



# Technical Memorandum: Network Assessment – Draft V2

Project: City of West Kelowna – Transportation Master Plan

Subject: Network Assessment

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# 1 Introduction

## 1.1 Background

The City of West Kelowna (City) is embarking on the development of a new Transportation Master Plan (TMP) to guide the strategic development and capital planning of their active transportation, transit, and vehicle networks. The TMP will include future projects, programs, and policies to improve transportation for the citizens of West Kelowna and prepare for growth and change.

The TMP is being completed at the same time as an update to West Kelowna's Official Community Plan, providing an opportunity to coordinate the two plans to align land use and transportation.

This technical memorandum, the Network Assessment, provides the initial context for the TMP. It includes descriptions of the existing network and operations, and the current planned future network and conditions. The final section, Next Steps - Issues and Opportunities, summarizes the upcoming task that will generate a summary of the primary existing and anticipated future transportation issues that the city is facing, the opportunities that can be explored to improve the transportation network and mobility for the citizens of West Kelowna. Figure 1 shows the boundaries for West Kelowna (study area) for this Network Assessment and the TMP. The study area does not include Westbank First Nation (IR#9 and IR#10), which are shaded grey.

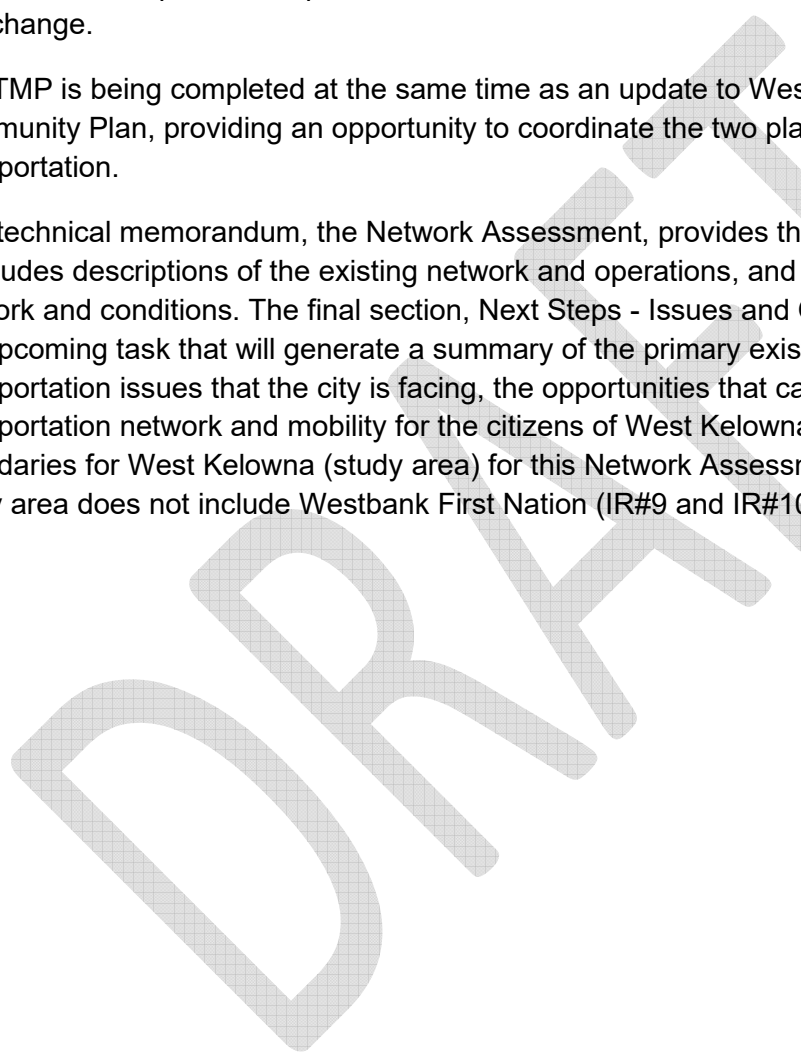
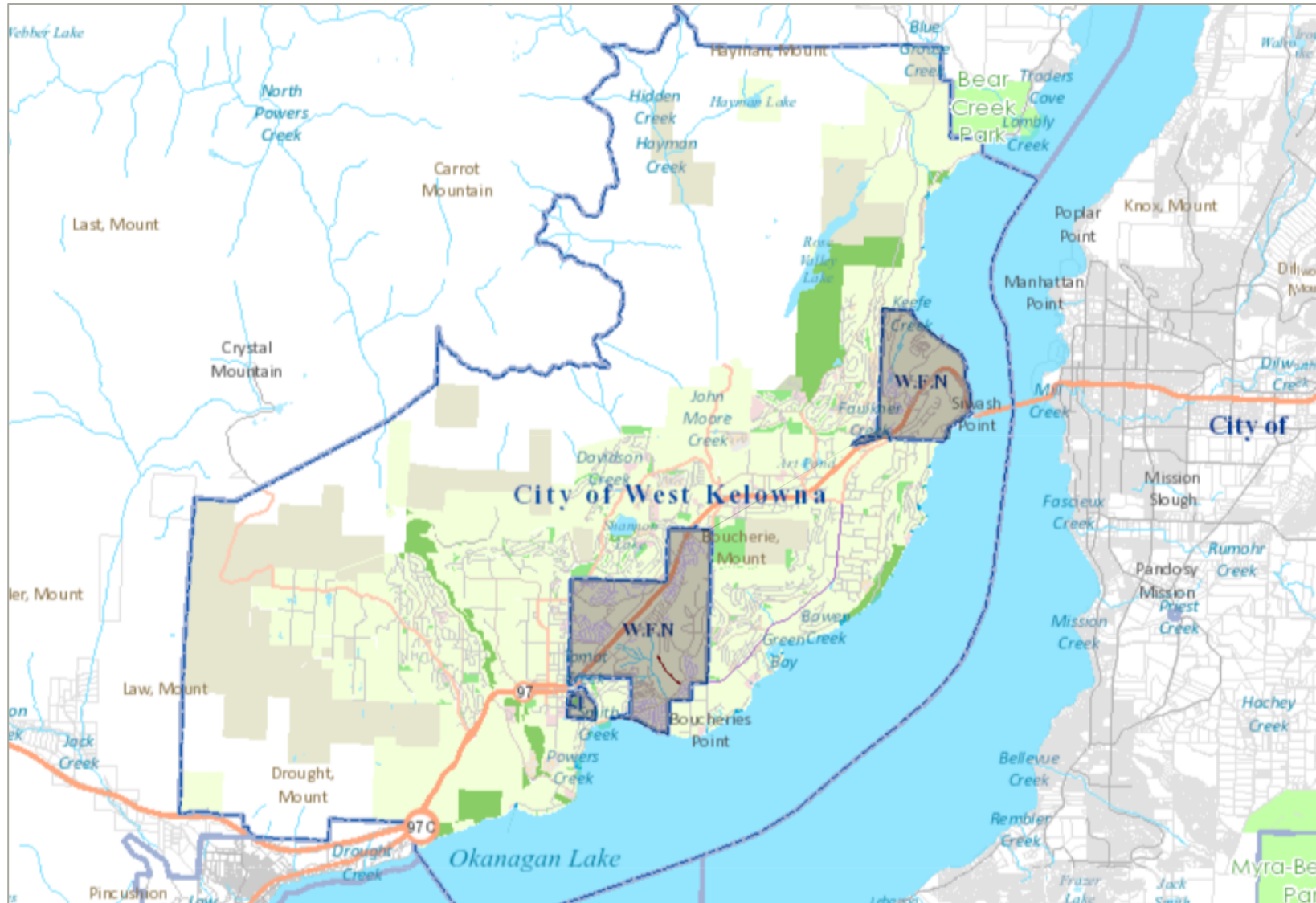


Figure 1: Study Area



## 1.2 Data Sources / Studies

There are a number of historical plans that provide context for past planning in West Kelowna. The major recent plans are summarized below, and aspects that relate to West Kelowna have been identified and described.

### 1.2.1 2014 Transportation Master Plan

The City of West Kelowna retained Boulevard (now Watt Consulting Group) to complete a TMP for the City in 2014. The study included new road cross sections, and capital plans for the 5 to 20-year horizons with a variety of projects, including intersection upgrades, active transportation improvements, and recommendations for corridor studies to advance the planning for various initiatives and ideas.

A major consideration in the 2014 TMP was a bypass on the north side of the city, called a “New Connector Route”, with connections to an extended Bartley Road and Smith Creek Road. This consideration has since been removed from consideration by the City and Ministry of Transportation and Infrastructure (MoTI). Projects that were identified in the study and have since been completed include intersection improvements at:

- Talus Ridge Drive / Shannon Lake Road.
- Boucherie Road / Hudson Road; and
- Boucherie Road / Cordova Way / Anders Road.

### 1.2.2 Central Okanagan Regional Transportation Plan

The Sustainable Transportation Partnership of Central Okanagan (STPCO)'s Regional Transportation Plan (2020) was developed in partnership with the City of Kelowna, the City of West Kelowna, District of Lake Country, District of Peachland, Westbank First Nation, and the Regional District of Central Okanagan (RDCO) to identify transportation projects and priorities that help connect people and places across the region. Key recommendations included projects along Highway 97, such as adding dedicated transit lanes in some locations and widening the shoulder in others to improve transit travel time and reliability. Other recommendations included adding 81 kilometers of new regional bicycling and trail facilities. Some of the major projects affecting West Kelowna included:

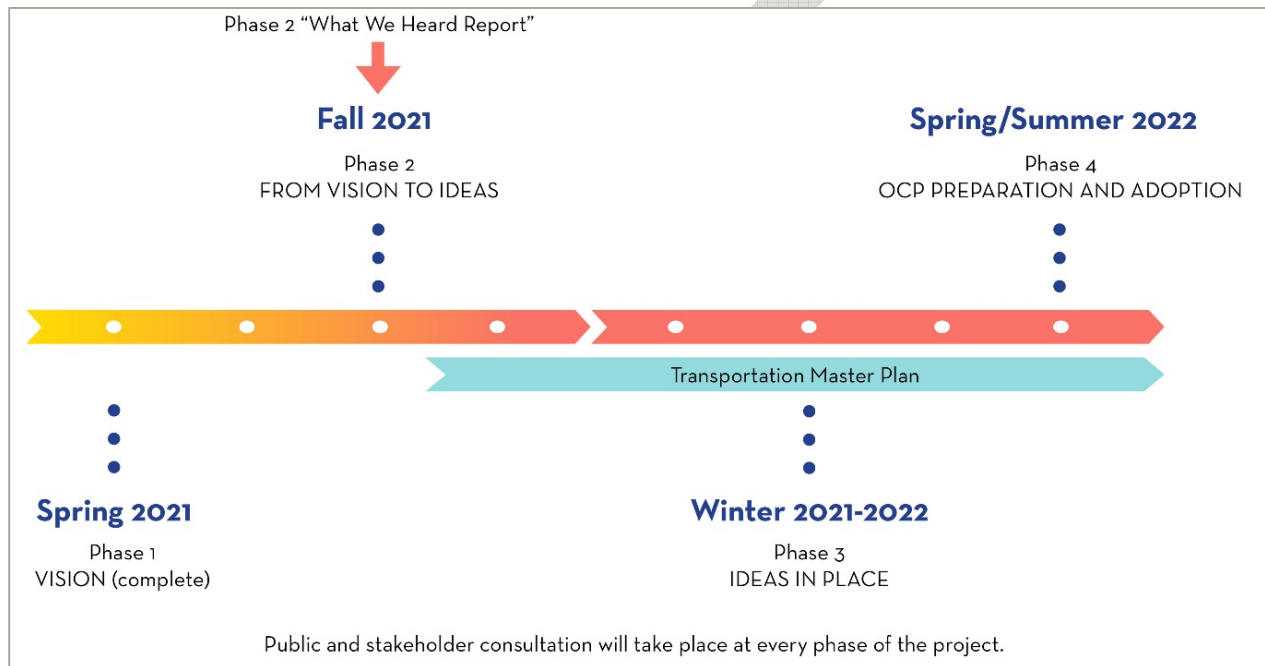
- Eastbound Transit Lane on the WR Bennett Bridge (Morning only)
- Westside Highway 97 Shoulder Transit / Park and Ride
- Active Transportation Route Parallel to Highway 97
- Completion of the Westside Trail

The Plan's suggested infrastructure improvements are supported by recommendations for policies, programs, and services. Altogether, the contents support the goals and vision of the region as well as municipal and provincial planning and policy already in place.

### 1.2.3 Official Community Plan (OCP) Renewal

The City is concurrently updating their Official Community Plan, with continued coordination between the OCP and the TMP processes. The OCP update will provide a plan for growth over the next 20 years. The OCP is currently in Phase 2: From Vision to Ideas, which involves collaboration with the development of the TMP at the end of the phase. There is continuous public engagement throughout the process and adoption of the final OCP is planned for Summer 2022, as shown in Figure 2. The updated land use plan will identify and inform the new TMP regarding the future growth areas in the City.

**Figure 2: Project Schedule for West Kelowna's OCP**



Source: (Source: City of West Kelowna, 2021, <https://www.ourwk.ca/ocp>)

### 1.2.4 Central Okanagan Planning Study

The Central Okanagan Planning Study (COPS) was a study of the highway corridors through the Central Okanagan, including West Kelowna. Phase 1 of the study has been completed and included existing and future condition assessments and public engagement. In West Kelowna, potential options that were considered include options for the Westbank Urban Centre. One of the options for this area was to consolidate the highway to Dobbin Street on a six-lane cross section (leaving Main Street as a two-way community street).

### 1.2.5 Central Okanagan Integrated Transportation Study

The Central Okanagan Integrated Transportation Study (COITS) is the second phase of COPS. The study is currently underway and will include recommendations along the Highway 97 corridor, including within West Kelowna.

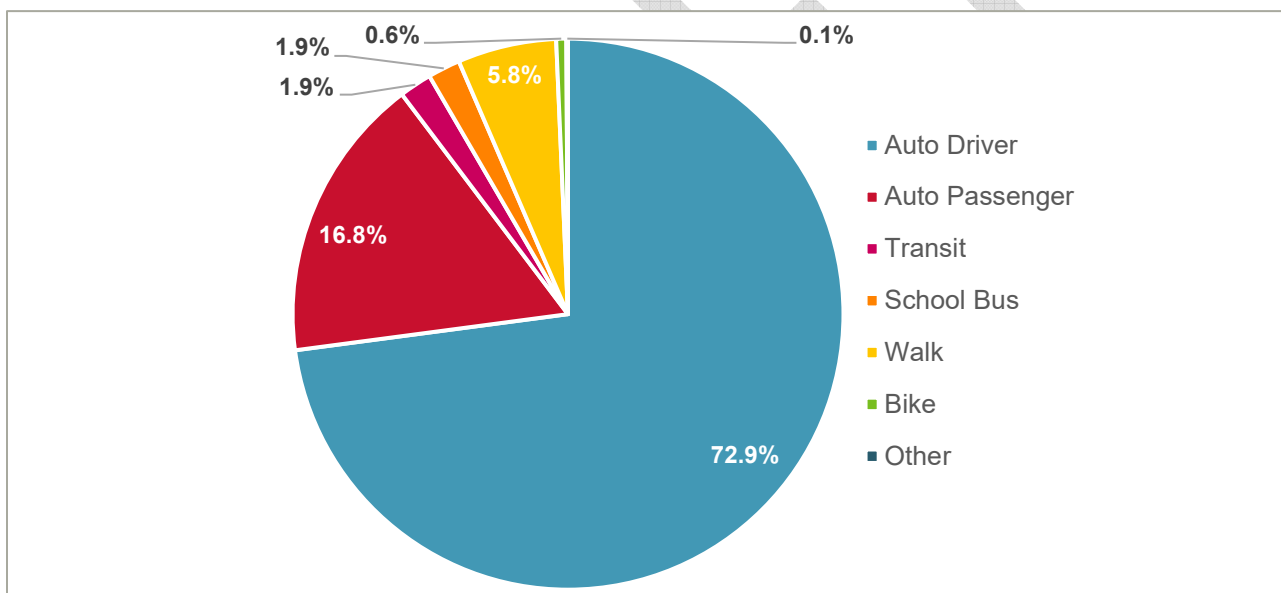
## 2 Travel Patterns

Understanding why, how, and where people travel within and to/from West Kelowna is an important consideration for understanding how the transportation network is used. The information in this section is primarily from the 2018 Okanagan Travel Survey and 2016 Journey to Work Census data. The Travel Survey includes information about all trips within the region, while the Census data provides information for all work-related travel in West Kelowna.

### 2.1 Mode Share

Figure 3 shows mode shares for all trips in West Kelowna based on the 2018 Travel Survey. Trips are primarily (89.7%) made by car as both passenger and driver. Walking and bicycling combined make up 6.4% of the mode share, while transit is 1.9%. Most trips in the Central Okanagan are to work, grade school, post-secondary, and back home. The rest of the trips (45%) are shopping, personal business, or other trips<sup>1</sup>.

**Figure 3: Mode Split for All Trip Purposes**



Source: Okanagan Travel Survey, 2018 & Central Okanagan RTP, 2020

### 2.2 Trip Location

The majority of trips by West Kelowna residents are local self-contained trips that both begin and end in West Kelowna<sup>2</sup>, yet Table 1 shows that less than 30% of work trips that start in West Kelowna end there. The rest of the work trips involve commuting to other municipalities within or outside of the Central Okanagan. The Okanagan Travel Survey noted that West Kelowna represents 13% of all workers and 9% of all places of work, with many workers living in West

<sup>1</sup> Central Okanagan Regional Transportation Plan, 2020

<sup>2</sup> The Central Okanagan Transit Future Action Plan (2012), <https://www.bctransit.com/documents/1529707596498>



Kelowna commuting to other communities. Trips to/from Kelowna are common, and primarily occur during AM and PM peak travel periods. The Transit Future Plan states that in 2012, 9% of all travel (all modes) in the region used the WR Bennett Bridge to travel between Kelowna and West Kelowna<sup>3</sup>.

Kelowna is the only municipality where over 50% of work trips are self-contained, and in the rest of the municipalities, including West Kelowna, the bulk of residents travel outside of their municipality for work. West Kelowna and WFN also have a notable share of commuting trips outside of the region (as shown in Table 1), with 6% travelling to destinations including Vernon, Summerland, and Penticton.

**Table 1: Commuting Destinations**

Location	Total Commuting Destination	Residents Commuting within Municipality	Residents Commuting Elsewhere within Region	Residents Commuting to Different Region within British Columbia	Residents Commuting to a Different Province or Territory				
<b>West Kelowna</b>	11,660	3,250	28%	7,490	64%	690	6%	235	2%
<b>Central Okanagan</b>	72,150	49,025	68%	17,915	25%	3,810	5%	1,400	2%

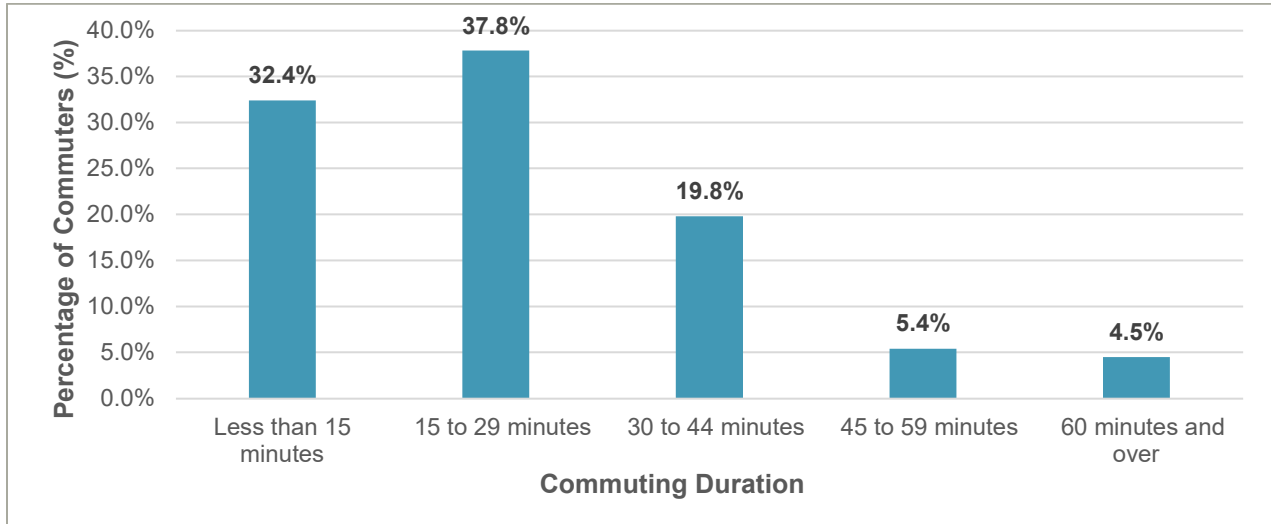
Source: Journey to Work, Census 2016

Average commute durations for West Kelowna residents are shown in Figure 4. The average commuting duration is 22.5 minutes for West Kelowna residents, which is slightly lower than the Kelowna CMA average of 24 minutes, and lower than the provincial (25.9 minutes) and national (26.2 minutes) averages (Census, 2016). The figure shows that only 30% of the population has an average commute time that is over 30 minutes. These commuting trends have likely shifted since 2016 due to COVID. Only 9.9% of the population in West Kelowna worked from home in 2016, but this number has likely increased since 2020.

<sup>3</sup> The Central Okanagan Transit Future Plan (2012), <https://www.bctransit.com/documents/1507213427854>



**Figure 4: Commuting Duration for West Kelowna’s Employed Labor Force (Census 2016)**



### 2.2.1 Summary

West Kelowna residents travel primarily by car (89.7%), and their auto mode share is approximately the same as the regional average of 89.1%, but higher than the City of Kelowna (83.8%). There are more self-contained trips within West Kelowna than most of the other municipalities in the region, with the exception of the City of Kelowna. Nearly half of these trips are for shopping or personal business, while trips to work, grade school, and post-secondary comprise the majority of the trips in the Central Okanagan<sup>4</sup>. Over 70% of the West Kelowna residents work in the region but outside of West Kelowna, and their average commute time is less than the regional average at 22.5 minutes.

<sup>4</sup> Central Okanagan Regional Transportation Plan, 2020

# 3 Active Transportation

## 3.1 Planning Context

There are a number of recent plans, studies and bylaws that provide the framework for active transportation planning and policy in West Kelowna. This section provides a brief summary of the main documents.

### 3.1.1 2018 Okanagan Travel Survey

Examines the relevant transportation and travel trends in the Okanagan Region in 2018, comparing them to the last time this survey was completed in 2013. This includes an examination of the regional trends in driving and licensing, cycling and bicycle ownership, mobility challenges, trip volumes and associated demographics, sustainable and active mode shares, and inter-regional traffic flows.



