City of Kelowna

Kelowna On the Move

Pedestrian and Bicycle Master Plan

April 2016

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CHAPTER 1: BACKGROUND

Kelowna residents aspire to have a community that is compact and walkable, where the natural environment is protected, and where walking paths and cycling routes connect destinations throughout the community (Kelowna 2030 Official Community Plan, 2011).

The Pedestrian and Bicycle Master Plan is a long-term plan that identifies infrastructure, planning and policy requirements to promote and facilitate walking and cycling throughout the community. The Plan is one component of the Transportation Master Plan and together the plans will help achieve the OCP goal to "Feature A Balanced Transportation Network, increasing the attractiveness, convenience and safety of all modes of transportation ... focusing on pedestrians, cyclists and transit service." Ultimately, the community can benefit economically, socially and environmentally from a well-established pedestrian and bicycle network.

Building on the guiding vision "to make walking and cycling safer, convenient, and practical modes of travel," the Plan is based on six key objectives to structure priorities for walking and cycling: network design; planning, monitoring and maintenance; end-of-trip and transit integration; education and promotion; policies and enforcement; and funding.

1.1 Plan Purpose

This Plan identifies infrastructure, planning, and policy requirements to promote walking and cycling in the community. It identifies current gaps and opportunities, and prioritizes improvements to create an interconnected active transportation network in a cost-effective manner.

The plan complements and builds on Kelowna's Official Community Plan (OCP) and the Community Climate Action Plan (CCAP). These plans have goals of providing non-vehicular transportation options and reduced greenhouse gas (GHG) emissions as the transportation sector accounts for an estimated 65 per cent[1] of Kelowna's GHG emissions. The overall target is to reduce GHG emissions 33 per cent below 2007 levels by 2020.

The Pedestrian and Bicycle Master Plan is based on a vision for the City that ensures that walking and cycling are safe, convenient, and practical modes of travel.

"Ensure that pedestrians, cyclists and transit users can move about pleasantly and conveniently and that they are not unduly impeded in their movements by provisions for enhanced automobile mobility."

KELOWNA OCP, CHAPTER 7

[1] Community Energy and Emissions Inventory (CEEI) Report (2010).

1.2 Principles, Goals, Objectives

This Pedestrian and Bicycle Master Plan is based on the following vision, goals and objectives that are aligned with the City's OCP. The principles and goals describe general outcomes, and the objectives provide measurable targets in order to achieve each goal.

Guiding Vision

To make walking and cycling safer, convenient, and practical modes of travel; to reduce motor vehicle use and resulting greenhouse gas emissions; and to increase opportunities for active living to improve community health and happiness.

Principles

- To increase walking and cycling as practical modes of travel;
- To improve safety and convenience for pedestrians and cyclists.

Goals

- Increase year-round walking and cycling so that within the next 20 years 25 per cent of all trips less than five kilometres in length are made by walking or cycling.
- Improve pedestrian and cyclist safety so that the rate of collisions with motor vehicles is reduced by 50 per cent within the next 20 years.

Objectives

The Pedestrian and Bicycle Master Plan has six key objectives to structure the short- and long-term priorities in walking and cycling improvements. Each objective is addressed within the implementation strategy.

Network Design

- Facilitate and enhance walking and cycling in all roadway designs;
- Apply higher design standards for high demand or "strategic" active transportation routes;
- Develop a comprehensive pedestrian and bicycle network for phased implementation.

Planning, Monitoring and Maintenance

- Establish proactive and ongoing planning for both new and existing infrastructure;
- Establish monitoring and evaluation mechanisms;
- Ensure ongoing maintenance programs for walking and cycling facilities.

End-of-Trip and Transit Integration

- Encourage transit-bicycle integration;
- Incorporate end-of-trip facilities for pedestrians and cyclists in new and existing developments.

Education and Promotion

- Develop and implement an ongoing education and awareness program.

Policies and Enforcement

- Establish bylaw, policy, and enforcement measures to improve pedestrian and cyclist safety.

Funding

- Support walking and cycling programs and infrastructure with effective and equitable investment.

1.3 Community Benefits

Creating a community that is suitable for walking and cycling for all trip purposes and demographics will benefit everyone. The City of Kelowna recognizes that healthier, more livable communities include a balanced multi-modal transportation system that serves the public and is more efficient to build and maintain in the long-term. The direct benefits of a high-quality pedestrian and cycling network include:

Economic Benefits

- Walking and cycling are affordable transportation options;
- Investments in pedestrian and cycling infrastructure cost less to build per kilometer than roadways;
- Pedestrian and bicycle activity is good for the local economy, reducing expenditures on operating and maintaining a motor vehicle, and freeing up disposable income for investment in local goods and services.

Health and Social Benefits

- Regular physical activity contributes to a wide variety of health benefits, such as lower rates of obesity and reduced risk of cardiovascular disease and type 2 diabetes;
- More people out walking and cycling contributes to more vibrant streets and more social capital through human interaction. Further, more eyes on the street results in safer streets.

Environmental Benefits

- Walking and cycling are zero-emission activities that provide environmental benefits such as improved air quality and reduced noise, vibration and light pollution.

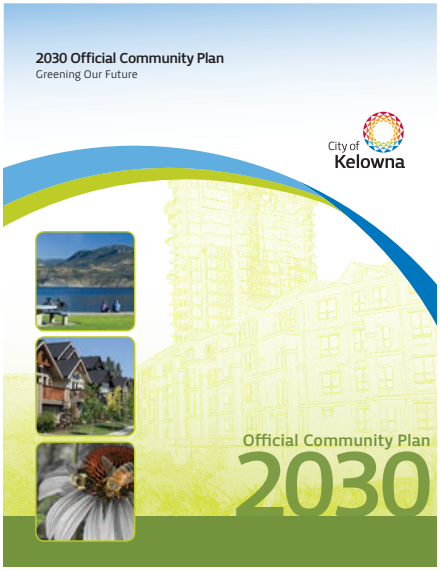
A sign of a City's attractiveness and livability is a superior walking and cycling environment. A recent trend has emerged among the younger generation of Millennials – they are choosing to live in compact urban centres, opting for walking, cycling and public transit over car ownership. Cities that respond to this emergent trend and shift towards active and sustainable transportation systems will attract and retain a younger population.

Mission Creek Greenway Trail

1.4 Policy Review

In developing the Pedestrian and Bicycle Master Plan all relevant official plans and policy documents were reviewed.

The 2030 Official Community Plan provides the over arching policy direction for the well-being, growth and development of the community. The OCP's comprehensive transportation strategies include implementing complete streets, transportation demand management policies, and facilitating walking and cycling for daily travel and recreation. Chapter 7 of the OCP details infrastructure policy directions for general transportation, demand management, pedestrians, cycling, and transit, and provides high-level recommendations to support increased walking and cycling. The OCP commits the City to a 33 per cent reduction in greenhouse gas (GHG) emissions below 2007 levels by 2020.



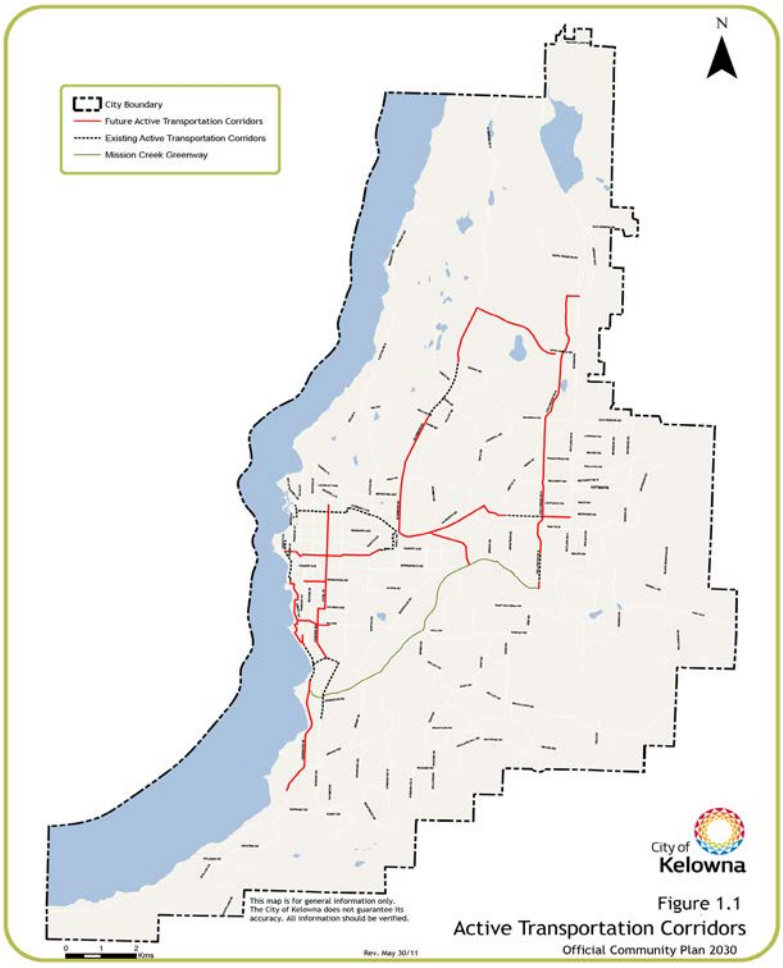
The 20-Year Servicing Plan (2011) supports the infrastructure needs identified in the OCP. It summarizes Development Cost Charges-based (DCC) Roads and Active Transportation Programs that creates transportation network connectivity and capacity required to support development in the City. A number of active transportation corridors are identified for delivery by 2030.

Figure 1.1 shows existing Active Transportation corridors and Future Active Transportation corridors that are planned for construction by 2030.

The Central Okanagan Regional Active Transportation Master Plan (2012) incorporates the needs and priorities of each local municipality and identifies opportunities to improve and expand pedestrian and cycling infrastructure to enhance active transportation connections and linkages between municipalities in Central Okanagan.

All projects identified in OCP Map are considered regionally significant.

Figure 1.1: Existing and Future Active Transportation Corridors, as identified in the Official Community Plan

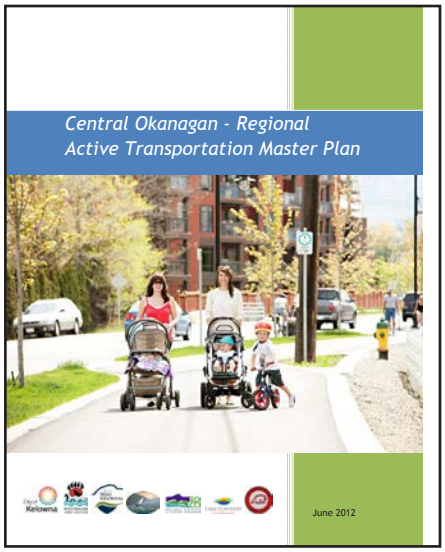


The Community Climate Action Plan (2012) outlines the steps required to achieve a 33 per cent reduction below 2007 levels in community GHG emissions by 2020. The CCAP reports that reducing overall driving levels and changing vehicle types are the most effective initiatives in reducing GHG emissions. To this end, the CCAP specifically identifies land-use planning and urban design as key in the creation of a compact, walkable community which, in turn, will facilitate reductions in GHGs.

The Linear Parks Master Plan (2009) envisions a network of linear parks serving primarily recreational travel purposes. The Master Plan presents a classification system for Kelowna's linear parks that differentiates facilities on the basis of width, level of use, and cost. The Linear Parks Master Plan interprets urban bicycle and pedestrian facilities as park facilities, and focuses accordingly on aspects of tourism, ecology and trail head design.

Emphasis of the Linear Parks Master Plan is on an off-road trail network throughout the city, versus a commuter network.

Figure 1.2 shows existing and planned linear corridors and pedestrian paths as identified in the Linear Parks Master Plan.



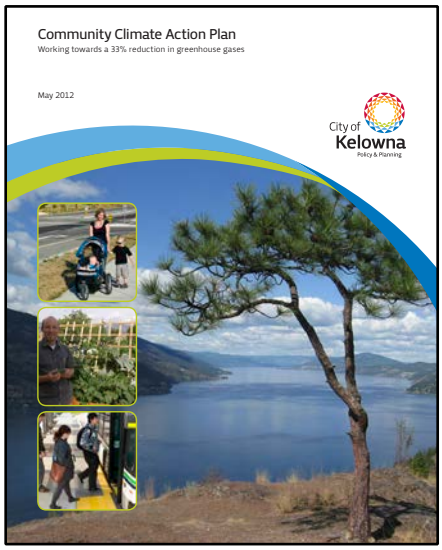
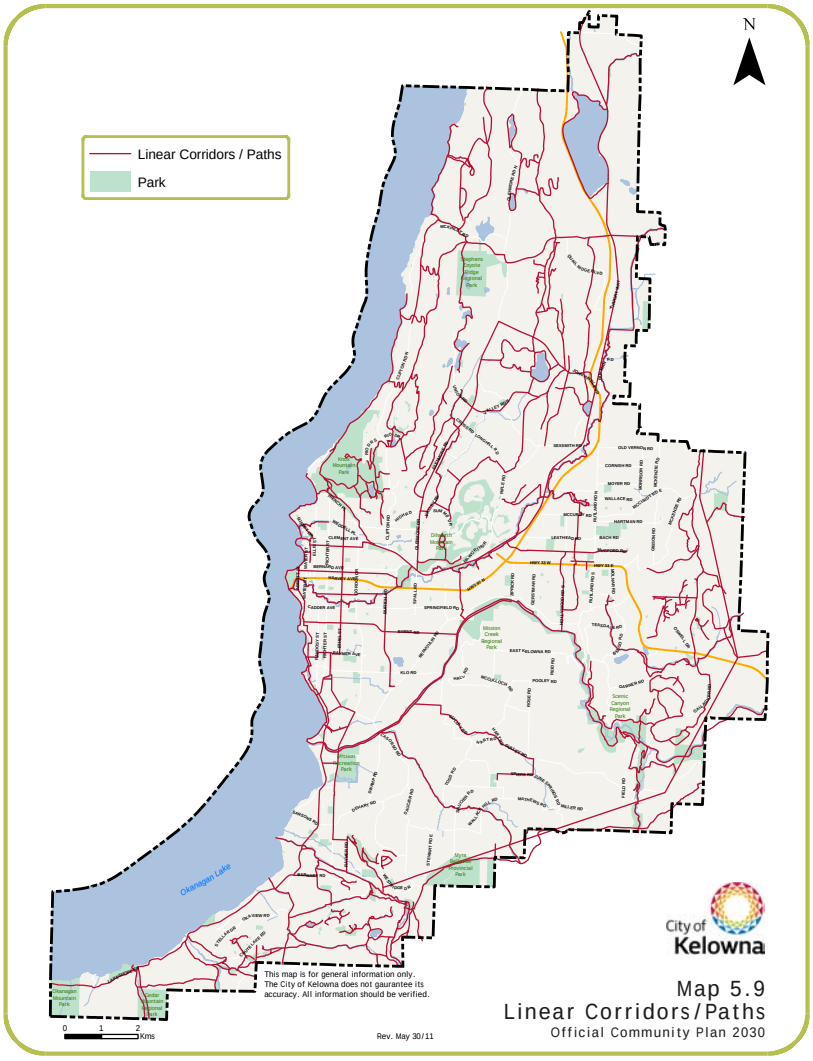


Figure 1.2: Existing and Planned Linear Corridors and Pedestrian Paths, as identified in the Linear Parks Master Plan



CHAPTER 2: EXISTING WALKING AND CYCLING CONDITIONS

Cawston at Richter

The City of Kelowna's existing transportation network consists of 400 km of sidewalks and walkways, 300 km of on-road bike lanes and over 40 km of shared-use pathways. Improving and adding a variety of facilities will enable users of all ages and abilities to walk or bike to their destinations.

The City has made great strides in improving the conditions for walking and cycling. The 2013 Household Travel Survey results show that there has been a 40 per cent increase in the number of daily trips taken by walking and cycling, going from 8 per cent of all trips originating in Kelowna in 2007 to more than 11 per cent in 2013.

These trends are consistent with Kelowna's Official Community Plan Objective 7.7: "reduce peak hour trips and the percentage of trips undertaken by single occupant vehicles, particularly in Urban Centres, in order to reduce the expansion of the network and capacity."

Feedback from stakeholders and residents was used in identifying barriers, such as safety and network gaps, to help design and prioritize a pedestrian and bicycle network that will meet our community's needs.

2.1 Existing Conditions

To meet walking and cycling demands, the City has been constructing sidewalks and shared-use pathways both as standalone projects and in concert with roadway upgrades and development frontage works. A variety of facility types have been used to meet this demand, outlined in the following definitions.

Cycling: Includes various types of bicycles, in-line skates, roller-skates and skateboards as defined/permitted by the City bylaws and Motor Vehicle Act.

Walkway: A short segment of walking facility used to connect neighbourhoods to sidewalks usually at the end of cul-de-sac bulbs.

Sidewalk: An asphalt or concrete walking facility adjacent to roads exclusively for pedestrians.

Shared-Use Pathway - Off-Road: An off-road two-way facility that is shared by pedestrians, cyclists, and other users with or without directional separation and built using a range of surface material.

Shared-Use Pathway - Roadside: A roadside two-way asphalt or concrete facility that is shared by pedestrians, cyclists, and other users.

Cycle Track: An exclusive one-way or two-way cycling facility that can be at road, sidewalk or an intermediate level and is physically separated from both vehicular and pedestrian traffic.

Bike Lanes: An exclusive one-way, street-level cycling space designated by means of pavement striping, markings and signage that is located adjacent to vehicular traffic.

Local Street Bikeway: A short segment of local road that is shared by cyclists and motor vehicles, designated through pavement markings and signage. Local Street Bikeways require traffic-calmed streets with 85 per cent vehicular operating speeds of 30 km/hr or less and Average Annual Daily Traffic volume (AADT) of less than 500.

2.2 Existing Pedestrian Network

Historically, land use in the Okanagan Valley has been predominantly rural with a dispersed population, resulting in dependence on motorized vehicles for transportation. As the City becomes more urbanized, with a mix of land uses and increased population density, walking and cycling become more viable options for a variety of trips. To meet walking and cycling demands, the City has been constructing sidewalks and shared-use pathways both as standalone projects and in concert with roadway upgrades and development frontage works.

The City has also been improving accessibility by adding improved crosswalks, curb ramps, audible pedestrian signals, and countdown timers at intersections. In 2015, the City had approximately 400 km of sidewalks and walkways (Figure 2.1). New walking facilities are added each year as part of new developments. In addition, the annual sidewalk capital program, allows the network to expand by approximately 2.0 km each year. This program does not include urbanization or beautification of streets such as curb, gutter, boulevard, paved parking to replace gravel shoulders.

2.3 Existing Cycling Network

The City of Kelowna has approximately 300 km of bike lanes plus 35 km of paved shared-use pathways.

The cycling network is expanded and improved each year, albeit slowly due to limited resources. In addition to on-road bike lanes, there are pathways, shared between cyclists and pedestrians, and more recently introduced separated cycle tracks, green bike lanes equipped with signal push buttons, signal displays and count stations.

Figure 2.2 illustrates the current system, which is a combination of various types of facilities ranging from traffic-calmed neighbourhood streets to separated cycle tracks and shared-use pathways.

The City undertakes other projects and programs to encourage and support cycling, including regular roadway sweeping, provision of bicycle lockers, bike racks, and SmartTRIPS. These measures are important and there remains an opportunity to do even more to serve users of all ages and abilities.

EXISTING WALKING AND CYCLING CONDITIONS

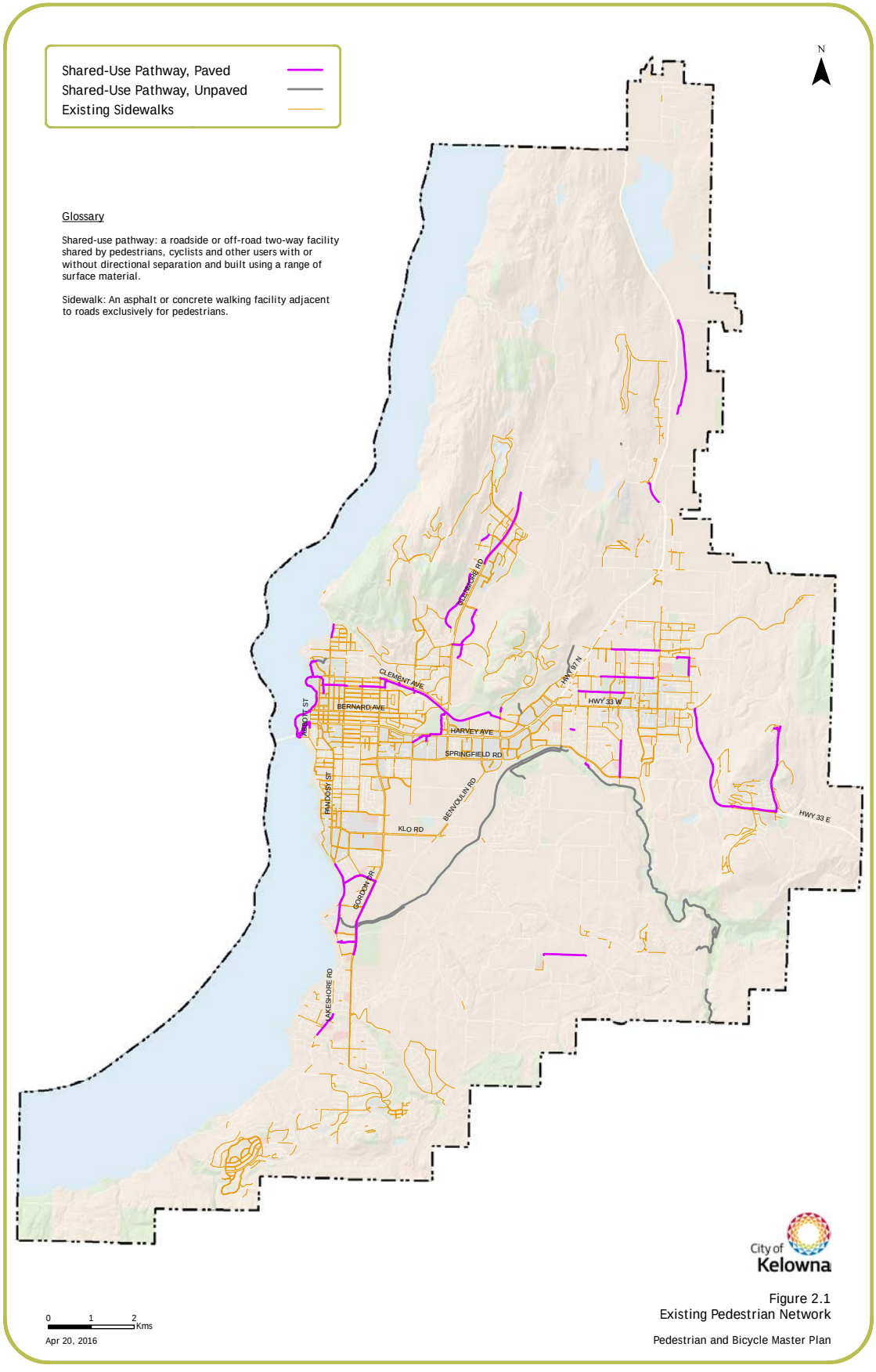


Figure 2.1
Existing Pedestrian Network

Pedestrian and Bicycle Master Plan

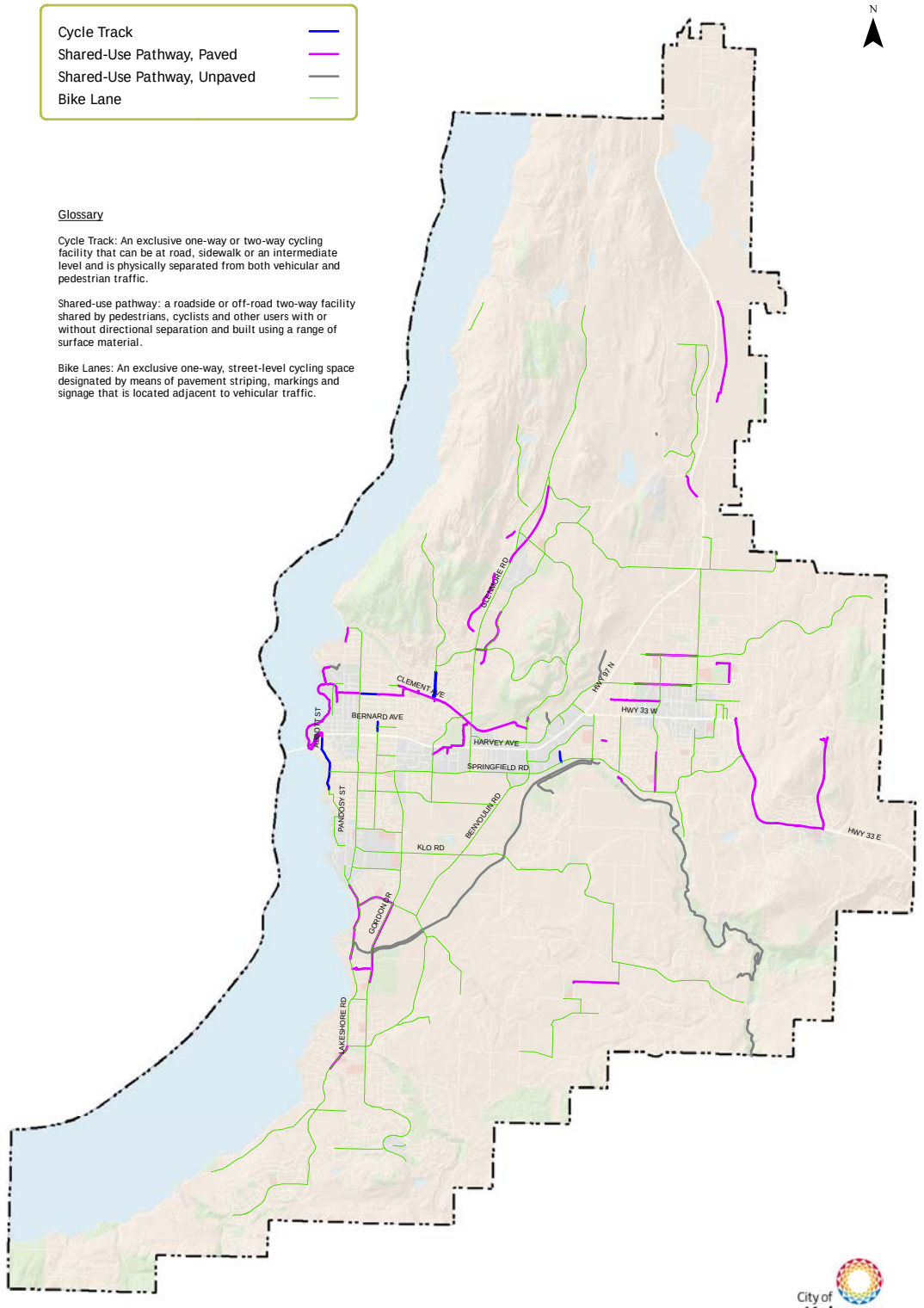


Figure 2.2
Existing Cycling Network

Pedestrian and Bicycle Master Plan

2.4 Who's Walking and Cycling, Why, and Where?

The Household Travel Surveys undertaken in the Central Okanagan Region in 2007 and 2013 indicate a gradual shift in travel behaviour away from single-occupancy motor vehicles and toward sustainable modes, such as walking, cycling and transit. Figure 2.3 shows trip mode trends for the City of Kelowna daily (24-hour) travel patterns surveyed in 2007 and 2013. The figure suggests that auto mode share dropped from 69.5 per cent of all trips to 66.4 per cent of all trips, while bicycle mode share increased from 2.6 per cent to 3.3 per cent and walking increased from 5.4 per cent to 7.8 per cent. The combined walking and cycling mode share for all trips is therefore 11.1 per cent, up from 8.0 per cent in 2007, a growth of almost 40 per cent. This growth is further described in Figure 2.5.

Figure 2.3: Trip mode trend (24 hr) City of Kelowna 2007 and 2013

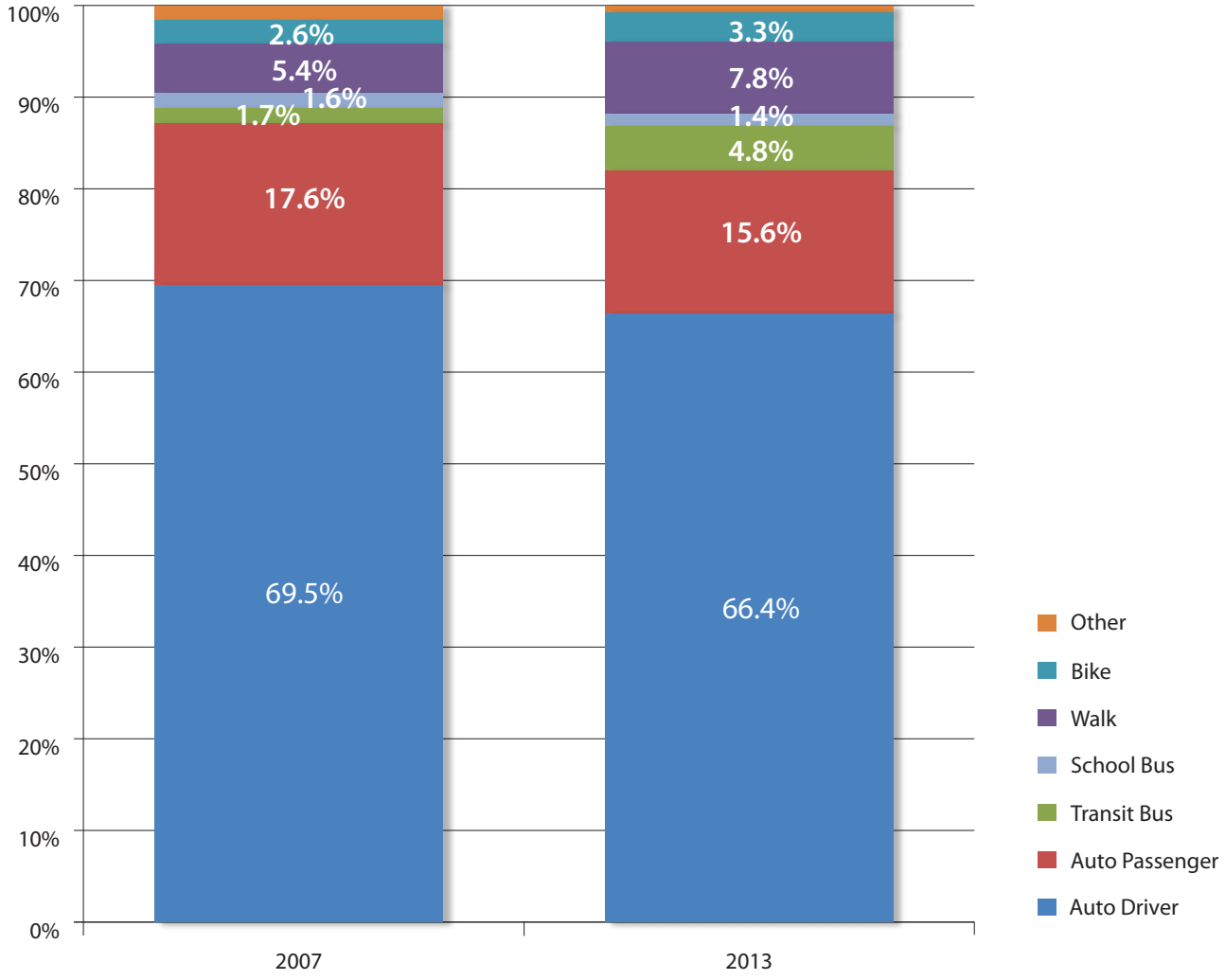
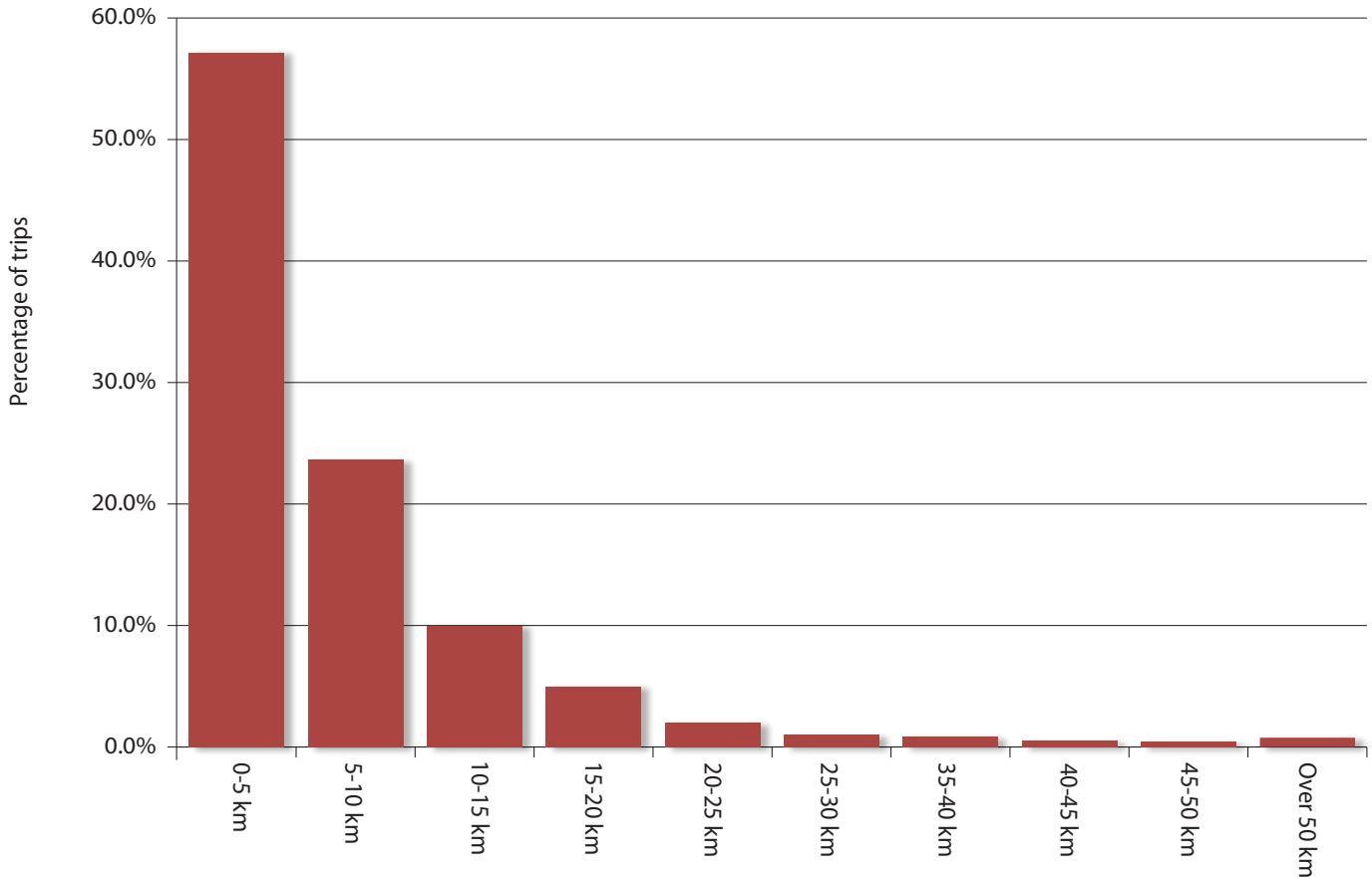


Figure 2.4, also from the 2013 Okanagan Household Travel Survey, indicates that 56 per cent of trips are under 5 km in length and approximately 23 per cent are between five and 10 km, for a total of approximately 79 per cent of all trips under 10 km.

Research undertaken by the National Household Travel Survey in the United States and by TransLink in Metro Vancouver shows that over 90 per cent of all bicycle trips are less than 10 km and 90 per cent of all walking trips are less than two km in length. This means that the significant number of trips in Kelowna that are under two and 10 km could potentially be shifted from driving to walking and cycling respectively. This Pedestrian and Bicycle Master Plan identifies infrastructure improvements and supporting programs to shift such short distance vehicular trips to alternative non-vehicular modes.

Figure 2.4: Trip length distribution Central Okanagan 2013



The Okanagan Household Travel Survey provides detailed statistics regarding the growth of pedestrian and cycling activity in Kelowna since 2007.

As described previously, the combined pedestrian and cycling mode share (for all trips) climbed from eight per cent in 2007 to 11.1 per cent in 2013. For the urban core area of Kelowna, the growth was more pronounced, as mode share moved from 8.9 per cent in 2007 to 13.0 per cent in 2013 (a 45 per cent increase). By contrast, outside the core grew from a 6.0 per cent combined mode share in 2007 to 8.0 per cent in 2013 (a 31 per cent increase).

As Figure 2.5 illustrates, pedestrian trips in the core area grew from 6.2 per cent of all trips in 2007 to 9.2 per cent in 2013 - a full 50 per cent increase over six years.

Cycling also had a large growth in the core area, growing from 2.8 per cent to 3.7 per cent, a 32 per cent increase.

Figure 2.6, the Census Journey to Work data spatially shows that the Core Area of Kelowna is favoured for walking to work. In the core neighbourhoods, walking rates are typically 5 to 12 per cent, with several neighbourhoods approaching 20 per cent.

As seen in Figure 2.7, the core and northern areas of Kelowna are also favoured for cycling to work. In the core and northern neighbourhoods, cycling rates are typically two to five per cent, with several neighbourhoods around seven per cent.

Figure 2.5: Kelowna walking and bicycling trip shares in 2007 and 2013 (2013 Okanagan Household Travel Survey)

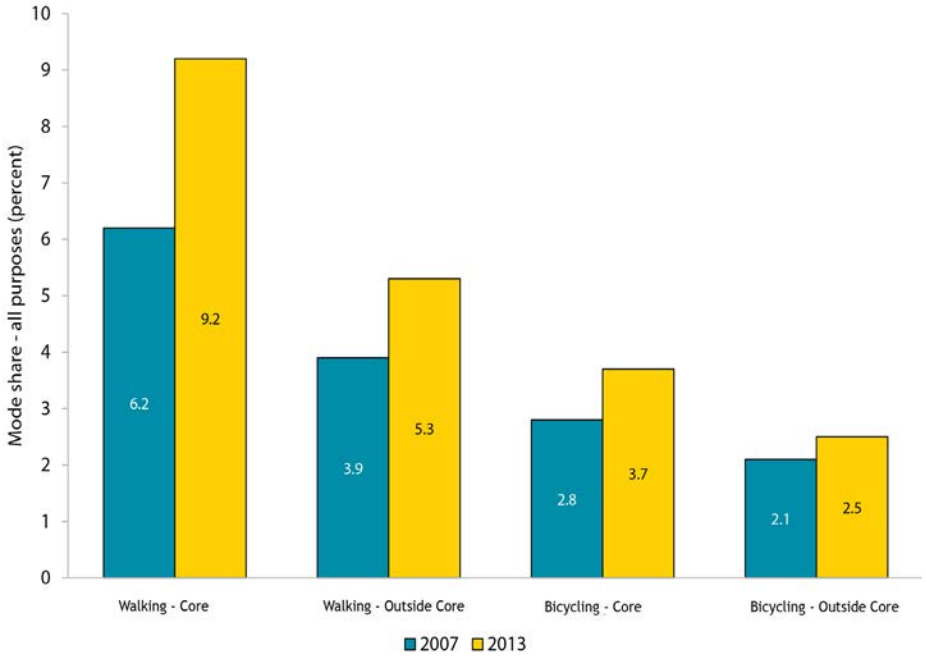


Figure 2.6: Kelowna walking mode share.
Census Journey to Work, 2011

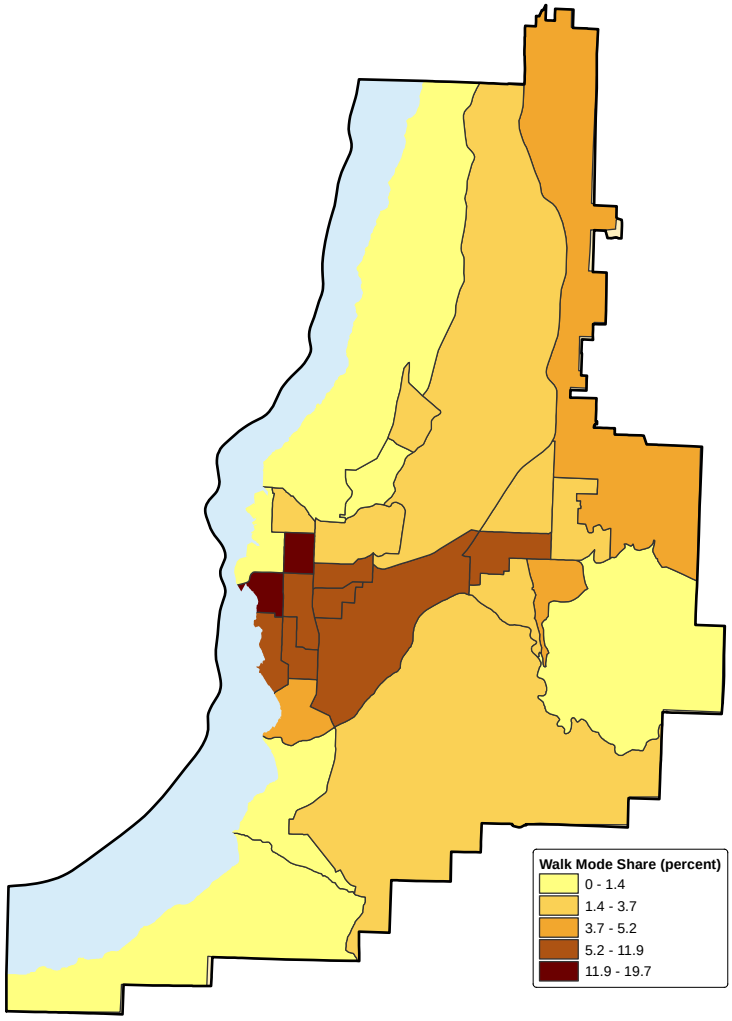
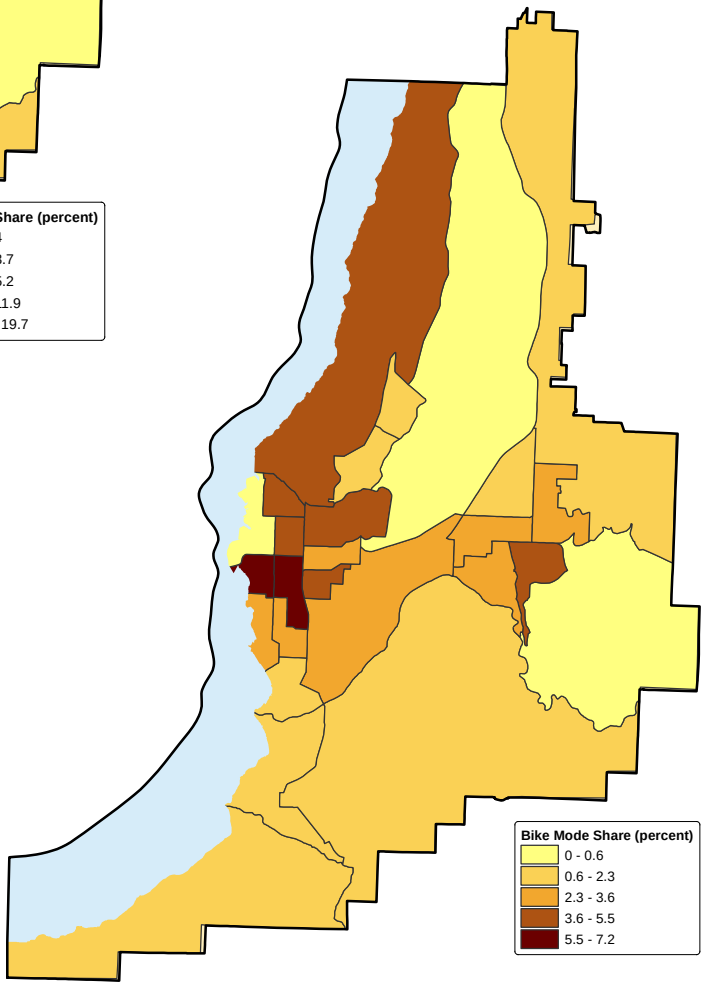


Figure 2.7: Kelowna cycling mode share.
Census Journey to Work, 2011



2.5 Barriers to Walking and Cycling

Based on responses to an online survey of Kelowna residents undertaken for this study, the most common perceived barriers to walking and cycling are inconvenience and lack of infrastructure (see Figure 2.8 and 2.9).

