



LYNN VALLEY ROAD ACTIVE
TRANSPORTATION
IMPROVEMENTS PHASE 2

EXISTING CONDITIONS
TECHNICAL REPORT

April 19, 2023

URBAN
S Y S T E M S

Suite 405, 9900 King George Blvd., Surrey, BC V3T 0K9 | T: 604-953-6500

CONTACT: Allison Clavelle, P.Eng.
E: alclavelle@urbansystems.ca

PREPARED FOR:

District of North Vancouver
355 West Queens Road
North Vancouver, BC V7N 4N5

PREPARED BY:

Urban Systems Ltd.

Suite 405, 9900 King George Blvd., Surrey, BC V3T 0K9 | T: 604-953-6500

This is a copy of the signed and sealed final report that has been delivered to the District of North Vancouver.

Fujiou Lu, EIT

Allison Clavelle, P.Eng.
Engineer of Record

File: 1333.0054.03

This report is prepared for the sole use of the District of North Vancouver]. No representations of any kind are made by Urban Systems Ltd. or its employees to any party with whom Urban Systems Ltd. does not have a contract. © 2023 URBANSYSTEMS®.

CONTENTS

1.0 INTRODUCTION	1
2.0 BACKGROUND	1
2.1 PROJECT DESCRIPTION	1
2.2 STUDY PROCESS	3
3.0 EXISTING CONTEXT	4
3.1 LAND USE CONTEXT AND DESTINATIONS	4
3.2 NETWORK CHARACTERISTICS	6
3.2.1 ROAD CHARACTERISTICS	8
3.2.2 GRADE REVIEW	9
3.2.3 TRANSIT SERVICE & FACILITIES	11
3.3 TRAVEL PATTERNS	13
3.3.1 MODE SHARE	13
3.3.2 PARK USE DATA	14
3.3.3 CORRIDOR AND INTERSECTION VOLUMES	17
3.3.4 TRANSIT DATA	19
3.4 SAFETY & INTERSECTION OPERATIONS	21
3.4.1 SPEED	21
3.4.2 HISTORICAL COLLISIONS	23
3.4.3 INTERSECTION TRAFFIC OPERATIONS	24
3.5 PARKING	25
4.0 OPPORTUNITIES & CHALLENGES	27
5.0 CONCLUSION AND NEXT STEPS	28

APPENDICES

APPENDIX A: GRADE PROFILES

APPENDIX B: BUS STOP PHOTOGRAPHS

APPENDIX C: COLLISION MAPS

APPENDIX D: PARKING UTILIZATION DAILY PROFILES

TABLES

Table 1: Grade Review Summary	10
Table 2: District of North Vancouver Mode Share (2011 and 2017 TransLink Trip Diary).....	13
Table 3: District of North Vancouver Mode Share (2019 and 2021 North Shore Travel Survey)	13
Table 4: Table X: Zone 2 (DNV Central) Mode Share (2019 and 2021 North Shore Travel Survey)	14
Table 5: Existing Overall Intersection Level of Service Summary.....	24
Table 6: On-Street Parking Capacity Summary (May 2021).....	26

FIGURES

Figure 1: Lynn Valley Active Transportation Project Policy Guidance.....	2
Figure 2: Lynn Valley Road Active Transportation Improvements Project Extents	2
Figure 3: LVRAT Project Phase 2 Timeline.....	3
Figure 4: Key Destinations.....	5
Figure 5: Road Classification	7
Figure 6: Grade Review Route Options.....	10
Figure 7: Bus Routes and Stop Locations (TransLink Interactive System Map).....	12
Figure 8: Zone 2 (DNV Central) Boundaries (2019 and 2021 North Shore Travel Survey)	14
Figure 9: Cycling Access Ratings Map (Alternative Transportation Study Part I: Access Inventory)	15
Figure 10: Transit Access Ratings Map (Alternative Transportation Study Part I: Access Inventory)	16
Figure 11: Peak Hour Corridor Motorized Vehicle Volumes (May 2021).....	18
Figure 12: Peak Hour Corridor Bicycle Volumes (May 2021 Intersection Counts).....	18
Figure 13: Average Daily Boardings (Fall 2021)	19
Figure 14: Average Daily Alightings (Fall 2021).....	20
Figure 15: Corridor 85 th Percentile Speeds (May 2021).....	22
Figure 16: Number of Collisions by Location (2007-2017)	23
Figure 17: On-street Parking Utilization Index Map.....	26

1.0 INTRODUCTION

The District of North Vancouver (District) is working to build a complete network of active transportation routes that connect Town Centres to key destinations and provide safe and comfortable travel options for all people. As the District works to plan and design these connections, there is an important opportunity to review the existing transportation network operations, characteristics, opportunities, and challenges around and between key destinations.

The District is currently undertaking the Lynn Valley Road Active Transportation Improvements Phase 2 (Peters Road to Dempsey Road) (LVRAT2). The goal of this project is to create a street design that is safer and more comfortable for people who live in the area, and for those who walk, bike, roll, drive or take public transit.

Lynn Valley Road between Peters Road and Dempsey Roads serves local residents and businesses, as well as visitors to destination parks. The District has heard many concerns from residents and road users about this stretch of road as it is today, including inadequate comfort and safety for people who walk, roll, or take transit as well as parking pressures. LVRAT2 will consider public input, along with technical analysis of existing conditions to develop future options to connect Lynn Valley to the Lynn Valley Headwaters and to improve safety and comfort for people travelling by all modes in this area of the District.

This report describes the technical analysis of existing conditions that will inform options development.

2.0 BACKGROUND

This section provides background information about the project, historic studies and policy, and summarizes the study process.

2.1 PROJECT DESCRIPTION

The Lynn Valley neighbourhood is located north of Highway 1, east of Lonsdale, and west of Lynn Creek within the District of North Vancouver. The neighbourhood includes Lynn Valley Town Centre which is one of five town and village centres identified in the Official Community Plan (OCP). The Lynn Valley neighbourhood also features natural areas and both local and regional parks.

As identified in **Figure 1**, there are a number of existing policy documents and directions that inform transportation planning and options development in the Lynn Valley Area. The Lynn Valley Road Active Transportation Improvements project is aligned with the District of North Vancouver's goals to realize a walking, rolling, cycling, transit, and driving network that will nurture healthier and safer communities, help mitigate the impacts of climate change, and makes use of partner funding for improving infrastructure, as outlined in the policy documents identified in **Figure 1**. This connection is identified as one of Council's priority routes and is listed as a priority action in Council's approved OCP Action Plan.

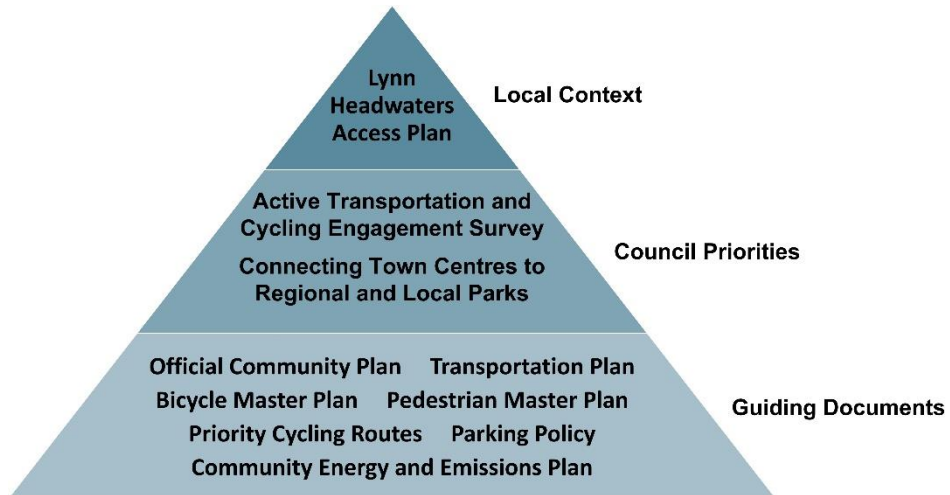


Figure 1: Lynn Valley Active Transportation Project Policy Guidance

Lynn Valley Road is a three-kilometre-long major travel route located in the District. This corridor connects the Trans Canada Highway to a number of key local and regional destinations, including Lynn Valley Town Centre, Lynn Canyon Park, and Lynn Headwaters Regional Park. LVRAT project will create comfortable multi-modal (multiple travel modes including walking, rolling, cycling, taking transit, and driving) connections along – or parallel to – Lynn Valley Road. As shown in **Figure 2**, Phase 1 of the LVRAT project focused on improvements between Mountain Highway and Peters Road, while Phase 2 will create more comfortable multi-modal connections between Peters Road and Dempsey Road. This report establishes the existing conditions for the Phase 2 connection.



Figure 2: Lynn Valley Road Active Transportation Improvements Project Extents

2.2 STUDY PROCESS

LVRAT Phase 2 is a corridor improvement project to create more comfortable multi-modal connections between Peters Road and Dempsey Road along or parallel to Lynn Valley Road. The current study focuses on options development and evaluation, beginning with an existing conditions assessment that includes public and stakeholder engagement, as well as technical work. The timeline for the overall project is illustrated in **Figure 3**. This study will result in a preferred option to be presented to Council in 2023. Once a preferred option has been selected, it will be moved into design and construction.

This report describes the results of the technical analysis of existing conditions completed in Summer 2022. A parallel report (**Lynn Valley Road Active Transportation Project Phase 2 Spring 2022 Engagement Report**) has been submitted under separate cover. The findings summarized in these two reports will guide the design of concept options.

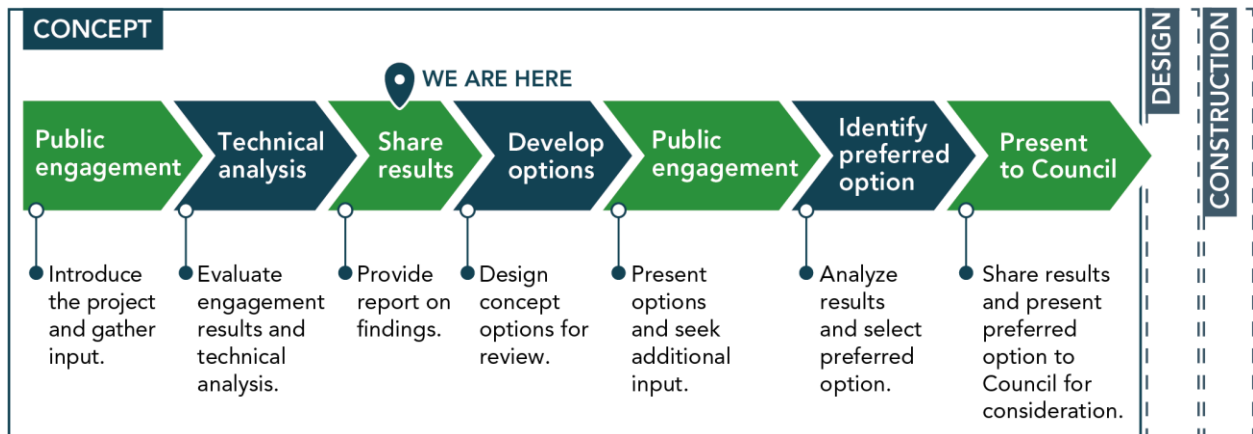


Figure 3: LVRAT Project Phase 2 Timeline

3.0 EXISTING CONTEXT

This chapter summarizes the analysis and review of existing conditions along Lynn Valley Road (between Peters Road and Dempsey Road) and its adjacent network. The analysis reviews the study area and corridor from multiple lenses of transportation, including adjacent land use, physical road elements, travel patterns, safety, and traffic operations. The findings from this review will be used to inform the design of conceptual options that will best address the existing challenges and enhance opportunities.

3.1 LAND USE CONTEXT AND DESTINATIONS

The Lynn Valley Road corridor provides an important connection between the Trans Canada Highway and a number of key destinations on the north side of the District, including Lynn Valley Shopping Centre, Lynn Canyon Park, Lynn Headwaters Regional Park. Adjacent land uses surrounding Lynn Valley Road largely consist of single-family detached residential. The Lynn Valley Town Centre, at the intersection of Lynn Valley Road with Mountain Highway, is an important local commercial hub for the neighbourhood, as identified in **Figure 4**. Lynn Valley is one five connected town and village centres identified in the ***Official Community Plan***

As population and development continue to increase, so does the desire and need for better integration between living, working, and recreation. Visits to parks in the Metro Vancouver region have increased 34% since 2019¹ and District staff have noted increased volumes of visitors to parks in the Lynn Valley neighborhood. Parking demand around Lynn Canyon Park and Lynn Headwaters Regional Park has also been observed to increase over the past two years. The role and function of Lynn Valley Road, as well as its convenient access to local and regional destinations, present a unique opportunity to support more local travel and better connections to recreation destinations.

¹ In 2021 16.3 million people visited regional parks, a 37% increase from 2019. ***Alternative Transportation Study Part II: Access to Regional Parks Report*** (Metro Vancouver, 2022)



Figure 4: Key Destinations

3.2 NETWORK CHARACTERISTICS

This section provides a description of the road network characteristics along and near Lynn Valley Road from Peters Road to Dempsey Road, including physical characteristics, active transportation facilities, and transit connections.

Adjacent to the North Shore mountains, the topography of the study area is characterized by a significant slope up towards the north. The average grade of incline along Lynn Valley Road is approximately 5% between Peters Road and Dempsey Road. On-street parking can be typically found on both side of the road, while a lack of separated bike facilities means that people who are cycling often share the road with vehicles. Mobility and accessibility for people walking in the area are also limited by gaps in the sidewalk network as sidewalks are typically only provided on one side of the road. The area is served by a few regional bus routes, operated by TransLink, that connect passengers to and from Lonsdale Quay and downtown Vancouver.

Lynn Valley Road is designated as a major arterial road under the District of North Vancouver's road classification (2013 Roadway Classification Review²). The corridor is oriented in a diagonal direction (southwest to northeast) and is served by a network of east-west and north-south roads that connect to Lynn Valley Road. This network of nearby roads is made up of minor arterials (Mountain Highway and Dempsey Road), collectors (Peters Road, Hoskins Road, Underwood Avenue and others), and multiple local roads, such as Kilmer Road and Evelyn Street. The road classification map of the study area is provided in **Figure 5**.