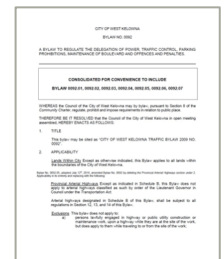
### 3.1.2 Regional Disruptive Mobility Strategy

Developed with the Regional Transportation Plan, the Regional Disruptive Mobility Strategy provides the Central Okanagan Regional District with a toolkit for managing potential new technology and their impacts on the mobility choices of residents and visitors. The report outlines Tactical Actions for Municipalities under one of five headings: connected, self-driving, shared, electric, and funding and growth. Each of these sections also outlines the primary actor, any additional participants or related groups, and related actions within the strategy.



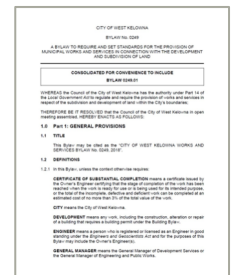
### 3.1.3 West Kelowna Traffic Bylaw (0092)

This document sets the general regulations for the use of streets in West Kelowna, including their use, prohibitions, permits, and enforcement, including general speed limits in the city and lanes. This document also governs the use of bicycles and other micromobility devices in West Kelowna, setting rules for which infrastructure they can use.



### 3.1.4 West Kelowna Works and Services Bylaw (0249)

Section 2 in this document outlines the geometric designs of West Kelowna's streets and defines the classification and hierarchy of the street system. This document also outlines the specifications towards bike lanes and multi-use pathways, boulevards and streetscaping, intersections, sidewalks, trails, and others.



### 3.1.5 West Kelowna Recreational Trails Master Plan (2013)

Outlines the existing trails network within West Kelowna and the Westbank First Nation, sets out the vision for a fully built out trails network for the area. This document includes a Trail Framework, goals, and objectives for the network, design guidelines for the trails, and an implementation plan including funding strategies and short (1-10 years), medium (10-20 years), and long term (20+ years) trail connections to fill out the network.



### 3.1.6 West Kelowna Parks Master Plan (2016)

This document outlines the overall direction for park management for a ten-year time frame. This document is intended to be a living document, with annual adjustments made to reflect differing opportunities and priorities of the public. The Plan summarizes the current parks system, provides a mission and goals for future parks provisions, and provides recommendations (both capital and operational) for growing the parks network.



The Regional Transportation Plan and Bicycle and Trails Master Plan are also important contextual documents for active transportation and were introduced and briefly summarized in Section 1.2.

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## 3.2 Networks

The City of West Kelowna provided data on the location of current active transportation facilities, including sidewalks, and cycling infrastructure. Figure 5 shows the existing sidewalks in the City as of 2020. As much of West Kelowna was originally built to a rural standard, the current sidewalk network is somewhat piecemeal and disconnected.

Outside of Westbank Urban Centre, most other centers and residential areas have limited or no sidewalks. Newer residential neighborhoods generally have better provision of sidewalks; however, many of these areas are effectively disconnected from the overall network, making it difficult to travel beyond one's own neighborhood.

Figure 6 shows the existing cycling network, and for context also includes the planned bike networks from the City's 2015 Bikeway Plan and from the recent Regional Bicycling and Trails Master Plan. A list of some of the primary routes, their extents, and facility type are included in Table 2.

Existing facilities are shown as solid green and blue lines, while planned facilities are shown as dashed lines. The current cycling facilities consist primarily of supporting regional facilities on Highway 97, west of Westbank Urban Centre, on Boucherie Road between Hudson Road and Ogden Road, and portions of the Westside Trail, which is part of the Regional level network and is generally parallel to the west side of Okanagan Lake. There are also several bike lane crossings across Hwy 97 at Westlake, Horizon/Boucherie, along with Nancee Way and Westside Road in IR #10 near the Bennett Bridge.

The City's most recent cycling network plan (2015) is shown in purple for context and comparison against the most recent Regional Plan. There is reasonable overlap between planned local and regional bikeway networks along the Westside Trail route (Gellatly, Boucherie), along East Boundary Road, and through Westbank Urban Centre. However, a noticeable omission from the local plan is a lack of a connection between the Westbank Urban Centre and the Steven's Road Area. It appears that the local plan lacks basic connections between regional centers, and direct routes for commuter cyclists linking from surrounding neighborhoods to the town centers.

The regional plan recommends high quality All Ages and Abilities (AAA) facilities along Primary (Regional) Spine routes (shown in green) with the Supporting Routes (blue) of lesser quality making connections between the regional spine and local town centers. Routes indicated as "upgrade" have been flagged to be improved over time in order to create AAA connections, or to separate pedestrians from cyclists at high volume locations.



**Table 2: Primary Active Transportation Facilities**

<b>Street</b>	<b>From/To</b>	<b>Facility Type</b>
<b>Highway 97</b>	Westbank UC, Seclusion Bay Rd	Bike Accessible Shoulders
<b>Goats Peak Pathway</b>	Seclusion Bay Rd, Whitworth Rd	Unpaved trail
<b>Kalamoir Trail</b>	Sunnyside Rd, Benedick Rd	Unpaved Trail
<b>Gellatly Road</b>	Gellatly Rd S, S of Boucherie Rd	MUP
<b>Boucherie Road</b>	Stuart Rd, Ogden Rd	Bike Path
<b>Green Bay Road</b>	Boucherie Rd, Private Driveway	Bike Lanes
<b>Westlake Road</b>	Stevens Rd, Hudson Rd	Bike Lanes
<b>Horizon Drive</b>	Boucherie Rd, Stevens Rd (extension)	Bike Lanes
<b>Bennett Bridge</b>	Kelowna, Campbell Rd	MUP
<b>Nancee Way (WFN)</b>	Katherine Rd, Sneena Rd	Bike Lanes
<b>Westside Rd (WFN)</b>	Sneena Rd, N side of Hwy Overpass	Bike Lanes
<b>Boucherie Road (WFN)</b>	E of Gellatly (WFN Private Beach), Old Boucherie Rd	Bike Lanes
<b>Sneena Road (WFN)</b>	Boucherie Rd, Campbell Rd	Bike Lanes

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Figure 5: Sidewalk Network

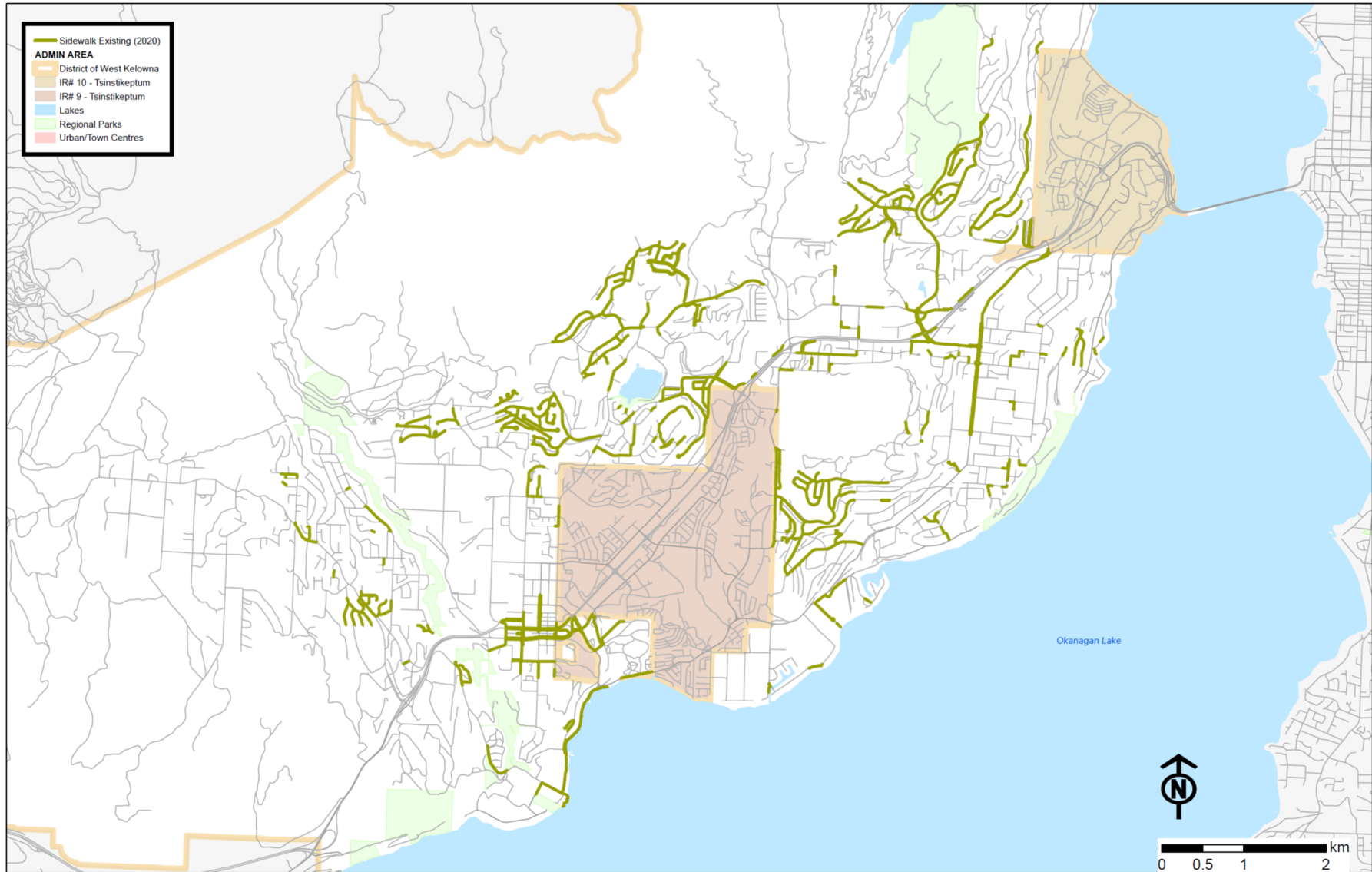
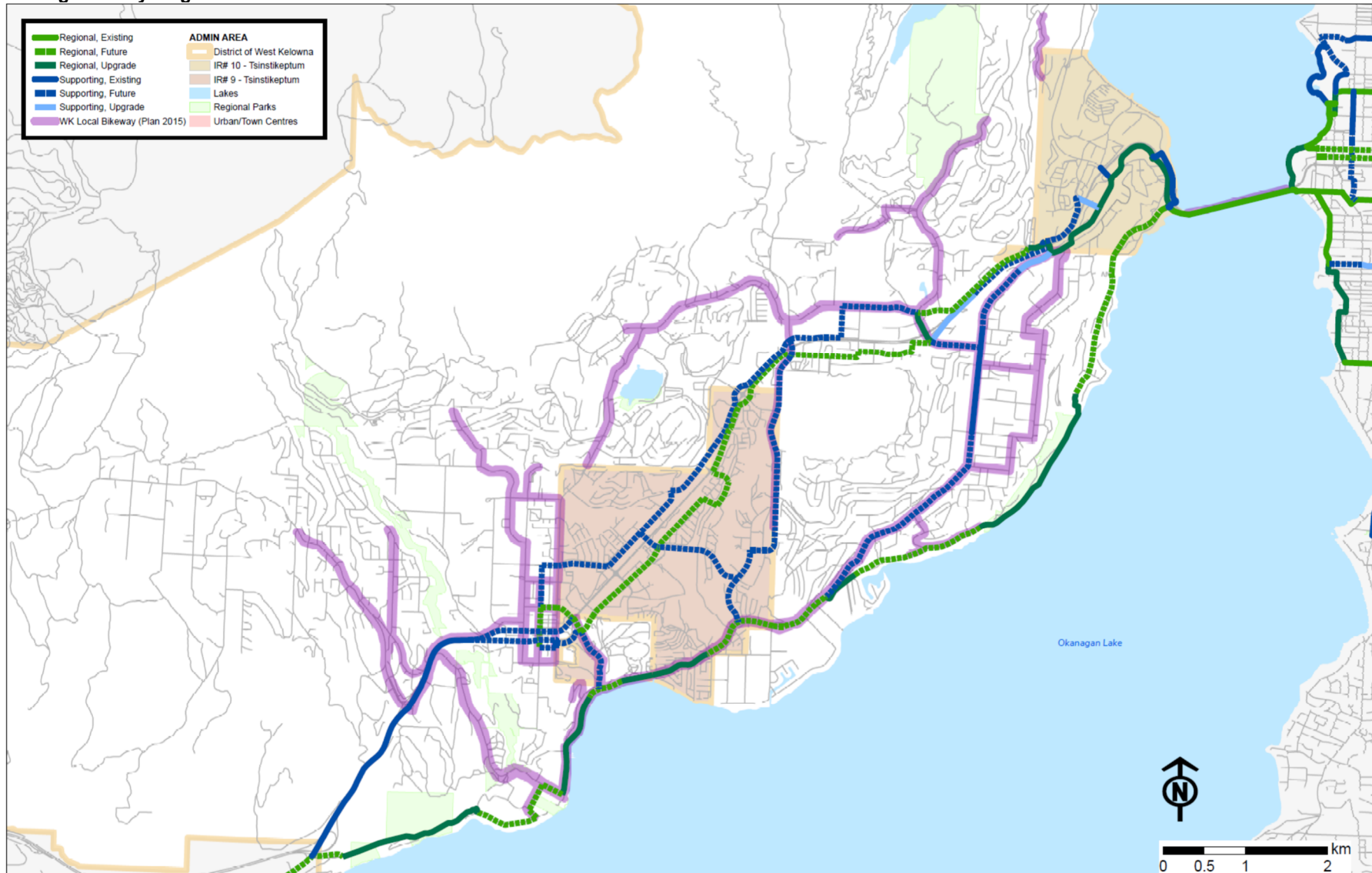


Figure 6: Cycling Network



### 3.3 Use

The City of West Kelowna partnered with the University of British Columbia Okanagan Centre for Transportation and Land Use (CETLUR) group to conduct active transportation counts at key locations to inform the TMP.

The new counts were collected by CETLUR during the week of October 11<sup>th</sup>, 2021, and additional counts were provided by the City. The weather during the week was a mix of sun and clouds, with temperatures around the average for this time of year (2°C daily low and 13°C daily high)<sup>5</sup>. Figure 7 provides a summary of the active transportation counts that were conducted by CETLUR. The table on the top right of the graphic shows the hourly volume of active transportation users (pedestrians and cyclists) that were captured in each time period (AM, Mid-Day, and PM peak hours), and the bars on the graphic visually show the volume of pedestrians and cyclists at the count location for each time period. The count locations were chosen to provide an understanding of the overall level of active transportation use and were conducted on routes that are expected to have higher levels of active transportation use.

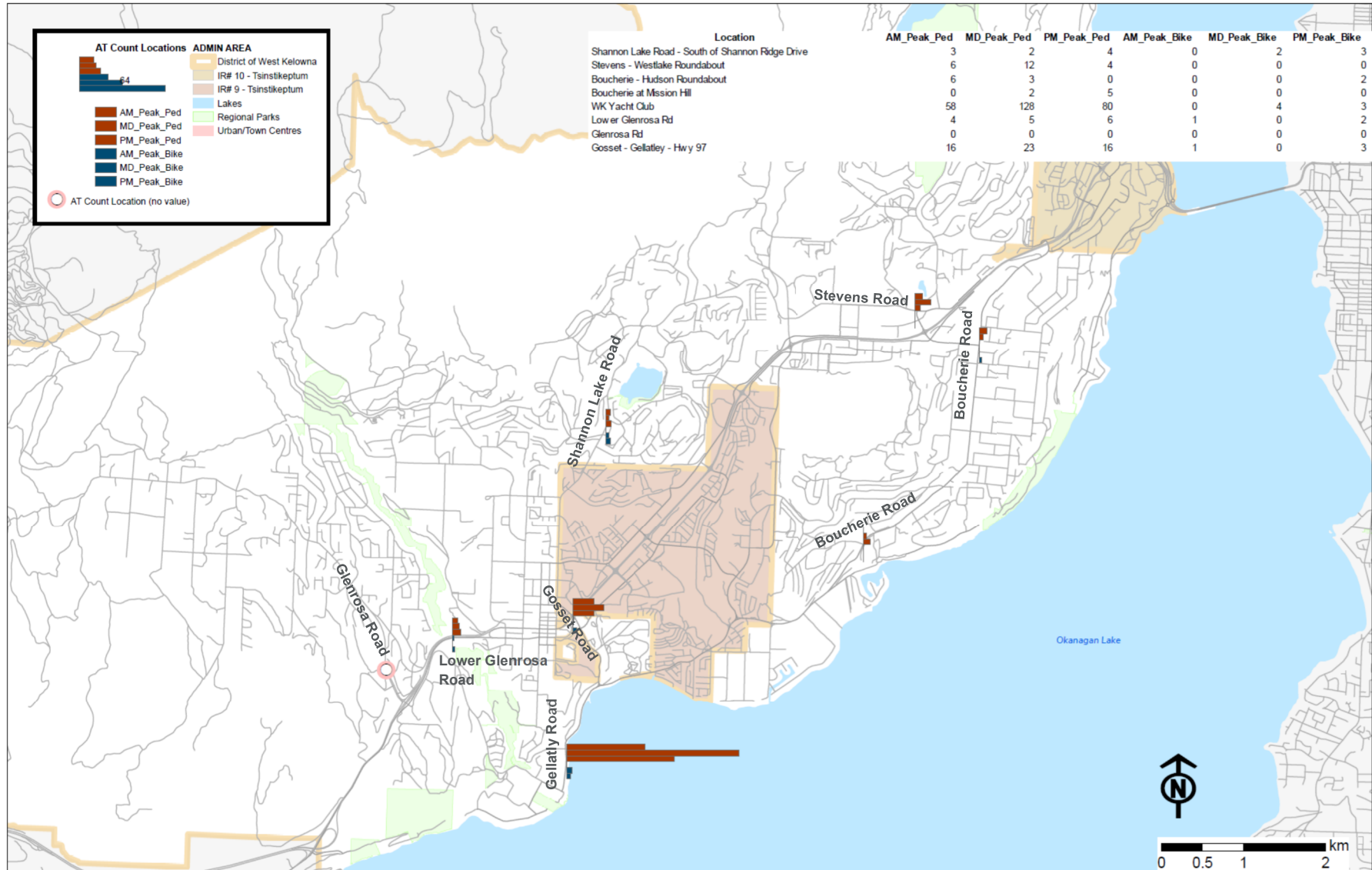
Active transportation use observed on some of the routes was limited, with zero pedestrians or cyclists observed during the AM peak hour at 6 of 8 count locations. However, there were greater volumes of active transportation users in the afternoon and evening, which indicates primarily recreational use (as opposed to commuting). Locations with AAA bicycle or high-quality pedestrian infrastructure tended to have much higher usage. For example, the multi-use pathway along Gellatly Road near West Kelowna Yacht Club is well used, with 128 pedestrians counted at the midday peak, as compared to a combined 48 pedestrians at the remaining 8 locations. Alternatively, zero people were observed walking or cycling on Glenrosa Road (north of Dunfield Road) on the data collection day.

The cycling volumes captured by the counts were limited, and potentially too sparse to draw any concrete conclusions from, beyond the fact that cycling volumes are limited. Some cyclists were observed on the multi-use pathway adjacent to the West Kelowna Yacht Club, suggesting that the increased provision of higher quality cycling facilities is likely to encourage and support more cycling. Likewise, higher pedestrian volumes in locations with sidewalks implies a latent demand for comfortable and safe walking infrastructure.

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<sup>5</sup> <https://www.timeanddate.com/weather/canada/kelowna/climate>

Figure 7: Active Transportation Use



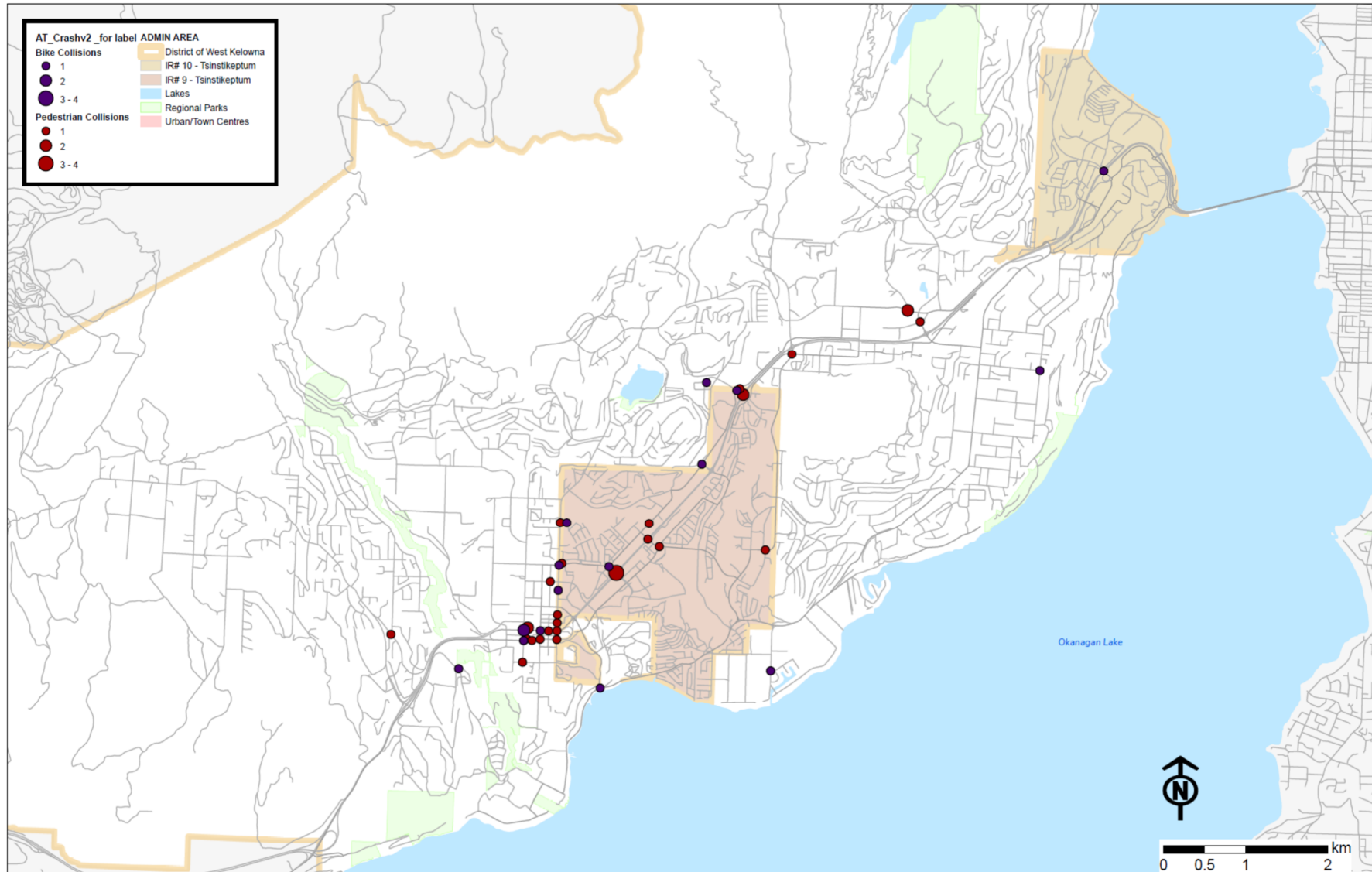
### 3.4 Collision Analysis

Collision records were obtained from ICBC for between 2015-2020, and collisions involving pedestrians and cyclists were extracted from the data for analysis. Figure 8 shows the collisions involving pedestrians and cyclists during the data period. Larger dots indicate a higher number of collisions at each location, and the blue dots represent collisions involving a cyclist, while the red dots represent collisions involving pedestrians.

