DELTA CYCLING MASTER PLAN

Delta

CITY OF DELTA | NOVEMBER 2022

Prepared by:

URBAN SYSTEMS

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INTRODUCTION

Delta is a municipality of just over 100,000 residents split across three communities – Ladner, Tsawwassen, and North Delta. Each community has its own cycling trip generators, including schools, commercial areas, recreation centres, local and regional parks, and transit connections. Delta also has several important regional transportation connections, including the Tsawwassen Ferry Terminal, Point Roberts border crossing, tunnel and bridge connections to Richmond and New Westminster, and on-street connections to neighbouring Surrey and Tsawwassen First Nation.

Delta's communities are connected by highways and narrow, rural roadways, making intercommunity bicycle travel a challenge. At the same time, Delta has relatively flat topography and several picturesque shoreline trails, making it an ideal environment for recreational cycling. The City has the opportunity to provide more safe and comfortable network connections that would encourage people of all ages and abilities to cycle to and from work, school, and other daily needs. This Cycling Master Plan represents the next step in encouraging and enabling cycling in Delta.

PLAN PURPOSE AND OVERVIEW

The Cycling Master Plan aims to increase bicycle use and create a culture of cycling in Delta by developing an integrated network of off-street pathways and on-street bicycle facilities that are comfortable for everyone. This includes new infrastructure projects as well as supporting policy and programming components that can educate and promote cycling as a practical, convenient, and safe transportation and recreation option for residents and visitors of Delta.

The Cycling Master Plan is a visioning document with long-term goals that will help guide Delta's investments in cycling over the next 20 years. The plan also includes short-term action plan to build a complete, connected, and comfortable cycling network for people of all ages and abilities, with a clear focus on actions over the next 5-10 years.

A PLAN FOR ALL AGES AND ABILITIES

One of the aims of the Cycling Master Plan is to develop a network that serves all areas of the City and provides equitable access for all residents. This means being inclusive of – and prioritizing – people of all ages, abilities, backgrounds, and identities. The Cycling Master Plan focuses on creating a city-wide network of bicycle facilities that are physically separated from traffic and on streets with low traffic volumes. This is an **All Ages and Abilities (AAA)** approach – meaning the facilities are safe, comfortable, and equitable for a wide range of users, from young children to older adults and everyone in between. The plan will include a core network of AAA facilities, complimented by a network of supporting facilities which will broaden the network and serve more confident commuter cyclists.

VISION

Delta envisions cycling as a **safe**, **comfortable**, **healthy**, and **equitable mobility choice** for people of **all ages and abilities**, for **all reasons**.

The City aspires to provide a cycling network with **connections within and between** its three urban areas, and takes advantage of the City's unique natural environment, flat topography, and moderate climate.

Cycling will help create a **livable**, **complete**, **green**, and **prosperous** community for residents and visitors.

GOALS

Livable	Delta will be a community where it is safe, fun, efficient, and affordable to travel by bicycle, and where cycling is an important part of a sustainable multi-modal transportation system.
Complete	Delta's cycling network will be complete and will connect to all major destinations within and between each of Delta's three urban areas, including schools, parks, commercial areas, and employment areas.
Green	Delta's cycling network will promote sustainable and non-polluting forms of transportation as way to improve environmental outcomes as well to connect to Delta's beautiful and unique parks, beaches, waterfront trails, rural areas, and natural spaces so all residents and visitors can easily access nature.
Planned	Delta will plan and prioritize investment in an objective and systematic way to strategically focus on projects with the greatest community benefits and cost-benefit to the community, including considering ease of implementation.
Prosperous	Delta residents and visitors will be able to access a wide variety of businesses by bicycle, and bicycle tourism will provide increased economic opportunities.
Involved	Delta will continue to engage with the community as it moves forward with implementing the Cycling Master Plan.