² <https://www.dnv.org/sites/default/files/edocs/road-classification-strategy.pdf>

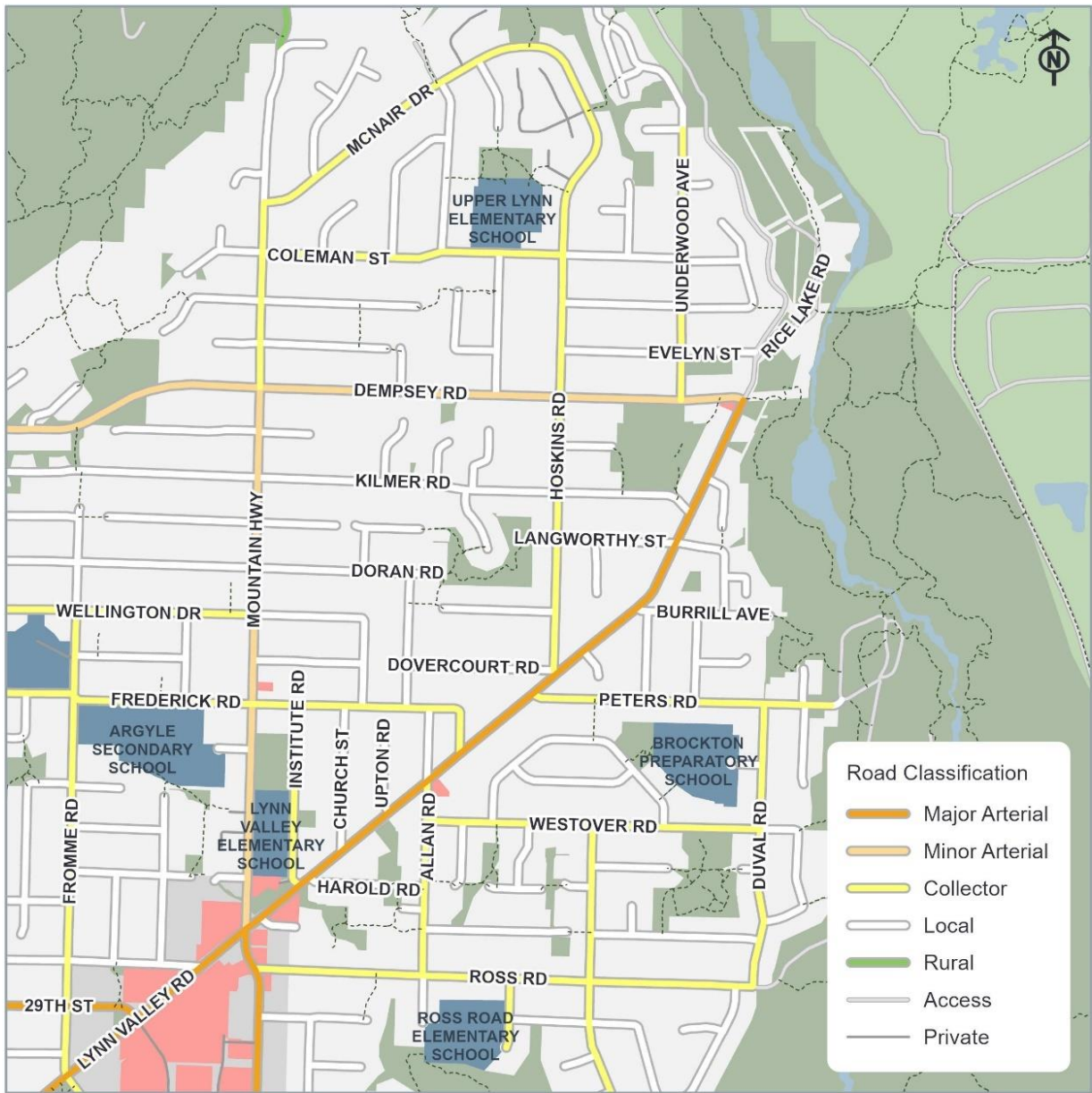


Figure 5: Road Classification

3.2.1 ROAD CHARACTERISTICS

This section provides a short description of arterial and collector roadway characteristics in the study area.

Lynn Valley Road

Lynn Valley Road between Peters Road and Dempsey Road is a two-lane major arterial road with on-street parking on both sides. The general slope of this section is about 2% to 7% and the curb-to-curb width is approximately 11.2 metres. Despite its classification as an arterial, Lynn Valley Road provides direct access to multiple single-family driveways along this segment, with varying roadside conditions consisting of steep lateral grades, closely spaced driveways, landscaping and planting, trees and wild growth, and utility poles. Sidewalks are currently provided on both sides of the road south of Hoskins Road and only on the east side north of this point. There is currently no separation between the sidewalk and roadway, and no dedicated cycling facilities along the segment.³ All of the intersections along the segment are stop-controlled with Lynn Valley Road given the right-of-way, with the exception of the intersection at Dempsey Road, which operates with an all-way stop control. Marked pedestrian crosswalks are provided at Peters Road and at Dempsey Road (the extents of the study corridor), with no marked crosswalks in between.

Mountain Highway.

Mountain Highway is a north-south two-lane minor arterial road with on-street parking on both sides. The slope along this corridor is in the range between 2% to 8%. The cross-section of Mountain Highway generally includes sidewalks on both sides with boulevards separating the west sidewalk from the roadway. However, some gaps in the sidewalk are present on the east side north of Dovercourt Road. Bus stops and power poles are also present on both sides.

Dempsey Road

Dempsey Road is an east-west two-lane minor arterial road with on-street parking on both sides. It connects to Lynn Valley Road at the east end and has a generally flat slope. There is a continuous sidewalk provided on the south side of the road, but only a few scattered sections of sidewalk are present on the north side. There are also power poles located along the north side of the road. Near Kilmer Park, Dempsey Road is signed with a posted speed limit of 30 km/h between Lynn Valley Road and Hoskins Road.

Hoskins Road

Hoskins Road is a north-south two-lane collector road with on-street parking on both sides. The average slope of the road is approximately 6%. Sidewalks with boulevard are only provided on the west side of the road, with power poles situated in the boulevard space. In the study area, Hoskins Road serves as a parallel route to Lynn Valley Road and provides access to multiple local roads as well as driveways to single-family homes. Intersections along Hoskins Road consist of two-way and all-way stop controlled operations, with priority generally given to Hoskins Road, with the exception of the intersection with Lynn Valley Road.

³ Construction of bike lanes south of Peters Road is underway.

Peters Road

Peters Road is an east-west two-lane collector road with on-street parking on both sides. It has a generally flat grade and connects to Lynn Valley Road on the west end and serves as the access to the Lynn Canyon Park parking lot on the east end. Peters Road features a sidewalk on the south side of the road and has a high density of single-family driveways on both sides. Power poles and bus stops are also present on both sides of the road. All of the intersections along Peters Road are two-way stop controlled and a marked crosswalk is installed at the intersection with Duval Road. The posted speed limit is reduced to 30 km/h east of Duval Road near the park entrance.

Underwood Avenue

Underwood Avenue is a north-south two-lane collector road with on-street parking on both sides. This road extends north of Dempsey Road and provides access to local roads and driveways. Sidewalks are provided on both sides of the road south of Ralph Street, and only on the west side north of this point. Power poles are present along the west side and a northbound bus stop exists on the east side just north of Evelyn Street. Underwood Avenue is currently signed with a posted speed limit of 30 km/h.

3.2.2 GRADE REVIEW

Slope and distance are important factors in determining the comfort and accessibility of walking and cycling infrastructure. As part of this work, the distance and grades along six potential routes between Lynn Valley Town Centre and Lynn Valley Headwaters were compared to understand where investments in active transportation are likely to result in the most accessible and comfortable connections.

The six route options are mapped in **Figure 6** and a summary of their distance and grades are shown in **Table 1**. The elevation profile of each route option is provided in **Appendix A**. As shown, the options range from making use of existing transportation right-of-way to utilizing a combination of transportation right-of-way and off-street trails. Based on the review of route distances and grade profiles, it was observed that the Lynn Valley Road alignment is universally the most direct (shortest distance) and contains the least amount of grade variations (most gradual grade profile). The Kilmer Park section of the Allan Road / Campbell Avenue, Doran Park / Kilmer Road, Kilmer Park route has the potential for a similar grade to Lynn Valley Road in that section; however, this area currently has a mix of treed and undeveloped area, as well as private use of the public space.

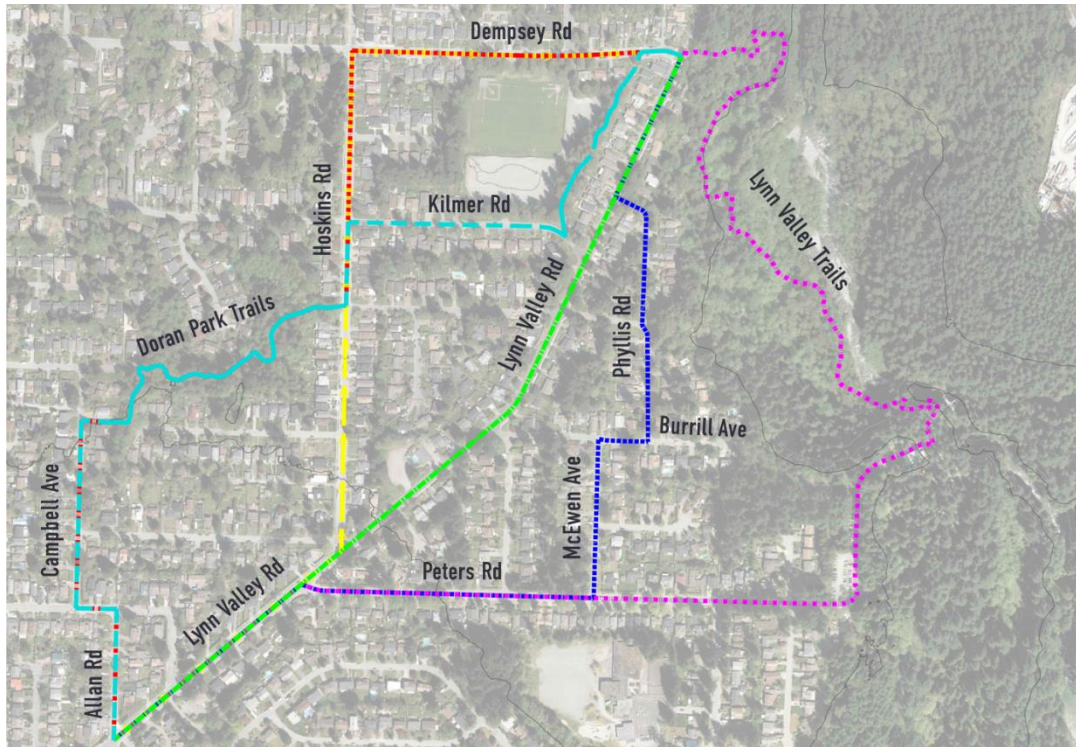


Figure 6: Grade Review Route Options

Table 1: Grade Review Summary

Route Description	Map Colour	Approximate Distance	Grade Variation (South to North)
Lynn Valley Road	Green	1,100 metres	2% to 7%
Allan Road/Campbell Avenue, Doran Park, Hoskins Road, Dempsey Road	Red	1,700 metres	-10% to 15%
Lynn Valley Road, Hoskins Road, Dempsey Road	Yellow	1,400 metres	1% to 11%
Lynn Valley Road, McEwen Avenue/Phyllis Road, Lynn Valley Road	Blue	1,500 metres	-3% to 18%
Lynn Valley Road, Peters Road, Baden Powell Trail	Purple	2,300 metres	-67% to 34%
Allan Road/Campbell Avenue, Doran Park/Kilmer Road, Kilmer Park	Cyan	1,600 metres	-10% to 15%

3.2.3 TRANSIT SERVICE & FACILITIES

Lynn Valley is served by a three bus routes, operated by TransLink, that connect passengers to and from Lonsdale Quay and downtown Vancouver. Currently, the following three transit routes provide service to the study area:

- **Route 209/210** (Upper Lynn Valley / Burrard Station)
 - This route connects Downtown Vancouver with the Upper Lynn area using the Ironworkers Memorial Bridge. It serves the Upper Lynn area via Mountain Highway and follows a clockwise loop at the terminal stations using Hoskins Road, Dempsey Road, Underwood Avenue and Coleman Street.
 - This route operates seven days a week with a frequency of one bus every 15 minutes during the weekday morning and afternoon peak periods, and about one bus every 30 minutes during the weekday off peaks and weekends. This frequency is consistent throughout the year.
- **Route 228** (Lynn Valley / Lonsdale Quay)
 - This route serves the Lynn area via Lynn Valley Road and performs a clockwise loop at the terminal stations via northbound Lynn Valley Road, then using Dempsey Road, Underwood Avenue, Coleman Street, and finally travels southbound Hoskins Road until it meets Lynn Valley Road again.
 - This is the only bus route that runs along the study segment of Lynn Valley Road.
 - This route operates seven days a week with a frequency of one bus every 15 minutes during the weekday morning and afternoon peak periods, and about one bus every 30 minutes during the weekday off peaks and weekends. This frequency is consistent throughout the year.

Bus stop amenities increase the comfort and accessibility of transit for people of all ages and abilities. Common bus stop amenities include bus stop signage, accessible landing pads, sidewalk connections, shelters, waste receptacles, route information, and lighting. Bus stops in the study area offer limited amenities for passenger comfort. For all three routes above, the terminus station is located at northbound underwood Ave @ Evelyn St (Stop 53989). Given the one-way routing of bus services, bus stops are only located on the east side of Lynn Valley Road and the west side of Hoskins Road. The following three bus stops are of note as they are situated directly along the study segment of Lynn Valley Road (See **Appendix B** for photographs of each bus stop).

- Stop 54186 – Northbound Lynn Valley Road @ Burrill Avenue
 - Amenities at this bus stop include of a bus stop sign installed directly within the pedestrian through zone of the sidewalk.
- Stop 54187 – Northbound Lynn Valley Road @ Langworthy Street
 - Amenities at this bus stop only consist of a bus stop sign installed in the grass boulevard on the backside of the sidewalk.
- Stop 54188 – Northbound Lynn Valley Road @ Dempsey Road
 - Amenities at this bus stop consist of a bus stop sign installed directly within the pedestrian through zone of the sidewalk, and a passenger waiting area designated by a concrete pad beside the sidewalk.

For all three bus routes described above, the terminus station is located at northbound Underwood Avenue @ Evelyn Street (Stop 53989). Amenities at this stop include a bus stop sign installed directly on the sidewalk, a passenger waiting area designated by an enlarged area of concrete sidewalk, and a waste receptacle.

The bus routes and stop locations are summarized in **Figure 7**.

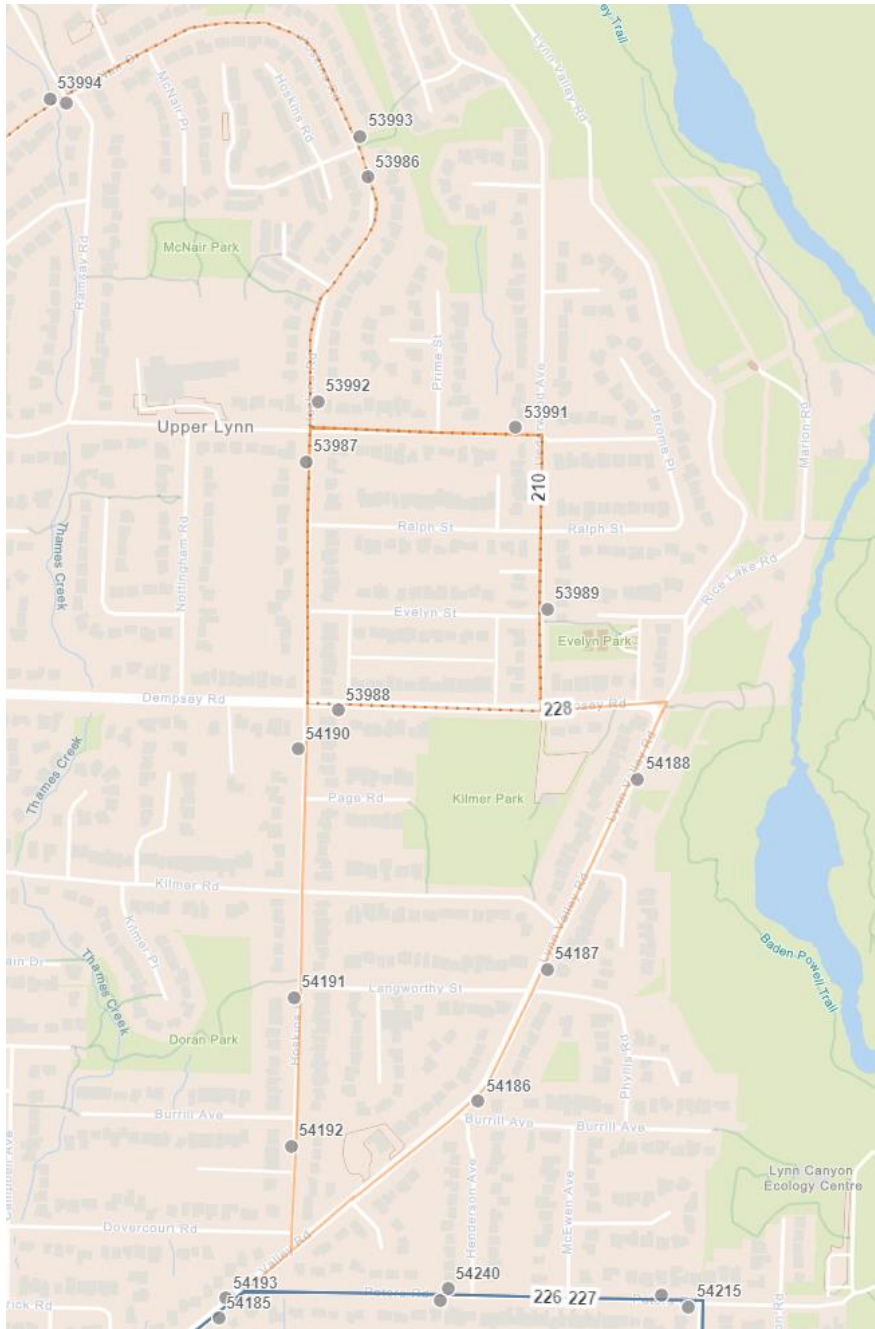


Figure 7: Bus Routes and Stop Locations (TransLink Interactive System Map)

3.3 TRAVEL PATTERNS

This section reviews the existing travel patterns in Lynn Valley from several aspects of transportation, including park visits, traffic volumes, and transit use.