For pedestrians, the concern regarding a lack of infrastructure (the #2 response) is compounded by the perception that travel distances are too long to walk (#1) and other convenience factors such as "I have too much stuff to carry" (#3) and "I don't have time" (#4). These convenience factors are more pronounced for pedestrians than for bicyclists, and together represent the most significant barrier for pedestrian travel, eclipsing the deterrent factor of missing sidewalks and/or paths.

For cyclists, lack of infrastructure comprised the top three responses, with lack of protected and/or off-street infrastructure representing two of these top three. To the extent that perceived lack of protected and/or separated bicycle infrastructure can be understood as an indicator of perceived lack of safety, the results suggest that safety is of particular concern to cyclists.

Figure 2.8: Reasons for not walking to a destination

What are the reasons you DO NOT choose to walk more often when heading to work/school/errands, etc? Check all that apply.

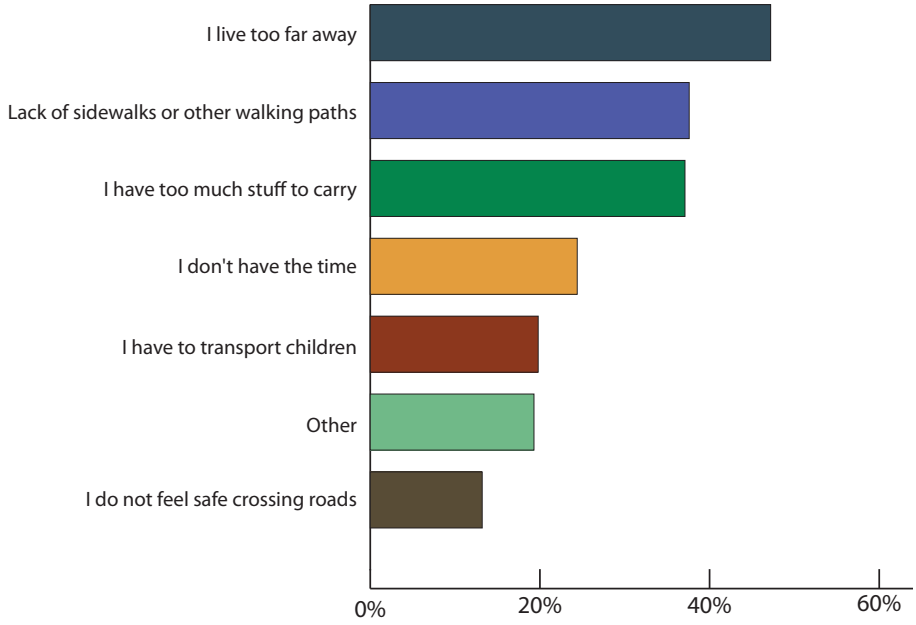
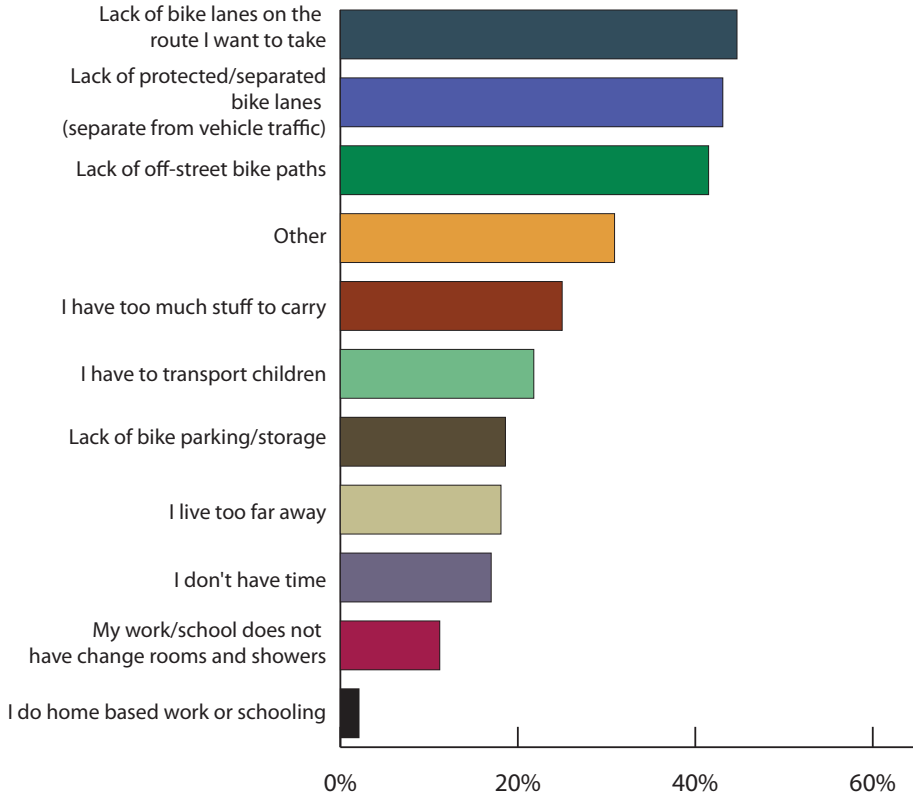


Figure 2.9: Reasons for not cycling to a destination

What are the reasons you DO NOT choose to cycle more often when heading to work/school/errands, etc? Check all that apply.



According to ICBC collision claims data, Kelowna averages 60 to 70 reported pedestrian collisions annually and 60 to 80 reported bicycle collisions annually. The absolute number of reported pedestrian collisions is increasing gradually over time; however, the number of collisions per capita is remaining steady. Figure 2.10 illustrates the trend line for pedestrian crashes from 2001 to 2013.

Total reported bicycle collisions are also gradually increasing, but population growth has meant that the number of per-capita bicycle crashes has maintained a relatively steady rate (about 60 collisions per 100,000 residents). These trends are shown in Figure 2.11.

Between 2001 and 2013:

- Kelowna has averaged about two pedestrian fatalities per year and one bicycle fatality per year;
- Four pedestrian fatalities occurred in parking lots, one cyclist fatality also occurred in a parking lot; and
- Heavy vehicles were not involved in any pedestrian fatalities, but heavy vehicles were involved in two cyclist fatalities in 2012.

Figure 2.10: Pedestrian collisions, 2001-2013 (ICBC)

Figure 2.11: Bicycle collisions, 2001-2013 (ICBC)

Figure 2.12 shows location of frequent pedestrian collisions include:

- Major arterials (especially Highway 33 and Gordon Drive);
- Intersections;
- Downtown.

Figure 2.15 shows locations of frequent bicycle collisions include:

- Major arterials (especially Highway 33, Gordon Drive, Harvey Avenue and Springfield Road);
- Intersections;
- Downtown.

There are a number of challenges with the current active transportation network that affect the desire to move around the City safely and conveniently.

These challenges include:

- A curvilinear[1] street network that provides few direct routes through some neighbourhoods;
- Physical and geographic barriers, such as Highway 97 and Orchard Park Mall;
- Conflicts between truck, transit, and bicycle routes;
- Areas of the City that are inaccessible by bicycle; and
- On-street bike lanes that are not suitable for all ages and abilities.

1 Curvilinear networks feature winding roads and cul-de-sacs that link to surrounding neighbourhoods via collector and arterial streets. They can be a challenge to navigate by foot and bicycle because routes are indirect, distances are long and high-speed, high-volume streets cannot be readily avoided. Curvilinear street networks are contrasted against conventional grid networks, which provide a nearly unlimited number of alternative travel routes due to increased connectivity (i.e. the presence of numerous intersections and multiple parallel and perpendicular streets).

Figure 2.12: Pedestrian collisions in Kelowna (ICBC, 2001-2013)

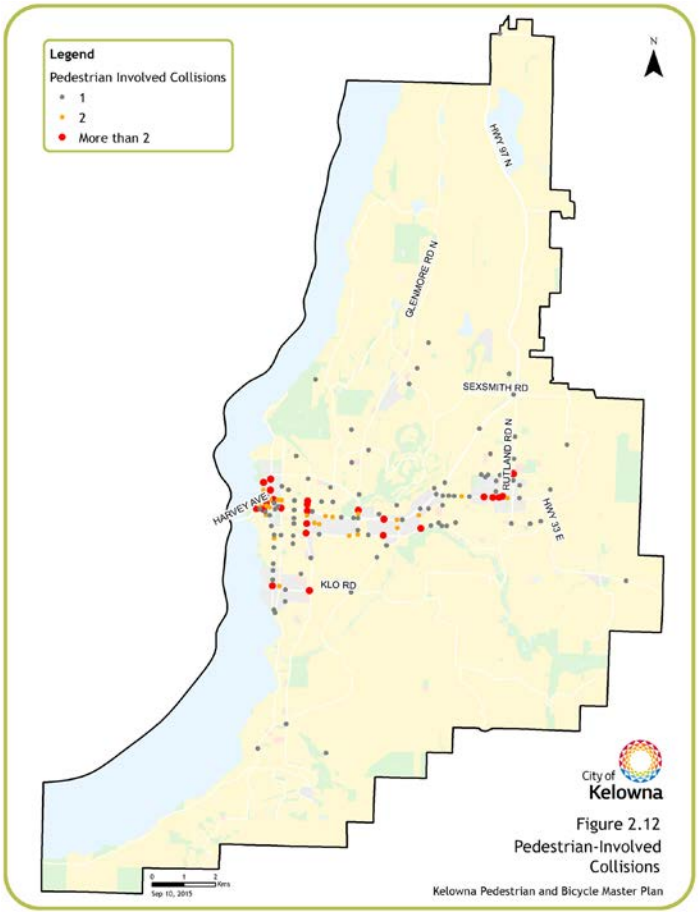
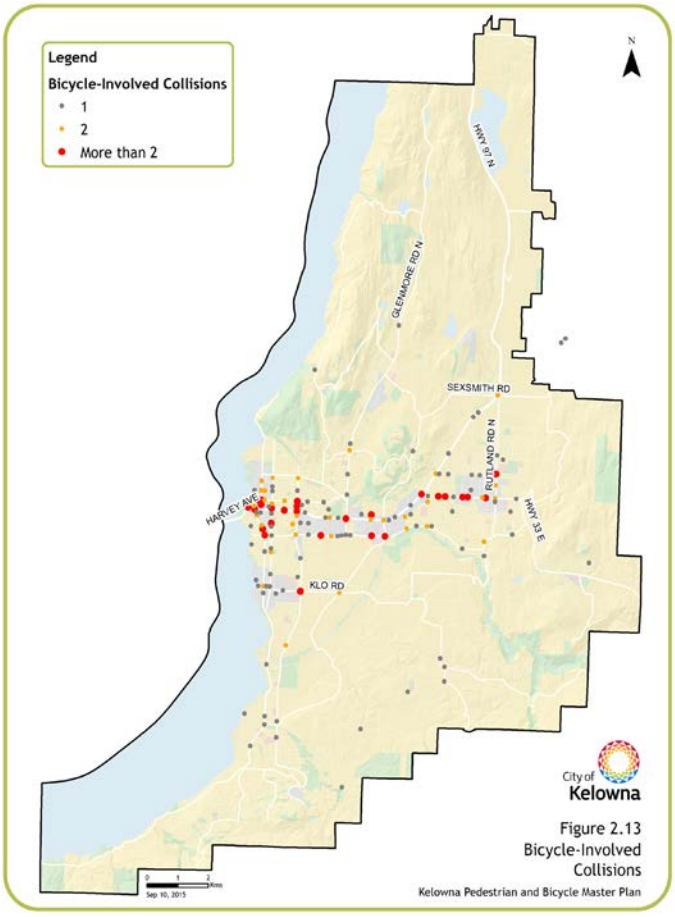


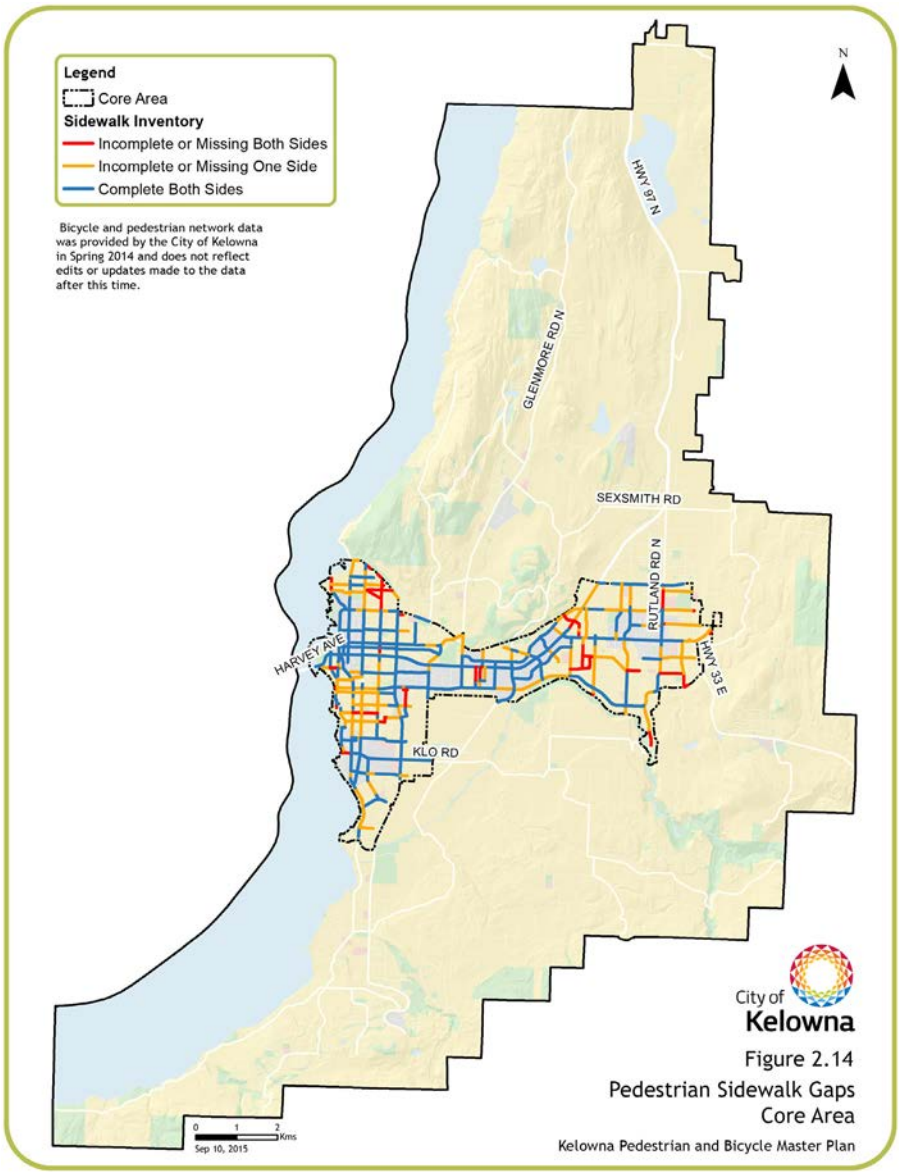
Figure 2.13: Bicycle collisions in Kelowna (ICBC, 2001-2013)



2.6 Pedestrian Network Gap Analysis

There are approximately 400 km of sidewalks in Kelowna, compared with 810 km of roadways. This means that, on average, the sidewalk network in Kelowna is one-quarter complete (assuming that 1600 km of sidewalk are required to service both sides of all streets). Gaps in the pedestrian network exist at the block level, even within the Core Area, where missing sidewalks create unexpected challenges for pedestrians, wheelchair users and others, and discourage walking. These gaps at the block level were the focus of the pedestrian gap analysis and presented in Figure 2.14.

Figure 2.14: Pedestrian sidewalk gaps - core area



This gap analysis was limited to the City's Core Area that includes the most built-up neighbourhoods, amenities, transit stops and other high activity areas. This area covers the neighbourhoods of Downtown, North End, South Pandosy, Landmark, Orchard Park, Enterprise, Baron Road, and sections of Rutland. The rationale for limiting the scope of the analysis to this area is two-fold:

- Most destinations that are attractive to pedestrians are located within the Core Area of Kelowna; and
- Walking mode shares in outlying areas are significantly lower than in the Core Area.

The gap analysis was conducted based on the pedestrian network Geographic Information Systems assembled in Spring 2014.

This approach recognizes that gaps in the pedestrian network are more likely to be problematic in areas of the City with relatively high pedestrian activity. It also acknowledges that resources for sidewalk improvements are limited, so investing in sidewalks will be most effective in areas with "walkable" characteristics like high population densities, compact urban form, grid-like street networks and clusters of amenities/destinations. Finally, this approach assumes that pedestrian gaps tend not to be neighbourhood-wide, and are best addressed at the block level.

Sidewalk gaps are shown on Figure 2.14. Red lines indicate where sidewalks are missing on both sides of the street. Yellow lines show locations with a sidewalk missing on one side.

It is notable that the only continuous east-west streets offering largely complete two-sided pedestrian travel through the Core Area are Highways 97 and 33—two of the least appealing streets for pedestrians due to vehicle traffic and intimidating intersections.

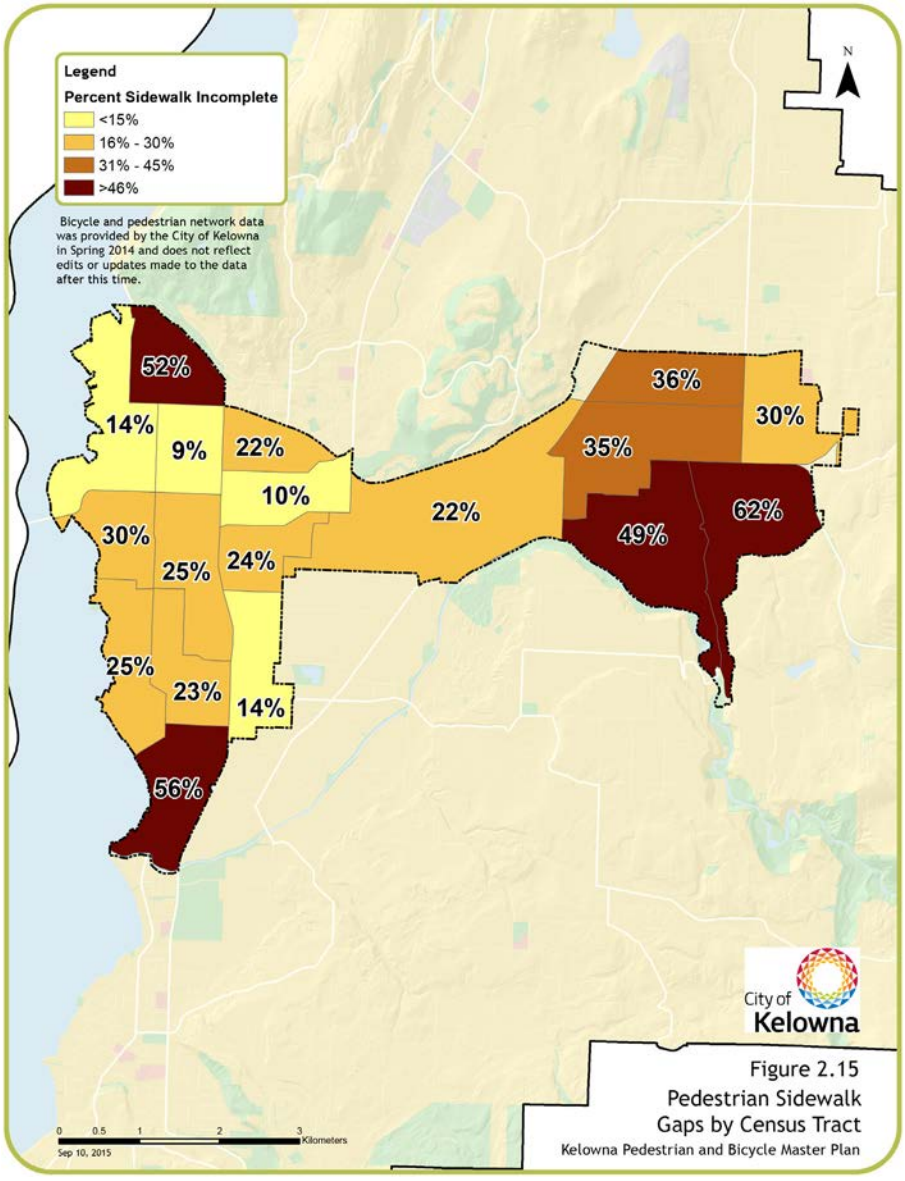
In addition to the detailed linear analysis shown in Figure 2.14, the sidewalk gap data was generalized to the Census Tract level to represent sidewalk connectivity at the neighbourhood scale in Figure 2.15. Sidewalk completion was calculated by computing the linear kilometres of sidewalk for each Census Tract, which was converted to a roadway centreline-kilometre equivalent by dividing by two. Centreline sidewalk kilometres and roadway centreline kilometres were then compared to obtain the percentage of roadway with complete sidewalk on both sides.

The neighbourhoods to the immediate east and south of Downtown have the most complete street networks in the Core Area, with two-sided sidewalks on nearly all non-local streets.[1] However, most other parts of the Core Area, including Downtown, are less complete.

The results highlight the need for targeted efforts in several sub-areas:

- The northern edge of the historic core, between Cawston Avenue and Knox Mountain;
- The Rutland neighbourhood;
- Downtown and South Central Kelowna;
- The area surrounding Kelowna General Hospital; and
- The southern area that is part of Lower Mission.

Figure 2.15: Pedestrian sidewalk gaps - by Census Tract



1 Due to data availability, the sidewalk gap analysis was limited to non-local streets only (i.e. collectors and arterials).

2.7 Cycling Gap Analysis

Bicycle trips tend to be longer than pedestrian trips – with some up to 10 km. The bicycle gap analysis therefore considered the entire City as the study area. Gap types identified range from Spot (or Point) Gaps (e.g., a location where a bikeway is "dropped"), Area Gaps (communities where limited or substandard bicycle or pedestrian facilities exist), and Weak Links (where cycling facilities exist but are not suitable for use by a broad spectrum of potential users). These gap types are listed in Table 2.1.

Spot Gaps

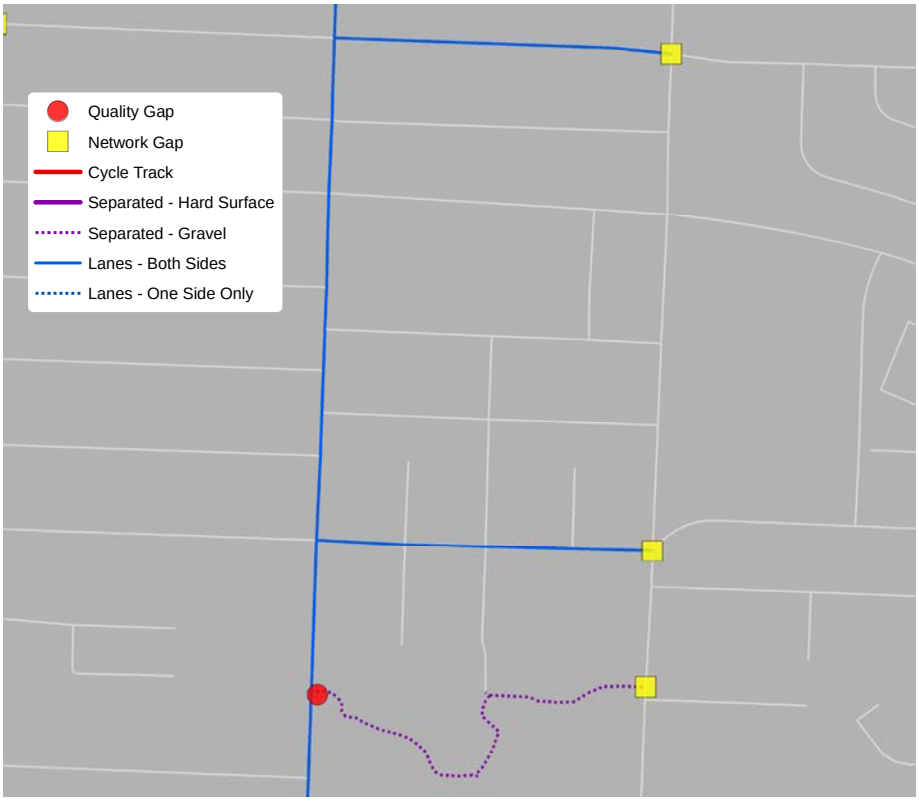
Figure 2.16 illustrates gaps in the bicycle network. Network gaps force cyclists onto a shared roadway—these locations are candidates for improvements. Quality Gaps occur where high-quality routes intersect with lesser routes. At these locations, a cyclist may be forced to transition to a gravel surface or from a pathway to bike lanes on a busy arterial. This is inappropriate for the majority of users due to experience level or bicycle type.

Figure 2.17 illustrates these gaps at a citywide scale, telling a story about where problems in the bicycle network are clustered.

Table 2.1: Cycling gap types

Gap Type	Gap Sub-Type	Description	Notes
Area Gap	n/a	Where no bicycle facility is present in a specified area, based on a coverage analysis of the existing network	This gap type is best identified through a GIS buffer analysis that applies a target mesh width to the existing network
Spot Gap	Network Gap	Where a bicycle or pedestrian facility is discontinuous ("dropped")	Facilities that terminate unexpectedly are potentially hazardous and are difficult to access
	Quality Gap	Where a bikeway transitions to a lower-order surface (e.g., forced transition from concrete to gravel)	An unexpected reduction in facility quality is a disincentive to bicycle
Weak Link	n/a	Where a bicycle facility is present in a given area, but does not meet guidelines identified in the Design Guide chapter	Existing bicycle routes are deemed "weak links" if they score 3 or 4 on a Level of Travel Stress (LTS) analysis

Figure 2.16 Cycling point gaps example



Key clusters in need of attention exist in the following areas:

- In the downtown core - Leon Avenue, Lawrence Avenue, Bernard Avenue, Pandosy Street, Sutherland Avenue, UBC Okanagan and Rutland Centre;
- In the Core Area including Orchard Park Mall. Infrastructure such as designated facilities and pedestrian-bicycle grade separation are needed to connect routes and eliminate discontinuities;
- Over a dozen dropped routes can be found along the Glenmore Road corridor.

Area Gaps

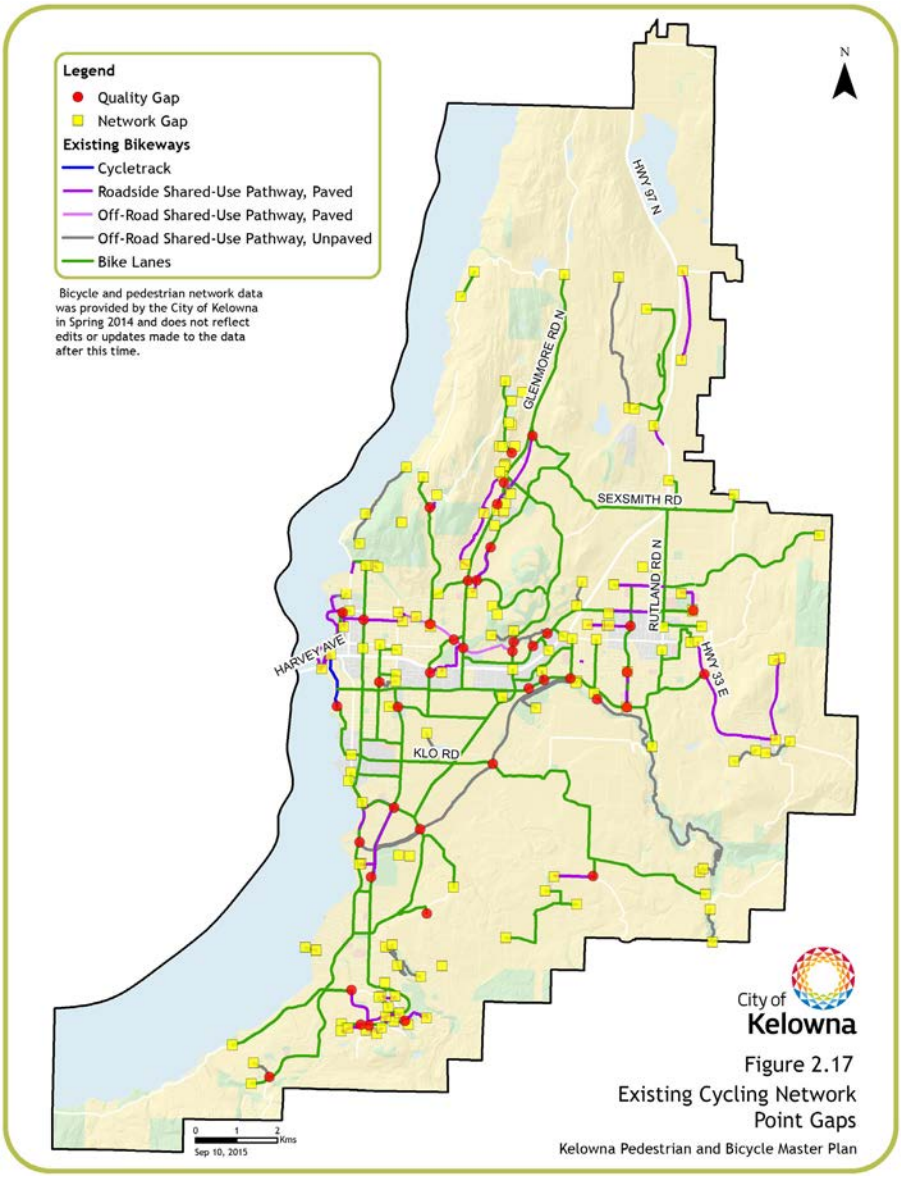
Area gaps are identified using a GIS buffer analysis that relies on the target mesh widths as follows:

- Inside the Core Area, a dedicated bike facility within 200 metres; and
- Outside the Core Area, a bike facility within 400 metres.

Conceptually, the area gap analysis draws a buffer with a radius of 100 m inside the Core Area around all existing routes (i.e., edge-to-edge diameter is 200 m). Outside the Core Area, a buffer of radius 200 m was drawn (i.e. edge-to-edge diameter of 400 m).[1]

For a mature, built-out bike network, these buffers would overlap to cover the entire City, leaving no area out of reach by bicycle. In reality, drawing these buffers reveals gaps in network coverage by highlighting the negative space between bikeway routes.

Figure 2.17 Cycling spot gaps

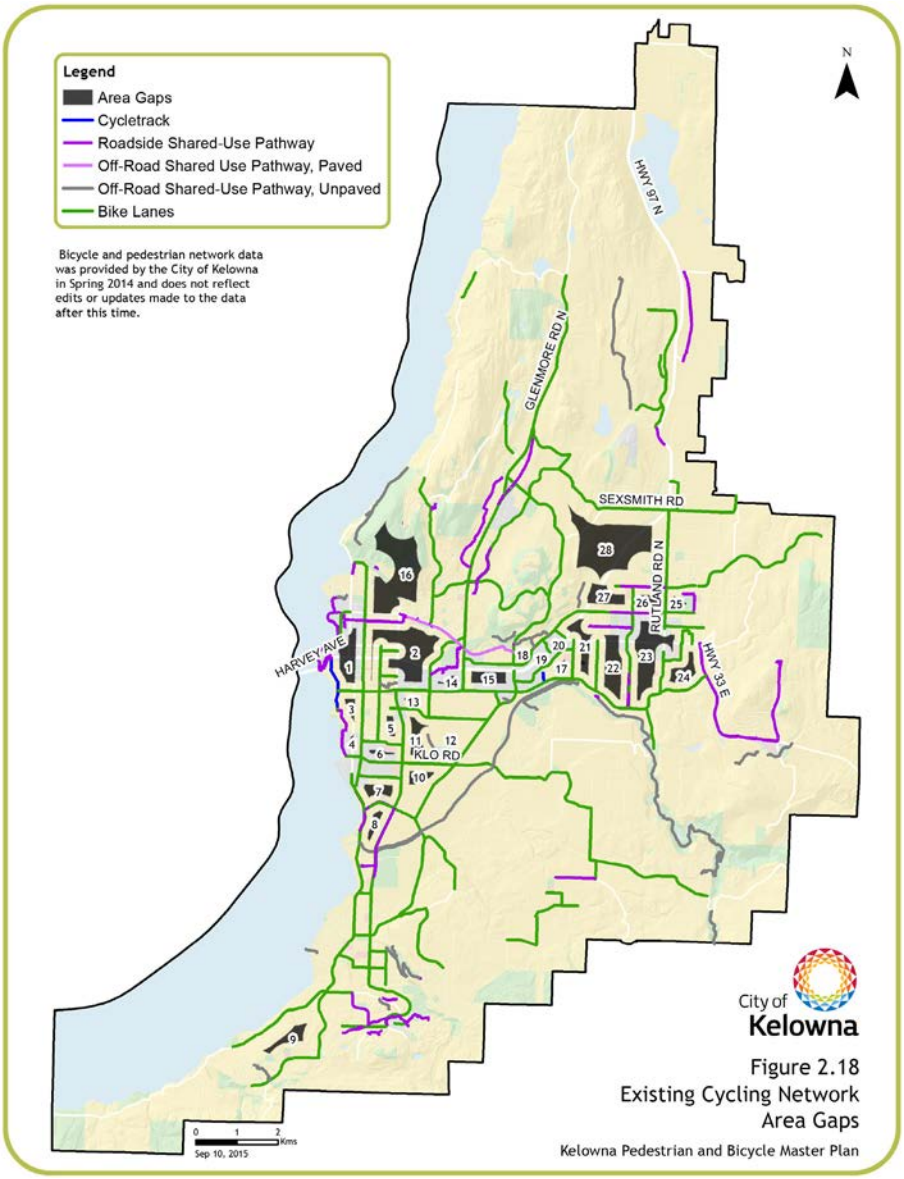


1 Although the mesh width standard for a bikeway is within 200 metres in the Core Area (ranging up to a maximum of 400 metres between bikeways), the gap analysis assumed a maximum of 200 metres between bikeways to conform to best practices and to provide a single GIS input, rather than a range of values. The same approach was taken outside the Core Area, with a maximum of 400 metres between bikeways assumed.

As Figure 2.18 shows, several gaps can be found throughout Kelowna, as shown in black. Strategies to close these gaps include:

- Between Harvey Avenue and Cawston Avenue, large areas of Downtown are not served by any bike facility (gaps 1 and 2). Investment is needed in both north-south and east-west routes to close gaps through these priority areas.
- South Pandosy neighbourhood (gaps 3 through 8) has a number of small gaps that can be closed by increasing the density of the bicycle grid in this part of the city. Targeted improvements here (e.g., extending existing routes) can improve network coverage substantially.
- Large vertical gaps through the Rutland neighbourhood (gaps 21 to 24) can be countered with the addition of several east-west bikeways through the community.
- Northwest Rutland (gap 27) could be improved with a facility along Pearson Road.
- Glenmore and UBC Okanagan area, where significant demand exists.

Figure 2.18: Cycling area gaps



Weak Links

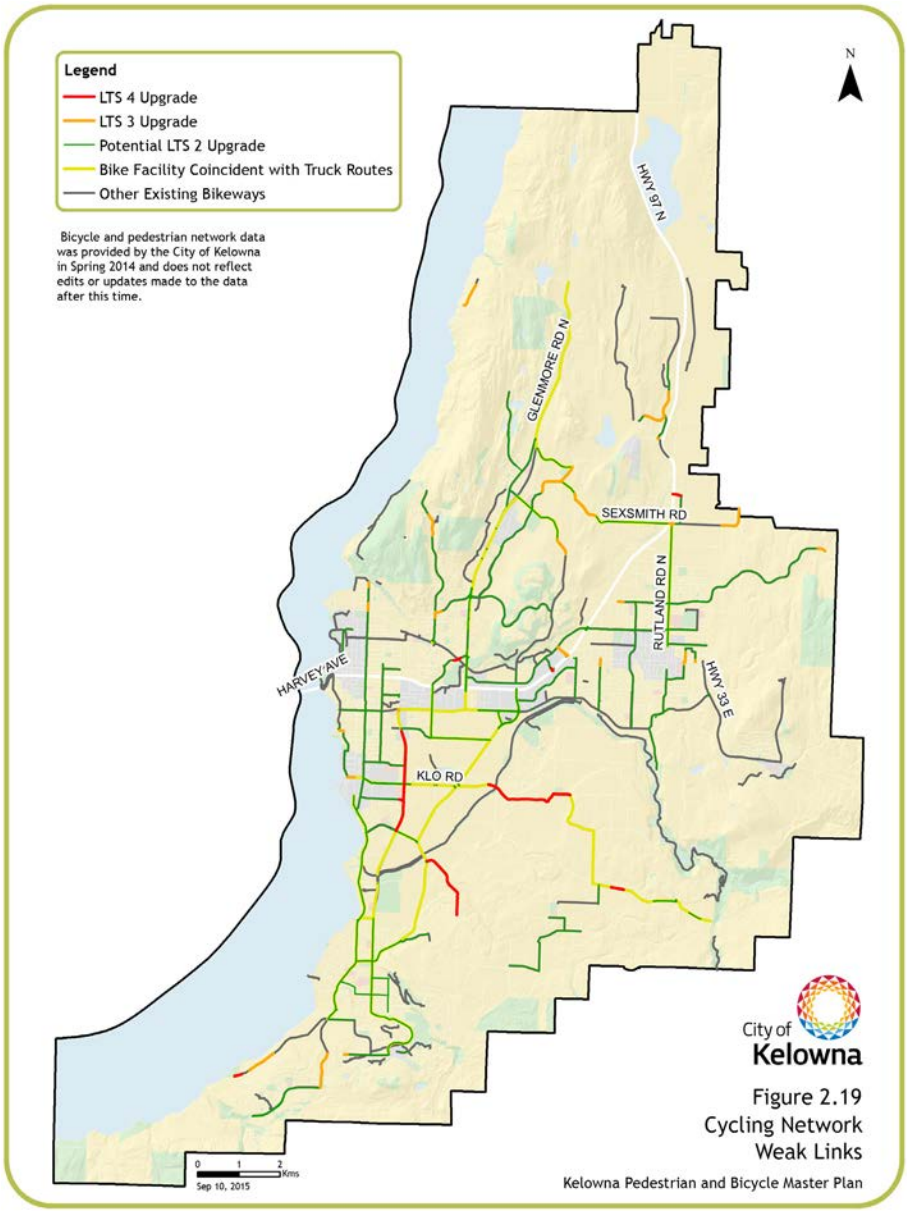
Cycling network gaps can exist even when there is a formal bicycle facility in place. In Kelowna, these situations occur when painted bike lanes are placed adjacent to high-speed, high-volume vehicle traffic, presenting safety concerns and discomfort.

In order to develop a bicycle network that is suitable for all travelers, several weak links require upgrading. These weak links are identified in Figure 2.19.

Weak links were identified through a Level of Traffic Stress (LTS) analysis that rated the existing Kelowna bicycle network on the basis of suitability for various road users. LTS 1 routes, such as Rails-with-Trails (Okanagan Rail Trail), are appropriate for all ages and abilities, while LTS 4 routes are suitable only for the most confident adult cyclist.

Weak links were also identified where bike lanes were installed on only one side of a street. For example, Crawford Road and Old Meadows Road need bike lanes on both sides.

Figure 2.19: Cycling network weak links



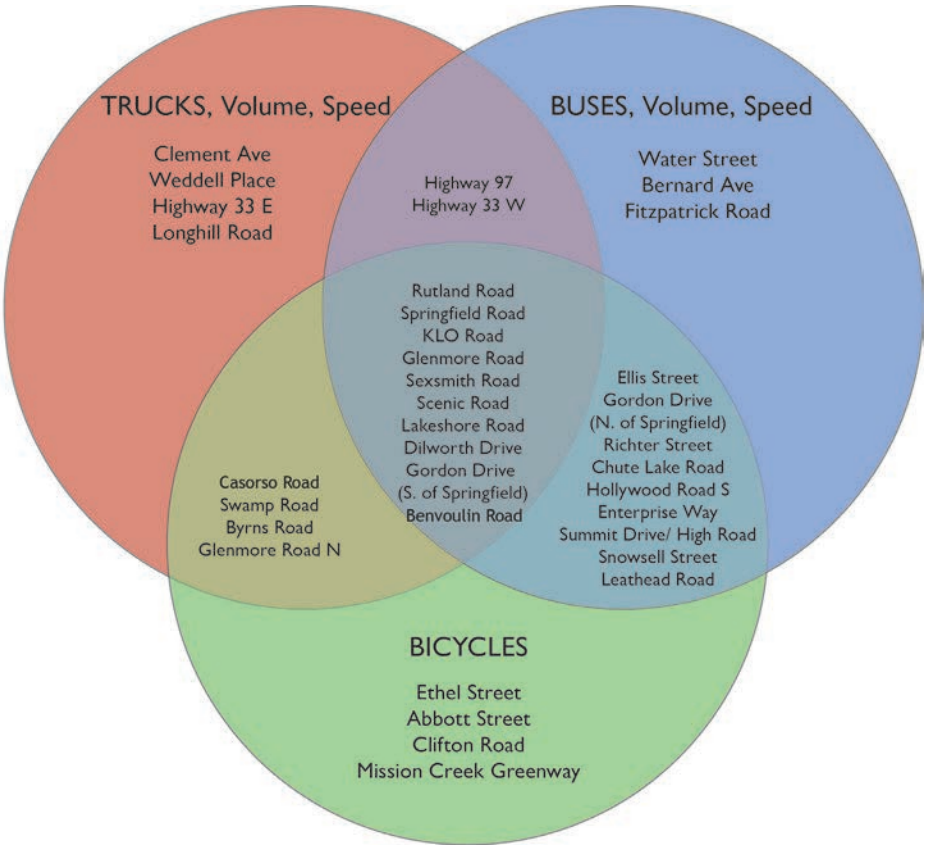
2.8 Multi-Modal Transportation Analysis

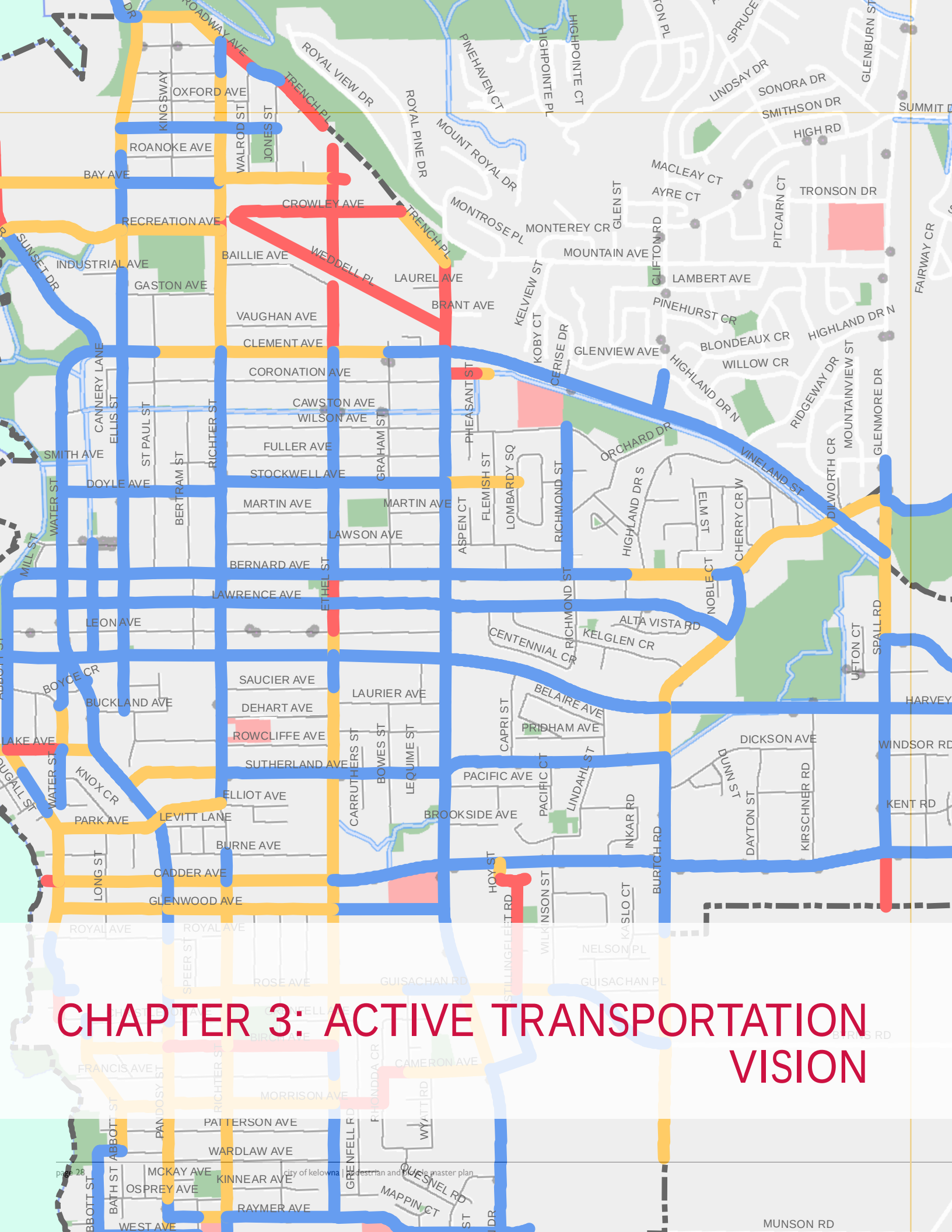
Figure 2.20 shows corridors in Kelowna where the truck, transit, and bicycle networks overlap. These roads were examined and one of two complementary strategies were established for network development:

- Avoid, to the extent possible, placing bike lanes along heavy vehicle and high speed routes; or
- For routes of high strategic importance with significant overlap, consider enhancing bike facilities to provide physical separation.

