 Gorge Road, Victoria, BC.

Our report is provided herewith. It addresses anticipated transportation impacts related to the proposed development, a review of the development's vehicle and bicycle parking strategy as well as initiatives to support more sustainable modes of transportation.

We trust that our input with this report will be of assistance. Please do not hesitate to contact us should you have any questions.

Best regards,
Bunt & Associates



Jason Potter, M.Sc. PTP
Senior Transportation Planner / Associate

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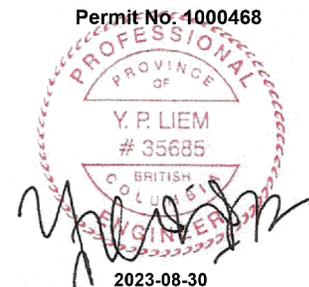
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Date: 2023-08-30

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EXECUTIVE SUMMARY

Intracorp Homes is proposing a two-phase development that will result in five mid-rise residential towers with approximately 4,900 ft² of commercial space at 133 and 135 Gorge Road in Victoria, BC. The residential towers will result in a total of 486 rental residential units. The proposed development will be built in two phases, with assumed completion years of 2025 and 2028. Vehicle access is proposed via the internal road, named Site Road for this study. The Site Road will have one access point onto Gorge Road.

The site is well-connected to the local transit, cycling, and pedestrian networks. There are four MODO car-share vehicles located within 1 km of the site.

Bunt collected traffic data at the study intersection of Gorge Road & Site Road during the PM peak period and used Synchro 11 traffic analysis software to assess the existing traffic operations at the study intersection. The Gorge Road & Site Road intersection currently operates within the acceptable performance thresholds and queuing limits in the PM peak hour.

Bunt collected vehicle trip generation data at the existing site which also consists of rental housing. Vehicle trip generation rates of 0.19 vehicles/unit and 0.07 vehicles/unit were observed for inbound and outbound trips, respectively, during the PM peak hour. These rates equated to 38 inbound and 14 outbound trips from the proposed development site's existing residential buildings.

Site traffic for the proposed Phase 1 and Phase 2 development was estimated by applying the existing trip generation rates to the proposed residential land uses and the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition, trip rate for ITE 822 - 'Strip Retail Plaza' to the proposed commercial land uses. This resulted in an estimated 107 total site-generated trips during the PM peak hour after removing trips from the existing land use.

Opening day (2028) total traffic volumes were estimated by adding the site traffic forecasts to the background traffic and the future proposed Gorge Road cross section as provided by the City of Victoria. Synchro 11 analysis indicated that all study intersection movements are anticipated to operate within the acceptable performance thresholds and queuing limits in the future total traffic scenario. The introduction of site traffic is anticipated to have a marginal impact on traffic operations in the study area.

The development is proposing 350 parking spaces, which is 203 fewer than the City of Victoria Zoning Bylaw requirement of 553 spaces. The development therefore requires a vehicle parking variance. The proposed residential parking supply rates are 0.61 spaces/unit and 0.6 spaces/unit for Phases 1 and 2, respectively.

The proposed vehicle parking supply is considered able to accommodate the site's parking demand for the following reasons:

- The proposed parking supply is 100% rental. Building management can inform prospective tenants if vehicle parking is not available, effectively reserving the units for non-vehicle owning tenants.
- The development site is located within strong cycling and walking networks along with four Modo cars within 1km radius. The nearby amenities and services will allow residents to make many trips without the use of an automobile.

The proposed development meets the accessible vehicle parking requirements for the site.

The proposed supply exceeds bylaw requirements for both short and long-term bicycle parking spaces.

A swept path analysis of passenger vehicle access, circulation, and manoeuvres was conducted using AutoTURN software. Convex mirrors will be installed at parkade corners in Phase 1 to allow drivers to yield to oncoming vehicles. A high-level swept path analysis was completed for Phase 2 rezoning purposes with further swept path analysis to be completed in coordination with the Phase 2 development permit application.

Bunt identified potential TDM initiatives that will serve to reduce vehicle traffic and parking demand at the proposed development. The identified measures include:

- Provision of a Modo car-share vehicle, dedicated on-street parking space, and 69 memberships provided to units on a first-come, first-served basis. The memberships can be transferred to between tenants and to new tenants as needed. In addition, Modo will provide \$100 in driving credit to any resident joining Modo for the first time;
- Provision of bicycle parking above the bylaw requirements;
- Provision of an on-site bicycle repair station for both development phases;
- Concrete sidewalks and pedestrian pathways in and adjacent to the site to facilitate walking to and from the development;
- Pedestrian wayfinding signage; and,
- Provision of marketing and promotion including welcome brochures for new tenants with information on the local transportation network and amenities, and events for employees such as bike-to-work week.

1. INTRODUCTION

1.1 Study Purpose & Objectives

Intracorp Homes (the developer) is proposing five mid-rise residential towers with approximately 4,900 ft² of commercial space at 133 and 135 Gorge Road in Victoria, BC. The residential towers will result in 486 rental residential units. The development will be built in two phases: Phase 1 will comprise the north parcel and Phase 2 will comprise the south parcel of the development. The assumed completion years for Phases 1 and 2 are 2025 and 2028, respectively. This study will separate the phases where applicable but will report future traffic analysis only for the 2028 horizon year (phases 1 and 2 combined).

Vehicle access is proposed via an internal road, named Site Road for the purposes of this study. This road connects to Gorge Road with an all-movements intersection with minor leg (Site Road) stop control. The site is currently zoned as T-1 Limited Transient Accommodation District.

Bunt & Associates Engineering Ltd. (Bunt) has prepared this Transportation Impact Assessment (TIA) as part of the rezoning application for Phases 1 and 2 of the development and the development permit application for Phase 1. The purpose of this study is to:

- Review existing conditions including land use, local transportation network, relevant policies and plans, and existing traffic volumes and operations;
- Assess the potential for traffic impacts due to the proposed development with regards to new vehicle demands in the study area;
- Review the parking strategy of the proposed development;
- Evaluate the proposed site plan with regards to vehicle access, vehicle circulation, and parking manoeuvres; and,
- Provide a Transportation Demand Management (TDM) strategy for the proposed development to support its vehicle parking variance.

1.2 Study Scope & Area

The proposed site is in the Burnside-Gorge neighbourhood of Victoria, BC. The site is bounded by Gorge Road to the north and Site Road to the east. The south edge of the site is adjacent to the Gorge Waterway. The study area includes one intersection: Gorge Road & Site Road.

Exhibit 1.1 illustrates the proposed site location.



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Exhibit 1.1 Site Location and Study Area

133 Gorge Road
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1.3 Proposed Development

The proposed development is broken down into two phases. Phase 1 includes a 6-storey building immediately south of Gorge Road while Phase 2 contains four 6-storey buildings adjacent to the waterfront. **Table 1.1** summarizes the proposed land uses.

Table 1.1: Proposed Land Uses

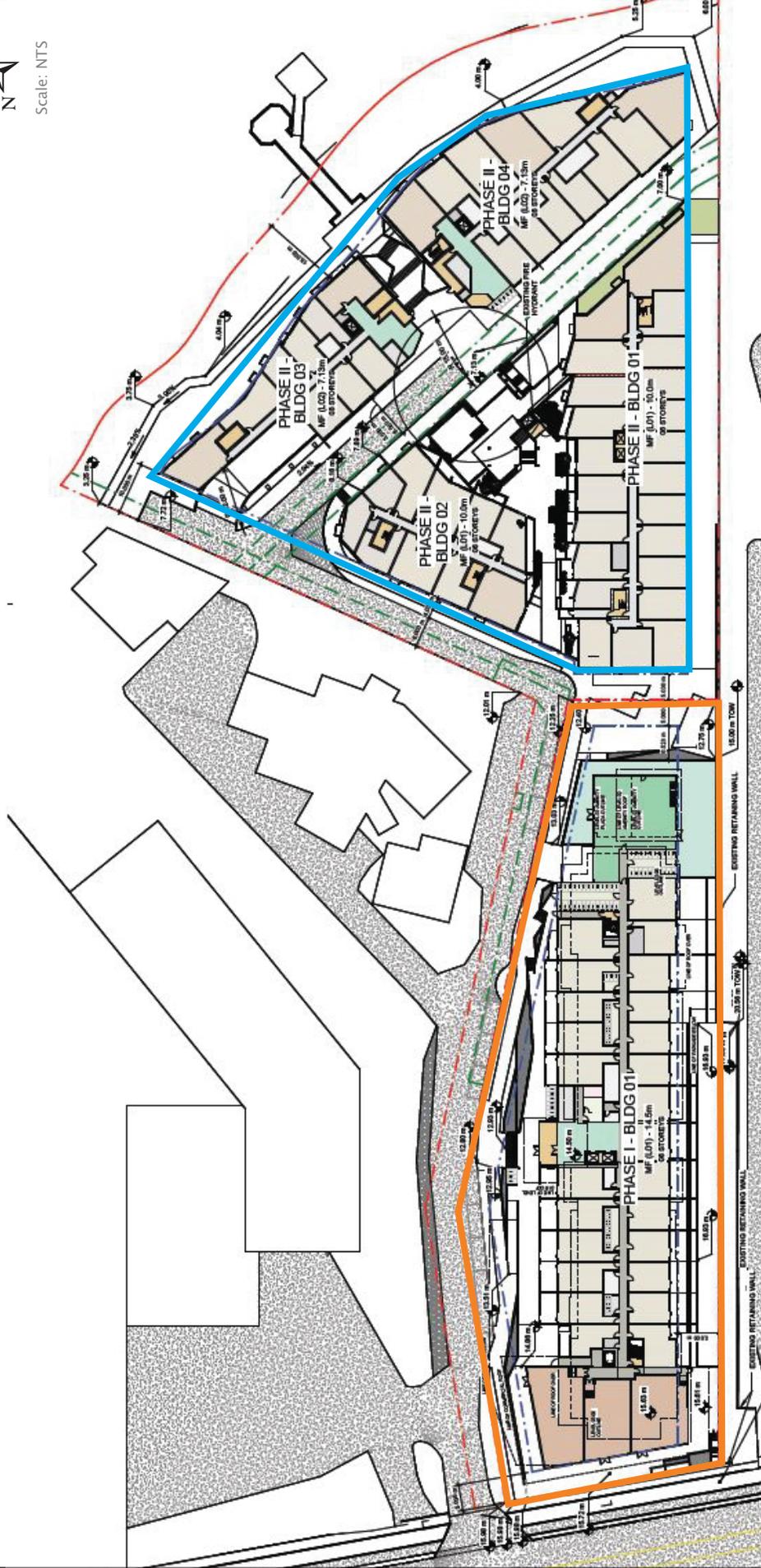
LAND USE	PHASE 1	PHASE 2	UNITS
Junior 1 Bedroom	28	14	Dwelling Units
1 Bedroom	54	119	Dwelling Units
Junior 2 Bedroom	45	46	Dwelling Units
Family 2 Bedroom	33	74	Dwelling Units
Family 3 Bedroom	16	57	Dwelling Units
Total Residential Units	176	310	Dwelling Units
Commercial / Retail	491	0	Square Meters