3.3.1 MODE SHARE

TransLink Local Trip Diary

According to TransLink’s Local Trip Diary Data, the District of North Vancouver observed an auto mode share of approximately 80% (driver and passenger combined) in 2011 and 2017. As shown in **Table 2**, the total share of sustainable trips (i.e., transit, walking and cycling) by District residents increased by 2.4% over this time period, including an increase in cycling trips.

Table 2: District of North Vancouver Mode Share (2011 and 2017 TransLink Trip Diary)

Mode Share	2011	2017
Auto Driver	65.5%	62.5%
Auto Passenger	16.4%	17.1%
Transit	9.0%	7.2%
Walk	7.8%	11.2%
Bicycle	0.7%	1.5%
Total Sustainable (Transit, Walk, Bike)	17.5%	19.9%

North Shore Travel Survey

An upward trend in total sustainable mode share and bicycle mode share appeared to continue during the 2019 North Shore Travel Survey (NSTS). However, as shown in **Table 3**, this trend reversed during the 2021 NSTS, reflecting a continued influence of the COVID-19 pandemic on travel patterns.

Table 3: District of North Vancouver Mode Share (2019 and 2021 North Shore Travel Survey)

Mode Share	2019	2021
Auto Driver	69.4%	71.6%
Auto Passenger	6.8%	7.8%
Transit	8.0%	5.7%
Walk	12.7%	12.9%
Bicycle	2.5%	1.6%
Total Sustainable (Transit, Walk, Bike)	23.2%	20.1%

Mode share data is also measured by sub-municipal zones in the NSTS. **Figure 8** depicts the boundaries of Zone 2 (DNV Central), which encompasses the study area for this project. Notably, total sustainable mode share for Zone 2 actually increased between 2019 and 2021. **Table 4** also shows that cycling and walking mode shares in Zone 2 appear to be higher than the District as a whole.

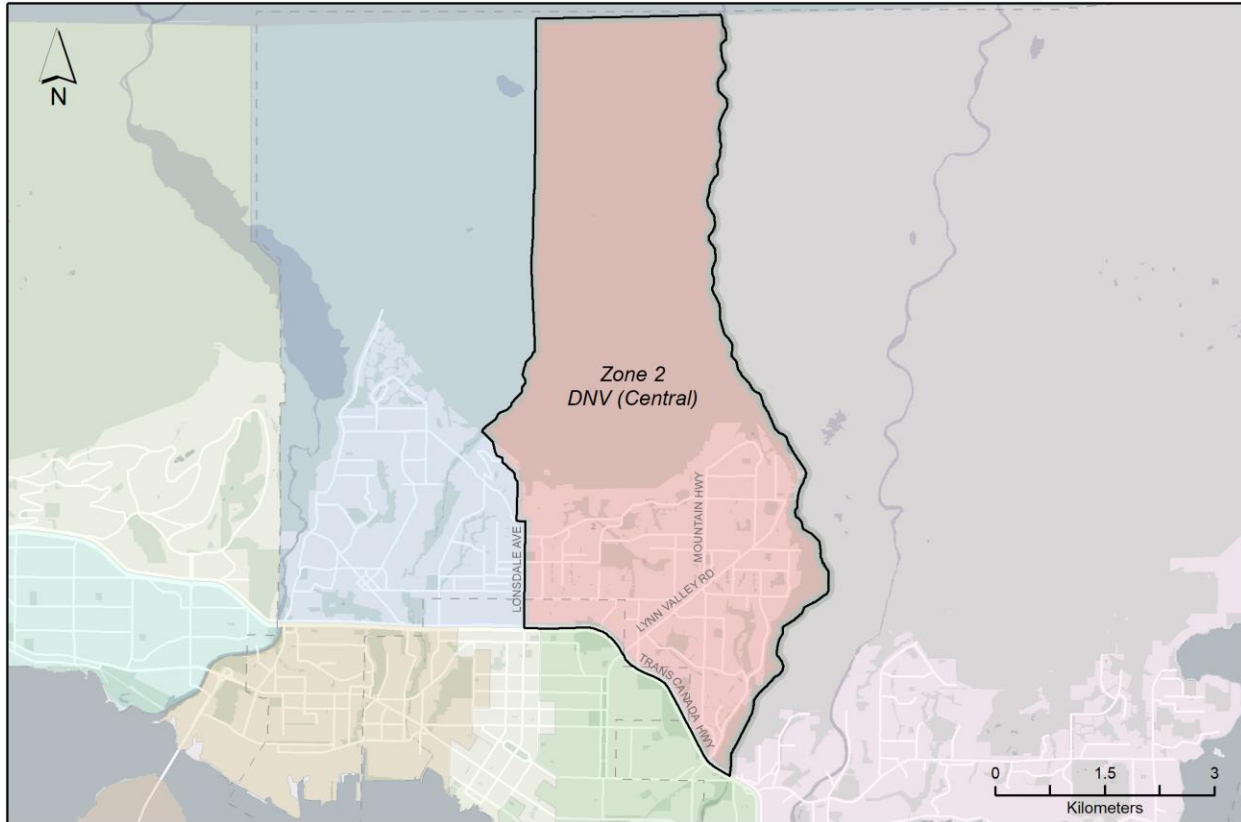


Figure 8: Zone 2 (DNV Central) Boundaries (2019 and 2021 North Shore Travel Survey)

Table 4: Zone 2 (DNV Central) Mode Share (2019 and 2021 North Shore Travel Survey)

Mode Share	2019	2021
Auto Driver	66.2%	67.1%
Auto Passenger	10.4%	6.8%
Transit	6.7%	9.6%
Walk	13.3%	14.1%
Bicycle	2.9%	2.2%
Total Sustainable (Transit, Walk, Bike)	22.9%	25.9%

3.3.2 PARK USE DATA

The destination park situated near this project’s study area is Lynn Headwaters Regional Park, which received 406,800 visits in 2021 alone. District staff have observed park use at Lynn Headwaters Regional Park increase since 2019 and some residents have reported increased parking impacts. The months of May through August represents the peak period of park visits, making up almost half of the total annual visits.

In 2021, Metro Vancouver completed a two-part study on assessing the accessibility of each regional park, titled *Alternative Transportation Study Part I: Access Inventory and Alternative Transportation Study Part II: Access to Regional Parks*. The study found that while the present distribution of regional parks reflects an outdated system plan developed in the 1960s (when automobile parking capacity was provided for a regional population of approximately one million), the region’s population has since

grown to 2.7 million and is projected to reach 3.8 million by 2050. Moreover, visits to regional parks typically increase at double the population growth rate. The study also stated that transportation planning efforts have significantly improved alternate transportation options across the region and in the present day, around 25% of regional park visitors arrive via sustainable transportation options (such as cycling, walking, and transit).

The study also referenced mode share surveys previously completed in 2013 and 2019 by Metro Vancouver. Somewhat contrary to the general trend, the study observed that between 2013 and 2019, visitor travel to Lynn Headwaters Regional Park showed some level of reduction in transit and cycling mode share (13% to 1% and 11% to 3%, respectively), supplemented by a notable increase in walking mode share (10% to 14%). However, an important caveat to this data is that in 2013, the respondents to the survey were permitted to select multiple transportation modes in order to capture multimodal trips, whereas the 2019 survey only allowed on mode choice selection. Therefore, the transit and cycling trips in 2019 were likely under-represented in comparison. **Figure 9** and **Figure 10** show the region-wide cycling and transit access ratings for each park. As displayed, Lynn Headwaters Regional Park is currently identified with above average accessibility by both bike and transit, with further opportunities for improvement.

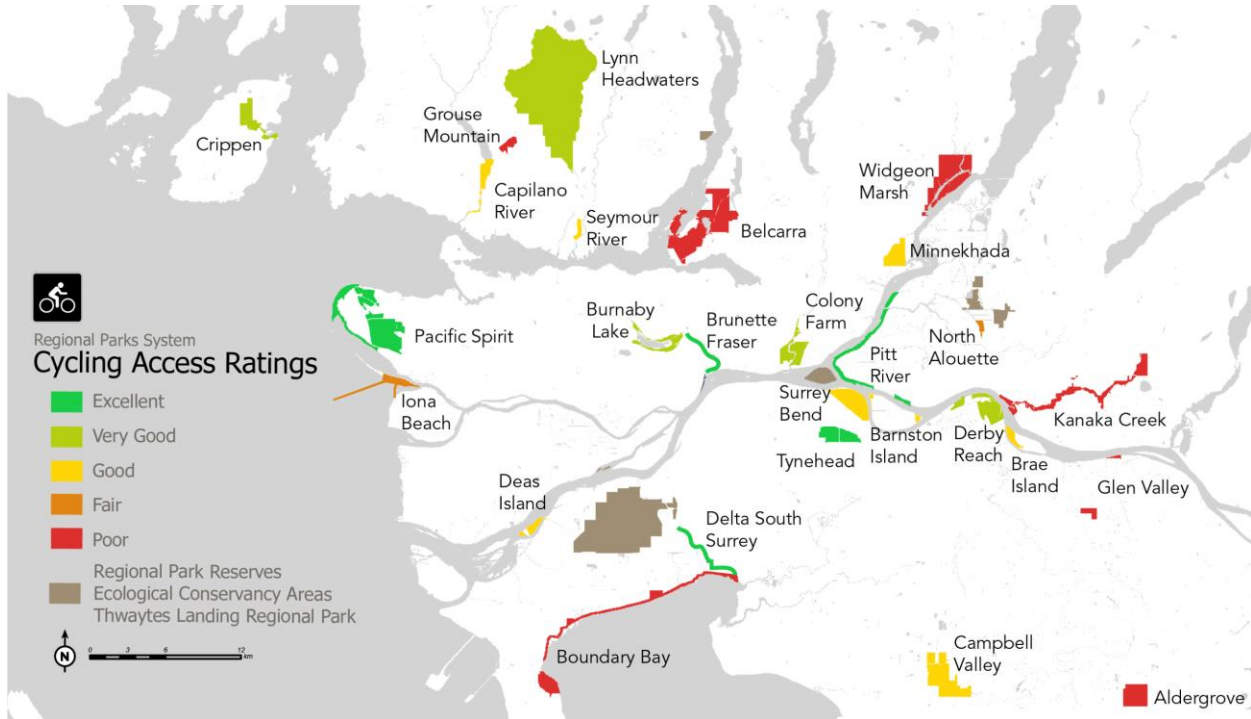


Figure 9: Cycling Access Ratings Map (Alternative Transportation Study Part I: Access Inventory)

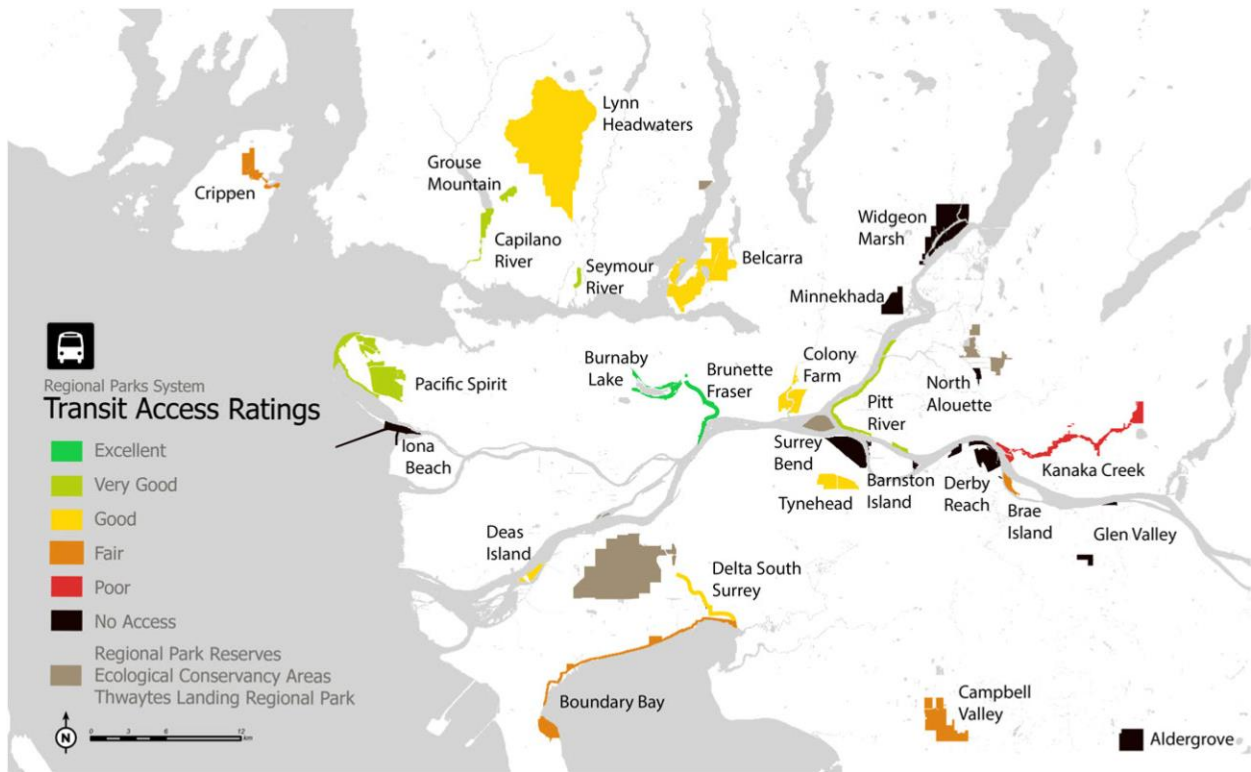


Figure 10: Transit Access Ratings Map (Alternative Transportation Study Part I: Access Inventory)

3.3.3 CORRIDOR AND INTERSECTION VOLUMES

Traffic volume data collected in May 2021 were reviewed to understand the magnitude of existing vehicle volumes in the study area. During this period, the Phase 2 segment of Lynn Valley Road (north of Peters Road) saw bidirectional peak hour volumes of 350 to 400 vehicles per hour, or about 3,000 to 4,000 vehicles per day. This is equivalent to traffic magnitudes typically observed on low volume collector roads in the region (and much lower than that of typical arterial roads). Additionally, it was observed that traffic volumes on other roads in the nearby network are also well below capacity, with existing demands generally amounting to less than 40% of full road capacities. Peak hour two-way traffic volumes along key routes are summarized in **Figure 11**.

