WOODCREST TOWNHOMES, WEST VANCOUVER

Transportation Impact Assessment (TIA)

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1.0 INTRODUCTION

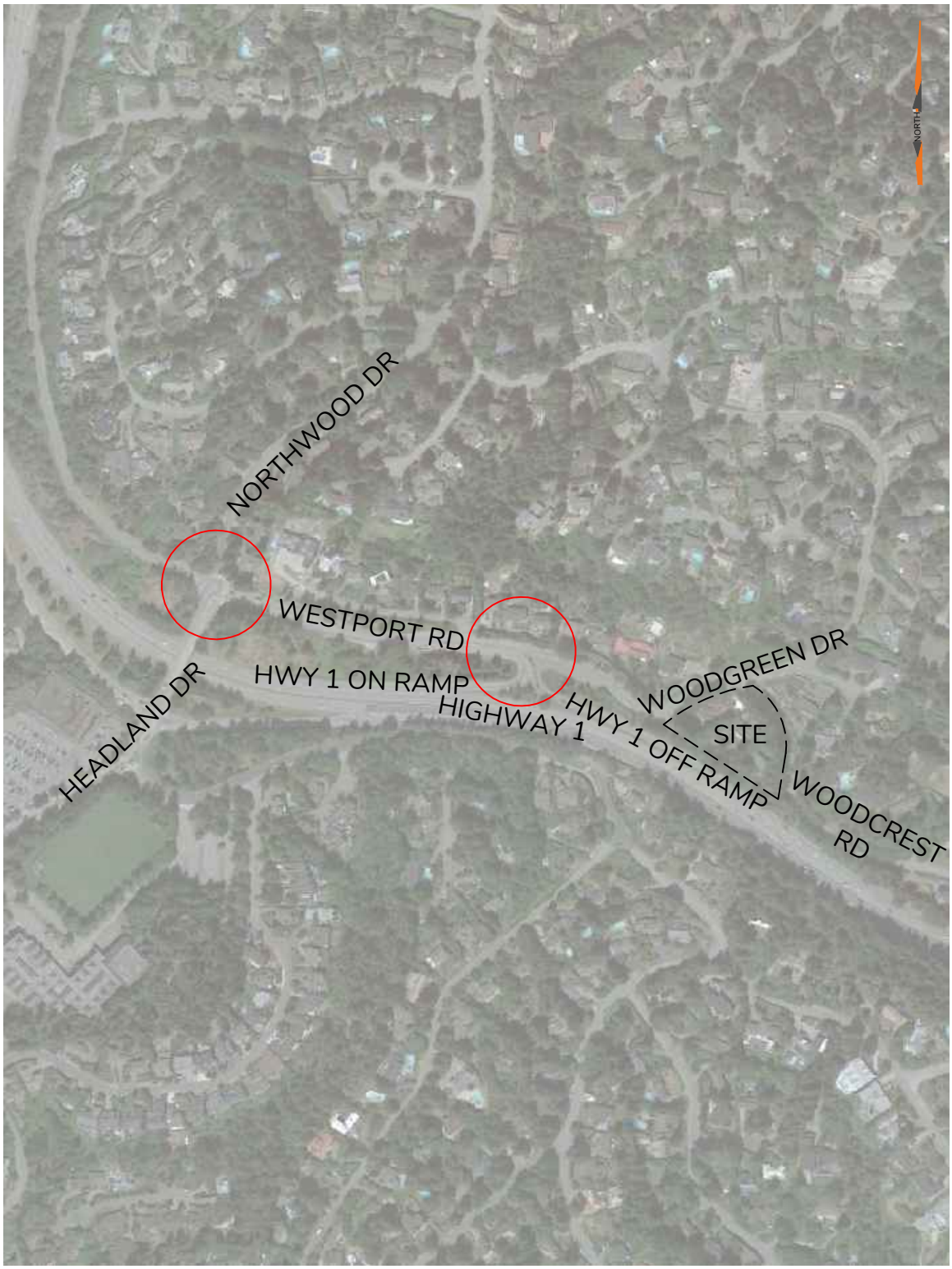
WATT Consulting Group (WATT) was retained by Symphony Group of Companies (Symphony) to prepare a Transportation Impact Assessment (TIA) for the development application of the Woodcrest Townhomes located at 4504 Woodgreen Drive, 4460 & 4450 Woodcrest Road in West Vancouver, BC for the District of West Vancouver (District).

The TIA forms part of the rezoning application (DWV File: 05.1020.01.2021). The information presented in this report reflects the development permit application site plan package by Siegrist Architecture as of January 2023.

1.1 The Site Today

The development site is bound by Woodgreen Drive to the west, Woodcrest Road to the east, and Trans-Canada Highway to the south.

The site location and lot layout are illustrated in **Figure 1.** The existing site is occupied by 3 single family houses.


NORTH
NORTHWOOD DR
WESTPORT RD
HWY 1 ON RAMP
HEADLAND DR
HIGHWAY 1
HWY 1 OFF RAMP
WOODGREEN DR
SITE
WOODCREST RD

1.2 Proposed Development

The proposed development includes 37 townhouse units across 5 buildings. The proposed access to the underground parking is on Woodgreen Drive.

The development will displace the 3 existing single-family houses. The date of occupancy of the development is expected to be in 2028.

1.3 This Report

This report is provided as part of the development permit application being submitted to the District. The report contains the following:

- An overview of the transportation context in the vicinity of the site, including vehicular, pedestrian, cycling, and transit facilities, and area travel characteristics.
- An overview of the proposed development program.
- An assessment of the existing traffic activity patterns and volumes in the study area during the weekday morning and afternoon peak periods.
- An assessment of the trip generation and assignment characteristics of the proposed development.
- A review of vehicular traffic operations at intersections in the area under existing (2023) and opening year (2028) conditions, including an assessment of the operational impacts of the proposed development.
- An assessment on the number of onsite parking stalls and the proposed street parking improvements.
- A review of feasible Transportation Demand Management (TDM) measures with the proposed development for encouraging sustainable transportation modes.

2.0 TRANSPORTATION CONTEXT

2.1 Road Network

The existing road network, lane configuration, and intersection control are illustrated in **Figure 2**. The study area consists of five roadways.

Woodgreen Drive is a collector road under the jurisdiction of the District. It extends north, up to the intersection with Woodley Drive, and south to the intersection of Highway 1 on ramp and off ramp, where it continues west as Westport Road. For most of the study area, Woodgreen Drive has a two-lane cross-section (one lane in each direction) except for at the intersection of Westport Road / Highway 1 on ramp / Highway 1 off ramp, where there is a westbound left-turn lane, making the road a three-lane cross-section. A shared lane sign (vehicles and bicycles) and bike route guide signs are installed between Westport Road / Highway 1 on ramp / Highway 1 off ramp and Woodcrest Road. Curbside parking is not available. Sidewalk is available on the east side of the road.

Westport Road is a collector road under the jurisdiction of the District. Westport Road extends west, connecting with Marine Drive, and to the east, at the intersection of Woodgreen Drive / Highway 1 on ramp / Highway 1 off ramp, where it continues east as Woodgreen Drive. For the majority of the study area, Westport Road has a two-lane cross-section (one lane in each direction), except for at the intersection of Northwood Drive / Headland Drive, where there is a westbound left turn lane, making the road a three-lane cross-section. Painted bike lanes are available west of the intersection of Northwood Drive / Headland Drive on both sides of the road as Westport Road is part of the on-street bike route while bike route guide signs and painted shoulders are provided east of the Northwood Drive / Headland Drive intersection. Curbside parking and sidewalks are not available.