All units listed in **Table 1.1** will be rental.

The commercial area is divided into 3 CRUs on the ground floor of the Phase 1 building (fronting Gorge Road).

Vehicle access to the Phase 1 underground parkade is on the private road adjacent to the site, named Site Road, which can be accessed from Gorge Road to the north of the site.

The proposed site plan is shown in **Exhibit 1.2**.



PHASE 1

PHASE 2

Exhibit 1.2 Site Plan

133 Gorge Road
June 2023

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2. EXISTING CONDITIONS

2.1 Land Use

133, 135 Gorge Road is currently occupied by four low-rise residential buildings with ground-level off-street parking for residents. This residential complex can be accessed from Gorge Road via a north-south private road.

Land use adjacent to the site primarily consists of single-family homes, low-rise and mid-rise multi-family residential buildings, as well as commercial and office land uses. The Gorge Road hospital is also approximately 120m west of the site.

The site is in the Gorge Sub-area of the Burnside Gorge Neighbourhood, approximately 3km northwest of Victoria downtown.

2.2 Existing Transportation Network

2.2.1 Road Network

Gorge Road is a two-way street with no parking on either side. Gorge Road operates as an arterial road, serving as an important east-west connection from Victoria Downtown to Saanich's Tillicum area.

Site Road is a two-way private road serving the residents of 133, 135, 141, 157 Gorge Road East. The private road has curbside parking on the southbound side. The adjacent street network, including laning and traffic control, is illustrated in **Exhibit 2.1**.

2.2.2 Transit Network

The site is well served by public transit, with three transit routes within 500 metres of the site (an approximate six-minute walk). These routes and local area bus stops are presented in **Exhibit 2.2**. **Table 2.1** shows the frequencies of the transit routes near the site.

Table 2.1: Existing Transit Service Frequency

#	ROUTE BUS ROUTE NAME	APPROXIMATE HEADWAY (MIN.)				
		AM	MID-DAY	PM	EVENING	WEEKEND
8	Interurban/Tillicum Centre/Oak Bay	40	40	40	45	45
9	Royal Oak/UVic	55	50	45	-	-
11	Tillicum Centre/UVic	15	17	15	30	30

The most frequent route near the site is the #11, which connects the Burnside-Gorge neighbourhood to the northwestern part of Victoria. The #11 operates every 15 minutes during the weekday and every 30 minutes on evenings and weekends. 15-minute service is considered frequent enough that transit riders do not need to check a schedule - they can simply walk to a bus stop, knowing a bus will arrive soon. These frequencies enable people to make spontaneous trips on transit and easily travel longer distances without needing to own a car.

With one frequent and two additional routes nearby, public transit provides convenient east-west connections for most trips to and from 133, 135 Gorge Road.

2.2.3 Cycling & Pedestrian Networks

The site is well connected to high-quality walking and cycling networks.

The bi-directional painted bike lanes on Gorge Road connects the neighbourhood to Finlayson Street bikeway, a major east-west connection, and other key regional connections such as the Galloping Goose Regional Trail. The Galloping Goose Regional Trail connects Saanich to Esquimalt via the Selkirk Trestle.

Residents of the proposed development will be able to access most everyday amenities and services either on foot or on a bike. Tillicum Centre, a shopping mall with a grocery store, shops, and entertainment, is under a 10-minute bike ride from the site.

The location receives a Bike Score of 66 out of 100, placing it in Walk Score's "Bikeable" category. The site is an approximate 10-minute bike ride from downtown Victoria via Gorge Road and Government Street. The Gorge Road bike lanes are planned to be upgraded to protected bike lanes as part of the Burnside Gorge Neighbourhood Plan, which will further encourage active travel to and from the site on the future and increases its bike score.

The existing and future cycling network surrounding the site is shown in **Exhibit 2.3**.

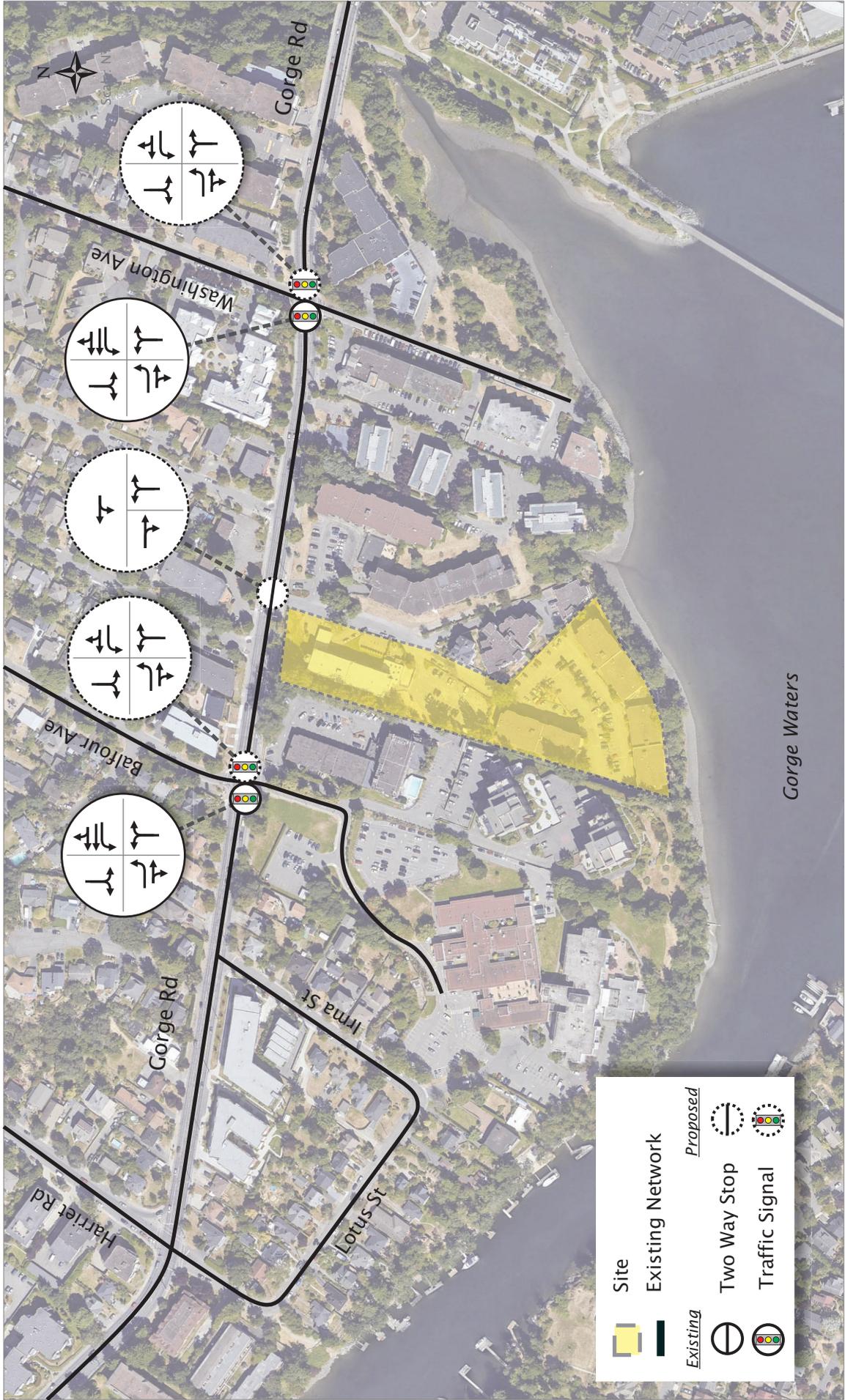
The location receives a Walk Score of 52 out of 100, placing it in Walk Score's "Somewhat Walkable" category, meaning some errands can be accomplished on foot. The three CRUs on the ground floor of the Phase 1 development will expand the village's commercial offerings and further increase the area's walkability.

2.2.4 Car-Share

The site has four Modo car-share vehicles located within 1 km of the site, the closest of which is located approximately 400 m away on Washington Avenue near Gorge Road. Approximately 30 other Modo vehicles are in downtown Victoria, which is easily accessible by bike or transit. Modo is a two-way carsharing service; registered members can pick up the vehicle from a parking spot and must return it to the same spot when they are done. Vehicles range from compact cars and sedans to SUVs and minivans, and compact cars and sedans are present within 1 km of the site. **Exhibit 2.4** shows the locations of nearby Modo carsharing vehicles.