Many of the collisions occurred at the intersections along Highway 97 and on the adjacent parallel routes. There was also a higher number of collisions that occurred in Westbank Urban Centre. Although the highway splits directionally through Westbank Urban Centre (along Main and Dobbin) and slows to 50km, there were still a number of collisions recorded on both sides of the highway. It is noted that there were no collisions involving cyclists on any routes with designated bike infrastructure.

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Figure 8: Collision Occurrences



### 3.5 Micro-mobility

The term micromobility refers to a wide range of vehicles that are human powered, electrically assisted, electrically or gas powered, capable of different speeds and of varying weight. They range in size and weight from small kick scooters, weighing under 5 kilograms (kg) to limited speed motorcycles weighing approximately 100 kg and able to reach speeds of over 70 kilometers per hour. Appendix A provides a brief overview of the different types of devices that are available.

The province has introduced enabling legislation that will establish rules to govern the use of micromobility devices and has also recently initiated a process to pilot shared micromobility. Local jurisdictions have historically set their own, and sometimes conflicting rules, concerning micromobility, creating potential challenges for interoperability between municipalities.

Despite the lack of clear regulations, the variety of micromobility vehicles in operation on streets and pathways in BC is becoming increasingly diverse and the numbers are growing. On any given day in Central Okanagan, one can encounter scooter style e-bikes, e-scooters, e-skateboards, hoverboards and electric unicycles operating on bikeways and streets throughout the region.

All micromobility devices identified have the potential to play a role in supporting active transportation and transit and reducing reliance on automobiles. Micromobility devices provide a number of benefits, including:

- Offer limited emissions, low noise levels, and can offer the flexibility to be carried on public transit (except scooter-style e-bikes and limited speed motorcycles).
- Are generally popular and where available and accessible, are utilized as means of transport.
- Tend to support reductions in motor vehicle kilometers travelled; and
- Those that are permitted on designated cycling infrastructure have the potential to spur growth of infrastructure designed to serve bicycles and a growing range of low-speed vehicles.

Bicycles, pedal assist e-bikes, skateboards and push scooters offer the added benefit of allowing people to get physical exercise, thus supporting public health objectives.

Of these devices, bicycles and pedal assist e-bikes are most appropriate in rural and suburban settings like West Kelowna, where average trip distances tend to be longer, where grades are steep and where micromobility users may be obliged to travel on gravel, dirt, and uneven pavement.

The opportunities for supporting the uptake of micromobility, including shared micromobility, will be further explored in the next steps of the project, and will consider the feedback received from stakeholder consultation and direction from Council.

## 4 Transit

### 4.1 Network

BC Transit provides transit service to the City of West Kelowna through the Kelowna Regional Transit System. The system also services the communities of Peachland, WFN, Kelowna, and Lake Country. The transit network is composed of 29 routes and is shown in Figure 9. Route 97 runs primarily along Highway 97 from Westbank Exchange in West Kelowna to UBC Okanagan in Kelowna. It is a RapidBus Service and runs on weekdays about every 15 – 40 minutes in West Kelowna. Route 22 connects Peachland to Westbank Exchange and runs about every 50 minutes on weekdays. Route 88 is labelled as “Special” and runs from Okanagan College to Boucherie Mountain Transit Exchange. Route 70 is operated by the South Okanagan-Similkameen Transit System and runs between Penticton and Kelowna with a stop in West Kelowna.

The Kelowna Regional Transit System includes four layers of service:

#### Primary Network

(Mainly serves and connects Transit Core Areas within the Central Okanagan Region)

- **Rapid Transit Network (RTN):** Routes to/from regional destinations and along key transportation corridors. These routes typically have high volumes of passengers.
- **Frequent Transit Network (FTN):** Routes along key corridors with frequent transit service.

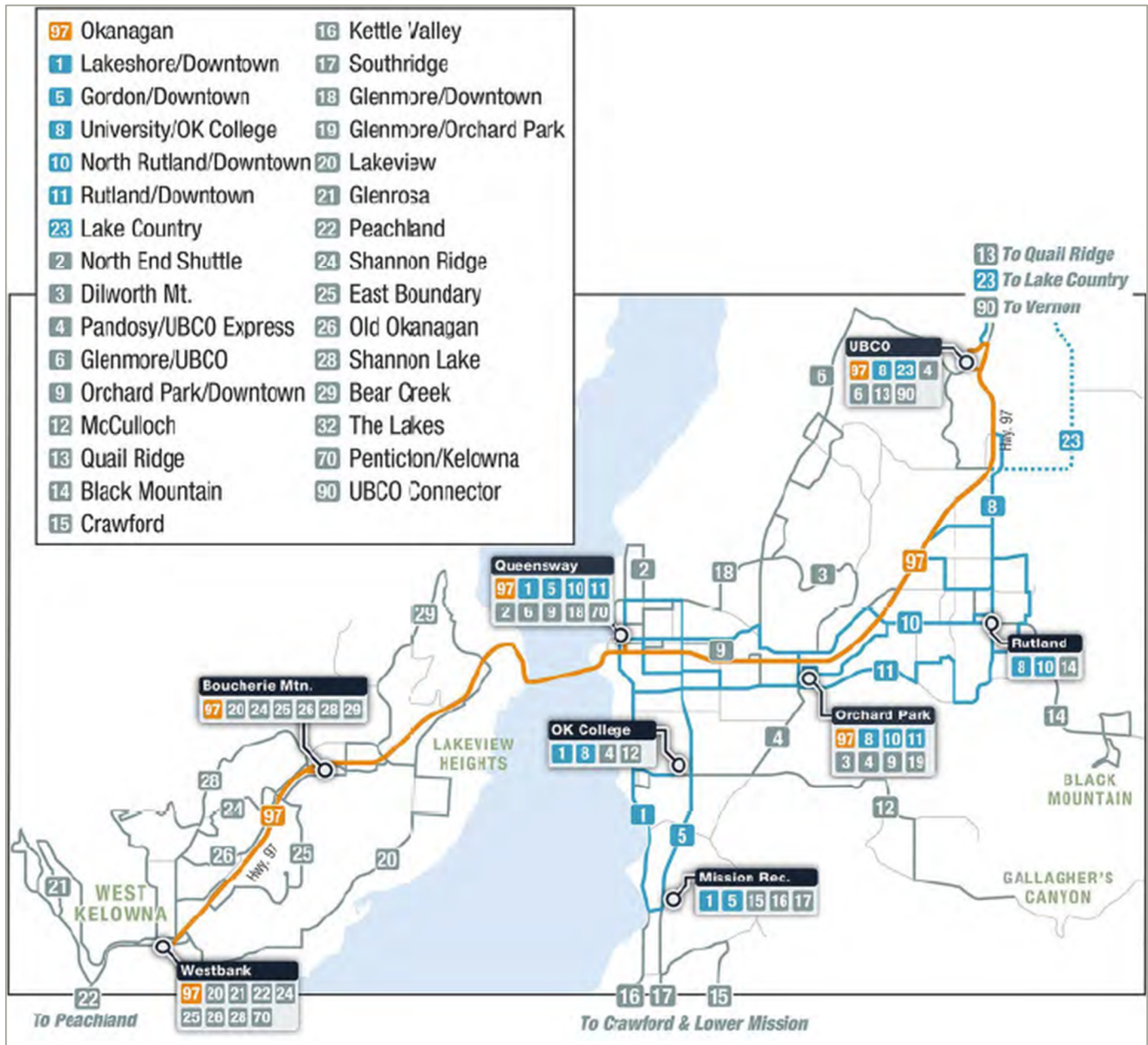
#### Secondary Network

(Local and targeted services)

- **Local Transit Network (LTN):** Connects neighborhoods within Transit Coverage Areas to other local stops as well as RTN and FTN.
- **Targeted Services:** Services such as handy DART, regional, express, and rural transit services that are within a fixed-route, conventional transit system. The handy DART taxi supplement, and taxi saver services are also provided by the custom transit system.

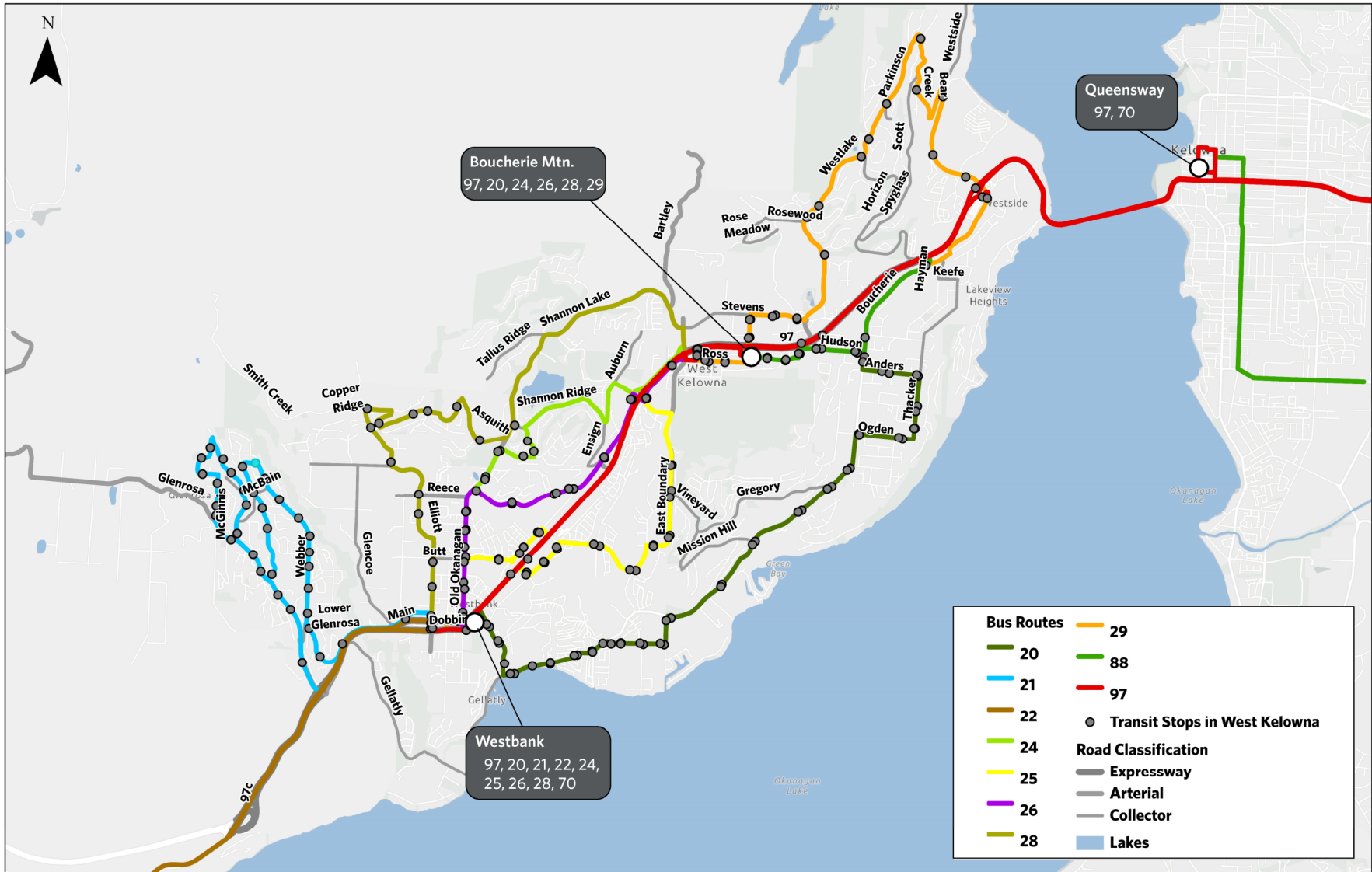
Figure 10 shows the transit network that runs through West Kelowna and WFN. It includes bus stops and transit exchanges, which include exchanges at Boucherie and Westbank Urban Centre.

**Figure 9: Kelowna Regional Transit Network**  
 (Rapid Transit Route in Orange, Frequent Transit Routes in Blue, and Local Transit Routes in Grey)



Source: BC Transit 2020

Figure 10: West Kelowna and WFN Transit Network





## 4.2 Service Frequency

Peak period headways for the transit routes in West Kelowna and WFN are shown in Table 3. Most routes have peak period headways (AM & PM) that are between 30-60 minutes, with a typical off-peak headway of 60 minutes. The only route with more regular frequent service is 97 – UBCO Connector, which has typical peak period frequencies of 15 minutes and off-peak frequencies of 30 minutes.

**Table 3: Peak Hour Headways by Route**

Route		Headway (min)				
#	Name	AM Peak	Mid-day	PM Peak	Evening	Saturday
20	Lakeview	30	60	30	60	60
21	Glenrosa	30	60	30	60	60
22	Peachland	30	60	30	60	60
24	Shannon Ridge	30	60	30	60	60
25	East Boundary	45	90	60	None	90
26	Old Okanagan	30	60	30	90	90
28	Shannon Lake	60	None	60	None	None
29	Bear Creek	30	None	30	None	None
70	Kelowna/Penticton	180	None	None	None	None
97	UBCO Connector	15	30	15	30	30

## 4.3 Ridership

Daily boardings and alightings for the transit routes that travel in West Kelowna were captured for one week in both 2019 and 2020, and the average boardings from this survey are shown in Table 4. Route 97 is the busiest, and the stops within West Kelowna make up 70% of the boardings for all stops within West Kelowna.

**Table 4: Average Daily West Kelowna Boardings (Oct. 7-11, 2019 & Oct. 5-10, 2020, Survey)**

Route	Boardings 2019	Boardings 2020
20	94	118
21	245	124
22	4	n/a
24	66	39
25	40	12
26	36	18
28	3	2
29	22	9
70	Ridership information not available	Ridership information not available
88	0	0
97	992	66

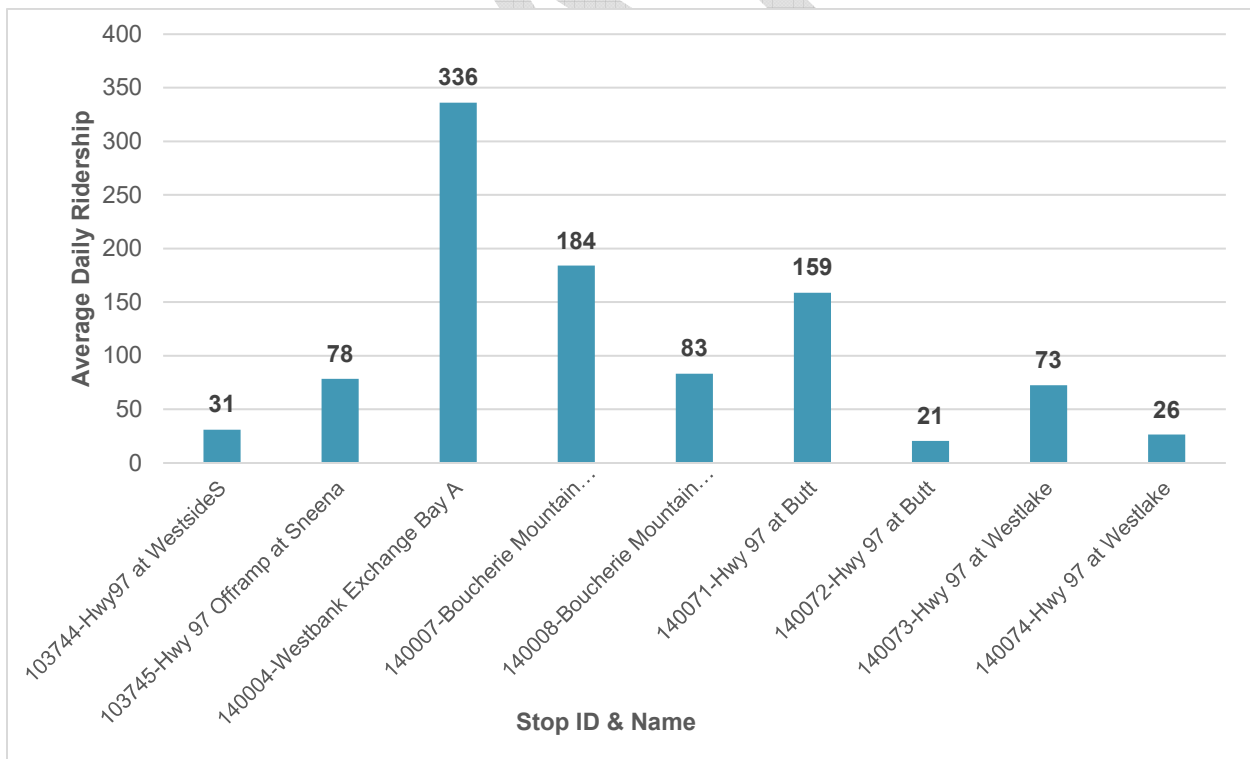


**Table 5: Route 97 Boardings in 2019 – Full Route vs. Stops Only in West Kelowna and WFN**

Route	Boardings
97 (only in West Kelowna)	992
97 (full route)	4,571

The routes that have the highest number of people boarding within West Kelowna and WFN are Routes 97 and 21. In 2019, Route 97 made up 70% of the transit ridership in West Kelowna and WFN and Route 21 made up 17% of the ridership. Routes 97 and 21 have high numbers of people boarding and alighting at Westbank Exchange. Figure 11 shows the comparative boarding / alighting for Route 97 stops in West Kelowna and WFN. The lowest amount of boarding is at the start and end of the routes, and the highest is at West Exchange Bay A (34% of the total), followed by Boucherie Mountain Exchange Bay A (19%), and Highway 97 at Butt (16%). Route 21 has nearly half of its boardings at Westbank Exchange Bay C and low boarding throughout the rest of the route, as shown in Figure 12. There are also a lot more buses stopping at Westbank Exchange Bay C along route 21 than the rest of the stops, with buses stopping 32 times throughout the day at Westbank Exchange while they stop 16 times at the rest of the stops.

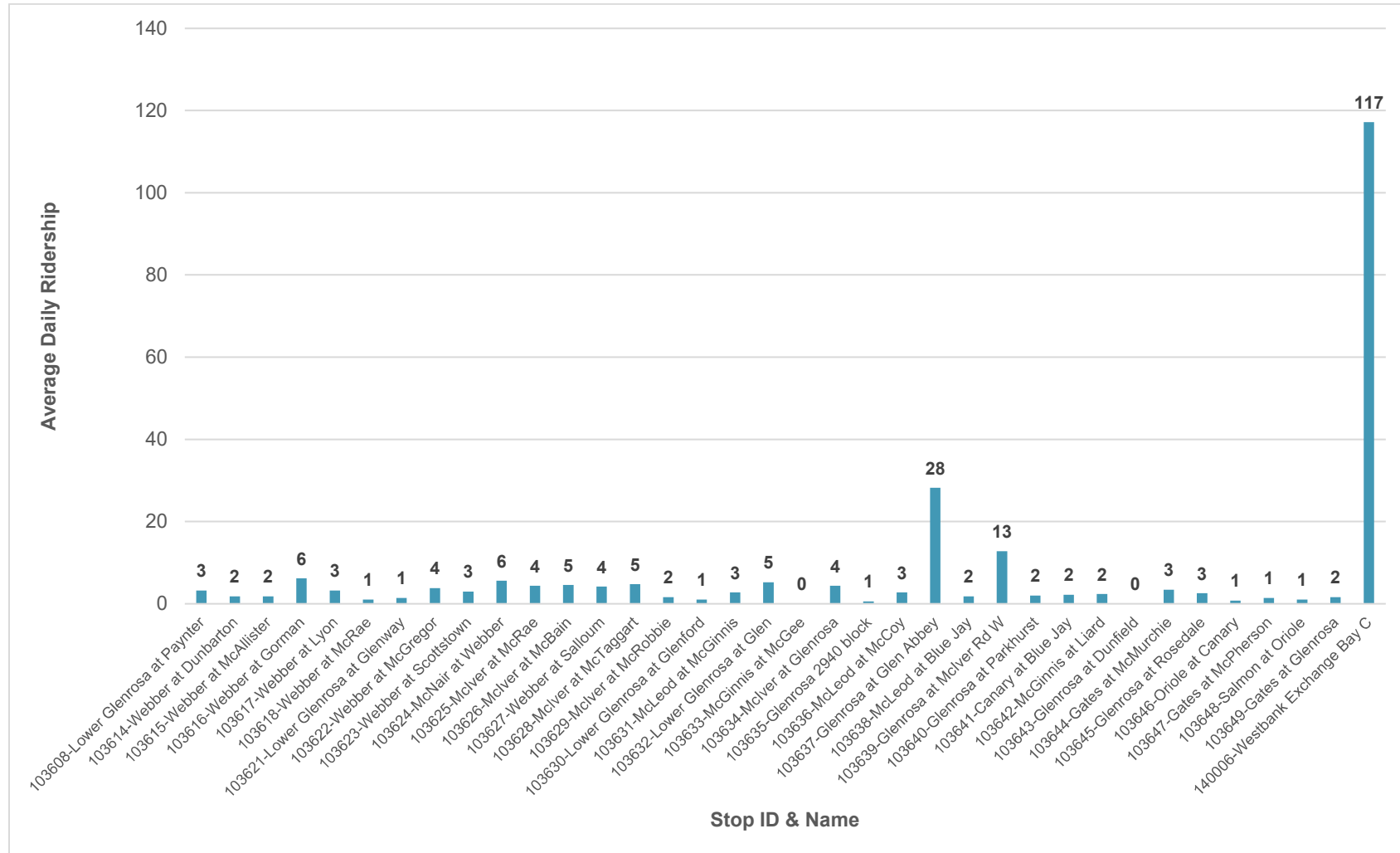
**Figure 11: Average Daily Route 97 Boarding at Stops in West Kelowna**



Observation Dates: October 7<sup>th</sup> – 11<sup>th</sup>, 2019



Figure 12: Average Daily Route 21 Boarding at Stops in West Kelowna



Observation Dates: October 7<sup>th</sup> – 11<sup>th</sup>, 2019

Before the pandemic, transit ridership in West Kelowna was growing, with an average annual increase of 1.5% between 2012 and 2018<sup>6</sup>, but the pandemic caused a 50% reduction in boardings between 2019 and 2020. It is anticipated that some transit demand will recover and continue to grow but there are still uncertainties.