Highway 1 Off ramp / Highway 1 On ramp are highway ramps for Westbound traffic on the Trans-Canada Highway / Upper Levels Highway (Highway 1) under the jurisdiction of the BC Ministry of Transportation and Infrastructure (MoTI). They act as the main access routes from the highway for heavy vehicles accessing Caulfeild Village Shopping Centre.

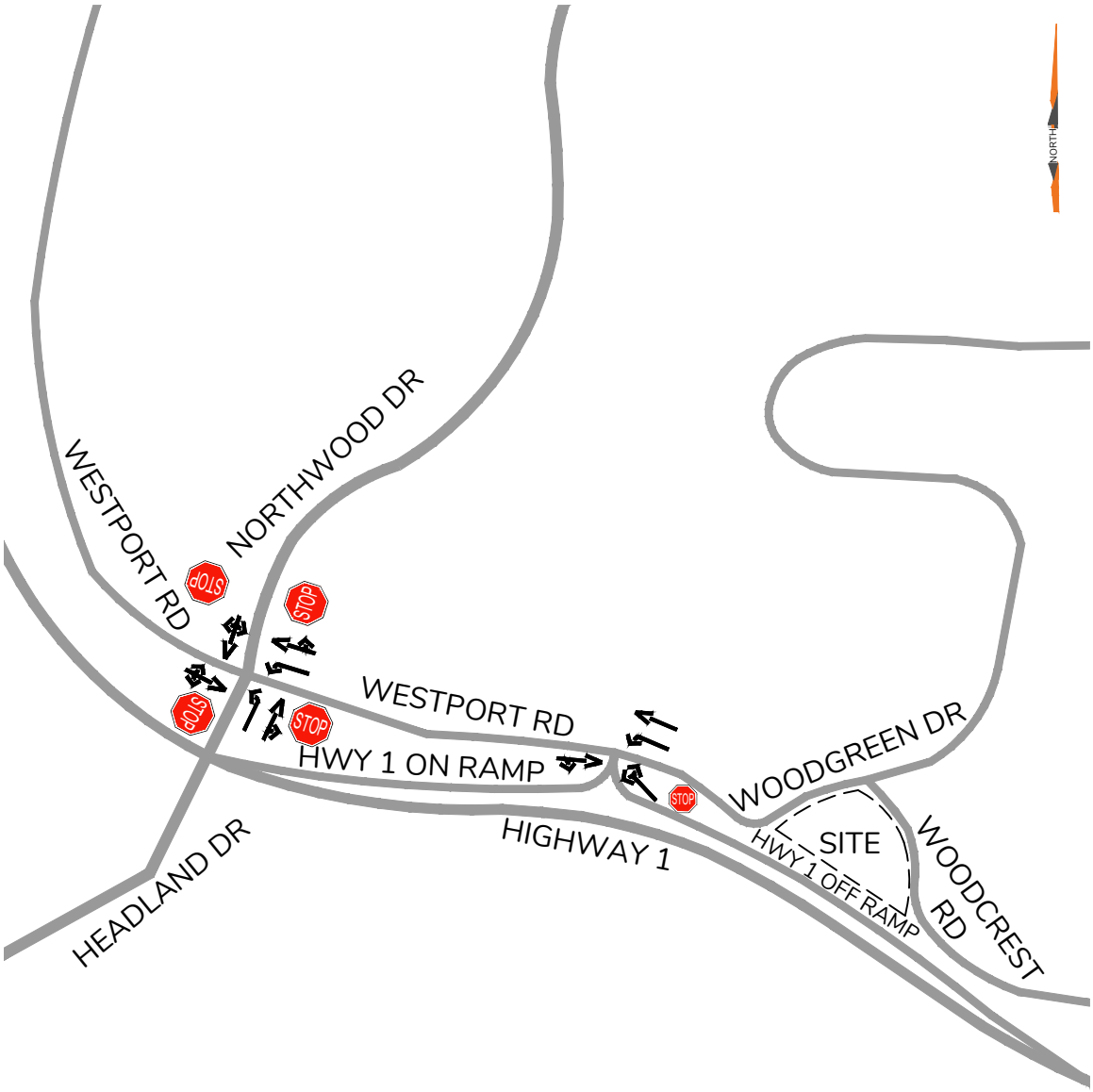
Northwood Drive and Headland Drive are collector roads under the jurisdiction of the District. Northwood Drive extends from Woodley Drive in the north to Westport Road in the south, where it continues south as Headland Drive. In the study area, Northwood Drive has a two-lane cross-section (one lane in each direction). Headland Drive has a three-lane cross-section (one lane in each direction and a dedicated northbound left turn lane). There are no cyclist facilities on both roads, but Headland Drive is part of the designated on-street bike route through the shared lane. Curbside parking is not available. Sidewalks are available on the west side of Northwood Drive, and on the east side of Headland Drive.

2.2 Study Intersections

The study area consists of two intersections.

Woodgreen Drive / Westport Road & Highway 1 on ramp / Highway 1 off ramp is an unsignalized three-legged intersection with stop control for the northbound approach, and free movements for eastbound and westbound approaches. All approaches have one lane for all movements, except a dedicated left turn lane is available for westbound approach.

Westport Road & Northwood Drive / Headland Drive is an unsignalized four-legged intersection controlled by a four-way stop. Eastbound and southbound approaches have one lane for all movements. A dedicated left turn lane is available for westbound and northbound approaches. Channelized right turn lanes with stop control are available for eastbound and northbound approaches. Pedestrian crossings are available on the north and east legs of the intersection.


NORTH
WESTPORT RD
NORTHWOOD DR
STOP
STOP
STOP
WESTPORT RD
HWY 1 ON RAMP
STOP
WOODGREEN DR
HIGHWAY 1
SITE
HWY 1 OFF RAMP
WOODCREST RD
HEADLAND DR

2.3 Transit Network

Table 1 summarizes the transit route in the site vicinity. The development is served by one bus route, which provides connections to key employment, institutional, and recreational locations such as Caulfeild Village Shopping Centre, Rockridge Secondary School, Dundarave, various commercial stores along Marine Drive, before terminating at Park Royal (which also acts as a major transit hub). The existing bus stop is within 100 metres from the development, which is less than a two-minutes walking distance. During AM and PM peak hours, selected trips will travel as far as Downtown Vancouver.