By overlaying the truck, transit, and bicycle networks, the analysis highlights the value in limiting multi-modal transportation to specific corridors in order to enhance connectivity and safety for all road users.

Figure 2.20: Bicycle and vehicular route overlap





CHAPTER 3: ACTIVE TRANSPORTATION VISION

A safe and functional network of pedestrian and bicycle facilities is important in encouraging travel by active modes. Users generally want to access the same locations by walking and cycling as they do by driving.

To address existing network issues identified in Chapter 2, the Pedestrian and Bicycle Master Plan identifies pedestrian and bicycle networks that seek to improve safety, connectivity and accessibility by:

- Improving the quality and convenience to pedestrians and cyclists by establishing a hierarchy of walking and cycling infrastructure;
- Taking into account the overlap between high speed, high volume vehicular movement along major roads and applying physical measures to reduce conflicts;
- Enhancing walking and cycling facility connectivity and continuity with new routes through gap areas; and
- Adding connectivity through problematic areas with better connections and shortcuts, including grade-separated crossings where appropriate.

In order to attract a broad range of users so that users feel confident to walk and cycle, a network and design approach was followed that takes into account needs of users of all ages and abilities.

3.1 Bikeway Network Mesh Width Standard

A "mesh width" standard is an important first step in the design and layout of active transportation facilities. Mesh width refers to the desired density of bike facilities in a given area.[1] Typically, these standards allow for greater density of bike facilities in areas with higher density mixed-use developments, such as city centres, with correspondingly lower densities in residential neighbourhoods and outlying rural areas.

Best practices in leading cycling and walking cities in North America and Europe were reviewed and, in consultation with stakeholders, a standard was developed that targets one facility within 200 to 400 metres (Figure 3.1) in the Core Area (for both north-south and east-west directions) and within 400 to 800 metres outside of the Core Area (Figure 3.2). The Core Area is the central more urban part of the City and is described further under Gap Analysis.

This standard was used as a rule of thumb in determining the densities of proposed routes in different parts of Kelowna, and was a key input into network layout.

Figure 3.1: Mesh width standard - core area

Figure 3.2: Mesh width standard - outside core area

1 Mesh width applies to bikeways, but not pedestrian facilities, because bike lanes are typically constructed on selected (not all) streets. Built-out pedestrian networks, on the other hand, consist of the entire street network (i.e., sidewalks on both sides), and thus have unique requirements for network improvements, as described under Pedestrian Network Gap Analysis.

3.2 Future Active Transportation Network

Based on technical analysis, public and stakeholder input and current best practice examples, comprehensive future pedestrian and bicycle networks were developed for gradual implementation in the longer term.

The Active Transportation Vision seeks to improve safety, connectivity, and accessibility by:

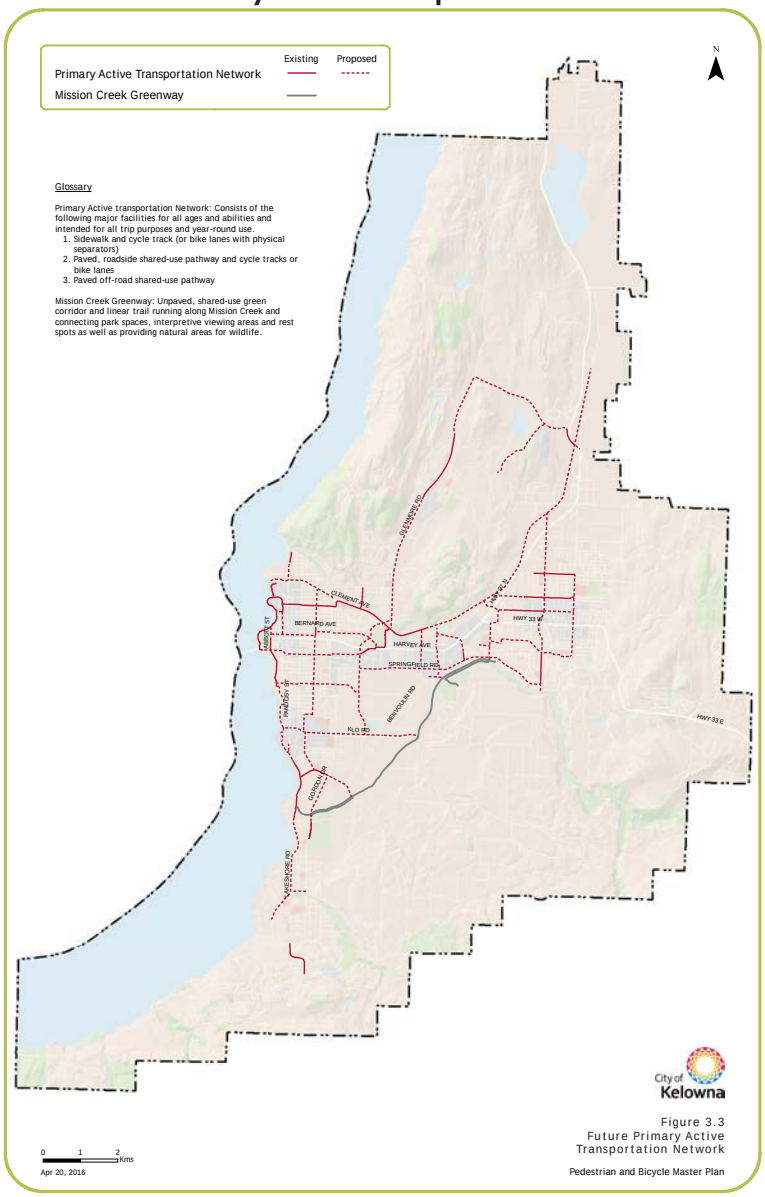
- Improving the quality and attractiveness of pedestrian and cycling facilities by establishing a low-stress Primary Network for users of all ages and abilities;
- Reducing conflicts due to truck, transit, and bicycle network overlaps;
- Enhancing route connectivity and continuity with new routes through gap areas; and
- Adding connectivity through high speed, high vehicle traffic volume areas with new connections and direct routes, including grade-separated crossings where appropriate

Future Primary Active Transportation Network

The Primary Network shown in Figure 3.3 forms the backbone of Kelowna's active transportation system and is intended to serve travelers of all ages and abilities with high quality walking and cycling facilities. This allows safe, convenient, and connected travel across the City.

The primary network connects neighbourhoods, Urban Centres, activity and recreational centres, health facilities, academic institutions, major commercial developments, and tourist attractions. These routes are located primarily within road rights-of-way, but physically separated from vehicular traffic. Such facilities provide low-stress conditions due to separation of potential conflicts between cyclists, pedestrians, and motor vehicles.

Figure 3.3: Future Primary Active Transportation Network



The primary network focuses on the major land uses in the City's Core area. It also takes into account two key land uses that are located beyond the core area but generate significant travel demands. These are the University of British Columbia Okanagan Campus and Kelowna International Airport, both located in the northern third of the City.

Future Pedestrian Network

A list of priority sidewalks and shared pathways both paved and unpaved was identified based on this master planning exercise. The primary focus was on major roads and the Core Area where the majority of walking demand exists. In 2015, the City had approximately 400 km of sidewalks and an additional 70 km of priority sidewalks have been identified. Additional sidewalks could be built in conjunction with developments on adjacent lands. The relatively small annual sidewalk capital program will need to focus on school zones, transit stops, major recreational and activity centres, as well as Urban and Village Centres.

Supporting the primary network is a series of pedestrian and cycling facilities at the neighbourhood level connecting subdivisions, schools, parks and other destinations.

The combination of the Primary Network together with supporting pedestrian facilities such as sidewalks creates the Future Active Transportation Network for Pedestrians as illustrated in Figure 3.4.

Future Cycling Network

A range of cycling facilities are envisioned for the City's transportation network. The Primary Network includes the highest form of infrastructure where physically separated cycling and walking facilities will be available; for example, a paved shared-use pathway and on-road bike lanes (e.g. Lakeshore Rd.) wide paved off-road pathway (Rails-With-Trails) or sidewalks with cycle tracks (e.g. Ethel Active Transportation Corridor). These are appropriate for the higher demand core area of the City. More cost-effective on-road bike lanes potentially with painted buffer strips are more appropriate for lower demand areas.

Further expansion of the netword will be feasible by including low volume, low speed local roads as supporting cycling corridors. This will be identified as part of the overall Transportation Master Plan.

Similarly, the combination of the Primary Network with supporting cycling facilities creates the Future Active Transportation Network for Cyclists as illustrated in Figure 3.5.

Inter-Municipal Connectivity

In developing the Active Transportation Corridors (ATC) vision for cyclists, consideration was given on regional connectivity to West Kelowna and Lake Country. The existing pathway on the south side of the W.R. Bennett Bridge was considered for this purpose interconnected to Abbott Street ATC and City Park Promenade. The proposed Okanagan Rail Trail and Glenmore Road bike lanes will ensure connectivity to the District of Lake Country. Highway 33 is another route that extends beyond the City limits to the east heading toward the Big White Ski Resort. With the existing pathway along the north side within Kelowna and paved shoulders outside city limits, this was deemed acceptable for rural conditions with low demand on Highway 33, which is under provincial jurisdiction.

ACTIVE TRANSPORTATION VISION

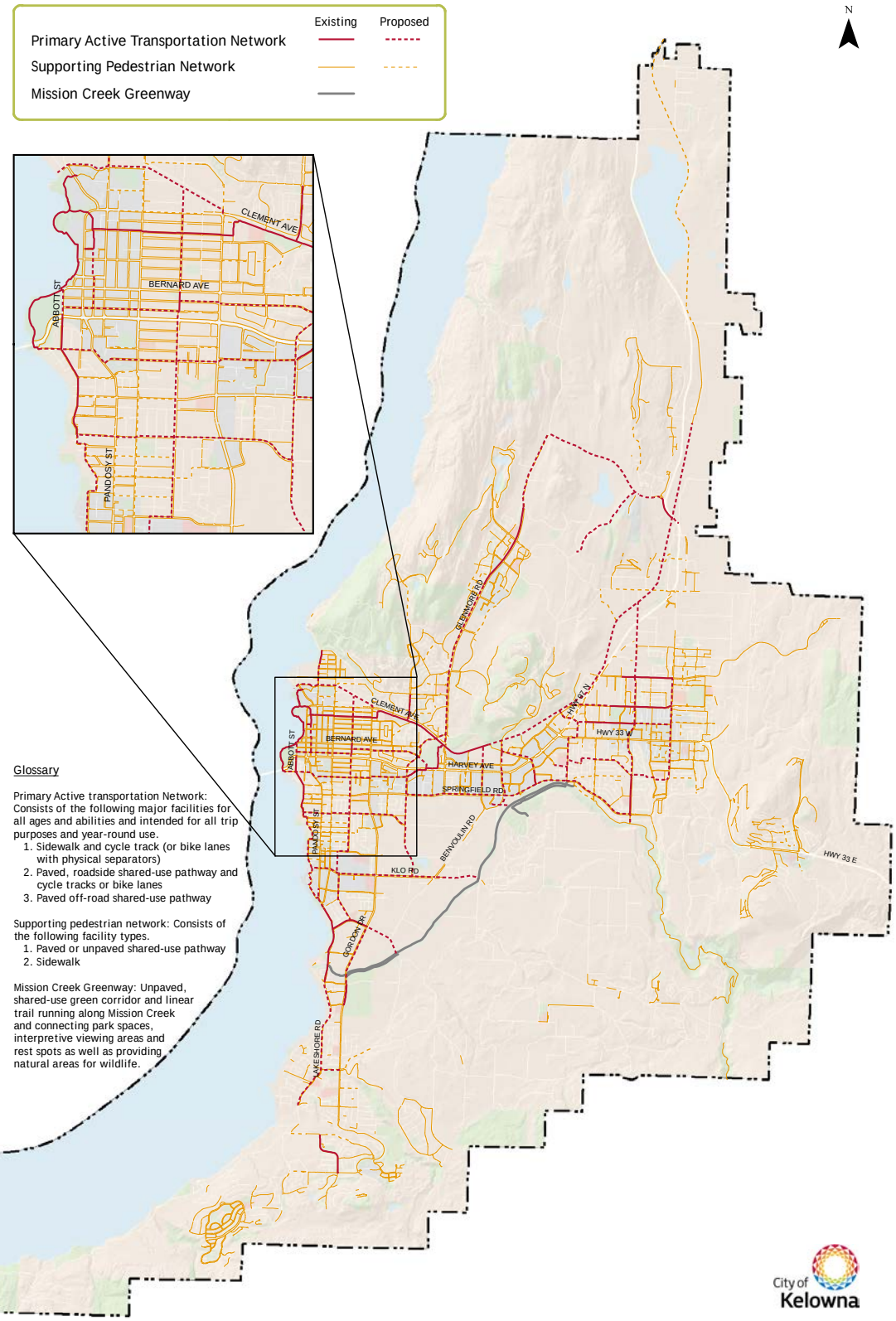


Figure 3.4
Future Primary and Supporting Pedestrian Network

Pedestrian and Bicycle Master Plan

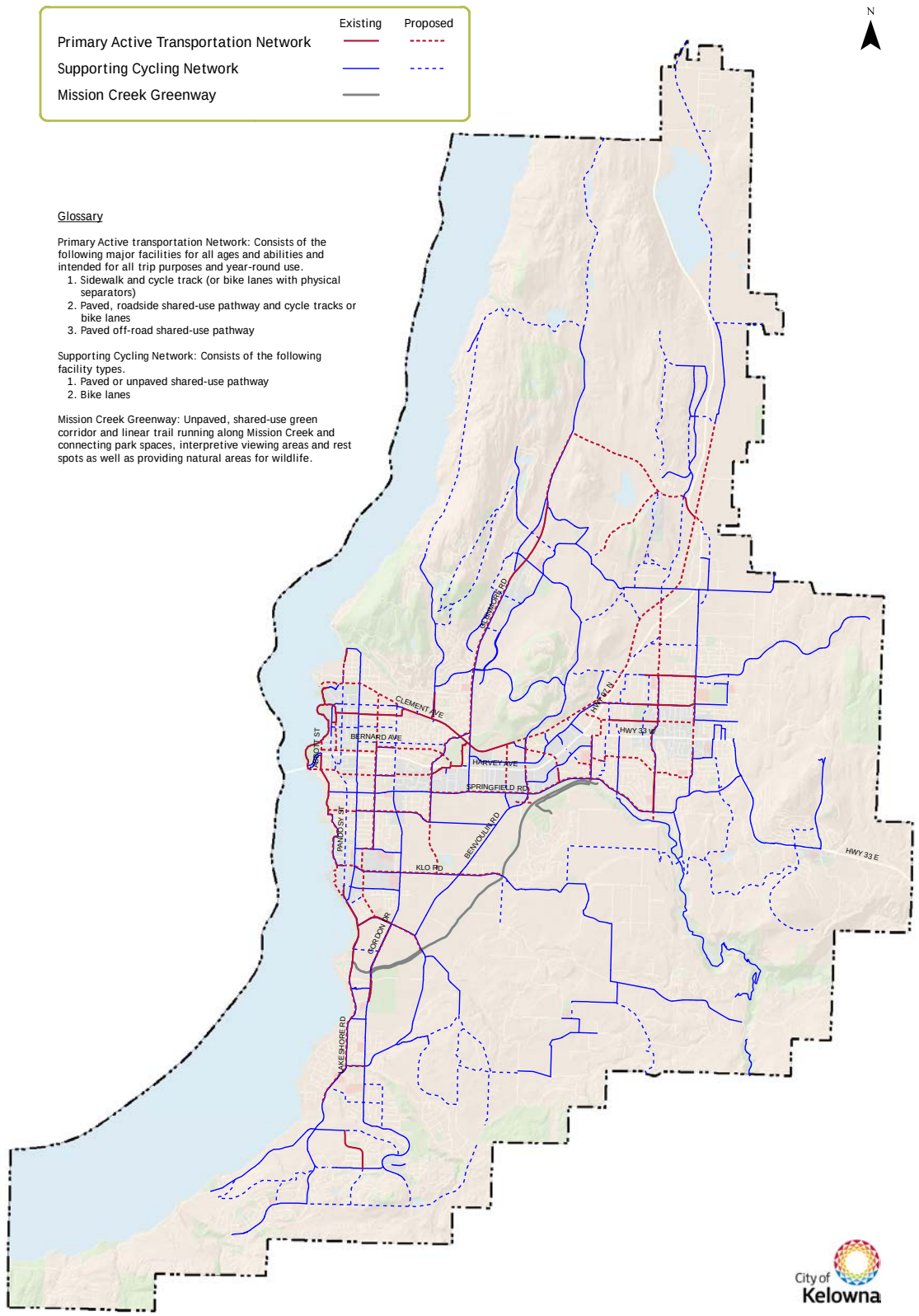


Figure 3.5
Future Primary and Supporting Cycling Network

Pedestrian and Bicycle Master Plan

ACTIVE TRANSPORTATION VISION

The Future Pedestrian and Cycling Transportation Network shown in figures 3.6 and 3.7 are comprised of a mixture of existing and proposed facilities. Facility types identified for each segment have been carefully selected based on the needs for all ages and abilities, trip purpose, and safety.

The Glossary of Terms used on the following network maps can be summarized as follows (for more details on these and other active transportation terms, see Chapter 2):

- Cycle Track: An exclusive one-way or two-way cycling facility at road, sidewalk or an intermediate level, which is physically segregated from vehicular and pedestrian traffic.
- Shared-use Pathway: A roadside or off-road two-way facility shared between pedestrians, cyclists, and other users with or without directional separation.
- Bike Lanes: An exclusive one-way, street-level cycling space designated through use of pavement striping, markings and signage, that is located adjacent to vehicular traffic.
- Sidewalk: An asphalt or concrete walking facility exclusively for pedestrians.

A combination of several facility types are used to create the Primary Network. These facilities are intended for all ages and abilities, used for all trip purposes and are anticipated to be used year-round.

They include:

- Sidewalk & Cycle Track (or bike lanes with physical separators)
- Paved Shared-Use Pathway and Cycle Tracks or Bike Lanes
- Paved Off-road Shared-Use Pathways

The Primary Network is supported by a variety of facilities. These routes are located on local or collector streets and may not require significant investments to create comfortable and safe conditions for pedestrians and cyclists. Facilities include:

- Sidewalk and Bike Lanes
- Paved or unpaved Shared-Use Pathway without Bike Lanes
- Sidewalks
- Bike Lanes

Given that hundreds of kilometres of facilities are envisioned for both pedestrian and cyclists, and the significant cost to build such facilities, it is important to prioritize the facilities, as described in Chapter 4.

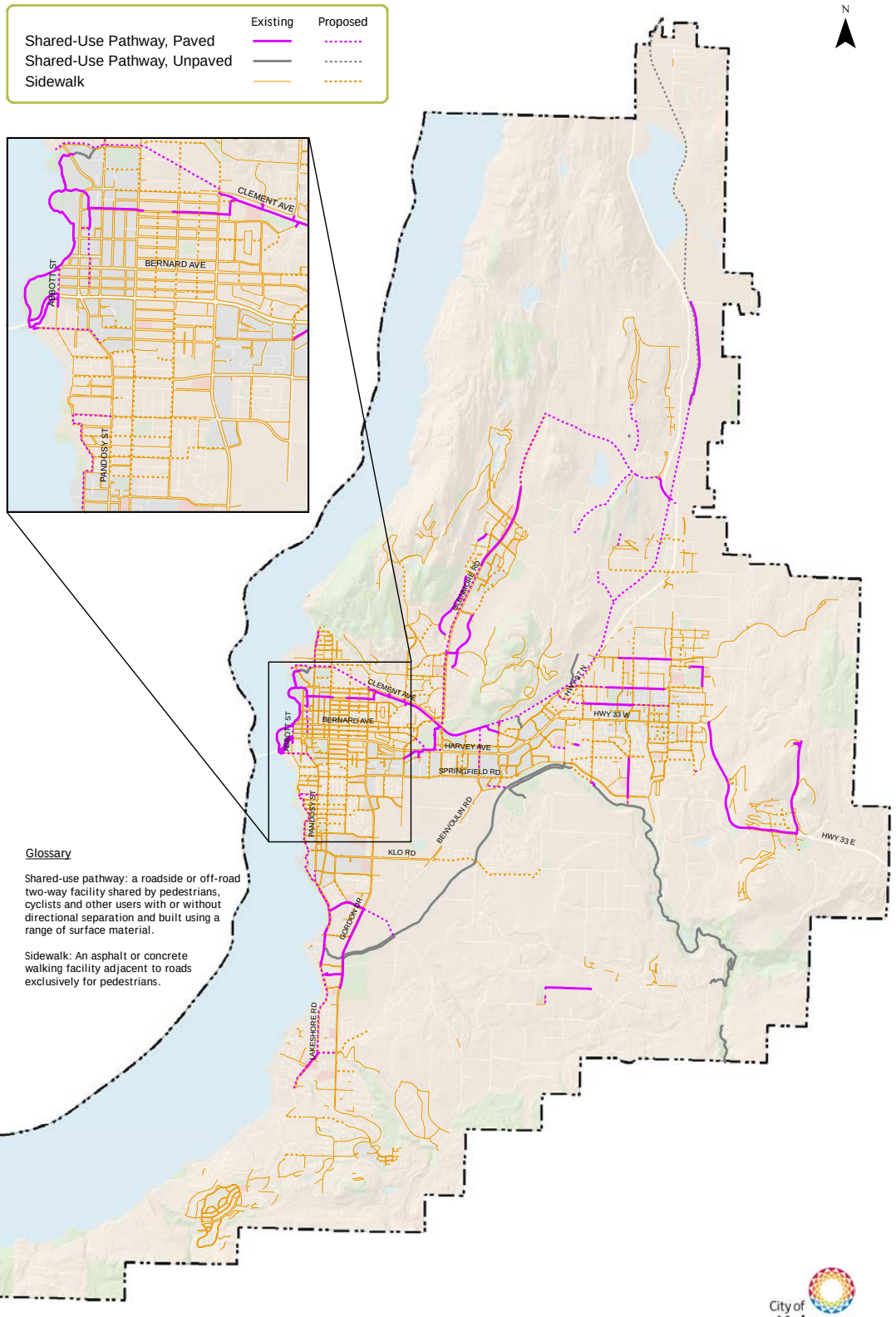


Figure 3.6
Future Pedestrian Network

Pedestrian and Bicycle Master Plan

ACTIVE TRANSPORTATION VISION

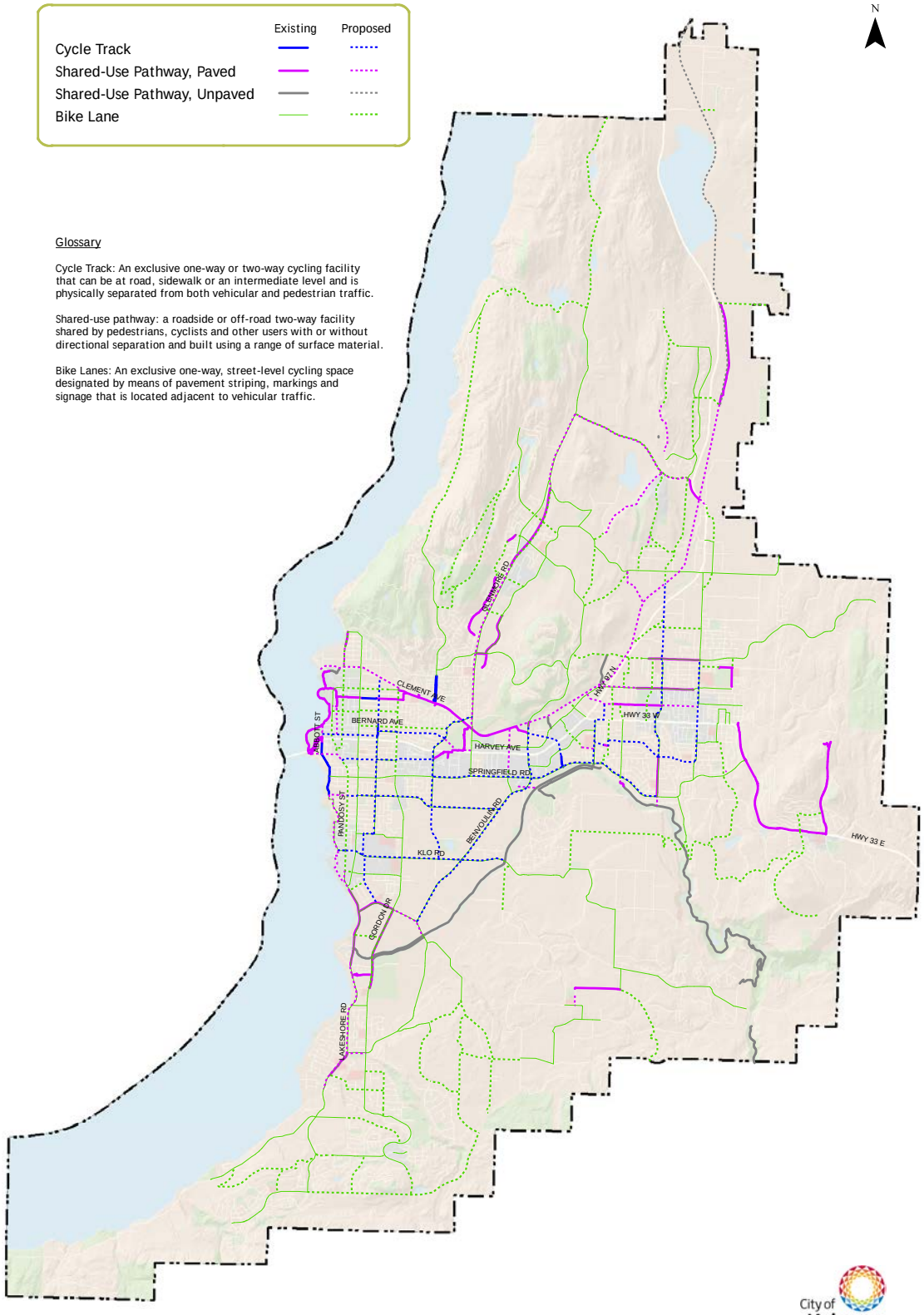
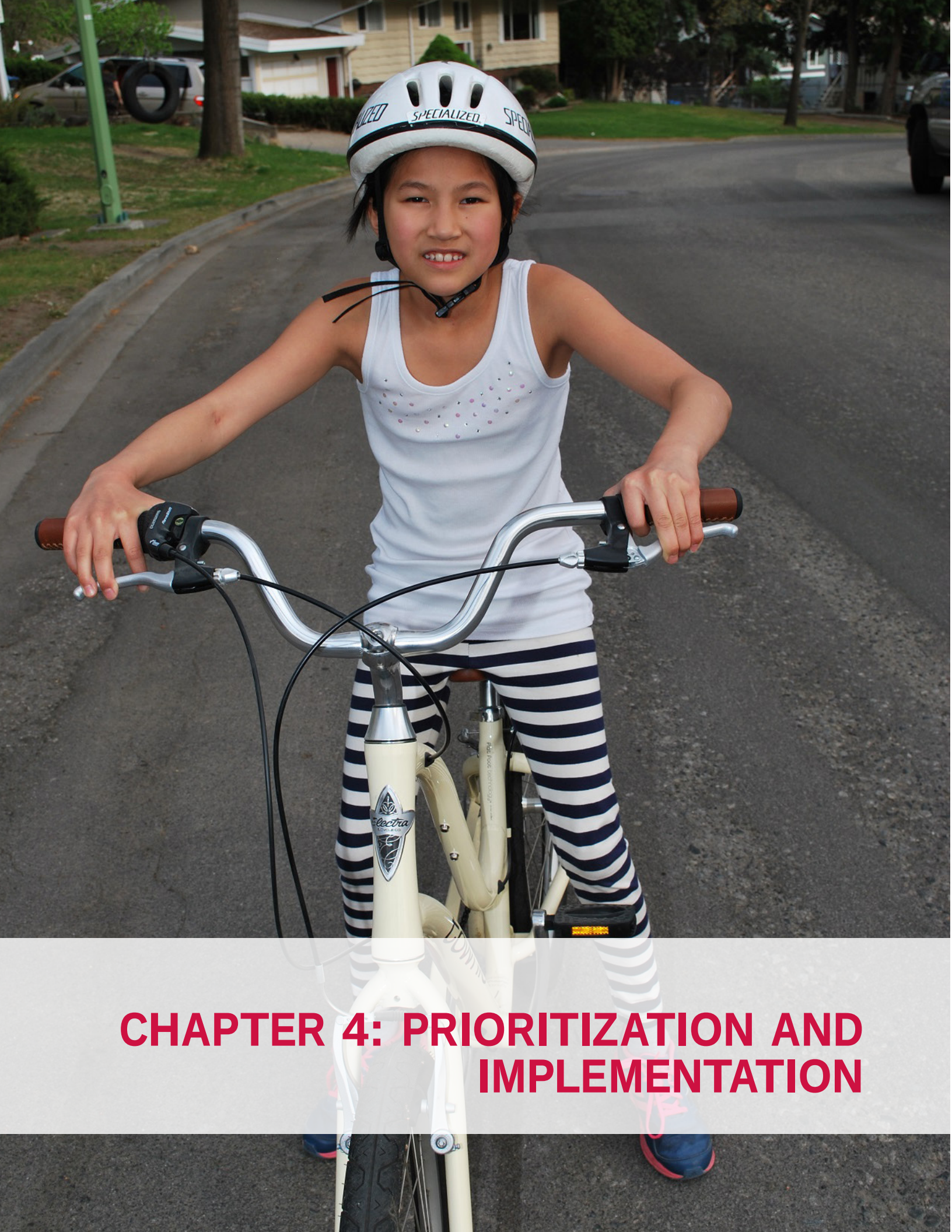


Figure 3.7
Future Cycling Network

Pedestrian and Bicycle Master Plan



CHAPTER 4: PRIORITIZATION AND IMPLEMENTATION

Given the number of infrastructure projects identified in Chapter 3, and limited resources available within annual capital programs, it is important to prioritize individual active transportation projects required throughout the City.

The order in which projects are constructed will depend on many factors. Based on a set of prioritization criteria developed based on best practices and endorsed through stakeholder input, projects were assessed for facility importance and ranking order of priority.

4.1 Prioritization Criteria

This section provides a framework for facility prioritization—a scored Multiple Account Evaluation process that takes into account key constraints and maximizes cost effectiveness of projects implemented.

The criteria are designed to evaluate linear routes – such as pathways, sidewalks and bicycle lanes – and are not intended for other facilities like bicycle parking, signal enhancements, or sidewalk furnishings. The criteria are organized into "utility" and "implementation" prioritization factors.

Utility Prioritization Factors

Utility criteria include characteristics that enhance the pedestrian and bicycle network. The utility prioritization was developed based on best practice review and stakeholder input. Each criterion is discussed below.

Gap Closure

Filling gaps in the walking and cycling networks opens up new areas of Kelowna to pedestrian and bicycle access. Projects that fill gaps will score higher than projects that do not (i.e., projects that are redundant with existing routes).

Primary Network Route

A future network of Primary Active Transportation Corridors is recommended for implementation as part of this Master Plan. This network is intended to serve as the "spine" for active travel throughout Kelowna, linking all parts of the City on routes that are comfortable and attractive for people of all ages and abilities. Projects that form part of the future Primary Active Transportation Network will score highest on this criterion.

"Provide infrastructure to the urban centres based on the expectation that not more than 45 per cent of total trips in City Centre and other Town Centres will be by motor vehicle."

KELOWNA OCP, CHAPTER 7

Connectivity to Schools

Schools generate short distance trips that could be served by walking and cycling. Constructing safe routes to schools relieves parents of the need to drive each morning, encourages physical activity among children, and instills healthy inter-generational habits. Proposed projects that connect directly to schools (K-12) score higher on this criterion.

Connectivity to Transit

Active Transportation facilities that link to public transit increase the geographical distance that pedestrians and cyclists are able to travel and provide an alternative in case of problems during a trip. Proposed projects that connect directly to transit facilities will score higher on this criterion.

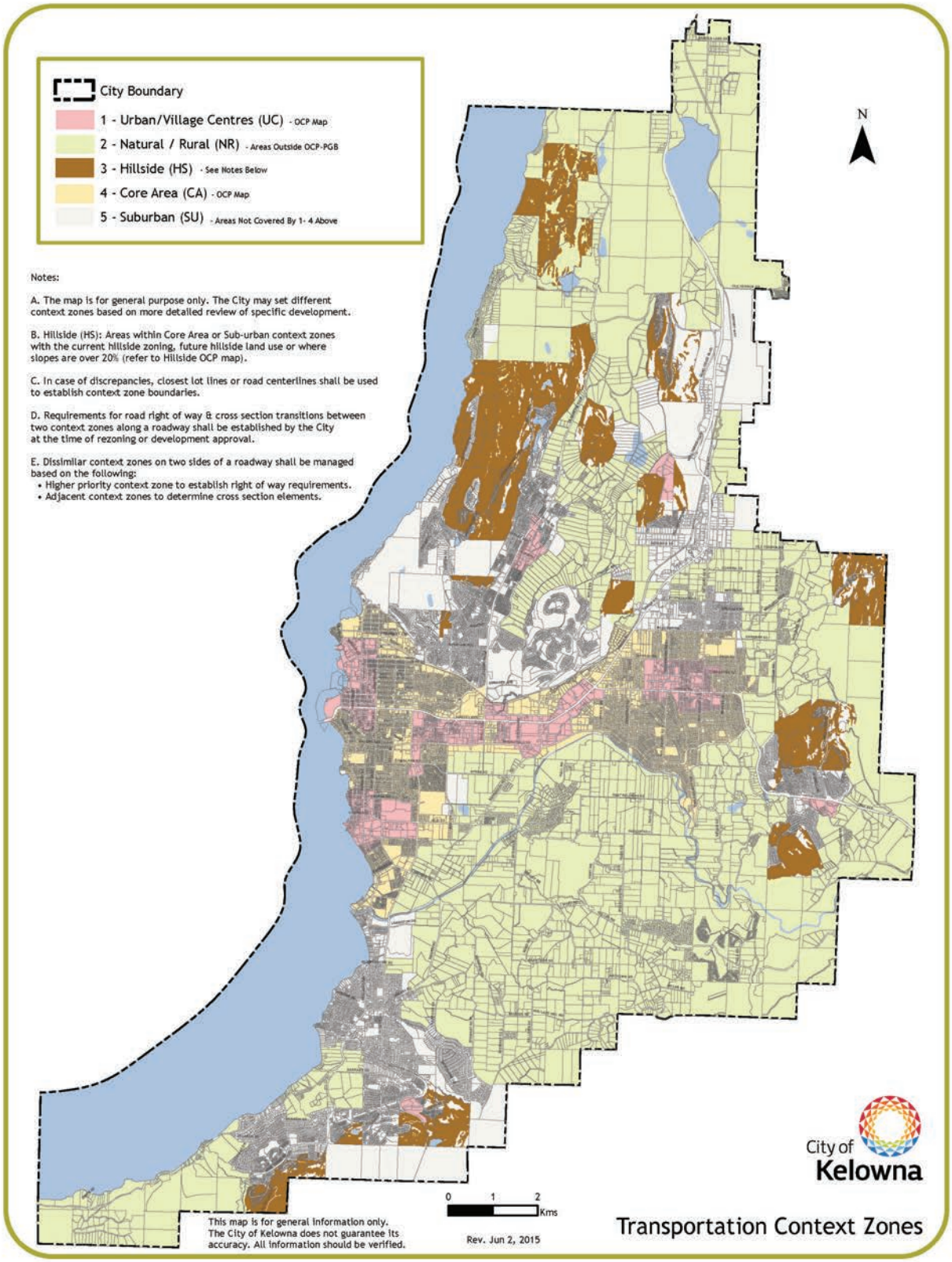
Geographic Area

Through the OCP process and reinforced through the community engagement process, priority areas for active transportation routes have been identified within Kelowna. These areas are largely highlighted in pink and yellow within Figure 4.1, the Transportation Context Zone Map and include:

- Downtown, north of Harvey;
- Mid Town, in the vicinity of Orchard Park Mall;
- Downtown south of Harvey;
- South Pandosy;
- Rutland; and
- Glenmore/ North Glenmore.

Projects located in these central areas will be weighted more heavily according to this criterion.

Figure 4.1: Transportation Context Zone Map



Implementation Factors

Implementation criteria address the ease or challenge of implementing each active transportation project. Each criterion is discussed below. These criteria were also used to prioritize projects to achieve an implementable plan.

Project Readiness

Projects that can be implemented solely by the City of Kelowna are easier to construct than those requiring lands for rights-of-way and approvals from other agencies (i.e., Agriculture Land Commission, Province of B.C.). Those projects that are easier to build will score higher on this criterion.

Development Opportunity

Active Transportation facilities such as sidewalks are constructed by individual developments as part of their frontage upgrades or Traffic Impact Study (TIS) requirements, in which case facilities could extend beyond the site frontage.

Any project where development is expected in the near future will be deferred to meet site design, access needs and also to reduce burden on the small taxation based capital programs. Projects where no development opportunity exists will score higher.

Project Cost and Site Constraints

Cost estimates have been developed for various facility types, such as shared-use paths, cycle tracks, bike lanes, and sidewalks. These estimates are based on per-metre unit costs and take into account site-specific constraints or challenges such as retaining walls, trees, drainage terrain, driveways, etc.

Projects with lower costs or easier to implement will score higher on this criterion.

4.2 Project Ranking

Two sets of prioritization factors were developed and are shown in Tables 4.1 and 4.2, the Utility Prioritization Factors and Implementation Prioritization Factors. These were used to objectively sort projects within the recommended pedestrian and bicycle networks.

All pedestrian and bicycle facility projects were ranked and based on the Prioritization Factors, and each project segment was organized into a list for implementation.

Projects that received fewer points fell into the low priority and projects that scored a higher number of points fell into the high priority implementation phase.

The lists of pedestrian and bicycle projects are provided in Appendix C.

Table 4.1: Utility prioritization criteria

Criteria	Description
Utility Prioritization Factors	
Geographic Area	Areas score 0 - 5 based on descending order of geographic priority for sidewalks and bicycle facilities from Urban Centres (5) to Rural Areas (0)
Gap Closure	Resolves multiple existing network gaps (5)
Connectivity to Transit	Provides direct access (within 100 metres) to a major transit exchange or rapid ride bus (5)
	Provides direct access (within 100 metres) to a standard bus stop (2)
	Does not directly or indirectly access to a major transit exchange (1)
Primary Network Route	Facility is identified as part of the proposed Primary Network (5)
	Facility is not identified as part of the proposed Primary Network (1)
Connectivity to Schools	Is within 200 metres of a K – 12 school (5)
	Does not directly access to a K – 12 school (1)

4.3 Network Implementation

All individual projects in the bicycle and pedestrian networks have been ranked and higher priority projects will be implemented as funding becomes available. Additional facilities will need to be built in conjunction with adjacent or nearby future developments to enable new customers or residents to use active modes of transportation and minimize the site traffic impact.

Table 4.2: Implementation prioritization criteria

Criteria	Description
Implementation Prioritization Factors	
Project Readiness	Projects that require land acquisition, Agiculture Land Commission approval, etc. will be scored lower (1)
	Requires approval etc. (2)
	Does not have any major challenge will score higher (5)
Project Cost & Site Constraint	Will cost less than $25,000 to implement (5)
	Will cost between $25,001 and $75,000 to implement (3)
	Will cost over $75,000 to implement (1)
Development Opportunity	A development that may contribute to the project is imminent (i.e., current planning year) (1)
	A proposed development that is likely in the mid-term (2)
	No developments are expected that may contribute to the project (5)

PRIORITIZATION AND IMPLEMENTATION

Implementing the long-term vision for the pedestrian and bicycle networks will require significant financial investment, partnership between different levels of government and participation from the private sector. Such investments will in return provide benefits in terms of a balanced and efficient transportation system, reduced healthcare costs, increased tourism, improved air quality and recreation for all residents and visitors. This prioritization and investment will help Kelowna meet its goals of increasing walking and cycling trips under 5.0 km, and of reducing pedestrian and bicycle collisions.

To achieve the optimum use of funds both the pedestrian and bicycle networks have been ranked such that projects which offer greater benefits to the community will be implemented first.

Table 4.3 summarizes the total length of various active transportation facilities identified in the pedestrian and bicycle network maps in this master plan.

Based on preliminary planning level cost estimates the delivery of the priority facilities alone will cost approximately $267 million.

Cost estimates include costs directly attributed or related to active transportation such as planning, engineering, construction, and contingency. Items such as repaving or reconstructing the existing road or related utility upgrades within the corridor are excluded, as are land acquisition costs. Project cost estimates do not include ongoing maintenance.

This is only one third of the amount allocated in the draft 2030 Infrastructure Plan. This means only one-third of the priority projects can be completed by 2030, which will be completed based on the ranking of the individual projects.

Appendix C provides a summary of the priority projects.

Table 4.3: Summary of existing and proposed pedestrian and bicycle networks

Infrastructure Type	Existing (km)	Proposed (km)
Sidewalks	399.8	71.8
Cycle Tracks	3.0	41.5
Shared-Use Pathway, Paved	36.4	37.7
Bike Lanes	298.6	210.0

It should be noted that land developments/redevelopments will still be required to complete their responsibility in terms of frontage improvements. This typically involves sidewalks with urbanization including curb, gutter and storm drainage. Such shared delivery of infrastructure will reduce pressure on taxation based small capital programs.

4.5 Implementation Strategy

The pedestrian and bicycle networks presented in this Master Plan will need to be completed in phases to minimize financial burden on residents.

The City of Kelowna currently invests approximately $500,000 in its annual sidewalk program and $300,000 in bike network programs each year. Approximately $3.0 million dollars of gas tax and development cost charge (DCC) funding is allocated toward Primary Active Transportation Corridor programs each year.

The Draft 2030 Infrastructure Plan shows amounts per program type and time period, as reproduced in Table 4.4. The amounts are dependant on Council's approval of the annual budgets and other civic priorities each year.

Further, as the active transportation network grows, addtional operation and maintenance investments will be necessary to support the new routes.

This current allocation in bicycle and pedestrian infrastructure is inadequate to complete the delivery of facilities for users of all ages and abilities, as summarized in Table 4.3.

Increased investment means new funding sources including higher taxation will need to be considered to promote walking and cycling as alternative modes of travel. It is equally important to explore new cost-effective infrastructure designs to ease funding challenges and to accelerate the Plan's implementation.

The optimal allocation of funding is expected to be established based on the public consultation process currently in progress for the 2030 Infrastructure Plan.

Table 4.4: Anticipated active transportation capital investments 2016 to 2030 (pending annual Council approval)

Infrastructure Capital Program	2016-2020	2021-2025	2026-2030	Sub-Total
Sidewalk Network Expansion	2,417,620	3,400,000	3,750,000	9,567,620
Bicycle Network Expansion	1,540,000	2,150,000	2,800,000	6,490,000
Primary Active Transportation Corridor Expansion	28,273,800	14,076,515	29,320,000	71,670,315
Sub-total	**$32,231,420**	**$19,626,515**	**$35,870,000**	**$87,727,935**

Source: Draft 2030 Infrastructure Plan, City of Kelowna 2015

CHAPTER 5: INVESTMENT OPTIONS

Financial investments in active transportation infrastructure influence long term travel behaviour in any community. The Central Okanagan Household Travel Surveys undertaken in 2007 and 2013 indicate the percentage of daily walking and cycling trips has increased from 8 per cent to over 11 per cent of all daily trips, which equates to an increase of 38 per cent. Despite this increase, Kelowna's walking and cycling mode shares are still low compared to other cities in North America that are leaders in promoting walking and cycling.

This chapter explores potential options to increase the investment in active transportation to deliver projects and programs sooner than it would take based on the current funding level. Investment practices from other cities could be used as a benchmark for Kelowna. This will assist the City of Kelowna in its efforts to establish itself as the best mid-sized city in North America.

5.1 Current and Planned Investment

Table 5.1 and Figure 5.1 summarize the City of Kelowna's historical annual investment in walking and cycling infrastructure between 2010 and 2014.