PILLARS, STRATEGIES, AND ACTIONS

The Cycling Master Plan outlines a series of strategies and actions based on three pillars – **A Connected Network**, **A Convenient Way to Move**, and **A Culture of Cycling**. Each pillar includes a series of strategies and more detailed actions for how to best achieve these outcomes. The pillars, strategies, and actions were all informed by analyzing feedback from the first public consultation held online in early 2021 as well as consultation with key stakeholders like HUB Cycling and Delta Committees. The strategies and actions provide holistic guidance regarding improvements to policies, standards, infrastructure, and programming to ensure that cycling is a comfortable and convenient choice for everyone.

PILLAR 1: A CONNECTED NETWORK

A Connected Network aims to create a safe, comfortable, complete, and connected network of cycling facilities within and between Delta's three urban areas as well as to foster regional connections. Establishing a complete network of cycling facilities is fundamental to creating a culture of cycling in Delta.

Delta already has an extensive cycling network of on-street and off-street bicycle facilities, and many residents make use of the numerous routes recreationally. However, there are many gaps in the network and limited number of facilities that are comfortable for people of all ages and abilities. The City can improve connectivity by better connecting key destinations within each of Delta's three communities, establishing spines that connect the communities to one another, and better linking Delta to the region. This will help to improve the ease of moving around the community, increase recreational opportunities, and make traveling by bicycle safer and a more practical transportation choice. The long-term cycling network is shown in **Map es 1**.

Five strategies have been developed to develop **a connected network**:

Strategy 1A: Develop All Ages and Abilities (AAA) Urban Centre Cycling Networks

Strategy 1B: Improve Cycling Connections Between Delta's Urban Centres and Industrial Areas

Strategy 1C: Improve Regional Connections

Strategy 1D: Address Barriers to Cycling

Strategy 1E: Integrate Transportation and Recreation

PILLAR 2: A CONVENIENT WAY TO MOVE

For cycling to become a more attractive and competitive way to move around Delta, it needs to be as safe and convenient as possible. Strategies aimed at improving the user experience in the Cycling Master Plan relate to the types of supporting infrastructure that is needed to support the convenient and comfortable use of the cycling network across Delta.

This strategy aims to support Delta residents and others to experience cycling as easy and effortless year-round. This can be done through a variety of approaches, such as providing short-term and long-term bicycle parking, supporting multi-modal connections, leveraging new technologies, and maintaining the network year-round. Providing a convenient and high-quality experience for people every time they use cycling routes will help to make cycling a more desirable transportation option.

Five strategies have been developed to create **a convenient way to move**:

Strategy 2A: Provide More Bicycle Parking and End-of-trip Facilities
Strategy 2B: Enable Multi-modal Connections
Strategy 2C: Leverage New Technologies
Strategy 2D: Keep the Network in a State of Good Repair
Strategy 2E: Update Guidelines and Standards

PILLAR 3: A CULTURE OF CYCLING

While the installation of new cycling routes is critical to increase the number of people cycling in Delta, a range of 'soft' support measures are also important to encourage more cycling. These measures can help to provide education and raise awareness about cycling in Delta and help achieve the goal of building a culture of active living. This pillar includes a range of strategies and actions that address support measures such as education, encouragement, and heightened awareness. These are all done with the intent of making cycling a safe, fun, and accessible part of everyday life.

Some of the ways the City can work to create an active culture and increase awareness and promotion of cycling routes is through education and encouragement initiatives, building awareness of routes and destinations, promoting active school travel and family-oriented activities, and creating cycle tourism opportunities.

Five strategies have been developed to create **a culture of cycling**:

Strategy 3A: Raise Education and Awareness
Strategy 3B: Make it Easy to Find the Way
Strategy 3C: Make Cycling Safe for Families and Promote Active School Travel
Strategy 3D: Promote Bicycle Tourism
Strategy 3E: Create and Promote Recreational Touring Loops

IMPLEMENTATION PLAN

The strategies and actions developed as part of the Cycling Master Plan are intended to guide the City's policy, planning, programming, and capital investment decisions as well as on-going public engagement, operations, and maintenance activities in support of building a cycling culture over the next 20 years. It is important to note that this plan is only one step towards implementing the vision for cycling in Delta; the long-term Cycling Master Plan will require significant financial investment, staff resources, and coordination between municipal departments, other levels of government, and external agencies and stakeholders.