The Central Okanagan RTP and BC Transit's Future Action Plan for the Central Okanagan Region outline future transit priorities for West Kelowna. The Central Okanagan RTP calls for a transit spine along Highway 97 throughout the region, including shoulder bus lanes within portions of West Kelowna, and a reversible lane on the bridge. The BC Transit Future Action Plan has action items for the Westside, which includes both the City of West Kelowna and Westbank First Nation. Some of the priorities in the area include broader goals of service reliability and optimization for Routes 27 Horizon, 29 Bear Lake, and RapidBus Route 97, and expansion of the service into new areas. The following are key projects that will be focused on over the next ten years:

- Expand service beyond the rapidly developing area beyond Shannon Lake
- Seasonal service in the summer to Gellatly waterfront, which will be revisited in 3-5 years for consideration of expansion of transit service to upcoming developments in the Gellatly Lakeside area

Major infrastructure changes stated in the Future Action Plan that are within West Kelowna are additional RapidBus stop locations at Main Street / Dobbin Road at Old Okanagan Highway, and Highway 97 at Daimler Road. Park and Rides are also a priority and consideration of emerging technology, such as fleet-related technology, mobility as a service, and autonomous vehicles. The Central Okanagan RTP recommends demand responsive transit as an opportunity to provide transit in areas where conventional fixed routes are not economically feasible. Specifically, the RTP states that Peachland, Lake Country, and the Westside and rural RDCO communities are places where demand-responsive transit service can be successful.<sup>7</sup>

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<sup>6</sup> <https://www.bctransit.com/documents/1529707596498>

<sup>7</sup> Central Okanagan RTP, 2020. p. 43

# 5 Vehicle Operations

## 5.1 Network

### 5.1.1 Existing Network

The City of West Kelowna vehicle network is made up of a distribution of different road classifications. The classifications are based on the purpose of the corridors, with higher classified roads directly facilitating travel, while lower classified roads provide access to land. The existing vehicle transportation network in West Kelowna is shown in Figure 13.

Highway 97 is the primary corridor that extends throughout the city and provides connections to the north and south, both within the region and beyond. It extends from Highway 97C in the southwest to William R. Bennett Bridge in the northeast. Other important facilities include Glenrosa Boulevard, Gellatly Road, Shannon Lake Road, and Boucherie Road, which together provide access to residents and businesses through the west, north and south portions of West Kelowna.

The segment of Highway 97 passing through West Kelowna is approximately 15km long with four lanes of traffic (two in each direction), and a typical speed limit of 80 km/h. Interchanges are provided at the connecting roads of Campbell Road, Westside Road, and Glenrosa Road. Seven signalized intersections are found along the route connecting Boucherie Road, Westlake/Hudson Road, Ross Road, Bartley Road, Daimler Road, Butt Road and Gellatly Road.

A one-way, two-lane couplet system is utilized within Westbank Urban Centre from Gellatly Road to Glencoe Road, where signalized intersections are provided at the major cross streets, including Old Okanagan Highway, Hoskins Road, Brown Road, Elliot Road, and Herbert Road, and stop controlled intersections provided at the minor cross streets. This section of the highway has a posted speed limit of 50km/h. Most of the intersections along the major collectors/arterials in West Kelowna are stop controlled. Spot intersection upgrades have been recently completed, including roundabouts at Hudson Road / Boucherie Road, and Stevens Road / Westlake Road in recent years.

### 5.1.2 Traffic Analysis Focus Areas

The blue areas highlighted in Figure 13 show the two focus areas for the traffic analysis portion of this study, and the laning and intersection control for these focus areas are shown in

Figure 14 and Figure 15. The study areas for the traffic analysis were determined in collaboration with the City of West Kelowna and included two primary focus areas, Westbank Urban Centre, and the Steven's Road area. These are two of the densest and busiest locations in the city, and the most likely to change as the city continues to grow and develop. The primary study areas and intersections selected for detailed traffic analysis are those where there is a high concentration of activity and intersection operations in a small area, and interaction between these intersections. It is noted that while intersection improvements and projects will be required outside of these areas, those improvements can be identified and addressed independently.

Figure 13: Existing Vehicle Network

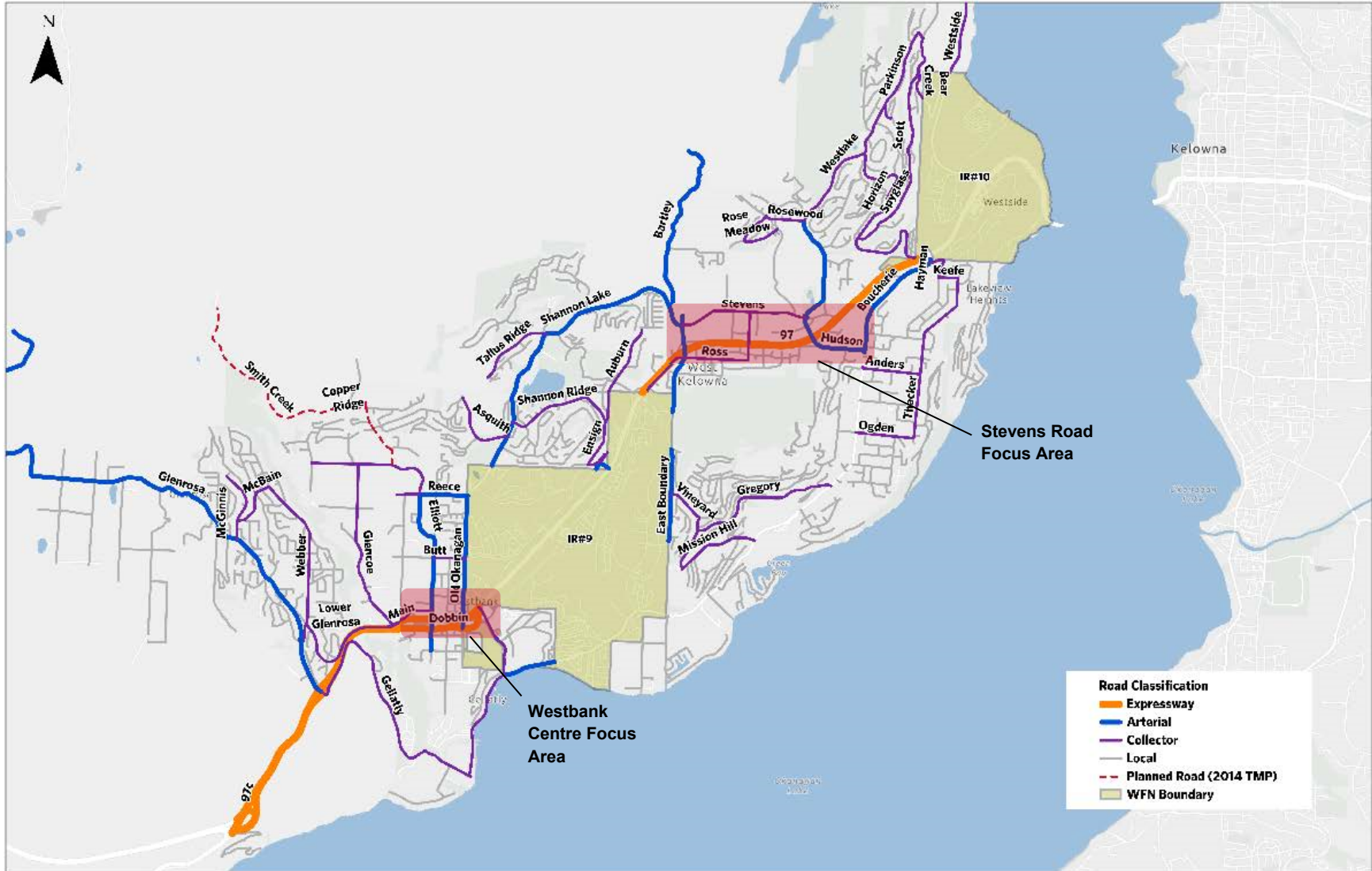


Figure 14: Intersection Control & Laning - Westbank Urban Centre Focus Area

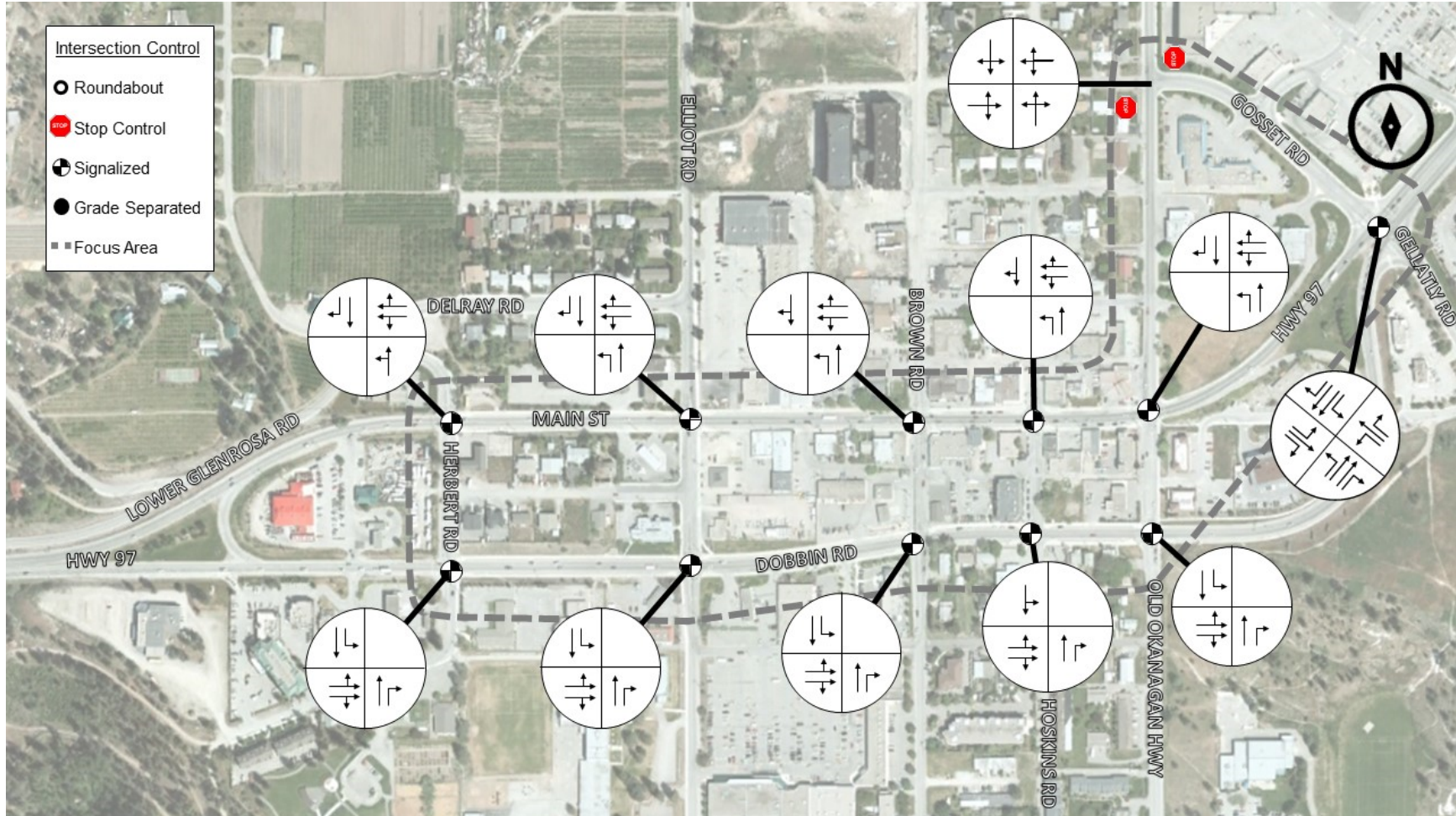
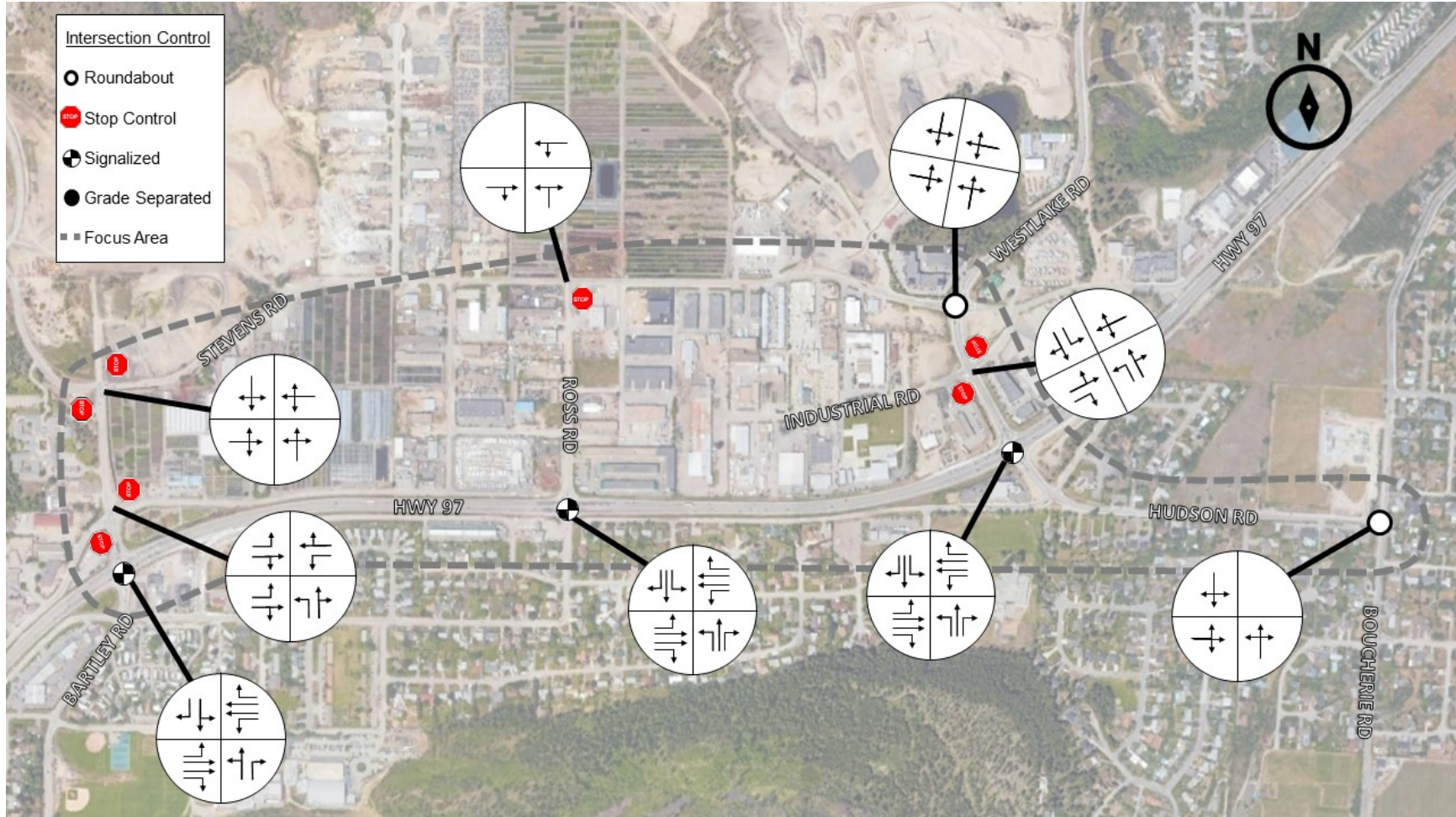


Figure 15: Intersection Control & Laning - Stevens Road Focus Area



### 5.1.3 Planned Network

The 2014 West Kelowna TMP, COPS, and Central Okanagan Regional Plan all proposed infrastructure improvement projects in the City of West Kelowna, and many of these projects are anticipated to be built in the near to mid-term future.

A list of all committed future projects was compiled and provided to the City for review. The projects and future base case network will be confirmed with the City, and then this section will be updated.

## 5.2 Existing Traffic Volumes and Operations

### 5.2.1 Existing (2020 Non-COVID)

Traffic and active transportation volumes for select intersections and road links were provided from the following sources for the project:

- BC Ministry of Transportation and Infrastructure
  - Raw counts from traffic controllers along Highway 97 for 2018, 2019
  - 2020 traffic volumes on Highway 97 being used in COITS
- Counts from past studies from the City of West Kelowna

CETLUR also conducted turning movement counts from Tuesday to Thursday during the week of October 12<sup>th</sup>, 2021. There was some overlap between the available traffic data and differences between the overlapping volumes, particularly on Highway 97 and within Westbank Urban Centre. The recently collected volumes (2021 by CETLUR) were generally lower on the highway than the historical Ministry data and the volumes being used for COITS (based on 2017-2019 counts).

To confirm that highway traffic in West Kelowna has, in fact, decreased since 2017/2019, Annual Average Daily Traffic (AADT) volumes on the W.R. Bennett bridge were obtained from the Ministry and are shown in Figure 16. The figure shows that bridge crossing volumes fell significantly in 2020 due to the COVID-19 pandemic and have yet to fully recover to pre-pandemic levels<sup>8</sup>. That said, traffic volumes are anticipated to rebound to and beyond pre-COVID levels once the pandemic subsides.

To maintain consistency with the on-going COITS, and to incorporate the anticipated re-bound in traffic volumes on the highway and in West Kelowna once the pandemic subsides, the traffic volumes from COITS were used where available, and were supplemented by the other traffic data (primarily the CETLUR counts). The resulting volumes set for the AM and PM peak hours are shown in Figure 17 and Figure 18, and are considered to represent a 2020 Non-COVID

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<sup>8</sup> 2021 AADT volumes were estimated by factoring up the 2020 volumes based on a comparison of September 2020 to 2021 growth (the most recent month at the time of writing).



scenario, which is consistent with that approach used for the COITS analysis (summarized in Appendix B). These volumes are the basis for the Existing analysis presented in Section 5.2.3