The surge in 2010 reflects federal stimulus funds to improve the economy.

The 2020 Capital Plan outlines planned future investments in active transportation capital projects up to 2020. Based on the plan, the initial low annual investments would gradually increase in the final years of the capital plan. This 2020 plan is currently being updated to the 2030 horizon year and the anticipated investments are now shown in a draft document titled 2030 Infrastructure Plan. The draft plan shows an investment of $500,000 in annual new sidewalk program and $300,000 in new bicycle network program that gradually increase to

Figure 5.1: Recent investments in active transportation

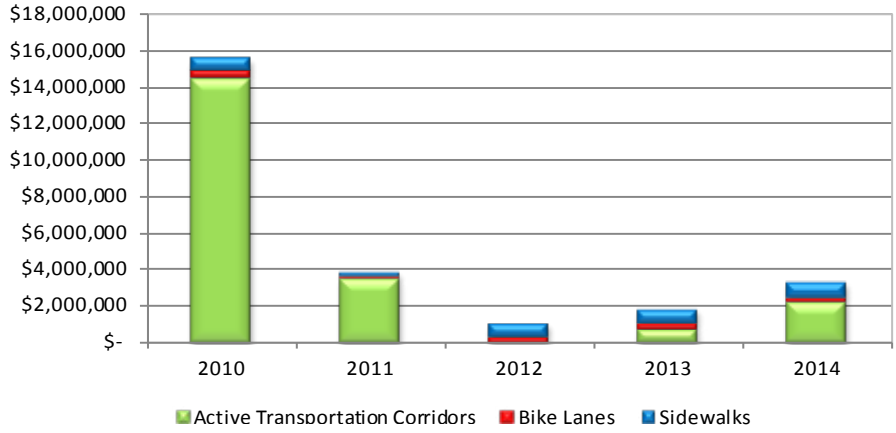
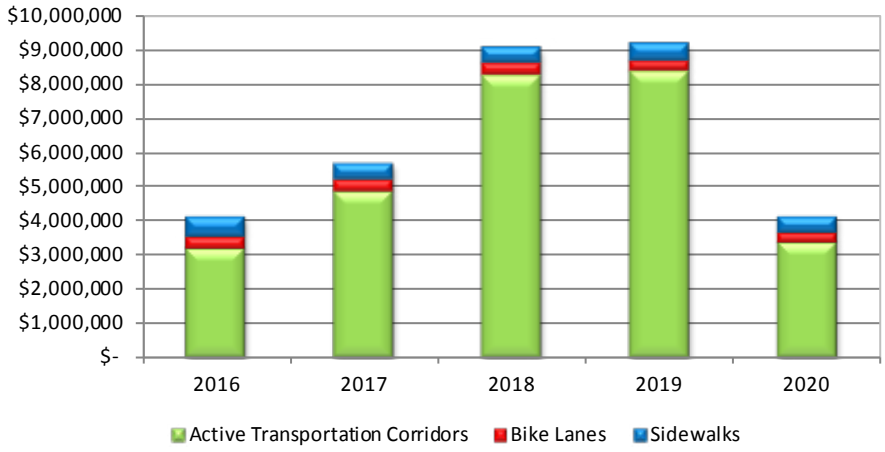


Figure 5.2: 2030 Infrastructure Plan (Draft) anticipated investments



$750,000 and $600,000 respectively by 2030. Table 5.2 and Figure 5.2 show an additional primary active transportation corridor program that anticipates $4.78 million to be spent on average each year between 2016 and 2030 utilizing federal Gas Tax Funds and Development Cost Charges (DCC).

The City supports various educational and encouragement programs. Some programs are funded regionally. The direct investment in such programs is approximately $50,000 per year. This is funded through general taxation and supported by volunteer contributions from residents, employers and nonprofit agencies.

Encouragement programs branded as 'SmartTRIPS' include, Bike to Work Week, Bike/Walk to School Week, and Carpool month.

The annual budget leverages additional amounts of varying magnitude in foundation grants, private contributions and volunteer support, for a total of approximately $100,000.

This funding fluctuates annualyy depending on contributions available and are for the region and not exclusively for the City of Kelowna.

The City invests in active transportation in terms of ongoing repair and maintenance such as facility repairs, sign and marking replacements, outdoor lighting repairs, landscaping, replacement of signal hardware, sweeping and snow clearing, etc.

Table 5.1: Recent investments in active transportation

Facility Types	2010	2011	2012	2013	2014
Sidewalks	$805,319	$238,328	$750,157	$758,792	$783,583
Bike Lanes	$351,020	$115,014	$248,133	$285,376	$217,543
Active Transportation Corridors	$14,508,792	$3,564,537	$96,364	$836,735	$2,339,291
Total	**$15,665,131**	**$3,917,879**	**$1,094,654**	**$1,880,903**	**$3,340,417**

Table 5.2: 2030 Infrastructure Plan (Draft) anticipated investments

Facility Types	2016	2017	2018	2019	2020
New Sidewalks	$417,620	$500,000	$500,000	$500,000	$500,000
New Bike Lanes	$340,000	$300,000	$300,000	$300,000	$300,000
New Active Transportation Corridors	$3,230,000	$4,928,400	$8,307,799	$8,407,601	$3,400,000
Total	**$3,987,620**	**$5,728,400**	**$9,107,799**	**$9,207,601**	**$4,200,000**

5.2 Best Practices

In a review of active transportation investment on a per capita basis from jurisdictions throughout Europe and North America, research has found that existing and planned per capita annual investment amongst communities with a commitment to improving walking and cycling mode shares is as follows:

- Pedestrian and cycling infrastructure $40-80 per capita;
- Education $0.75-$3.00 per capita;
- Encouragement $1.00-$3.00 per capita; and
- Evaluation $0.25-$1.75 per capita.

As an example, the District of Saanich has a population comparable to Kelowna (109,750 vs. 115,560, respectively, based on 2009 data) and mix of urban and rural conditions.

The most up-to-date active transportation statistics for Kelowna and Saanich are shown in Table 5.3

Table 5.3: Active transportation commute mode shares for Kelowna and Saanich

Mode	Kelowna	Saanich
Cycling	3.5%	5.4%
Walking	5.6%	5.8%
Total	9.1%	11.2%

Source: Statistics Canada National Household Survey, 2011

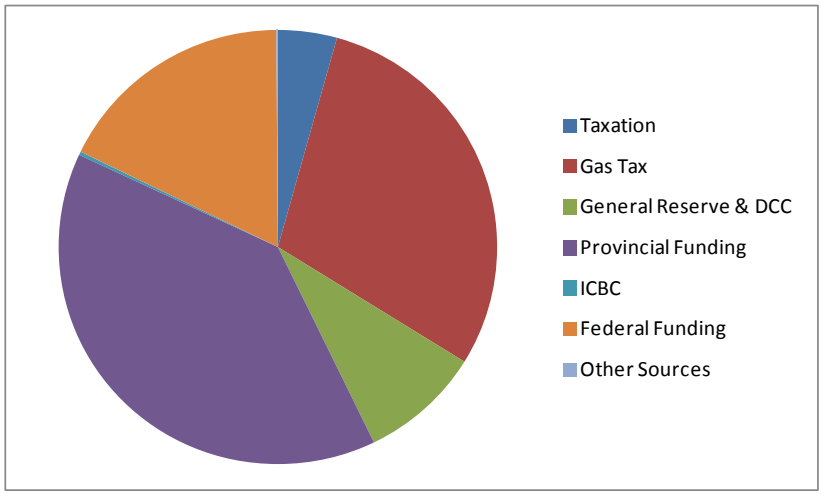
Although the climate in Saanich is slightly more conducive year round, the mode share measurements listed tend to occur in late spring and fall, thus allowing a more direct comparison. In 2009, Saanich was investing approximately $1.9 million/ year and leveraged an additional $2.6 in funding for active transportation projects for a total of $4.5 million.

In 2009 their annual investment in walking and cycling infrastructure was approximately $41 per capita.

Based on the best practices review, Kelowna would have to invest the following amounts annually:

- Pedestrian and cycling infrastructure $5.2 - $10.5 million;
- Education $100,000 - $400,000;
- Encouragement $130,000 - $400,000; and
- Evaluation and Monitoring $30,000 - $230,000.

Figure 5.3: Revenue sources for active transportation improvements (2010-2014)



5.3 Potential Funding Sources

This plan explored potential funding sources that could be used to fund active transportation improvements in Kelowna. This section also examines their potential to contribute to active transportation improvement programs.

1. Community Contribution Fees and Taxes:
   a. General Funds/Taxation
   b. Local Area Services
2. User Fees and Project Related Revenue Sources:
   a. Cash-in-lieu Parking
   b. Latecomer Agreements
3. Other Grants:
   a. Climate Action Revenue Incentive Program
   b. Gas Tax Fund
   c. Infrastructure Canada
   d. Green Municipal Funds
   e. ICBC
4. Private Sector:
   a. Deeds, donations and dedications
   b. Service Clubs
   c. Advertising

The following criteria were used to assess each of the potential funding sources:

1. Reliability – Does the funding source provide a reliable and steady flow of income?
2. Administrative Ease – Has the collection method been established; is it easy to collect?
3. Travel Demand Management (TDM) – Will a funding method influence people's propensity to use active modes?
4. Revenue Potential – Can this stream provide a significant stream of additional revenue?
5. Equity – Is this revenue source equitable in terms of the geographic distribution of those who pay, relative to the area that will benefit and in terms of income, by avoiding drawing overly upon those that can least afford to pay?
6. Political Support – Is there public support for a particular funding source?
7. Feasibility – Is Kelowna able to implement without approval or support from other agencies? Is the method likely to face legal or technical challenges?

The following criteria were considered for inclusion but were omitted for the reasons listed below:

- User pay – Does the method support user pay? This is generally an accepted measure of success for transportation related revenue sources, but in this case those that do not pay also benefit by decreased congestions, reduced healthcare costs, and reduced pollution and noise. User pay is thus not an important consideration for active transportation related sources.
- Transparency – Is the link between a cost and benefit clear? Is the taxpayer aware of how much they are paying and what they are paying for? This is an important consideration but is more of a concern in the implementation phase, rather than in the exploration phase. Moreover, one can mitigate such concerns through communication.

Community Contribution Fees and Taxes

A number of broad community based funding sources and strategies can be used to implement pedestrian and bicycle facilities, as follows:

General Funds/Taxation

General funds are provided by property tax or other regular jurisdictional revenue streams. In Kelowna, General Funds are used for active transportation projects and programs, providing only about 5-20 per cent of total annual funding.

To accelerate the delivery of the priority projects, it will be important to consider an increased contribution from General Taxation to match funding from Federal and Provincial Grants to achieve consistency with current best practices.

Local Area Services

A form of taxation that is levied against residents and property owners who vote in favour of a particular improvement. In order to be successful the petition must be signed by the owners of at least 50 per cent of the parcels subject to the local service tax and represent at least 50 per cent of the assessed value of land and improvements that would be subject to the Local Service Tax (Division 5 of Part 7 of the BC Community Charter, Section 212(3)a and b). This mechanism could be used to allow residents to accelerate sidewalk projects identified in the Plan by funding a portion of the costs as described in Table 5.4. The remaining percentage of costs would be paid through general tax revenues or other municipal sources.

User Fees and Project Related Revenue Sources

Cash-in-lieu Parking

Recent changes to the Local Government Act allow municipalities to use funding from cash-in-lieu parking reserves to fund alternative transportation such as active transportation network upgrades. The City of Kelowna allows cash-in-lieu of parking within the Urban Town Centre (Schedule "A" of City of Kelowna Bylaw No 8125).

This source of funding could be used to fund a range of programs and measures designed to reduce reliance on the private auto for trips to and from a development that takes advantage of Cash-in-lieu Parking, including but not limited to, trip reduction programs, active transportation improvements, and access to bike and car sharing vehicles.

Latecomer Agreements

In B.C. local governments may require an owner of land that is under development to provide "excess" or "extended" services including roads, water, sewage and/or drainage works with enough capacity to service properties that are situated nearby.

A roadway that must be widened and upgraded with designated cycling facilities to serve future traffic increases surrounding a proposed subdivision is an example of an extended service. A local government can require the subdivision owner or developer to pay the up-front costs of extended services or can pay those costs themselves. These parties are then able to recover a portion of the costs from the owners of properties that will benefit from the works in the future. These "latecomers" are subject to a latecomer tax or fee that is collected by local government and remitted to the entity that paid for the extended or excess service.

Latecomer schemes are normally initiated through an agreement with the owner or developer that identifies the costs that will be recovered by a latecomer charge. The term of the agreement cannot exceed 15 years and no latecomer charges are payable after the term of the agreement. Because some or all of the properties that will benefit from the extended service may not connect or use the service before the term of the agreement ends, those who finance excess or extended services are obliged to accept the risk that not all of their costs will be recovered (http://www.cscd.gov.bc.ca/lgd/finance/latecomer_connection.htm).

Table 5.4: Proportion of local area service costs proposed to be funded by residents

Location	percentage funded by residents
Projects identified in the Plan and located in Core Urban Area	25 per cent
Projects identified in the Plan but located outside of Core Urban Area	50 per cent
All other projects	100 per cent

Other Grants

As funding opportunities change regularly, the information in this section is subject to change. Kelowna should regularly check with all levels of government to keep up to date on funding opportunities.

Climate Action Revenue Incentive Program

The Climate Action Revenue Incentive Program is a conditional grant program that provides funding to BC Climate Action Charter (Charter) signatories equivalent to one hundred per cent of the carbon taxes they pay directly. This funding supports local governments in their efforts to reduce greenhouse gas emissions and move forward on achieving their Charter goals. Governments must take action towards carbon neutrality and measuring GHG emissions to be eligible. These funds have been applied toward various planning efforts that are related to active transportation, including sustainability planning, local area planning, age friendly plans, and air quality studies, to name a few. In Kelowna this fund is allocated to corporate energy reduction measures.

Gas Tax Fund

Gas tax is collected annually by the federal government. Jurisdictions receive a proportion of the federal dollars based on their populations through the Gas Tax Fund.

The Gas Tax Fund supports environmentally sustainable municipal infrastructure, including active transportation infrastructure.

Kelowna's Surplus/Reserves fund sourced from the Gas Tax Fund should be invested in for active transportation infrastructure improvements as per the original intent of reducing vehicle use.

Infrastructure Canada

The programs of Infrastructure Canada are the New Building Canada Fund (NBCF) and the Gas Tax Fund named above. Typically, the federal government contributes one-third of the cost of municipal infrastructure projects. Provincial and municipal governments contribute the remaining funds and, in some instances, there may be private sector investment as well. The NBCF support projects of national, regional and local significance that promote economic growth, job creation and productivity.

Green Municipal Funds

The Federation of Canadian Municipalities (FCM) manages the Green Municipal Fund (GMF). Eligible capital projects include transportation that must demonstrate the potential to reduce vehicle kilometres travelled in a single occupancy vehicle by encouraging active transportation. Matched funds are a requirement to apply for the Green Municipal Fund.

ICBC

An increased ICBC contribution would be allocated to improve the safety for vulnerable road users such as pedestrians and cyclists.

About 1.0 per cent of the City's active transportation funding has come from ICBC in the last 10 years.

Private Sector

Many private sector businesses may wish to be socially and environmentally responsible neighbours. Active transportation facilities are well-suited to corporate sponsorship. Examples in B.C. include Construction Aggregates in Sechelt, which constructed an overpass over a gravel conveyor to provide a link for pedestrians and cyclists, and 7-Eleven and Molson Breweries which sponsored multi-use pathways in Vancouver, Burnaby and New Westminster.

Deeds, Donations and Dedications

In many communities, multi-use pathways have been funded in part by local residents who purchased "deeds" to sections of the pathway. The Trans Canada Trail, for example, is funded partially by sales of one metre sections for $40. Kelowna partially funded development of a greenway along Mission Creek through community donations. A dedication program can be set up for residents and corporations to donate bicycle facilities, such as bicycle racks or lockers. In many cases, these deeds, donations and dedications are tax-deductible where administered by a not-for-profit agency.

Service clubs

Efforts to provide new bicycle facilities can be coordinated with service clubs, such as the Lions Club, the Rotary Clubs and Kiwanis. In Kelowna and Port Coquitlam, for example, one of the Rotary Clubs provided funding for the construction of bicycle facilities.

Advertising

There may be several options for obtaining funding for bicycle projects from advertising revenues. The costs of producing and distributing a bicycle route map could be partially or fully offset by selling advertising space on the map. Advertising on bicycle racks could reduce the costs of providing bicycle parking and in some cases infrastructure projects have been funded directly through revenues from advertising. For example, McBride pedestrian/bicycle overpass in New Westminster, B.C. was paid for by Mediacom in return for a 20-year advertising deal involving seven billboards throughout the community.

A Sponsorship Program and Policy is being developed in 2016 for the City of Kelowna to guide these types of revenue opportunities.

Table 5.5: Summary of potential funding sources

Funding Option Name	Pros	Cons	Best Practice Example	Previous use in Kelowna	Recommended
General Funds/ Taxation	Tends to be equitable as lower valued properties will pay less tax.	Not geographically equitable depending on how improvements distributed. Political support low as residents do not generally support increased taxes.	Most, if not all, jurisdictions in North America use general revenues to support transportation improvements.	Yes	Yes
Local Area Services	Collected through property taxes; easy to administer. By providing pedestrian environments in proximity to affected residents, this mechanism will influence people's propensity to use active modes. Geographic equity is strong. Likely to enjoy strong public support and can be implemented without support from other agencies or levels of government.	Income equity may be an issue as some who vote no (due to financial constraints) may be forced to contribute by the majority. Feasibility of this measure is challenging since residents must go through considerable effort to solicit support from their neighbours and must secure support from over 50% through a binding petition.	Local area service taxes are available to all municipalities in B.C. and are utilized by many communities including Vancouver, Kelowna, Surrey and Saanich.	Yes	Yes

Table 5.5: Summary of potential funding sources, continued

Funding Option Name	Pros	Cons	Best Practice Example	Previous use in Kelowna	Recommended
Cash-in-lieu-Parking	Typically nets between $5,000 and $40,000 per foregone parking stall, depending on whether parking is at grade or within a structure. Potentially significant funds, yet limited to specific developments. Relatively easy to administer as fees are collected as part of a development approval. Geographic and income equity would be strong, assuming the proceeds are used to benefit those who contribute. Political support would likely be strong, given that Kelowna already makes use of this measure.	Does not provide a reliable or steady flow of income. To meet parking demands, a well thought-out multi-modal transportation plan will be required. This fund is directed to build new parkades and parking infrastructure.	The City of New Westminster updated the parking in-lieu provision of their Zoning Bylaw and added a complementary bylaw called the Parking Cash in-Lieu Reserve Fund Bylaw to create an Alternative Transportation Reserve Fund for the revenue generated from the updated cash in-lieu policy.	Yes	Yes
Latecomer Agreement	Agreements are expected to have an immediate and ongoing impact on travel behaviour. Arrangements are considered equitable both from a geographic and income perspective. Political support could be high for such initiatives and they can be implemented without approval from the Provincial government.	Administratively such agreements are challenging to negotiate; however, once established, these agreements are relatively easy to administer. Risk to developer if term exceeds 15 years.	Vernon, Summerland, Hope and Surrey all use latecomer agreements.	No	Yes
Other Grants	Helps supplement project costs.	Not always available. Specific requirements sometimes have to be met.		Yes	Yes

5.4 Funding Options for Further Consideration

Some best practice funding options that are outside existing provincial legislation require further investigation to determine the legalities and/or feasibility for implementing in Kelowna.

Benefiting Area Tax

This is a type of value capture tax that imposes a charge on property owners based on their geographic proximity to a major transportation facility. This form of tax is most commonly used in proximity to light rail, bus rapid transit stations, or transit exchanges i.e. properties that are within 400-800 metres and which thus benefit directly through improved access.

Car Rental Tax

Municipal and regional authorities may choose to use revenue from locally imposed taxes on vehicle rentals to fund transportation improvements. Such a tax would require visitors to pay a portion of the cost associated with their use of the transportation system. Vehicle rental companies are responsible for reporting and remitting these taxes (Lambert, 2012).

Parking Levy

A tax on off-street, commercial parking stalls would be assessed regardless of whether or not users are charged directly for the use of that parking space. For example, this tax would apply to shopping malls that offer free parking to their patrons. The levy would be set as a flat fee on each parking stall or calculated based on the land area dedicated to parking. (TransLink, 2013).

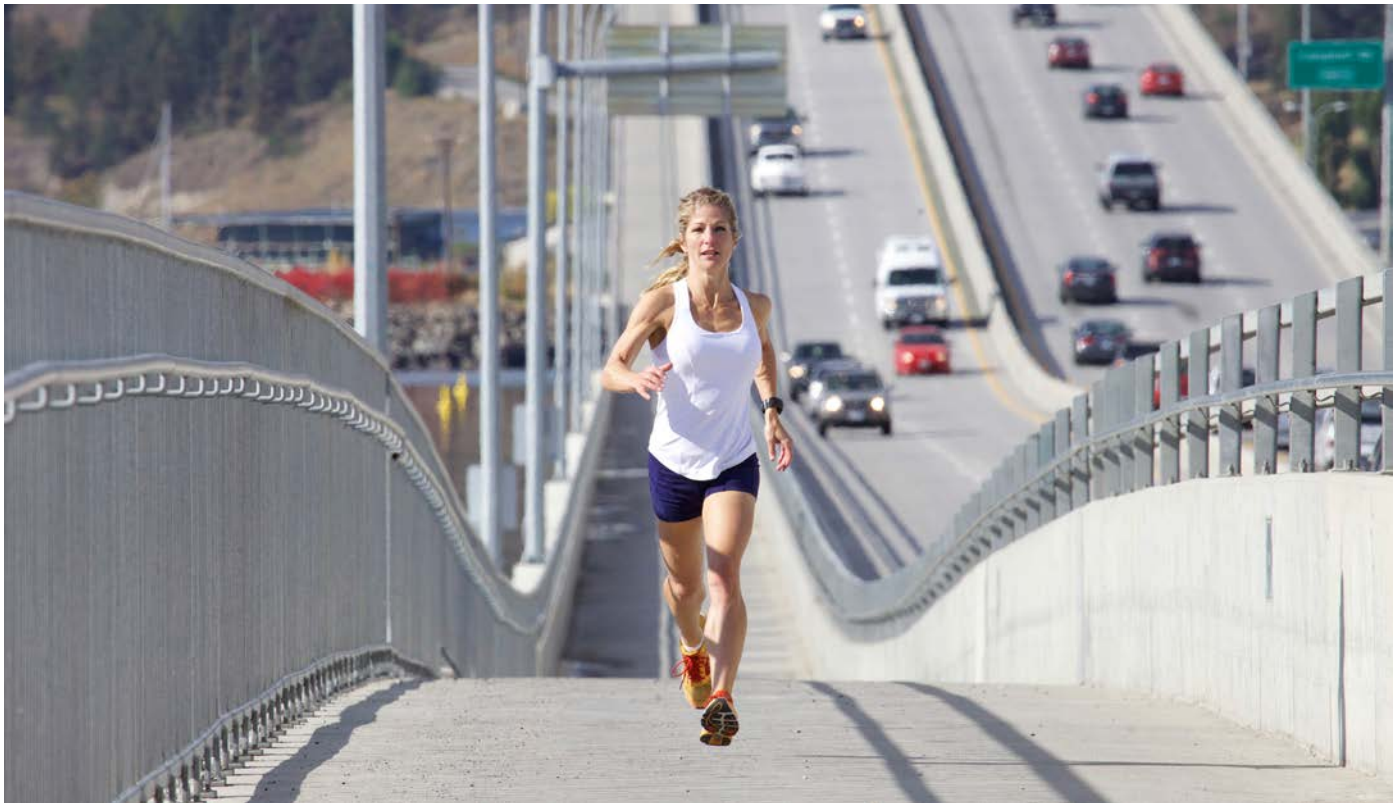


Table 5.6: Funding sources for further consideration

Funding Option Name	Pros	Cons	Best Practice Example	Previous use in Kelowna	Recommended
Benefiting Area Tax	Offers a reliable flow of income. Can be implemented and collected with ease. Likely to influence transportation behaviour since those in proximity to a transportation improvement are more likely to use it. Offers strong revenue potential if facility cost is dispersed amongst property owners within 400-800 metres of the entire route length. Offers strong geographic equity. Can be implemented without support from other levels of government.	Likely to face strong opposition from those opposed to increased property taxes.	This mechanism is common in the U.S. and is being discussed for use in Metro Vancouver.	No	Further study needed
Car Rental Tax	Funding could provide a reliable and steady flow of income. Relatively easy to establish and collect. Public support for such an initiative is likely to be strong since fund would largely target visitors, allowing them to pay a portion of the costs for local roadways.	Revenue potential is limited to the size of the rental car market and would likely be vigorously resisted by car rental agencies.	Seattle has levied a rental car tax to support public transit since 1996. In 2015, a 0.8 per cent tax yields approximately $2.5 million per year.	No	Further study needed
Parking Levy	Potential to provide a reliable and steady flow of income. The influence on travel behaviour is potentially strong, depending on how the cost is passed to the user. Revenue potential could be significant; for example, an annual cost of $65 per stall in Metro Vancouver would generate approximately $50 million (TransLink, 2013).	A mechanism to implement and administer would be required. Could potentially be costly for those who are relatively poor but who rely on a motor vehicle. Could be strongly resisted by those subject to tax, and this group could be large and diverse. Feasibility is unknown given that provincial legislative changes would be required.	In Metro Vancouver, a region-wide parking levy was implemented in 2006 to fund transportation improvements, but was subsequently repealed by legislative changes by the B.C. Government in 2008 due to opposition.	No	Further study needed

5.5 Investment Considerations

The previous analysis provides a high level overview of potential sources to fund active transportation improvements in Kelowna. Further investigation is required to understand the feasibility of drawing more funding from existing sources and to clarify the feasibility of sources not currently in use. Consequently it is recommended that Kelowna undertake further investigation to assess existing and potential funding sources and their applicability as a new or increased source of funding toward active transportation improvements.

CHAPTER 6: FACILITY DESIGN AND MAINTENANCE

Active transportation facilities must be designed based on environmental and functional requirements that take into account roadway and traffic conditions (e.g. vehicle speed and volume, topography), land-use context, and intended user types (e.g. all ages and abilities versus commuters versus recreational only).

This Master Plan presents pedestrian and bicycle networks designed to meet the goals of increasing walking and cycling trips and improving their safety. To increase the walking and cycling mode share, a fresh approach to facility design is necessary that considers users of all ages and abilities.

Developing an active transportation network with new facility types and retrofitting existing facilities will make cycling more suitable and attractive to children, less confident cyclists, and seniors.

This section provides guidance on the selection of the type of facilities and their design, as well as maintenance considerations.

6.1 Active Transportation Facility Design

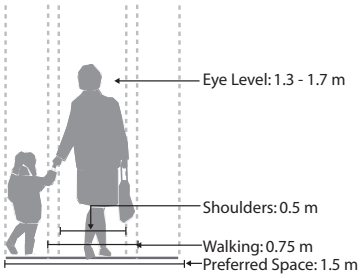
Careful consideration is important in selecting the type of facility to meet the needs of anticipated users on the corridor. The design of a facility requires measures to minimize unpleasant traffic conditions. The design should consider user types and required dimensions. Figure 6.1 illustrates the spatial needs of various active transportation users.

The following section describes each active transportation facility type with guidelines for design elements.

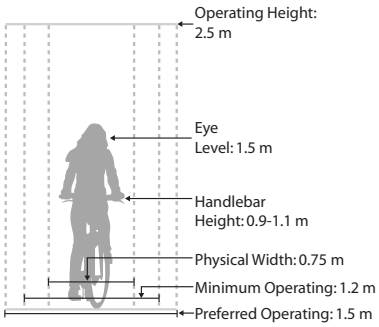
The City is currently working to update its roadway design standards. The process is anticipated to address safety and accessibility needs of vulnerable road users, inclusing seniors, wheelchairs, walkers and visually impaired pedestrians. Additional information is provided in Chapter 7.

Figure 6.1: Spatial needs of active transportation users

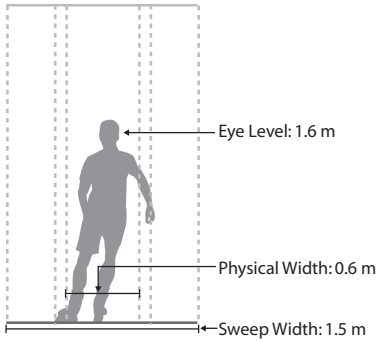
Spatial Needs of Pedestrians



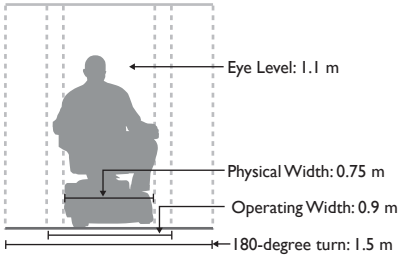
Spatial Needs of Cyclists



Spatial Needs of Roller bladers



Spatial Needs of Wheelchair Users



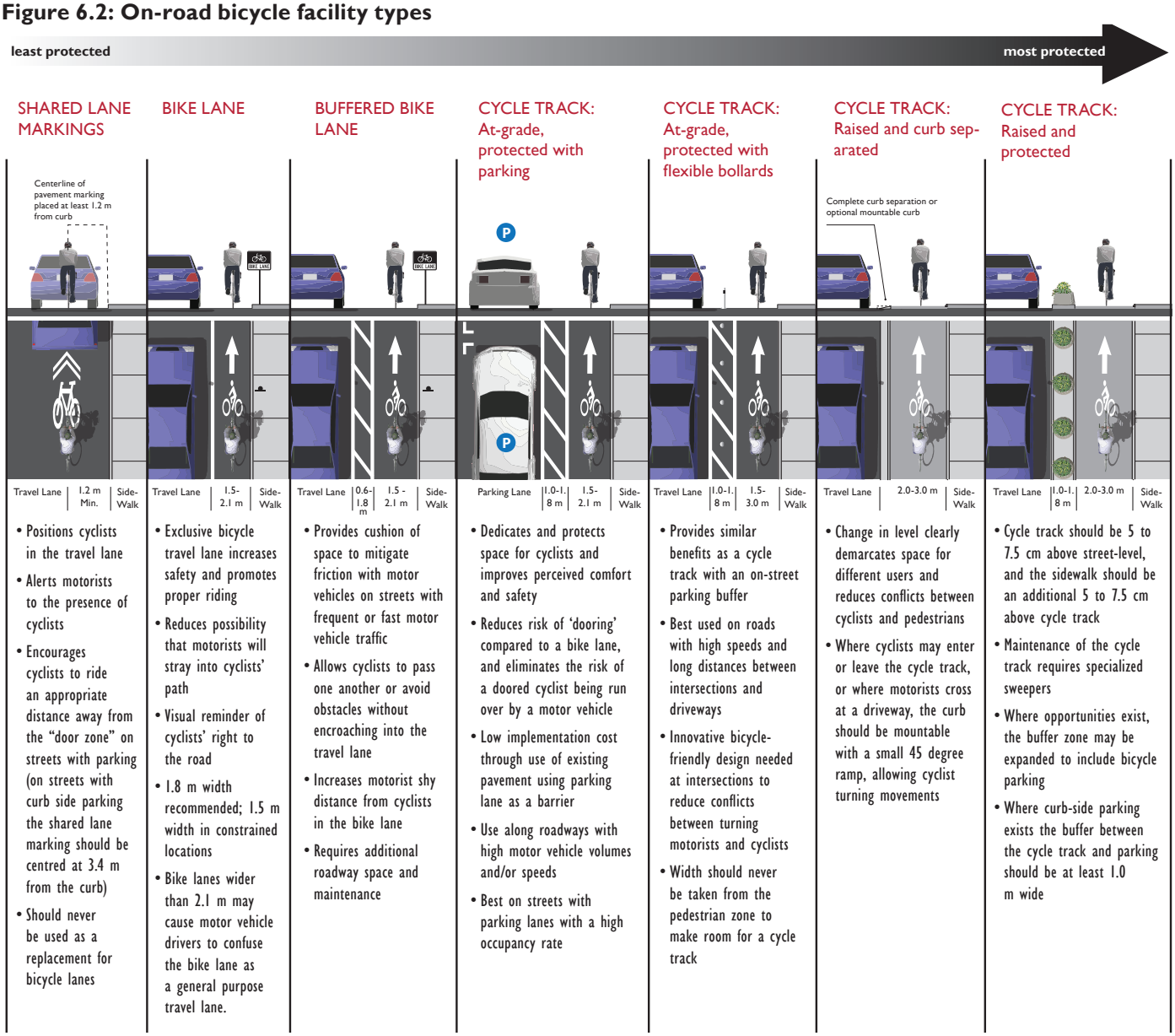
6.2 Bicycle Facility Types

When developing facility recommendations for a specific corridor, criteria should be based on engineering standards, traffic analysis, corridor plans, land use context and stakeholder input.

Figure 6.2 shows the spectrum of facility treatments, from the most exposed to the most protected facility for cyclists. Beneath each facility type is a description of the benefits and things to consider in selecting that type of facility for the roadway.

Additional design guidance is provided in Appendix D.

Figure 6.2: On-road bicycle facility types



- Positions cyclists in the travel lane
- Alerts motorists to the presence of cyclists
- Encourages cyclists to ride an appropriate distance away from the "door zone" on streets with parking (on streets with curb side parking the shared lane marking should be centred at 3.4 m from the curb)
- Should never be used as a replacement for bicycle lanes

- Exclusive bicycle travel lane increases safety and promotes proper riding
- Reduces possibility that motorists will stray into cyclists' path
- Visual reminder of cyclists' right to the road
- 1.8 m width recommended; 1.5 m width in constrained locations
- Bike lanes wider than 2.1 m may cause motor vehicle drivers to confuse the bike lane as a general purpose travel lane.

- Provides cushion of space to mitigate friction with motor vehicles on streets with frequent or fast motor vehicle traffic
- Allows cyclists to pass one another or avoid obstacles without encroaching into the travel lane
- Increases motorist shy distance from cyclists in the bike lane
- Requires additional roadway space and maintenance

- Dedicates and protects space for cyclists and improves perceived comfort and safety
- Reduces risk of 'dooring' compared to a bike lane, and eliminates the risk of a doored cyclist being run over by a motor vehicle
- Low implementation cost through use of existing pavement using parking lane as a barrier
- Use along roadways with high motor vehicle volumes and/or speeds
- Best on streets with parking lanes with a high occupancy rate

- Provides similar benefits as a cycle track with an on-street parking buffer
- Best used on roads with high speeds and long distances between intersections and driveways
- Innovative bicycle-friendly design needed at intersections to reduce conflicts between turning motorists and cyclists
- Width should never be taken from the pedestrian zone to make room for a cycle track

- Change in level clearly demarcates space for different users and reduces conflicts between cyclists and pedestrians
- Where cyclists may enter or leave the cycle track, or where motorists cross at a driveway, the curb should be mountable with a small 45 degree ramp, allowing cyclist turning movements

- Cycle track should be 5 to 7.5 cm above street-level, and the sidewalk should be an additional 5 to 7.5 cm above cycle track
- Maintenance of the cycle track requires specialized sweepers
- Where opportunities exist, the buffer zone may be expanded to include bicycle parking
- Where curb-side parking exists the buffer between the cycle track and parking should be at least 1.0 m wide

Shared-Use Pathways

Pathways (Figure 6.3) are designed for shared use of a facility between pedestrians, runners, pedestrians with strollers or walkers, wheelchairs, roller bladers and cyclists of various ages and skills.

A minimum width of 3.0 m is needed to allow a cyclist to pass another user approaching from the opposite direction. Paths narrower than this should only be considered in constrained conditions for short distances or one-direction movement.

Wide paths are advisable in the following circumstances:

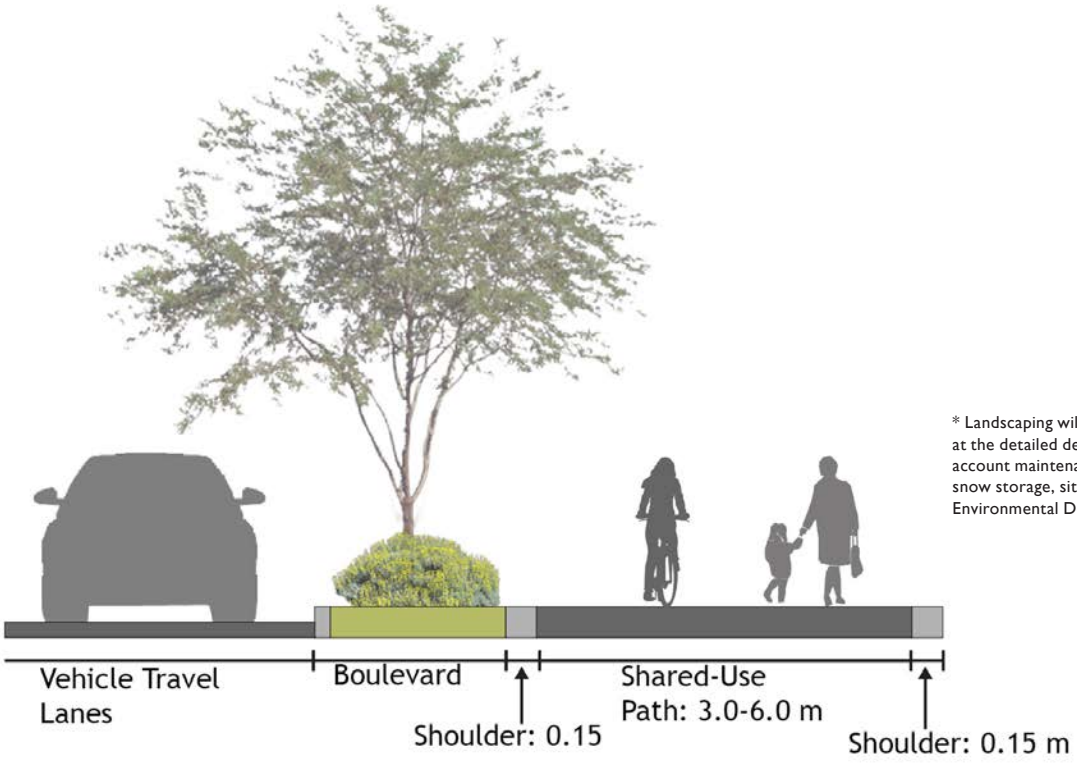
- Where cyclists may be expected to travel faster than 12 km/h;
- On steep grades (>7%) to provide additional passing area; and
- Through curves or around obstructions for operating space and better sightlines.

Centre line marking is not recommended to allow users to organize themselves according to circumstance and to avoid confusion.

Edge lines, flush curbing or banding in urban environments should be included as they are a helpful means to highlight path edges in low light conditions.

Just as the speed differential and volume of traffic between cyclists and vehicles often warrants physical separation, the speed differential and volume of cyclists and pedestrians may warrant separation between them. In instances where cyclists can be expected to travel at over 20 km/h, it is advisable to separate cyclists from other active travel users. This is particularly important if two-way cyclist travel is permitted ie., Abbott Street Corridor.

Figure 6.3: Shared-use pathways adjacent to roadways



* Landscaping will be addressed for each identified project at the detailed design stage. Landscaping will take into account maintenance requirements, water conservation, snow storage, site lines and Crime Prevention through Environmental Design Guidelines.

Landscaping shown is for illustrative purposes only. *

Conventional Bicycle Lanes

On minor streets with appropriate volumes and speeds, conventional painted bicycle lanes are adequate as supporting infrastructure to the Primary Network.

Standard minimum dimensions for bicycle lanes are cited in the Bikeway Traffic Control Guidelines for Canada as 1.5 m, although for increased comfort, 1.8 m should be the standard minimum dimension (Figures 6.4 & 6.5). Narrower lanes are acceptable only in constrained conditions or for short (less than 100 m) distances.

Widening of existing bike lanes by reducing vehicular lane width will be explored at the time of annual road resurfacing or with replacement projects.

Conventional bicycle lanes (and intersections) should be improved by adding buffer space from parked cars and moving traffic. Physical buffers such as flexible bollards, concrete curbs or medians will be appropriate for this purpose.

Figure 6.4: Conventional bicycle lane configurations

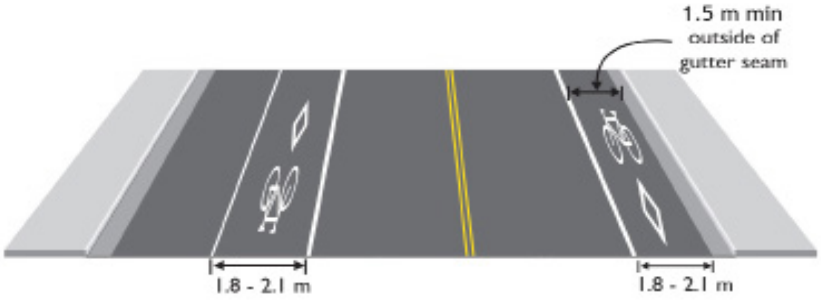
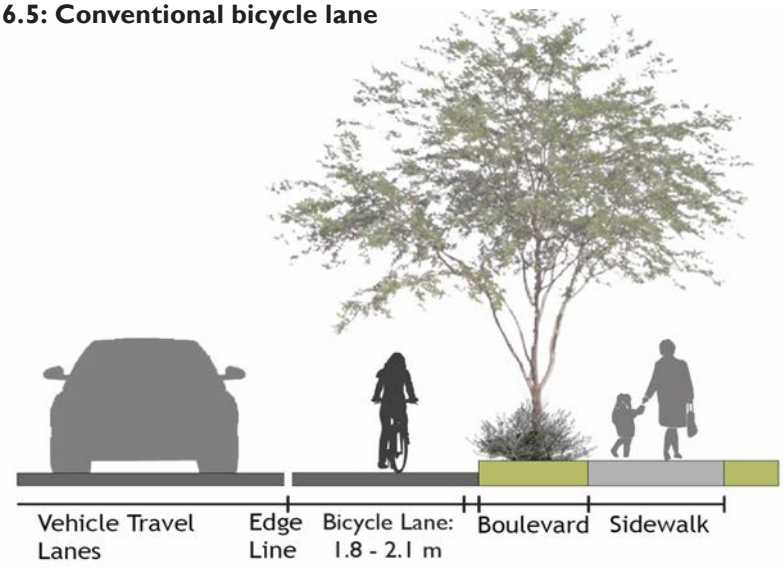


Figure 6.5: Conventional bicycle lane



Landscaping shown is for illustrative purposes only. *

Buffered Bicycle Lanes

Buffered bicycle lanes (Figures 6.6 and 6.7) add a buffer zone to a conventional bicycle lane to increase the separation between cyclists and motor vehicles. The width of the buffer zone should ideally be 0.6 m as a minimum (Figure 6.8).

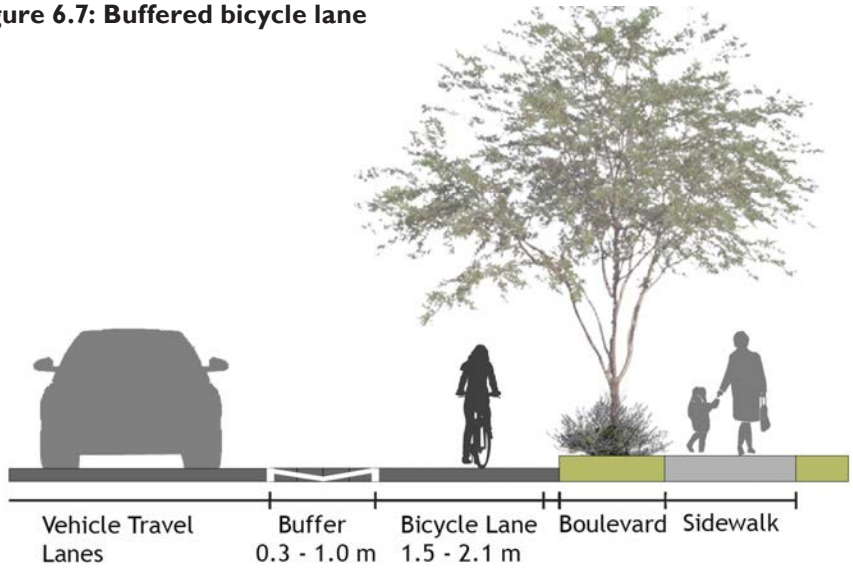
The buffer zone should be used on both the parking and travel side of the bicycle lane. This protects cyclists from the door zone of an adjacent parking lane.

On corridors on the primary network prior to the implementation of cycle tracks, wide buffered bicycle lanes could offer an opportunity for future upgrades to cycle tracks.

Buffered bicycle lanes should be enhanced with physical separations such as flexible bollards, curbs or medians.