Evo Car Share is a one-way point-to-point carsharing service operated by BCAA that expanded to Victoria in August 2021. Users are charged by the minute, with hourly and daily rates available, and they can start or end a trip within the “home zone”, which currently covers the entire City of Victoria.

Other new car-sharing opportunities are anticipated in the years ahead as these types of businesses become more viable with app based and autonomous vehicle technologies.



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Exhibit 2.1 Existing and Future Lanings and Traffic Controls

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Exhibit 2.3 Existing Cycling Network

133 Gorge Road
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Exhibit 2.4 Carshare Vehicles

133 Gorge Road
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2.3 Current Relevant Policies & Plans

The Burnside Gorge Neighbourhood Plan identifies the site as part of the Gorge sub-area; a “largely residential neighbourhood west of Cecelia Ravine, characterized by primarily ground-oriented housing with multi-unit housing along Burnside Corridor, and a mix of multi-unit housing and tourist accommodations along Gorge Road”. The Plan intends to create better pedestrian and cycling connections, encourage housing diversity, and create connection to the waterfront in the area near the project site. A Gorge Road AAA bike lane is part of this plan and is currently in Capital works plans.

2.4 Data Collection

2.4.1 Traffic Data Collection Program

Bunt collected full turning movement vehicle and pedestrian data at the Gorge Road and Site Road intersection during the PM peak period on Thursday August 19, 2022.

The existing 2022 weekday PM peak hour is estimated to occur from 4:45 to 5:45 PM. The study area volumes during this timeframe are presented in **Exhibit 2.5**.



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Exhibit 2.5 Existing Weekday PM Peak Hour Vehicle Volumes

133 Gorge Road
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2.4.2 Existing Site Vehicle Trip Generation

During the count period, a total of 78 vehicles were observed entering the Site Road to access the development site and adjacent buildings, and 28 vehicles were observed leaving. The total number of residential units served by the Site Road & Gorge Road intersection is calculated from the unit counts collected in the field and provided by the client (Table 2.2). The area access via this intersection contains 412 residential units, most of which are in low- to mid-rise rental apartments. Based on the in/out volumes observed, the existing trip generation rate is around 0.19 trip in/unit and 0.07 trip out/unit. Applying this rate to the existing units within the site area (129, 133, 135 Gorge Road East), the existing site is estimated to generate 38 trips in and 14 trips out, totalling to 52 two-way vehicle trips (Table 2.3).

Table 2.2: Number of Existing Residential Units on Site and Its Adjacent Buildings

ADDRESS	SITE OR ADJACENT BUILDINGS?	NUMBER OF DWELLING UNITS
133 Gorge Road East	Site	59
129, 135 Gorge Road East	Site	141
137 Gorge Road East	Adjacent	3
141 Gorge Road East	Adjacent	40
145 Gorge Road East	Adjacent	6
155 Gorge Road East	Adjacent	87
157 Gorge Road East	Adjacent	76
		412

Table 2.3: Existing Site Vehicle Trip Generation

LAND USE	DENSITY	SOURCE OF BASE RATE	PM TRIP RATES			EXISTING SITE TRIPS		
			IN	OUT	TOTAL	IN	OUT	TOTAL
Existing - Low-/Mid-rise Residential	200 units	Bunt Counts	0.19	0.07	0.26	38	14	52

These trips were subtracted from the future “with development” scenarios. As the existing units are similar to the ones being proposed in the future development (in that they are rental units in mid-rise apartment buildings), the same trip rates will also be applied to the residential component of the future site vehicle trip generation.

2.5 Existing Traffic Operations

2.5.1 Method of Analysis

Peak hour traffic operations of the study area intersections were evaluated using Synchro/SimTraffic 11 traffic analysis software. This software model uses the standard procedures to estimate traffic operations performance indicators such as the Volume to Capacity ratio (V/C) and the delay-based traffic Level of Service (LOS) on roadway intersections. Bunt prepared Synchro models to represent pre-redevelopment traffic operations during the Weekday PM peak hour period, by coding the roadway network characteristic

(road link and intersection laning configurations), traffic controls (stop signals, signals) and traffic and pedestrian demands.

Heavy vehicle percentages, pedestrian volumes, and cyclist volumes were collected during traffic counts and input into the model.

A V/C ratio of less than 0.90 typically indicates busy but acceptable urban peak hour traffic conditions; a V/C ratio between 0.90 and 0.95 indicates a near-capacity traffic condition with considerable delays and vehicle queuing. A V/C ratio over 0.95 indicates that traffic conditions are close to saturated or saturated, while a V/C ratio above 1.00 indicates traffic demand exceeds the available capacity.

For the Level of Service indicator, the following summarizes the range of delays (in seconds per vehicle) for signalized and unsignalized intersections:

- For signalized intersections, Level of Service ranges from LOS 'A' conditions with minimal delay (< 10 sec per vehicle) through to LOS 'E' 'near capacity' conditions (> 55 sec to ≤ 80 sec per vehicle) and LOS 'F' 'over-saturated' conditions (> 80 sec per vehicle).
- For unsignalized intersections, Level of Service ranges from LOS 'A' conditions with minimal delay (< 10 sec per vehicle) through to LOS 'E' 'near capacity' conditions (> 35 sec to ≤ 50 sec per vehicle) and LOS 'F' 'over-saturated' conditions (> 50 sec per vehicle).

If LOS F delays or >0.99 V/C ratios are modelled, some jurisdictions may consider mitigation measures in the form of road network changes (new roads, widened roads) or traffic controls (new traffic signals, changes in signal timing, installation of signage) to mitigate operational issues. However, in more urban environments, the focus is typically placed on walking, cycling and transit infrastructure instead of roadway expansion. For the purposes of the traffic analysis undertaken in this TIA, Bunt has used LOS E and F and V/C ratios 0.99 as thresholds for further analysis and review.

2.5.2 Existing Operational Analysis Results

Exhibit 2.6 summarizes the existing traffic operations for the Existing 2022 Weekday PM peak hour. The v/c ratio, LOS, and 95th percentile queues are presented for all lane groups of each approach. Detailed Synchro output files are provided in **Appendix A**.

The Synchro traffic analysis indicates the Gorge Road & Site Road intersection currently (2022, pre-development) operates well with LOS C for the northbound movements existing the site and no queuing noticeable queues in the PM peak hour.



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Lane Group LOS
 Lane Group V/C
 Lane Group
 Overall V/C
 Overall LOS
 95th % Queue
 exceeds available
 storage

0.83 (C)
 0.54 (B)
 0.91 (F)
 0.86 (E)

Lane Group	
LOS A to D	V/C ≤ 0.85
LOS E	0.85 < V/C < 0.90
LOS F	V/C > 0.90
Overall	
LOS A to C	V/C ≤ 0.80
LOS D	0.80 < V/C < 0.85
LOS E to F	V/C > 0.85

Exhibit 2.6 Existing (2022) Weekday PM Peak Hour Traffic Operations

133 Gorge Road
June 2023

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3. FUTURE TRAFFIC CONDITIONS

3.1 Traffic Forecasts

3.1.1 Background Traffic

Background traffic is traffic that would be present on the road network regardless of whether the proposed development is constructed or not. In this context, background conditions represent any non-site traffic on the adjacent road system, scaled up to account for growth.

City of Victoria historic traffic data suggests that there is no significant year-by-year traffic growth in the city. Therefore, a static (0% per year) growth rate was applied to the existing traffic volumes. As a result, the future background 2028 vehicle volumes are assumed to be equal to the existing 2022 volumes.

3.1.2 Site Traffic

Table 3.1 summarizes the existing and future land uses for 133, 135 Gorge Road. The site traffic was estimated based on the proposed land uses of 486 rental residential units and 491 m² of CRU. The vehicle trips generated by the existing 200 rental residential units were subtracted from the site traffic forecasts.

Table 3.1: Development Content Summary

SCENARIO	LAND USE
Existing	200 rental apartments
Proposed Development	Phase 1: 176 rental apartments and 491 m ² (or 5,403 ft ²) of CRU
	Phase 2: 310 rental apartments

Vehicle ownership trends and surveys indicate that rental tenure of residential units results in a lower-than-average rate of vehicle ownership and use.

The existing site trip generation rate, outlined in **Section 2.3.2**, was applied to the residential component of the proposed site. This rate is anticipated to be an acceptable estimate for the proposed residential land use as the existing units are similar to those being proposed (rental units in mid-rise apartment buildings).

The Institute of Transportation Engineers (ITE) Trip Generation Manual (11th Edition) rate for ITE 822 - 'Strip Retail Plaza' was used to estimate the trip generation of the retail land use as there is no existing retail use on site.

As shown in **Table 3.2**, the proposed development (Phase 1 & Phase 2 in total) is anticipated to generate approximately 107 trips during the PM peak hour after removing trips from the existing on-development site rental apartments.

Table 3.2: Vehicle Trip Rates and Estimated Net PM Peak Hour Trips

LAND USE	SOURCE	UNIT	VEHICLE TRIP RATES			VEHICLE TRIPS		
			WEEKDAY PM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			IN	OUT	TOTAL	IN	OUT	TOTAL
Phase 1 Rental Apartments (Mid-Rise)	Existing Counts	Per residential unit (176 units)	0.19	0.07	0.26	33	12	45
Phase 1 Retail CRU	ITE LUC 822	Per 100 ft ² GLA (4,962 ft ² GFA*)	3.29	3.30	6.59	17	17	34
Phase 2 Rental Apartments (Mid-Rise)	Existing Counts	Per residential unit (310 units)	0.19	0.07	0.26	59	21	80
Subtract existing 200 rental apartments	Existing Counts	Per dwelling unit (200 units)	-0.19	-0.07	-0.26	-38	-14	-52
TOTAL	-	-	-	-	-	71	36	107

* Assume Gross Leasable Area (GLA) = 90% x Gross Floor Area (GFA) for the retail component.