**Figure 16: Highway 97 Bridge Daily Volumes (AADT)**

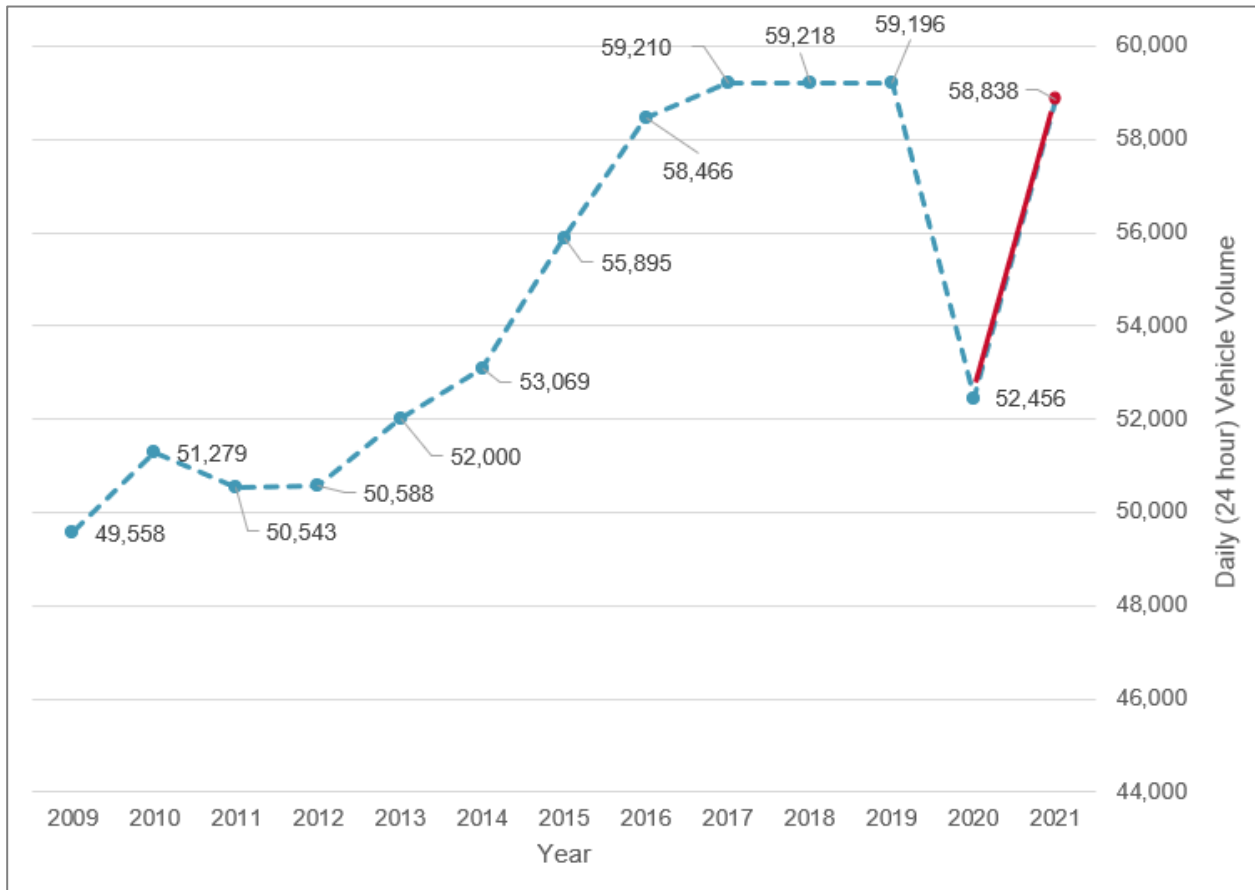


Figure 17: Intersection Volumes - Westbank Urban Center Focus Area

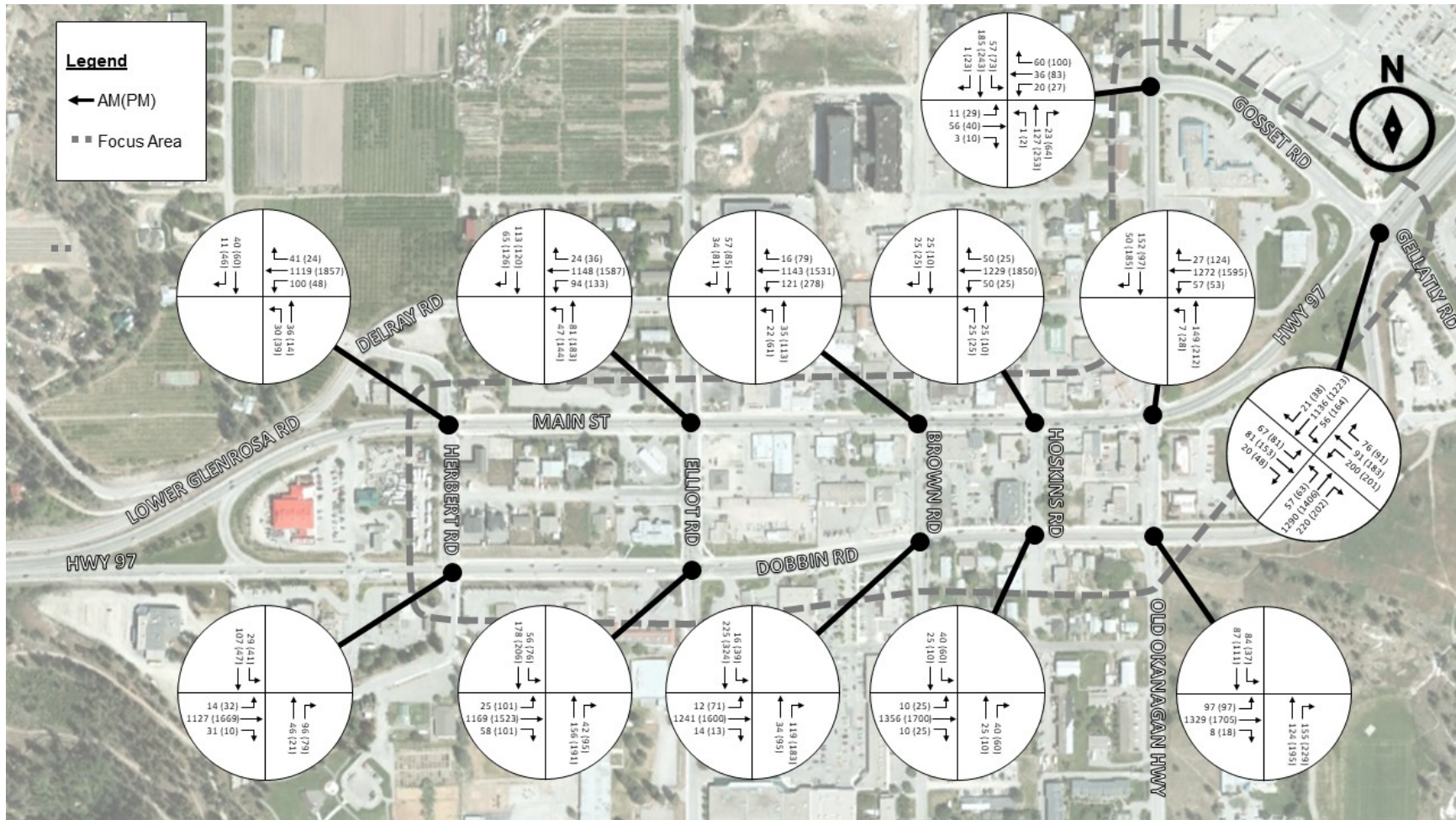
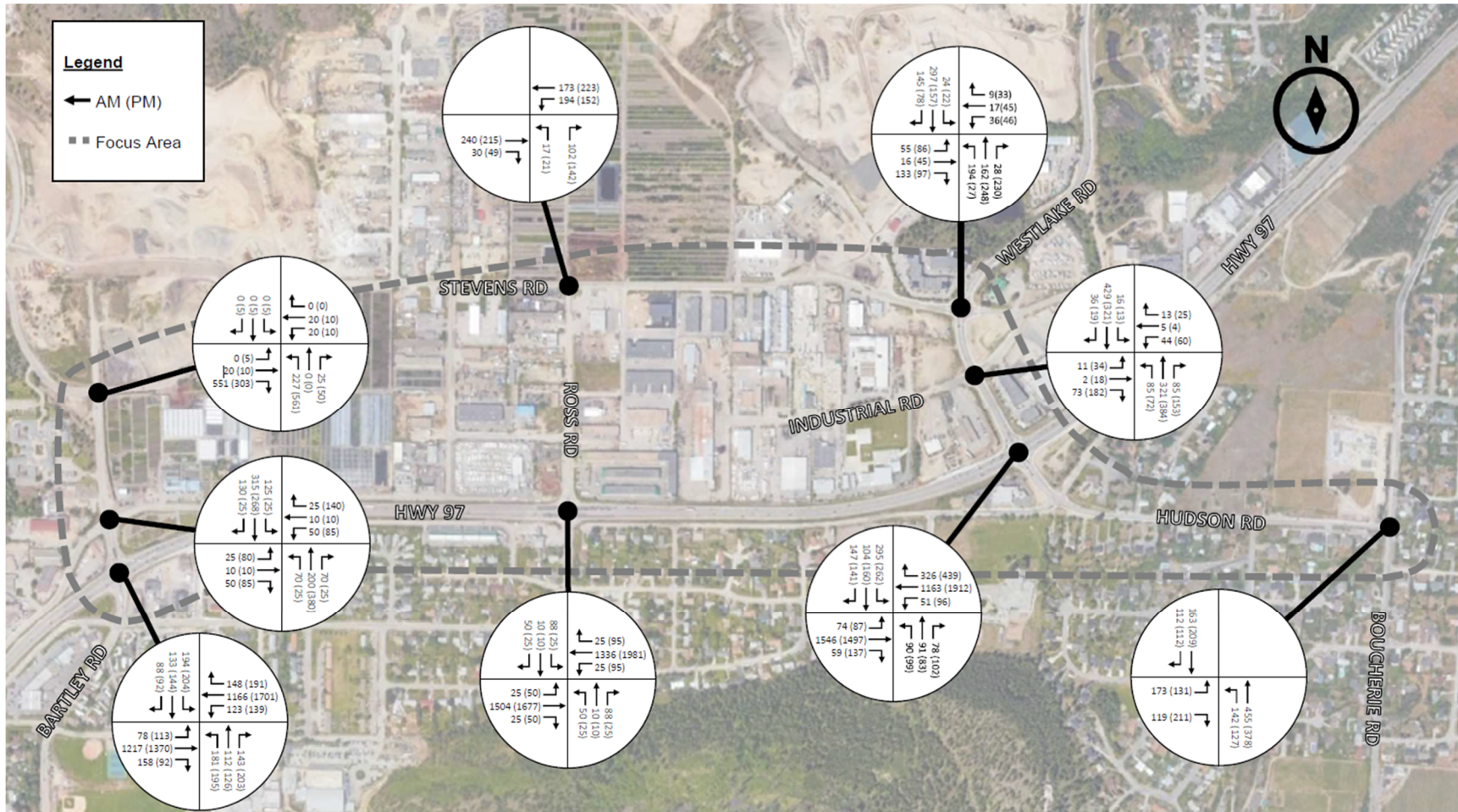


Figure 18: Intersection volumes - Stevens Road Focus Area





### 5.2.2 Existing Operations

Using the existing traffic volumes presented in the previous section, the operating conditions during AM and PM peak hours at the focus area intersections were evaluated using the Synchro 11 software package, which is based on the Highway Capacity Manual (HCM 2010) evaluation methodology.

For signalized intersections, the methodology considers the intersection geometry, traffic volumes, traffic signal phasing/timing plans, and pedestrian volumes. The average delay for each lane group is calculated, as well as the delay for the overall intersection. Individual movement and intersection Level-of-Service (LOS) are calculated based on the average delay experienced. The operating conditions can also be expressed in terms of volume to capacity (v/c) ratios.

For un-signalized (stop-controlled) intersections, the LOS is based on the computed delays on each of the critical movements. LOS 'A' represents minimal delays for minor street traffic movements, and LOS 'F' represents a situation with an insufficient number of gaps on the major street for minor street motorists to complete their movements without significant delays.

All roundabouts reviewed in this study were evaluated using the SIDRA Intersection 9.0 software package, which follows the HCM methodology as well. For roundabout approaches, the LOS is based on the computed delays on each of the approaches. LOS 'A' represents minimal delays, and LOS 'F' represents a scenario with an insufficient number of gaps on the circulating flow for motorists to enter the roundabout without significant delays.

Industry standard performance thresholds were used and are summarized in Table 6<sup>9</sup>. Any individual movement or intersection that exceeds these thresholds has been identified.

**Table 6: Performance Thresholds**

Performance Measurement	Desired Performance Thresholds
Level of Service (LOS)	LOS D or better
Volume to Capacity (v/c)	≤ 0.85
95 <sup>th</sup> Percentile Que (m)	≤ available storage

The results from the traffic analysis are summarized in Figure 19 and Figure 20, and detailed results are shown in Appendix C.

There are a number of movements and intersections that have levels of performance that exceed the performance thresholds.

Intersections where the thresholds are exceeded include the major intersections between Highway 97 and Westlake Road, Ross Road, Bartley Road, and Gellatly Road. There are also some movements on Westlake Road at Steven's Road and Industrial Road where movement

<sup>9</sup> Planning and Designing Access to Developments, BC MOTI - These thresholds are similar to those of BC MOTI for urban areas, with the exception that the ministry permits v/c ratios up to 0.90 for individual movements, whereas 0.85 is used here to be conservative.



level of service is E or F, and the volume to capacity ratios exceed 1.00. Particularly, the westbound and eastbound approaches at Westland Road and Industrial Road have high delays during both peak periods. This occurrence is considered to be the result of Synchro not accounting for the gaps in traffic on Westlake that would be caused by the traffic signal at Westlake / Highway 97, and the intersection approaches are likely operating much better than reported, as the east and westbound volumes used for the analysis were directly observed at the intersection. This was confirmed in SimTraffic, which showed that there were enough gaps in traffic on Westlake Road for eastbound and westbound traffic on Industrial Road, with only minor delays and queues. It is also noted that drivers have other routes that they can use if they experience too high of delays. Some of the other side streets at the unsignalized intersections in the Stevens Road area also experience high delay, but as the volumes at these intersections were observed and counted through these intersections recently, there is considered to be sufficient capacity at these intersections at this time.

In Westbank Urban Centre, most of the intersections and movements operate within capacity, with the exception that the 95<sup>th</sup> percentile queues often extend back to adjacent intersections at many of the signalized intersections. The intersection of Highway 97 with Gossett Road and Gellatly Road operates essentially at capacity with v/c ratios of 0.95 and 0.99 in the AM and PM peak hours accordingly. Some of the left turn and through movements have high delays, and also significant queues. This intersection is not coordinated with the other signalized intersections in Westbank Urban Centre.

Figure 19: Movements Exceeding Performance Thresholds – Westbank Urban Centre Focus Area

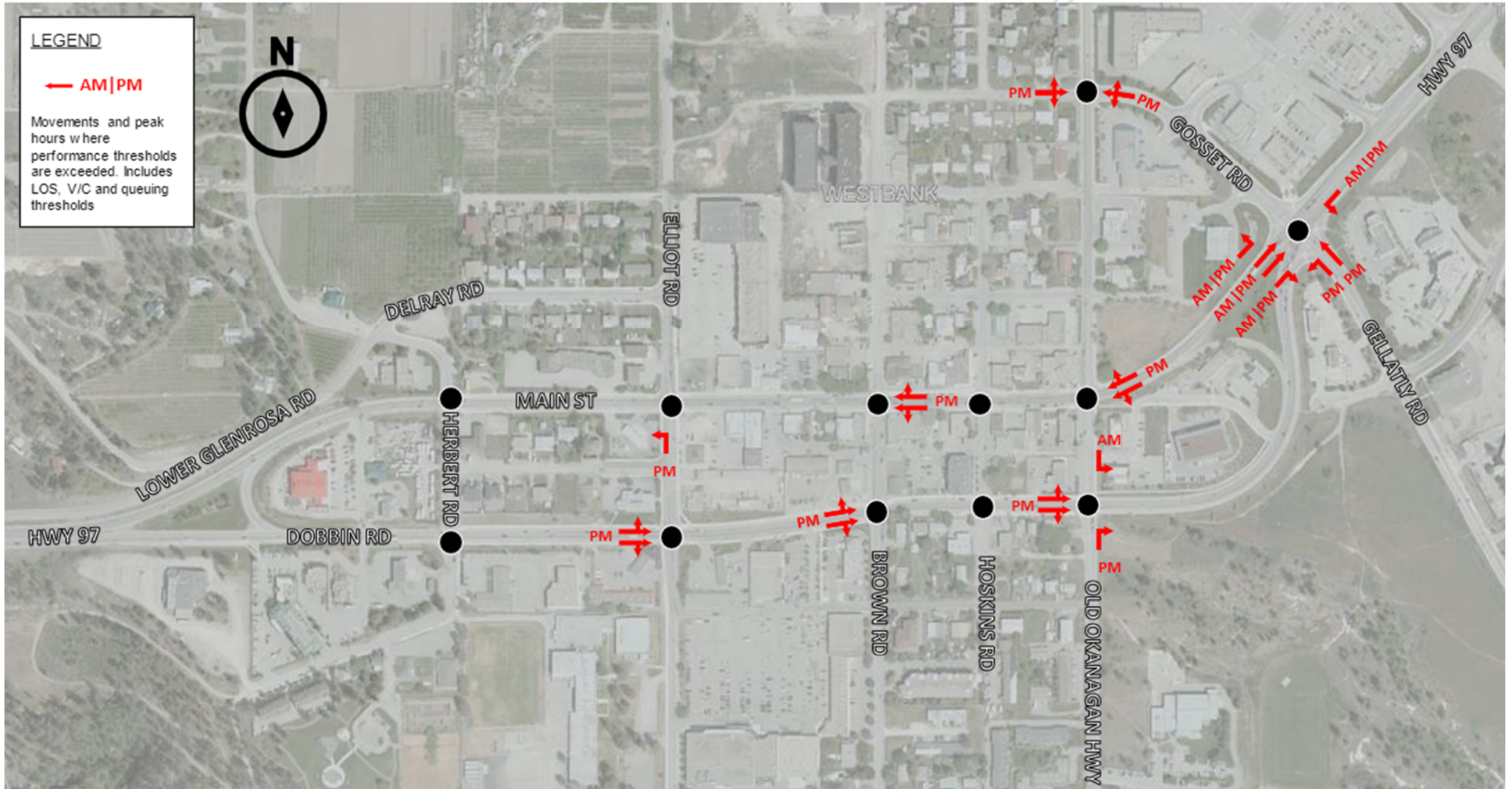


Figure 20: Movements Exceeding Performance Thresholds - Stevens Road Focus Area

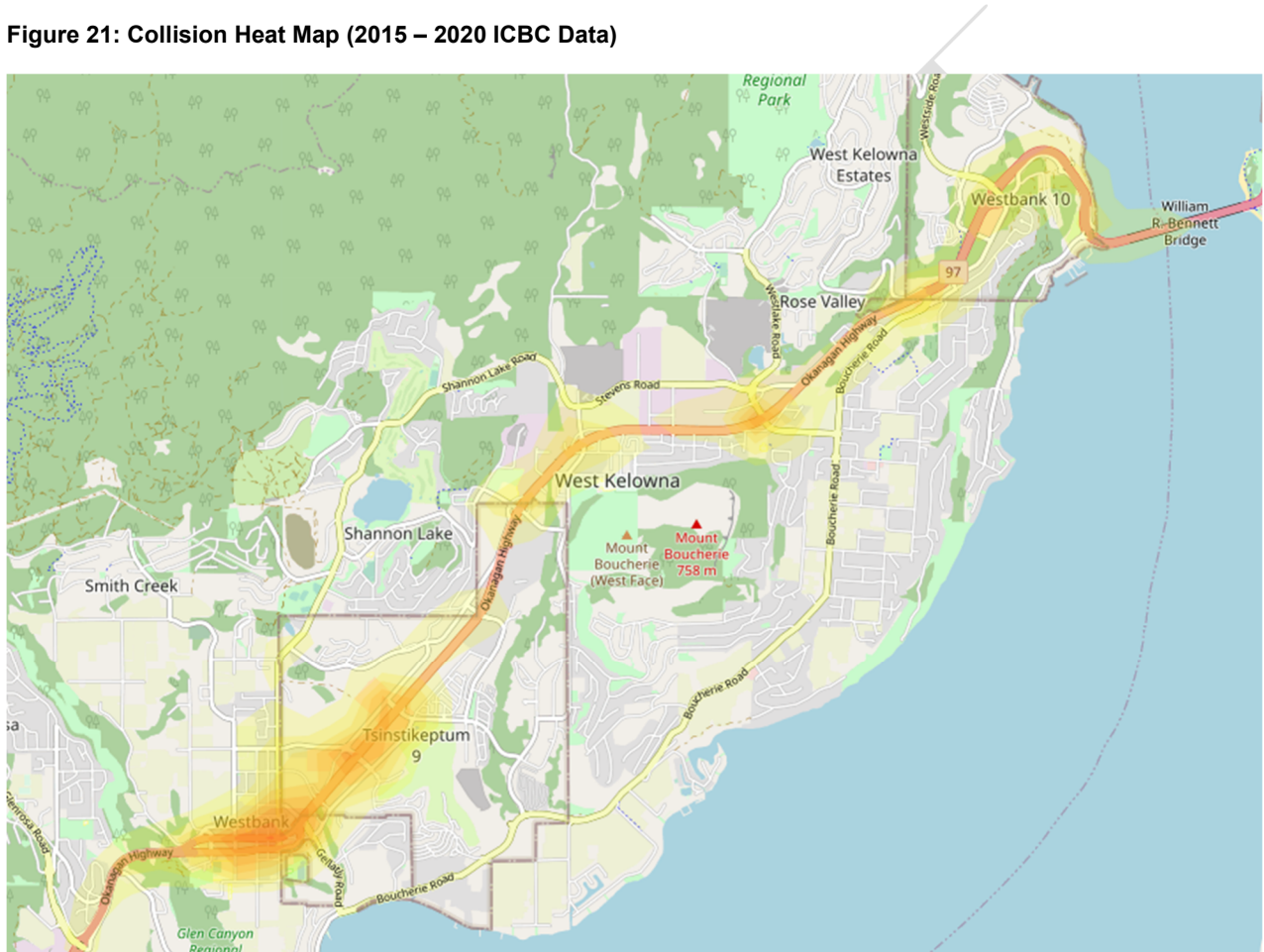


### 5.2.3 Collision Analysis

Collision information is recorded by both the BC MoTI, which uses police reports on provincial highways, and the Insurance Corporation of British Columbia (ICBC), which is based on insurance claims to ICBC. Data from ICBC was obtained for use in this study. The most recently available complete 5-year data set of ICBC claims data was between the years 2015 – 2020. The data was reviewed and was edited to remove erroneous data entries at the beginning of the analysis.

A heat map of ICBC recorded collisions (Property Damage Only, Bodily Injury, and Fatal Accidents) between 2015-2020 is shown in . The highest frequency of collisions occurred along Highway 97, specifically within Westbank Urban Centre near Westlake Road. While collisions were recorded off the highway, there were no intersections or areas off of the highway that stood out besides the Westbank Urban Centre Area.

**Figure 21: Collision Heat Map (2015 – 2020 ICBC Data)**



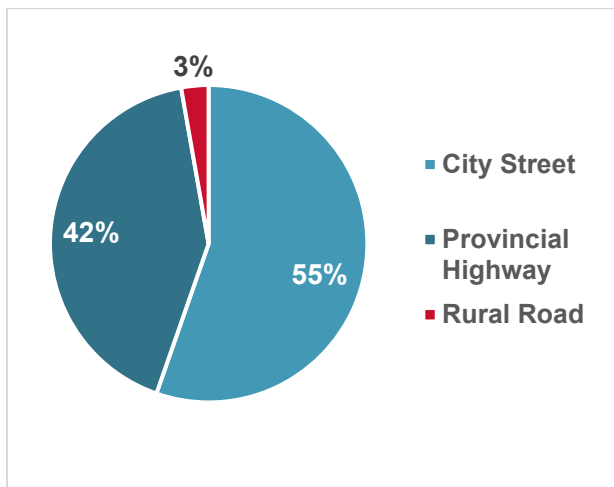
Source: <http://www.heatmapper.ca/geomap/>

ICBC data from the years 2015-2020 was further organized to provide data regarding the severity and conditions of the collisions.

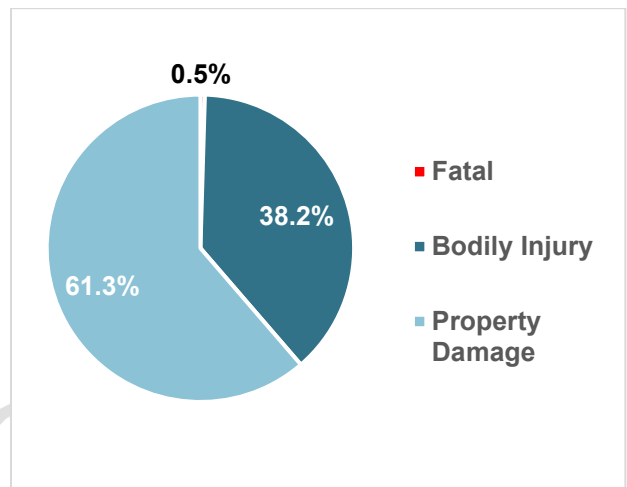
shows the share of collisions that occurred on municipal roads, rural roads, and the provincial highway network (Highway 97 in this case). Just over half of all collisions (55%) occurred on City streets, with the rest occurring on the provincial and rural roads in the area (42% and 3%, respectively).

shows the collisions by type (PDO, Injury and Fatal). 0.5% of all crashes were recorded as fatal, 42% recorded as bodily injury and 61.3% recorded as Property Damage.

**Figure 22: Collision by Road Type**

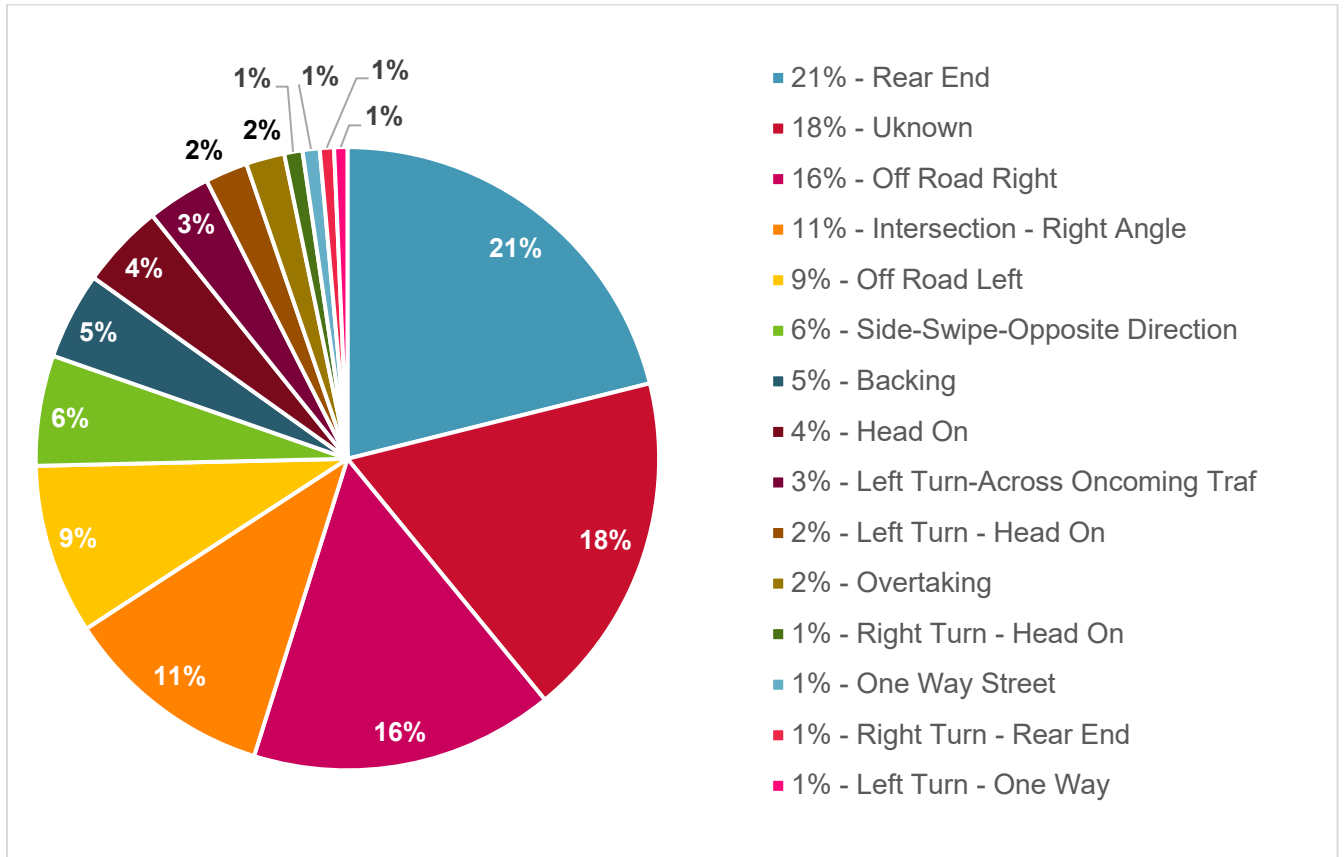


**Figure 23: Collision by Accident Type**



Shows the collisions by collision types. ICBC data categorizes each collision by type. The three most recorded types of collisions include rear-ends, unknown and off-road right.