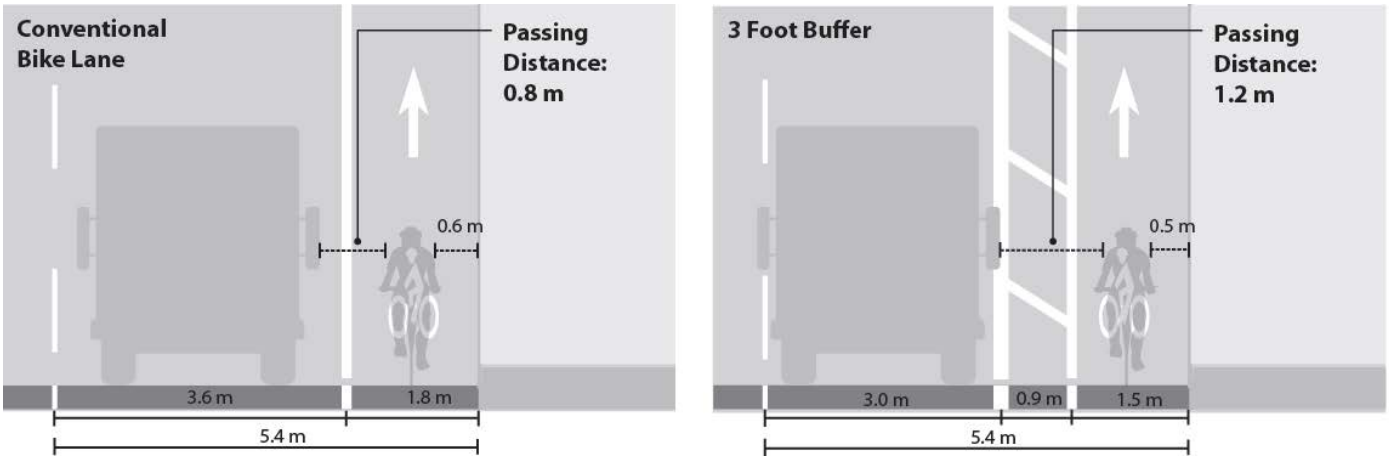
Figure 6.6: Buffered bicycle lane configurations

Figure 6.7: Buffered bicycle lane



Landscaping shown is for illustrative purposes only. *

Figure 6.8: Buffer effect on passing distance



Cycle Tracks

Cycle tracks use physical barriers from vehicles and pedestrians to offer increased safety and comfort for cyclists as shown in Figure 6.9 and 6.10.

Narrow cycle tracks of 1.5 m prevent cyclists from passing slower riders and avoiding obstacles. Thus, minimum dimensions should only be used in constrained conditions and for short distances.

Further, street-level cycle tracks are recommended over raised ones to better accommodate all types of cyclists and improve comfort and safety.

Figure 6.9: Cycle track

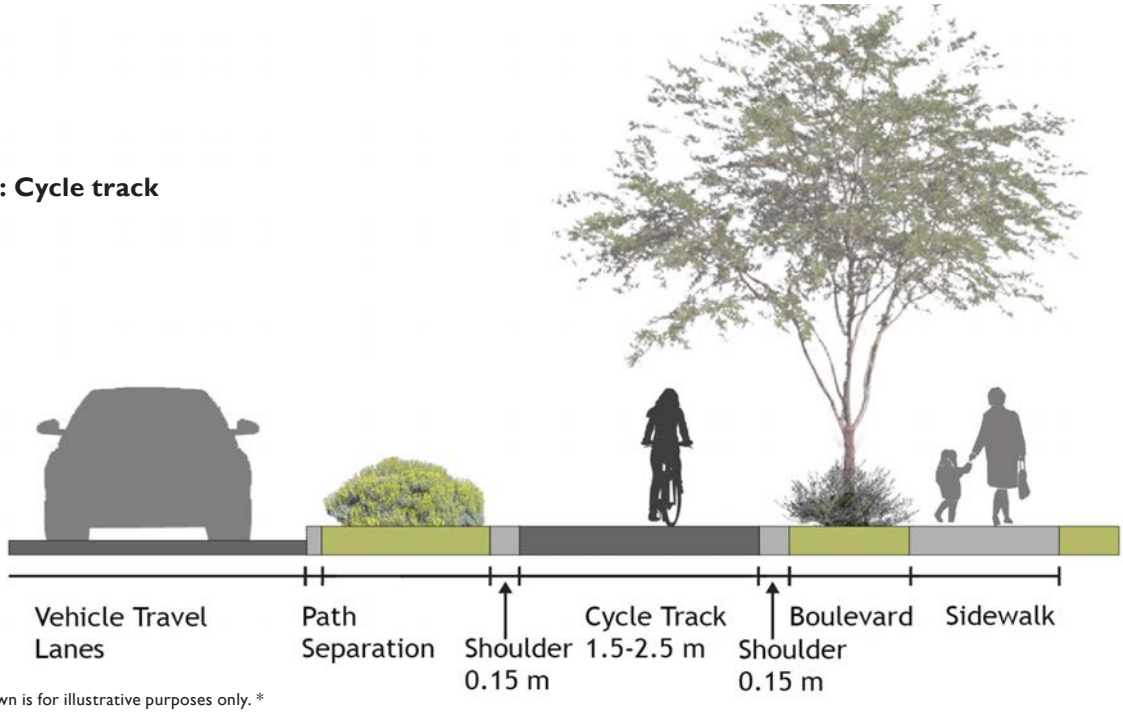


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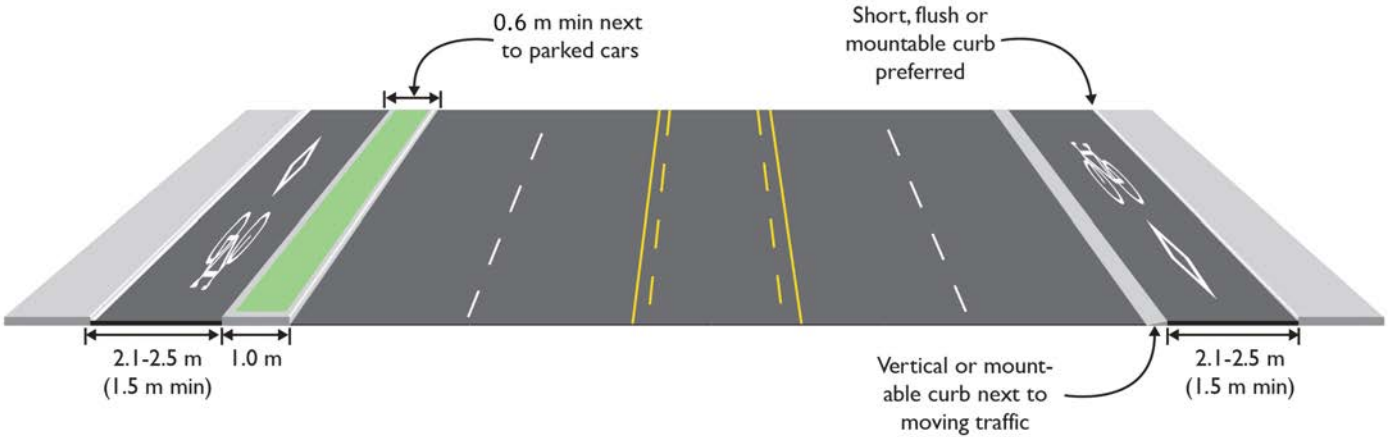
Figure 6.10: Cycle track configurations



Retrofit Cycle Tracks

Retrofit cycle track designs attempt to preserve existing sidewalks, curbs, roadside utilities, and stormwater drainage. Retrofit designs often use less durable materials (e.g. delineator posts) to reduce costs. Figures 6.11 to 6.13 illustrate various retrofit design features.

Plastic bollards can delineate while planters or curbs create a more aesthetically pleasing and more robust form of protection.

Shared Traffic Lane

Shared vehicle-bike lanes, or sharrows, are used to highlight the presence of cyclists on roadways in special circumstances. When used, they should be in the middle of the travel lane to indicate single-file movement. Side-by-side sharrows are not recommended.

Sharrows should be used in special cases only and are less preferred than a dedicated bike facility. They can be used only in retrofit situations if no suitable alternative can be found and should be combined with traffic calming measures. Inadequate road right of way due to expanding vehicular capacity cannot be excused for limiting bike facilities to sharrows.

Roads with a posted speed limit of 30 km/hr or less are suitable for sharrows as cyclists and vehicles can share the road comfortably. Roads with a posted speed limit of more than 30 km/ hour should include a dedicated bike facility, as speed differentials become hazardous. Roads will not be marked with sharrows if there is already a dedicated on or off road bike facility along the road.

Figure 6.11: Cycle track barrier design

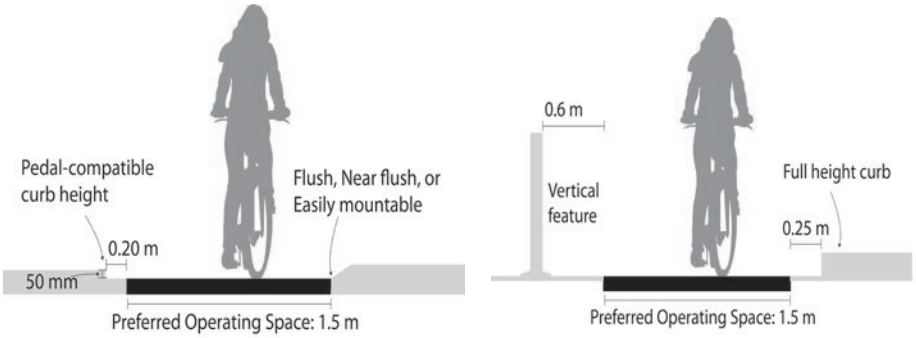
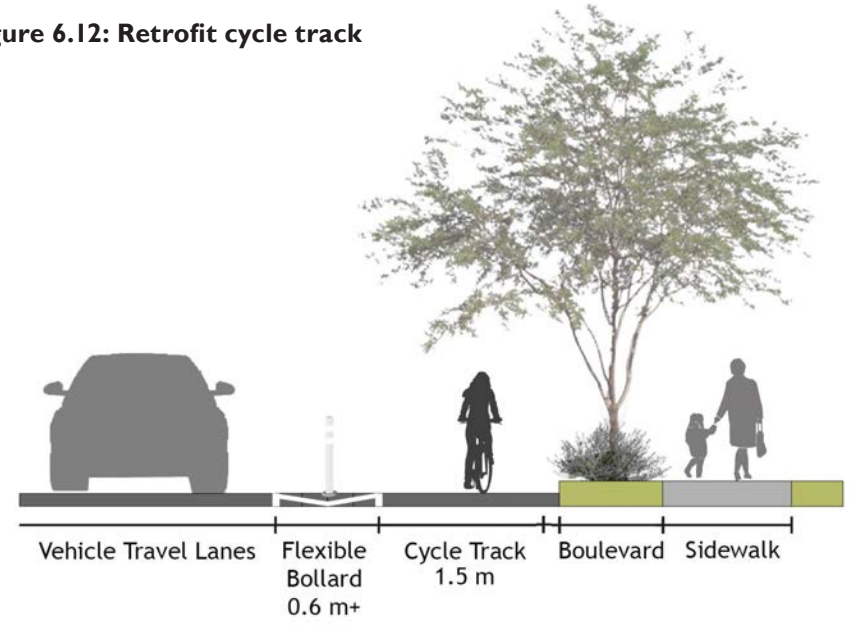
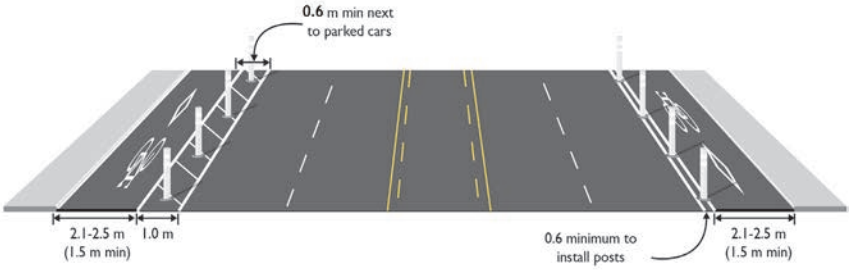


Figure 6.12: Retrofit cycle track



Landscaping shown is for illustrative purposes only. *

Figure 6.13: Retrofit cycle track configurations



6.3 Linear Parks Master Plan

The Linear Parks Master Plan was approved by Council in 2009 as an overall guide for linear parks development within the City and it helped inform the Kelowna 2030 OCP.

While this Pedestrian and Bicycle Master Plan identifies active transportation routes within road right of ways, the Linear Parks Master Plan individually describes: a detailed network of 142 predominantly off-road recreation trails for all forms of non-motorized users including equestrians and mountain bikers; prioritizes them; and, further breaks them down into a hierarchy of six trail classifications based on location, anticipated type and number of users, width, surfacing and topography.

Trails identified in the Linear Parks Master Plan connect parks and points of interest by providing access to cultural and heritage sites, and natural features e.g., creek corridors, viewpoints, rock outcroppings, lakes and ponds etc.

The Linear Parks Master Plan is a valuable resource that helps identify land for park acquisition and provides justification for dedication of public parkland and registering of statutory right-of-ways during the development application process.

The two master plan documents are complementary and contain some overlap. Of the six trail classes identified in the Linear Parks Master Plan (referred to as facility types in the Pedestrian and Cycling Master Plan), there is a potential duplication of two classes:

- The Major Urban Promenade is an off-road shared-use pathway (referred to as mulit-use trail in the Linear Parks Master Plan) typically located in waterfront parks in the downtown core.
- The Roadside Corridor is a shared-use pathway (referred to as mulit-use trail in the Linear Parks Master Plan) separated from vehicle traffic and designed for use within the road right of way. The design guidelines for the Roadside Corridor include the option of separate bicycle and pedestrian pathways, i.e. the Abbott Street Corridor

6.4 Bicycle Parking Guidelines

Adequate supply of visible, well-lit, secured and accessible parking removes a major barrier toward the ownership and use of bicycles. Bicycle parking is therefore an important supporting infrastructure for public places such as road rights-of-way and private developments.

Off-Street Private Bicycle Parking

The City of Kelowna's Zoning Bylaw No. 8000 stipulates off-street parking requirements for new developments, as well as change-in use and development expansions. The requirements are outlined in terms of dimensions, type and number of parking spaces. These are separated into two categories based on their intended function and location. These categories are:

i. Bicycle parking, CLASS I means bicycle parking that is provided for residents, students, or employees of a development. It is intended for the long term secure parking of bicycles and includes bicycle lockers, compounds or rooms specifically provided and equipped for longer term bicycle storage.

ii. Bicycle parking, CLASS II means bicycle parking that is provided for patrons or visitors of a development.

It is intended for the short term parking of bicycles and includes racks, lockers, or other structurally sound devices designed to secure one or more bicycles in an orderly fashion (recommended updates to the Zoning Bylaw found in Section 7.1).

On-Street Public Bicycle Parking

Bicycle parking demands are typically higher in Urban Centres and major activity centres such as transit stations, commercial, retail, medical, institutional, recreational uses and parks. The City should invest directly or form partnerships to deliver parking infrastructure and thereby address demands generated by the majority of existing land use that has not recently gone through the development approval process.

In theory, to promote cycling, parking supply should be proactive, publicly funded and involve minimal regulations. However, certain criteria and prioritization are necessary due to limited budget and to meet safety and functional requirements in a consistent manner.

Table 6.1 summarizes recommended criteria towards the screening and selection of potential locations for on-street parking. Such parking can be short or long term and located on the roadside boulevard, extended curbs, and along vehicle parking bays with adequate lateral and longitudinal clearance. Bike lockers can be installed based on private-sector interests and to achieve a minimum ratio of one locker per every five bike rack spaces.

Table 6.1: On-street bicycle parking needs assessment criteria

New Candidate Location	Yes	No	Criteria
	X		Urban Centre or Transit Exchange within 200 m?
	X		Demand> Supply Evident within 200 m?
	X		Nearby Street Volume >1000 ADT?
	X		Nearby Surplus Parking > 100 m?
	X		Visible/ non-obstructing?
	X		Public Space Available> 3x.6x1.8 m2?
	X		Commercial or Transit Routes>1 within 200 m?
	X		Racks<5 or Lockers<3
	X		Quailifies for on-street bicycle parking installation

6.5 Bicycle Parking Facility Types

This section summarizes various types of bicycle parking grouped into short and long term parking categories and offers guidance for design and implementation of each facility.

Short-Term Parking

Short-term bicycle parking is generally intended to be used for few hours by residents, visitors or employees to an establishment.

Sidewalk Boulevard Parking

Typical sidewalk parking frequently includes ring and post, "U", cluster, or decorative racks, allowing multiple bicycles to be locked to both sides of the rack.

Bike Corral

On-street or curb-mounted bicycle corrals minimize clutter, free up space for pedestrians and other uses and increase bicycle parking capacity at high-demand destinations. Where roadside boulevard is unavailable, on-street corrals are an efficient use of right-of-way space as 12 or more bicycles can park in two car parking spaces. Curb-mounted corrals can avoid potential conflicts with street sweeping, vehicle movement/ manoeuvering, and offer better overall design.

Temporary (Event) Parking

Temporary parking typically consists of portable racks that meet demands for an event. Racks are clustered together, providing a higher level of security and more bikes can be parked in less space. Bicycle valet parking often includes event staff to monitor the area.

Bike corral

Temporary (event) parking

FACILITY DESIGN AND MAINTENANCE

Long-Term Parking

Long-term bicycle parking areas are intended to be used all day and/or night. Primary users are employees, residents, students, or travellers leaving their bicycle at inter-modal stations, bus stops, or airports.

Bicycle Lockers

Bicycle lockers are the most secure, weather-protected, single-user-access parking type, usually by subscription, rental, or on demand. Bike locker rental is available through the City for a monthly fee at numerous locations.

Shelters

Short- and long-term bicycle parking can be accommodated with shelters for weather protection. Sheltered bicycle parking can be on public or private property.

Transit and Bicycle Parking

Kelowna recognizes that trips are increasingly multi-modal and users expect flexibility to park their bike and ride on transit buses. The City of Kelowna and BC Transit are also working to improve bicycle access and integration with transit by means of front loading bike racks on buses and incorporating short- and long-term parking at transit stations and exchanges.

Bicycle secured parking area

Transit and bicycle parking

Bicycle lockers

Transit and bicycle parking

6.6 Facility Design Guidance

This section provides guidance on the site design, layout and planning for short- and long-term bicycle parking.

Bicycle Racks

Description

Short-term bicycle parking should use approved standard racks and be placed in consistent locations.

The Association for Pedestrian and Bicycle Professionals (APBP) recommends selecting a bicycle rack that:

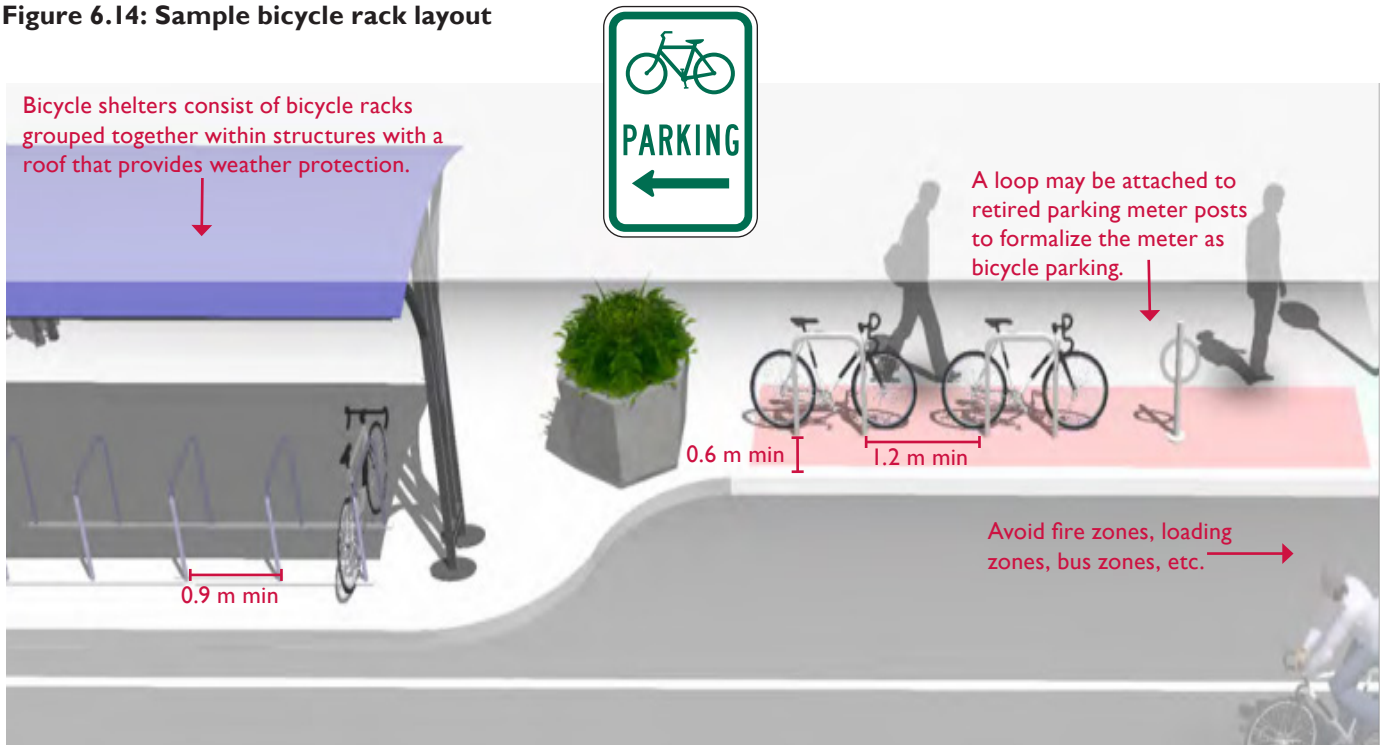
- Supports the bicycle in at least two places, preventing it from falling over;
- Allows locking of the frame and one or both wheels with a U-lock;
- Is securely anchored to ground; and
- Resists cutting, rusting and bending or deformation.

Guidance

Bicycle racks for short-term parking should be placed:

- 0.6 m minimum from the curb face to avoid 'dooring';
- Close to destinations – 15.2 m maximum distance from main building entrance; minimum clear distance of 1.8 m between the bicycle rack and the property line;
- In a location that is highly visible from adjacent bicycle routes and by pedestrian traffic; and
- Using installation site assessment criteria in Figure 6.14.

Figure 6.14: Sample bicycle rack layout



Bicycle Corrals

Description

Bicycle corrals consist of bicycle racks grouped together in a common area within the street traditionally used for vehicle parking. Bicycle corrals provide a relatively inexpensive solution to providing high-capacity bicycle parking.

Bicycle corrals can be easily implemented by converting two on-street vehicle parking spaces into a series of racks. Each vehicle parking space can be replaced with approximately 6 bicycle parking spaces.

Bicycle corrals move bicycles off the sidewalks, leaving more space for pedestrians, sidewalk café tables, and amenities and furniture.

Bicycle parking does not block sight lines and can be located in 'no-parking' zones near intersections and crosswalks.

Guidance

Guidelines for sidewalk bicycle corral placement include.

- Cyclists should have an entrance width from the roadway of 1.5 m - 1.8 m;
- Parking stalls adjacent to curb extensions are good candidates for bicycle corrals since the concrete extension serves as delimitation on one side.

Discussion

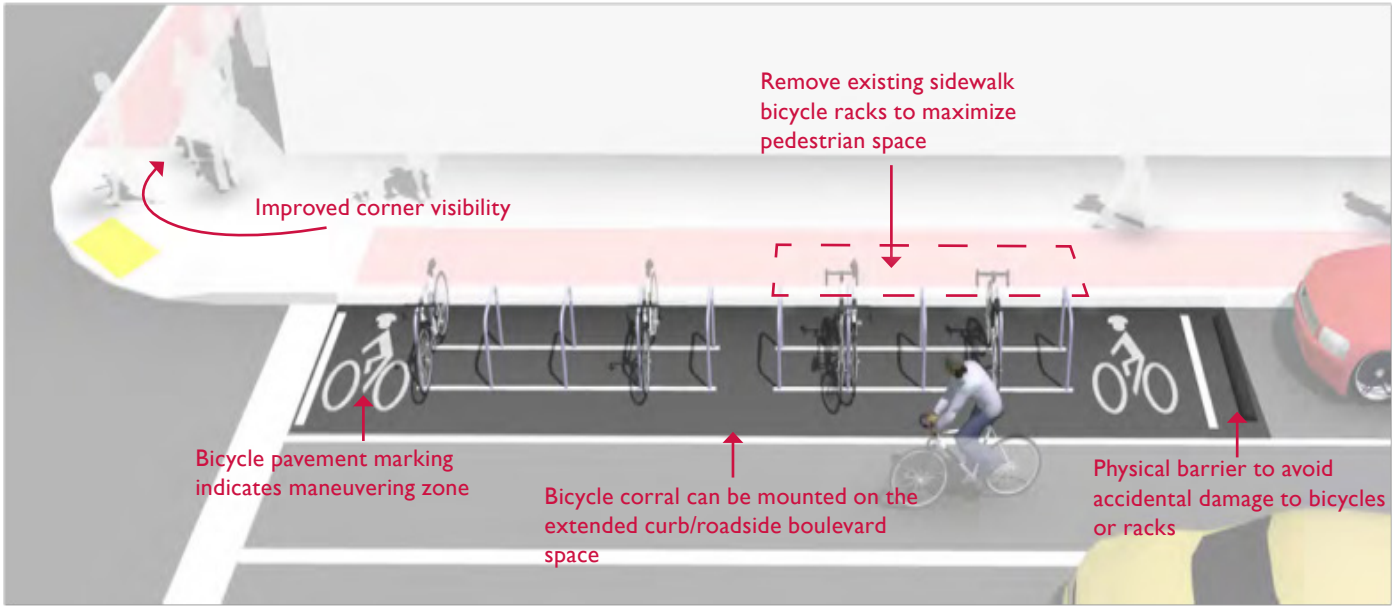
Bicycle corrals can be especially effective in areas with high bicycle parking demand or along street frontages with narrow sidewalks where parked bicycles would be detrimental to the pedestrian environment.

Kelowna has installed a bike corral on Water Street at Cawston Avenue.

Materials and Maintenance

Physical barriers may obstruct drainage and collect debris if installed on street. Establish a maintenance agreement with neighboring businesses.

Figure 6.15: Sample bicycle corral layout



Bicycle Lockers

Description

Bicycle lockers provide space to store accessories or rain gear in addition to containing the bicycle. Some lockers allow access to two users—a partition separating the two bicycles can help users feel their bike is secure. Lockers can also be stacked, reducing the footprint of the area, although that makes them more difficult to use.

Guidance

Bicycle lockers should have the following minimum dimensions:

- Width (opening) 1.76 m; height 1.2 m; depth 1.8 m;
- 1.2 m side clearance and 1.8 m end clearance;
- 2.1 m minimum distance between facing lockers;
- Should allow visibility and inspection of contents for safety and security; and
- Control access by a key or access code.

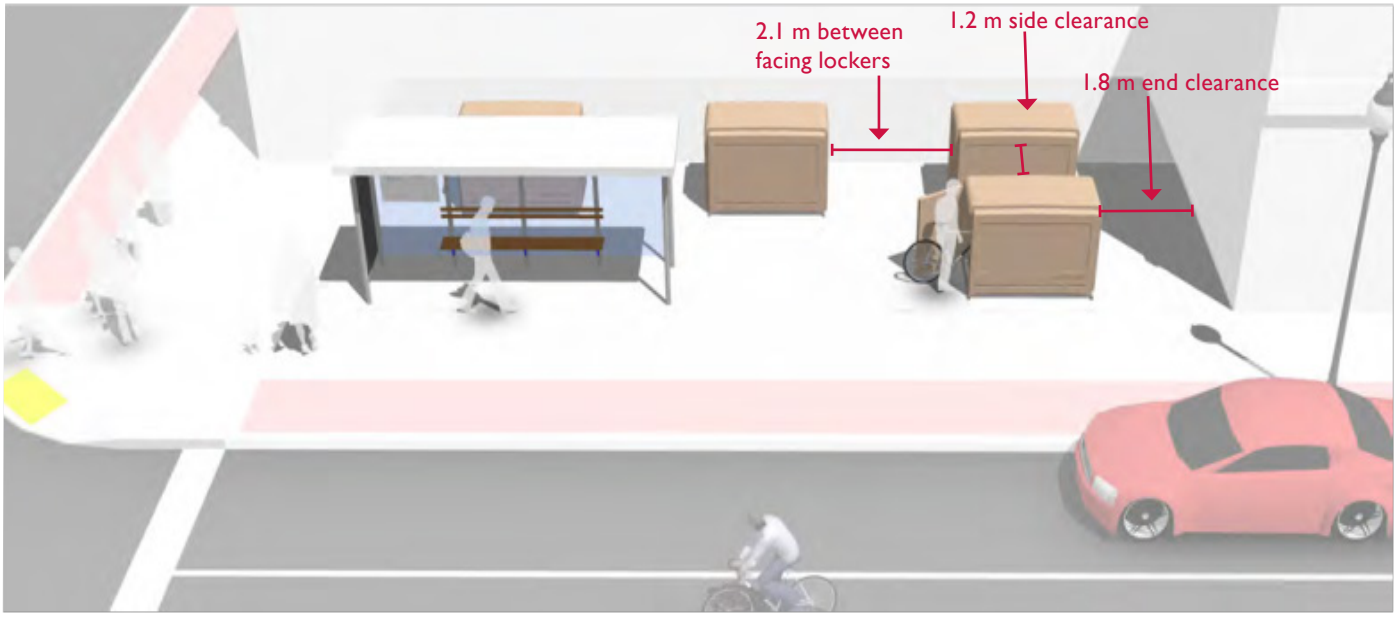
Discussion

Although many bicycle commuters would be willing to pay a nominal fee to guarantee better safety of their bicycle, long-term bicycle parking should be free wherever vehicle parking is free and to promote cycling.

Potential locations for long-term bicycle parking include transit stations, major institutions where people use their bikes for commuting, and on site facilities are not available.

Kelowna has installed a number of bike lockers that are available to rent monthly throughout Downtown.

Figure 6.16: Sample bicycle locker layout



Secure Parking Areas

Description

A Secure Parking Area (SPA) for bicycles, also known as a Bike SPA or Bike & Ride (when located at transit stations), is a semi-enclosed space that offers a higher level of security than ordinary bike racks.

Accessible via key-card, combination locks, or keys, BikeSPAs provide high-capacity parking for 10 to 100 or more bicycles.

Increased security measures create an alternative transportation option for users whose biggest concern is theft and vulnerability.

Guidance

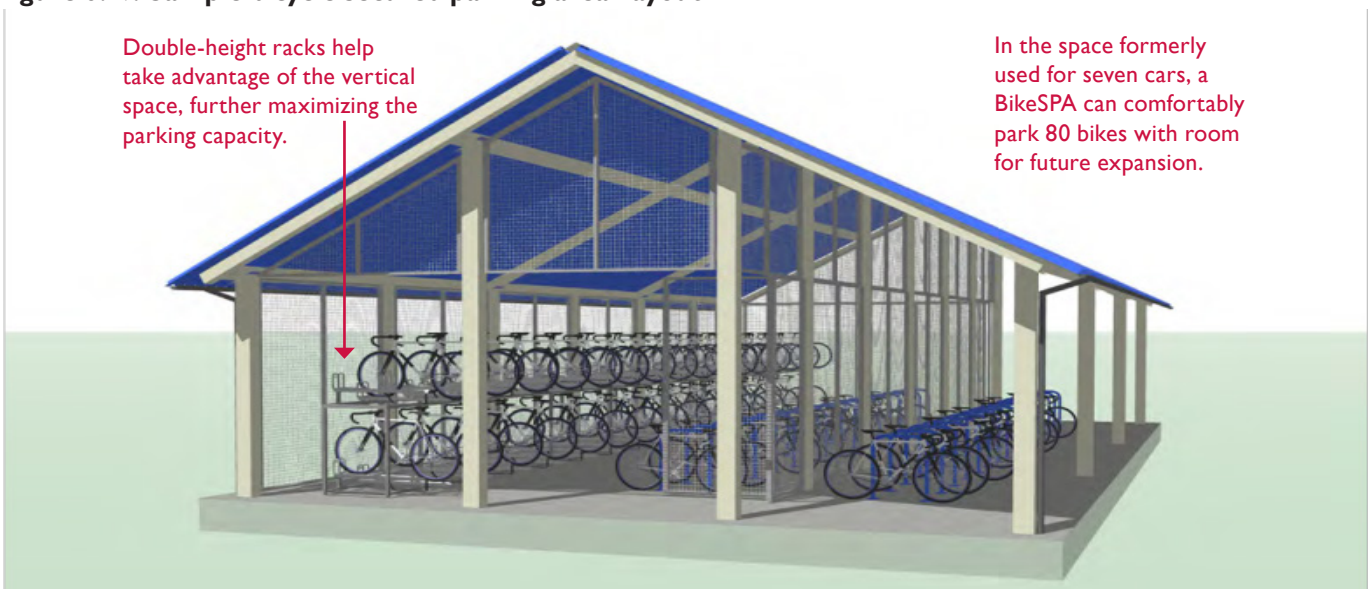
Key features of a SPA may include:

- Closed-circuit television monitoring;
- Double high racks and cargo bike spaces;
- Bike repair station with bench;
- Bike tube and maintenance item vending machine;
- Bike lock "hitching post" – allows people to leave bike locks; and
- Secure access for users.

Discussion

BikeSPAs are ideal for transit centres, parkades, airports, institutions, City Park, or wherever large numbers of people might arrive by bicycle and need a secure place to park while away.

Figure 6.17: Sample bicycle secured parking area layout



6.7 Active Transportation Facility Maintenance

A well maintained active transportation network can provide many benefits that include:

- Improved safety;
- A positive user experience to cause behaviour change;
- Protection of investment in infrastructure; and
- Ensured compliance to policies, standards, and regulations.

The City of Kelowna's current Road Maintenance Policy includes road cleaning and sweeping between March and May, weather permitting. Bike lanes are swept in conjunction with the road network, and sidewalk construction and maintenance is inspected in the spring and repaired, as needed.

Residents are also expected to complete their responsibilities. The current Maintenance of Boulevards by the Owners of Lands Abutting Thereon Bylaw 10425 outlines adjacent homeowners' responsibilities in maintaining sidewalks and boulevards.

To keep pace with the expansion of the active transportation network additiional maintenance funding will be necessary over time.

Design Considerations

Maintenance requirements need to be captured in pedestrian and bicycle facility design. The design affects ongoing maintenance procedures and costs. Key design considerations include:

- What equipment and crew capabilities are needed?
- How will maintenance or service vehicles access the facility?
- Are supportive features, such as lighting, signs, irrigation, information kiosks, water fountains, and garbage receptacles, located and designed to allow for maintenance and operation?

Maintenance Procedures

Maintenance of pedestrian and bicycle facilities require specific procedures, priorities, schedules, and budget. Maintenance activities are generally classified as either routine maintenance or remedial maintenance.

- Routine maintenance refers to day-to-day and scheduled tasks, including garbage and debris removal, sweeping, sign replacement, marking, landscaping, etc. Routine maintenance also includes minor repairs and replacement such as sealing cracks and potholes.
- Remedial maintenance involves tasks that are of a larger scale, and are required less frequently, such as resurfacing or minor replacement. Some items ("minor repairs") may occur on a five to ten year cycle such as repainting, seal coating asphalt Anticipating and budgeting for these expenses can be critical to ensure facilities meet user needs and expectations and to avoid significant costs in deferred maintenance.
- Major reconstruction items occur at the end of service life and are part of long-term capital plans.
- Regular bicycle facility maintenance includes sweeping, maintaining a smooth roadway and ensuring that the gutter-to-pavement transition remains relatively flat. Pavement overlays are a good opportunity to improve bicycle facilities. The following recommendations provide options to consider to enhance a maintenance regimen.

Sweeping

Description

The City has a fleet of sweeping equipment for sidewalks. Sidewalks, cycle tracks and shared-use pathways are swept once per year, whereas bike lanes are swept 10 times per year as part of regular road sweeping.

Cyclists often avoid shoulders and bike lanes filled with gravel, broken glass and other debris; they will ride in the vehicle lanes to avoid these hazards, potentially causing conflicts with motorists. Debris from the roadway should not be swept onto sidewalks, nor should debris be swept from the sidewalk onto a designated cycling facility. A regularly scheduled inspection and maintenance program helps ensure that roadway debris is regularly picked up or swept.

Guidance

- Work to establish priority cycling routes for street sweeping taking into account operational conditions.
- Sweep walkways and bikeways whenever there is an accumulation of debris on the facility.
- In curbed sections, sweepers should pick up debris; on open shoulders, debris can be swept onto gravel shoulders.
- Pave gravel driveway approaches to minimize loose gravel on paved roadway shoulders.
- Perform sweeping in the spring to remove debris from the winter. Consideration should be given for additional sweeping on priority routes to enhance user safety.
- Perform sweeping in the fall in areas where leaves accumulate.

Signage and Marking

Description

Bike lanes, shared shoulders, transportation corridors and paths all have different signage types for wayfinding and regulations. Such signage is vulnerable to damage, vandalism or wear, and requires periodic maintenance and replacement.

Guidance

- Bike lane markings can be renewed at the time of road resurfacing which will also create an opportunity to improve the design. Consideration should be given for additional repairing of lines on priority routes to enhance user safety.
- To discourage wrong way movement, and to guide cyclists in the intended direction, directional arrows should be considered as per Bikeway Traffic Control Guidelines for Canada (TAC).
- Create a Maintenance Management Plan.

Roadway Surface

Description

Bicycles are much more sensitive to subtle changes in roadway surface than motor vehicles. Various materials are used to pave roadways, and some are smoother than others. Compaction is also an important issue after trenches and other construction holes are filled. Uneven settlement after trenching can affect the roadway surface nearest the curb where bicycles travel.

Sometimes compaction is not achieved to a satisfactory level, and an uneven pavement surface can result due to settling over the course of days or weeks. When resurfacing streets, use the smallest chip size and ensure that the surface is as smooth as possible to improve safety and comfort for cyclists.

Guidance

- Conduct inspections and maintain a smooth pothole-free surface.
- In order to improve safety, amend design standards in the Subdivision and Servicing Bylaw so there is a smooth transition and minimize the vertical drop.
- Maintain pavement so ridge buildup does not occur at the gutter-to-pavement transition or adjacent to railway crossings.
- Inspect the pavement 2 to 4 months after trenching construction activities are completed to check that excessive settlement has not occurred.
- If chip sealing is to be performed, use the smallest possible chip on bike lanes and shoulders. Sweep loose chips regularly following application.
- During chip seal maintenance projects, if the pavement condition of the bike lane is satisfactory, it may be appropriate to chip seal the travel lanes only. However, use caution when doing this so as not to create an unacceptable ridge between the bike lane and travel lane.

Pavement Overlays

Description

Pavement overlays present good opportunities to improve conditions for cyclists if done carefully. A ridge should not be left in the area where cyclists ride (this occurs where an overlay extends part-way into a shoulder bikeway or bike lane). Overlay projects also offer opportunities to widen a roadway, add bike lanes, or re-stripe a roadway to widen/improve bike lanes.

Guidance

- Extend the overlay over the entire roadway surface to avoid leaving an abrupt edge.
- If the shoulder or bike lane pavement is of good quality, it may be appropriate to end the overlay at the shoulder or bike lane stripe provided no abrupt ridge remains.
- Ensure that inlet grates, manhole and valve covers are flush with the finished pavement surface and are made or treated with slip resistant materials.
- Move valve or manhole covers where possible away from bike lanes, preferably in boulevards or sidewalks. Where this is not possible, covers and lids should be flush with the surface.

Drainage Grates

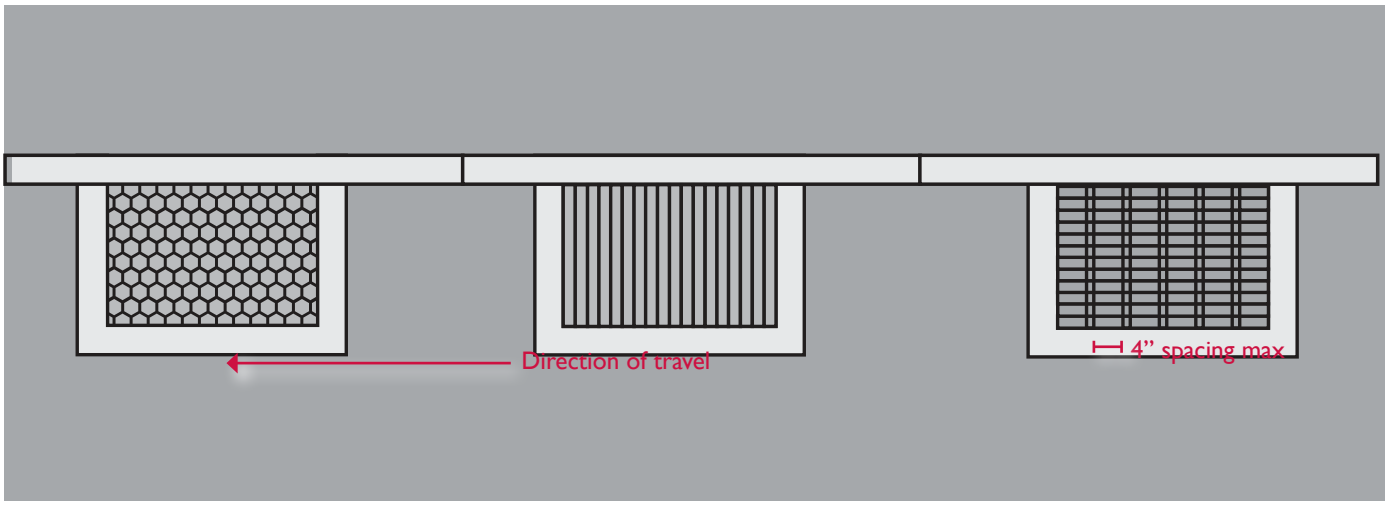
Description

Drainage grates are typically located on catch basins in the gutter area near the curb of a roadway. Drainage grates have slots through which water drains into the municipal storm sewer system. Many older grates were designed with linear parallel bars spread wide enough that the front tire of a bicycle could become caught in the slot and create a tripping hazard. This would cause the cyclist to tumble and sustain potentially serious injuries.

Guidance

- Install grates that have horizontal slats on them so that bicycle tires and assistive devices do not fall through the vertical slats, as illustrated in Figure 6.18.
- Replace hazardous grates – temporary modifications such as installing rebar horizontally across the grate is not an acceptable alternative to replacement.
- Review Bylaw 7900 Subdivision and Servicing to include more bicycle friendly catch basin grates.

Figure 6.18: Drainage grate examples



Gutter to Pavement Transition

Description

On streets with concrete curbs and gutters, 0.3 metre of the curbside area typically includes the gutter pan, where water collects and drains into catch basins. On many streets, the bike lane is situated near the transition between the gutter pan and the pavement edge. This transition can be susceptible to erosion, creating potholes and a rough surface for travel.

The pavement on many streets is not flush with the gutter, creating a vertical transition between these segments. This area can buckle over time, creating a hazardous condition for cyclists.

Guidance

- Ensure that gutter-to-pavement transitions have no more than a two cm vertical transition.
- Examine pavement transitions during every roadway project for new construction, maintenance activities, and construction project activities that occur in streets.
- Inspect the pavement 2 to 4 months after trenching construction activities are completed to ensure that excessive settlement has not occurred.
- Provide at least 0.9 m of pavement outside of the gutter seam.

Landscaping

Description

Bike lanes and sidewalks can become inaccessible due to overgrown vegetation. All landscaping needs to be designed and maintained to ensure compatibility with the use of the bikeways.

Guidance

- Ensure that shoulder plants do not hang into or impede passage along bikeways and sidewalks
- After major damage incidents, remove fallen trees or other debris as quickly as possible

Traffic Management Plan

Description

Cyclists need accommodation during construction and maintenance activities when bike lanes may be closed or unavailable. Users must be warned of bike lane closures and given adequate detour information to bypass the closed section. Users should be warned through the use of standard signing approaching each affected section (e.g., "Bike Lane Closed," "Trail Closed"), including information on alternate routes and dates of closure. Alternate routes should provide reasonable directness, equivalent traffic characteristics, and be signed.

Although much of the maintenance required for on-street bike lanes can be seamlessly incorporated into present roadway maintenance activities, there may be additional costs to ensure that facilities remain safe and accessible. Table 6.2 describes maintenance costs for bicycle and pedestrian facilities recommended in this Plan. These costs should be included in the annual budget and financial plan to achieve a balanced transportation system.