The data also contained bicycle volumes at several intersections that provided a high-level understanding of cycling activity. It was observed that there is a notable proportion of cyclist traffic at the north end of the Lynn Valley Road corridor, near the park entrances. Specifically,

- Bike volumes represent up to 20% to 25% of total peak hour traffic at the intersection of Lynn Valley Road and Dempsey Road.
- Bike volumes represent up to 15% to 20% of total peak hour traffic at Dempsey Road and Underwood Avenue.
- Bike volumes represent up to 10% to 15% of total peak hour traffic at Lynn Valley Road and Kilmer Road
- People cycling are generally observed accessing the area using Lynn Valley Road to/from the south and Dempsey Road to/from the west.

The corridor bicycle volumes are summarized in **Figure 12**.

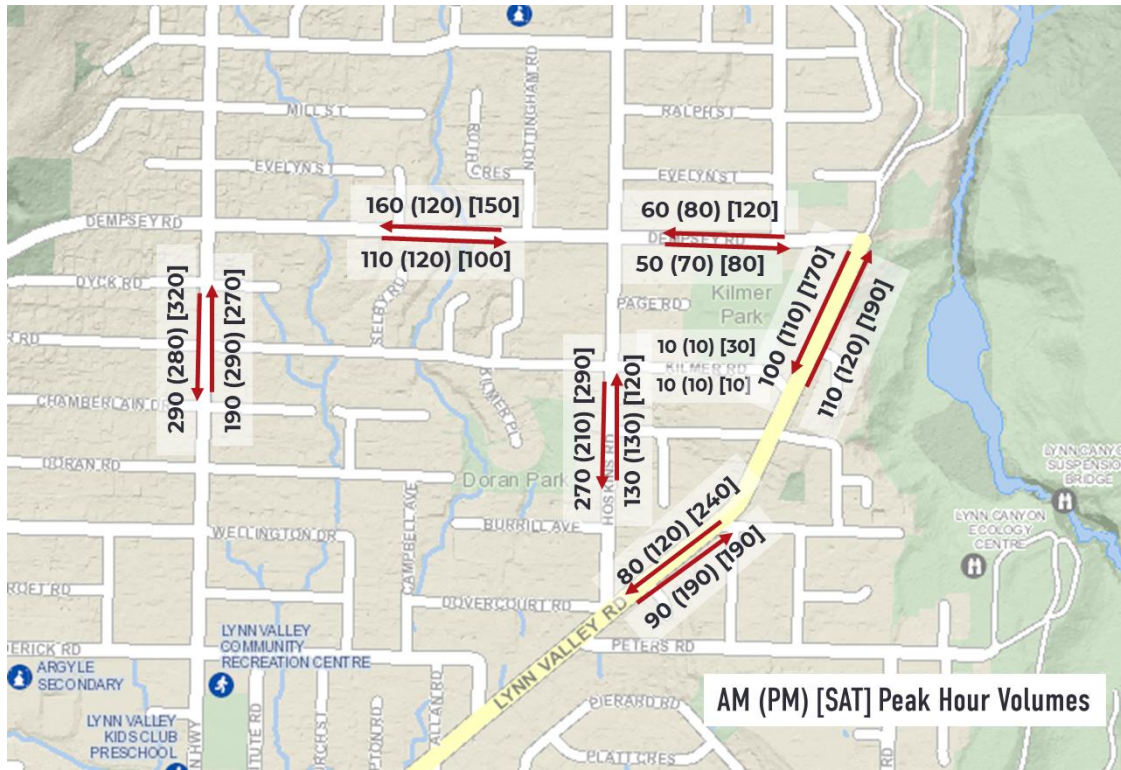


Figure 11: Peak Hour Corridor Motorized Vehicle Volumes (May 2021)

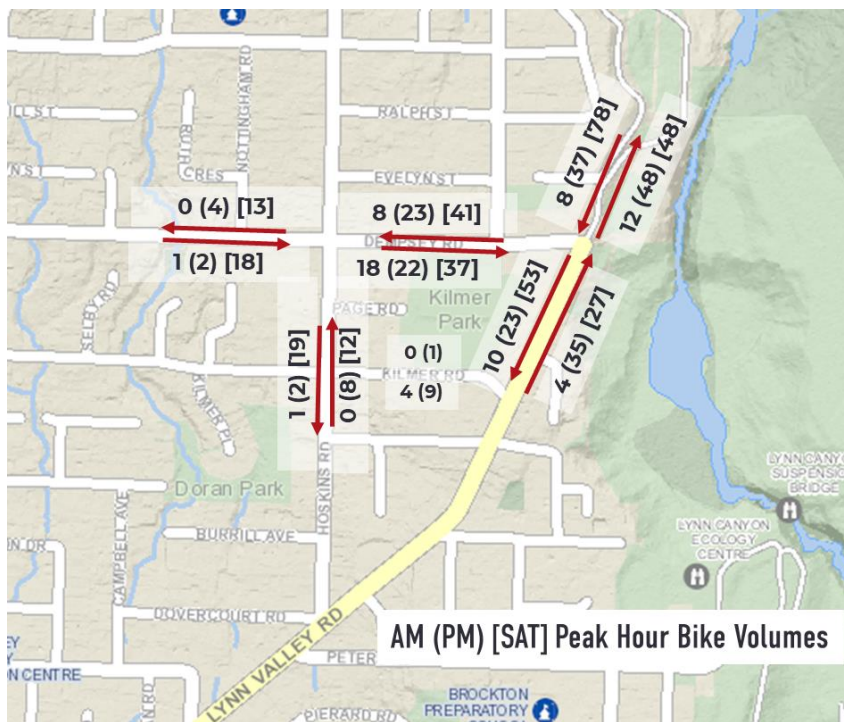


Figure 12: Peak Hour Corridor Bicycle Volumes (May 2021 Intersection Counts)

3.3.4 TRANSIT DATA

TransLink’s Fall 2021 transit data was reviewed for the stops near the study corridor to understand people’s travel patterns by transit. Note that it was assumed that this data represents a baseline of transit use and similar data in the summer season would likely show higher ridership given the volume of regional visitors to destination parks in addition to daily commuters.

The highest boarding and alighting activities by far were observed at northbound Underwood Avenue @ Evelyn Street (Stop 53989), which is the terminus stop for all three routes. This stop saw about 230 daily buses on weekdays and about 170 daily buses on Saturdays, with over 500 average daily boardings and alightings. Given that the bus stops along northbound Lynn Valley Road were primarily used for alightings, averaging about 25 alightings per stop per day and minimal boardings. **Figure 13** and **Figure 14** summarizes the level of bus boarding and alighting activity at each bus stop, respectively.

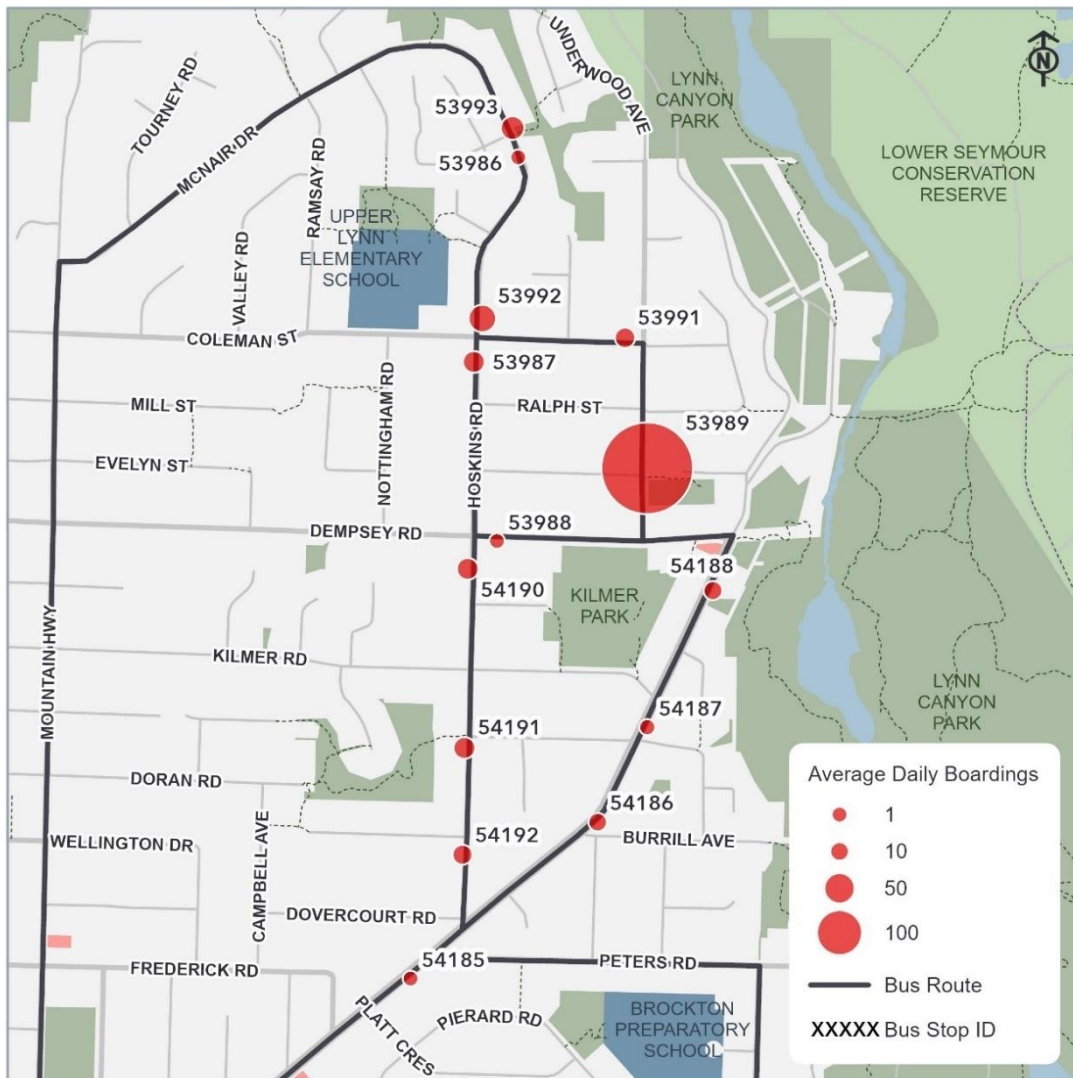


Figure 13: Average Daily Boardings (Fall 2021)



Figure 14: Average Daily Alightings (Fall 2021)

3.4 SAFETY & INTERSECTION OPERATIONS

This section summarizes the findings from the safety and operational review of Lynn Valley Road and the adjacent network. Overall, intersections and roadways in the study area are observed to be operating with optimal level of service and well under their maximum capacity. Vehicles in the area are generally operating at or slightly above posted speeds, with some locations exhibiting more frequencies of speeding, notably along sections of steeper downhill slopes. A review of historical collision data collected between 2007 and 2017 indicated that the most collision-prone locations along the Lynn Valley Road study corridor include intersections with Peters Road, Dovercourt Road, Burrill Avenue, and Dempsey Road.

3.4.1 SPEED

24-hour vehicle speed data was collected at several mid-block locations using tube counters for a one-week period in May 2021. The speed data was analyzed to measure the average speed and 85th percentile speed of vehicles travelling in the study area. The 85th percentile speed represents the speed at which 85 percent of vehicles are operating at or below, and is typically used to compare to the posted speed limit to identify speeding issues. A review of the speed data showed that 85th percentile vehicle speeds along Lynn Valley Road and Kilmer Road were generally observed to be at or less than the posted speed limit (as shown in **Figure 15**). Slightly higher speeds were observed along Mountain Highway, Dempsey Road, and Hoskins Road, where 85th percentile speeds typically ranged between 50km/h to 60km/h. Speeds were higher in the downhill directions. Additionally, 85 percentile speeds of over 40km/h were recorded along the 30km/h zone on Dempsey Road near Kilmer Park. The data suggests that vehicle speeds in the area are generally at or slightly above posted speeds, with some locations exhibiting more frequencies of speeding, notably along sections of downhill slopes.

Vehicle speeds along Lynn Valley Road were reviewed in more detail. The data revealed that although the 85th percentile speeds indicated that majority of the traffic are operating at or below 50km/h (posted speed limit), there is still a portion of traffic that recorded speeds of up to 70km/h in the uphill direction, and up to 80km/h in the downhill direction. Specifically, about 10% of vehicles were observed to be within 10km/h above the speed limit (or 60km/h), and about 1 to 2% (or 50 vehicles per day) were travelling above 60km/h. The data suggests that speeding is generally not a significant issue along Lynn Valley Road, however there are still regular occurrences of excessive speeds on a daily basis. The majority of the high speeds occur during morning and afternoon peaks as well as late night hours.

The severity of collisions between motor vehicles and people walking, cycling, or using other forms of active transportation is highly correlated with the operating speed of the motor vehicle involved in the collision. As noted in the **BC Active Transportation Design Guide**, the probability of survival of a person walking who is involved in a pedestrian-motor vehicle collision is more than 90% at 30 km/h and less than 15% at 50 km/h. The safety and comfort of active transportation users can be improved by greater separation from motor vehicles travelling more than 30 km/h.

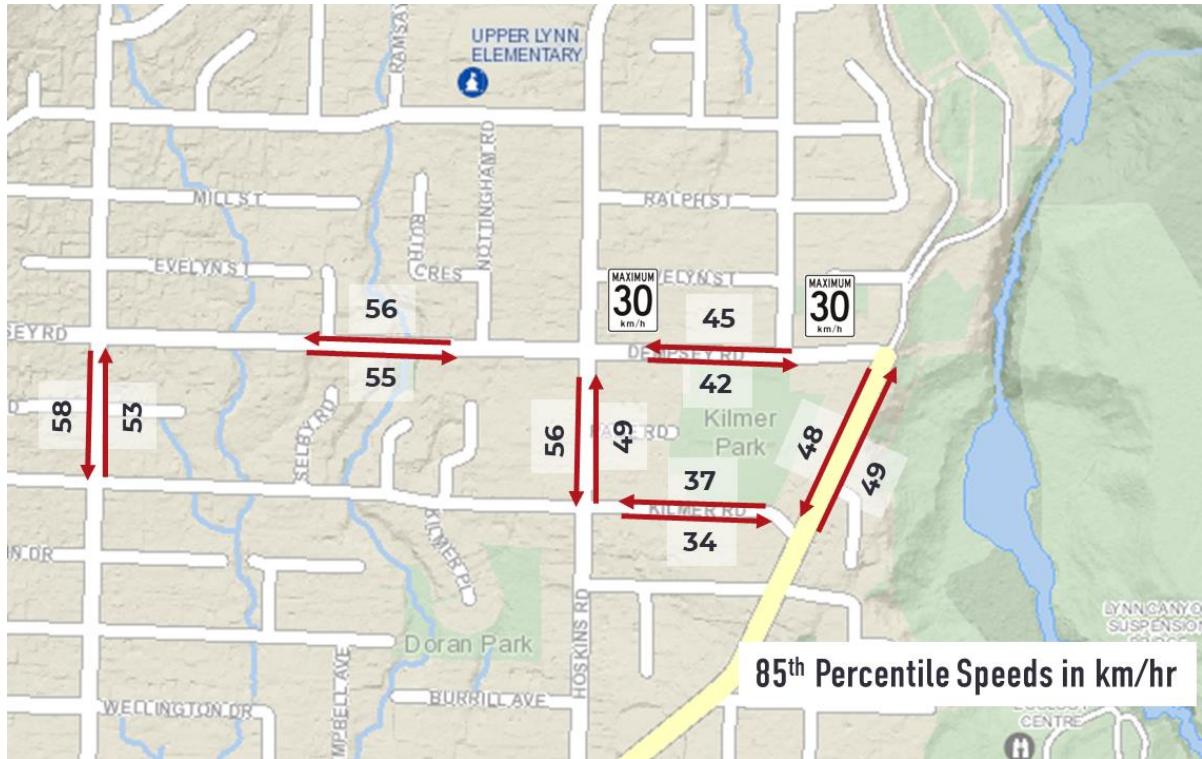


Figure 15: Corridor 85th Percentile Speeds (May 2021)

3.4.2 HISTORICAL COLLISIONS

Historical collision data collected between 2007 and 2017 from the District of North Vancouver was reviewed for the upper Lynn Valley Road corridor. A total of 101 collisions were recorded during this period, consisting of 64 property damage only incidents and 37 injury incidents. Seven of the collisions involved people walking and six of them involved people on bicycles, together making up about 35% of injury incidents. This proportion is significantly higher than the average across the North Shore municipalities, where collisions involving people walking and cycling make up only about 8% of overall injury incidents (Source: ICBC Online 2017-2021 Crash Data).