The implementation section of the Cycling Master Plan prioritizes the actions and network improvements to ensure that the highest priority items are completed first, and that adequate funding levels are allocated to cycling projects. The Plan is meant to be a flexible and living document that is revisited and updated on a regular basis as needed, including further public and stakeholder consultation.

The City should incorporate the short-term priorities into its 5-year Capital Plan, and a new investment strategy should be developed for the long-term. High-level cost estimates have been developed for bicycle facilities on City-owned roadways. Cost estimates do not include any bicycle facilities under the jurisdiction of the Ministry of Transportation & Infrastructure. The total capital cost to implement on the Cycling Master Plan is approximately $105 million (see **Table es-1**).

The timeframe of the Cycling Master Plan depends on annual funding levels. Cycling routes have been prioritized as high, medium-high, medium, medium-low, and low priority (See Section 4.3). **Table es-1** shows the high-level cost estimates by priority and facility type (new vs. upgraded routes).

Priority	New Routes		Upgraded Routes		Total	
	KM	$	KM	$	KM	$
High (50+)	40	$16,405,000	29	$13,152,000	69	$29,557,000
Medium-High (40-49)	30	$12,530,000	20	$8,059,000	50	$20,589,000
Medium (30-39)	29	$14,730,000	16	$8,497,000	45	$23,227,000
Medium-Low (20-29)	24	$11,350,000	17	$15,577,000	41	$26,927,000
Low (<20)	10	$4,420,000	0	-	10	$4,420,000
Total	134.4	$59,435,000	88.8	$45,285,000	223.2	$104,720,000

Table es-1: Cost Estimates by Type of Facility

Table es-2 breaks down the high-level cost estimates by priority and sub-area. Of the three main communities, North Delta has the largest share of cycling projects, with just over $25 million worth of projects. The largest portion of facilities are in the "connections" area, which covers by far the largest distance. However, for the most part, these are lower priority facilities compared to those located in Ladner, North Delta, and Tsawwassen.

Priority	Ladner		North Delta		Tsawwassen		Connections	
	KM	$	KM	$	KM	$	KM	$
High (50+)	10	$5,187,000	41	$18,340,000	11	$4,010,000	7	$2,018,000
Medium-High (40-49)	15	$4,631,000	12	$5,406,000	13	$6,190,000	10	$4,361,000
Medium (30-39)	0	-	5	$1,453,000	10	$3,475,000	30	$18,300,000
Medium-Low (20-29)	0	-	0.3	$64,000	0	-	40	$26,862,000
Low (<20)	0	-	0	-	0	-	10	$4,417,000
Total	25	$9,818,000	58.0	$25,263,000	37.3	$13,675,000	103	$55,958,000