Guidance

- Enforce speed limits and other rules of the road
- Provide temporary advance construction signs to warn of work zones within bicycle or pedestrian facilities
- Plan detours to ensure safe passage by cyclists and pedestrians
- Follow temporary traffic control measures defined in the Manual of Uniform Traffic Control Devices ("MUTCD")

Table 6.2: Maintenance cost estimates

Maintenance Activity	Unit Cost (2015)	Notes
Ongoing regular maintenance	$2,000 to $12,500 per km/year	Maintenance of landscaped boulevards including mowing, irrigation, fertilization and turf care, pruning and weeding of shrub beds, tree pruning, pest management, and litter removal. Costs vary according to the level of landscaping, e.g. hard surfacing and trees, versus more extensive lawn, trees and shrubs.
Line painting (non-intersection)	$2,000 per km/year	Repainting lane stripes and stencils, sign replacement as needed
Line painting (intersections)	$1,500 / year / intersection	
Street lighting maintenance	$2,500 per km/year	This includes electricity costs and maintenance and repair costs.
Traffic signal maintenance	$300 per location per year	Maintenance for signal head and pushbuttons
Snow and Ice Control	$3,900 per km/year	Refers to primary network only
Sweeping and flushing	$400 per km/year	Refers to primary network only
Additional equipment	$200,000 / 12 km of network growth	
Eco-counters	$300/location	Based on battery life

Snow and Ice Removal

The City of Kelowna maintains approximately 815 centre line kilometres of roadway (centre line road length represents the length of the road corridor and does not include the combined length of various lanes). Plowing and sanding takes place on a priority basis with major routes receiving first priority. Bike lanes are either cleared as the same level of service as adjacent roadway or are used as snow storage. Additional resources will be required to prioritize maintenance on new cycle tracks or shared-use pathways so that these primary facilities receive higher priority than local roads.

Guidance

- Plan bike facilities with sufficient right-of-way to accommodate unimpeded travel, snow removal vehicles, and storage space for snow. Buffered bike lanes and cycle tracks have the advantage of allowing for additional vehicle access and storage space.
- Where roadways are plowed, sidewalks should be kept free and clear of snow debris to the extent possible. Curb ramps and landings, crosswalks and refuge islands must be kept clear so as not to impede safe pedestrian movements.
- During snow event, on-street parking may be used for snow storage to keep bike lanes clear.
- Investment in smaller, more specialized snow removal equipment will allow for better access to newer active transportation facilities. Due to smaller size, the equipment has better maneuverability, and may also be used for clearing sidewalks.
- A prioritization schedule for snow removal is necessary and should focus on primary corridors and destinations that serve the highest volume of cyclists. Council Policy 332: Snow and Ice Control should be updated to include primary active transportation corridors for snow and ice control. Where feasible, snow storage will be kept to the roadside boulevard.

6.8 Summary of Facility Maintenance Recommendations

Maintenance of the active transportation network is vital to ensure user safety, comfort and accessibility. To keep pace with the expansion of the network, additional maintenance funding will be necessary over time as capital improvements are approved.

Table 6.3: Recommended pedestrian and bicycle facility maintenance activities

Maintenance Activity	Current Activity	Recommended Frequency
Inspections		Seasonal – at beginning and end of Summer
Curb/gutter sweeping/blowing	Twice per year	As needed, with higher frequency in the early Spring and Fall
Bike lane sweeping/blowing	10 times per year	Higher frequency in Spring and Fall, whenever there is accumulation
		Work to establish priority cycling routes for street sweeping taking into account operational conditions.
Sidewalk sweeping/blowing	Once per year (spring)	Higher frequency in Spring and Fall, whenever there is accumulation
Multi-use path sweeping/blowing	Once per year	Spring and Fall, whenever there is accumulation
Pavement sealing		5 - 15 years
Pothole repair	As needed	1 week – 1 month after report
Culvert inspection	After winter	Before Winter and after major storms
Drainage grate inspection	Annual	Before Winter and after major storms
Pavement markings replacement	As needed	As needed
Signage replacement	As needed	As needed
Shoulder plant trimming (weeds, trees, brambles)	2 - 3 times per year	Twice a year; middle of growing season and early Fall
Roadside mowing (weeds, rough grass, brambles)	Once per year	1 - 3 years
Tree trimming		Once every 2 - 9 years, depending on tree age and species
Shrub pruning		Once per year
Major damage response (washouts, fallen trees, flooding)	As needed	As soon as possible
Snow/Ice removal bicycle lanes/ facilities	Used for snow storage	Update Council Policy 332, Snow and Ice Control, to include primary active transportation corridors for snow and ice control. Where feasible snow storage will be kept to the roadside boulevard.

CHAPTER 7: BYLAW AND POLICY MEASURES

The City of Kelowna civic bylaws are intended to keep Kelowna safe, healthy and operational. Updated bylaws and policies are necessary to improve conditions for walking and cycling. Based on best practices, the recommended updates would ensure important new bicycle amenities such as bicycle parking and end-of-trip facilities are in place. The updates will allow other users, such as skaters and skateboarders, to utilize sidewalks and shared-use pathways. Finally, significant updates to road cross-section designs are recommended to better accommodate pedestrian and bicycle access. It is also important to ensure proper enforcement of these bylaws and regulations. The existing and proposed regulatory changes require enforcement for greater success.

7.1 Zoning Bylaw No. 8000

The City's Zoning Bylaw No. 8000 regulates land use and development. Implementing recommended updates will help support bicycle parking and end of trip facilities as summarized in Table 7.1.

Table 7.1: Zoning bylaw recommended updates

Section	Topic	Recommendation
8.4	Off-Street Bicycle Parking	Update section 8.4 to increase the number of Class I (long-term) and Class II (short-term) bicycle parking spaces required in educational institutions as outlined in Table 7.1(a). Review table 8.3 of Zoning Bylaw and update bicycle parking requirements for commercial and industrial zones based on best practices.
8.1.11	Parking space size requirements	Amend section 8.1.11 to include a provision enabling the conversion or substitution of bicycle parking for Full Size Vehicle Parking, at a ratio of five bicycle spaces per Full Size Vehicle Parking space.
13, 14, 15, 16, 17, 18	End of Trip Facilities	Create an end-of-trip facility regulation for commercial, industrial, institutional, or other developments, with a requirement for change rooms. Updates to the Development Permit guidelines (OCP) and the corresponding requirements in the Building Bylaw may also be required to be consistent with and align to the Zoning Bylaw updates.

Rails-with-Trails shared-use pathway

Bicycle parking

Cyclists need a safe and accessible place to secure their bicycle after reaching their destination.

The Zoning Bylaw (sections 8.4.6 to 8.4.10) contains development standards that outline location, accessibility and dimension requirements for off-street bicycle parking to meet these needs. Bicycle parking spaces are regulated in Section 8.4 of the Bylaw. The Class I (long- term) and Class II (short-term) parking requirements are based on development type and land use.

Based on the current best practice examples the current requirements at educational institutions could be enhanced, as per best practices in Table 7.1(a) to account for school staff and to more accurately meet the current and anticipated demand.

Table 7.1(a): Recommended bicycle parking requirements for educational institutions

Type of Activity	Long-Term Bicycle Parking Requirement	Short-Term Bicycle Parking Requirement
Education		
a) Public, parochial, and private day-care centers for 15 or more children	1 space for each 10 employees, min. 2 spaces	1 space for each 10 students of planned capacity, minimum 2 spaces
b) Public, parochial and private nursery schools, kindergartens, and elementary schools (1-3)	1 space for each 10 employees, min. 2 spaces	1 space for each 10 students of planned capacity, minimum 2 spaces
c) Public, parochial and elementary (4-6) public and high schools	1 space for each 10 employees, plus 1 space for each 10 students or planned capacity, min. 2 spaces	1 space for each 10 students of planned capacity, minimum 2 spaces
d) Colleges and universities	1 space for each 10 employees, plus 1 space for each 10 students planned capacity; or 1 space for each 20,000 s.f. of floor area, whichever is greater	1 space for each 10 students of planned capacity, minimum 2 spaces

Adapted from Association of Pedestrian and Bicycle Professionals (2010)

Best Practice Example:

The City of Victoria Bicycle Parking Strategy outlines parking requirements that are slightly more stringent than Kelowna's. For example, at educational institutions, Kelowna requires 2.5 long-term spaces per classroom and 0.1 short-term spaces per classroom. The City of Victoria requires one space per five to ten students and one space per ten employees.

End-of-trip Facilities

In addition to bicycle parking, other end-of-trip facilities, such as showers, lockers and change rooms are important supportive infrastructure for cyclists and pedestrians. The City of Kelowna has no such end-of-trip facility requirement. These should be included in the development and zoning regulations similar to parking requirements. Parking bylaw incentives can be offered in the form of reducing the required number of vehicle parking spaces in new developments when adequate end-of-trip facilities and bicycle parking are provided.

Best Practice Examples:

- UBC Okanagan promotes campus locations for shower or change rooms.
- The District of Saanich's OCP encourages change and shower facilities in commercial, institutional, public, recreational, and multi-family residential buildings.
- Vancouver's Building Bylaw specifies a certain number of shower and change rooms based on the number of long-term bicycle parking spaces and employment areas (see Table 7.1(b).
- Toronto's Green Building Development Standard for mid-to-high-rise residence, commercial, industrial, and institutional developments require one facility per gender for every 30 bicycle parking spaces.
- The City of Coquitlam Transit-Oriented Development Strategy includes the provision of end-of-trip facilities in new office and retail developments.

Table 7.1(b): Vancouver shower/change rooms (Vancouver, 2003)

Required Long-Term Bike Spaces	Minimum Number for Each Sex		
	Water Closets	Wash Basins	Showers
0-3	0	0	0
4-29	1	1	1
30-64	2	1	2
65-94	3	2	3
95-129	4	2	4
130-159	5	3	5
160-194	6	3	6
Over 194	6 plus one for each additional 30 bike spaces or part thereof	3 plus one for each additional 30 bike spaces or part thereof	6 plus one for each additional 30 bike spaces or part therof

7.2 Payment in Lieu of Parking Bylaw No. 8125

The Payment in Lieu of Parking Bylaw No. 8125 permits land owners within the Urban Centres to pay a lump sum amount in lieu of providing off-street parking spaces required under the Zoning Bylaw.

According to section 8.5.3 of the Zoning Bylaw, Council can direct the disposition of funds deposited into the reserve fund. Updates to the Payment in Lieu Bylaw in conjunction with Zoning Bylaw revisions could create additional reserve funds for active transportation infrastructure in Urban Centres.

Best Practice Example:

The City of New Westminster updated the parking in-lieu provision of their Zoning Bylaw and added a complementary bylaw called the Parking Cash in-Lieu Reserve Fund Bylaw to create an Alternative Transportation Reserve Fund for the revenue generated from the cash in-lieu policy. The revenue in the Reserve Fund is allocated for infrastructure projects that support public transit, walking and cycling. Further, the City increased the cash in-lieu amount to reflect the actual construction costs for parking.

Table 7.2: Payment in lieu parking bylaw recommended updates

Section	Topic	Recommendation
Schedule A	Cost per parking stall	Update schedule with increased cash amounts per parking space.

7.3 Building Bylaw No. 7245

The Building Bylaw sets out regulations regarding the construction, alteration, repair, or demolition of buildings and structures. Updates to the Building Bylaw can require end of trip facilities providing more amenities for people using active transportation.

Potential incentives to encourage end of trip facilities in existing buildings include:

- Grants – that use a specific fund to share the costs of end-of-trip facilities. Kelowna's Cost-Shared Bike Rack Program, for example, allows businesses to apply for a fifty per cent reduction in purchase and installation price for high-quality bike rack.
- Recognition/Awards – that recognize initiatives such as bike- friendly businesses.

Table 7.3 Building bylaw recommended updates

Section	Topic	Recommendation
	End of Trip Facilities	Create an end-of-trip facility regulation for commercial, industrial, institutional, or other developments, with a requirement for change rooms. This is to be done in conjunction with Zoning Bylaw updates.

7.4 Official Community Plan Updates

The Urban Design Development Permit Guidelines in Chapter 14 of Kelowna's Official Community Plan provide design guidelines with respect to site layout, building form and character and landscaping. These DPs apply to commercial, industrial, multi-family and mixed use developments and updates could provide an opportunity to incorporate end of trip facilities.

Table 7.4 Official Community Plan recommended updates

Section	Topic	Recommendation
Chapter 14	Urban Design DP Guidelines	Regulations can be a stronger mechanism to require the inclusion of indoor secure bike parking, lockers, or shower facilities. This is done in conjunction with Zoning and Building Bylaw updates. The City of Vancouver provides an example of best practice for shower/change room provisions as illustrated in Table 7.1(b)

7.5 Traffic Bylaw No. 8120

The Province of British Columbia's Motor Vehicle Act regulates the operation of all motor vehicles, cycles, and pedestrians on all roadways.

The City of Kelowna's Traffic Bylaw No. 8120 provides additional Bylaws to complement the provincial laws within the municipal jurisdiction to ensure the safety of all road users including pedestrians, bicycles, and other users (e.g. inline skates) on the City streets. Some updates to the Traffic Bylaw is required to better support walking, cycling, and other modes of active transportation.

Snow and Rubbish Removal

The Traffic Bylaw Part 2 General Regulations Section 2.5 Snow and Rubbish Removal outlines the regulations associated with property owners' responsibility to remove snow, ice, or rubbish from the adjacent sidewalks or walkways within 24 hours of accumulation and these standards are consistent with best practices. The bylaw also lists properties that are exempt from this provision. Maintenance of pedestrian and bicycle facilities is further discussed in Appendix D.

Cycling Regulations

Section 9.1.2 of the Traffic Bylaw states that no person shall cycle on the sidewalk unless directed by a traffic control device, the individual is under the age of 12 years, and is operating a "non- chain-driven 3- or 4-wheeled cycle which is designed for recreational use." Research indicates that cycling on the sidewalk is generally less safe than cycling on the roadway and could affect the safety of pedestrians. Many municipalities, however, allow children under a specified age to cycle on the sidewalk as roadways are intimidating and possibly unsafe for young, inexperienced cyclists.

As most bicycles for children above the age of 3 are either a) chain-driven and two-wheeled or b) non chain driven and two-wheeled, it is recommended the bylaw be amended to remove the "non-chain driven 3 or 4 wheeled bicycle." It is anticipated that allowing younger children to cycle on the sidewalk will be supported by parents and better serve children in Kelowna.

Table 7.5 Traffic bylaw recommended updates

Section	Topic	Recommendation
9.1.2(a)	Cyclist Duties	Remove the specified non-chain-driven 3 or 4 wheeled bicycles.
9.1.7 (a), (b), (d)	In-line skates, roller skates	Add text to allow users of skates, skateboards and recreation scooters to use sidewalks, bicycle facilities, and shared-use paths, with minor or minimal restrictions. Recreation scooters include all low-powered motorized vehiclues (50cc engine displacement or 1.5kw motor rating or less) such as limited-speed motorcycles, mopeds, small motor scooters, electric motor-assisted cycles, pocket bikes, motorized skateboards, self-balancing boards, motorized wheelchairs, etc. that have a maximum speed of 32km/h.

Best Practice Example:

The City of Calgary, Traffic Bylaw 42.2(d) Use of Sidewalks states that a person may ride a bicycle on a sidewalk if they propel a child's bicycle operated by a person under the age of 14 years.

The District of Saanich Street and Traffic Bylaw Section 8.16 indicates a person may ride on any sidewalk that has been designated and marked for the use of bicycles, notwithstanding the Motor Vehicle Act.

Inline Skates, Roller Blades

Traffic Bylaw section 9.1.7 does not allow skaters on the sidewalk unless directed by a traffic control device. Further, the bylaw states in-line skaters shall use a bike lane if one is present on the roadway.

Peer jurisdictions have customized approaches to skate and skateboard access as summarized in Table 7.6. Bylaw regulations typically state whether skate and skateboard users may use sidewalks, bike lanes and general purpose roadways and specify restrictions on the basis of topography.

While in-line skates or roller blades have a sweep width suitable for bike lanes, the speed at which skaters travel tends to be less than cycling speed, and is a consideration for allowing them in bicycle facilities over pedestrian facilities.

Restrictions on skaters will need to be carefully considered as town centres, urban centres, and villages are often key destinations and restricting use to in popular locations will run counter to the goals of encouraging sustainable modes of travel.

Considered as modes of active transportation, skateboards, in-line skates, roller skates, and scooters should be supported. Updates to the Traffic Bylaw should be made to allow for wheeled devices on sidewalks, paths and bicycle facilities. Education and enforcement efforts could support changes to the bylaw to reduce anticipated user conflicts.

Table 7.6: Inter-municipal policy comparison: skate and skateboard access

Location	Source	Sidewalk	Bike Lane	Road	Restrictions
West Kelowna	Traffic Bylaw B0092	No	Yes	Yes	• On sidewalks unless directed • Must ride on right if no bike lane
Kamloops	By-law No. 23-63	Yes	Yes	Yes	• On arterial, collector roads • On steep roads, steep sidewalks • In town centres
Victoria	Streets and Traffic Bylaw 09-079	No	No	Yes	• On sidewalks • On designated streets only
North Vancouver	Bylaw No. 8335	Yes	Yes	Yes	• On steep roads, steep sidewalks • On roads with speeds over 50 km
Calgary	Bylaw No. 26M96	Yes	Yes	Yes	• In town centres • To a max speed of 20 km
Chilliwack	Bylaw No. 3023	Yes	Yes	Yes	• On designated streets only
Winnipeg	Traffic Bylaw 1573/77	Yes	No	No	• Only for "Transportation"

7.6 Subdivision, Development and Servicing Bylaw No. 7900

The Subdivision, Development & Servicing Bylaw No. 7900 establishes standards and regulations for works and services, and sets out application procedures in connection with the subdivision and development of land within the City. Recommended updates are primarily for the standard road cross-sections outlined in the bylaw.

These cross-sections represent standardized approaches to various street classifications. The designs presented herein are intended to inform the design of new and existing roadways, both for City-funded projects and improvements funded through developer contributions. Appendix D reviews the cross sections in relation to recommended facility design and selection.

Minimum Widths

Minimum widths for standard street elements - sidewalk, boulevard, bike lane and median - are described in Table 7.8.

These minimums are applicable to all street classifications referenced in this chapter. Preferred dimensions are provided on a case-by-case basis. Generally speaking, the widths and level of separation required for active transportation facilities increase on street classifications associated with higher motor vehicle speeds and volumes (e.g. collectors and arterials).

Dimensions for bicycle and pedestrian facilities should only be reduced to minimum widths in constrained conditions and only after other cross-section elements have also been reduced to their constrained minimum widths.

Table 7.7 Subdivision, development and servicing Bylaw recommended updates

Section	Topic	Recommendation
Schedule 4 and 5	Design Standards Highway and Drawings Road Works	Incorporate the concepts of the cross-sections illustrated in this chapter into the standard street cross-sections. Review bylaw and update based on on best practices to include mroe bicycle friendly catch basin grates.
Schedule 4	Minimize driveway access that intersects with active transportation corridor	The number of private driveways and direct accesses must be minimized across all primary active transportation corridors. No additional driveways will be supported at the time of land-use change for these networks. All driveways in active transportation corridors will limit their let down within the boulevard area. If no boulevard exists, then parking may be removed to build bulb-outs for the purpose of driveway let down.

Table 7.8: Minimum widths/separations & constraints

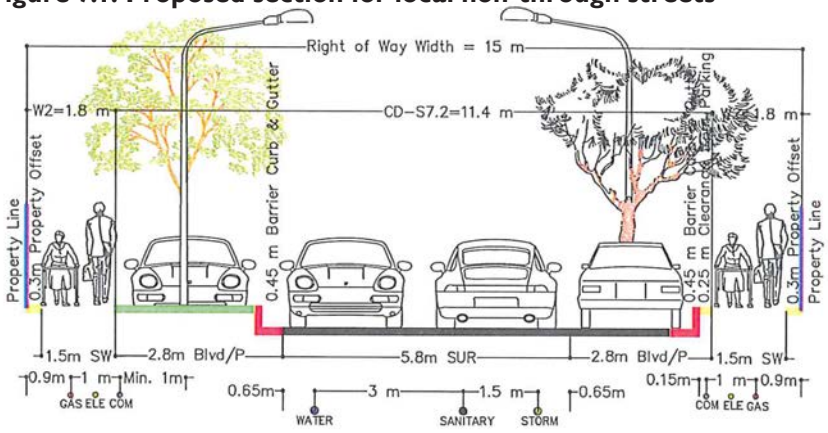
Attribute	Minimum Clear Width	Notes
Sidewalk Width	1.5 m	Minimum width sidewalks should periodically widen to 1.8 m to allow users in mobility devices to pass.
Boulevard Width	1.2 m for tree boulevard, grass or planter	Minimum width for raised hard surface is 0.9m.
Bike Lane Width	1.5 m	When positioned adjacent to parked cars, 1.8 m should be provided.
Median Width	0.9 m (raised)	When used to separate cycle tracks from parking, minimum width of 1.0 m raised median. Use shallow bicycle-friendly curb designs (low height, chamfered profile) on medians adjacent to cycle tracks.

Local non-through streets

On local non-through streets, no separated bicycle facility is specified and cyclists are expected to ride within the roadway (Figure 7.1). Assuming low motor vehicle speeds (<30 km/hr) and volumes (<2000 ADT), a designated local street bikeway may appropriate.

If these operating conditions are not met, traffic calming should be used to lower volumes and speeds.

Figure 7.1: Proposed section for local non-through streets



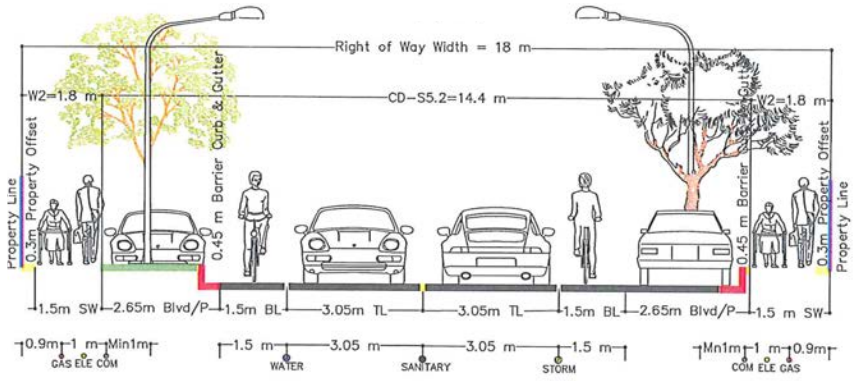
Local through streets

A 1.5 m bike lane plus curb and gutter is specified on local through streets (Figure 7.2). Including the curb and gutter into bike lane measurements, this specification meets the preferred bike lane dimensions of 1.8 m.

This facility is appropriate given the 40 km/h design speed and the potential for higher traffic volumes using the through street connection.

If calmer traffic or increased separation from cyclists and motor vehicles is desired, one option is to not mark the centreline of the street. The lack of the centreline may encourage passing motor vehicles to position closer to the center of the street and farther away from cyclists.

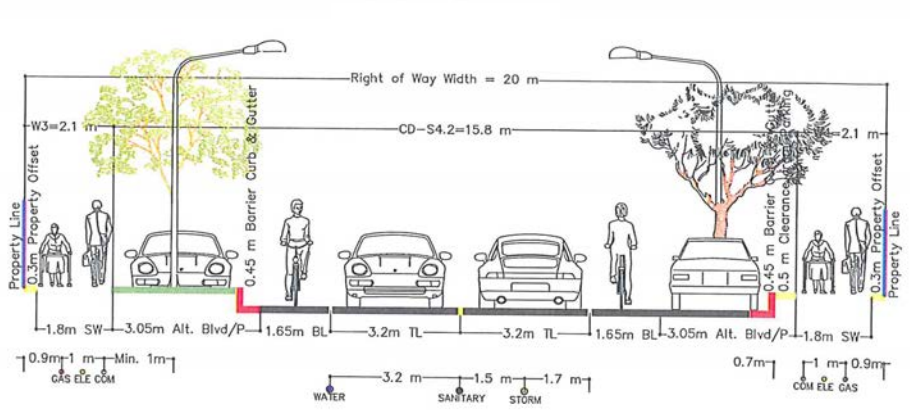
Figure 7.2: Proposed section for local through streets



Minor collector streets

A 1.65 m bike lane plus curb and gutter is specified on minor collector streets (Figure 7.3). This meets the minimum for this facility selection. Given the likelihood of higher speeds and vehicle volumes, a more robust bike facility should be used on the primary network routes. Buffered bike lanes or cycle tracks can offer increased comfort and safety for users of all ages and abilities. Vehicle lane widths should be limited to a maximum of 3.2 metres. For designated active transportation corridors, this should be kept to 3.05 metres in conjunction with other physical traffic calming measures. Landscaping will be important on primary active transportation corridors to create a more walking and cycling friendly environment.

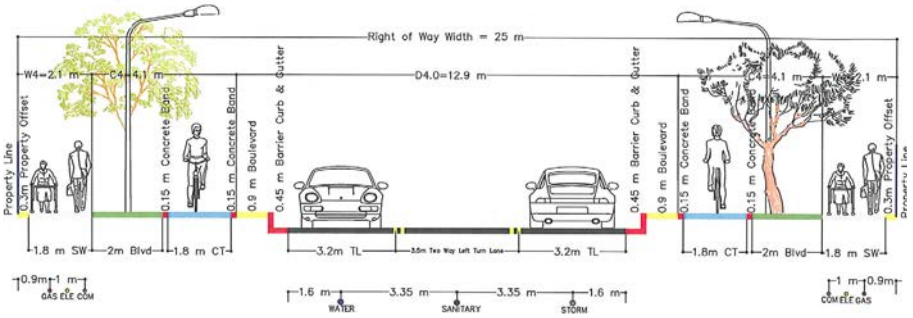
Figure 7.3: Proposed section for minor collector streets



Major collector streets

Figure 7.4 shows a cross-section for major collector streets. The standard cross-section includes 1.65 m bike lanes, and the Major Collector with Cycle Tracks includes 1.8 m cycle tracks. Given the likelihood of higher speeds and vehicle volumes, and increased number of travel lanes, the Major Collector with Cycle Tracks cross- section is preferred for its increased comfort and safety for cyclists.

Figure 7.4: Proposed section for major collector streets with cycle track



Minor arterial streets

Figure 7.5 is one of two alternative cross-sections available for minor arterial streets. The standard cross- section includes 1.65 m bike lanes plus curb and gutter, and the Minor Arterial with Cycle Tracks includes 1.8 m cycle tracks. Given the higher design speed (60 km/h), likelihood of high motor vehicle volumes, and increased number of travel lanes, the Minor Arterial with Cycle Tracks cross-section is preferred for its increased comfort and safety for cyclists.

Major arterial streets

Figure 7.6 is one of two alternative cross-sections available for major arterial streets. The standard cross- section includes 1.8 m bike lanes, and the Major Arterial with Cycle Tracks includes 2.1 m cycle tracks.

Given the high design speed (70 km/h) of the road, the preferred bicycle facility on this street is a cycle track. Conventional bike lanes are not adequate to provide the necessary degree of comfort and safety for users of all ages and abilities. For routes on the primary network, the Major Arterial with Cycle Tracks cross- section should be used.

Most cycle track designs shown in the proposed cross-sections are illustrated at the height of the adjacent sidewalk, with the exception of the Major Arterial with Cycle Track cross-section. This section is illustrated with a channelized cycle track, located between the sidewalk curb and a median island. While the height of the cycle track curbs is not labeled, they appear to be the height of regular barrier curbs. These curbs are tall enough to interfere with a cyclist's pedals and reduce the effective operating space.

The cycle track should be raised to sidewalk level or to an intermediate level between the roadway and the sidewalk and mountable curbs added to improve safety and the effective operating space.

Figure 7.5: Proposed section for minor arterial atreets

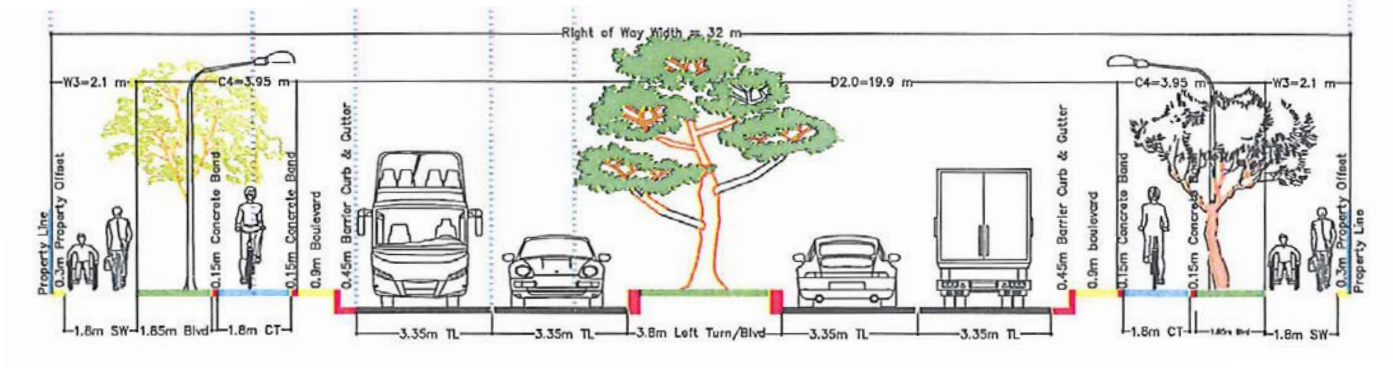
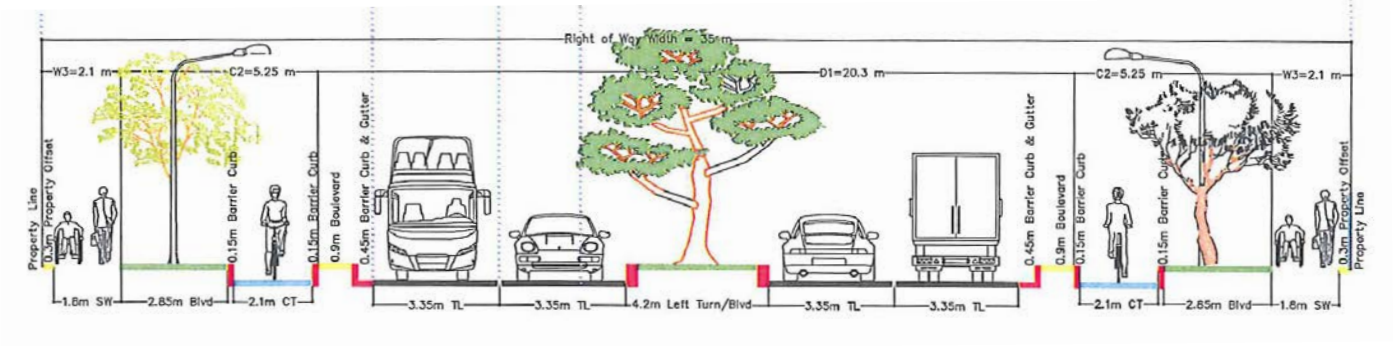


Figure 7.6: Proposed section for major arterial streets



7.7 Additional Bylaw and Policy Measures

Some recommended best practice bylaw updates that are outside of existing provincial legislation or require further investigation to determine the legalities and/or feasibility for implementing in Kelowna.

Bicycle Parking in Existing Buildings

The City should explore opportunities to apply bicycle parking regulations to existing developments. The addition of bylaws for the provision of bicycle parking in existing buildings could better serve older commercial or residential buildings.

Bicycle parking bylaws for existing buildings could include provisions that:

- encourage a building owner to convert vehicle parking spaces to long-term bicycle parking spaces; and
- require bicycle access in buildings with freight elevators.

Table 7.9: Bylaw updates for further consideration

Bylaw	Topic	Recommendation
Zoning Bylaw No. 8000	Incentives for end of trip facilities	Kelowna could benefit most from the establishment of either a financial incentive or parking requirement reduction to encourage new or retrofit developments to include end of trip facilities.
	Parking location	Investigate options to encourage developments to site parking at the rear of buildings.
Building Bylaw No. 7245	Bicycle storage access	Investigate a provision requiring bicycle access to buildings with freight elevators for the purpose of facilitating secure bicycle storage for employees.
Traffic Bylaw No. 8120	Rules of the road	Investigate the addition of policy to the Traffic Bylaw outlining user right of way for various infrastructure not covered by the motor vehicle act (e.g. elephant feet cross walks, cycle tracks, etc.).
Subdivision, Development and Servicing Bylaw No. 7900 (Section 9.3, subsection 2)	Road frontage requirements at development approval	Include a policy requiring developers of new buildings, as applicable, to construct adjacent roadway elements in accordance with the ultimate cross-section of the road, which may include parcels that front onto a planned active transportation network. This would require, for instance, a new development on a major collector with planned sidewalks and cycle tracks construct each of these elements as part of the development.

7.8 Summary of Recommended Bylaw & Policy Measures

Table 7.10: Summary of recommended bylaw revisions

Bylaw	Section	Topic	Recommendation
Zoning Bylaw No. 8000	8.4	Off-Street Bicycle Parking	Update section 8.4 to increase the number of Class I (long-term) and Class II (short-term) bicycle parking spaces required in educational institutions as outlined in Table 7.1. Review table 8.3 of zoning bylaw and update bicycle parking requirements for commercial and industrial zones based on best practices.
	8.1.11	Parking space size requirements	Amend section 8.1.11 to include a provision enabling the conversion or substitution of bicycle parking for Full Size Vehicle Parking, at a ratio of five bicycle spaces per Full Size Vehicle Parking space.
	13, 14, 15, 16, 17, 18	End of Trip Facilities	Create an end-of-trip facility regulation for commercial, industrial, institutional, or other developments, with a requirement for change rooms. Updates to the Development Permit guidelines (OCP) and the corresponding requirements in the Building Bylaw may also be required to be consistent with and align to the Zoning Bylaw updates.
Payment in Lieu of Parking Bylaw No. 8125	Schedule A	Cost per parking stall	Update schedule with increased cash amounts per parking space. Use these funds to manage vehicle travel demands by investing in alternative active modes of transportation
Building Bylaw No. 7245	To be determined	End of Trip Facilities	Create an end-of-trip facility regulation for commercial, industrial, institutional, or other developments, with a requirement for change rooms. This is to be done in conjunction with Zoning Bylaw updates.
Official Community Plan	Chapter 14	Urban Design DP Guidelines	Regulations can be a stronger mechanism to require the inclusion of indoor secure bike parking, lockers, or shower facilities. This is done in conjunction with Zoning and Building Bylaw updates. The City of Vancouver provides an example of best practice for shower/ change room provisions as illustrated in Table 7.1(b)
Traffic Bylaw No. 8120	9.1.2(a)	Cyclist Duties	Remove the specified non-chain-driven 3 or 4 wheeled bicycles.
	9.1.7 (a), (b), (d)	In-line skates, roller skates	Add text to allow users of skates, skateboards and non-motorized recreation scooters to use sidewalks, bicycle facilities, and shared-use paths, with minor or minimal restrictions.
Subdivision, Development and Servicing Bylaw No. 7900	Schedule 4 and 5	Design Standards Highway and Drawings Road Works	Incorporate the concepts of the cross-sections illustrated in this chapter into the standard street cross-sections. Review bylaw and update based on best practices to include more bicycle friendly catch basin grates.
	Schedule 4	Minimize driveway access that intersects with active transportation corridor	The number of private driveways and direct accesses must be minimized across all primary active transportation corridors. No additional driveways will be supported at the time of land-use change for these networks. All driveways on active transportation corridors will limit their let down within the boulevard area. If no boulevard exists, them parking may be removed to build bulb-outs for the purpose of driveway let down.
Additional bylaw and policy updates for future consideration	Zoning Bylaw No. 8000	Incentives for end of trip facilities	Kelowna could benefit most from the establishment of either a financial incentive or parking requirement reduction to encourage new or retrofit developments to include end of trip facilities.
		Parking location	Investigate options to encourage developments to site parking at the rear of buildings.
	Building Bylaw No. 7245	Bicycle access storage	Investigate a provision requiring bicycle access to buildings with freight elevators for the purpose of facilitating secure bicycle storage for employees.
	Traffic Bylaw No. 8120	Rules of the road	Investigate the addition of policy to the Traffic Bylaw outlining user right of way for various infrastructure not covered by the motor vehicle act (e.g. elephant feet cross walks, cycle tracks, etc.).
	Subdivision, Development and Servicing Bylaw No. 7900 (Section 9.3, subsection 2)	Road frontage requirements via development approvals	Include a policy requiring developers of new buildings, as applicable, to construct adjacent roadway elements in accordance with the ultimate cross-section of the road, which may include parcels that front onto a planned active transportation network. This would require, for instance, a new development on a major collector with planned sidewalks and cycle tracks construct each of these elements as part of the development.

CHAPTER 8: SUPPORTING PROGRAMS

Education, encouragement, enforcement, and awareness programs enhance the walking and cycling experience and can be cost effective complements to infrastructure investments. These types of programs encourage people to try using active transportation, inform the public of the benefits of walking and cycling, and provide resources to shift motor vehicle trips to sustainable transportation.

The majority of the City of Kelowna's current cycling and pedestrian programs are offered through the regional smartTRIPS program. These initiatives aim to reduce single-occupancy vehicle trips to high occupancy vehicles (HOV), transit use, walking and cycling. The extent of current programs is not as intensive as the assessed need, popular demand and the pace of infrastructure delivery and introduction of new designs. A more intensive campaign and education in the City will require the support of additional staff and financial resources.

8.1 Awareness Programs

Awareness programs inform residents about the existing facilities, safety rules and how to use them. These educational programs improve safety, build awareness of alternative modes of travel and facilitate shift to active transportation modes.

Such programs also highlight walking and cycling routes and newly designed infrastructure.

Through the consultation process, safety education was identified as a community priority and specific programs can help eliminate cyclist and pedestrian related collisions.

Awareness programs also build broad community support for active transportation, even for those who do not regularly use these modes for commuting. This creates inclusivity and builds support for investment in active transportation projects that lead to a balanced transportation system.

Best Practice Example:

The City of Toronto has a Cycle Ambassadors program as a cost-effective way to engage the community with safety and encouragement programs and campaigns.

The City of Chicago also has a popular bicycle ambassador program which includes junior ambassadors to provide peer-to-peer bicycle safety education to Chicago children.

Table 8.1 Recommended awareness programs

Topic	Measure
Communication and Marketing Strategy	Develop a Communication and Marketing Strategy for the City to build support and awareness for the pedestrian and bicycle network. The strategy should include promotion of new infrastructure (where, what), annual communication plans, and information on proper use and benefits of new facilities (for example cycle tracks), as well as how to interact with these new elements as a motorist. Consistently utilize dialogue and tools to shift from defining people by their mode (e.g. cyclist, motorist, pedestrian) to speaking of people, community members and neighbours, and of taking care of one another while travelling on the roadways. http://www.modacitylife.com/ http://www.citylab.com/commute/2015/02/dont-say-cyclists-say-people-on-bikes/385387/
Online	Ongoing information sharing as detailed in the Communications and Marketing Strategy to educate users about facilities (e.g. elephant's feet crossings, signals, crosswalks, bike parking, routes) promoting the network and Active Transportation in general. Prepared messaging to share with stakeholders, including direct links to the online information.
Maps and Route Planners	Provide funding for printed bike route maps and on-line mobile-friendly maps showing designated cycling and walking routes in Kelowna. This will also benefit Active By Nature and way-finding initiatives. Promotional and advertising funding should be provided and complement the Communication and Marketing Strategy.
Program Assistant	Provide additional program budget and hire an additional Active Transportation program coordinator to focus on City infrastructure initiatives. A variety of funding sources could support the position such as ICBC safety improvement grants, capital project budgets, taxation. etc. (Budgetary requirements to be based upon outcome of further program research and development in Section 8.2).
Active Transportation Ambassadors	Bicycle ambassador programs use outreach staff to provide assistance and information to public about safe walking and cycling rules, routes, new facilities, and resources at events or as roving staff (e.g. on a busy shared-use path). Explore opportunities to partner with Business Improvement Associations, Kelowna Area Cycling Coalition (KACC), schools, Interior Health and major employers to create a Bicycle Ambassadors program. An Ambassador program could help maintain momentum of Bike to Work and School events, support tourism, disseminate information, recognize local cyclists, or businesses.
Street Closure Events	A wide range of events with a variety of names encourage running, walking, cycling, or rolling (inline skate or scooter) by providing car-free streets. These events involve periodic street closures to create an open urban park space for walking, cycling, and celebrating. While these events are not focused ongoing behavior change, they are successful for building social interaction, and exposing the general public to alternate modes of travel generating broader awareness and acceptance of active transportation. Resource - http://issuu.com/switchhfx/docs/pdc_switch_toolkit-final.

8.2 Encouragement Programs

Transportation Demand Management (TDM) measures are now relying more on Community-Based Social Marketing (CBSM) principles to encourage behaviour change for a lasting effect. Such behaviour change programs are specifically designed to identify and remove barriers to embracing walking, cycling and transit as regular modes of transportation. Barriers are identified through research and programs developed using CBSM principles. Such tools are more successful at changing behaviour than information alone.

The CBSM concept emphasizes direct contact among community members and identifies and removes barriers to behaviour change such as switching from driving to commuting by riding a bike or walking. This technique uses "tools" that are known to be effective in fostering such change. While each of these tools on its own is also capable of promoting sustainable behaviour under right conditions, the tools are most effective when used together.

Community-based social marketing involves:

- Identifying barriers to behaviour change through research;
- Developing and piloting a program to overcome these barriers;
- Implementing the program across a community; and
- Evaluating the effectiveness of the program.

Customized travel encouragement programs can reduce single-occupancy vehicle trips and increase cycling, walking and transit use within a target area. These marketing programs focus on long-term behaviour change by revealing barriers and then shifting participants to the new travel behaviour through the use of commitments, prompts, norms, and incentives.

Best Practice Example:

Inspired by the "people's planner" Jane Jacobs, the annual Jane's Walk event held in early May is a series of free neighbourhood walking tours, developed and delivered by citizens, as a way to help put people in touch with their environment and each other by bridging social and geographic gaps. This event creates a space for cities to discover themselves and to reacquaint citizens with enjoyable walkable areas.

A similar type of initiative is the Glenmore Footprint Days, a citizen driven initiative.

Table 8.2 Recommended Encouragement Programs

Topic	Measure
Annual encouragement programs	Residents who are likely to adopt active transportation should be researched to identify barriers. With this information, a strategy could be developed which prioritizes programs that would be most effective in achieving behavioral change. Programs could focus on the City as a whole or in select neighborhoods to grow the number of residents using active transportation.
Annual events	Annual initiatives to build awareness and encourage people to try active transportation in a safe, fun way. It is likely that participants will continue to use active transportation after the program ends. Current events include Bike to Work Week, Bike and Walk to School Week and Walk and Wheel to School Week (a part of International Walk to School Month). Further ideas can be found at: http://dashbc.ca/what-we-do/programs-initiatives/walk-and-wheel/ The City should continue to offer annual encouragement programs and make adjustments based on the results of completed strategy to achieve behavioral change.
Cycling skills courses / Learn to Ride	Cycling skills courses provide a diverse level of training for children and adults to improve cycling knowledge and skill level. Cycling courses cover topics on safe bicycle handling skills, rules of the road, and on-road advance training. The City of Kelowna's Active Living and Culture Department offers an annual course to introduce participants to a range of cycling skills and knowledge in a fun, supportive environment. Resources would allow continuation of Kelowna Area Cycling Coalition facilitated certified bicycle safety training courses, Basic Commuter and Advance Skills Courses. These fee-for-service courses would target adults. Broaden the reach of cycling skills courses to youth and adults which teach them to navigate safely, to combine the use of transit and cycling to reach destinations and to understand the cost savings and health benefits of walking, cycling and transit.
School programs	Based on success of programs elsewhere, the City (through UBCM) should lobby the Provincial Ministry of Education to incorporate cycling skills training into the school curriculum so that children can learn to cycle in a safe and confident manner at an early age (e.g. Bike Right/Guide to Ride initiatives). District, school administrations and Parents Advisory Council (PAC) play a crucial role in development of a culture of active travel. Programs at the school level should seek to empower these stakeholders and encourage them to make active travel a priority for students through school level grass roots initiatives (e.g. walking school bus, bike trains, regular communications, etc). These could include working with School District 23 and/or target schools to pilot the Physical and Health Education Canada (PHE) 'Guide to Ride' cycling lesson plans (http://www.phecanada.ca/resources/guide-to-ride), as well as continuing efforts underway to lobby for and develop more comprehensive Provincially endorsed youth cycling education programming through the 'Bike Right' campaign (led by HASTE BC in partnership with HUB, the lower mainland cycle coalition and BC Cycling Coalition (BCCC) (http://bikeright.nationbuilder.com/).