Trip Distribution & Assignment

The assumed distribution of the site generated trips was based on the pre-development traffic patterns which are shown in **Table 3.3**.

Table 3.3: Trip Distribution Assumptions (Weekday PM Peak Hour)

ORIGIN / DESTINATION	INBOUND DISTRIBUTION	OUTBOUND DISTRIBUTION
Gorge Road (west)	58%	43%
Gorge Road (east)	42%	57%
TOTAL	100%	100%

The net site traffic forecasts for the PM peak hour are presented in **Exhibit 3.1**.

3.1.3 Total Traffic

Phase 1 and 2 opening day (2028) total traffic volumes were estimated by adding the site traffic forecasts to the background traffic.

Exhibit 3.2 presents the opening day (2028) total traffic forecasts.



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Exhibit 3.1 Site Traffic Forecasts

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Exhibit 3.2 Opening Day (2028) Total Peak Hour Vehicle Volumes

133 Gorge Road
June 2023

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3.1.4 Future Traffic Operations

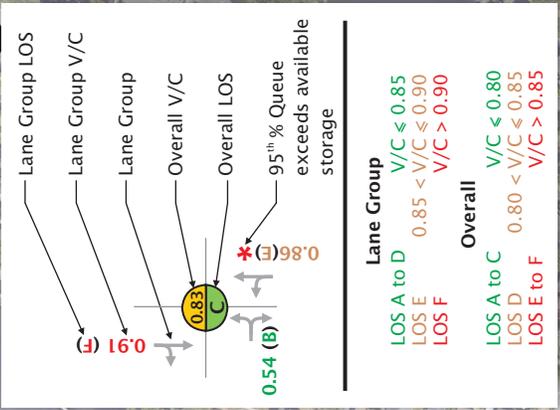
Exhibit 3.3 summarizes traffic operations with the forecasted 2028 total (Phase 1 and 2) traffic volumes. Detailed Synchro output files are provided in **Appendix A**.

The introduction of site traffic results in a slight increase in delays, from LOS C to D, for the northbound turning movements at the study intersection; this increase in delays remains within acceptable performance limits. The 95th percentile queue length of the northbound approach is also anticipated to be acceptable at approximately 10m, i.e., 1-2 car length. It should be noted that the Synchro analysis did not capture the effect of the traffic signals adjacent to the study intersection. Traffic signals create gaps in traffic flow, which provide opportunities to turn onto Gorge Road from the Site Road. As a result, actual study intersection performance is anticipated to be better than indicated by traffic modelling outputs.

Overall, the results of the Synchro analysis indicate that the study intersection will operate within the acceptable performance thresholds and queuing limits in the total traffic condition under existing minor leg stop control.

3.1.5 Summary of Traffic Impacts

All study intersection movements are anticipated to operate well without noticeable queues in the future total traffic scenario. The introduction of site traffic is anticipated to have a marginal impact on traffic demand in the study area based on the minimal change to performance from the existing condition.



Lane Group	
LOS A to D	V/C ≤ 0.85
LOS E	0.85 < V/C < 0.90
LOS F	V/C > 0.90
Overall	
LOS A to C	V/C ≤ 0.80
LOS D	0.80 < V/C < 0.85
LOS E to F	V/C > 0.85

M:\Operations\Dept BC\Projects\2022\04-22-0138 133 Gorge Road Victoria\5.0 Deliverables\5.1 Draft Report\Graphics

Exhibit 3.3 Opening Day (2028) Total PM Peak Hour Traffic Operations

133 Gorge Road
June 2023

04-22-0138

4. SITE PLAN DESIGN REVIEW

4.1 Parking Supply

4.1.1 Vehicle Parking Bylaw Requirements

As per City of Victoria zoning requirements (Schedule C, Zoning Regulation Bylaw) the residential component of the development must provide a minimum of 0.75 to 1.3 resident parking spaces per residential unit depending on unit size. These rates consider rental tenure of the development, but they do not consider the development's location in a walkable, bikeable, and transit-friendly village area.

The 133, 135 Gorge Road site is outside of Victoria's "Core" or "Village" areas as defined by Schedule C of the Zoning Bylaw. Hence, parking rates for "Other Areas" will be used.

In addition, the Bylaw requires the development to provide 0.1 residential visitor parking spaces per unit.

The CRUs in the development will follow the bylaw requirements for "Commercial-Retail" in "Other Areas", which is one space per 37.5 m².

Vehicle parking requirements for the proposed development are summarized in **Table 4.1**.

Table 4.1: Vehicle Parking Supply Requirement & Provision

LAND USE	DENSITY	BYLAW RATE	BYLAW SUPPLY REQUIREMENT	PROVIDED	DIFFERENCE
PHASE 1					
Apartment	25 units	0.75 per unit that is less than 45m ²	166	101	-65
	125 units	0.90 per unit that is equal to 45m ² and up to 70m ²			
	27 units	1.30 per unit that is more than 70m ²			
	176 units total	0.10 visitor parking spaces per unit	18	18	-
Commercial - Retail	491 m ²	1 space per 37.5 m ² floor area	13	14	+1
Phase 1 Subtotal			197	133	-64
PHASE 2					
Apartment	9 units	0.75 per unit that is less than 45m ²	325	186	-139
	184 units	0.90 per unit that is equal to 45m ² and up to 70m ²			
	117 units	1.30 per unit that is more than 70m ²			
	310 units total	0.10 visitor parking spaces per unit	31	31	-
Phase 2 Subtotal			356	217	-139
DEVELOPMENT TOTAL			553	350	-203

The developer is seeking a variance from the bylaw requirement for residential vehicle parking. The proposed residential parking supply rates are 0.61 spaces/unit and 0.6 spaces/unit for Phases 1 and 2, respectively. An analysis of the anticipated vehicle parking demand is outlined below. In addition, Section 5 identifies potential TDM measures that aim to support this variance by reducing resident reliance on vehicles, thus reducing the parking demand at the proposed development.

4.1.2 Vehicle Parking Demand

Many municipalities, including Victoria, are recognizing variations in resident parking demands based on various factors. Variables to consider when forecasting resident auto ownership and corresponding parking demands include:

- **Tenure type (rental or strata):** Vehicle parking demand is shown to be significantly influenced by tenure. Parking demand is typically lower for rental units than owned or strata units.
- **Unit size:** Parking requirements should be proportional to the dwelling size (square footage/ number of bedrooms). Unit size can also correlate with factors such as the number of working adults in the household, income level, and unit affordability.
- **Geographic area:** Parking requirements should be lowest in areas that are in close proximity to frequent and high-quality transit and active mode infrastructure.
- **Transportation Demand Management (TDM):** TDM initiatives can have substantial impact in reducing vehicle dependency.

Tenure is a key consideration for determining vehicle parking supply feasibility. Since the residential units at the proposed development are all rental, the development can manage or limit the number of occupants who require parking. The rental manager would have to inform the prospective tenants of the limited rental parking spaces. When the parking spaces are fully rented, the management will then only accept tenants who do not own any vehicle thus have no need for a vehicle parking space. With this rationale and the site being near viable transportation options and robust supporting transportation demand management (TDM) Bunt has recently supported and seen approval for various zero resident parking projects in both Vancouver and Victoria.

It is our sustained view that rental units can effectively manage their parking demand and that there are enough prospective tenants who do not own a vehicle to take advantage of the reduced development costs stemming from right-sized parking supplies.

Regarding the location of the site, the proposed site is outside of Victoria's downtown core and any Village areas; however, the site is within 600m of Selkirk Village, identified as a village in the City Bylaw.

In addition, the site's proximity to a village, as well as the nearby high-quality walking, cycling, and transit routes, are expected to result in reduced parking demands in the proposed development.

The mixed-use nature of this development provides an opportunity to share parking between different land uses as the peak parking demands between commercial land uses and residential visitors tend to occur at different times. Retail parking demands are usually highest on weekday afternoons and weekends, while residential visitor parking demands usually peak in the evenings.

4.1.3 Vehicle Parking Demand - Comparable Sites

Bunt has collected and obtained local parking demand data for rental apartment sites in the City of Victoria as part of previous studies. The observed parking demand at similar sites can inform the anticipated vehicle ownership at the proposed development.

The average vehicle ownership obtained from a combination of observed data and ICBC vehicle registration data at eleven (11) rental apartment sites located in the City of Victoria, but outside Core or Village/Centre areas, is approximately 0.75 vehicles/unit. It is assumed that no TDM measures have been implemented at any of the eleven buildings due to their age.

The proposed residential parking supplies of 0.61 and 0.6 spaces/unit in each development phase are anticipated to meet development parking demands when considering factors outlined in subsection 4.1.2 and the development's proposed TDM initiatives as outlined in Section 5.

4.1.4 Accessible Parking Bylaw Requirements

As per City of Victoria zoning requirements, the proposed development requires 7 accessible parking spaces for the residential uses in Phase 1, two (2) of which must be van accessible spaces. One (1) van accessible space is required for the Phase 1 commercial uses.

The proposed development requires 13 accessible parking spaces for the residential uses in Phase 2, three (3) of which must be van accessible spaces.

The proposed development meets the accessible parking requirements for the site.