Figure 16 shows the breakdown of these collisions by location of intersections (red circles) and mid-block sections (blue lines). As shown, the most collision prone locations along the Lynn Valley Road study corridor include the following intersections:

- Lynn Valley Road at Peters Road
- Lynn Valley Road at Dovercourt Road
- Lynn Valley Road at Burrill Avenue
- Lynn Valley Road at Dempsey Road

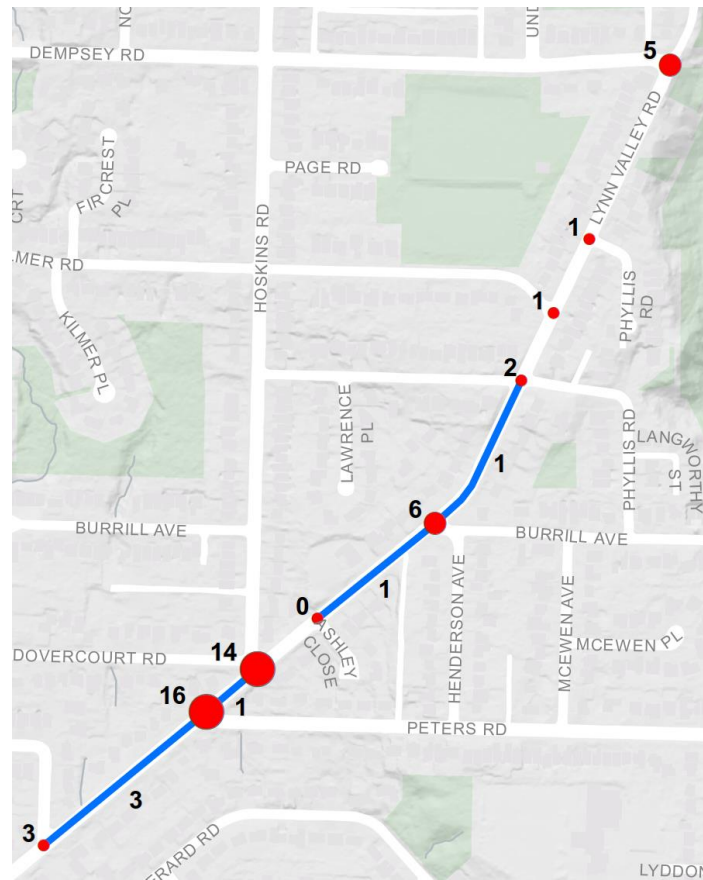


Figure 16: Number of Collisions by Location (2007-2017)

In terms of breakdown by collision types, the more frequent occurring vehicle incidents at collision-prone intersections include rear-ends, sideswipes, and head-on collisions. Visual collision type maps at key intersections are included in **Appendix C**.

3.4.3 INTERSECTION TRAFFIC OPERATIONS

Traffic operations at key intersections in the Upper Lynn Valley area were analyzed using Synchro, an industry recognized traffic analysis tool. Synchro is usually used to determine traffic conditions based on volumes, intersection geometry, and traffic control type. The analysis results can be reported in terms of several Measures of Effectiveness (MOE) such as Volume to Capacity (V/C) Ratio, average delay, level of service (LOS) and 95th percentile queues. The overall performance of an intersection is typically measured by the delays experienced by vehicles for each individual movement and collectively, also referred to as the level of service (LOS). The LOS is defined by a letter grade and can range between LOS A (best) to LOS F (worst). LOS A through C generally indicates that the intersection experiences very few delays during the peak hour whereas LOS F suggests the delays are significant. Overall intersection operation of LOS D or better and minor movement operation of LOS E or better are generally considered an acceptable threshold, while operations outside of these thresholds may require improvement.

Overall LOS at key intersections are summarized in **Table 5**. The results of the analysis showed minimal delay for motor vehicles on and near Lynn Valley Road in the existing day, with overall LOS of A (average delay of less than 10 seconds per vehicle) at all intersections. Additionally, individual movements at each intersection were observed to operate at LOS C or better.

Table 5: Existing Overall Intersection Level of Service Summary

Intersection	Weekday Morning Peak LOS	Weekday Afternoon Peak LOS	Weekend Peak LOS
Lynn Valley Rd @ Dempsey Rd	A	A	A
Lynn Valley Rd @ Kilmer Rd	A	A	A
Dempsey Rd @ Underwood Ave	A	A	A
Dempsey Rd @ Hoskins Rd	A	A	A
Dempsey Rd @ Mountain Hwy	A	A	-*
Hoskins Rd @ Kilmer Rd	A	A	-*
Lynn Valley Rd @ Peters Rd	A	A	-*
Lynn Valley Rd @ Hoskins Rd/Dovercourt Rd	A	A	-*

*Weekend intersection volumes not available

3.5 PARKING

On-street parking is generally provided on both sides of the street along most of the roads in the study area, including Lynn Valley Road, Dempsey Road, and Hoskins Road. Additionally, there are a number of off-street parking options in the vicinity, including parking lots at Kilmer Park, Evelyn Park, as well as a series of four lots near the entrance to Lynn Headwaters Regional Park. Annual parking occupancy data has been collected for the area over the past few years (2018 to 2022). This data was reviewed and analyzed as part of this study. Parking activities are observed to consistently increase as development and park visitations continue to grow year by year. Parking data from May 2021 are summarized in this section as they contain the highest level of parking occupancy among the data collected to date.

In general, parking density was observed to correlate with the distance from park entrances. Highest visitor parking activities were observed along Dempsey Road, Lynn Valley Road (north of Kilmer Road), Kilmer Road, and local streets north of Dempsey Road. Alternatively, minimal visitor parking usage was observed on Lynn Valley Road south of Kilmer Road, on Hoskins Road, and in adjacent local streets to the east. **Figure 17** presents a colour coded map of the on-street parking occupancy during peak times, with **Table 6** summarizing the baseline and peak time excess capacity in each numbered zone. Baseline condition represents typical parking utilization consisting of overnight parking by local residents, while peak utilization represents parking conditions during peak periods of park visitors.

Specific to the study corridor between Peters Road and Dempsey Road, it was observed that Lynn Valley Road contains two distinct segments of on-street parking utilization patterns. The section north of Kilmer Road regularly experiences constrained parking conditions and sees significant parking usage by park visitors during peak seasons and periods. Peak times typically include late morning and afternoon during weekdays and midday during weekends. On the contrary, the section south of Kilmer Road experiences low visitor parking demands throughout the day and consistently ample excess supply available. Daily profile of parking utilization along Lynn Valley Road of are included in **Appendix D**.



Figure 17: On-street Parking Utilization Index Map

Table 6: On-Street Parking Capacity Summary (May 2021)

#	LOCATION	TOTAL CAPACITY (SPACES)	BASELINE* EXCESS CAPACITY (SPACES)	PEAK** EXCESS CAPACITY (SPACES)
1	Dempsey Rd	70	40	0
2	Lynn Valley Rd north of Kilmer Rd	35	10	0
3	Kilmer Rd	30	25	5
4	Evelyn Park	20	10	0
5	North of Dempsey Rd	135	90	60
6	Langworthy St and Lawrence Pl	55	30	25
7	Peters Rd	75	50	30
8	Hoskins Rd	150	95	90
9	Lynn Valley Rd south of Kilmer Rd	70	65	45
10	North of Burrill Ave	60	40	40
11	South of Burrill Ave (incl. Burrill Ave)	140	100	95

*Baseline scenario represents residential parking use only (during overnight hours with no visitor parking use)

**Peak scenario represents daytime hours (7AM to 7PM) with the highest observed parking usage

4.0 OPPORTUNITIES & CHALLENGES

Lynn Valley Road between Peters Road and Dempsey Road is a multi-modal corridor serving many different modes of travel, including driving, cycling, walking, and taking transit. There is a valuable opportunity to enhance the existing space and provide a more comfortable and safe experience for all road users. The review of existing data highlighted some existing challenges associated with how people are travelling along this corridor today, as well as opportunities to utilize the existing public space more effectively.

Based on the review of existing conditions, a number of existing challenges and future opportunities have been identified as part of this project. A summary of the findings and takeaways to consider during option development are as follows:

- The continued growth of the Town Centre and recreational visitors to regional and local parks provides an opportunity to improve existing transportation connections for all road users.
- Compared to several alternative routes, Lynn Valley Road offers the most comfortable and desirable grade profile for active transportation users (people walking, cycling, and using other new mobility tools). The assessment of grade profiles indicated that Lynn Valley Road is particularly suited for travel in the uphill direction when compared to other routes.
- There is a lack of separation between people walking, people cycling, and vehicles due to the existing gaps in the sidewalk network, the absence of boulevard space between pedestrian facilities and the roadway, and the absence of dedicated cycling facilities. People are sometimes forced to walk on the roadway adjacent to occasionally high vehicle speeds. There is an opportunity to enhance the active transportation facilities in the and, where feasible, implement physical separation between vehicles and other road users.
- Historic collisions at some intersections along Lynn Valley Road have a higher than average percentage of incidents involving people walking and cycling, when compared to the District as a whole. There is opportunity to integrate safety treatments with future design options to address existing hotspots and collision-prone intersections on Lynn Valley Road, notably at Peters Road, Dovercourt Road and Dempsey Road. Safety improvements may include treatments such as geometric modifications and more formal pedestrian crossing opportunities.
- There is a lack of amenities (such as benches and shelters) at transit stops, which may limit transit passenger comfort and the accessibility of transit. There is an opportunity as part of this study to enhance the existing bus stops and improve the comfort, accessibility, and attractiveness of taking transit.
- The physical constraints of the existing road cross-section may limit the feasibility of some potential improvement options and lead to challenging design considerations and trade-offs. These constraints include road edge conditions characterized by incomplete sidewalks, steep lateral grades, closely spaced driveways, trees and wild growth, and utility poles. Off-street segments also feature trees and unauthorized use of public space by private residents.
- On-street parking usage is currently heavily concentrated near the park entrances on the north end of Lynn Valley Road. Parking demand often reaches maximum capacity on Dempsey Road, Kilmer Road, and Lynn Valley Road north of Kilmer Road during peak times. On the contrary, it was also observed that there is underutilized capacity elsewhere in neighbourhood. For example, locations such as Lynn Valley Road south of Kilmer Road, local street east of Lynn Valley Road, and Hoskins Road currently sees less than 50% parking utilization during peak times. As such, this creates an opportunity to develop design options that better distributes

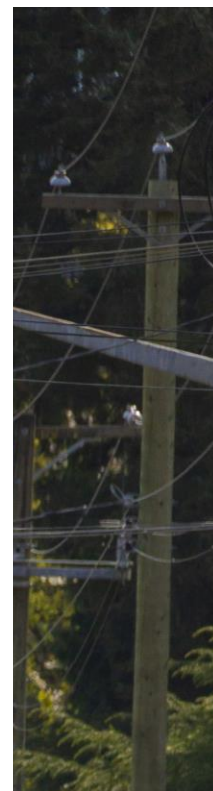
existing parking pressures and more effectively utilize the overall road space in the neighbourhood.

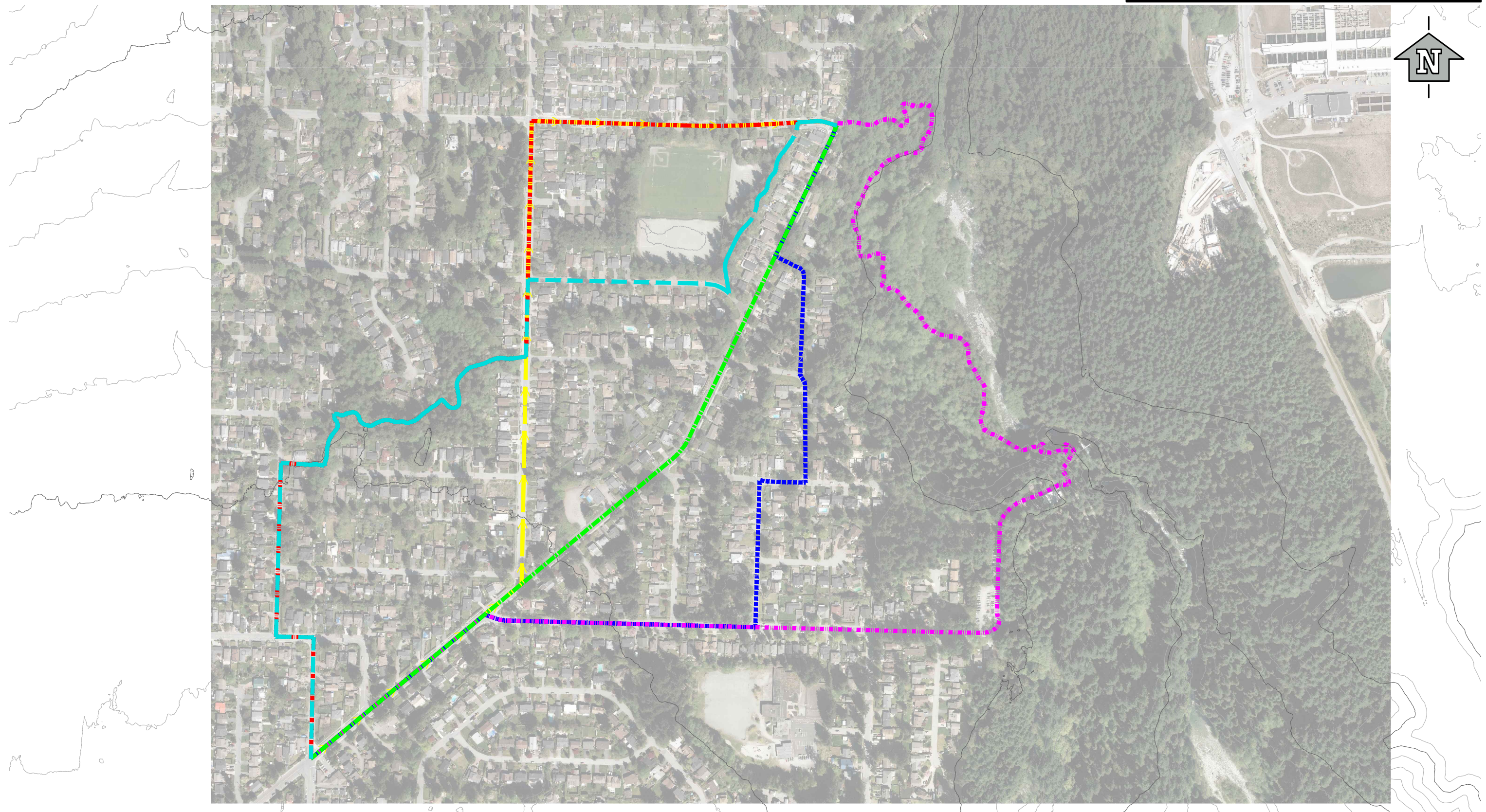
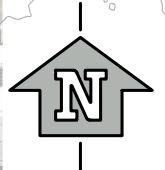
- Peak period traffic operations along Lynn Valley Road and elsewhere in the neighbourhood are near optimal conditions. There is ample available roadway capacity under existing configuration and there is no need to develop additional vehicle travel lanes for capacity purposes.