Table 1 - Existing Transit Services

Route	Direction	Walking Distance	Service Frequency (Peak Hours)
253 – Caulfeild / Vancouver / Park Royal	East/West	100 m	30 min

2.4 Cycling Network

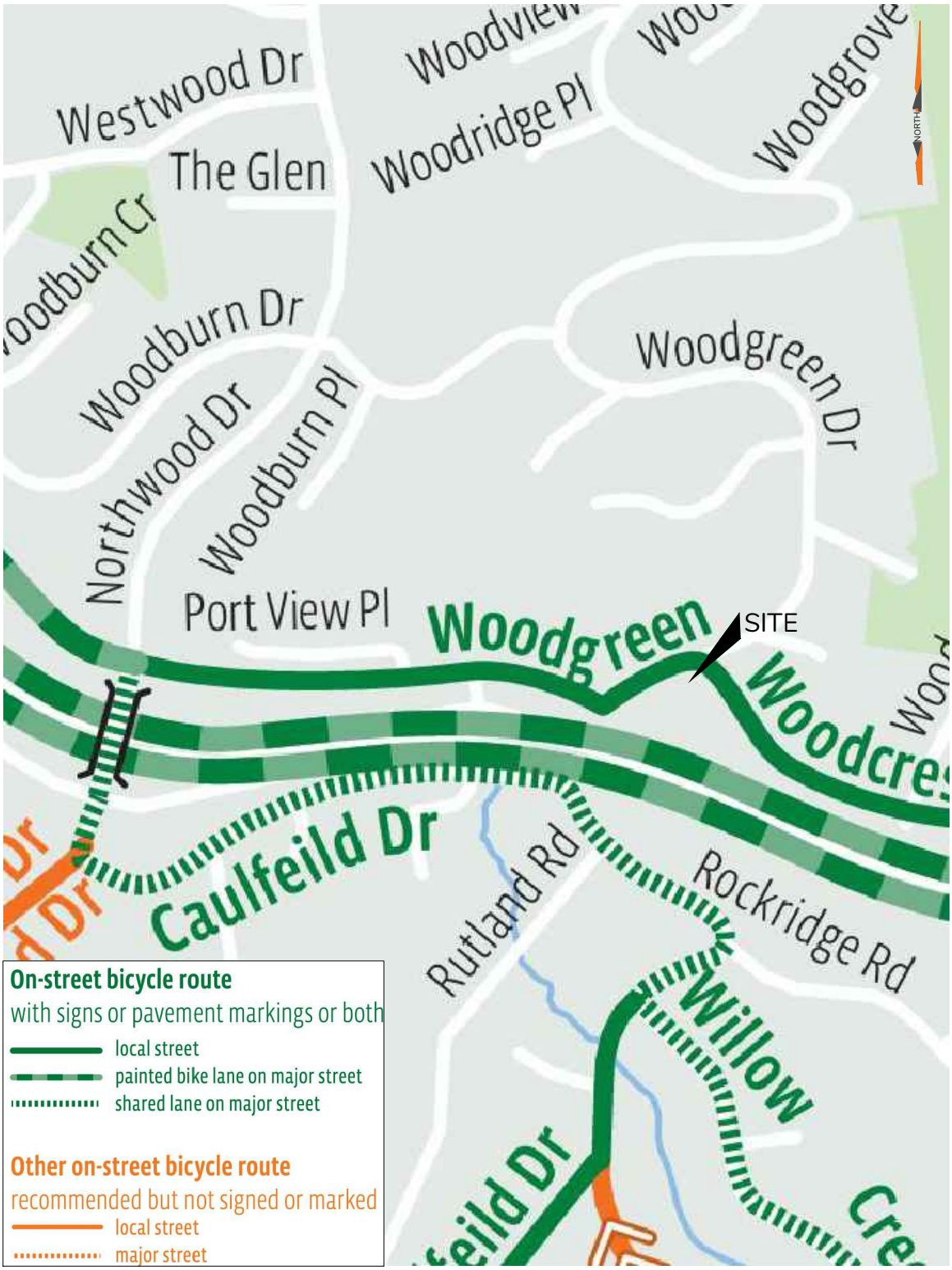
The existing area cycling network is illustrated in **Figure 3**. The site has adequate connection to the network of cycling routes in the District.

Woodgreen Drive and Westport Road are part of the on-street bike route that has signs or pavement markings. They connect users to the signed routes across the District. However, given the elevation changes within the area and much of the bike route through shared lane with vehicles, the bike route may not be comfortable for all cyclists.

2.5 Pedestrian Environment

There is limited walking infrastructure in proximity to the site. Sidewalk is available on the east side of Woodgreen Drive. The sidewalk continues south through an underpass below Upper Levels Highway, before connecting to a pedestrian crossing for further continuity of sidewalks on Caulfeild Drive. However, sidewalks are not available on Woodcrest Road and Westport Road.

The proposed development is planned to include improvements and refurbishments to the existing sidewalk on Woodgreen Drive along the site frontage. As part of the improvement, the sidewalk is planned to be extended onto Woodcrest Road along the site frontage.


Westwood Dr
The Glen
Woodridge Pl
Woodgrove
Woodburn Dr
Woodburn Dr
Northwood Dr
Woodburn Pl
Woodgreen Dr
Port View Pl
Woodgreen
SITE
Caulfeild Dr
Rutland Rd
Rockridge Rd
Willow
On-street bicycle route
with signs or pavement markings or both
local street
painted bike lane on major street
shared lane on major street
Other on-street bicycle route
recommended but not signed or marked
local street
major street

3.0 PROPOSED DEVELOPMENT

3.1 Overview

The architectural and landscape site plans are provided in **Appendix A**.

Table 2 - Development Program

Site Element	Details
Residential Units	37 units
Vehicular Access	Access to the underground parking facility is provided from the proposed driveway on Woodgreen Drive. Access to the surface loading facility is provided from the same proposed driveway.
Cyclist Access	Secure bicycle parking is located underground with elevator access at-grade at Woodcrest Road as well as access using the parking ramp. Short-term bicycle parking is proposed to be provided at-grade along Woodgreen Drive.
Pedestrian Access	Depending on the unit, pedestrian access will be provided through either the internal walkway and the sidewalk along the site's frontage on Woodgreen Drive and Woodcrest Road. The internal walkway can be accessed through the site's frontage on Woodgreen Drive.

4.0 TRAFFIC VOLUMES

4.1 Traffic Analysis Scenarios and Design Periods

Vehicle traffic operational analysis has been undertaken for the weekday morning (AM) and afternoon (PM) peak hour under the following conditions:

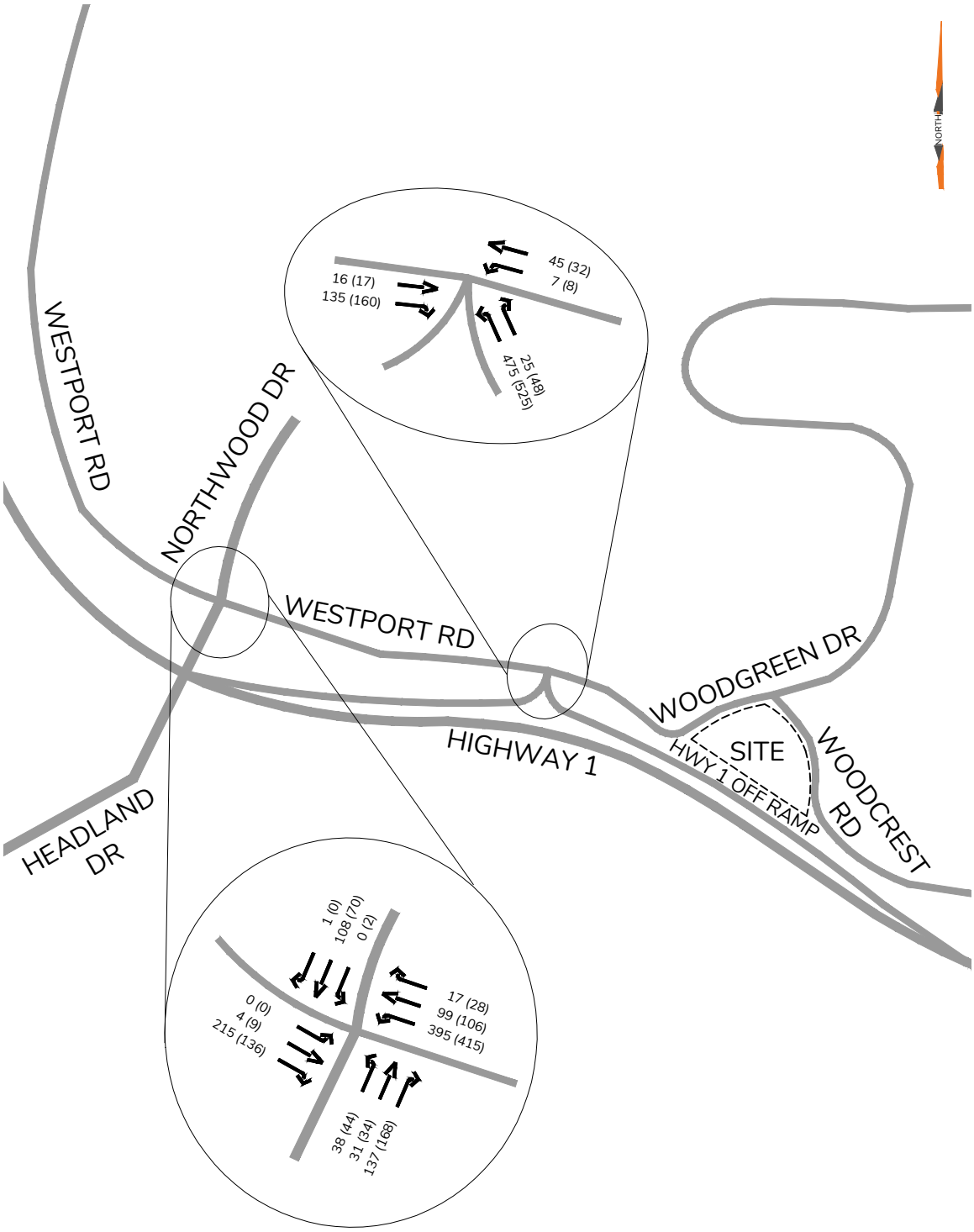
- **Existing traffic:** traffic activity under current conditions.
- **Background traffic:** traffic activity levels in the future, which includes allowances for corridor growth and other background developments.
- **Post-development traffic:** traffic activity levels in the future with the site redeveloped and projected site-generated traffic added to the road network.

Traffic operations are discussed in the following sections for these scenarios:

- Existing conditions (2023)
- Opening day (2028) background conditions
- Opening day (2028) post-development conditions

4.2 Existing Traffic

Turning movement volumes were collected on Tuesday May 30th, 2023 between 7:00AM and 9:00AM to identify the AM peak hour, and 2:30PM to 5:30PM to capture school traffic as well as commuter traffic for the PM peak hour at the study intersections. The AM and PM peak hours were found to be between 8:00AM and 9:00AM, and 4:30PM and 5:30PM respectively. The existing traffic volumes for the weekday AM and PM peak hour are illustrated in **Figure 4**.



- AM PEAK HOUR
(##) - PM PEAK HOUR

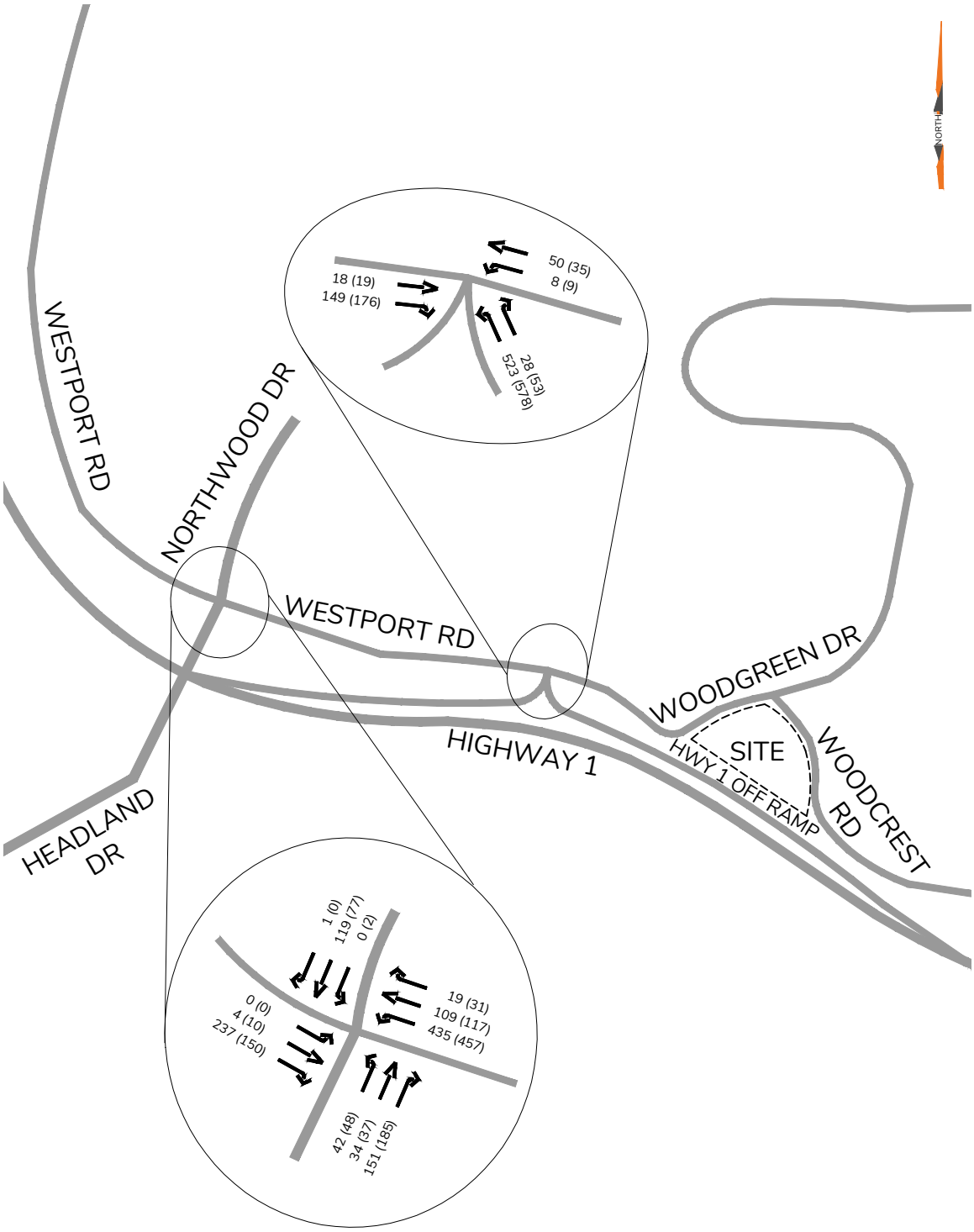
4.3 Background Traffic Volumes

4.3.1 Corridor Growth

Corridor growth for all study roads was forecast using a +2.0% annual linear growth rate applied to the existing 2023 volumes to the 2028 horizon year. This growth would capture background traffic growth and any traffic growth due to adjacent redevelopments.

4.3.2 Background Traffic Volumes

Background traffic volumes are the sum of the existing traffic volumes and corridor growth. Background traffic volumes for the 2028 opening day are illustrated in **Figure 5**.