8.3 Enforcement

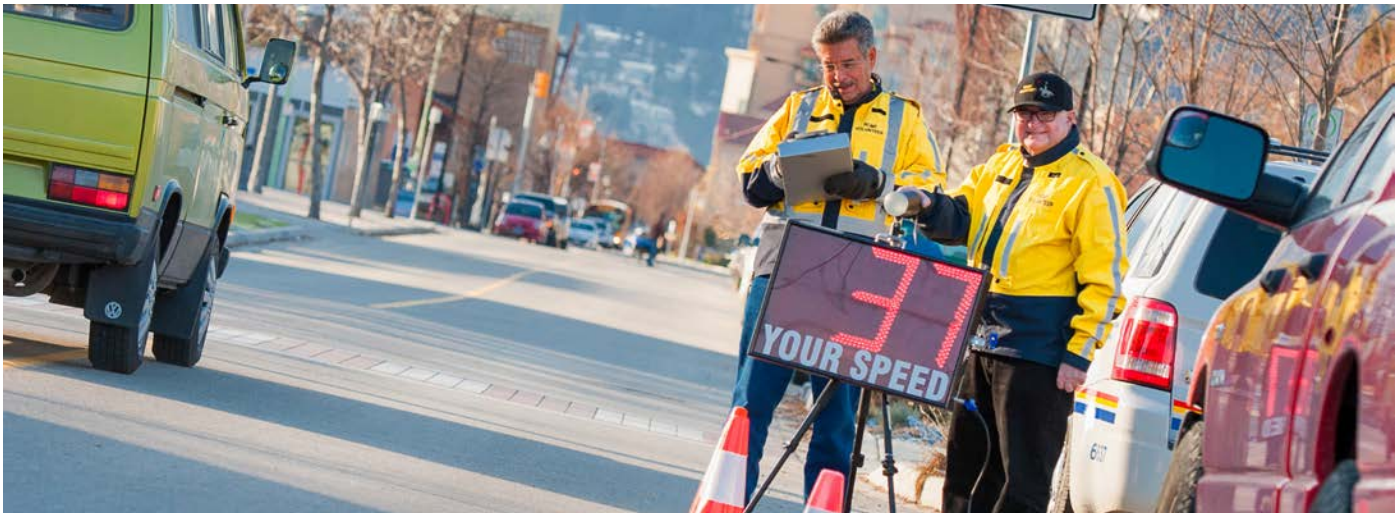
Enforcement initiatives improve the safety of road users and support legal and respectful use of the transportation network. Enforcement programs also provide a regulatory framework for addressing common or recurring issues experienced by the most vulnerable road users, i.e. cyclists and pedestrians.

Best Practice Examples:

Back-to-School Crosswalk Stings with accompanying publicity have been conducted in Surrey, British Columbia; Shoreline, Washington and Roseburg, Oregon.

Table 8.3 Enforcement measures

Topic	Measure
Motor Vehicle Act Enforcement	The RCMP Traffic Services provide enforcement, public education, and work closely with partners to keep roads safe. The RCMP run a Speed Watch program that involves volunteers who monitor problem areas, collect data and respond to requests from the City, School District and general public. Based on requests the RCMP typically conduct enforcement at problem spots or in conjunction with an event. Targeted enforcement at specific locations can influence road user behavior and increase awareness about safety of pedestrians and cyclists. For example, targeted crosswalk enforcement can generate publicity which in turn reinforces the importance of obeying the provincial Motor Vehicle Act and the City's Traffic Bylaws.
School Safety Patrol	The Regional Traffic Safety Officer works with schools, Bylaw Services and RCMP to manage transportation challenges in school zones. The officer provides on-site education to parents and students to operate safely within school zones.
Bylaw Enforcement	The City's Bylaw Enforcement Branch enforces regulations in the Traffic Bylaw to ensure public safety and security within the municipal jurisdictions. Bylaw officers may wish to consider a theme-based or seasonal event-based enforcement campaign as a unique approach for encouraging safer road user behavior. For example: http://www.ibiketo.ca/blog/2008/06/16/safe-cycling-police-campaign-starts



8.4 Evaluation and Monitoring

Monitoring and evaluation is important to assess and understand needs, travel characteristics, facility utilization, year-to-year ridership trends that can guide future planning and design decisions. The effect of various investments and initiatives in terms of projects, policies and programs should be monitored over time.

Data collection by means of surveys, road safety data and count equipment evaluate not only the impacts of specific projects, but also function as a method to measure the progress towards the targets in terms of active transportation mode share and road safety.

Table 8.4 Evaluation and monitoring measures

Topic	Measure
National Survey	Bike to Work Week participants are surveyed before and after the week-long event, allowing first time cyclists to be identified so that follow up can occur to see if they are continuing to cycle. Statistics Canada surveys play a critical role in assessing the overall travel characteristics in the municipalities and by smaller geographic area. Changes over time in travel behavior and transportation mode can be made by comparing surveys. The City should continue to utilize Statistics Canada survey data to assess the impacts of initiatives.
Automated and Manual Counters	Count programs provide useful information related to travel behavior, priority routes, measuring project success, and monitoring trends over time. Counts are done manually or through the use of automated equipment and results are useful to communicate progress to everyone. Data and presentation tools can be utilized to complement behavior change programs by providing further encouragement to adopt, and maintain participation in active transportation. Kelowna has permanent and portable automated count technologies deployed at 10 locations around the downtown core and other major facilities (http://www.eco-public.com/ParcPublic/?id=4198). Automated counters work well for counting users that pass a specific point and can track longer-term counts, establishing daily, weekly, or monthly ridership and variations. Further, Kelowna performs intersection counts every year at the major intersections using manual count boards and various detection technology. These counts capture motor vehicles, pedestrians and cyclists. The current annual traffic data collection program should be expanded to include bicycle and pedestrian counts. This will allow more accurate tracking of active transportation trends in the City. The cost of vehicular data collection can be recovered at the time of distribution for private commercial use and thereby support the current taxation-based count program.
Road Safety Data	Continue to use ICBC crash data and input from the health agency and emergency services.
Citizen Surveys	The Citizen Survey is conducted to gauge public satisfaction with municipal programs and services and to gain an insight into citizens' service priorities. Results are benchmarked against other local governments. Insight gained by this research helps the City make decisions regarding planning, budgeting and issues management. Top issues for citizens in Kelowna consistently include transportation (traffic congestion and condition of streets). The continued inclusion and analysis of active transportation related questions will indicate citizen satisfaction with infrastructure changes and investments. The City should continue to obtain public feedback and utilize tools to assess public programming efforts.
Transit Ridership	At strategic bus stop locations monitor annual boardings and alightings for ridership and mode split assessment.

8.5 Summary of Recommended Programs

Table 8.5 Summary of recommended programs

	Category	Recommendation
Encouragement and Awareness	Communication and Marketing Strategy	Develop a Communication Strategy for the City of Kelowna to build support and awareness for the pedestrian and bicycle network and roadway safety for all users.
	Program Assistant	Provide program budget and hire an Active Transportation Assistant to focus on various City safety and active transportation initiatives.
	Maps	Establish ongoing funding for a printed bike map and add an online and/or mobile bike map showing all of the designated cycling and pedestrian routes in Kelowna.
	Active Transportation Ambassador	Explore opportunities to partner with Business Improvement Associations, Kelowna Area Cycling Coalition, schools and major employers to create an ambassador program.
Behaviour Change	Program Development	Research and develop a strategy to demonstrate which programs would be most effective in achieving behavioral change to grow the share of residents selecting active modes of transportation.
	Cycling skills	Continue to offer cycling skills courses to adults in collaboration with Active Living and Culture Department.
	Annual encouragement programs	Continue to offer annual encouragement programs and make adjustments based on the results of completed strategy to achieve behavioral change.
	School travel planning	Based on success of other country's programs, lobby the provincial Ministry of Transportation and Ministry of Education to incorporate cycling skills training into the school curriculum. Eg. Bike Right, PHE Guide to Ride.
Enforcement	Law enforcement	Consider a theme-based or seasonal event-based enforcement campaign.
Evaluation and monitoring	Surveys	Continue to utilize Citizen surveys to assess the impacts of initiatives.
	Counts	Expand automated and manual counters to more accurately track active transportation behavior using data and public interfaces to incentivize and encourage public behavior change.

City of Kelowna

Pedestrian and Bicycle Master Plan
Appendices

APPENDIX A: GLOSSARY

Bike Lanes: An exclusive one-way street-level cycling space designated through the use of pavement striping, markings and signage that is located adjacent to vehicular traffic

Cycling: Includes the riding of various types of cycles, in-line skates, roller-skates and skate boards as permitted by the City Bylaws or Motor Vehicle Act

Cycle Track: An exclusive one-way or two-way cycling facility that can be at road, sidewalk or an intermediate level and is physically segregated both from the vehicular and pedestrian traffic

Local Street Bikeway: A street with low motorized traffic volumes and speeds, designated and designed to give bicycle travel priority. Local Street Bikeways use signs, pavement markings, and speed and volume management measures to discourage through trips by motor vehicles and create safe, convenient bicycle crossings of busy arterial streets

Mission Creek Greenway: An upaved, shared-use green corridor and linear trail running along Mission Creek and connecting park spaces, interpretivie viewing areas and rest spots as well as providing natural areas for wildlife

Off-Road: Placed within an exclusive right-of-way without any vehicular traffic except service/emergency vehicles

Paved: A surface paved with asphalt, concrete or pavers but excludes loose materials such as gravel or crushed rock

Primary Corridor: A major active transportation route consisting of the following major faciliites for all ages and abiliites and intended for all trip purposes and year-round use:

- Sidewalk and cycle track (or bike lanes with physical separators)
- Paved shared-use pathway and cycle track or bike lanes
- Paved off-road shared-use pathway

Roadside: Placed within the same road right of way as vehicular traffic and separated by a regular boulevard, drainage ditch/swale or barriers

Shared-Use Pathway: A roadside or off-road two-way facility that shared by pedestrians, cyclists and other users with or without directional separation

Sidewalk: An asphalt or concrete walking facility adjacent to roads exclusively for pedestrians

Supporting Corridor: A minor active transportation route with a narrower range of service levels feeding to the Primary Network and comprised of the following facility combinations:

- Paved or unpaved shared-use pathway
- Bike lanes
- Sidewalks

APPENDIX B: ENGAGEMENT PROCESS

To ensure the Pedestrian and Bicycle Master Plan was well-informed, shaped in part by public input, and that the plan would meet the needs of residents, the City offered a variety of opportunities throughout the project to engage the public and gather their feedback.

In accordance with the guiding principles defined in Council's Engage Policy, engagement outreach was done twice during the project. Initial consultation was done near the onset of the project to gather input for the Plan, and final engagement at the end of the project was done to ensure the draft Plan reflected the communities' desires.

Initial consultation from nearly 250 surveys, 12 stakeholders, 14 administrators, and over 200 open house attendees provided support for the Plan goals; helped develop project prioritization criteria; identified priority network routes and gaps; and identified issues the Plan should address including safety, connectivity and barriers to cycling. This information was used to help draft the active transportation network and Plan.

During the final engagement, the community could comment on the Plan they helped shape. Feedback from the more than 500 surveys and over 260 open house participants during the final consultation showed that the draft Plan would encourage nearly three quarters of respondents to walk more and 83 per cent to bike more. While the majority of respondents expressed support for the Pedestrian and Bicycle Master Plan, feedback on possible plan improvements was reviewed and considered for inclusion in the final version of the Plan.

B.1 "On the Move" Online Survey, Mind Mixer Map and Online Survey

A designated project area was established and linked from the Active Transportation page of the City's website (www.kelowna.ca). An Online Survey was available for the public to complete and included links to the interactive maps via Mind Mixer at www.getinvolved.kelowna.ca.

More than 1,500 individuals viewed the maps, 489 people had some interaction with the maps and/or left comments, and 243 people completed the survey. The majority of the respondents were individuals who choose to walk or cycle regularly. The results provide excellent input for the Pedestrian and Bicycle Master Plan (PBMP.) However, the results are not a representative sample of Kelowna residents.

Common survey themes were:

- Safety;
- Lack of pedestrian and bicycle facilities in some locations; and
- Building a comprehensive active transportation network.

Project info cards the size of business cards were printed to drive the public to the project website, online survey, and interactive maps. These were distributed at project events and in the community. Many were left on parked bicycles throughout the City.

The following feedback provided the basis for determining the pedestrian and bicycle network. A summary from the Online Survey and MindMixer maps included:

1. Facility Design and Connectivity:

- Support for better facilities and transportation options to UBC is very strong, and the most frequently mentioned destination in the network.
- Connecting existing routes and pathways was also frequently mentioned.
- Respondents highlighted a desire to focus on comprehensive complete loops or routes, not just segments (i.e., the routes in the Mission being broken out into segments).

2. Bicycle Network:

- Connecting to UBC was the most common network gap.
- Improving the routes surrounding Orchard Park, along Dilworth Drive and Lakeshore Road were also highlighted. However, improved facilities from the Upper Mission through to Downtown is highly supported.
- Ethel Street was the third most mentioned route within the discussion around the primary route network for upgraded facilities.

3. Pedestrian Network Gaps:

- Expanding the sidewalk network and pedestrian infrastructure were the primary concerns for the public.
- Respondents noted filling in gaps in the network and ensuring connections to popular destinations.
- Maintenance of sidewalks and paths were identified as concerns, and adding wheel chair ramps at intersections and corners for total accessibility.

Other topics mentioned:

- More education and engagement is required around safety
- There is a strong sense in the community that Glenmore Road is unsafe for cycling
- Request for more "bike buttons" at crossings and throughout town
- Education for motorists about not parking in bike lanes, general awareness of pedestrian and cyclist needs
- Education for cyclists about laws prohibiting cycling on sidewalks (with the exception of young children)

B.2 Stakeholder Event

Open House

A project Open House was hosted for a full day on Saturday October 18, 2014, at Kelowna's Orchard Park Mall. The event was publicized via the City's communications channels including e-Subscribe, social media, via the website, through Orchard Park communications, street signage, and through stakeholder networks.

Six display boards presented the vision and objectives, showed pathway networks, highlighted gaps in connectivity and displayed a proposed "all ages and abilities" (AAA) network. More than 200 individuals spoke with project representatives, learned more about the Pedestrian and Bicycle Master Plan, asked questions, and shared their insights and perspectives. Info cards were distributed and citizens were encouraged to visit the project website to complete the online survey and utilize the interactive maps. Some individuals completed hard copy surveys at the Open House and these were later entered into the online survey by the project team.

A diverse group of community stakeholders were invited to attend an interactive information session. The purpose of the meeting was to introduce and raise awareness of the project and its intended outcomes. Attendees were invited to share their insights and suggestions. They were also asked to share information about the Pedestrian and Bicycle Master Plan online survey with their members, employees, and customers.

Sixteen individuals attended the two-hour session on September 23, 2014. They included representatives from Kelowna Area Cycling Coalition (KACC), Okanagan College, Community Action Toward Children's Health (CATCH), School District 23, Interior Health, Kelowna Chamber of Commerce, Downtown Kelowna Association, Worman, Urban Development Institute, Canadian Home Builders' Association, Central Okanagan Regional District, and UBC Okanagan. The feedback gathered at the stakeholder event was addressed in the Master Plan.

Stakeholder Event

Three top themes emerged at this event:

Schools

Virtually all participants at the meeting emphasized the importance of school connectivity. Access to schools provides independence for children, frees up parents in the mornings and instills healthy inter-generational habits. The Pedestrian and Bicycle Master Plan should provide strategies to break down barriers around school travel. Connectivity to UBCO and other post-secondary schools was also emphasized, but to a lesser extent than K to 12 schools.

Major Streets

There was broad support for pedestrian and bicycle facilities along the most direct available routes, which tend to be high volume arterials. In a number of instances, existing facilities along these arterials were identified as inadequate, including, for example, Springfield, Burtch, Dilworth, and Benvoulin.

"Bowtie" Bottleneck

A bottleneck in the Kelowna street grid occurs around the Orchard Park Mall due to natural topography and a limited number of through-routes. This area was identified as a priority for north-south connectivity (e.g., Harvey) and east-west connectivity (e.g., Springfield). Support for improvements in this area was generally as high, or higher, than for improvements Downtown, reflecting acute connectivity issues and a limited number of alternate routes.

B.3 School District Survey

A survey was created and distributed to 25 school Principals or Administrators within School District #23. The purpose of the survey was to gather preliminary knowledge of or implementation of Safe Routes to School strategies and explore any infrastructure concerns that impede students walking and cycling to school. In addition, the survey asked for information regarding students' mode of transportation to and from school, their desire for infrastructure enhancements, and education programming designed to increase the number of students who walk or cycle to school.

Fourteen responses from school administrators were received. Over half (56 per cent) of the schools in Kelowna responded to the survey. Garnering survey responses was initially hampered due to the BC teachers' strike. Once school resumed, the project team made three further requests for participation in the survey. Overall, individual school administrators or Parent Advisory Councils initiate pedestrian and bicycle training and promotions, such as Walk and Bike to School Week or on-site skills training. Most schools are familiar with local road safety programs relevant to schools, such as bylaw enforcement or ICBC community road safety projects. However, the majority (58 per cent) are not familiar with Safe Routes to School initiatives. In addition, formal school travel surveys have not been conducted in schools.

Five common deterrents to walking and cycling to school identified are:

- More convenient for parents to drive students to school;
- Some live too far away/takes too long to walk or bike to school;
- Motorist behaviour (speeding, distracted driving) causing safety concerns;
- Parents don't want their child to walk or bike alone; and
- Intersections are challenging or dangerous to cross.

When asked if there are specific locations around the schools that impose barriers for students walking, riding a bike, scooting or skateboarding to school, respondents highlighted:

- Streets with lots of high speed and high volume traffic;
- Intersections without safe crosswalks;
- Streets without bike paths or bike lanes;
- Streets without sidewalks; and
- Hilly streets.

The feedback collected from the school district surveys was integrated into the Master Plan.

APPENDIX B: ENGAGEMENT PROCESS

People expressed a strong desire for coordinated pedestrian and bicycle programming in schools. Many schools have delivered one or more initiatives aimed at increasing safety, educating the school community about traffic issues or participated in a promotional event like Walk/Bike to School Week. The most common programs schools have participated in are:

- Bicycle safety training or assemblies focused on safe bicycling and walking;
- Bylaw/Police/Traffic Safety Officer enforcement;
- Parent driver education (e.g. drop-off/pick-up rules, driver behaviour tips);
- Walk and Bike to School events in spring or fall;
- On-site bicycle skills training (e.g., parking lot "bike rodeos"); and
- Contests or incentives for walking or cycling to school.

Based on the responses, roughly one-quarter of the surveyed schools have participated in one of the above-mentioned pedestrian or bicycle programs.

The feedback from the school administrators indicates more information about Safe Routes to School or School Travel Planning initiatives would be beneficial.

While schools in District 23 are individually addressing road safety issues such as education and encouragement, greater support is needed on issues of enforcement. For example, a survey response from one school noted there is significant traffic on the adjacent roadway and school-zone speed limits are not generally adhered to by motorists. This feedback suggests that an enforcement initiative would improve conditions around that school.

Furthermore, feedback from community members through the Stakeholder Event emphasized the need to prioritize improvements for active travel on the journey to and from school. The primary champions for school travel programs are often administrators, teachers, or parent groups, and there is a strong interest for additional support and resources to deliver school-based walking and cycling initiatives.

"There is a strong desire for coordinated pedestrian and bicycle programming in schools."

B.4 Draft Plan Engagement

The goal of the final phase of the engagement process was to seek input from the community on the draft Master Plan. Public feedback on the draft was obtained during this phase and was considered for incorporation into the final Master Plan.

The engagement tactics utilized included:

- An online survey to collect input on the draft Master plan
- Two open houses to inform and consult with the community
- Outreach through City Communication Channels (email bulletins, social media, Public Service Announcements, stakeholder and resident association networks).

An online survey provided a platform for community members to share their feedback on the draft Master Plan and garnered more than 500 responses, 12 per cent of which were also involved in the initial consultation.

The City held two public open houses in 2016 to inform and gather feedback on the draft Pedestrian and Bicycle Master Plan network and recommendations.

The first, held at Parkinson Recreation Centre, welcomed 170 attendees. Ninety-two individuals attended the second open house at Okanagan College. More than 50 hardcopy surveys were completed at the open houses and participants were also encouraged to complete the same survey online. The hardcopy survey answers were compiled with the online responses and analyzed together.

The majority of survey respondents expressed support for the Pedestrian and Bicycle Master Plan.

Nearly three quarters of respondents said the plan would encourage them to walk more, while 83 per cent would be encouraged to bike more. Furthermore, 83 per cent of respondents were satisfied with the plan's prioritization criteria for future sidewalk and cycling route construction.

Safety and education of all users, including motorists, was a recurring theme at the open houses and in the online survey responses.

Concerns over cost, including taxation

impact, and length of implementation time were also noted. Several individuals called for greater attention to snow and ice removal. In fact, 65 per cent of respondents would like snow clearing that would provide winter cycling on some routes through budget reallocations or tax increases, whereas 35 per cent of respondents would like the City to maintain the current level of service. Many also stated that connectivity to schools, such as UBCO, and gap closures should be given high priority.

With respect to the proposed network, community members suggested building pathways and cycle tracks only instead of full road reconstruction projects, providing paved shoulder bike lanes on Glenmore road and inquiries about specific local road sidewalks in neighbourhoods not shown on the plan due to lower priority.

When asked what people liked about the plan, many highlighted the ability to access more areas of the city on foot or by bike in a safer manner. Separated cycle paths and better connectivity with existing routes, particularly throughout the downtown core and towards the University of British Columbia Okanagan, were frequently mentioned in the responses.

Primary responses for those who said the plan would not encourage them to walk or cycle more were becayse they do already and/or they are satisfied with the existing routes.

Eighty-seven per cent of respondents said the recommended complementary updates to bylaws and policies would increase walking and/or cycling convenience. Updates would include changes to road design standards, bicycle amenity requirements and to allow skates and skateboards on sidewalks and pathways.

Pathway signage, and driver and cyclist education were common responses to encourage more walkway and clycling through education and programs.

Priority Cycle Track Projects

S. No.	Project Name	From	To	Length, m	Ranking
1	Ethel St	Cawston Ave	Bernard Ave	592	High (1)
2	Ethel St	Harvey Ave	Sutherland Ave	520	High (2)
3	Sutherland Ave	Ethel St	Gordon Dr	417	High (3)
4	Sutherland Ave	Gordon Dr	Burtch Rd	823	High (4)
5	Dilworth Rd	Rails with Trails	Leckie Rd	159	High (5)
6	Sutherland Ave	Pandosy St	Ethel St	772	High (6)
7	Leon Ave	Abbott St	Ethel St	1,197	High (7)
8	Ethel St	Sutherland Ave	Raymer Ave	1,605	High (8)
9	Dilworth Dr	Enterprise Way	Harvey Ave	155	High (9)
10	Benvoulin Rd	Mayer Rd	Springfield Rd	214	High (10)
11	Dilworth Dr	Harvey Ave	Springfield Rd	525	High (11)
12	Dilworth Dr	Leckie Pl	Enterprise Way	301	High (12)
13	Raymer Ave	Lane	Ethel St	235	High (13)
14	Springfield Rd	Ziprick Rd	Hollywood Rd S	1,625	Medium (1)
15	Rutland Rd S/Rutland Rd N	McIntosh Rd	Robson Rd E	560	Medium (2)
16	Lawrence Ave	Ethel St	Gordon St	420	Medium (3)
17	Lawrence Ave	Gordon Dr	Burtch Rd	1,064	Medium (4)
18	Springfield Rd	Ziprick Rd	Benvoulin Rd	1,419	Medium (5)
19	Rutland Rd N	McCurdy Rd	McIntosh Rd	1,005	Medium (6)
20	Rutland Rd S	Robson Rd E	Venus Rd	649	Medium (7)
21	Hollywood Rd N/Hollywood Rd S	Houghton Rd	Hollydell Rd	1,158	Medium (8)
22	Hollywood Rd N	McCurdy Rd	Houghton Rd	1,028	Medium (9)
23	Hollydell Rd/Dougall Rd S/Venus Rd	Hollywood Rd S	Rutland Rd S	836	Medium (10)
24	Cedar Ave	Abbott St	Lakeshore Rd	164	Medium (11)
25	Rose Ave/Guisachan Rd	Pandosy St	Ethel St	617	Medium (12)
26	Lane	Raymer Ave	KLO Rd	482	Medium (13)
27	Ethel St	Baillie Ave	Cawston Ave	449	Medium (14)
28	Casorso Rd	KLO Rd	Barrera Rd	1,077	Medium (15)
29	Guisachan Rd	Ethel St	Gordon Dr	476	Medium (16)
30	Guisachan Rd	Burtch Rd	GordonDr	811	Medium (17)
31	Burtch Rd	Spall Rd	Sutherland Ave	1,437	Medium (18)
32	Findlay Rd/Loyd Rd	Rails with Trails	McCurdy Rd	1,621	Medium (19)
33	Burtch Rd	Sutherland Ave	Springfield Rd	399	Medium (20)
34	Benvoulin Rd	KLO Rd	Casorso Rd	1,664	Low
35	Benvoulin Rd	Mayer Rd	KLO Rd	2,166	Low
36	Burtch Rd	Guisachan Rd/Byrns Rd	KLO Rd	1,185	Low
37	Burtch Rd	Springfield Rd	Guisachan Rd/Byrns Rd	639	Low
38	Byrns Rd	Benvoulin Rd	Burtch Rd	1,463	Low
39	Elwyn Rd/Hollydell Rd	Taylor Rd	Hollywood Rd S	1,217	Low
40	KLO Rd	Benvoulin Rd	Mission Creek Greenway	955	Low
41	KLO Rd	Benvoulin Rd	Lakeshore Rd	2,524	Low
42	Leckie Rd	Dilworth Dr	Parkview Cr	970	Low
43	Renfrew Rd	Woods Rd	Ziprick Rd	204	Low
44	Springfield Rd	Benvoulin Rd	Burtch Rd	2,114	Low
45	Taylor Rd	Elwyn Rd	Renfrew Rd Walkway	170	Low
46	Ziprick Rd/Hwy 33 W/Mills Rd	Houghton Rd	Springfield Rd	1,458	Low
Total				**41,539**	

APPENDIX C: PEDESTRIAN AND BICYCLE PROJECT LIST

Priority Shared-use Pathway Projects

S. No.	Project Name	From	To	Length, m	Priority
Paved					
1	John Hindle Dr	Glenmore Rd N	Hollywood Rd N	2,922	High (1)
2	Hwy 97 N	E of Rails with Trails	Bulman Rd	172	High (2)
3	Curtis Rd Pathway	John Hindle Dr	Curtis Rd	1,933	High (3)
4	Cooper Rd Pathway	Rails with Trails	Enterprise Way	146	High (4)
5	Commerce Ave	Rails with Trails	Lester Rd	683	High (5)
6	Smith Ave	Water St	Artwalk	92	High (6)
7	Abbott St	Rose Ave	Christleton Ave	92	High (7)
8	Christleton Ave	Abbott St	Abbott St	99	High (8)
9	Pandosy St	Lake Ave	Sutherland Ave	184	High (9)
10	Lake Ave	Terminus of Lake Ave	Pandosy St	505	High (10)
11	Rails with Trails	Leckie Pl	Cambro / Loyd Rd	4,740	High (11)
12	Rails with Trails	Airport Way	Cambro Rd/Loyd Rd	4,132	High (12)
13	Houghton Rd/McIntosh Rd	Hollywood Rd N	Rutland Rd N	786	Medium (1)
14	Hollywood Rd S	Springfield Rd	Mission Creek Greenway	199	Medium (2)
15	Pandosy St	Artwalk	Leon Ave	599	Medium (3)
16	Abbott St	Christleton Ave	Cedar Ave	1,244	Medium (4)
17	Benvoulin Pathway	Mission Creek Greenway	Benvoulin Ct	430	Medium (5)
18	Lakeshore Rd	Lexington Dr	DeHart Rd	1,960	Medium (6)
19	Cooper Rd	Enterprise Way	Orchard Park Mall Entrance	471	Medium (7)
20	Lakeshore Rd	Lanfranco Rd	Swordy Rd	462	Medium (8)
21	Rails with Trails	Gordon Dr	Okanagan Lake	1,900	Medium (9)
22	Watt Rd	Cedar Ave	Lakeshore Rd	849	Medium (10)
23	Clydesdale Pathway	Clydesdale Rd	Arab Rd	260	Medium (11)
24	Abbott St	Bernard Ave	Harvey Ave	268	Medium (12)
25	Banks Rd Pathway	Ziprick Rd	Banks Rd	299	Low
26	Rails with Trails	Willits Rd	Belgo Rd	79	Low
27	Casorso Rd	Gordon Dr	Mission Creek Greenway	565	Low
28	Country Club Dr Pathway	Terminus of Country Club Dr	UBCO	1,102	Low
29	Dehart Rd	Gordon Dr	Lakeshore Rd	405	Low
30	Ellis St	Oxford Ave	Rails with Trails	459	Low
31	Glenmore Rd	Dallas Rd	Summit Dr	2,038	Low
32	Glenmore Rd N	John Hindle Dr	Scenic Rd	1,736	Low
33	KGH Pathway	Abbott St	Pandosy St	399	Low
34	Lakeshore Rd	McClure Rd	Vintage Terrace Rd	331	Low
35	Leathead Rd	McPhee St	Rails with Trails	866	Low
36	Parkinson Pathway	Burtch Rd	Harvey Ave Overpass	321	Low
37	Sexsmith Pathway	Sexsmith Rd	Rails with Trails	824	Low
38	Spiers Rd	Existing Spiers Rd Pathway	Wallace Hill Rd	212	Low
39	Spall Pathway	Spall Rd	Angel Way	166	Low
40	Spall Rd/Glenmore Rd	Summit Dr/High Rd	Clement Ave	1,605	Low
41	Taylor Pathway	Taylor Rd	Renfrew Rd	97	Low
42	Watson Rd	Glenmore Rd	Yates Rd	141	Low
Unpaved					
43	Rails with Trails	Old Vernon Rd	Airport Way	2,227	Low
44	Rails with Trails	City Limit	Old Vernon Rd	6,485	Low
Total				**45,488**	

Priority Sidewalk Projects

S. No.	Road	From	To	Project Length, m	Priority
1	Banks Rd	Hwy 97	Baron Rd	168	High
2	Bernard Ave	Burtch Rd	Spall Rd	1,267	High
3	Bernard Ave	Lakeview St	Noble Ct	671	High
4	Cadder Ave	Richter St	Ethel St	401	High
5	Casorso Rd	Swordy Rd	Bechard Rd	362	High
6	Dilworth Dr	Leckie Pl	Enterprise Way	600	High
7	Dilworth Dr	N of Leckie Pl	Rails With Trails	44	High
8	Gordon Dr	Trench Pl	Clement Ave	322	High
9	Graham Rd	Stirling Rd	Springfield Rd	1,152	High
10	Guisachan Rd	Ethel St	Charolais Rd	546	High
11	High Rd	Lowland St	Kennedy St	211	High
12	High Rd	Tronson Ct	Glengarry St	168	High
13	Hollywood Rd S	S of Hwy 33	Hollydell Rd	573	High
14	Leckie Rd	Hunter Rd	Enterprise Way	284	High
15	Pandosy St	Birch Ave	Lane N of McKay Ave	1,524	High
16	Richter St	Elliot Ave	Raymer Ave	1,634	High
17	Richter St	Recreation Ave	Clement Ave	441	High
18	Rose Ave	Pandosy St	Ethel St	1,222	High
19	Rowcliffe Ave	Richter St	Marshall St	289	High
20	Rutland Rd S	Gray Rd	Venus Rd	1,498	High
21	Snowsell St	Union Rd	Crosby Rd	629	High
22	Spall Rd	Bernard Ave	N of Enterprise Way	504	High
23	Springfield Rd	Benvoulin Rd	Benvoulin Ct	188	High
24	Venus Rd	Rutland Rd S	Dougall Rd S	570	High
25	Agassiz Rd	Ambrosi Rd	Barlee Rd	102	Medium
26	Ambrosi Rd	Harvey Ave	Ambrosi Rd	180	Medium
27	Bach Rd	Rutland Rd N	E of Hemlock Rd	849	Medium
28	Banks Rd	Baron Rd	Terminus of Banks Rd	477	Medium
29	Belgo Rd	Rutland Rd S	Springfield Rd	921	Medium
30	Benvoulin Ct	Springfield Rd	S of Springfield Rd	67	Medium
31	Benvoulin Rd	Springfield Rd	Mayer Rd	307	Medium
32	Birch Ave	Abbott St	Ethel St	1,813	Medium
33	Burtch Rd	Harvey Ave	Sutherland Ave	349	Medium
34	Burtch Rd	Harvey Ave	Lawrence Ave	739	Medium
35	Cadder Ave	Abbot ST	Pandosy St	392	Medium
36	Cameron Ave	Rhondda Cr	Gordon Dr	791	Medium
37	Cary Rd	Enterprise Way	Hwy 97 N	651	Medium
38	Cedar Ave	Abbott St	Pandosy St	180	Medium
39	Clifton Rd	Cara glen Way	Rio Dr	805	Medium
40	Clement Ave	St Paul St	Graham St	863	Medium
41	Commerce Ave	Enterprise Way	Hwy 97 N	299	Medium
42	Dehart Rd	Gordon Dr	Lakeshore Rd	756	Medium
43	Ellis St	Broadway Ave	Industrial Ave	1,321	Medium
44	Enterprise Ct	Spall Rd	Enterprise Way	193	Medium
45	Ethel St	Saucier Ave	Morrison Ave	1,898	Medium
46	Franklyn Rd	McCurdy Rd	Leathead Rd	643	Medium

Priority Sidewalk Projects

S. No.	Road	From	To	Project Length, m	Priority
47	Gerstmar Rd	Hwy 33 W	Springfield Rd	1,028	Medium
48	Glenmore Dr	Summit Dr	Bernard Ave	1,351	Medium
49	Gray Rd	Cambie Rd	Dougall Rd S	255	Medium
50	Gray Rd	Park Rd	Cambie Rd	154	Medium
51	Hardy St	Rails with Trails	Enterprise Way	289	Medium
52	Hartman Rd	Rutland Rd N	YMCA Entrance	442	Medium
53	High Rd	Gordon Dr	Terminus of High Rd	321	Medium
54	Hollydell Rd	Davie Rd	Hollywood Rd S	1,997	Medium
55	Hollydell Rd	Hollywood Rd S	Dell Rd	608	Medium
56	Hollywood Rd N	McCurdy Rd	Renshaw Rd	562	Medium
57	Hollywood Rd S	Springfield Rd	Terminus of Hollywood Rd S	398	Medium
58	Hunter Rd	W of Enterprise W	Leckie Rd	352	Medium
59	Jurome Rd/Robson Rd W/Robson Rd E	Prior Rd S	Dougall Rd S	780	Medium
60	KLO Rd	E of Benvoulin Rd	East Kelowna Rd	2,264	Medium
61	Lake Ave	Terminus of Lake Ave	Pandosy St	1,013	Medium
62	Lakeshore Rd	Lanfranco Rd	Lanfranco Rd	38	Medium
63	Lakeshore Rd	Swordy Rd	Cook Rd	878	Medium
64	McIntosh Rd	Froelich Rd	Rutland Rd N	412	Medium
65	Molnar Rd	Hwy 33 E	Belgo Rd	799	Medium
66	Mountain Ave	Van St	Clifton Rd	347	Medium
67	Orchard Dr	Wilson Ave	Richmond St	280	Medium
68	Pinecrest Lane	Gillard Dr	Highland Dr N	188	Medium
69	Powick Rd	Enterprise Way	Hwy 97	307	Medium
70	Raymer Rd	Raymer Rd	Gordon Dr	383	Medium
71	Renfrew Rd	Woods Rd	Ziprick Rd	204	Medium
72	Richards Rd	Hartman Rd	86m S of Hartman Rd	86	Medium
73	Richter St	Central Ave	Recreation Ave	518	Medium
74	Roxby Rd	Shepherd Rd	Hwy 33 W	210	Medium
75	Royal Ave	Pandosy St	Speer St	299	Medium
76	Rutland Rd N	Fitzpatrick Rd	Sumac Rd E	409	Medium
77	Springfield Rd	Durnin Rd	Dilworth Dr	352	Medium
78	Stockwell Ave	Richmond St	Lombardy Sq	74	Medium
79	Stockwell Ave	Gordon Dr	Lombardy Sq	267	Medium
80	Sutherland Ave	93m E of Pandosy St	Pandosy St	92	Medium
81	Tronson Dr	Kennedy St	Tronson Ct	199	Medium
82	Union Rd	Glenmore RD	Valley Rd N	460	Medium
83	Valley Rd	Kane Rd	Yates Rd	812	Medium
84	Wilkinson St	McBride Rd	Guisachan Rd	252	Medium
85	Willow Cr	Highland Dr N	Highland Dr N	376	Medium
86	Abbot St	Rose Ave	Cedar Ave	990	Low
87	Acland Rd	N of Penno Rd	Edwards Rd	180	Low
88	Asher Rd	McIntosh Rd	Shepherd Rd	250	Low
89	Asher Rd	Shepherd Rd	Hwy 33 W	250	Low
90	Barlee Rd	Harvey Ave	Springfield Rd	576	Low
91	Barnaby Rd	Paret Rd	South Rdge Dr	557	Low
92	Barnaby Rd	South Ridge Dr	Lakeshore Rd	358	Low

Priority Sidewalk Projects

S. No.	Road	From	To	Project Length, m	Priority
93	Benvoulin Rd	Byrns Rd	N of Byrns Rd	97	Low
94	Borden Ave	Gordon Dr	Bowes St	207	Low
95	Briarwood Rd	Terminus of Briarwood Rd	Rutland Rd N	98	Low
96	Central Ave	Kingsway	Ellis St	149	Low
97	Chute Lake Rd	Frost Rd	S of Frost Rd	145	Low
98	Cook Rd	Bird Pl	133m W of Bird Pl	133	Low
99	Creekside Rd	Gerstmar Rd	Graham Rd	516	Low
100	Crowley Ave	Richter St	Trench Pl	619	Low
101	Dehart Rd	Swamp Rd	Westpoint Dr	769	Low
102	Drysdale Blvd	Whitman Rd	Glen Park Dr	600	Low
103	Edwards Rd/Lougheed Rd	Acland Rd	Rails With Trails	680	Low
104	Elliot Ave	Pandosy St	Richter St	509	Low
105	Elwyn Rd	Taylor Rd	Davie Rd	1,047	Low
106	Ethel St	Crowley Ave	Clement Ave	1,032	Low
107	Feedham Ave	Oswell Dr	Loseth Dr	315	Low
108	Findlay Rd	N of Stremel Rd	McCurdy Rd	494	Low
109	Frost Rd	Killdeer Rd	Chute Lake Rd	450	Low
110	Gallagher Rd	Gallagher Ct	146m S of Gallagher Ct	246	Low
111	Gaston Ave	Richter ST	Ellis St	361	Low
112	Gerstmar Rd	Springfield Rd	Creekside Rd	93	Low
113	Glen Park Dr	Valley Rd	NW of Drysdale Blvd	262	Low
114	Glenmore Rd N	John Hindle Dr	Scenic Rd	1,739	Low
115	Glenview Ave	Clifton Rd	Hillcrest St	176	Low
116	Graham St	Clement Ave	Lane N of Lawson Ave	615	Low
117	Holbrook Rd E	Rutland Rd S	Brighton Rd	842	Low
118	Hwy 33 W	Enterprise Way	Clement Ave	380	Low
119	Hwy 97 N	McCurdy Rd	Keehn Rd	2,712	Low
120	Hwy 97	N Leckie Rd	N of Leckie Rd	62	Low
121	Kane Rd	Drysdale Blvd	Valley Rd	129	Low
122	Kent Rd	Ambrosi Rd	Spall Rd	351	Low
123	Keyes Rd/Irene Rd	Sumac Rd E	McCurdy Rd E	516	Low
124	Kirschner Rd	Harvey Ave	Springfield Rd	571	Low
125	Lakeshore Rd	Lequime Rd	Old Meadows Rd	750	Low
126	Lakeshore Rd	Bluebird Rd	Lequime Rd	780	Low
127	Lakeshore Rd	McClure Rd	Vintage Terrace Rd	320	Low
128	Lakeshore Rd	DeHart Rd	Old Meadows Rd	1,335	Low
129	Large Ave	W of St Clare Ct	Black Mountain Dr	362	Low
130	Leon Ave	Ethel St	241m E of Ethel St	156	Low
131	Manhattan Dr	Ellis St	Guy St	447	Low
132	Mills Rd	Hwy 97 N	North of Fir Ct	148	Low
133	Miscellaneous Walkways	Various Places		1,500	Low
134	Morrison Ave	Abbott St	Rhonda Cr	1,928	Low
135	Moubray Rd	Cosens Ct	Ballou Rd	466	Low
136	Mugford Rd	Rutland Rd	Poonian St	1,894	Low
137	Nickel Rd/Lester Rd	Houghton Rd	Hwy 33 W	540	Low
138	Old Vernon Rd	E of Acland Rd	Sexsmith Rd	612	Low

Priority Sidewalk Projects

S. No.	Road	From	To	Project Length, m	Priority
139	Oswell Dr/Duncan Ct	166m W of Henderson Dr	Duncan Ct	548	Low
140	Park Ave	Abbott St	Pandosy St	371	Low
141	Park Rd/Gray Rd	Rutland Rd S	Hwy 33 W	225	Low
142	Pemberton Rd	Gray Rd	Jurome Rd	262	Low
143	Prior Rd N	Mugford Rd	Danube Ct	291	Low
144	Recreation Ave	Ellis St	Richter St	363	Low
145	Rhondda Cr	Cameron Ave	Morrison Ave	224	Low
146	Robson Rd W	Jurome Rd	Holbrook Rd W	95	Low
147	Sexsmith Rd	Acland Rd	Adams Rd	217	Low
148	Sexsmith Rd	Adams Rd	Arab Rd	1,185	Low
149	Shepherd Rd	Rutland Rd N	Asher Rd	460	Low
150	Spruceview Pl S	Spruceglen Dr	Caldow St	485	Low
151	Sumac Rd E	Irene Rd	Keyes Rd	54	Low
152	Toovey Rd	W of Ackerman Ct	Hwy 33 E	451	Low
153	Vasile Rd	Harvey Ave	Agassiz Rd	79	Low
154	Wardlaw Ave	Ethel St	Pandosy St	597	Low
155	Watt Rd	Lakeshore Rd	Walnut St	260	Low
156	Willits Rd	Eastbourne Rd	Seaford Rd	72	Low
157	Yates Rd	McTavish Rd	Ballou Rd	553	Low
Total				**88,027**	

APPENDIX C: PEDESTRIAN AND BICYCLE PROJECT LIST

Priority Bike Lane Projects

S. No.	Project Name	From	To	Length, m	Ranking
1	Bernard Ave	Richmond St	Burtch Rd	592	High (1)
2	Glenmore Rd	Rails with Trails	High Rd/Summit Dr	1,631	High (2)
3	Ellis St	Broadway Ave	Buckland Ave	2,514	High (3)
4	Doyle Ave/Stockwell Ave	Water St	Gordon Dr	1,442	High (4)
5	Bernard Ave	Richter St	Richmond St	1,271	High (5)
6	Lanfranco Rd	Richter St	Lakeshore Rd	158	High (6)
7	Glenmore Rd	Scenic Rd	Dallas Rd	1,974	High (7)
8	Union Rd	Millard Pl	Valley Rd	813	High (8)
9	Clement Ave	Graham St	Ellis St	985	High (9)
10	Curtis Rd	Planned Pathway at Curtis Rd	Sexsmith Rd	253	High (10)
11	Academy Way	John Hindle Dr	ClydesdaleRd	1,244	Medium (1)
12	Banks Rd	Driveway NW of Hwy 97 N	Terminus of Banks Rd	503	Medium (2)
13	Cooper Rd	Orchard Park Mall Entrance	Springfield Rd	193	Medium (3)
14	Gerstmar Rd	Springfield Rd	Creekside Rd	103	Medium (4)
15	Pandosy St/Buckland Ave	Lake Ave	Ellis St	258	Medium (5)
16	Raymer Rd	Gordon Dr	Varney Ct	1,195	Medium (6)
17	Swordy Rd	Lakeshore Rd	Casorso Rd	358	Medium (7)
18	Glenmore Rd N	McKinley Rd	City Limit	4,328	Medium (8)
19	Pandosy St	Sutherland Ave	KLO Rd	1,982	Medium (9)
20	Pandosy St/Water St	Queensway	Buckland Ave	630	Medium (10)
21	Acland Rd/Hereron Rd/Bulman Rd	300 m north of Hereron Rd	Edwards Rd	919	Low
22	Airport Way	Hollywod Rd N	Rails with Trails	597	Low
23	Arab Rd	Clydesdale Rd	Sexsmith Rd	894	Low
24	Ballou Rd/Kane Rd	Yates Rd	Valley Rd	640	Low
25	Bedford Rd	Stewart Rd E	Saucier Rd	1,453	Low
26	Belgo Rd/Garner Rd/Kloppenburg Rd	Teasdale Rd	Loseth Rd	3,047	Low
27	Belgo Rd/Molnar Rd/Belgo Rd/Holbrook Rd E	Mallach Rd	Teasdale Rd	2,818	Low
28	Biggar Rd	Moubray Rd	Snowsell St	99	Low
29	Cambro Rd	Sexsmith Rd	Rails with Trails	265	Low
30	Clifton Rd N	McKinley Rd	Magic Dr	4,994	Low
31	Clydesdale Rd	Proposed Pathway	Hollywood Rd N	698	Low
32	Cook Rd	Gordon Dr	Lakeshore Rd	536	Low
33	Country Club Dr	Quail Ridge Blvd	Terminus of Country Club Dr	1,445	Low
34	Craig Rd	McCurdy Rd E	Hartman Rd	191	Low
35	Crawford Rd	Stewart Rd W	Parkridge Dr	239	Low
36	Crawford Rd	Parkridge Dr	South of DeHart Rd	1,597	Low
37	Dease Rd	McCurdy Rd	Leathead Rd	739	Low
38	DeHart Rd	Crawford Rd	Casorso Rd	883	Low
39	E Kelowna Rd	KLO Rd	Dunster Rd	1,023	Low
40	E Kelowna Rd	Dunster Rd	Mission Creek Greenway	2,824	Low
41	E Kelowna Rd/Hollywood Rd S/Teasdale Rd	Mission Creek Greenway	Belgo Rd	1,287	Low
42	Fenwick Rd/Finns Rd	Rails with Trails	Findlay Rd	859	Low
43	Fitzpatrick Rd	Finns Rd	Rutland Rd N	1,043	Low
44	Franklyn Rd	McCurdy Rd	HWY 33 W	1,374	Low

Note - Bike lane projects are based on road centre line distance. Total project distance is double this amount.