5.0 CONCLUSION AND NEXT STEPS

The findings from the technical review of existing conditions on Lynn Valley Road will be used along with input from public and stakeholder engagement to inform the development of design options for LVRAT-Phase 2.

APPENDIX A:
GRADE PROFILES
ROUTE OPTIONS REVIEW





C:\Users\dkang\AppData\Local\Temp\AcP\Publish_26416\1333005401-AL_I_ROUTES.dwg, C01, 2022/06/29 03:24 pm dkang

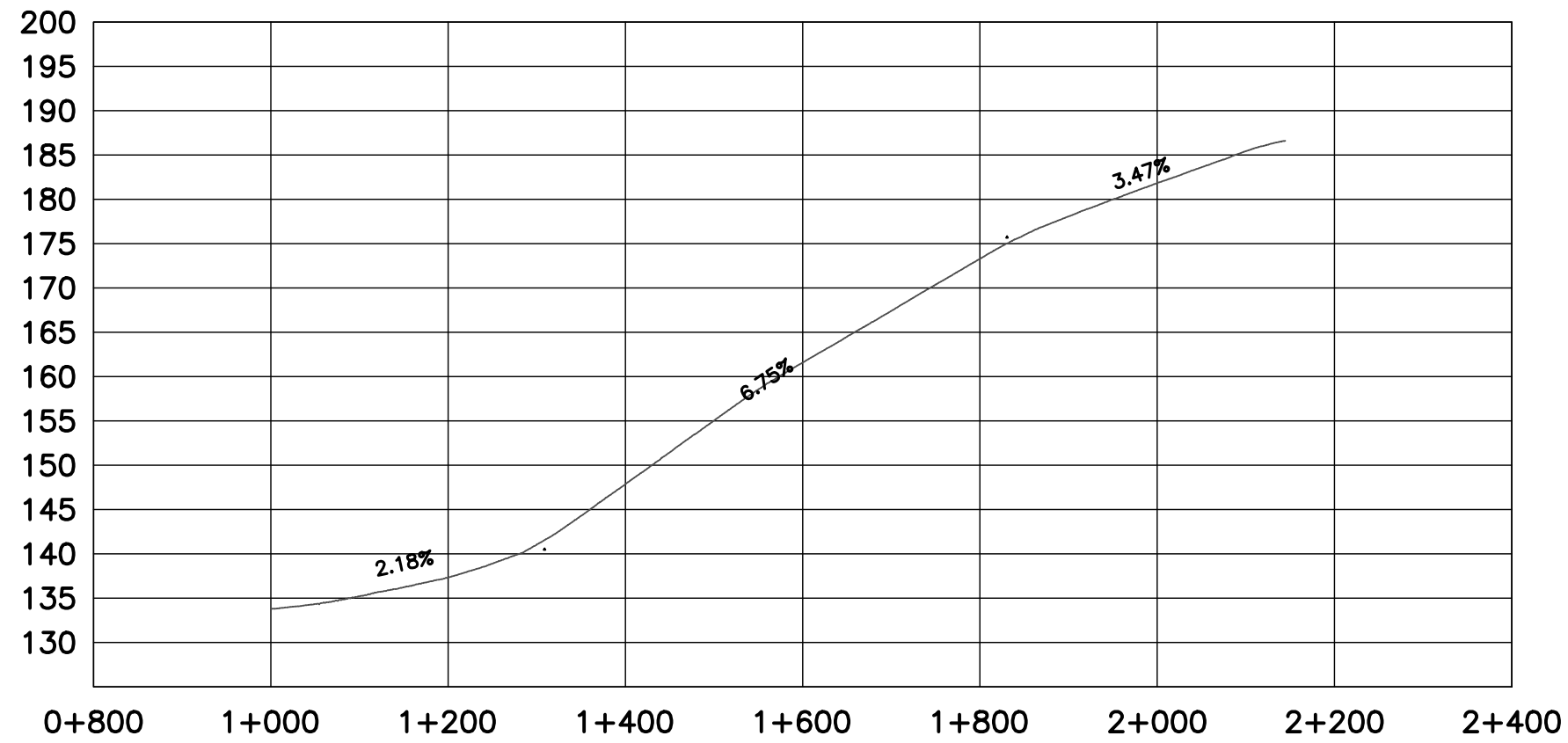


ISSUED FOR DISCUSSION
June 29, 2022
urbansystems.ca



Client/Project	DISTRICT OF NORTH VANCOUVER LVR
Revision Date	2022-06-29
Figure	1
Title	C01

OPTION 1: LYNN VALLEY ROAD



C:\Users\dkang\AppData\Local\Temp\AcPublish_26416\1333005401-ALI_ROUTING.dwg, C02, 2022/06/29 03:24 pm dkang

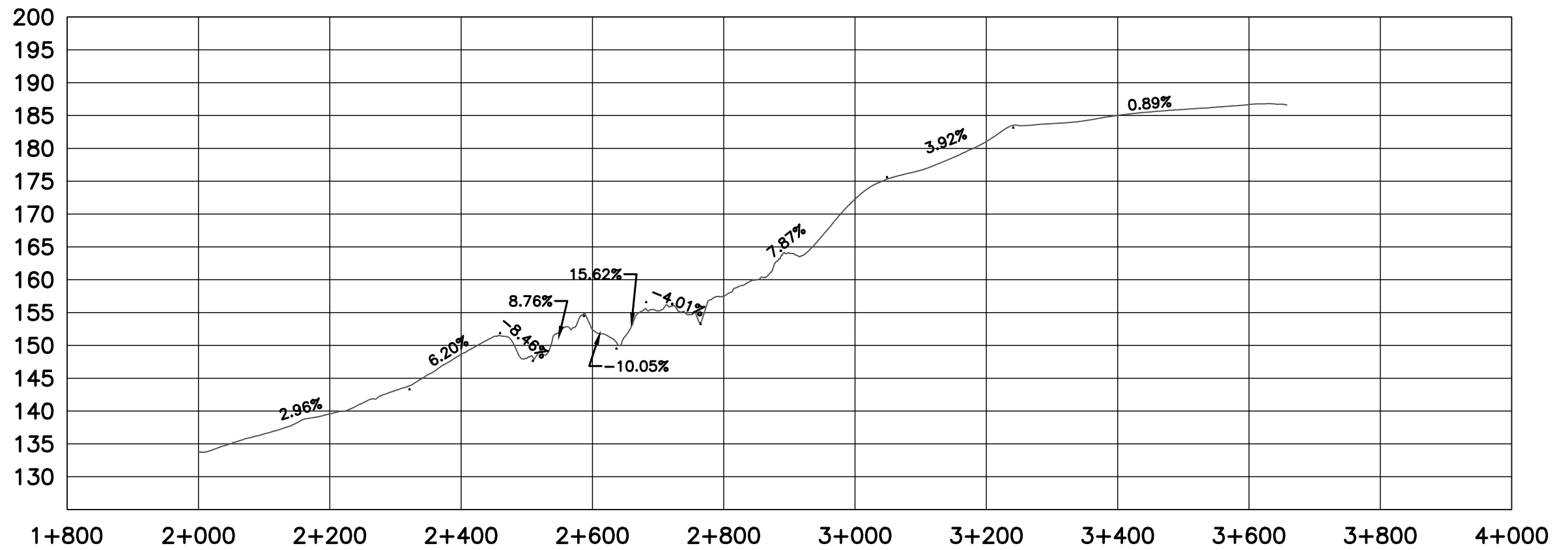


ISSUED FOR DISCUSSION
June 29, 2022
urbansystems.ca



Client/Project	
DISTRICT OF NORTH VANCOUVER	LVR
Revision Date	
2022-06-29	2
Title	
1333.0054.01	C02

OPTION 2: DORAN PARK



C:\Users\dkang\AppData\Local\Temp\AcPublish_26416\1333005401-ALI_ROUTING.dwg, C03, 2022/06/29 03:24 pm dkang

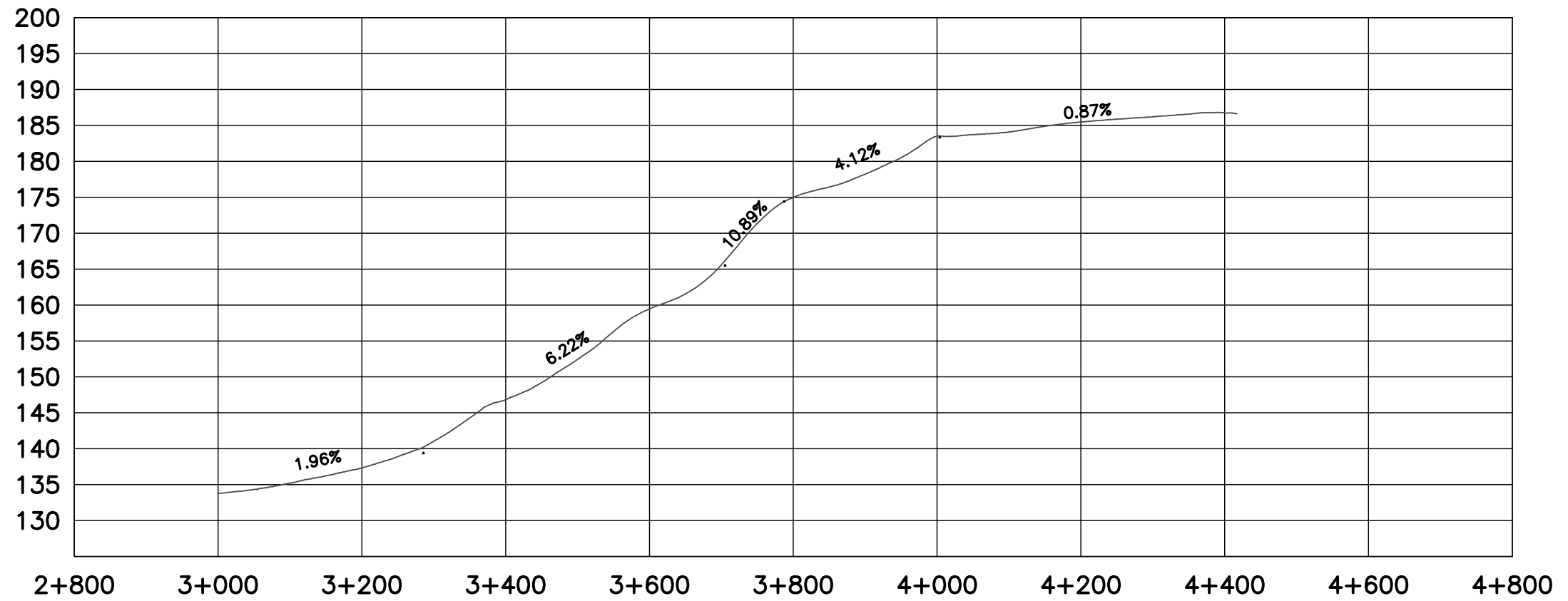


ISSUED FOR DISCUSSION
June 29, 2022
urbansystems.ca



Client/Project	
DISTRICT OF NORTH VANCOUVER	
LVR	
Revision Date	Figure
2022-06-29	3
Title	
1333.0054.01	

OPTION 3: HOSKINS ROAD



C:\Users\dkang\AppData\Local\Temp\Ac\Publish_26416\1333005401-AL_I_ROUTES.dwg, C04, 2022/06/29 03:24 pm dkang

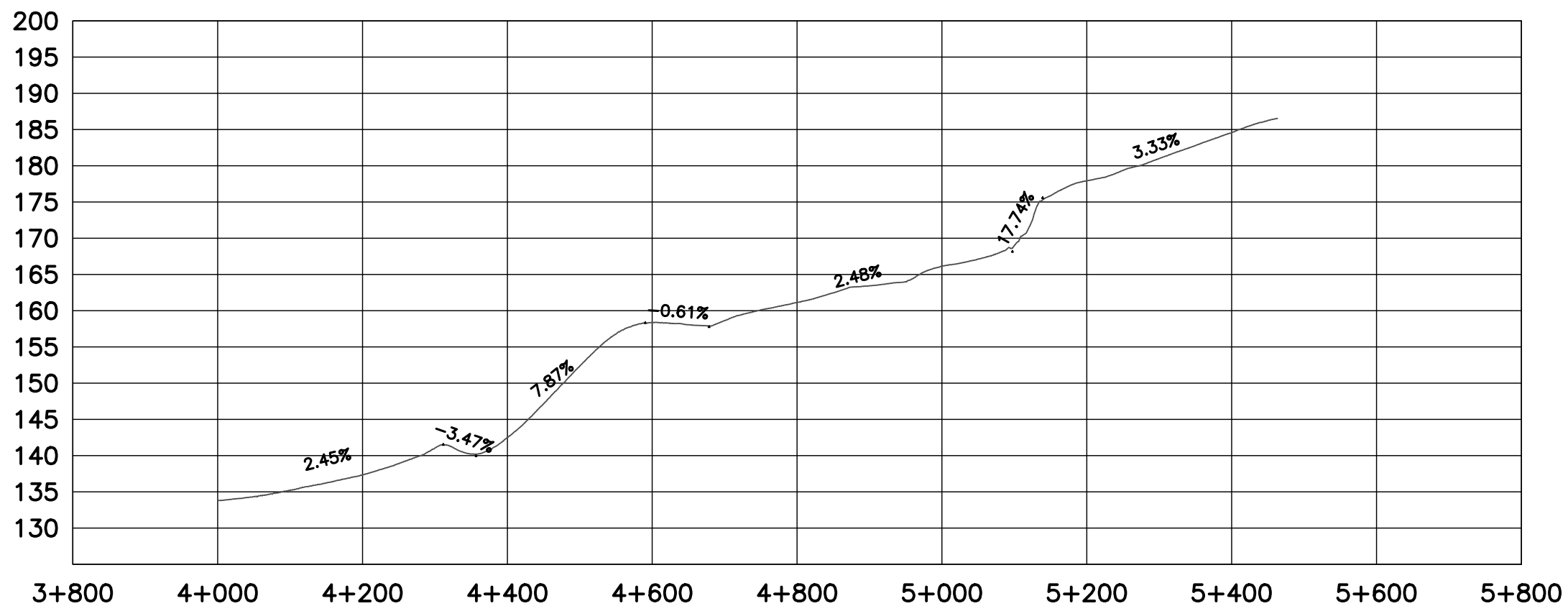


ISSUED FOR DISCUSSION
June 29, 2022
urbansystems.ca



Client/Project	
DISTRICT OF NORTH VANCOUVER	
LVR	
Revision Date	Figure
2022-06-29	4
1333.0054.01	
Title	

OPTION 4: MCEWEN AVENUE



C:\Users\dkang\AppData\Local\Temp\AcP\Publish_26416\1333005401-ALI_ROUTING.dwg, C05, 2022/06/29 03:25 pm, dkang