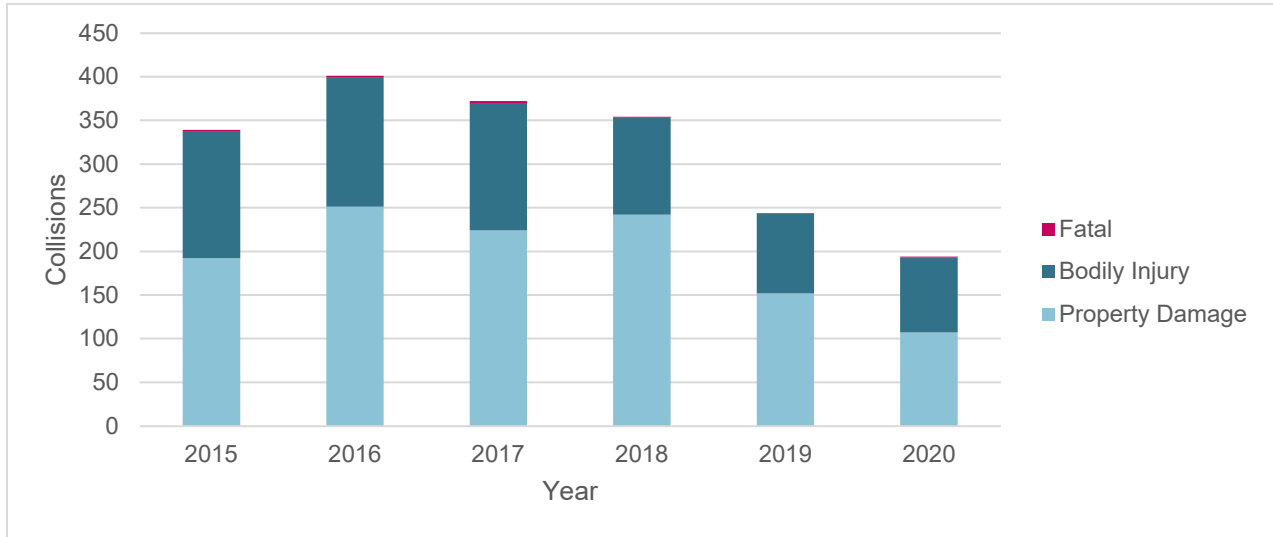
Figure 24: Collisions by accident type



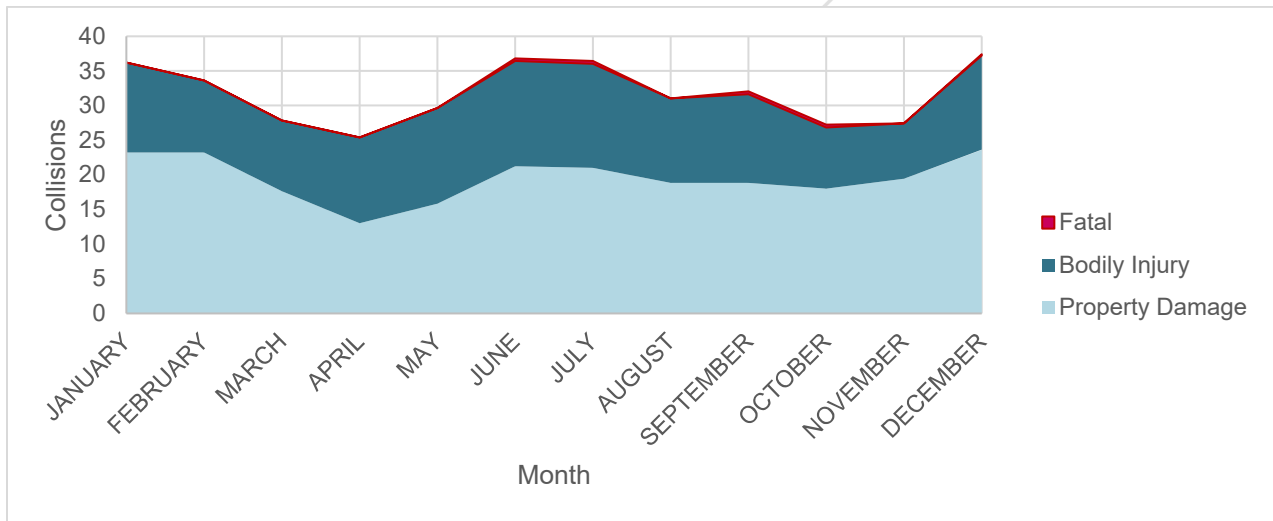
Additional summaries of the ICBC data are provided in , which shows the number of collisions annually by type, and in , which shows the average number of monthly collisions by type.

A total of 401 collisions were recorded in 2016, and the number of collisions has since consistently declined. For the monthly average collision occurrences shown in , the number of collisions per month peak in the winter months of December and January, and in the summer months of June and July. Conversely, fewer collisions occur in the spring and fall months.

**Figure 25: 2015-2020 Annual Collisions by Type**



**Figure 26: 2015-2021 Average Monthly Collision Occurrences**



## 5.3 Future Traffic Volumes and Operations

### 5.3.1 Future Base Volumes (2040 Horizon)

To develop a future volume set to analyze in Synchro, HDR used West Kelowna's EMME model to forecast the travel demand within the study area and grow existing intersection volumes. The EMME model utilizes future population and employment land use values to forecast trips in the City. Planned and committed projects were also included in the future EMME network.

**Appendix E** includes the specific projects that were included in the future 2040 base network, as directed by the City of West Kelowna.

The EMME model generally forecasted traffic growth on the City's network, however reduced vehicle volumes were observed on some links. The reductions and changes in traffic patterns were generally considered to be due to the planned and committed projects noted above, including those anticipated to come from the on-going Central Okanagan Integrated Transportation Strategy (COITS)<sup>11</sup>.

As a conservative approach, links which saw a reduction within the EMME model were not reduced, instead existing volumes were carried over unless major changes to laning and subsequent changes to traffic patterns were observed. The resulting volumes set for Synchro analysis for the AM and PM peak hours are shown in Figure 27 and Figure 28.

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<sup>11</sup> <https://www2.gov.bc.ca/gov/content/transportation/transportation-reports-and-reference/reports-studies/okanagan/central-okanagan-integrated-transportation-strategy>

Figure 27: Intersection Volumes - Westbank Urban Center Focus Area 2040

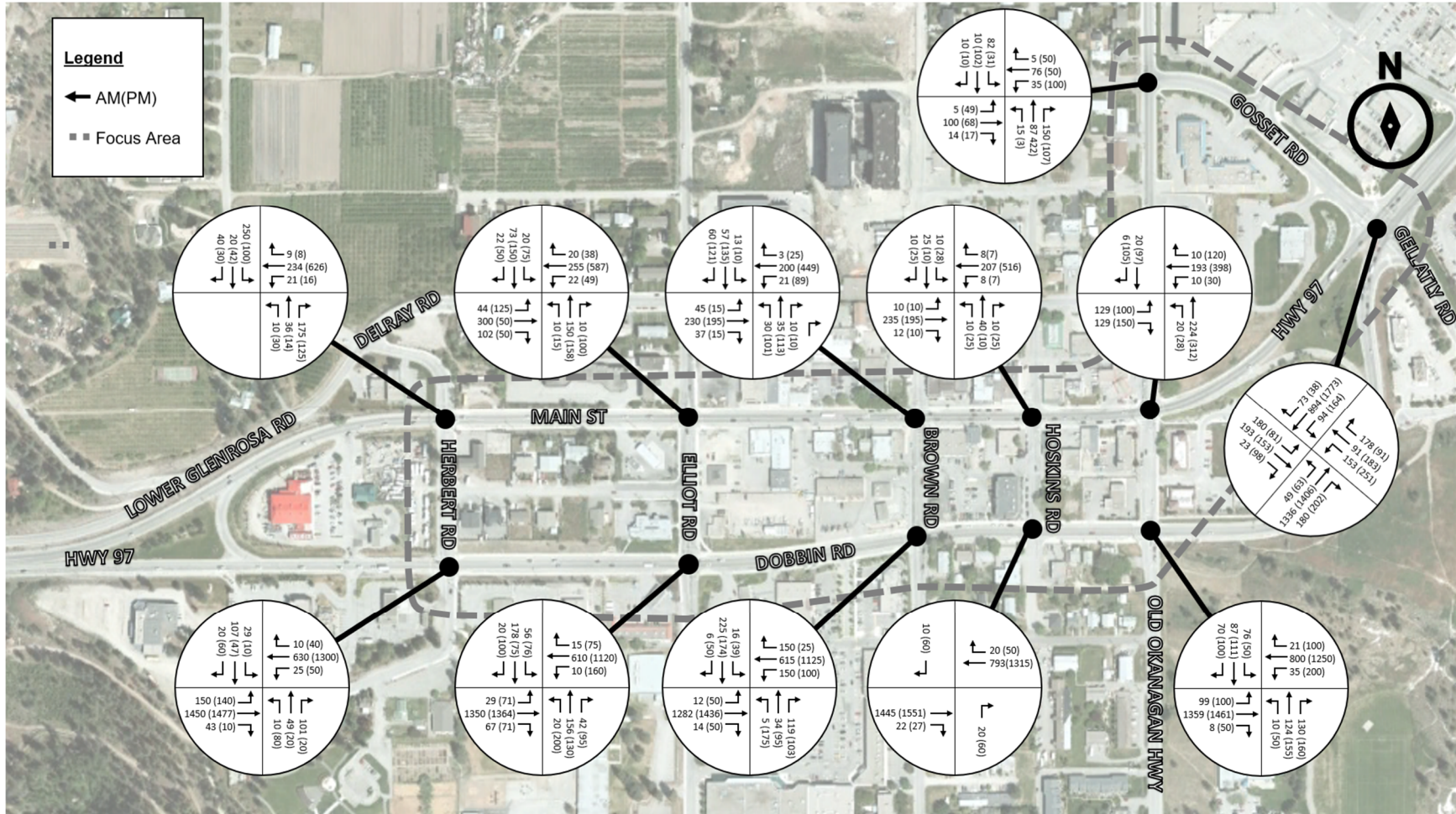
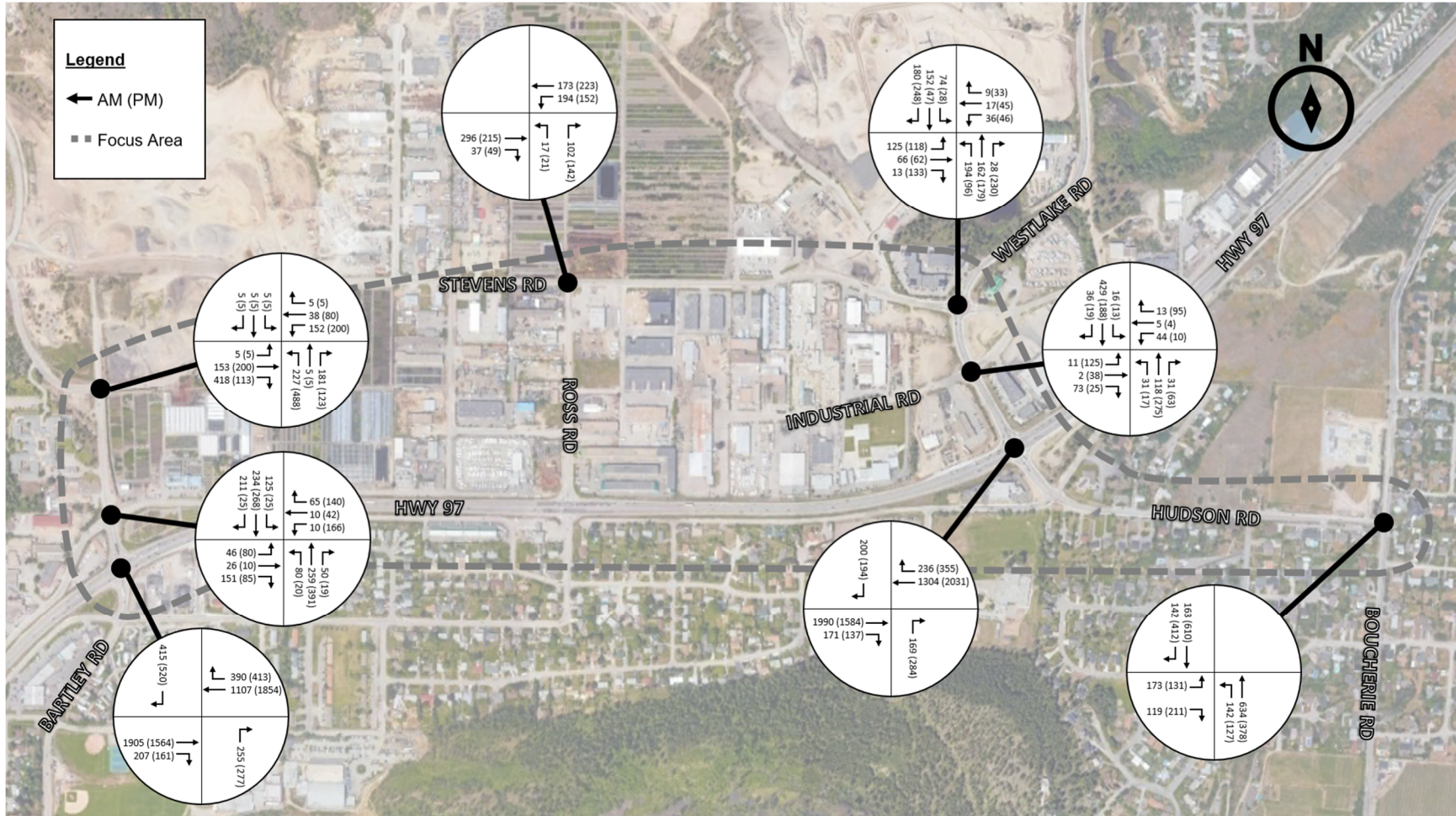


Figure 28: Intersection Volumes - Stevens Road Focus Area 2040



### 5.3.2 Future Operations

The results from the traffic analysis are summarized in Figure 29 and Figure 30, and detailed results are shown in Appendix D. There are a number of movements and intersections that have levels of performance that exceed the performance thresholds.

Within the Westbank Urban Centre Focus Area, there are intersections which exceed performance thresholds as shown in Figure 29. While performance thresholds are exceeded, all intersections are operating at a LOS “D” or better with volume/capacity ratios less than or equal to 1.00. It is expected however that the intersections not performing at an acceptable LOS or with high volume to capacity ratios will be addressed as part of the future studies when Westbank Urban Center is reconfigured from one-way to two-way operations.

As shown in Figure 30, within the Stevens Road Focus Area, intersections are performing at a LOD “C” or better with the exception of the intersection at:

- Stevens Road and Bartley Road
- Byland Road and Bartley Road
- Westlake Road and Stevens Road
- Hudson Road and Boucherie Road

With planned improvements on Highway 97 intersections with Bartley Road, Ross Road and Westlake Road, traffic is expected to operate freely and these locations are excluded from the Synchro analysis. The increase in growth and change in traffic pattern will cause the intersection of Stevens Road and Bartley Road to operate at a LOS “F”, further studies are recommended for this intersection to confirm the ultimate design, and it is expected that signalization will be required.

The intersection of Byland Road and Bartley Road experiences high delays for left turning movement in both the east and west approaches. This is due to the relatively large north and southbound volumes.

Figure 29: Movements Exceeding Performance Thresholds – Westbank Urban Centre Focus Area 2040

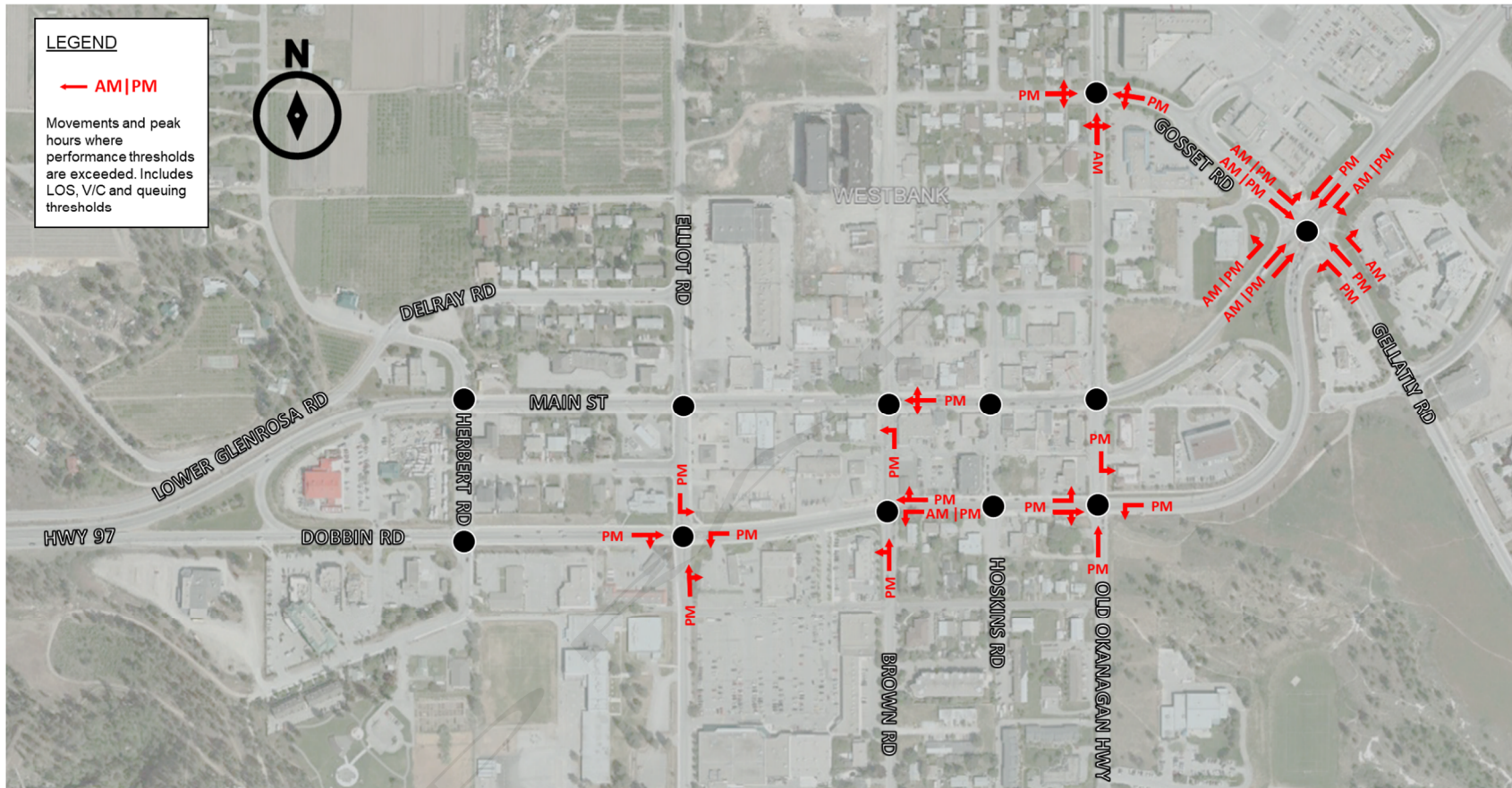


Figure 30: Movements Exceeding Performance Thresholds - Stevens Road Focus Area 2040



## 6 Microscopic Vissim Modelling

The CETLUR team was retained by the City to develop a PTV Vissim Microscopic analysis model to support the TMP project. HDR has been supporting and guiding this modelling exercise. Westbank Urban Centre was selected as the focus area for analysis, and CETLUR is currently working on developing an existing conditions model for this area and calibrating the model to existing conditions.

The purpose of this model is to inform the analysis of future options in Westbank Urban Centre, and to provide a more detailed analysis than what will be provided through HDR's Synchro-based traffic analysis.

Separate deliverables will be provided from CETLUR to the City of West Kelowna through the duration of this study, and HDR will continue to guide, support, and review the analysis work to help develop a model that can be used beyond the project to analyze different transportation options and the impact of different land development scenarios and projects in Westbank Urban Centre.

## 7 Emerging Trends and Technologies Review

Changing technologies and emerging trends continue to change how people travel. The following is a description of some of the trends and technologies that are likely to change how people travel around West Kelowna in the coming years, and how that will affect the need for infrastructure, policy, and other improvements to respond to these changing demands.