- AM PEAK HOUR
(##) - PM PEAK HOUR

4.4 Site Traffic Volumes

The weekday peak hour trip generation rates are obtained from Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition. They are then used to estimate the number of site-generated trips for the proposed development. The trip generation rates are summarized in **Table 3**.

Table 3 - Trip Generation Rates

Land Use	Trip Generation Source	Setting	Units	Trip Type	Weekday AM Peak Hour Trips			Weekday PM Peak Hour Trips		
					Rate	In	Out	Rate	In	Out
Townhouse	ITE 220: Multi-family Housing (Low-Rise)	General Urban/ Suburban	Dwelling Units	Vehicles	0.40	24%	76%	0.51	63%	37%
Single-family (Existing)	ITE 210: Single-Family Detached Housing	General Urban/ Suburban	Dwelling Units	Vehicles	0.70	25%	75%	0.94	63%	37%

Based on the vehicle trip generation rates notes above, the number of external vehicle trips expected to be generated by the proposed development are shown in **Table 4**. The proposed development is expected to generate a total of 12 vehicle trips in the AM peak hour and 16 vehicle trips in the PM peak hour. This is equivalent to approximately 1 vehicle trip every 5 minutes in the AM peak hour and approximately 1 vehicle trip every 4 minutes in the PM peak hour.

Table 4 - Trip Generation, External Vehicle Trips

Land Use	Trip Generation Source	Setting	Units	Trip Type	Weekday AM Peak Hour Trips			Weekday PM Peak Hour Trips		
					Total	In	Out	Total	In	Out
Townhouse	ITE 220: Multi-family Housing (Low-Rise)	General Urban/ Suburban	37	Vehicles	15	3	12	19	12	7
Single-family (Existing)	ITE 210: Single-Family Detached Housing	General Urban/ Suburban	3	Vehicles	(3)	(1)	(2)	(3)	(2)	(1)
Net Vehicle Trips					**12**	**2**	**10**	**16**	**10**	**6**

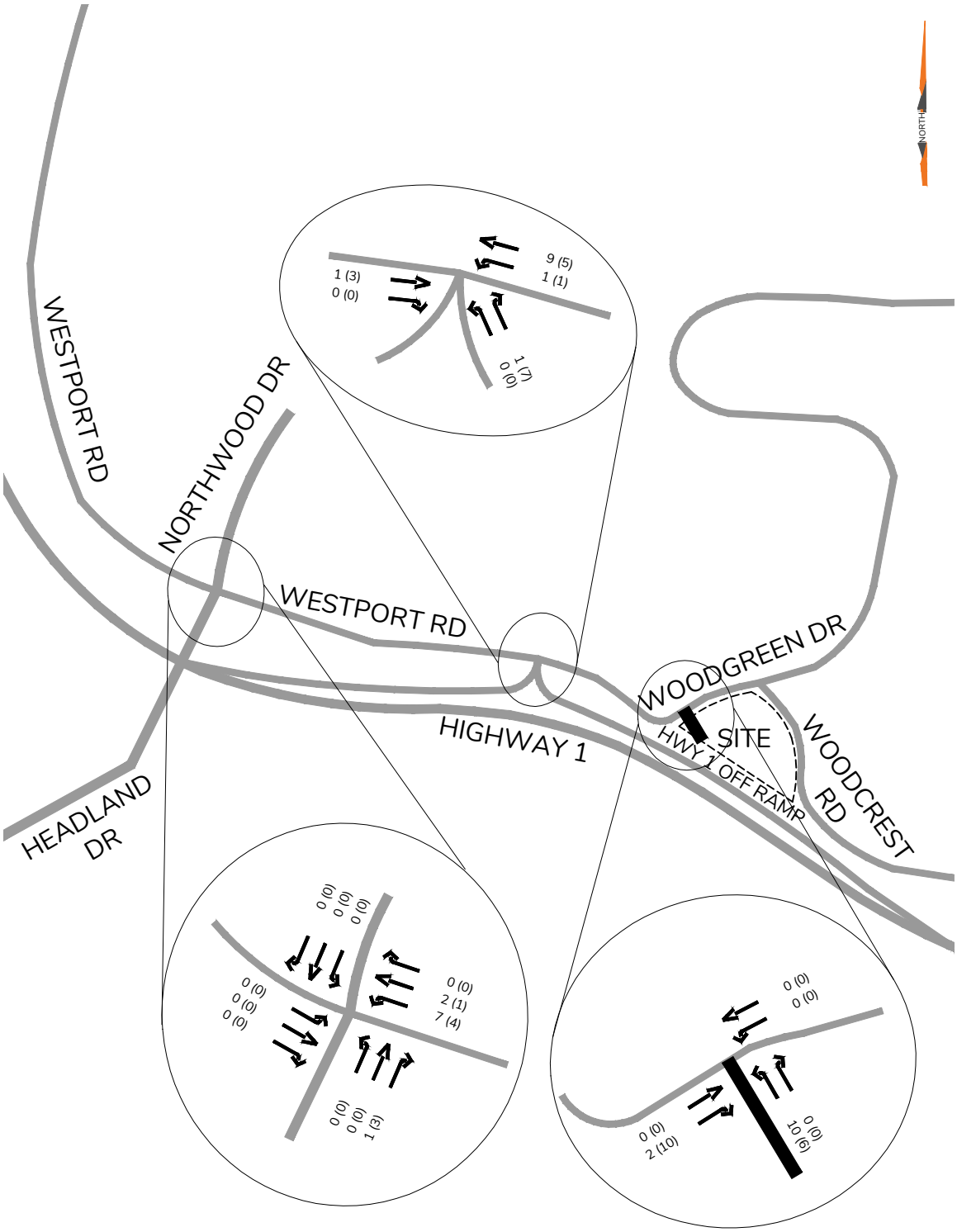
4.4.1 Trip Distribution and Assignment

The trip distribution pattern for site-generated traffic was established based on the existing traffic patterns at each intersection. To be conservative, all site-generated traffic are distributed west of Woodgreen Drive before being distributed at the Trans-Canada Highway Ramps & Woodgreen Drive / Westport Road intersection.

The distribution of inbound and outbound traffic adopted for the proposed development is summarized in **Table 5**. The net new site traffic volumes assigned to the area road network are illustrated in **Figure 6**.