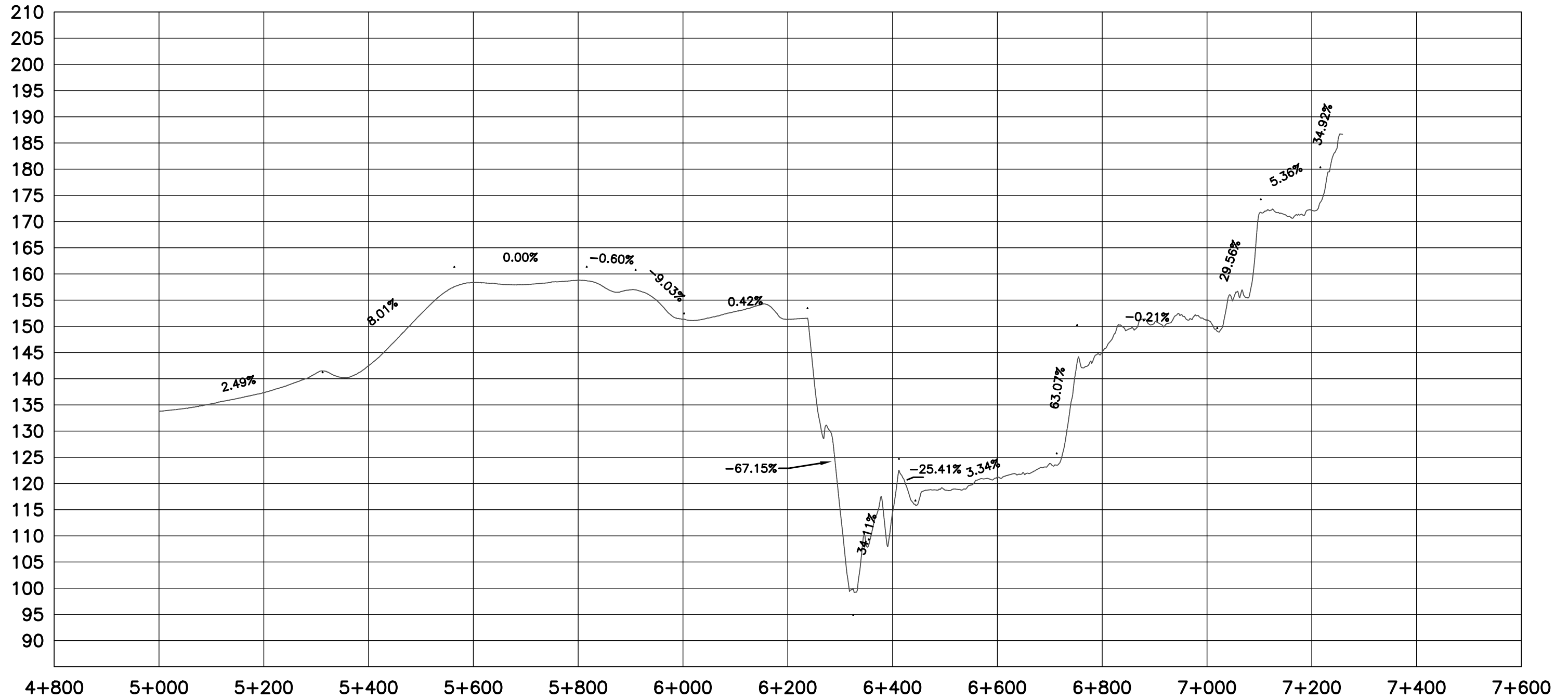


ISSUED FOR DISCUSSION
June 29, 2022
urbansystems.ca



Client/Project	DISTRICT OF NORTH VANCOUVER LVR
Revision Date	2022-06-29
Figure	5
Title	1333.0054.01

OPTION 5: BADEN POWELL TRAIL



C:\Users\dkang\AppData\Local\Temp\Apur\Publish_264161\333005401-ALI_ROUTING.dwg, C06, 2022/06/29 03:25 pm, dkang

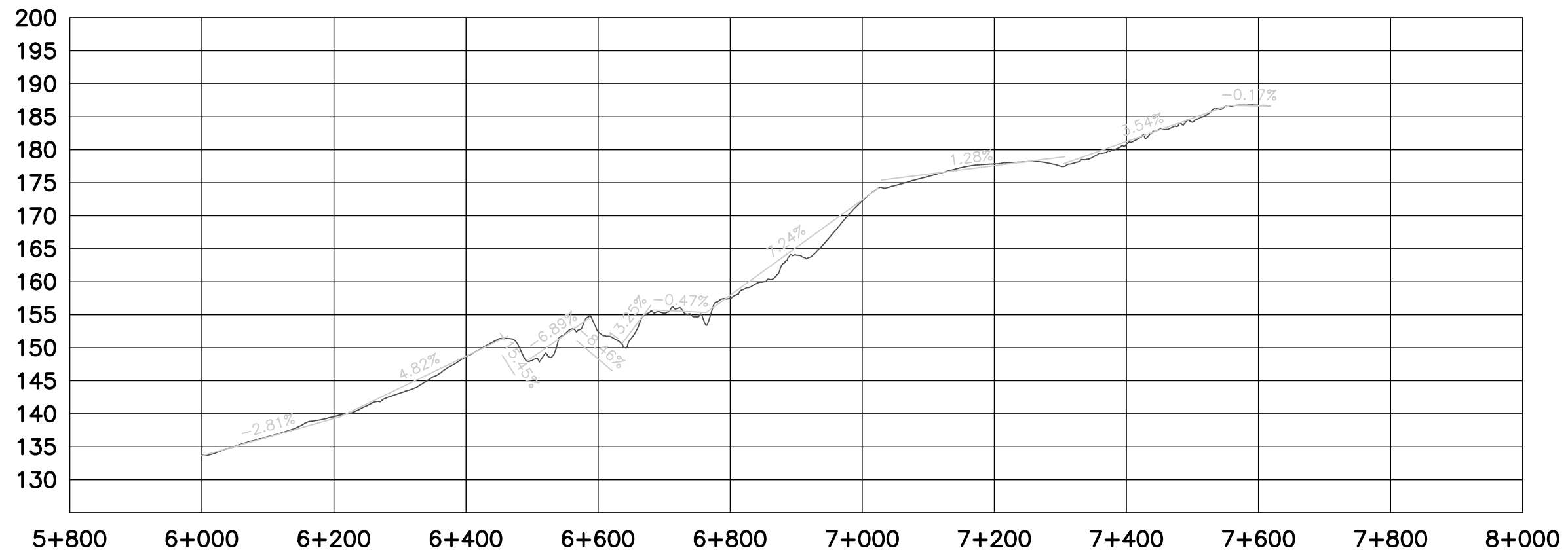


ISSUED FOR DISCUSSION
June 29, 2022
urbansystems.ca



Client/Project	DISTRICT OF NORTH VANCOUVER LVR
Revision Date	2022-06-29
Figure	6
Title	1333.0054.01

OPTION 6: KILMER PARK



C:\Users\dkang\AppData\Local\Temp\AcPublish_26416\1333005401-ALI_ROUTING.dwg, C07, 2022/06/29 03:25 pm, dkang

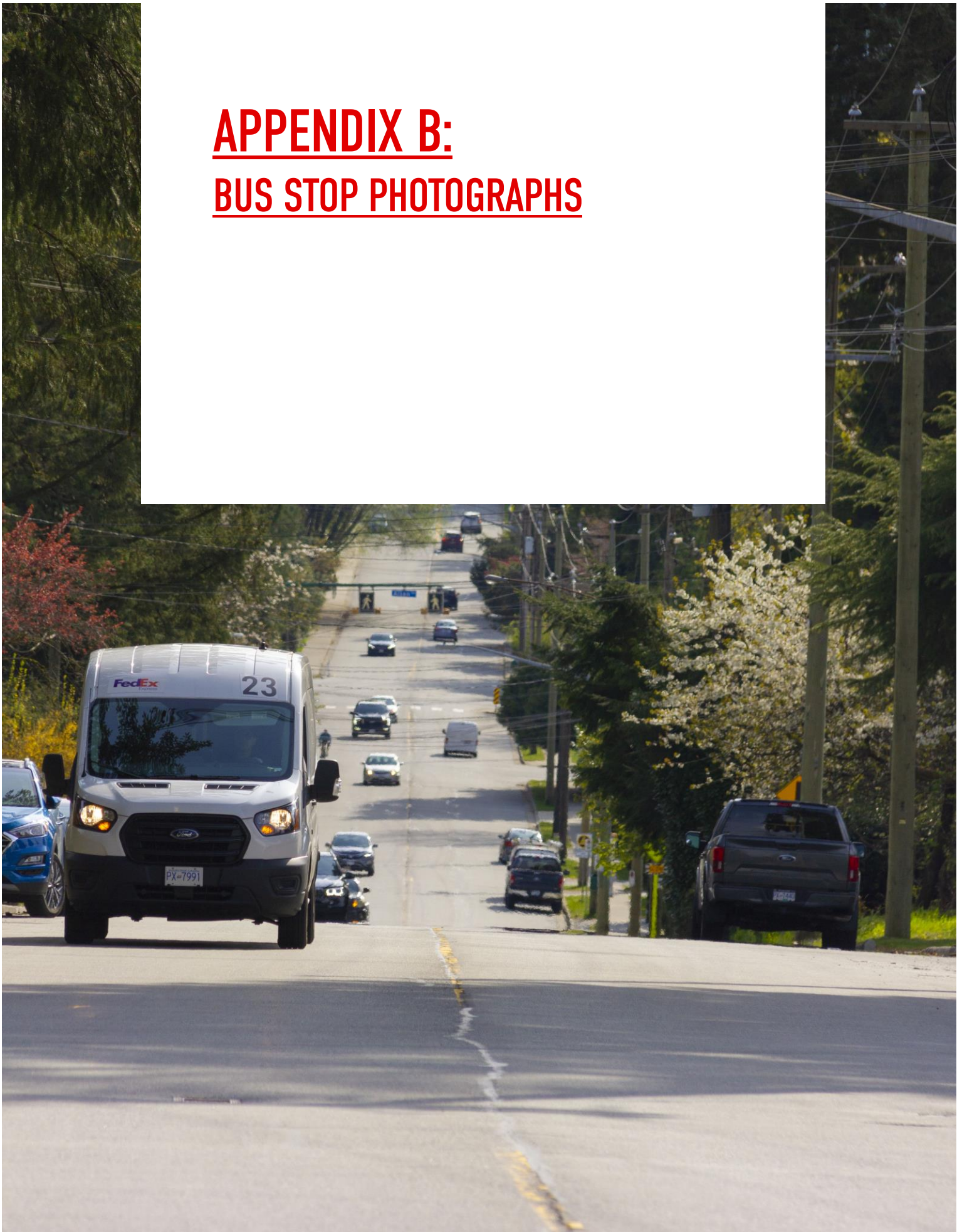


ISSUED FOR DISCUSSION
June 29, 2022
urbansystems.ca



Client/Project	DISTRICT OF NORTH VANCOUVER LVR
Revision Date	2022-06-29
Figure	7
Title	1333.0054.01

APPENDIX B: BUS STOP PHOTOGRAPHS





Stop 54186: Northbound Lynn Valley Rd @ Burrill Ave



Stop 54187: Northbound Lynn Valley Rd @ Langworthy St



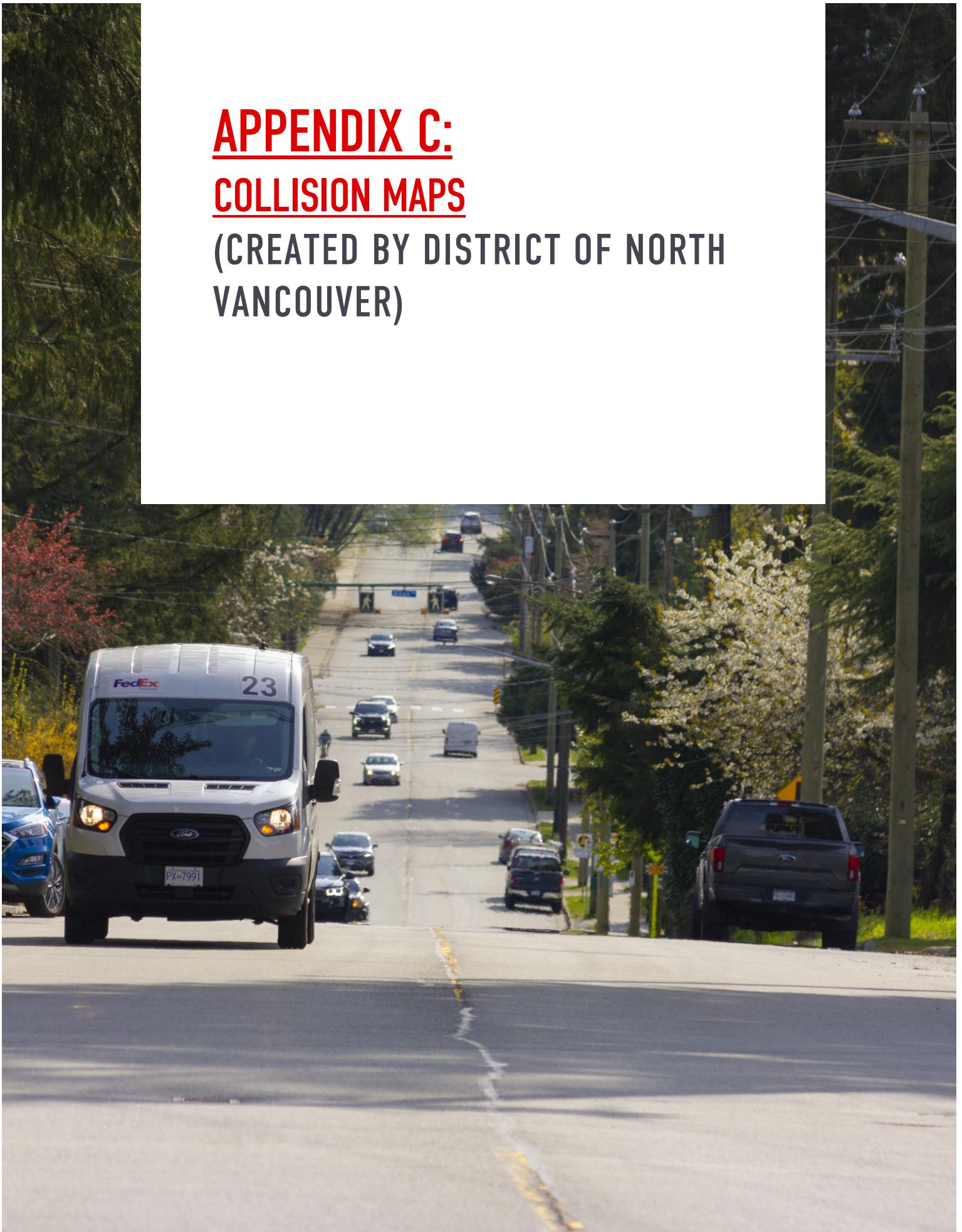
Stop 54188: Northbound Lynn Valley Rd @ Dempsey Rd