4.1.5 Bicycle Parking Bylaw Requirements

Well managed, secure, accessible, and covered bicycle parking will be provided as part of the development plan. **Table 4.2** summarizes City of Victoria Bylaw requirements and the proposed bicycle parking supply.

Table 4.2: Bicycle Parking Supply Requirement & Provision

LAND USE	DENSITY	BYLAW RATE	BYLAW SUPPLY REQUIREMENT	PROVIDED	DIFFERENCE
PHASE 1					
Apartment	24 units	Long-term: 1 space per unit that is less than 45m ²	214	247	+33
	152 units	Long-term: 1.25 spaces per unit that is 45m ² or greater			
	176 units total	Short-term: The greater of 6 spaces per building or 0.1 spaces per unit	18	20	+2
Commercial - Retail	491 m ²	Long-term: 1 space per 200 m ² floor area	3	3	-
		Short-term: 1 space per 200 m ² floor area (minimum 6)	6	6	-
Phase 1 Subtotal			217 Long-term 24 Short-term	250 Long-term 26 Short-term	+33 Long-term +2 Short-term
PHASE 2					
Apartment	9 units	Long-term: 1 space per unit that is less than 45m ²	385	388	+3
	301 units	Long-term: 1.25 spaces per unit that is 45m ² or greater			
	310 units total	Short-term: The greater of 6 spaces per building or 0.1 spaces per unit	31	32	+1
Phase 2 Subtotal			385 Long-term 31 Short-term	388 Long-term 32 Short-term	+3 Long-term +1 Short-term
DEVELOPMENT TOTAL			602 LONG-TERM 55 SHORT-TERM	638 LONG-TERM 58 SHORT-TERM	+36 LONG-TERM +3 SHORT-TERM

The proposed supply exceeds the bylaw requirement for both short and long-term bicycle parking spaces.

4.2 Swept Path Analysis

A swept path analysis of passenger vehicle access, circulation, and parking manoeuvres was completed in AutoTURN software and is attached in **Appendix B**. Analysis of loading vehicles was not necessary as the City of Victoria Zoning Bylaw does not require off-street loading spaces for residential land uses. The proposed development will provide one (1) on-street loading space, located on Site Road, for the phase 1 commercial uses. The following summarizes the swept path analysis:

Phase 1

- **Exhibit B1.1** illustrates two-way, concurrent access to the parkade for passenger vehicles. It also illustrates passenger vehicle circulation in the parkade. Convex mirrors will be installed where indicated as vehicle paths overlap at corners. These mirrors will alert drivers if a vehicle is approaching from around a corner, allowing drivers to yield.
- **Exhibit B1.2a** illustrates inbound parking stall manoeuvres.
- **Exhibit B1.2b** illustrates outbound parking stall manoeuvres. No issues were identified with passenger vehicle parking.

Phase 2

A high-level swept path analysis was completed for Phase 2 rezoning purposes. Further swept path analysis will be completed in coordination with the Phase 2 development permit application.

- **Exhibit B2.1** illustrates passenger vehicle access and circulation on the P1 level. A chamfer at the northeast corner of the parkade access will allow two-way, concurrent movements for passenger vehicles. The parking gate should be widened to abut the walls to facilitate two-way, concurrent access. Further review, with Phase 2 development permit, is required to confirm functionality of Phase 2 parkade ramps. No issues were identified with passenger vehicle circulation within the parkade.
- **Exhibits B2.2a and B2.2b** illustrate inbound and outbound parking stall manoeuvres on the P1 level.
- **Exhibit B2.3** illustrates passenger vehicle access and circulation on the L1 level. The width of the access to the upper parking deck in the northeast area of the site can only accommodate one vehicle at a time; a warning system or mirrors are required to allow vehicles to yield and avoid conflicts. Further review is required to confirm functionality of parkade ramps.
- **Exhibits B2.4a and B2.4b** illustrate inbound and outbound parking stall manoeuvres on the L1 level. No issues were identified with parking manoeuvres on L1.

5. TDM & ACTIVE MODES

5.1 Transportation Demand Management (TDM)

Transportation Demand Management (TDM) is defined as the “application of strategies and policies to reduce travel demand (specifically that of single-occupant private vehicles), or to redistribute this demand in space or in time”¹. 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 implementation of TDM measures can range across many groups, including regional and municipal governments, transit agencies, private developers, residents/resident associations, or employers.

5.2 Proposed TDM Measures

Table 5.1 summarizes the TDM Measures to be included with the proposed development.

Table 5.1: Summary of TDM Plan

CATEGORY	TDM INITIATIVE
Car Share	One (1) Modo car share vehicle and designated space on site. Space would be at-grade and visible to neighbours i.e., on internal lane.
	Modo car share memberships for up to 69 residential unit (\$500 value per unit). Memberships would stay with the unit.
	\$100 driving credit per resident/unit joining Modo for the first time.
Cycling	Additional secure, covered long-term bike parking as well as short-term bike parking at building entrances.
	A centrally located Bicycle Repair Station for both development Phase 1 and 2.
Walking	Improvements to walking infrastructure, on and off site.
	Wayfinding signage to connect Gorge Road to new waterfront trail through the site.
	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 vehicles.
Marketing & Promotion	Welcome Brochure, with an information package on transportation alternatives, that is issued to all new residents and employees and posted in common areas.
	Participation in Bike to Work Week and other community and regional promotions/events for sustainable transportation.

¹ <http://ops.fhwa.dot.gov/tdm/index.htm> FHWA Travel Demand Management home page

5.2.1 Car-Share

Modo is the primary car-share service in Greater Victoria, offering round trips for members. Modos enables people to have short-term access to a vehicle, without having to buy or maintain their own.

The developer will purchase one (1) car-share vehicle from Modos and dedicate a publicly accessible parking space to its use. As part of the agreement, Modos will waive the \$500 membership fee for up to 69 residential units. These memberships will be distributed to residential units as needed and will remain with the building for the lifetime of the development. Modos will also provide \$100 in driving credit to any resident joining for the first time.

The Metro Vancouver Car-Share Study provides information on the effects of car-share on vehicle ownership. Each shared car has been shown to remove 3-11 private vehicles from the street system. In addition, the number of vehicles owned per household was reduced by 27% when a Modos membership was acquired².

Exhibit 2.4 in Section 2 illustrates the location of existing Modos vehicles near the proposed site. One Modos car share vehicle is currently located within walking distance. A new Modos vehicle located at the proposed site will be a valuable addition to the neighbourhood and reduce resident vehicle ownership.

5.2.2 Cycling Initiatives

Additional Bicycle Parking

The development will be providing 638 long-term bicycle parking spaces and 58 short-term spaces. This represents a 6% and 5% increase in bicycle parking from the requirements for long-term and short-term parking, respectively, and is expected to help promote cycling to and from the development.

Bicycle Repair Station

The developer will provide a centrally located bike repair station for each of development's two phases. These stations remove a barrier to cycling by providing tools needed to perform basic maintenance. With the large supply of bicycle parking and strong access to nearby cycling routes, a bike repair station would likely be well used in this development.

² <http://www.metrovancouver.org/services/regional-planning/PlanningPublications/MetroVancouverCarShareStudyTechnicalReport.pdf>

Figure 5.1. Bicycle Repair Station Examples



5.2.3 Walking Improvements

Pathway Improvements

There are currently no sidewalks or pedestrian paths adjacent to the site on the Site Road. The proposed development will include the construction of concrete sidewalks and pathways on the Site Road and internal to the site. These pathways will provide a significant upgrade to the local pedestrian network in terms of safety and comfort and will encourage residents and shoppers to walk to and from the site.

Wayfinding Signage

The developer will provide new wayfinding signage on Gorge Road. These signs will direct residents of the area towards new and existing pathways along the waterfront.

5.2.4 Marketing and Promotion

Welcome packages and flyers will be provided to new employees and tenants to provide targeted information on nearby sustainable modes of transportation associated with the site. The information may include bus routes, bicycle routes, bicycle storage options and availability, location of bike maintenance facilities, location of car share vehicles, and facilities within a 5 to 10-minute walking distance.

The building management team is encouraged to facilitate participation of employees and tenants in Bike to Work Week and other community and regional promotions/events for sustainable transportation by distributing related marketing information.

6. SUMMARY & RECOMMENDATIONS

6.1 Summary

6.1.1 Proposed Development

- Intracorp Homes is proposing five mid-rise residential towers with approximately 4,900 ft² of commercial space at 133 and 135 Gorge Road in Victoria, BC. The residential towers will consist of 486 rental residential units.
- The proposed development will be built in two phases, with assumed completion years of 2025 and 2028 respectively.
- Vehicle access is proposed via the internal road, named Site Road for this study. The Site Road is accessed from Gorge Road.

6.1.2 Existing Conditions

- The site is well-connected to the local transit, cycling, and pedestrian networks.
- There are four MODO car-share vehicles located within 1 km of the site.
- Bunt collected traffic data at the study intersection of Gorge Road & Site Road during the PM peak period.
- The Gorge Road & Site Road intersection currently operates within the acceptable performance thresholds with no noticeable queues in the PM peak hour.

6.1.3 Future Traffic Conditions

- A vehicle trip generation rate of 0.19 vehicles/unit and 0.07 vehicles/unit was observed for inbound and outbound trips, respectively, during the PM peak hour. These rates result in 38 inbound and 14 outbound trips from the site's existing land use.
- The build-out phase 1 and 2 full development is estimated to generate 107 total vehicle trips during the PM peak hour after removing trips from the existing land uses.
- The study intersection movements are anticipated to operate within the acceptable performance thresholds in the total future scenario. The introduction of site traffic is anticipated to have a minimal impact on traffic operations in the study area.