### 7.1 Aging Population, Shrinking Workforce and Housing Options & Affordability

West Kelowna currently has an estimated population of 32,655 due to a growth of 5.7% between 2011 and 2016, which is expected to continue.<sup>12</sup> It currently accounts for 17% of the Central Okanagan's population, making it the second most populous municipality in the region. Alongside population growth there has been a recent rise of retirees, with a 40% increase in the Central Okanagan that will continue as Baby Boomers age and retire. These factors, mixed with an estimated 70% of the West Kelowna population living in single-detached homes, have impacts on the use of space and travel patterns.<sup>13</sup>

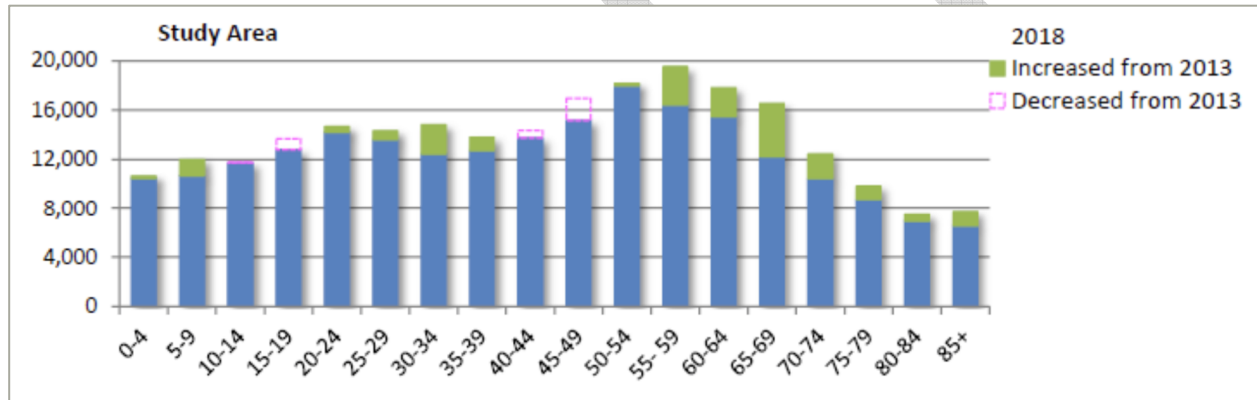
The 2018 Okanagan Travel Survey showed that number of people between the ages of 50 and 70 increased between 2013 and 2018, as shown in Figure 31. This growth is due to a combination of factors, including an aging population and the migration of retirees to the Central Okanagan. In this same time period, there was a slight decrease in the number of people aged 15-19, 20-24, and 40-49 years. Although the employed labor force is expected to increase in the future, their share of the population in the province is forecasted to decrease from 37% to 28%

<sup>12</sup> <https://www.westkelownacity.ca/en/building-business-and-development/WestKelownaStatistics.aspx>

<sup>13</sup> 2018 Okanagan Travel Survey

by 2041. As the aging population grows, it will be important to consider the mode choices, purposes, and needs of the aging population while also accounting for the needs of all other age groups and the continued increase in the employed labor force and population.

**Figure 31: Population Distribution by Age, with Change from 2013-2018**



## 7.2 COVID-19 Pandemic

The COVID-19 pandemic has impacted and changed the way people travel, leading to fewer people commuting, a decrease in transit ridership, and the use of more active transportation. Some of the travel trends at the beginning of the pandemic included:

- Around 50% of Canadians were working from home. In British Columbia, higher income households worked in tele-working for a longer duration than lower- or middle-income groups
- An estimated 52% decrease in activities at transit stations compared to before the pandemic in Canada
- Increase in online shopping throughout Canada that resulted in fewer trips to retail stores
- In British Columbia, residents made approximately 50% fewer trips during the first few months of the pandemic than they would have before the pandemic. Most of these trips were routine shopping, followed by commuting to work
- For long-distance travel, there was an increased use of private cars in West Kelowna and neighboring municipalities that replaced airplane travel<sup>14</sup>

Although pre-pandemic levels of travel and travel patterns have rebounded some since the start of the pandemic, many of these trends continue today to varying extents. Some of the travel patterns, such as decreases in transit ridership, have started to recover throughout 2021.<sup>15</sup> This

<sup>14</sup> Source for all bullet points: <https://www.sciencedirect.com/science/article/pii/S2226585620302260>

<sup>15</sup> [https://www.kelownadailycourier.ca/news/article\\_c13b8a3a-ebd3-11eb-abf8-a304e0f1c2ad.html](https://www.kelownadailycourier.ca/news/article_c13b8a3a-ebd3-11eb-abf8-a304e0f1c2ad.html)

TMP will help establish a plan for the continued growth of the population and their transportation needs by considering the changes in travel patterns and how they will transform or continue in the future.

### 7.3 Climate Change

Over 65% of greenhouse gas emissions (GHGs) are from the transportation sectors in the Central Okanagan.<sup>16</sup> The province has set a number of targets to reduce emissions, including reducing provincial emissions to 40% less than the levels of 2007 emissions by 2030.<sup>17</sup> The province also created the Zero Emissions Vehicles (AEV) Act that calls for 10% of total vehicles sold to be ZEV by 2025 and 100% by 2040. To help achieve these goals, the City of West Kelowna developed a Climate Action Plan Update, which lists transportation objectives that include the following:

- Fleet replacement or upgrades
- New or improved electric vehicle initiatives
- New or improved active transportation infrastructure for staff
- Communication or outreach for staff related to corporate transportation initiatives
- New or improved public transportation initiatives for staff

In addition to these objectives, some of which the City has already started to plan, the City has also undertaken other initiatives to help reduce GHG emissions, including purchasing e-bikes that City staff can use for site inspections.<sup>18</sup> There will be upgrades to the Gellatly Bridge as well, which will involve flood mitigation measures in the design. The bridge upgrades will help reduce emissions by getting more people to take the direct route along bridge rather than lengthier, circuitous routes.<sup>19</sup>

The TMP provides another venue for which the City can plan and implement policies to further reduce emissions. Transportation planning can be a powerful tool to reduce transportation-based emissions, as it can change the efficiency of a transportation network and help shift travel from higher emitting modes to lower ones.

### 7.4 Transportation Technologies

Technologies continue to progress at a rapid rate, creating new opportunities and challenges for transportation, including autonomous vehicles, the sharing economy, low-carbon technologies, intelligent transport systems, and smart technologies. These technologies are promoted as a way to help decrease GHG emissions and provide more choice for people; however, even with

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<sup>16</sup> Central Okanagan RTP, 2020, p. 6

<sup>17</sup> Climate Change Accountability Act, BC, 2018

<sup>18</sup> <https://www.westkelownacity.ca/en/our-community/resources/Documents/Website-CARIP-Public-Report-2019.pdf>

<sup>19</sup> <https://www.westkelownacity.ca/en/our-community/resources/Documents/2017-Climate-Actions.pdf>

careful planning and implementation there is still uncertainty that brings risks and challenges as these technologies continue to develop and integrate into the transportation network.

For example, shared mobility from companies such as Evo, Uber, and Modo, can provide transportation mode options without owning the vehicle, bike, or scooter. This transportation as-a-service option allows someone to reserve and pay for a trip or use a device through an app.

Another example is Connected and Automated Vehicles (CAVs), which can have features that automate parts of driving and communicate with nearby vehicles and/or infrastructure. This concept is increasingly seen in everyday life as many vehicles already owned today have some automated features, such as the ability to self-park or adaptive cruise control. The level of automation in vehicles is expected to increase in the future as many car companies are improving and testing fully automated vehicles.

Although improvements in vehicle technology is a way to make vehicle travel more comfortable and at times more sustainable, it is important to note that these new vehicles need to be supported by a transportation network that provides options other than private vehicles, so the new technology doesn't necessarily lead to an increase in congestion, trip lengths, and vehicle kilometers traveled (VKT).






Local goods movement and deliveries are also undergoing technological changes. There has been an increase in online shopping that has transformed the ways people get their products, and drones or unmanned aerial vehicles (UAVs) may become a solution to deliver parcels while reducing goods-related traffic. These technologies and unmanned ground vehicles (UGVs) are currently being tested. UAVs and UGVs would help with current challenges in the supply chain by choosing a direct route that would increase the speed that products get to their final destination. The vehicles operating in the air would not impact the road network, nor would it be constrained by the road network.




## 8 Next Step - Issues & Opportunities


The next step that we propose for this project is to develop a set the primary challenges that the City faces, along with the opportunities that these challenges bring. We propose to host a workshop with City staff / Council to begin to identify these challenges and opportunities. This memo, coupled with the issues and opportunities, will be used to guide the identification of improvements.

DRAFT

## Appendix A: Micromobility Summary

Type	Typical Specs	Provincial Regulations	Permitted on	Insurance, Registration & Licensing Requirements
Skateboards and Longboards 	Weight: 4.5kg Dimensions: 0.2m x 0.8m Speed: 16kmph Powered: Active	No provincial rules, but many (though not all) municipalities have enacted by laws regulating their use.	Major Roads - No Local Roads - Some Bike Lane/Pathway - Some Sidewalk - Some	None
E-skateboards (hover-boards, and electric unicycles) 	Weight: 10kgs Dimensions: 0.3m x 0.8m Speed: 25kmph Powered: Internal Battery	Considered a vehicle under BC MVA. Does not meet safety requirements for vehicles.	Major Roads - No Local Roads - No Bike Lane/Pathway - No Sidewalk - No	None
Push scooters 	Weight: 4.5kg Dimensions: 0.2m x 0.5m Speed: 15kmph Powered: Active	No provincial rules, but some municipalities have enacted by laws regulating their use.	Major Roads - No Local Roads - Some Bike Lane/Pathway - Some Sidewalk - Some	None
E-scooters and Segways 	Weight: 12.5kg Dimensions: .4m x 1.2m Speed: 25kmph Powered: Integrated battery	Considered a vehicle under BC MVA. Does not meet safety requirements for vehicles. The province has drafted regulations to permit e-scooters to operate in BC.	Major Roads - No Local Roads – No* Bike Lane/Pathway – No* Sidewalk – No* *Except where permitted by municipal bylaws	None
Motorized wheelchairs 	Weight: 100kg Dimensions: 0.6m x 1.2m Speed: 8kmph	Treated similarly to pedestrians and can operate anywhere that pedestrians are permitted to walk.	Major Roads - No Local Roads - No Bike Lane/Pathway - No Sidewalk - Yes	None

Type	Typical Specs	Provincial Regulations	Permitted on	Insurance, Registration & Licensing Requirements
	Powered: Multiple removable batteries			
Bicycle 	Weight: 10kg Dimensions: 0.7m x 1.8m Speed: 20kmph Powered: Active	Not considered a vehicle but referenced within the BC MVA. Rider must wear a helmet.	Major Roads – Yes, with some exceptions Local Roads - Yes Bike Lane/Pathway – Yes Sidewalk - Some	None
E-bikes (bicycle-style) 	Weight: 30 kg Dimensions: .7m x 1.8m Speed: 32kmph Powered: Battery	Not considered a vehicle but referenced in the BC MVA. Classified as an electric assist bike (requiring pedaling for assist to engage) or as a limited speed motorcycle (with throttle operation). Rider must be 16 years or older and wear a helmet. Gas-powered cycles and electric cycles without attached pedals don't qualify.	Major Roads – Yes, with some exceptions Local Roads - Yes Bike Lane/Pathway – Yes, with some exceptions Sidewalk - No	None
E-bikes (scooter-style) 	Weight: 95kg Dimensions: 0.9m x 2m Speed: 32kmph Powered: Internal battery	Considered a vehicle under BC MVA. Rider must be 16 years or older and wear a helmet. Gas powered scooters are prohibited in BC.	Major Roads – Yes, with some exceptions Local Roads - Yes Bike Lane/Pathway – Yes, with some exceptions Sidewalk - No	None**
Limited speed motorcycles (mopeds & scooters)	Weight: 95kg Dimensions: 0.8m x 1.9m Speed: 70kmph Powered: gas or electric	Considered a vehicle under BC MVA.	Major Roads - Yes Local Roads - Yes Bike Lane/Pathway – No Sidewalk - No	Must be registered and insured. Any license sufficient (except learner's).

Type	Typical Specs	Provincial Regulations	Permitted on	Insurance, Registration & Licensing Requirements
				

# Appendix B: COITS Synchro Analysis Record



October 8, 2021

File: 1961.0472.01

## West Kelowna Synchro Model Assumptions

The following scenarios are included in the West Kelowna Synchro model:

- 2020 PM Peak (with Existing “Base” Signal Timing)
- 2020 PM Peak (with Optimized Signal Timing)
- 2040 PM Peak (with Existing “Base” Signal Timing)
- 2040 PM Peak (with Optimized Signal Timing)

## Traffic Volumes

- MoTI provided traffic volumes from traffic signal controllers which are from various dates between 2017 and 2019. Butt Road is the only exception which was counted in 2021.
- Minor volume balancing was applied to the through movements along the highway.
- Turning movements at intersections through the couplet were not captured in the traffic counts (due to these intersections having shared through and turn lanes on the highway approaches); therefore, turning movements at these intersections were estimated based on proportions modeled in the 2014 Synchro traffic analysis for the COPS Phase 1: Existing Conditions analysis.

Note: No traffic volumes are currently available at unsignalized intersections, or at Gellately Road / Gossett Road.

## Forecast Assumptions

- Turning movement count volumes were grown up to 2020 using a linear growth rate of 1.0%, based on historic traffic growth.
- Background traffic growth was factored up from 2020 to 2040 using a linear annual growth rate of 1.0% for all highway through movements and 1.5% for all side-street movements, based on EMME model outputs.

## Signal Timing

- Existing signal timing was coded at all intersections.
- Signal timing (cycle length, offsets, and splits) was optimized for the network and all intersections in both horizons and saved as separate scenarios.

Sincerely,  
**URBAN SYSTEMS LTD.**

Jasmine Smith, EIT  
Transportation Engineer

/js/bp  
Enclosure

cc: James Donnelly, P.Eng., PTOE  
\\uslkel\proj\1961\0472\01\Z-Reference\Outbound\West Kelowna Synchro Model\2021-10-08\_CO-ITS\_W-Kel-Synchro-Model\_Assumptions-JS.docx

## Appendix C: Existing Traffic Operations

Intersection and Movement		Lanes	Storage(m)	AM Peak Hour			PM Peak Hour		
				LOS	v/c	95th Q	LOS	v/c	95th Q
<b>Main St &amp; Herbert Rd</b>		-	-	<b>B</b>	<b>0.70</b>	-	<b>A</b>	<b>0.74</b>	-
West Bound	Left-Through-Right	2	195	A	0.70	17	A	0.74	32
North Bound	Left-Through	1	107	D	0.56	23	D	0.38	16
South Bound	Through	1	-	C	0.24	32	C	0.4	16
	Right	1	30	A	0.10	4	C	0.26	11
<b>Main St &amp; Elliot Rd</b>		-	-	<b>A</b>	<b>0.66</b>	-	<b>B</b>	<b>0.82</b>	-
West Bound	Left-Through-Right	2	182	A	0.66	38	A	0.82	169
North Bound	Left	1	35	C	0.34	16	D	0.76	36
	Through	1	107	B	0.30	25	C	0.64	42
South Bound	Through	1	-	C	0.58	25	C	0.4	28
	Right	1	40	B	0.29	10	C	0.37	25
<b>Main St &amp; Brown Rd</b>		-	-	<b>A</b>	<b>0.55</b>	-	<b>B</b>	<b>0.85</b>	-
West Bound	Left-Through-Right	2	80	A	0.55	13	A	0.85	181
North Bound	Left	1	35	C	0.22	5	C	0.52	12
	Through	1	87	C	0.25	7	C	0.4	19
South Bound	Through-Right	1	-	C	0.48	18	C	0.62	31
<b>Main St &amp; Hoskins Rd</b>		-	-	<b>A</b>	<b>0.42</b>	-	<b>A</b>	<b>0.61</b>	-
West Bound	Left-Through-Right	2	80	A	0.42	1	A	0.61	1
North Bound	Left	1	80	C	0.19	6	D	0.19	5
South Bound	Through-Right	1	98	C	0.17	5	C	0.17	5
<b>Main St &amp; Old Okanagan Hwy</b>		-	-	<b>B</b>	<b>0.70</b>	-	<b>C</b>	<b>0.89</b>	-
West Bound	Left-Through-Right	2	-	B	0.70	91	B	0.89	184
North Bound	Left	1	35	C	0.11	3	C	0.17	7
	Through	1	89	D	0.65	37	D	0.67	42
South Bound	Through	1	-	C	0.55	36	C	0.29	17
	Right	1	-	B	0.20	8	C	0.69	41
<b>Dobbin Rd &amp; Herbert Rd</b>		-	-	<b>B</b>	<b>0.63</b>	-	<b>A</b>	<b>0.71</b>	-
East Bound	Left-Through-Right	2	-	A	0.58	76	A	0.71	113
North Bound	Through	1	-	C	0.24	11	C	0.16	7
	Right	1	30	C	0.63	20	C	0.39	18
South Bound	Left	1	40	C	0.14	4	C	0.32	12
	Through	1	110	C	0.62	28	C	0.27	12
<b>Dobbin Rd &amp; Elliot Rd</b>		-	-	<b>B</b>	<b>0.73</b>	-	<b>C</b>	<b>0.94</b>	-
East Bound	Left-Through-Right	2	190	A	0.70	32	B	0.94	187
North Bound	Through	1	-	C	0.57	34	C	0.67	41
	Right	1	40	A	0.14	7	C	0.4	18
South Bound	Left	1	40	C	0.44	17	D	0.62	20



Intersection and Movement		Lanes	Storage(m)	AM Peak Hour			PM Peak Hour		
				LOS	v/c	95th Q	LOS	v/c	95th Q
	Through	1	110	D	0.73	40	D	0.75	46
<b>Dobbin Rd &amp; Brown Rd</b>		-	-	<b>A</b>	<b>0.65</b>	-	<b>C</b>	<b>0.98</b>	-
East Bound	Left-Through-Right	2	180	A	0.65	19	C	0.98	187
North Bound	Through	1	-	C	0.11	10	B	0.21	21
	Right	1	35	C	0.47	23	C	0.46	34
South Bound	Left	1	40	B	0.11	5	B	0.18	7
	Through	1	88	C	0.64	43	C	0.76	58
<b>Dobbin Rd &amp; Hoskins Rd</b>		-	-	<b>A</b>	<b>0.44</b>	-	<b>A</b>	<b>0.56</b>	-
East Bound	Left-Through-Right	2	75	A	0.44	1	A	0.56	1
North Bound	Through	1	75	C	0.15	17	C	0.14	4
	Right	1	10	C	0.15	17	C	0.14	4
South Bound	Left-Through	1	84	C	0.23	20	C	0.24	7
	Through	1	84	C	0.23	20	C	0.24	7
<b>Dobbin Rd &amp; Old Okanagan Hwy</b>		-	-	<b>B</b>	<b>0.86</b>	-	<b>C</b>	<b>0.94</b>	-
East Bound	Left-Through-Right	2	75	B	0.83	23	B	0.92	24
North Bound	Through	1	-	C	0.47	29	D	0.74	43
	Right	1	40	C	0.62	32	E	0.94	53
South Bound	Left	1	35	E	0.86	22	D	0.48	12
	Through	1	88	C	0.30	25	C	0.35	27
<b>Hwy 97 &amp; Gellatly Rd</b>		-	-	<b>C</b>	<b>0.95</b>	-	<b>D</b>	<b>0.99</b>	-
West Bound	Left	1	100	E	0.58	25	F	0.92	90
	Through	2	-	C	0.74	165	C	0.75	163
	Right	1	60	A	0.05	1	A	0.06	1
North Bound	Left	1	-	D	0.76	60	E	0.88	60
	Through	1	-	D	0.55	32	E	0.72	65
	Right	1	25	A	0.24	4	A	0.3	8
East Bound	Left	1	120	E	0.65	31	F	0.89	36
	Through	2	385	D	0.95	226	D	0.99	255
	Right	1	30	A	0.36	32	A	0.31	30
South Bound	Left	1	60	E	0.58	25	F	0.85	50
	Through	1	50	C	0.74	165	D	0.61	56
	Right	1	-	A	0.05	1	A	0.18	1
<b>Hwy 97 &amp; Bartley Rd</b>		-	-	<b>C</b>	<b>0.78</b>	-	<b>D</b>	<b>1.05</b>	-
East Bound	Left	1	65	E	0.61	47	F	0.72	74
	Through	2	-	C	0.78	200	D	0.94	259
	Right	1	30	A	0.21	17	A	0.13	3
West Bound	Left	1	70	E	0.69	57	E	0.82	106
	Through	2	-	C	0.70	166	E	1.05	336
	Right	1	40	A	0.19	20	A	0.18	18



Intersection and Movement		Lanes	Storage(m)	AM Peak Hour			PM Peak Hour		
				LOS	v/c	95th Q	LOS	v/c	95th Q
North Bound	Left	1	25	D	0.68	65	E	0.79	74
	Through	1	67	E	0.49	48	D	0.48	53
	Right	1	20	B	0.45	19	B	0.55	32
South Bound	Left	1	30	E	0.71	70	E	0.86	77
	Through	1	64	E	0.67	59	E	0.7	63
	Right	1	30	A	0.30	2	A	0.31	3
<b>Hwy 97 &amp; Ross Rd</b>		-	-	<b>B</b>	<b>0.66</b>	-	<b>B</b>	<b>0.83</b>	-
East Bound	Left	1	70	E	0.28	17	E	0.47	31
	Through	2	-	B	0.66	169	B	0.78	211
	Right	1	30	A	0.03	1	A	0.05	4
West Bound	Left	1	70	E	0.28	17	E	0.54	65
	Through	2	-	B	0.59	136	B	0.83	335
	Right	1	50	A	0.03	1	A	0.09	10
North Bound	Left	1	40	D	0.35	24	D	0.24	15
	Through	1	-	D	0.05	8	D	0.07	8
	Right	1	30	B	0.37	15	A	0.14	1
South Bound	Left	1	45	E	0.62	39	D	0.24	15
	Through	1	-	D	0.05	8	D	0.07	8
	Right	1	30	A	0.23	7	A	0.14	1
<b>Hwy 97 &amp; Westlake Rd</b>		-	-	<b>C</b>	<b>0.98</b>	-	<b>D</b>	<b>1.05</b>	-
East Bound	Left	1	60	F	0.80	51	F	0.95	62
	Through	2	-	C	0.89	232	C	0.87	218
	Right	1	75	A	0.08	6	A	0.17	14
West Bound	Left	1	60	E	0.46	29	E	0.58	56
	Through	2	-	C	0.67	132	D	1.02	357
	Right	1	65	A	0.37	15	A	0.49	51
North Bound	Left	1	40	D	0.31	41	E	0.53	47
	Through	1	-	D	0.21	39	D	0.23	36
	Right	1	40	A	0.18	7	A	0.27	15
South Bound	Left	1	80	F	0.98	164	F	1.05	141
	Through	1	130	D	0.24	44	D	0.45	64
	Right	1	25	A	0.31	18	B	0.37	28
<b>Old Okanagan Hwy and Gosset Rd</b>		-	-	<b>A</b>	<b>0.29</b>	-	<b>C</b>	<b>0.78</b>	-
East Bound	Left-Through-Right	1	-	C	0.24	17	F	0.7	34
West Bound	Left-Through-Right	1	-	B	0.29	5	E	0.78	51
North Bound	Left-Through-Right	1	-	A	0.00	13	A	0.01	1
South Bound	Left-Through-Right	1	-	A	0.06	1	A	0.08	2
<b>Bartley Rd and Byland Rd</b>		-	-	<b>A</b>	<b>0.38</b>	-	<b>A</b>	<b>0.56</b>	-
East Bound	Left	1	25	D	0.18	5	F	0.56	23