Table 5 – Site Trip Distribution

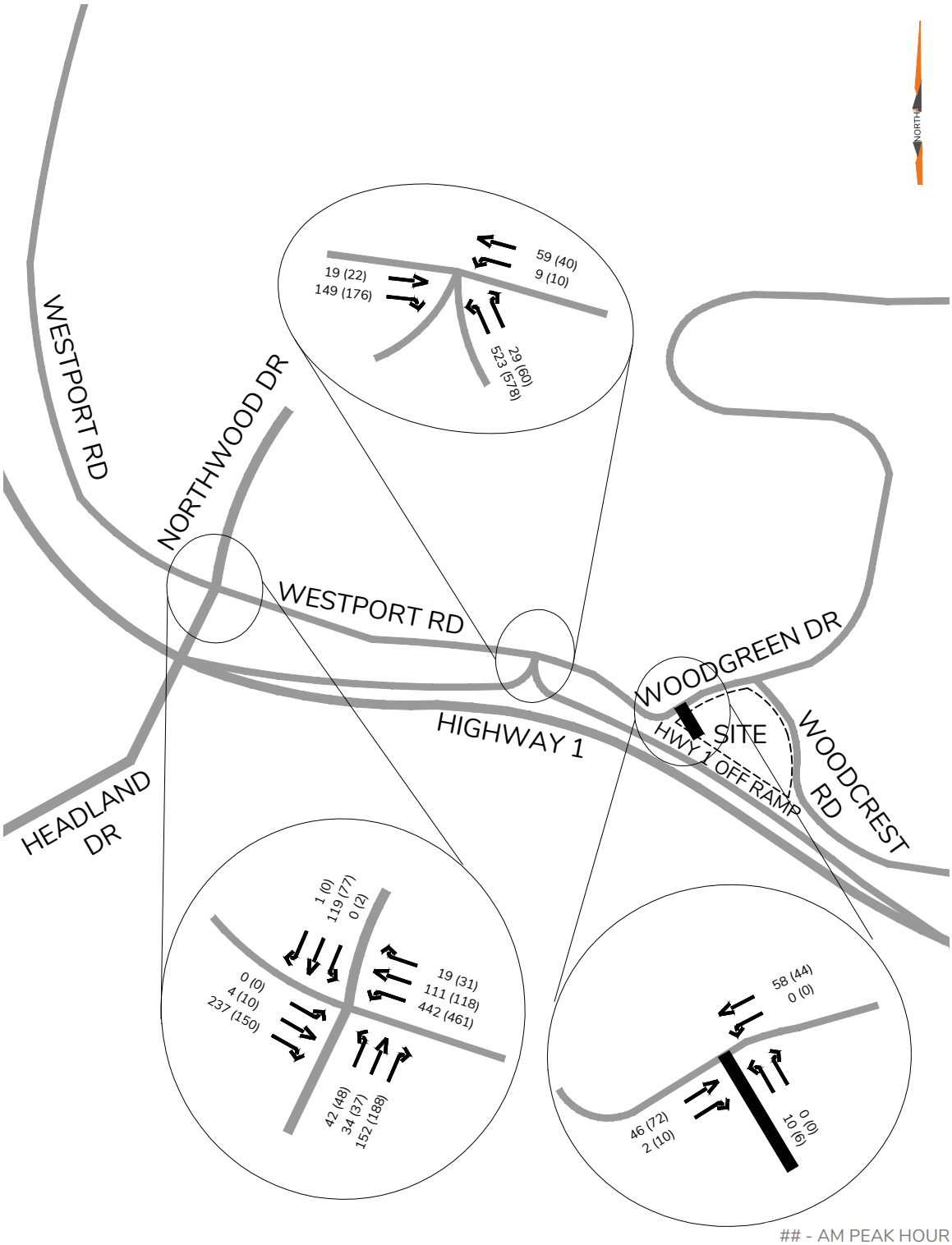
Route	From /To	AM Peak Hour		PM Peak Hour	
		Inbound	Outbound	Inbound	Outbound
Trans-Canada Highway	West	-	13%	-	13%
	East	61%	-	74%	-
Westport Road	West	0%	17%	1%	17%
Northwood Drive	North	0%	3%	0%	4%
Headland Drive	South	39%	67%	25%	66%
Total		**100%**	**100%**	**100%**	**100%**



- AM PEAK HOUR
(##) - PM PEAK HOUR

4.5 Post-Development Traffic Volumes

Post-development traffic volumes are the sum of the background traffic volumes and net new site traffic volumes. Post-development traffic volumes for opening day (2028) are illustrated in **Figure 7**.



- AM PEAK HOUR
(##) - PM PEAK HOUR

5.0 TRAFFIC OPERATIONS ANALYSIS

5.1 Methodology

Analysis of vehicular traffic conditions at the study area intersections was undertaken using Synchro version 11. Synchro and SimTraffic is a two-part traffic modelling software that provides analysis of traffic conditions based on Highway Capacity Manual sixth edition evaluation methodology. A detailed description is provided in **Appendix B**.

5.2 Input and Calibration Parameters

Heavy Vehicle

Heavy vehicle percentages incorporated into the analysis were based on information provided as part of the intersection turning movement counts.

Peak Hour Factor

Peak hour factors (PHF) incorporated into the analysis were calculated from the intersection turning movement counts.

Lane Configuration

Lane configuration mirrored existing conditions for all scenarios within the report.

5.3 Trans-Canada Highway Ramps & Woodgreen Drive / Westport Road

Traffic analysis results for the Trans-Canada Highway Ramps & Woodgreen Drive / Westport Road intersection are summarized in **Table 6**.

Under existing conditions, Trans-Canada Highway ramps & Woodgreen Drive / Westport Road operates at Level of Service (LOS) C or better during the AM and PM peak hours. There are no significant queueing reported for the eastbound and westbound movements. The northbound movements have queues up to 40-metres long, which can be contained within the off-ramp and do not spill back onto the highway.

Under the 2028 background conditions, the eastbound and westbound movements continue to operate at LOS A with minimal queueing. The northbound movements drop to LOS D with a 33.4 seconds/vehicle delay, very close to the 35 seconds/vehicle delay threshold for LOS E. The 95th percentile queues are up to 65-metres long. The queue, however, can still be contained within the off-ramp and does not spill back onto the highway.

The addition of development traffic for the 2028 post-development scenario does not affect the LOS for eastbound and westbound movements. Although the northbound movements drop to LOS E during the AM peak hour, the actual difference in the delay from background conditions is approximately three seconds. Therefore, development traffic does not cause any significant operational impacts at this intersection. The northbound queues are expected to be similar to that of background conditions in the same horizon year and are not expected to spill onto the highway.

Table 6 – Trans-Canada Highway Ramps & Woodgreen Drive / Westport Road Traffic Operations

Key Movement	Existing (2023)			Background			Post Development		
	LOS	Delay (s)	Queue (m)	LOS	Delay (s)	Queue (m)	LOS	Delay (s)	Queue (m)
2023/28 Horizon Year (Opening Day)									
EBTR	A (A)	0 (0)	0 (0)	A (A)	0 (0)	0 (0)	A (A)	0 (0)	0 (0)
WBL	A (A)	7.6 (7.6)	5 (0)	A (A)	7.6 (7.6)	5 (5)	A (A)	7.6 (7.6)	5 (5)
WBT	A (A)	0 (0)	0 (0)	A (A)	0 (0)	0 (0)	A (A)	0 (0)	0 (0)
NBLR	C (C)	23.5 (19.7)	35 (40)	D (D)	33.4 (25.4)	45 (65)	E (D)	36.6 (27.5)	40 (60)

Notes: XX (XX) = AM (PM); # = storage length; 95th percentile queue lengths are rounded to the nearest 5 metres.

5.4 Headland Drive / Northwood Drive & Westport Road

Traffic analysis results for the Headland Drive / Northwood Drive & Westport Road intersection are summarized in **Table 7**.