6.1.4 Site Plan Design Review

- The development is proposing 350 parking spaces, which is 203 fewer than the City of Victoria Zoning Bylaw requirement of 553 spaces. The development therefore requires a vehicle parking variance.
- The proposed residential parking supply rates are 0.61 spaces/unit and 0.6 spaces/unit for Phases 1 and 2, respectively.
- The proposed parking supply is considered able to accommodate the site's parking demand for the following reasons:

- The proposed parking supply is 100% rental. Building management can inform prospective tenants if vehicle parking is not available, effectively reserving the units for non-vehicle owning tenants.
- The development site is located within strong cycling and walking networks as well as four Modo vehicles within 1km radius. The nearby amenities and services will allow residents to make everyday trips without the use of an automobile.
- Cycling will be promoted by providing cycling amenities such as a bicycle repair station and a bicycle parking space supply that exceeds the City's bylaw requirements.
- The proposed development meets the accessible parking requirements for the site.
- The proposed supply exceeds the bylaw requirement for both short and long-term bicycle parking spaces.
- A swept path analysis of passenger vehicle access, circulation, and manoeuvres was completed in AutoTURN software. Convex mirrors will be installed at parkade corners in Phase 1 to allow drivers to yield to oncoming vehicles. A parking management strategy is required in Phase 1 to allocate end parking stalls to smaller vehicles. A high-level swept path analysis was completed for Phase 2 rezoning purposes with further path analysis to be completed at a later stage for the Phase 2 development permit application.

6.2 Recommendations

6.2.1 Transportation Demand Management (TDM)

Bunt identified potential TDM initiatives that will serve to reduce vehicle traffic and parking demand at the proposed development. The identified measures include:

- Provision of a Modo car-share vehicle on a dedicated on-street parking space, and 69 memberships provided to units as needed. The memberships can be transferred to any new tenants of these units or between units. In addition, Modo will provide \$100 in driving credit to any resident joining Modo for the first time;
- Provision of bicycle parking above the bylaw requirements;
- Provision of an on-site bicycle repair station for both development phases;
- Construction of concrete sidewalks and pedestrian pathways in and adjacent to the site to facilitate walking to and from the development;
- Installation of pedestrian wayfinding signage; and,
- Distribution of marketing and promotion including welcome brochures for new tenants with information on the local transportation network and amenities, and events for employees such as bike-to-work week.

APPENDIX A

Traffic Modelling Outputs

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	362	45	33	870	12	16
Future Vol, veh/h	362	45	33	870	12	16
Conflicting Peds, #/hr	0	48	48	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	399	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	393	49	36	946	13	17

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	490	0	1011 466
Stage 1	-	-	-	-	466 -
Stage 2	-	-	-	-	545 -
Critical Hdwy	-	-	4.13	-	6.63 6.23
Critical Hdwy Stg 1	-	-	-	-	5.43 -
Critical Hdwy Stg 2	-	-	-	-	5.83 -
Follow-up Hdwy	-	-	2.219	-	3.519 3.319
Pot Cap-1 Maneuver	-	-	1071	-	250 596
Stage 1	-	-	-	-	631 -
Stage 2	-	-	-	-	546 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1021	-	230 568
Mov Cap-2 Maneuver	-	-	-	-	230 -
Stage 1	-	-	-	-	602 -
Stage 2	-	-	-	-	527 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	16.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	349	-	-	1021	-
HCM Lane V/C Ratio	0.087	-	-	0.035	-
HCM Control Delay (s)	16.3	-	-	8.7	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

1: Site Road & Gorge Road E Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	2.5	1.7	8.0	2.4	18.0	5.8	2.7

2: Balfour Ave & Gorge Road E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	4.2	0.4	0.5	0.0	0.0	0.0	0.2	0.1	0.2	0.1	0.1	0.1
Total Del/Veh (s)	32.9	12.2	8.8	17.4	4.5	2.7	10.4	6.1	6.1	10.1	10.3	6.1

2: Balfour Ave & Gorge Road E Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	7.3

3: Washington Ave & Gorge Road E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	2.6	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2
Total Del/Veh (s)	35.5	6.5	2.6	24.8	12.9	5.4	9.5	3.5	2.3	7.7	10.8	3.9

3: Washington Ave & Gorge Road E Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	11.1

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	19.8

Intersection: 1: Site Road & Gorge Road E

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (m)	3.8	13.7	11.4
Average Queue (m)	0.5	3.9	5.5
95th Queue (m)	3.8	13.2	13.1
Link Distance (m)	93.4		97.1
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)		39.9	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Balfour Ave & Gorge Road E

Movement	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	TR	L	T	TR	L	TR	LTR
Maximum Queue (m)	7.3	55.1	8.3	19.6	22.1	8.9	10.6	11.9
Average Queue (m)	2.4	32.8	2.6	10.7	12.6	2.4	4.4	4.4
95th Queue (m)	8.4	53.5	8.7	20.8	25.0	8.9	11.9	12.2
Link Distance (m)		257.2		93.4	93.4	57.4	57.4	264.4
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	27.0		28.0					
Storage Blk Time (%)		10		0				
Queuing Penalty (veh)		1		0				

Intersection: 3: Washington Ave & Gorge Road E

Movement	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	TR	L	T	TR	LTR	LTR
Maximum Queue (m)	12.8	26.9	18.5	62.1	49.4	8.0	10.7
Average Queue (m)	5.0	14.8	4.4	44.4	27.9	2.6	4.1
95th Queue (m)	13.5	28.8	18.1	65.2	49.8	8.5	11.0
Link Distance (m)		188.0		154.4	154.4	160.7	246.0
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	25.0		25.9				
Storage Blk Time (%)		2		23			
Queuing Penalty (veh)		0		6			

Network Summary

Network wide Queuing Penalty: 7

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	362	45	33	870	12	16
Future Vol, veh/h	362	45	33	870	12	16
Conflicting Peds, #/hr	0	48	48	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	399	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	393	49	36	946	13	17

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	490	0	1484 466
Stage 1	-	-	-	-	466 -
Stage 2	-	-	-	-	1018 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1073	-	137 597
Stage 1	-	-	-	-	632 -
Stage 2	-	-	-	-	349 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1023	-	126 569
Mov Cap-2 Maneuver	-	-	-	-	126 -
Stage 1	-	-	-	-	603 -
Stage 2	-	-	-	-	337 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	23.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	227	-	-	1023	-
HCM Lane V/C Ratio	0.134	-	-	0.035	-
HCM Control Delay (s)	23.3	-	-	8.6	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-

1: Site Road & Gorge Road E Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	2.2	1.8	6.3	6.1	27.1	6.5	5.1

2: Balfour Ave & Gorge Road E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.4	0.4	0.4	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Total Del/Veh (s)	57.3	8.5	5.4	25.0	23.4	28.2	19.1	11.8	5.7	14.1	14.5	12.2

2: Balfour Ave & Gorge Road E Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	18.7

3: Washington Ave & Gorge Road E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	8.0	9.1	4.4	0.1	0.1	0.1	0.2	0.1	0.1
Total Del/Veh (s)	62.7	13.0	9.9	34.9	34.1	28.5	14.9	11.6	6.2	21.9	12.5	13.1

3: Washington Ave & Gorge Road E Performance by movement

Movement	All
Denied Del/Veh (s)	6.1
Total Del/Veh (s)	28.2

Total Network Performance

Denied Del/Veh (s)	5.6
Total Del/Veh (s)	47.2

Intersection: 1: Site Road & Gorge Road E

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (m)	1.6	9.7	28.5	12.1
Average Queue (m)	0.2	2.7	7.8	6.2
95th Queue (m)	2.4	9.7	30.9	14.1
Link Distance (m)	94.5		187.9	97.1
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)		39.9		
Storage Blk Time (%)			3	
Queuing Penalty (veh)			1	

Intersection: 2: Balfour Ave & Gorge Road E

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	L	TR	L	TR	L	TR	LTR
Maximum Queue (m)	8.0	45.9	30.4	100.6	9.5	10.8	13.6
Average Queue (m)	2.3	26.2	5.9	90.4	3.5	3.4	4.6
95th Queue (m)	8.3	43.7	25.2	107.8	10.7	10.3	13.0
Link Distance (m)		257.1		94.5	57.4	57.4	268.2
Upstream Blk Time (%)				8			
Queuing Penalty (veh)				73			
Storage Bay Dist (m)	27.0		28.0				
Storage Blk Time (%)		5		40			
Queuing Penalty (veh)		1		6			

Intersection: 3: Washington Ave & Gorge Road E

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	20.6	59.5	27.7	156.4	8.6	12.4
Average Queue (m)	7.2	36.6	7.5	113.9	2.8	5.0
95th Queue (m)	20.3	59.1	27.0	186.3	8.8	12.6
Link Distance (m)		187.9		155.9	160.7	250.1
Upstream Blk Time (%)				21		
Queuing Penalty (veh)				0		
Storage Bay Dist (m)	25.0		25.9			
Storage Blk Time (%)	2	13		40		
Queuing Penalty (veh)	8	3		10		

Network Summary

Network wide Queuing Penalty: 102

Intersection						
Int Delay, s/veh	1.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	362	66	47	870	21	28
Future Vol, veh/h	362	66	47	870	21	28
Conflicting Peds, #/hr	0	48	48	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	399	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	393	72	51	946	23	30

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	513	0	1525 477
Stage 1	-	-	-	-	477 -
Stage 2	-	-	-	-	1048 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1052	-	130 588
Stage 1	-	-	-	-	624 -
Stage 2	-	-	-	-	338 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1003	-	118 561
Mov Cap-2 Maneuver	-	-	-	-	118 -
Stage 1	-	-	-	-	595 -
Stage 2	-	-	-	-	321 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	27.2
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	215	-	-	1003	-
HCM Lane V/C Ratio	0.248	-	-	0.051	-
HCM Control Delay (s)	27.2	-	-	8.8	-
HCM Lane LOS	D	-	-	A	-
HCM 95th %tile Q(veh)	0.9	-	-	0.2	-