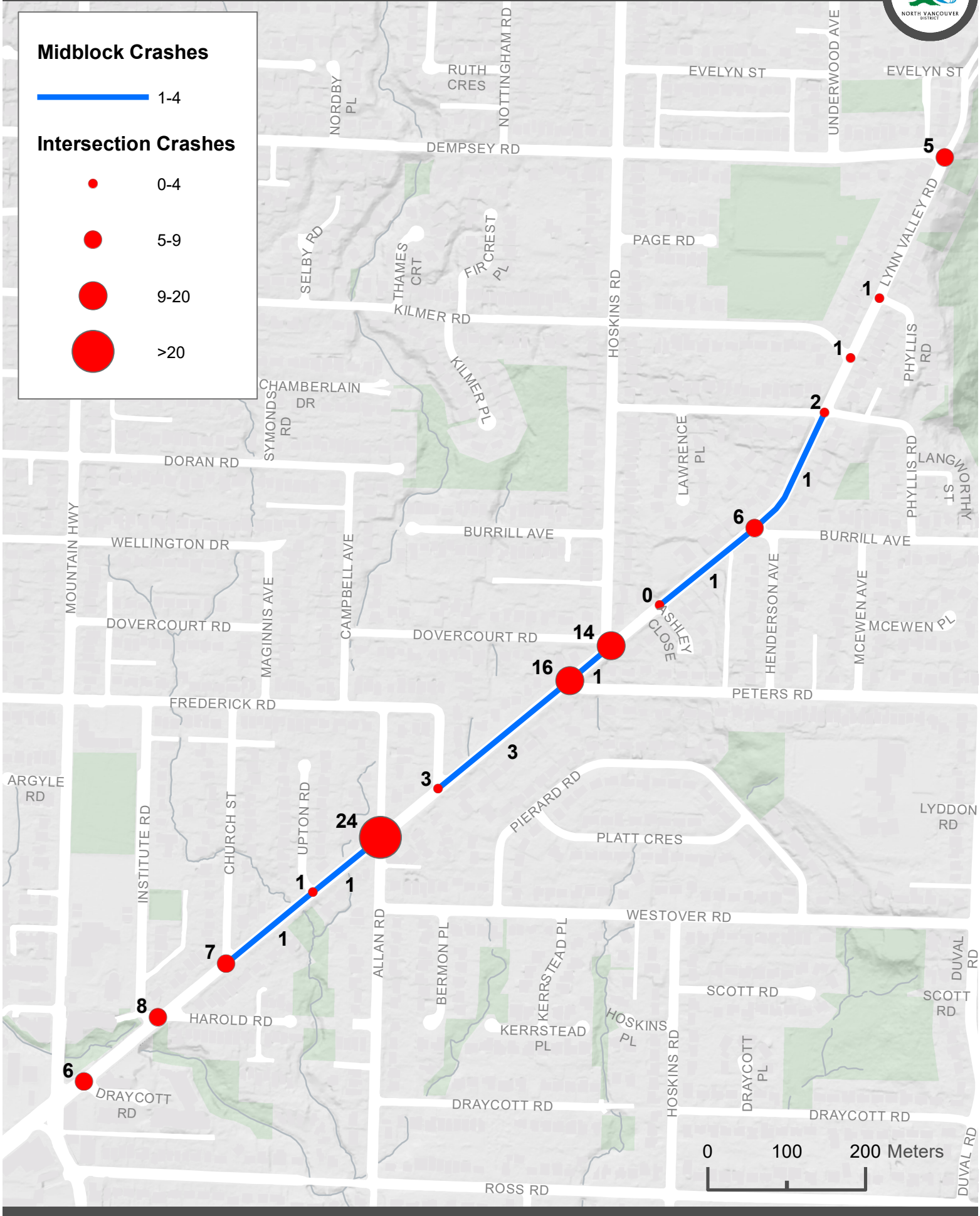
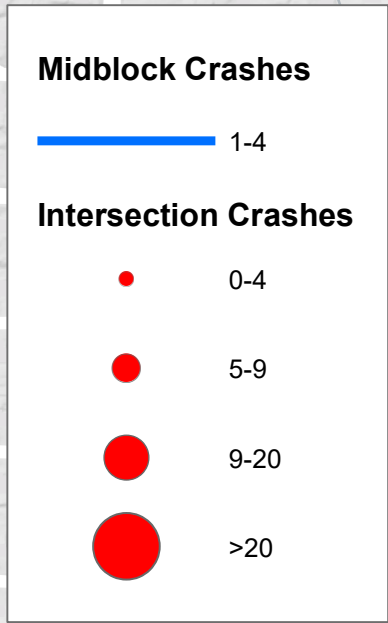
Stop 53989: Northbound Underwood Ave @ Evelyn St

APPENDIX C: COLLISION MAPS

(CREATED BY DISTRICT OF NORTH
VANCOUVER)



Number of Crashes Along Lynn Valley Road (2007-2017)



Legend

Rear-end collisions →→

Head on collisions →↖

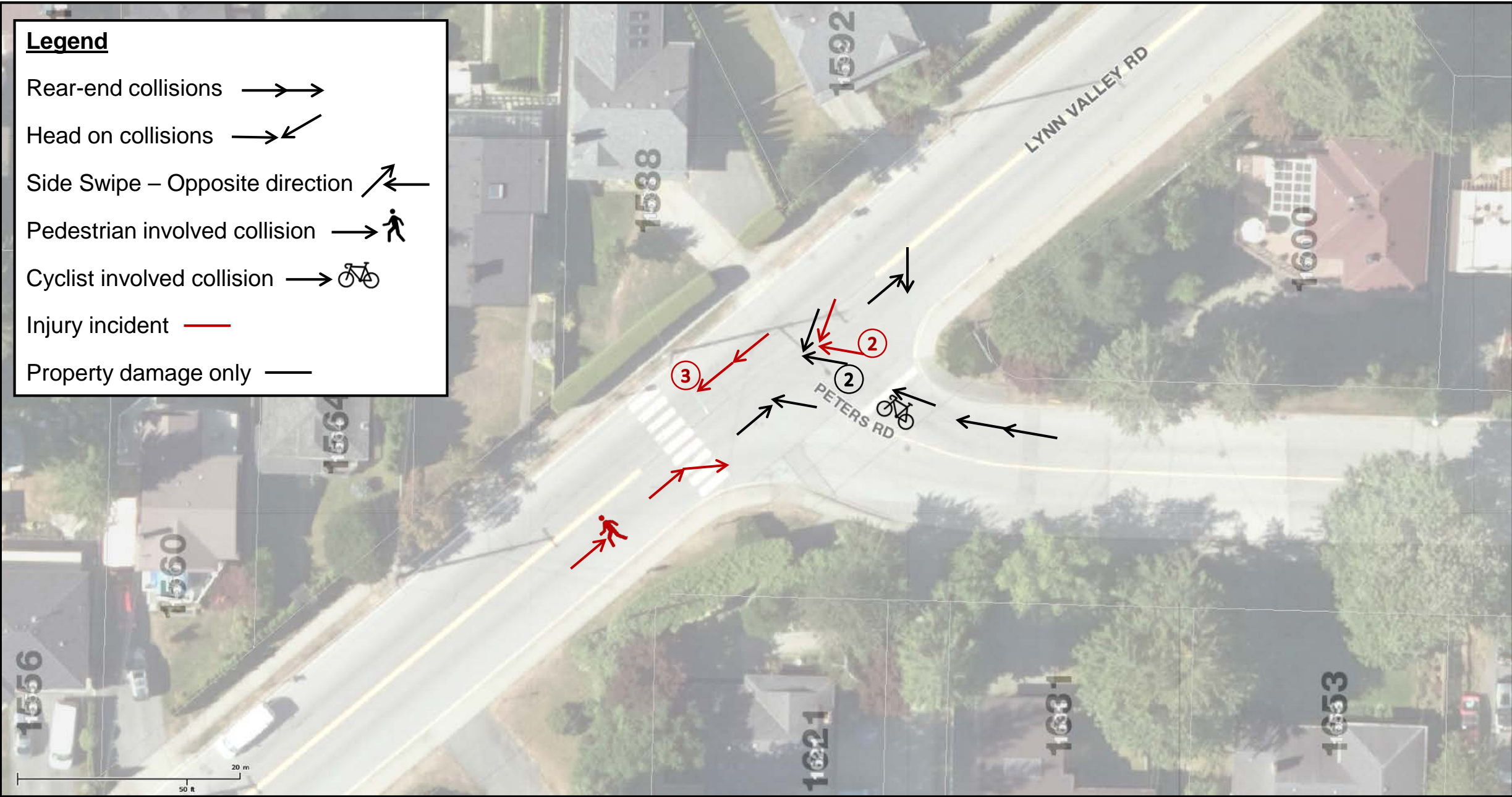
Side Swipe – Opposite direction ↗←

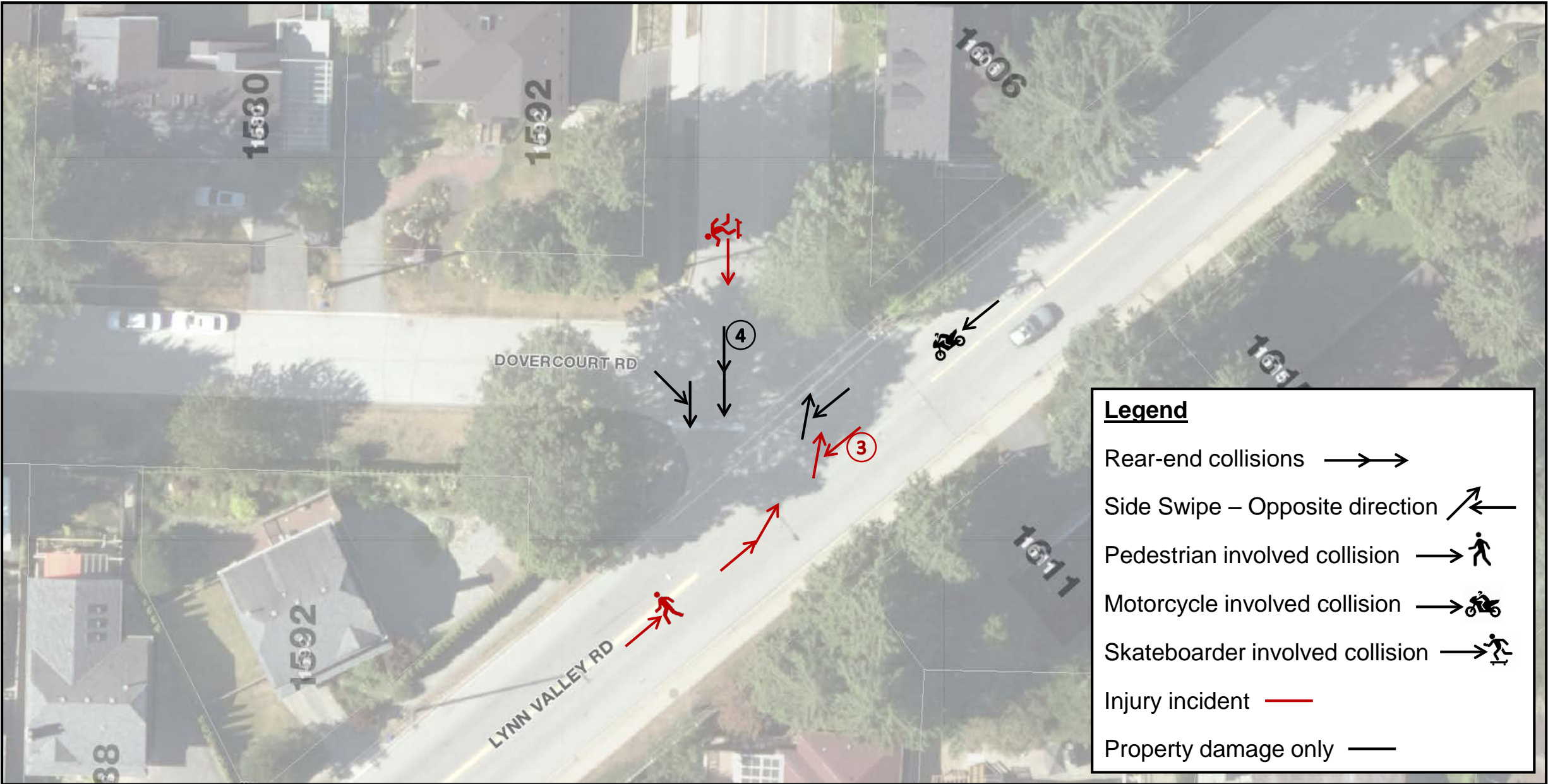
Pedestrian involved collision →🚶

Cyclist involved collision →🚲

Injury incident —

Property damage only —





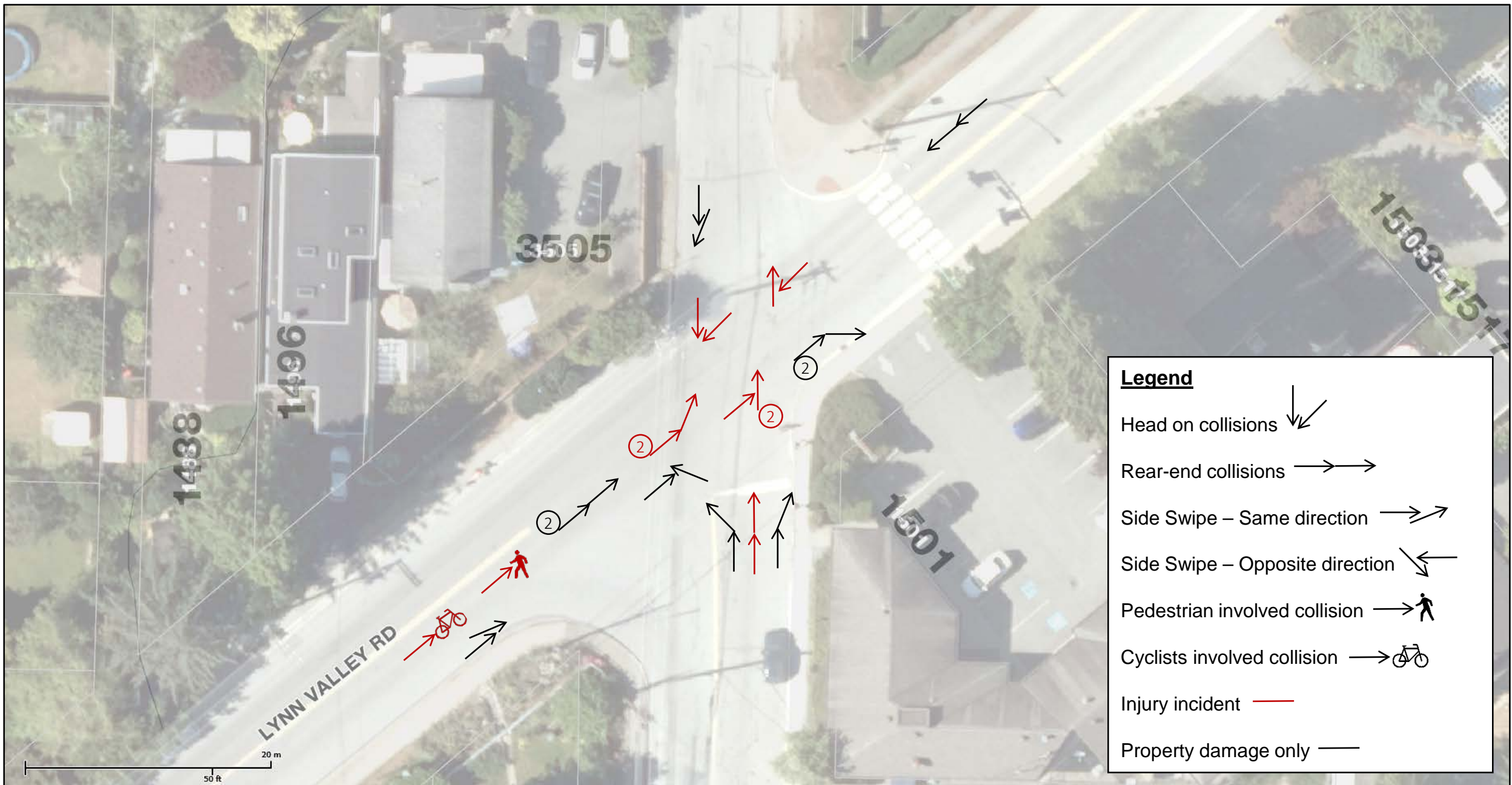
Legend

- Rear-end collisions →→
- Side Swipe – Opposite direction ↗↖
- Pedestrian involved collision → 👤
- Motorcycle involved collision → 🏍️
- Skateboarder involved collision → 🛹
- Injury incident — (red line)
- Property damage only — (black line)

Lynn Valley Rd & Hoskins Rd/Dovercourt Rd intersection

Crash History Map (2007-2017)

Jan 14, 2020



Legend

- Head on collisions
- Rear-end collisions
- Side Swipe – Same direction
- Side Swipe – Opposite direction
- Pedestrian involved collision
- Cyclists involved collision
- Injury incident
- Property damage only

Lynn Valley Rd & Allan Rd intersection

Crash Map (2007-2017)

Oct 11, 2019



APPENDIX D: PARKING UTILIZATION DAILY PROFILES