Intersection and Movement		Lanes	Storage(m)	AM Peak Hour			PM Peak Hour		
				LOS	v/c	95th Q	LOS	v/c	95th Q
	Through-Right	1	-	C	0.15	4	B	0.17	5
West Bound	Left	1	-	E	0.38	13	E	0.47	18
	Through-Right	1	-	C	0.11	3	B	0.28	9
North Bound	Left	1	10	A	0.07	2	A	0.02	1
	Through-Right	1	67	A	0.17	1	A	0.26	1
South Bound	Left	1	20	A	0.11	3	A	0.02	1
	Through-Right	1	-	A	0.28	1	A	0.19	1
<b>Bartley Rd and Stevens Rd</b>		-	-	<b>C</b>	<b>0.68</b>	-	<b>B</b>	<b>0.52</b>	-
East Bound	Left-Through-Right	1	-	C	0.68	44	C	0.52	24
West Bound	Left-Through-Right	1	-	F	0.51	18	F	0.51	16
North Bound	Left-Through-Right	1	225	A	0.18	5	A	0.41	16
South Bound	Left-Through-Right	1	-	A	0.00	1	A	0	1
<b>Ross Rd and Stevens Rd</b>		-	-	<b>A</b>	<b>0.37</b>	-	<b>A</b>	<b>0.37</b>	-
East Bound	Left-Through-Right	1	-	A	0.18	1	A	0.19	1
West Bound	Left-Through-Right	1	-	A	0.21	6	A	0.16	4
North Bound	Left-Through-Right	1	225	C	0.37	13	C	0.37	13
<b>Westlake Rd and Stevens Rd</b>		-	-	<b>A</b>	<b>0.60</b>	-	<b>A</b>	<b>0.6</b>	-
East Bound	Left-Through-Right	1	-	A	0.60	39	A	0.3	2
West Bound	Left-Through-Right	1	-	A	0.43	24	A	0.56	6
North Bound	Left-Through-Right	1	-	A	0.46	27	A	0.49	4
South Bound	Left-Through-Right	1	-	A	0.10	4	A	0.22	1
<b>Westlake Rd and Industrial Rd</b>		-	-	<b>B</b>	<b>0.97</b>	-	<b>F</b>	<b>1.93</b>	-
East Bound	Left-Through	1	-	D	0.31	26	F	0.92	81
	Right	1	10	D	0.31	26	F	0.92	95
West Bound	Left-Through-Right	1	-	F	0.97	151	F	1.93	95
North Bound	Left	1	30	A	0.11	2	A	0.08	2
	Through-Right	1	-	A	0.29	2	A	0.37	1
South Bound	Left	1	25	A	0.02	1	A	0.03	1
	Through-Right	1	-	A	0.37	1	A	0.27	1
<b>Boucherie Rd and Hudson Rd</b>		-	-	<b>A</b>	<b>0.57</b>	-	<b>A</b>	<b>0.46</b>	-
East Bound	Left-Through-Right	1	-	A	0.29	14	A	0.35	17
North Bound	Left-Through-Right	1	-	A	0.57	35	A	0.46	26
South Bound	Left-Through-Right	1	-	A	0.28	13	A	0.3	14

## Appendix D: 2040 Traffic Operation

Intersection and Movement		Lanes	Storage(m)	AM Peak Hour			PM Peak Hour		
				LOS	v/c	95th Q	LOS	v/c	95th Q
<b>Main St &amp; Herbert Rd</b>		-	-	<b>B</b>	<b>0.53</b>	-	<b>B</b>	<b>0.79</b>	-
West Bound	Left-Through-Right	1	195	C	0.53	57	A	0.56	17
North Bound	Left-Through	1	107	A	0.25	13	B	0.45	21
South Bound	Through	1	-	B	0.52	28	D	0.79	28
<b>Main St &amp; Elliot Rd</b>		-	-	<b>A</b>	<b>0.63</b>	-	<b>C</b>	<b>0.79</b>	-
East Bound	Left-Through-Right	1	200	A	0.42	7	B	0.50	14
West Bound	Left-Through-Right	1	182	A	0.27	37	C	0.79	112
North Bound	Left	1	35	A	0.06	1	B	0.06	4
	Through-Right	1	107	B	0.63	8	C	0.53	44
South Bound	Left-Through-Right	1	-	C	0.42	24	C	0.66	71
<b>Main St &amp; Brown Rd</b>		-	-	<b>B</b>	<b>0.55</b>	-	<b>C</b>	<b>0.92</b>	-
East Bound	Left-Through-Right	1	180	A	0.27	56	A	0.22	12
West Bound	Left-Through-Right	1	80	A	0.19	19	B	0.58	88
North Bound	Left	1	35	C	0.29	11	F	0.92	32
	Through	1	87	C	0.19	12	C	0.32	25
South Bound	Through-Right	1	-	C	0.55	22	C	0.74	43
<b>Main St &amp; Hoskins Rd</b>		-	-	<b>A</b>	<b>0.13</b>	-	<b>A</b>	<b>0.01</b>	-
East Bound	Left-Through-Right	1	82	A	0.01	1	A	0.01	1
West Bound	Left-Through-Right	2	80	A	0.01	1	A	0.01	1
North Bound	Left	1	80	B	0.13	4	C	0.16	5
South Bound	Through-Right	1	98	B	0.10	3	C	0.19	5
<b>Main St &amp; Old Okanagan Hwy</b>		-	-	<b>B</b>	<b>0.53</b>	-	<b>B</b>	<b>0.68</b>	-
East Bound	Left-Through-Right	1	80	A	0.38	20	A	0.41	18
West Bound	Left-Through-Right	2	-	A	0.24	22	B	0.68	85
North Bound	Left	1	35	B	0.09	4	B	0.11	5
	Through	1	89	B	0.53	27	B	0.64	38
South Bound	Through	1	-	B	0.07	4	B	0.28	12
	Right	1	-	A	0.02	1	A	0.23	7



Intersection and Movement		Lanes	Storage(m)	AM Peak Hour			PM Peak Hour		
				LOS	v/c	95th Q	LOS	v/c	95th Q
<b>Dobbin Rd &amp; Herbert Rd</b>		-	-	<b>B</b>	<b>0.67</b>	-	<b>B</b>	<b>0.72</b>	-
East Bound	Left	1	30	A	0.34	15	C	0.62	24
	Through-Right	1	-	A	0.67	105	A	0.66	104
West Bound	Left	1	30	B	0.18	8	B	0.35	17
	Through-Right	1	-	B	0.34	48	B	0.72	131
North Bound	Left-Through	1	-	C	0.36	16	D	0.63	19
	Right	1	30	B	0.35	16	A	0.07	1
South Bound	Left	1	40	C	0.20	11	C	0.07	5
	Through-Right	1	110	D	0.58	31	C	0.41	17
<b>Dobbin Rd &amp; Elliot Rd</b>		-	-	<b>B</b>	<b>0.68</b>	-	<b>C</b>	<b>1.00</b>	-
East Bound	Left	1	30	A	0.09	5	B	0.47	9
	Through-Right	2	-	B	0.74	104	C	0.92	170
West Bound	Left	1	30	A	0.09	3	D	0.78	46
	Through-Right	2	-	A	0.29	28	A	0.55	67
North Bound	Left	1	-	C	0.14	8	D	0.80	66
	Through-Right	1	45	D	0.74	41	D	0.82	50
South Bound	Left	1	20	D	0.54	18	F	1.00	37
	Through	1	-	D	0.68	41	C	0.28	21
	Right	1	50	A	0.06	4	B	0.27	15
<b>Dobbin Rd &amp; Brown Rd</b>		-	-	<b>B</b>	<b>0.91</b>	-	<b>C</b>	<b>0.96</b>	-
East Bound	Left	1	30	A	0.12	2	C	0.79	5
	Through-Right	2	-	B	0.65	50	B	0.84	109
West Bound	Left	1	30	E	0.91	23	F	0.96	42
	Through-Right	2	-	B	0.45	34	C	0.87	113
North Bound	Left-Through	1	-	B	0.10	4	E	0.96	82
	Right	1	35	A	0.30	2	A	0.21	11
South Bound	Left-Through	1	85	C	0.68	33	C	0.57	47
	Through	1	85	A	0.02	1	A	0.1	2
<b>Dobbin Rd &amp; Hoskins Rd</b>		-	-	<b>A</b>	<b>0.62</b>	-	<b>A</b>	<b>0.66</b>	-
East Bound	Through-Right	2	75	A	0.62	1	A	0.66	1
West Bound	Through-Right	2	75	A	0.34	1	A	0.56	1
North Bound	Right	1	10	A	0.03	1	B	0.1	3
South Bound	Right	1	84	A	0.01	1	B	0.09	3



Intersection and Movement		Lanes	Storage(m)	AM Peak Hour			PM Peak Hour		
				LOS	v/c	95th Q	LOS	v/c	95th Q
<b>Dobbin Rd &amp; Old Okanagan Hwy</b>		-	-	<b>B</b>	<b>0.71</b>	-	<b>C</b>	<b>0.89</b>	-
East Bound	Left	1	45	D	0.56	42	E	0.66	40
	Through-Right	2	-	B	0.71	160	C	0.89	188
West Bound	Left	1	30	A	0.16	5	D	0.79	56
	Through-Right	2	-	B	0.49	64	B	0.71	118
North Bound	Left	1	30	C	0.05	5	D	0.34	21
	Through	1	-	C	0.59	28	E	0.87	47
	Right	1	30	A	0.35	13	B	0.46	20
South Bound	Left	1	35	D	0.47	22	E	0.63	28
	Through	1	88	C	0.34	22	D	0.52	36
	Right	0	50	A	0.21	8	B	0.33	14
<b>Hwy 97 &amp; Gellatly Rd</b>		-	-	<b>C</b>	<b>0.91</b>	-	<b>D</b>	<b>0.99</b>	-
West Bound	Left	1	100	E	0.81	88	F	0.73	47
	Through	2	-	D	0.61	72	E	0.63	63
	Right	1	60	A	0.07	1	A	0.3	5
North Bound	Left	1	-	C	0.50	46	E	0.93	99
	Through	1	-	D	0.47	39	E	0.77	74
	Right	1	25	C	0.64	28	A	0.3	3
East Bound	Left	1	120	E	0.41	28	F	0.83	49
	Through	2	385	D	0.91	252	C	0.87	255
	Right	1	30	A	0.24	22	A	0.26	26
South Bound	Left	1	60	E	0.70	60	F	0.92	98
	Through	1	50	C	0.57	133	D	0.99	344
	Right	1	-	A	0.13	1	A	0.06	1
<b>Old Okanagan Hwy and Gosset Rd</b>		-	-	<b>A</b>	<b>0.91</b>	-	<b>D</b>	<b>1.02</b>	-
East Bound	Left-Through-Right	1	-	A	0.64	1	F	0.8	48
West Bound	Left-Through-Right	1	-	A	0.42	1	F	1.02	83
North Bound	Left-Through-Right	1	-	F	0.91	58	A	0.01	1
South Bound	Left-Through-Right	1	-	D	0.60	30	A	0.04	1
<b>Bartley Rd and Byland Rd</b>		-	-	<b>A</b>	<b>0.42</b>	-	<b>C</b>	<b>0.9</b>	-
East Bound	Left	1	25	F	0.42	14	F	0.64	27
	Through-Right	1	-	C	0.42	17	B	0.17	5
West Bound	Left	1	-	C	0.12	3	F	0.9	57
	Through-Right	1	-	F	0.18	5	C	0.42	16
North Bound	Left	1	10	B	0.08	2	A	0.02	1
	Through-Right	1	67	B	0.20	1	A	0.26	1
South Bound	Left	1	20	A	0.11	3	A	0.02	1
	Through-Right	1	-	A	0.28	1	A	0.19	1



Intersection and Movement		Lanes	Storage(m)	AM Peak Hour			PM Peak Hour		
				LOS	v/c	95th Q	LOS	v/c	95th Q
<b>Bartly Rd and Stevens Rd</b>		-	-	<b>F</b>	<b>4.03</b>	-	<b>F</b>	<b>Error</b>	-
East Bound	Left-Through-Right	1	-	F	1.05	137	F	2.37	235
West Bound	Left-Through-Right	1	-	F	4.03	Error	F	Error	Error
North Bound	Left-Through-Right	1	225	A	0.17	5	A	0.36	13
South Bound	Left-Through-Right	1	-	A	0.01	1	A	0.01	1
<b>Ross Rd and Stevens Rd</b>		-	-	<b>A</b>	<b>0.33</b>	-	<b>A</b>	<b>0.37</b>	-
East Bound	Left-Through-Right	1	-	A	0.23	1	A	0.19	1
West Bound	Left-Through-Right	1	-	A	0.21	7	A	0.16	4
North Bound	Left-Through-Right	1	225	C	0.33	11	C	0.37	13
<b>Westlake Rd and Stevens Rd</b>		-	-	<b>A</b>	<b>0.87</b>	-	<b>A</b>	<b>0.54</b>	-
East Bound	Left-Through-Right	1	-	A	0.23	10	A	0.28	13
West Bound	Left-Through-Right	1	-	A	0.09	4	A	0.16	6
North Bound	Left-Through-Right	1	-	A	0.44	24	A	0.54	4
South Bound	Left-Through-Right	1	-	A	0.46	4	A	0.33	15
<b>Westlake Rd and Industrial Rd</b>		-	-	<b>A</b>	<b>0.25</b>	-	<b>A</b>	<b>0.56</b>	-
East Bound	Left-Through	1	-	A	0.06	2	B	0.56	17
	Right	1	10	A	0.25	2	A	0.07	2
West Bound	Left-Through-Right	1	-	A	0.24	2	A	0.27	1
North Bound	Left	1	30	A	0.06	3	A	0.04	4
	Through-Right	1	-	A	0.17	9	B	0.46	38
South Bound	Left	1	25	A	0.17	4	A	0.06	2
	Through-Right	1	-	A	0.19	8	A	0.28	24
<b>Boucherie Rd and Hudson Rd</b>		-	-	<b>A</b>	<b>0.73</b>	-	<b>A</b>	<b>0.88</b>	-
East Bound	Left-Through-Right	1	-	A	0.29	14	B	0.62	44
North Bound	Left-Through-Right	1	-	A	0.73	63	A	0.47	29
South Bound	Left-Through-Right	1	-	A	0.28	14	A	0.88	131



# Appendix E: Planned and Committed 2040 Projects

ID	Location	Description	Mode	Budget	Include in Base Future Network?	CWK NOTES	Improvement Type
1	Boucherie Rd / Mission Hill Rd	Intersection Improvement	Road	\$ 500,000	Y	Required. Part of overall Wine Trail improvements along Boucherie. Currently designing multi-use pathway along Boucherie from Ogden to Greenbay road which may delay road improvements, which would therefore postpone improvements on following phase of the wine trail which includes this intersection	Signal
2	Gosset Rd / Old Okanagan Hwy	Intersection Improvement	Road	\$ 350,000	Y	Not currently in forecast. Improvements are required further north at Butt/Old OK Hwy due to development. Design in 2022 with AS noted in 1022 above. Design in 2022, construction in 2023.	Signal
3.5	Butt Rd / Old Okanagan Hwy Intersection Improvement	Mitigation	Road	\$ 150,000	Y	Undetermined whether improvements will include a traffic circle, or additional lanes	Signal
4	Tallus Ridge Dr / Shannon Lake Rd	Intersection Improvement	Road	\$ 900,000	Y	Improvements required - unsafe intersection due to grades/sight lines and an increase in development in the Tallus Ridge area.	Signal
5	Boucherie Rd / Hudson Rd Intersection Improvement	Mitigation	Road	\$ 350,000	Y	Traffic Circle complete in 2018	Traffic Circle
6	Boucherie Rd/ Cordova Way/ Anders Rd Intersection	Mitigation	Road	\$ 400,000	Y	Traffic Circle complete in 2018	Traffic Circle
7	Glenrosa Rd / Webber Rd Intersection Improvement	Mitigation	Road	\$ 250,000	Y	Traffic Circle complete	Traffic Circle
8	Webber Rd / Lower Glenrosa Rd Intersection	Mitigation	Road	\$ 350,000	Y	Traffic circle complete in 2020	Traffic Circle
13	Highway 97/Westlake Road	Intersection / interchange capacity and safety improvements along	Highway		Y	Required. Currently under design with MOTI - Construction date undetermined	Include Both Option 1 from BC MOTI Package (ppt 23), and Option 2, ppt 25
14	Highway 97/Boucherie Road	Future interchange (undecided)	Highway		Y	Required. Currently under design with MOTI - Construction date undetermined	No changes
32	Highway 97/Dobbin	Grade separated crossings on highway, four lane dobbin, main street returned as main street.	Highway		Y	MOTI's CO-ITS initiative has identified this as an option. Unsure of implementation date and priority. I am of the understanding that the intersection at Hwy 97 and Westlake and Boucherie are further in the design process	Option 1 from BC MOTI Package (ppt 7)
40	Highway 97/Bartley Road	Provide additional channelization and clarity or roundabouts for	Highway		Y	Overpass or grade separation required as noted in ID34	Interchange - All Movements
61	Eastbound Transit Lane on the Bridge (Mornings Only)	This project would provide an eastbound transit lane on the WR	Transit	\$5-20M	Y	with MOTI, supported by West Kelowna	See page 70 of this file: <a href="https://www.smarttrips.ca/sites/files/6/docs/related/kelowna_regionaltransportationplan_122120.pdf">https://www.smarttrips.ca/sites/files/6/docs/related/kelowna_regionaltransportationplan_122120.pdf</a>
62	Westside Highway 97 Park and Ride / Shoulder Transit	This project would widen the shoulder along Highway 97 from	Transit	\$20-50M	Y	with MOTI, supported by West Kelowna	See page 71 of this file: <a href="https://www.smarttrips.ca/sites/files/6/docs/related/kelowna_regionaltransportationplan_122120.pdf">https://www.smarttrips.ca/sites/files/6/docs/related/kelowna_regionaltransportationplan_122120.pdf</a>
63	Active Transportation Route Parallel to Highway 97	This project would develop an active transportation route parallel to Highway 97 between the WR Bennett Bridge and Westbank Centre.	Ped/Cycling	\$5-20M	Y	with MOTI, supported by West Kelowna - does not seem feasible. May have to look at AT routes along Boucherie, Shannon Lake and connection to Kalamoir park for access to and from Bennett Bridge	See page 72 of this file: <a href="https://www.smarttrips.ca/sites/files/6/docs/related/kelowna_regionaltransportationplan_122120.pdf">https://www.smarttrips.ca/sites/files/6/docs/related/kelowna_regionaltransportationplan_122120.pdf</a>
64	Westside Trail	This project includes a multi-use pathway on the west side of	Ped/Cycling	\$5-20M	Y	Supported by West Kelowna	See page 73 of this file: <a href="https://www.smarttrips.ca/sites/files/6/docs/related/kelowna_regionaltransportationplan_122120.pdf">https://www.smarttrips.ca/sites/files/6/docs/related/kelowna_regionaltransportationplan_122120.pdf</a>
70	Highway 97/Daimler Drive	Advance left turn phasing provided from Highway 97 with	Highway		Y	Improvements are required at this location, however this intersection is shared jurisdiction between MOTI, CWK and WFN	Signal Upgrade
71	Highway 97/Sneena Road Overpass	Provision of overpass of a new 2-lane Sneena Road connection	Highway		Y	WFN Jurisdiction	New connection - already built, see google
72	Stevens Rd / Westlake Rd	Intersection Improvement	Road	\$ 400,000.00	Y	Traffic circle complete	Roundabout
83	Shannon Lake Rd and Bartley Rd Intersection	Mitigation	Road	\$ 350,000	Y	Currently being constructed, completion anticipated in 2022	Roundabout
85	Asquith Rd from Iron Ridge Rd to Tallus Ridge Dr		Road	\$ 100,000	Y	Connection required as previously discussed - TMP to recommend route	New Connection
86	Tallus Ridge Dr from Smith Creek Rd to Cobblestone Rd		Road	\$ 100,000	Y	Connection required as previously discussed - TMP to recommend route	New Connection
94	Boucherie from Stuart to Ogden	Full cross section improvements with ped & bicycle facilities.	Ped/Cycling		Y	Complete in 2018	Ped / Bike Corridor
95	Gellatly from Hwy 97 to Boucherie	This segment includes sections of Gellatly Road (3A) and Boucherie Road (2). It would connect to Gellatly Phase 3 which	Road		Y	Intersection improvements complete at Gellatly/Carrington, south of Carrington to Boucherie deferred to future year. Safety stats currently show this is a lower priority	Intersection upgrade

96	Glenrosa Road, from Glen Abbey to McGinnis	This segment is the highest ranked project that benefits the Glenrosa neighbourhood. It is a long segment, 875m, that connects two existing sidewalks on Glenrosa Road to the North and South Full cross section improvements with ped & bicycle facilities. Roundabout possibly at McIver. Design funding is approved, very likely to be constructed in the next 5 years.	Road		Y	Complete	Ped / Bike Corridor
97	Shannon Lake - IR #9 to Asquith		Road		Y	Currently in design - construction anticipated in 2022/2023	Ped / Bike Corridor
98	Elliott - Smith Creek to Reece	This road section would begin a pedestrian and cycling connection from the Smith Creek neighbourhood to Westbank Centre Full cross section improvements with ped & bicycle facilities. In the 10 year capital plan.	Road		Y	Priority with Council - potential design in 2023 with construction in 2024	Ped / Bike Corridor
99	Boucherie - Ogden to Sunnyside	This road section would continue the Wine Trail section from the completion of the phase 2 works, which is currently under construction. Benefits of completing this section would be to completing the road network in a continuous fashion. It would connect sidewalks, bike lanes and transit improvements to a recently improved road section at Ogden Road. The Wine Trail section would then be improved from Highway 97 to Sunnyside Road, approximately 4 km of total improvements. Full cross section improvements with ped & bicycle facilities. In the 10 year capital plan.	Road		Y	As noted previously, multi-use pathway currently in design which may defer road improvements	Ped / Bike Corridor
100	Stevens - Bartley to Ross & Shannon Lake intersection	This road section is recommended to be completed in conjunction with the Public Works facility. It would be a partial construction of several segments including the Shannon Lake, Stevens, and Bartley intersection. Full cross section improvements with ped & bicycle facilities. Roundabout at the Bartley, Stevens, Shannon Lake intersection. In the 10 year capital plan.	Road		Y	Currently in construction, completion anticipated in summer 2023	Ped / Bike Corridor
201	Gellatly Road South from Glen Canyon Park to Whitworth Road	Currently utilized as a bypass to Highway 97, insufficient ROW of extents, no sidewalks future growth anticipated in this area with development on Goat's Peak. Access to Waterfront			Y	Currently a priority with Council	road upgrade
205	Active Transportation Connection	Sunnybrae Road to Green Bay Road			Y	Discussions currently in progress with property owner - part of the Trail of the Okanagan initiative connecting Bennet Bridge to Peachland	Ped / Bike Corridor