Priority Bike Lane Projects

S. No.	Project Name	From	To	Length, m	Ranking
45	Frost Rd	Treadgold Ct	Killdeer Rd	126	Low
46	Frost Rd ROW	Chute Lake Rd	Treadgold Ct	291	Low
47	Gertsmar Rd/Kneller Rd	Houghton Rd	Hwy 33	360	Low
48	Gordon Dr	Lequime Rd	Casorso Rd	525	Low
49	Gordon Dr	Rails with Trails	Springfield Rd	1,902	Low
50	Gordon Dr	Southcrest Dr/Clarance Ave	South Perimeter Rd	589	Low
51	Hartman Rd	YMCA Entrance	Rutland Rd N	418	Low
52	Hollywood Rd N	Airport Way	University Way	1,228	Low
53	Hollywood Rd N	John Hindle Dr	Sexsmith Rd	2,098	Low
54	Hwy 33 W	Enterprise Way	Rails with Trails	146	Low
55	Jim Bailey Cr	Rails with Trails	Jim Bailey Cr	308	Low
56	John Hindle Dr	Hollywod Rd N	Glenmore Rd N	2,922	Low
57	June Springs Rd	Spiers Rd	City Limit	2,106	Low
58	Lark St	Okaveiw Rd	Chute Lake Rd	533	Low
59	Leckie Rd	Dilworth Dr	Parkview Cr	984	Low
60	Lester Rd/Nickel Rd	Leathead Rd	Hwy 33 W	709	Low
61	Longhill Rd	Rifle Rd	Sexsmith Rd	1,261	Low
62	Loseth Dr/Large Ave	Black Mountain Dr	Hwy 33 E	930	Low
63	Loseth Rd	Hwy 33 E	Autumn Rd	333	Low
64	Loseth Rd	Autumn Rd	Terminus of Gallagher Rd	2,430	Low
65	Mail Rd	Sexsmith Rd	Longhill Rd	1,220	Low
66	McClure Rd	Raymer Rd	Lakeshore Rd	1,342	Low
67	McCurdy Rd	Rails with Trails	Dalton Rd	1,187	Low
68	McCurdy Rd/Mount Baldy Dr	Dilworth Dr	Rails with Trails	385	Low
69	McKinley Rd	Glenmore Rd N	N of Arthur Rd	2,977	Low
70	Moubray Rd/Ballou Rd/Yates Rd	Crossridge Cr	Existing SUP at Yates Rd	924	Low
71	Old Vernon Rd	Spencer Rd	Airport Way	1,029	Low
72	Quail Ridge Blvd	E of Country Club Dr	Terminus of Quail Ridge Blvd	252	Low
73	Ridge Rd/Cara Glen Way	Upper Canyon Dr	Clifton Rd	3,193	Low
74	Rutland Rd N	Old Vernon Rd	Cornish Rd	433	Low
75	Saucier Rd	Stewart Rd W	Sallows Rd	1,393	Low
76	Saucier Rd	Bedford Rd	Stewart Rd W	912	Low
77	South Perimeter Rd	Stewart Rd W	Chute Lake Rd	4,450	Low
78	South Ridge Dr	Frost Rd	South Perimeter Rd	871	Low
79	Spiers Rd	KLO Rd	Gulley Rd	1,085	Low
80	Steele Rd	South Ridge Dr	Gordon Dr	1,401	Low
81	Stewart Rd E	Saucier Rd	Terminus of Stewart Rd E	1,197	Low
82	Stewart Rd W	Saucier Rd	Terminus of Stewart Rd W	1,112	Low
83	Taylor Rd/Collison Rd/Mark Rd/Graham Rd	Hwy 33 W	Springfield Rd	1,050	Low
84	Uplands Dr/Okaview Rd/Chute Lake Cr	Lakeshore Rd	Chute Lake Rd	2,998	Low
85	Upper Canyon Dr	Union Rd	Ridge Rd	3,822	Low
86	Yates Rd	Valley Rd	Glennmeadows Rd	435	Low
Total				**106,759**	

Note - Bike lane projects are based on road centre line distance. Total project distance is double this amount.

D.1 Intersection Design Improvements

The majority of more serious pedestrian and bicycle collisions occur at intersections and driveways. It is therefore important to incorporate necessary safety features at such locations.

This section describes recommended intersection design improvements for pedestrians and cyclists. To create a safe network of cycle tracks, shared paths, sidewalks, crosswalks and bike lanes, design care is critical at intersections, vehicle right turn lanes, driveways, and minor street crossings.

The City of Kelowna will adopt and apply the National Association of City Transportation Officials (NACTO) recommended design features in its publication titled Urban Bikeway Design Guide. This will supplement the Transportation Association of Canada (TAC) standards in the Bikeway Traffic Control Guidelines for Canada. The City will also consider references such as the Massachusetts Department of Transportation's Separated Bike Lane Planning & Design Guide.

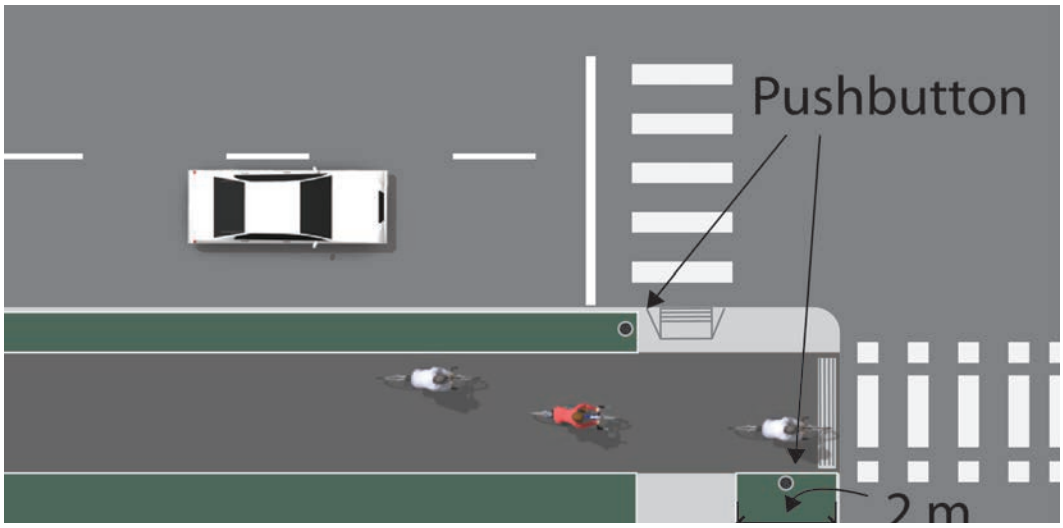
The City will continue to work to develop standards for bike signals which will significantly enhance safety and convenience for cyclists on cycle tracks and shared-use pathways. Furthermore, various left-turn specific treatments for cyclists will also be formally incorporated. In particular, future work will look at intersections in urban centres which need more attention to improve accessibility, safety and convenience for active transportation users.

Shared-Use Pathway Intersection Approach

When a Shared-use pathway meets an intersection, the corners of the crossing should provide a large clear area to allow cyclists to stop and wait to cross without blocking the through zone of the sidewalk. Pushbuttons should be placed on each corner approach, close enough to the path to be reached by cyclists without the need to dismount.

Figure D.1 illustrates the preferred location of pushbuttons. If suitable pushbutton is not possible, loop detectors could be used. The specific actuation area should be well marked to inform cyclists of proper positioning.

Figure D.1: Ramps and Waiting Areas for a Shared-Use Pathway at an Intersection



Cycle Track Design

Intersection approach treatments should be based on available roadway width, right-turn volumes, corner geometry and other traffic operation considerations. This section highlights a few design features for cycle tracks at intersections.

Signal-Protected Turns

A cycle track can extend all the way to an intersection by including a traffic signal to separate the movements of cyclists and conflicting vehicles. The signal is triggered by a cyclist on the track at the intersection and on its approach. In this instance, right turn on red should be prohibited to preserve the protection of cyclists. Because there are no bicycle and motor vehicle conflicts, coloured pavement is not necessary.

Corner Refuge Islands

Corner refuge islands can be used to manage right turn motor vehicle bicycle conflicts further within the intersection (Figure D.2). This strategy is used in the Netherlands, and is particularly beneficial at locations where two cycle tracks cross and the cycle tracks are protected by a wide buffer strip. The geometry of the corner refuge island brings cyclists in a clear line of sight of the motorists to avoid conflict and also reduces vehicle turning speed.

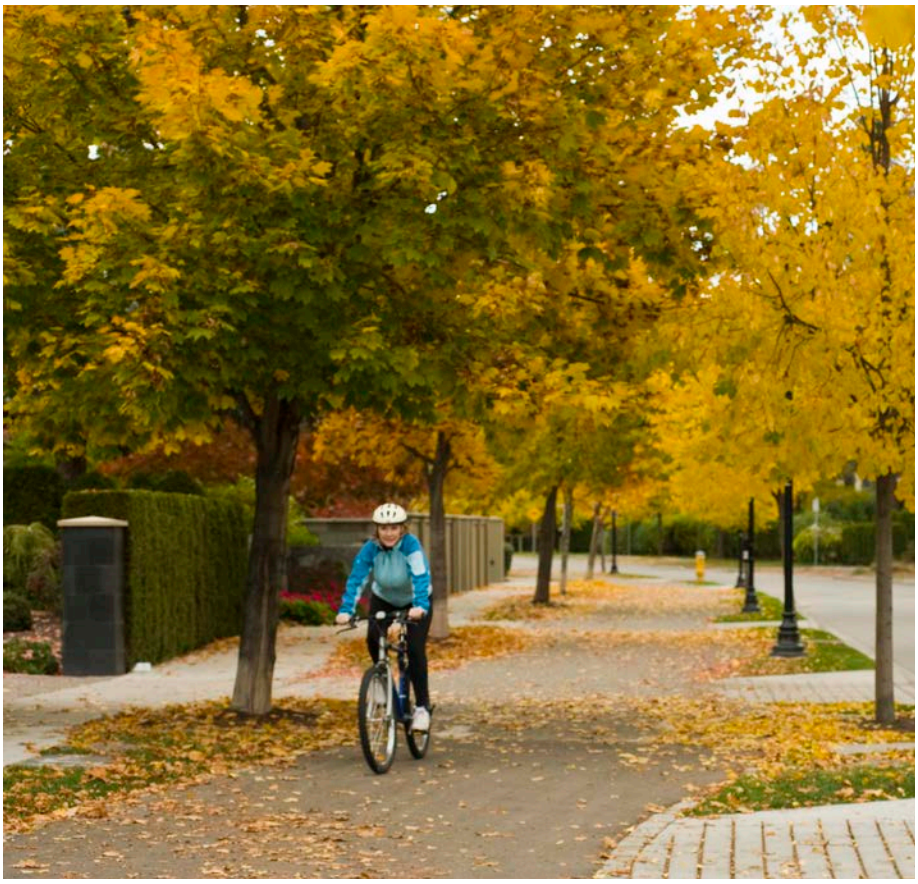
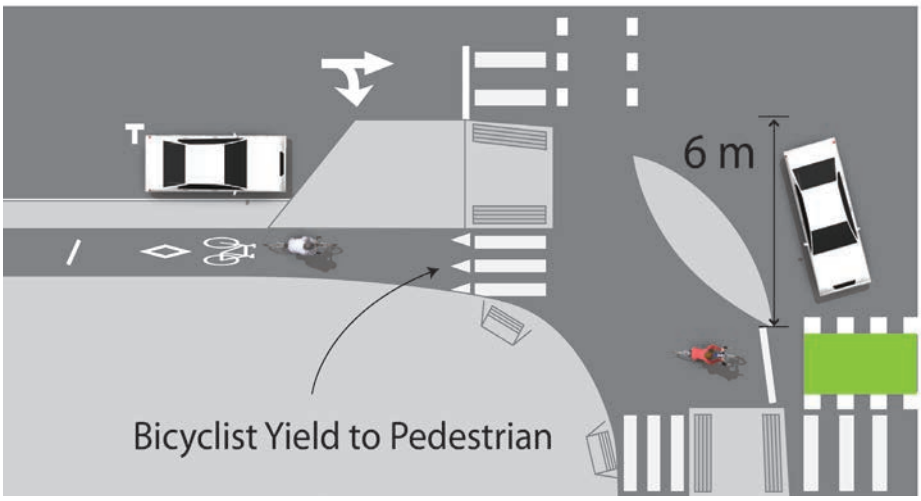


Figure D.2: Cycle Track at a Corner Refuge Island



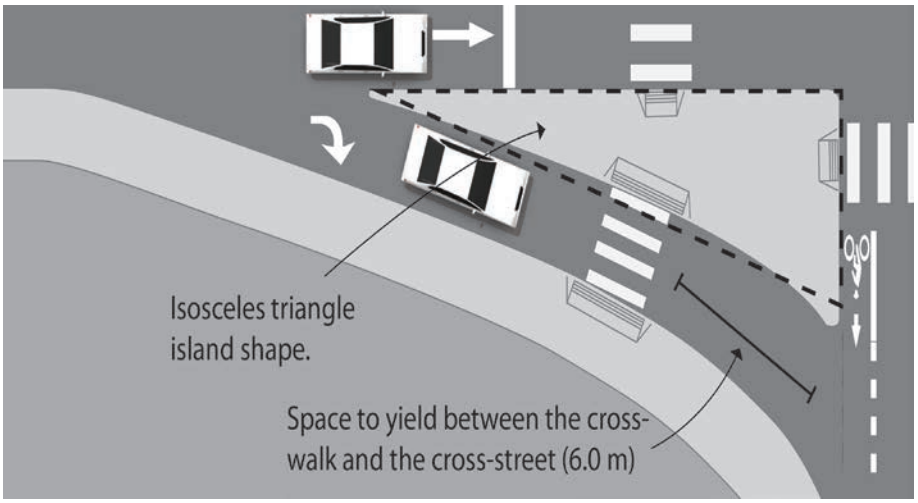
Crossing Channelized Turn Lanes and Roundabouts

Channelized turn lanes and roundabouts can be challenging for cyclists and pedestrians to navigate, particularly for users with vision disabilities. Efforts should be made to mitigate the negative effect on these users.

The geometry of a channelizing island should promote clear visibility of crossing pedestrians and provide sufficient space to accommodate pedestrians, bikes, and vehicles.

The alignment of the turn lane should be a nearly right-angle entry to the cross street (Figure D.3). There should be adequate length of the turn lane to store yielding vehicles both before and after the crosswalk.

Figure D.3: Channelized Island Geometry

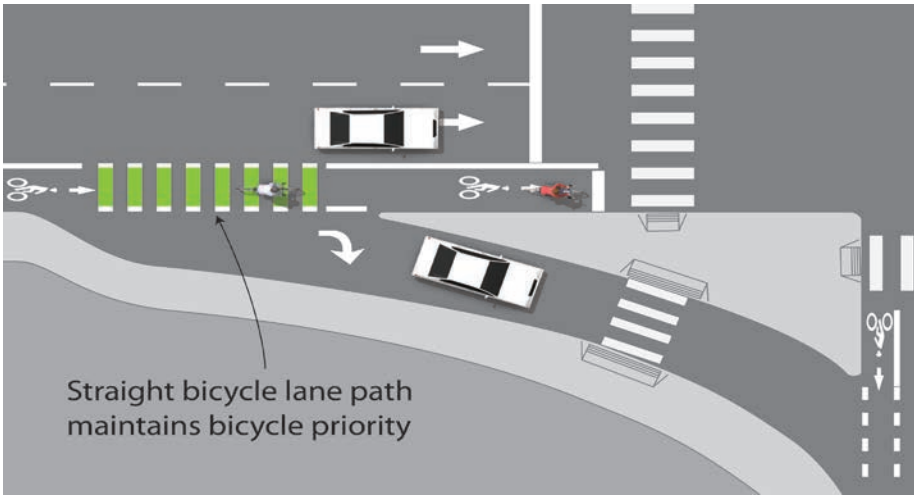


Bicycle Lane Priority

When a right-turn-only lane is added to the right of the bicycle lane, the cyclist path should remain straight and drivers are expected to yield before entering the turn lane (Figure D.4).

These configurations create a clear sense of yield priority for all users.

Figure D.4: Channelized Island Geometry



Right Turn Lane Priority

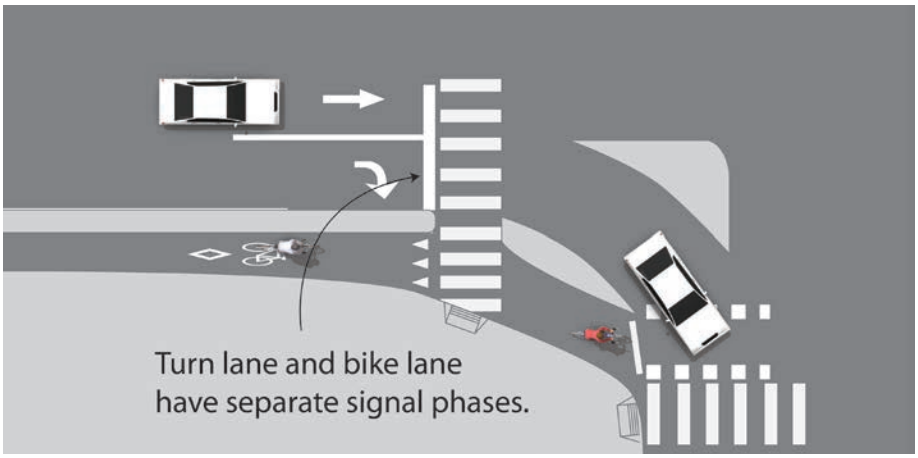
When a fast-moving through lane transitions into a right-turn-only lane, there is no reasonable expectation for drivers to yield to cyclists (Figure D.5). In these cases, cyclists should yield for their own safety. Pavement markings should dash the bicycle lane well in advance to cue cyclists to merge across when safe. In these situations, it may be prudent to allow cyclists to move to the sidewalk and cross with pedestrians at the crosswalk. Less confident cyclists may mount the sidewalk and cross with pedestrians using Elephant's Feet Crossing.

Figure D.5: Right Lane Transition

Signalized Corner Refuge Island

Using signal control to prevent conflict and providing corner refuge islands to create physical separation offers better protection at channelized turn lanes (Figure D.6). In this situation, vehicles cannot make a right turn on red. Separation of cyclists and pedestrians is maintained, and cyclists and pedestrians have a more direct path in crossing an intersection.

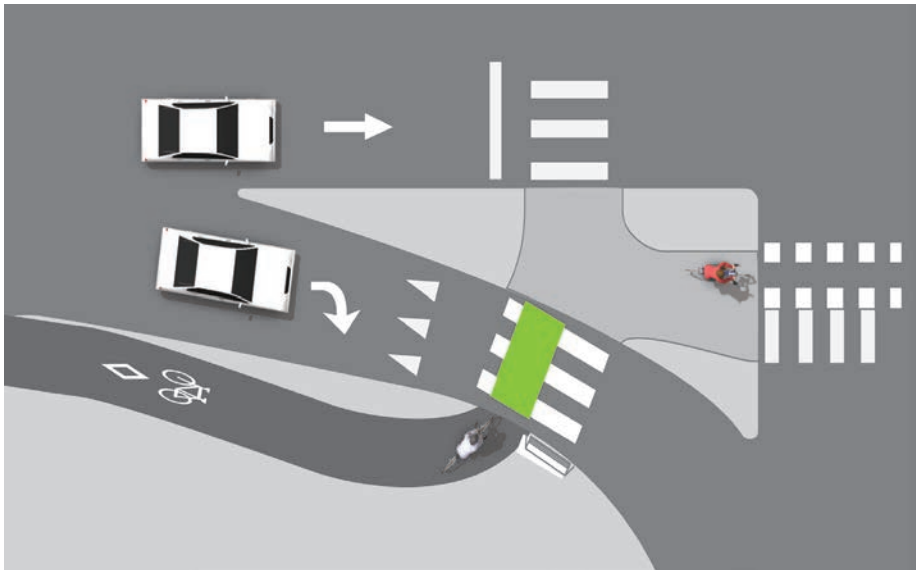
Figure D.6: Signalized Refuge Island

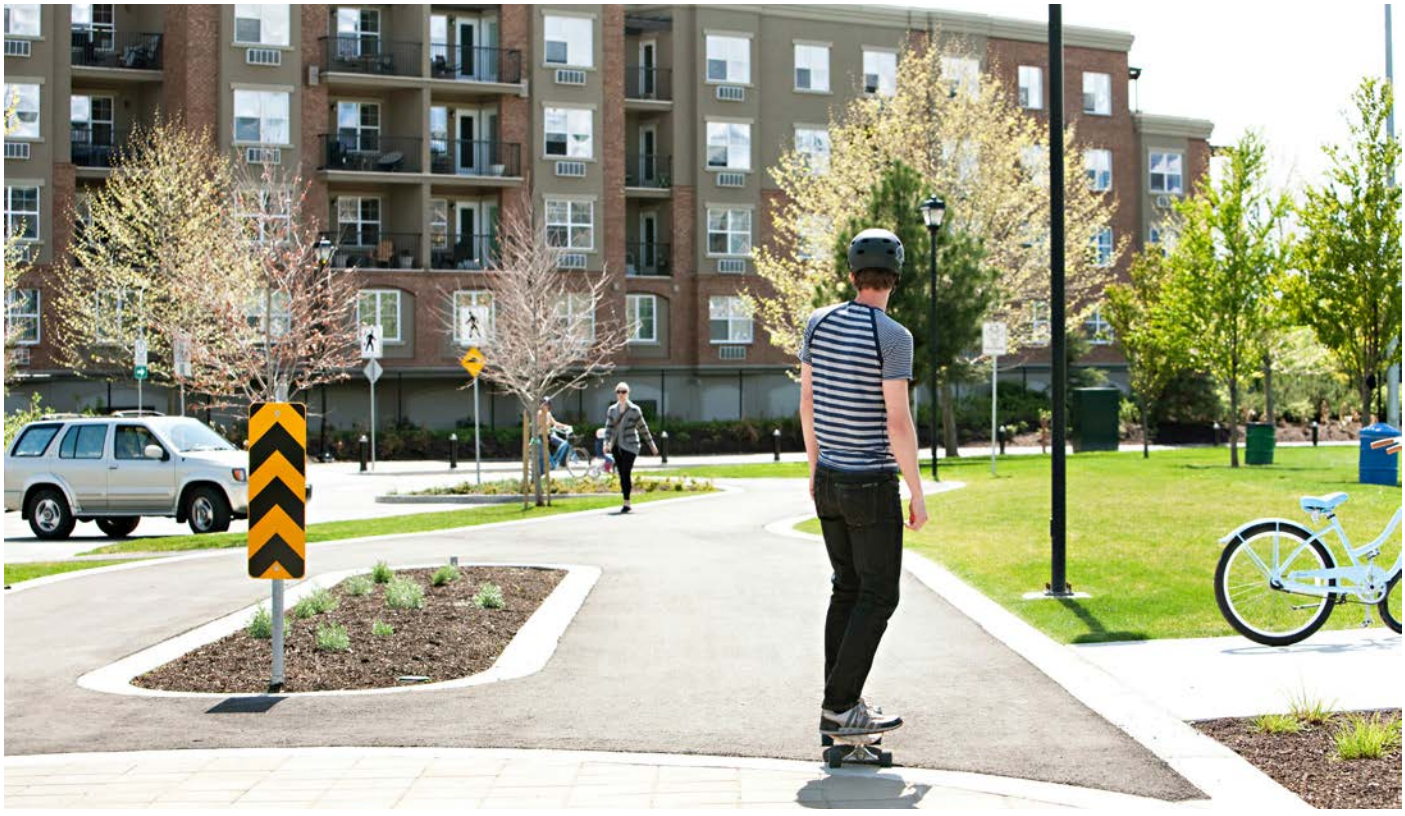


Traffic Island Pass Through

When a cycle track crosses an intersection with a channelized turn lane, cyclists can be directed to cross at the pedestrian crosswalk to maintain physical protection of the bikeway, yet there will still be an uncontrolled crossing of the channelized turn lane. Design of the traffic island should promote slow turning speeds and a high level of visibility of crossing users (Figure D.7). This design is appropriate for use with a cycle track or shared-use path. Raised crosswalks and crosswalk flashers can increase motorist yielding compliance at the crossing. This design may lead to frustration amongst commuter cyclists who feel unnecessarily delayed. However, this provides better protection and is suitable for the majority of users.

Figure D.7: Traffic Island Pass Through





Unsignalized Minor Street Crossings

At minor streets, through traffic along the major facility has priority over traffic entering or exiting a minor-street. This priority applies to cyclists and pedestrians traveling along the major street, and designs strategies should enhance and encourage proper yielding behaviour.

Minor Street Crossings Retrofit

At unsignalized minor street crossings where cars may turn right but the bicycle lane has priority, bicycle visibility should be enhanced for increased user awareness of potential conflict. Parking should be prohibited 15.0 m in advance of the intersection for clear motor vehicle sightlines to the intersection (Figure D.8). Pavement markings, posts, and signs can prevent use of the no parking area. Alternatively, this space can be used for bicycle parking or low height landscaping.

Coloured pavement across the intersection and warning signs can further promote awareness of the potential conflict.

Minor Street Crossing Reconstruction

For raised cycle tracks, the physical geometry can create clear user priority for cyclists, and encourage deliberate motorist transition across the cycle track. The raised level of the cycle track should be maintained for a smooth level crossing and to slow motor vehicles. Curb extensions can also narrow the street entrance and create a "gateway" effect for cars entering and exiting the street (Figure D.9).

Coloured pavement and warning signs further help identify potential conflict.

Figure D.8: Minor Street Crossing Retrofit

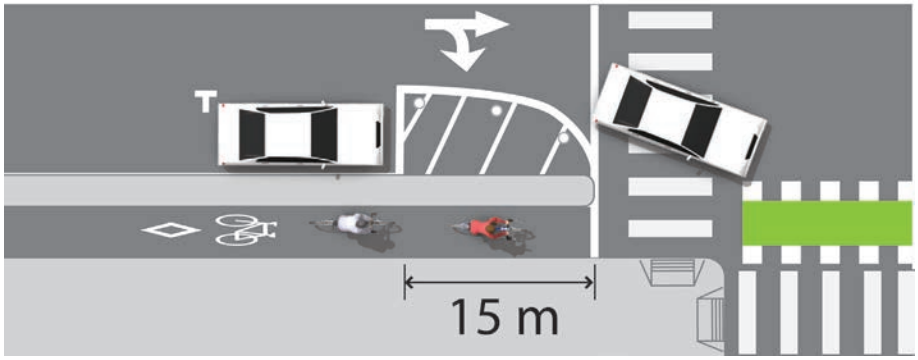
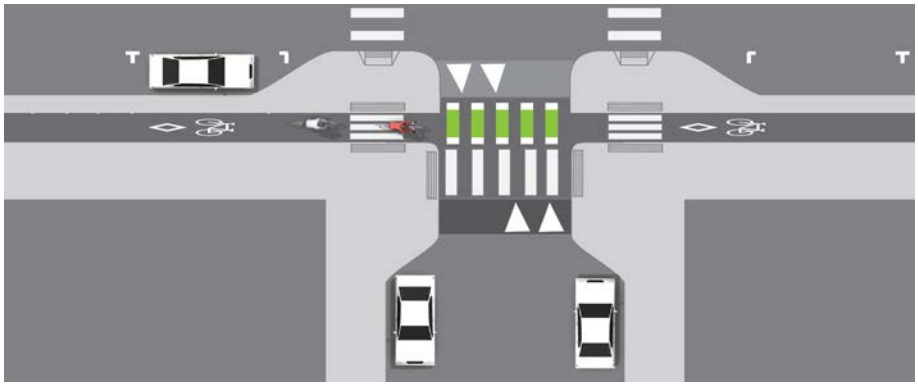


Figure D.9: Minor Street Crossing Reconstruction



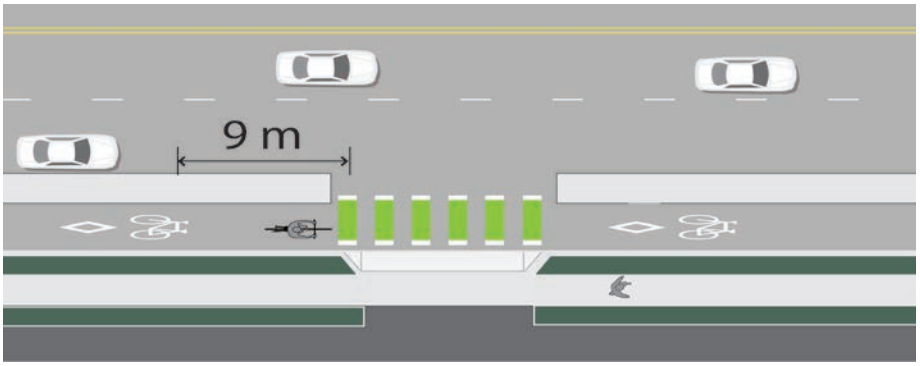
Driveways

Drivers crossing driveways must yield to cyclists and pedestrians. Geometric design, markings and signs can all be used to identify the conflict and promote yielding.

Driveway Crossing Retrofit

Parking can be restricted to a minimum 9 m in advance of the driveway for improved bicycle visibility for vehicles exiting the driveway (Figure D.10). Colored pavement can also alert motor vehicles to cyclist crossing.

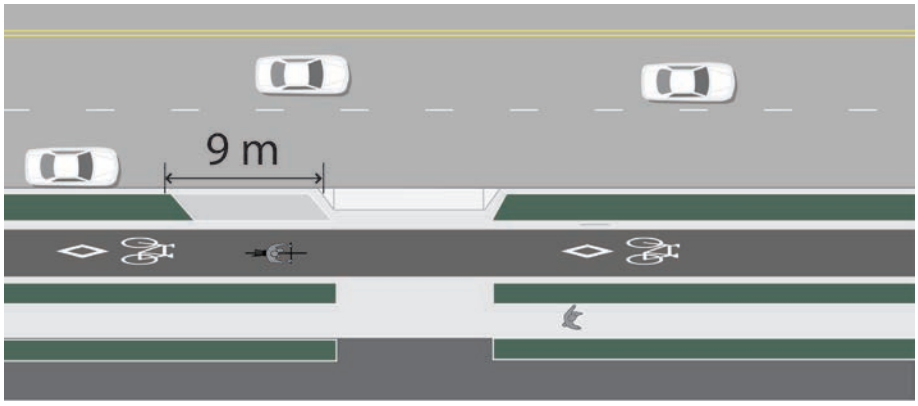
Figure D.10: Driveway Crossing Retrofit



Driveway Crossing Reconstruction

Raised cycle tracks offer more opportunity to use geometric design of driveway aprons, grade and driveway aisle width to promote yielding (Figure D.11). The raised level of the cycle track can be maintained with driveway aprons. These aprons should be steep and abrupt to prompt slow turning speeds into and out of the driveway. Parking can be restricted 9 m in advance of the driveway for improved bicycle visibility, and landscaping can be used to define the driveway aisle. Abbott Street driveways are similar to the design shown in Figure D.11.

Figure D.11: Driveway Crossing Reconstruction



D.2 Potential Retrofit Ideas for Existing Streets

These strategies are focused on identifying opportunities for additional bikeway and walkway space. Available street space may be used to establish new bikeways, enhance existing bikeways or expand the pedestrian realm.

Travel Lane Reconfigurations

Streets with excess vehicle capacity provide opportunities for active transportation projects. The removal of a single wide travel lane can provide ample space for pedestrians and cyclists. Figure D.12 illustrates how vehicle lane space can be reallocated to bicycles and pedestrians without adding additional width to the right-of-way. Various lane reduction configurations may apply to a street, depending on a street's existing configuration, traffic operations, user needs and safety concerns. Prior to implementing any measure, a traffic analysis should identify potential impacts.

Travel Lane Narrowing

Lane narrowing utilizes roadway space that exceeds minimum standards to provide additional space for active transportation. Many roadways have existing travel lanes that are wider than those prescribed in local and national roadway design standards (Figure D.13). Most standards allow for the use of 3.2 m, sometimes 3 m wide travel lanes. Special consideration should be given to the amount of heavy vehicle traffic and horizontal curvature before the decision is made to narrow travel lanes. In some situations, center turn lanes can also be narrowed.

Figure D.12: Potential Use of Space from Travel Lane Reconfigurations

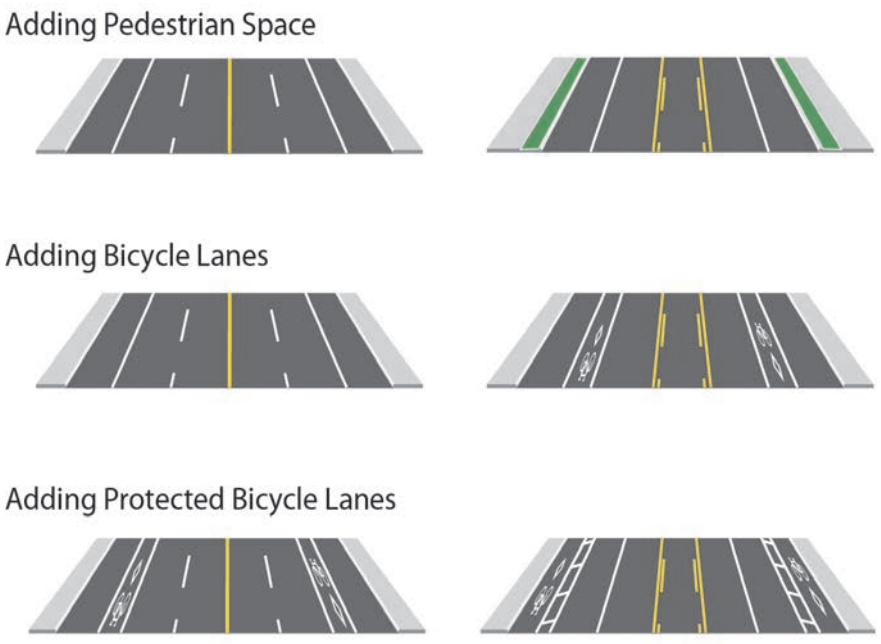
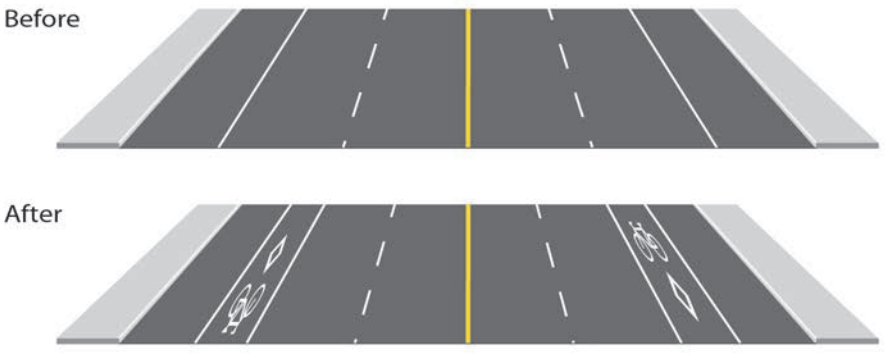


Figure D.13: Lane Narrowing to Create Bicycle Lanes

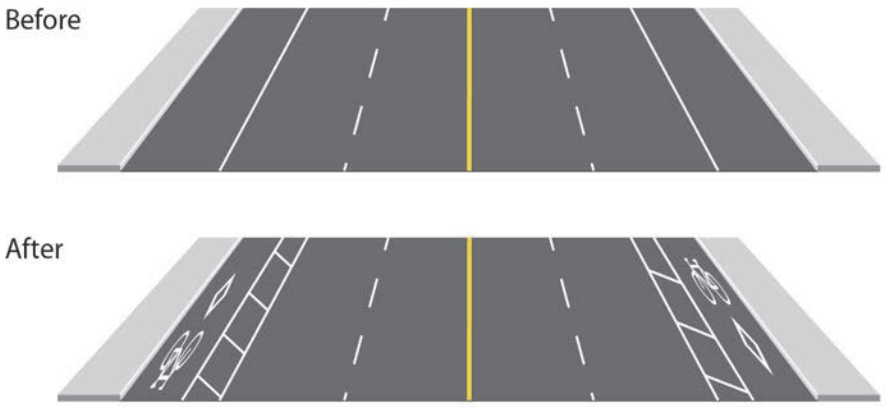


Parking Lane Removal

Like travel lane removal, the removal of one or both parking lanes on a roadway may provide necessary space to establish enhanced bicycle or pedestrian facilities (Figure D.14).

Typical parking lane widths of 2.5 m or more are directly compatible with one-way cycle tracks, and direct conversions from one to the other may be very cost effective.

Figure D.14: Parking Lane Removal to Create Bicycle Lanes



Shoulder Widening

Bicycle and pedestrian accessible shoulders can be accommodated on streets with excess right-of-way through roadway widening.

Although roadway widening often incurs higher expenses compared with re-striping projects, pedestrian and bicycle accessible shoulders can be added to streets lacking curbs, gutters, and sidewalks without the high costs of major infrastructure reconstruction (Figure D.15).

Figure D.15: Roadway Widening to Create Pedestrian and Bicycle Accessible Shoulders

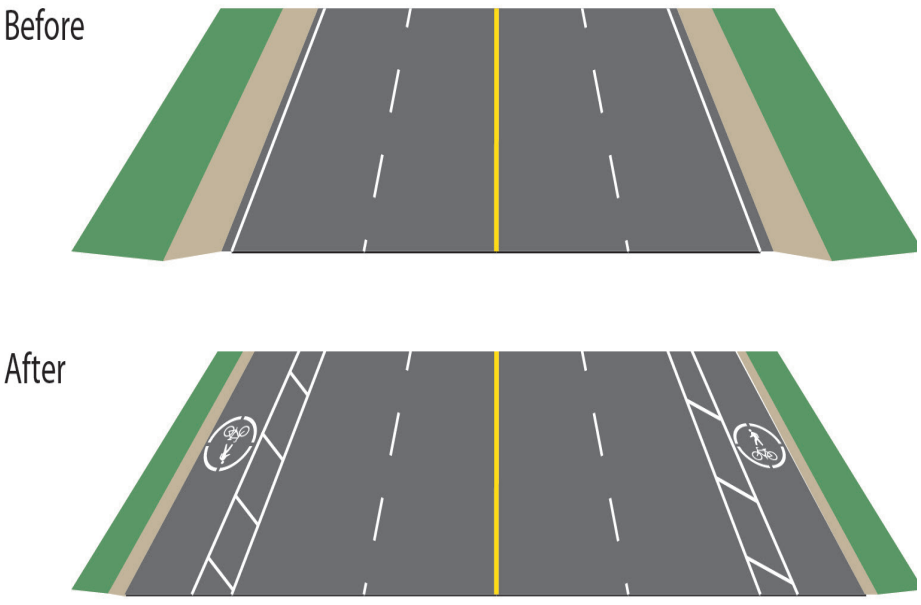


Figure D:16: Preferred Bicycle Lane Intersection Design

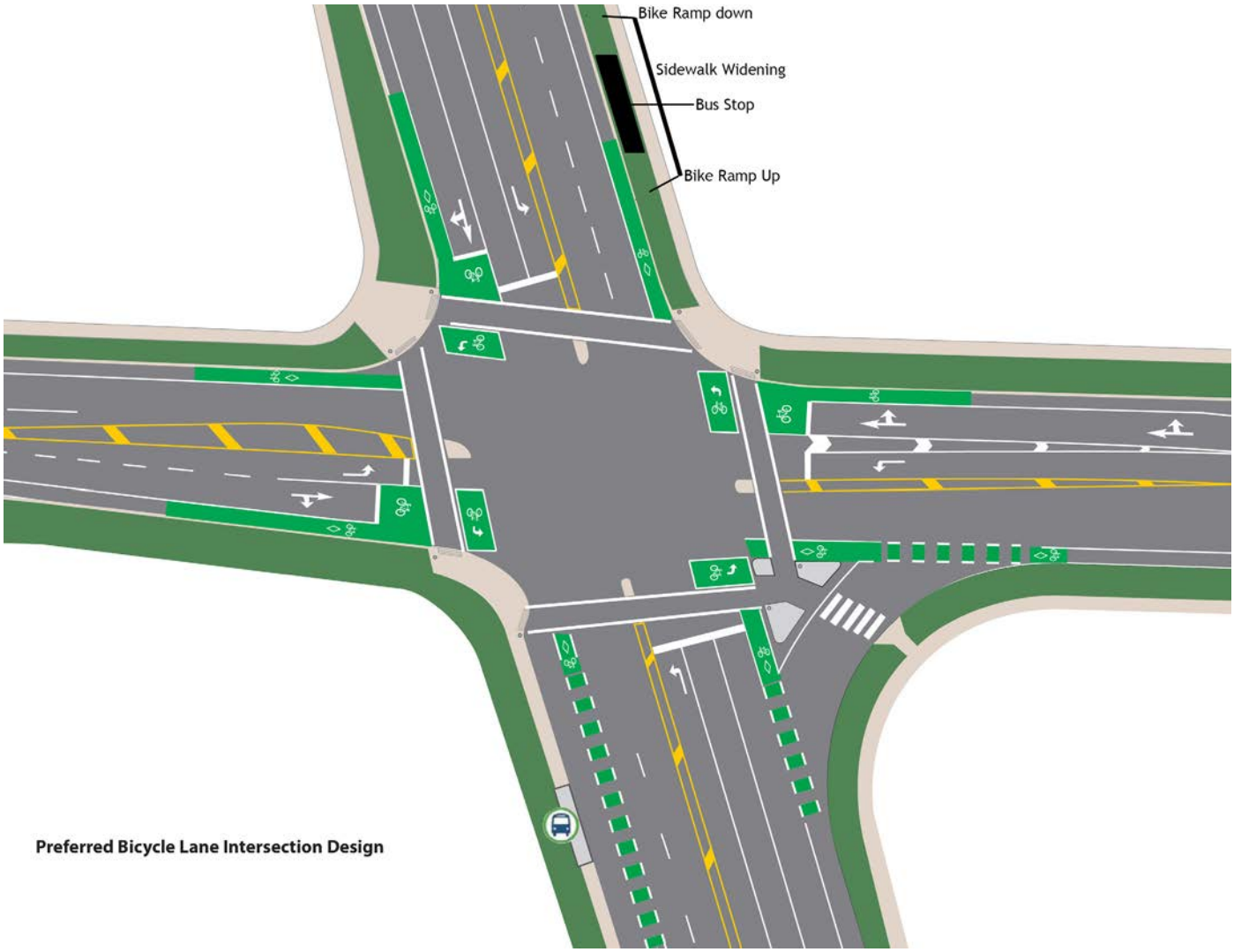


Figure D.17: Preferred Cycle Track Intersection Design