Table 7 - Headland Drive / Northwood Drive & Westport Road Traffic Operations

Key Movement	Existing (2023)			Background			Post Development		
	LOS	Delay (s)	Queue (m)	LOS	Delay (s)	Queue (m)	LOS	Delay (s)	Queue (m)
2023/28 Horizon Year (Opening Day)									
EBLTR	C (B)	17.5 (12.6)	25 (20)	C (B)	20.2 (13.6)	25 (20)	C (B)	20.3 (13.6)	25 (20)
WBL	F (F)	59.5 (53.9)	35 (35)	F (F)	101.4 (90.6)	40 (35)	F (F)	103.1 (94.5)	40 (35)
WBTR	B (B)	11.4 (11.1)	20 (20)	B (B)	12.2 (11.9)	35 (30)	B (B)	12.2 (11.9)	40 (30)
NBL	B (B)	11.9 (11.5)	15 (15)	B (B)	12.5 (12.0)	15 (15)	B (B)	12.5 (12.0)	15 (15)
NBTR	B (B)	14.8 (14.9)	20 (20)	C (C)	16.4 (16.7)	20 (25)	C (C)	16.4 (16.9)	20 (20)
SBLTR	B (B)	14.6 (13.4)	20 (15)	C (B)	15.8 (14.2)	20 (20)	C (B)	15.8 (14.2)	20 (20)

Notes: XX (XX) = AM (PM); # = storage length; 95th percentile queue lengths are rounded to the nearest 5 metres.

Under existing conditions, Headland Drive / Northwood Drive & Westport Road operates at LOS C or better during the AM and PM peak hours, except for the westbound left movement which operates at LOS F. Queues of up to 35 metres are reported for all movements, which can be contained in their respective storage lane and do not spill back into subsequent intersections.

Under 2028 background conditions, the intersection continues to operate at LOS C or better during the AM and PM peak hours, except for westbound left movements which is at a LOS F with increased delay. Queues of up to 40 metres are reported for all movements, which can still be contained in their respective storage lanes and do not spill back into subsequent intersections.

For the 2028 post-development scenario, LOS C or better is reported for all movements during the AM and PM peak hours, except for the westbound left movements which is observed to be at a LOS F due to background traffic and no additional impact is created by development traffic. Similar queue lengths are reported as in background conditions for the same horizon year.

The addition of the development traffic for the 2028 post-development scenario does not result in any significant changes to LOS or queuing. However, based on the existing conditions, the District may mitigate the delay experienced by westbound left movements by signalizing the intersection. This can help improve the traffic operations at the intersection, potentially with LOS C or better during the AM and PM peak hours for all movements. **Table 8** shows the traffic operations at the intersection when mitigated with a signal.

Table 8 - Headland Drive / Northwood Drive & Westport Road Traffic Operations Mitigation

Key Movement	Existing (2023)			Post Development (2028)		
	LOS	Delay (s)	Queue (m)	LOS	Delay (s)	Queue (m)
2023/28 Horizon Year (Opening Day)						
EBLTR	C (B)	27.8 (18.0)	30 (20)	C (B)	30.3 (18.4)	35 (20)
WBL	B (B)	19.9 (19.7)	45 (45)	C (C)	29.4 (27.5)	45 (45)
WBTR	A (A)	6.4 (7.1)	40 (35)	A (A)	6.5 (7.2)	55 (60)
NBL	C (B)	20.9 (15.6)	15 (15)	C (B)	21.3 (15.7)	20 (20)
NBTR	C (C)	22.8 (21.2)	30 (30)	C (C)	23.8 (22.6)	30 (35)
SBLTR	B (B)	19.2 (15.8)	30 (20)	B (B)	19.4 (15.9)	25 (25)

Notes: XX (XX) = AM (PM); # = storage length; 95th percentile queue lengths are rounded to the nearest 5 metres.

5.5 Site Access & Woodgreen Drive

Traffic analysis results for the Site Access & Woodgreen Drive intersection are summarized in **Table 9**.

Under the 2028 post-development scenario, all movements operate at LOS A during the AM and PM peak hours. Queues of up to 10 metres (approximate length of 2 cars long) are reported for the site access, which is not significant. No mitigations will be required as a result of development traffic based on forecast operations.

Table 9 – Site Access & Woodgreen Drive Traffic Operations

Key Movement	Existing (2023)			Background			Post Development		
	LOS	Delay (s)	Queue (m)	LOS	Delay (s)	Queue (m)	LOS	Delay (s)	Queue (m)
2023/28 Horizon Year (Opening Day)									
EBTR	-	-	-	-	-	-	A (A)	0 (0)	0 (0)
WBLT	-	-	-	-	-	-	A (A)	0 (0)	0 (0)
NBLR	-	-	-	-	-	-	A (A)	9.1 (9.2)	10 (5)

Notes: XX (XX) = AM (PM); # = storage length; 95th percentile queue lengths are rounded to the nearest 5 metres.

6.0 SITE ACCESS REVIEW

Access to the site is provided from a driveway that connects the site to Woodgreen Drive. The Transportation Association of Canada (TAC) *Geometric Design Guide for Canadian Roads* (2017) provides recommended minimum intersection sight distances for drivers turning onto a road from a stop-controlled intersection. For this study, the design vehicle used was a passenger vehicle and the design speed was set to 30 km/h in consideration of the advisory speed placed in advance of the horizontal curve on Woodgreen Drive. Drivers should be provided with 65 metres of sight distance in each direction. This requirement is met in both directions.

The TAC *Geometric Design Guide for Canadian Roads (2017)* provides suggested minimum corner clearances to accesses for residential driveways on local or collector roads and adjacent intersections to be 5 metres. This requirement is met from adjacent intersections with Woodcrest Road and Highway 1 ramps.

7.0 ONSITE & STREET PARKING REVIEW

The onsite parking supply for the proposed development is reviewed by comparing to the applicable bylaw. On-street parking will not be available at the site frontage. As a result, visitor parking spaces are included. Since the bylaw does not have a requirement for visitor parking, the District is seeking a recommended visitor parking rate. The recommended rate is based on research conducted in the 2018 Regional Parking Study for Metro Vancouver. **Table 10** summarizes the bylaw required and recommended parking supply, and proposed parking supply for the development.

Table 10 - Parking Required & Proposed Supply

Land Use	Bylaw / Study Reference	User Type	Required / Recommended Parking		Proposed Parking	
			Rate	Supply	Rate	Supply
Townhouse	Zoning Bylaw for RM2 Multiple Dwelling Zone 2	Vehicles (Residents)	1.5/unit	56	1.78/unit	66
	Bylaw No. 4662, Section 142.04(2)	Small Car Parking	30% max.	-	24%	16
	Bylaw No. 4662, Section 142.09(1)	Disability Parking	-	1	-	4
	Bylaw No. 4662, Section 143.01(3)	Secure Bicycle Parking	1.5/unit	56	2.0/unit	74
	Bylaw No. 4662, Section 143.02(2)	Short-Term Bicycle Parking	0.2/unit	8		
	2018 Regional Parking Study for Metro Vancouver	Visitor Parking	0.1/unit	4	0.24/unit	9

The proposed parking supply for the development satisfies all the bylaw and the recommended requirements for all user types.

8.0 TDM REVIEW

Although the proposed development is meeting the bylaw requirements for vehicle parking, a number of potential TDM measures can be incorporated into the proposed development to encourage people to travel via sustainable, non-auto modes. This can, in turn, reduce the number of vehicle trips and improve the capacity, delay, and queuing at the nearby intersections in the long-term horizon. **Table 11** are some TDM measures for consideration to promote use of sustainable transportation modes for future residents and visitors on site.