1: Site Road & Gorge Road E Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	2.6	2.0	7.9	8.1	23.9	7.5	6.6

2: Balfour Ave & Gorge Road E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	4.1	0.4	0.4	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2
Total Del/Veh (s)	57.9	9.0	6.5	25.8	25.8	21.5	15.5	15.6	6.1	17.4	5.6	14.7

2: Balfour Ave & Gorge Road E Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	20.0

3: Washington Ave & Gorge Road E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	12.2	14.9	5.1	0.1	0.1	0.1	0.2	0.2	0.2
Total Del/Veh (s)	88.4	13.3	10.5	37.2	37.3	31.1	15.4	15.8	6.5	17.2	7.5	13.2

3: Washington Ave & Gorge Road E Performance by movement

Movement	All
Denied Del/Veh (s)	9.9
Total Del/Veh (s)	30.5

Total Network Performance

Denied Del/Veh (s)	8.9
Total Del/Veh (s)	50.7

Intersection: 1: Site Road & Gorge Road E

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (m)	3.7	16.1	40.2	14.6
Average Queue (m)	0.5	4.4	15.4	8.5
95th Queue (m)	6.2	16.3	47.9	17.8
Link Distance (m)	94.5		187.9	97.1
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)		39.9		
Storage Blk Time (%)			3	
Queuing Penalty (veh)			1	

Intersection: 2: Balfour Ave & Gorge Road E

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	L	TR	L	TR	L	TR	LTR
Maximum Queue (m)	12.3	49.8	26.9	103.8	9.5	10.0	13.5
Average Queue (m)	2.5	29.0	5.2	95.8	3.0	3.7	4.3
95th Queue (m)	12.6	50.2	22.4	110.8	10.0	10.7	13.2
Link Distance (m)		257.1		94.5	57.4	57.4	268.2
Upstream Blk Time (%)				15			
Queuing Penalty (veh)				142			
Storage Bay Dist (m)	27.0		28.0				
Storage Blk Time (%)		7		42			
Queuing Penalty (veh)		1		6			

Intersection: 3: Washington Ave & Gorge Road E

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	22.4	60.4	24.9	158.0	9.9	15.2
Average Queue (m)	8.0	38.5	6.1	125.9	3.8	5.8
95th Queue (m)	23.9	61.1	24.3	190.4	11.1	15.0
Link Distance (m)		187.9		155.9	160.7	250.1
Upstream Blk Time (%)				20		
Queuing Penalty (veh)				0		
Storage Bay Dist (m)	25.0		25.9			
Storage Blk Time (%)	3	13	0	43		
Queuing Penalty (veh)	14	3	0	11		

Network Summary

Network wide Queuing Penalty: 178

Intersection						
Int Delay, s/veh	1.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	362	83	60	870	26	34
Future Vol, veh/h	362	83	60	870	26	34
Conflicting Peds, #/hr	0	48	48	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	399	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	393	90	65	946	28	37

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	531	0	1562 486
Stage 1	-	-	-	-	486 -
Stage 2	-	-	-	-	1076 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1036	-	123 581
Stage 1	-	-	-	-	618 -
Stage 2	-	-	-	-	327 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	988	-	110 554
Mov Cap-2 Maneuver	-	-	-	-	110 -
Stage 1	-	-	-	-	590 -
Stage 2	-	-	-	-	305 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	31.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	202	-	-	988	-
HCM Lane V/C Ratio	0.323	-	-	0.066	-
HCM Control Delay (s)	31.1	-	-	8.9	-
HCM Lane LOS	D	-	-	A	-
HCM 95th %tile Q(veh)	1.3	-	-	0.2	-

1: Site Road & Gorge Road E Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.2	0.1	0.0
Total Del/Veh (s)	2.9	2.1	9.0	10.3	23.9	6.4	8.0

2: Balfour Ave & Gorge Road E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.1	0.4	0.5	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.2
Total Del/Veh (s)	54.7	9.1	5.8	28.7	23.0	19.9	19.2	20.0	5.8	14.3	5.1	13.2

2: Balfour Ave & Gorge Road E Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	18.1

3: Washington Ave & Gorge Road E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	11.3	8.0	6.2	0.1	0.1	0.1	0.1	0.1	0.1
Total Del/Veh (s)	56.4	8.8	5.1	34.9	31.1	24.9	19.1	19.3	6.1	17.9	26.5	15.1

3: Washington Ave & Gorge Road E Performance by movement

Movement	All
Denied Del/Veh (s)	5.4
Total Del/Veh (s)	24.7

Total Network Performance

Denied Del/Veh (s)	4.9
Total Del/Veh (s)	45.0

Intersection: 1: Site Road & Gorge Road E

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (m)	3.3	19.2	86.7	18.6
Average Queue (m)	0.5	6.3	28.3	8.9
95th Queue (m)	4.3	20.6	88.4	19.6
Link Distance (m)	94.5		187.9	97.1
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)		39.9		
Storage Blk Time (%)			8	
Queuing Penalty (veh)			5	

Intersection: 2: Balfour Ave & Gorge Road E

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	L	TR	L	TR	L	TR	LTR
Maximum Queue (m)	9.8	54.3	20.0	100.7	8.6	10.0	12.0
Average Queue (m)	2.8	30.4	4.6	82.1	3.0	4.9	3.9
95th Queue (m)	11.0	52.8	19.9	118.0	10.5	11.9	12.0
Link Distance (m)		257.1		94.5	57.4	57.4	268.2
Upstream Blk Time (%)				10			
Queuing Penalty (veh)				94			
Storage Bay Dist (m)	27.0		28.0				
Storage Blk Time (%)		7		39			
Queuing Penalty (veh)		1		6			

Intersection: 3: Washington Ave & Gorge Road E

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	16.6	49.7	19.7	163.1	10.5	17.9
Average Queue (m)	6.7	27.6	5.0	116.8	3.0	6.7
95th Queue (m)	19.4	53.6	19.6	189.9	9.2	17.6
Link Distance (m)		187.9		155.9	160.7	250.1
Upstream Blk Time (%)				16		
Queuing Penalty (veh)				0		
Storage Bay Dist (m)	25.0		25.9			
Storage Blk Time (%)	0	8		37		
Queuing Penalty (veh)	1	2		10		

Network Summary

Network wide Queuing Penalty: 119

1: Site Road & Gorge Road E Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.2	0.1	0.0
Total Del/Veh (s)	3.0	2.1	13.0	12.1	24.4	10.5	9.5

2: Balfour Ave & Gorge Road E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.5	0.4	0.4	1.1	0.3	0.0	0.1	0.1	0.1	0.1		0.1
Total Del/Veh (s)	59.3	9.1	5.9	39.0	24.0	19.3	21.1	12.3	5.3	17.3		13.9

2: Balfour Ave & Gorge Road E Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	19.0

3: Washington Ave & Gorge Road E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.0	6.9	3.0	2.6	0.1	0.1	0.1	0.1	0.2	0.1
Total Del/Veh (s)	53.1	9.2	5.0	29.4	24.4	20.7	18.7	18.0	4.8	19.3	19.8	16.4

3: Washington Ave & Gorge Road E Performance by movement

Movement	All
Denied Del/Veh (s)	2.1
Total Del/Veh (s)	20.5

Total Network Performance

Denied Del/Veh (s)	2.1
Total Del/Veh (s)	43.1

Intersection: 1: Site Road & Gorge Road E

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (m)	5.4	21.6	87.0	21.6
Average Queue (m)	1.1	9.5	36.0	12.7
95th Queue (m)	8.3	25.3	108.2	23.2
Link Distance (m)	94.5		187.9	97.1
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)		39.9		
Storage Blk Time (%)			10	
Queuing Penalty (veh)			7	

Intersection: 2: Balfour Ave & Gorge Road E

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	L	TR	L	TR	L	TR	LTR
Maximum Queue (m)	7.8	54.7	13.5	102.9	8.9	10.5	13.2
Average Queue (m)	2.3	30.4	3.5	85.2	2.3	3.7	4.6
95th Queue (m)	7.9	54.8	15.9	120.4	8.7	11.2	12.9
Link Distance (m)		257.1		94.5	57.4	57.4	268.2
Upstream Blk Time (%)				12			
Queuing Penalty (veh)				120			
Storage Bay Dist (m)	27.0		28.0				
Storage Blk Time (%)		7		40			
Queuing Penalty (veh)		1		6			

Intersection: 3: Washington Ave & Gorge Road E

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (m)	16.4	50.6	20.1	144.9	9.3	13.4
Average Queue (m)	6.6	28.1	4.2	96.9	3.8	5.6
95th Queue (m)	17.6	51.6	18.3	158.2	10.6	14.2
Link Distance (m)		187.9		155.9	160.7	250.1
Upstream Blk Time (%)				5		
Queuing Penalty (veh)				0		
Storage Bay Dist (m)	25.0		25.9			
Storage Blk Time (%)	3	7		35		
Queuing Penalty (veh)	12	2		9		