Table 11 - Potential TDM Measures

TDM Measures	Example
Improved Access to Secure Bicycle Parking	Secure bicycle parking at-grade
Bicycle Maintenance Facilities	Secure area within the building with proper drainage where sufficient workspace with bicycle maintenance tools and supplies are readily available on a permanent basis and offered in good condition to encourage bicycling. Tools may include those necessary for fixing a flat tire, adjusting a chain, and performing other basic bicycle maintenance, such as a bicycle pump, wrenches, a chain tool, lubricants, tire levers, hex keys/Allen wrenches, screwdrivers, and spoke wrenches.
Enhanced Visitor Bicycle Parking Spaces	Well-lit, secure, indoor facilities and excellent access design with respect to lighting, finishes, grades, convenience
Multimodal Wayfinding Signage	Provide multimodal wayfinding signage that can withstand weather elements (e.g., wind, rain) in key locations so that residents and visitors can easily locate transportation facilities such as bike parking and bike maintenance facilities.

9.0 CONCLUSIONS

The proposed development will replace the existing 3 single-family detached homes with a townhouse consisting of 37 dwelling units across 5 buildings.

Under existing conditions (2023) of the proposed development, the Trans-Canada Highway Ramps & Westport Road / Woodgreen Drive intersection operates at LOS C or better. Queues are up to 40-metres long for the highway off-ramp; however, it can be contained within the off-ramp and do not spill out onto the highway. The Westport Road & Headland Drive / Northwood Drive intersection operates at LOS C or better, except for westbound left movement which operates at LOS F. Queues are up to 35-metres long.

Under the opening day background conditions (2028) of the proposed development, similar performances are reported for both intersections. The northbound movements at Trans-Canada Highway Ramps & Westport Road / Woodgreen Drive intersection drop to LOS D at 33.4 seconds/vehicle delay (almost to LOS E). Queues are up to 65-metres long for the highway off-ramp. However, this queue can still be contained within the off-ramp and do not spill out onto the highway. The Westport Road & Headland Drive / Northwood Drive intersection continues to operate at LOS C or better, except for westbound left movement which is a LOS F. Queues are up to 40-metres long.

The proposed redevelopment is expected to generate 12 and 16 vehicles trips in the AM and PM peak hours respectively which is equivalent to approximately 1 vehicle trip every 5 minutes in the AM peak hour and approximately 1 vehicle trip every 4 minutes in the PM peak hour. Under the opening day post-development conditions (2028), the northbound movements at the Trans-Canada Highway Ramps & Westport Road / Woodgreen Drive intersection operates at LOS E or better. This is expected as this movement is almost operating at a LOS E under background traffic conditions. The actual increase in the delay with development traffic is approximately three seconds, which is minimal. The increase in vehicle queueing at the highway off-ramp is also minimal and is not expected to spill out onto the highway. For the Westport Road & Headland Drive / Northwood Drive intersection, there are no changes to both the LOS and the queueing. Performance at the site access is acceptable, with the Woodgreen Drive & Site Access intersection forecasted to operate at LOS A.

The addition of development-related traffic results in minimal to no change to traffic operations as measured by capacity, delay, and queues on opening day for the study intersections. However, the District may upgrade the existing Westport Road & Headland Drive / Northwood Drive intersection from a four-way stop controlled intersection into a signalized intersection to mitigate delays for westbound left movements. This can help improve the traffic operations at the intersection with LOS C or better during the AM and PM peak hours for all movements. A continuous effort on modal shift can also help to reduce capacity and delay issues. Some feasible TDM measures are suggested for the development site to help encourage sustainable travel behaviour.

The site is served by one bus route, with the transit stop located within 100 metres of the development. There is limited walking infrastructure in the proximity to the site. However, the proposed development will include improvements to the existing sidewalk on Woodgreen Drive, and extension onto Woodcrest Road. The site has adequate connection to the network of cycling routes in the District.

The proposed parking supply satisfies the bylaw requirements and the recommended rate for visitor parking.

10.0 RECOMMENDATIONS

It is recommended that the District:

1. Consider upgrading the four-way stop control at the Westport Road & Headland Drive / Northwood Drive intersection into a traffic signal control.

It is recommended that the Applicant:

1. Provide a sidewalk along the site frontages on Woodgreen Drive and on Woodcrest Road.
2. Consider providing the suggested feasible TDM measures.

APPENDIX A: SITE PLAN

WOODGREEN DRIVE

WOODCREST ROAD

UPPER LEVEL HIGHWAY

BUILDING 1
4 STOREY BUILDING
BUILDING COVERAGE 4,631.86 sq ft

BUILDING 2
4 STOREY BUILDING
BUILDING COVERAGE 4,631.86 sq ft

BUILDING 3
3 STOREY BUILDING
BUILDING COVERAGE 1,811.95 sq ft

BUILDING 4
4 STOREY BUILDING
BUILDING COVERAGE 3,328.74 sq ft

BUILDING 5
4 STOREY BUILDING
BUILDING COVERAGE 3,328.74 sq ft

BUILDING 6
1 STOREY W/ ROOF DECK
Area 1,843.29 sq ft

LOADING

PARKADE RAMP

ACCESS EL. 518FT

4.50 4.5m SETBACK

BUILDING SETBACK 5.01

BUILDING SETBACK 5.32

BUILDING SETBACK 4.75

BUILDING SETBACK 4.64

BUILDING SETBACK 4.97

BUILDING SETBACK 4.50

BUILDING SETBACK 5.74

BUILDING SETBACK 5.28

BUILDING SETBACK 3.82

BUILDING SETBACK 4.35

BUILDING SETBACK 2.99

BUILDING SETBACK 2.99

1 Site Plan
SCALE: 1/16" = 1'-0"

SYMPHONY HOMES LIMITED

Siegrist ARCHITECTURE

1/16" = 1'-0"
January 6, 2023
DP Application

Site Plan

A-1.200

APPENDIX B: SYNCHRO BACKGROUND

SYNCHRO MODELLING SOFTWARE DESCRIPTION

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

SimTraffic integrates established driver behaviours and characteristics to simulate actual conditions by randomly "seeding" or positioning vehicles travelling throughout the network. The simulation is run ten times (ten different random seedings of vehicle types, behaviours and arrivals) to obtain statistical significance of the results.

Levels of Service

Traffic operations are typically described in terms of levels of service, which rates the amount of delay per vehicle for each movement and the entire intersection. Levels of service range from LOS A (representing best operations) to LOS E/F (LOS E being poor operations and LOS F being unpredictable/disruptive operations). LOS E/F are generally unacceptable levels of service under normal everyday conditions. A LOS C or better is considered acceptable operations, while D is considered to be on the threshold between acceptable and unacceptable operations. Operations will typically need to operate at LOS C or better for through movements and LOS E or better for other traffic movements with lower order roads.

The hierarchy of criteria for grading an intersection or movement not only includes delay times, but also takes into account traffic control type (stop signs or traffic signal). For example, if a vehicle is delayed for 19 seconds at an unsignalized intersection, it is considered to have an average operation, and would therefore be graded as an LOS C. However, at a signalized intersection, a 19 second delay would be considered a good operation and therefore it would be given an LOS B. The table below indicates the range of delay for LOS for signalized and unsignalized intersections.

Table B1 – LOS Criteria by Intersection Traffic Control

Level of Service (LOS)	Unsignalized Intersection Average Vehicle Delay (sec/veh)	Signalized Intersection Average Vehicle Delay (sec/veh)
A	0 – 10	0 – 10
B	> 10 – 15	> 10 – 20
C	> 15 – 25	> 20 – 35
D	> 25 – 35	> 35 – 55
E	> 35 – 50	> 55 – 80
F	> 50	> 80