Network Summary

Network wide Queuing Penalty: 157

APPENDIX B

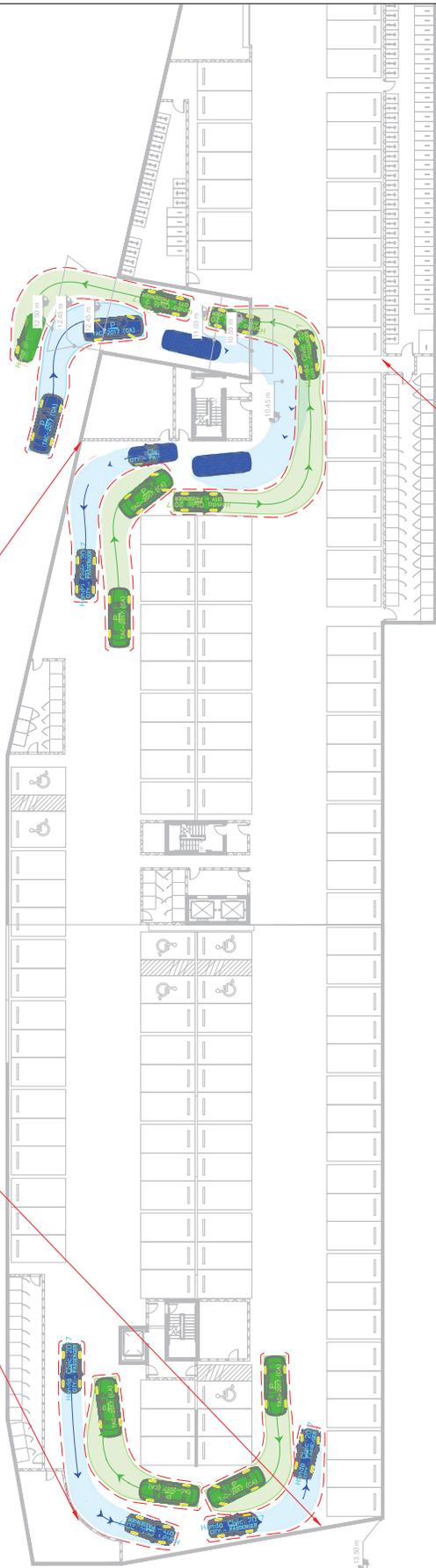
Swept Path Analysis



0.3m buffer for spatial reference

Install convex mirrors

Install convex mirror



Honda Civic 2017

meters	
Width	: 1.80
Track	: 1.78
Lock to Lock Time	: 6.0
Steering Angle	: 35.1

P

meters	
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

[Based on Drawing LP1 from Arcadis received on August 30, 2023]

[Issued for Discussion; not for Construction]

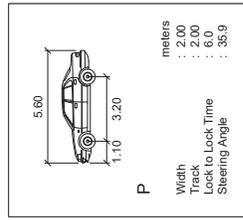
Phase 1 P1 - Passenger Vehicle Circulation



Exhibit B1.1

133,135 Gorge Road
Prepared by CJO/KQ

04-22-0138 August 2023 Scale 1:400 on Ledger



[Issued for Discussion; not for Construction]



Exhibit B2.1 Phase 2 P1 - Passenger Vehicle Circulation

133,135 Gorge Road
Prepared by CJO/KQ

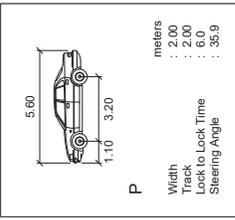
04-22-0138 August 2023 Scale 1:400 on Ledger



[Based on Drawing LP1 from Arcadis received on June 15, 2023]



0.3m buffer for spatial reference



[Based on Drawing LP1 from Arcadis received on June 15, 2023] [Issued for Discussion; not for Construction]

Phase 2 P1 - Parking Stall Manoeuvres - Inbound

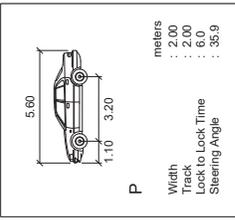


133,135 Gorge Road
Prepared by CJO/KQ

04-22-0138 August 2023 Scale 1:400 on Ledger



0.3m buffer for spatial reference



[Based on Drawing LP1 from Arcadis received on June 15, 2023] [Issued for Discussion; not for Construction]



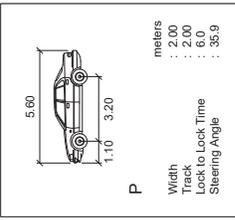
Exhibit B2.2b Phase 2 P1 - Parking Stall Manoeuvres - Outbound

133.135 Gorge Road
Prepared by CJO/KQ

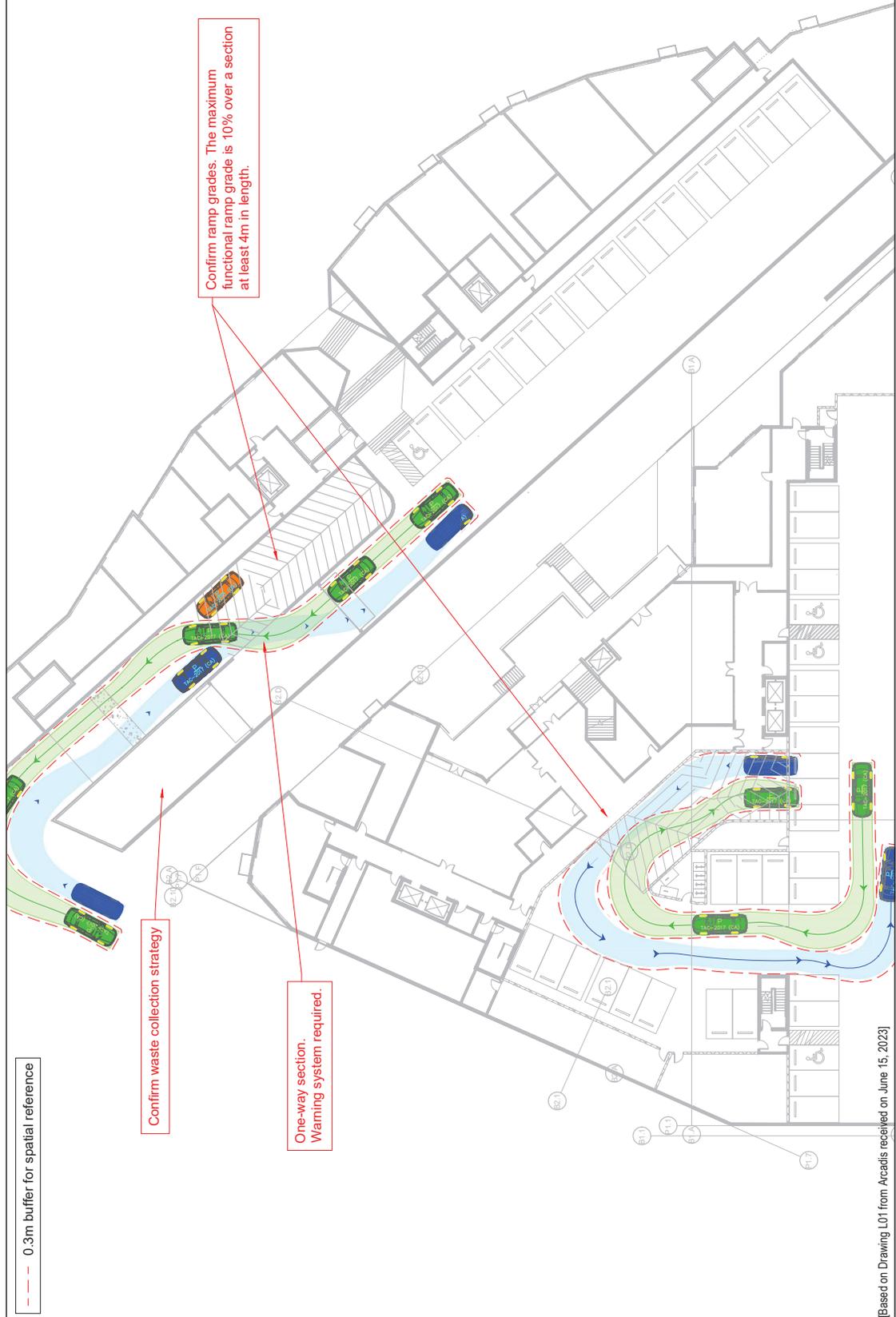
Scale 1:400 on Ledger

August 2023

04-22-0138



[Issued for Discussion; not for Construction]



0.3m buffer for spatial reference

Confirm waste collection strategy

Confirm ramp grades. The maximum functional ramp grade is 10% over a section at least 4m in length.

One-way section. Warning system required.

[Based on Drawing L01 from Arcadis received on June 15, 2023]

Exhibit B2.3 Phase 2 L1 - Passenger Vehicle Circulation

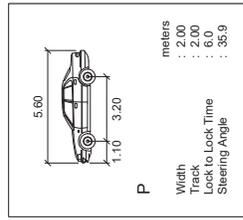


133,135 Gorge Road
Prepared by CJO/KQ

04-22-0138 August 2023 Scale 1:400 on Ledger



0.3m buffer for spatial reference



[Issued for Discussion; not for Construction]

Phase 2 L1 - Parking Stall Manoeuvres - Inbound



Exhibit B2.4a

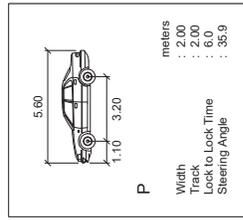
133,135 Gorge Road
Prepared by CJO/KQ

04-22-0138 August 2023 Scale 1:400 on Ledger

[Based on Drawing L01 from Arcadis received on June 15, 2023]



0.3m buffer for spatial reference



	meeters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

[Issued for Discussion; not for Construction]

Phase 2 L1 - Parking Stall Manoeuvres - Outbound



133,135 Gorge Road
Prepared by CJO/KQ

04-22-0138 August 2023 Scale 1:400 on Ledger

[Based on Drawing L01 from Arcadis received on June 15, 2023]