Table es-2: Cost Estimates by Sub Area

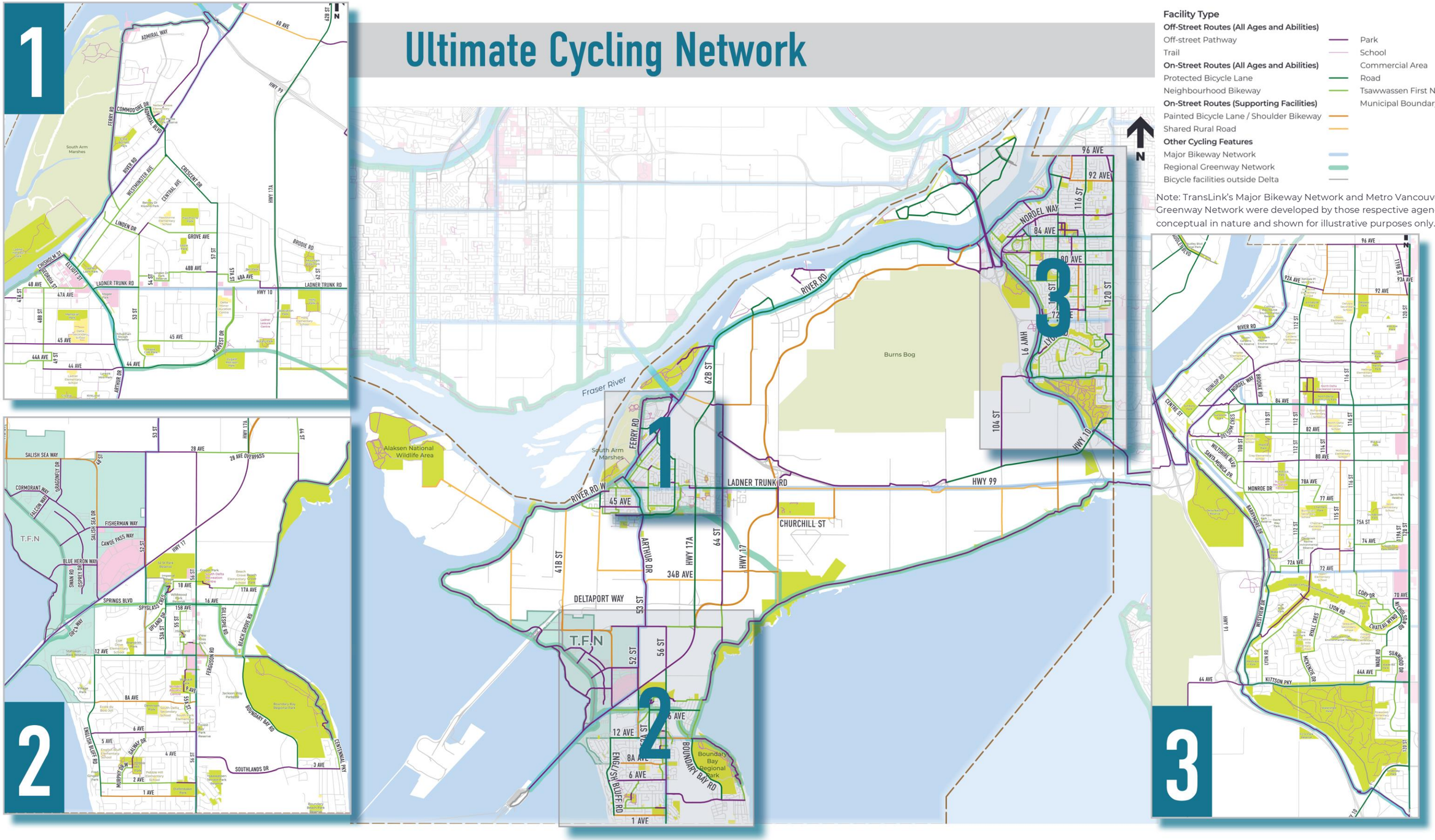
Various funding scenarios were reviewed for the five-year capital planning cycle. The funding scenarios were identified to illustrate potential cycling network development of high priority projects over the short-term (five years). This included scenarios of $100,000 annual funding (status quo) as well as increased funding levels to $250,000, $500,000, $1,000,000, $2,000,000, and $3,000,000 annually. While the City may not necessarily invest at those full levels directly itself, the City may be able to leverage other funding opportunities to help invest at higher levels.

As demonstrated in **Table es-3**, if the City continues to spends $100,000 per year, it will take several hundred years to complete the high priority cycling projects identified in this plan (and much longer to complete all routes). However, increasing annual funding levels will significantly speed up this process – for example, spending $3,00,000/year over, including leveraging external funding sources, would complete the high priority network in only 10 years. Furthermore, if the City prioritizes only the new cycling facilities rather than upgrading existing facilities, this will further accelerate the process. This would allow the City to build out a robust cycling network and focus on upgrading existing facilities over the medium and long term.

Priority	Annual Funding Scenarios					
	$100,000/ year	**$250,000/ year**	**$500,000/ year**	**$1,000,000 / year**	**$2,000,000 / year**	**$3,000,000 / year**
All High Priority Projects	300 years	120 years	60 years	30 years	15 years	10 years
New High Priority Projects Only	160 years	64 years	32 years	16 years	8 years	5 years

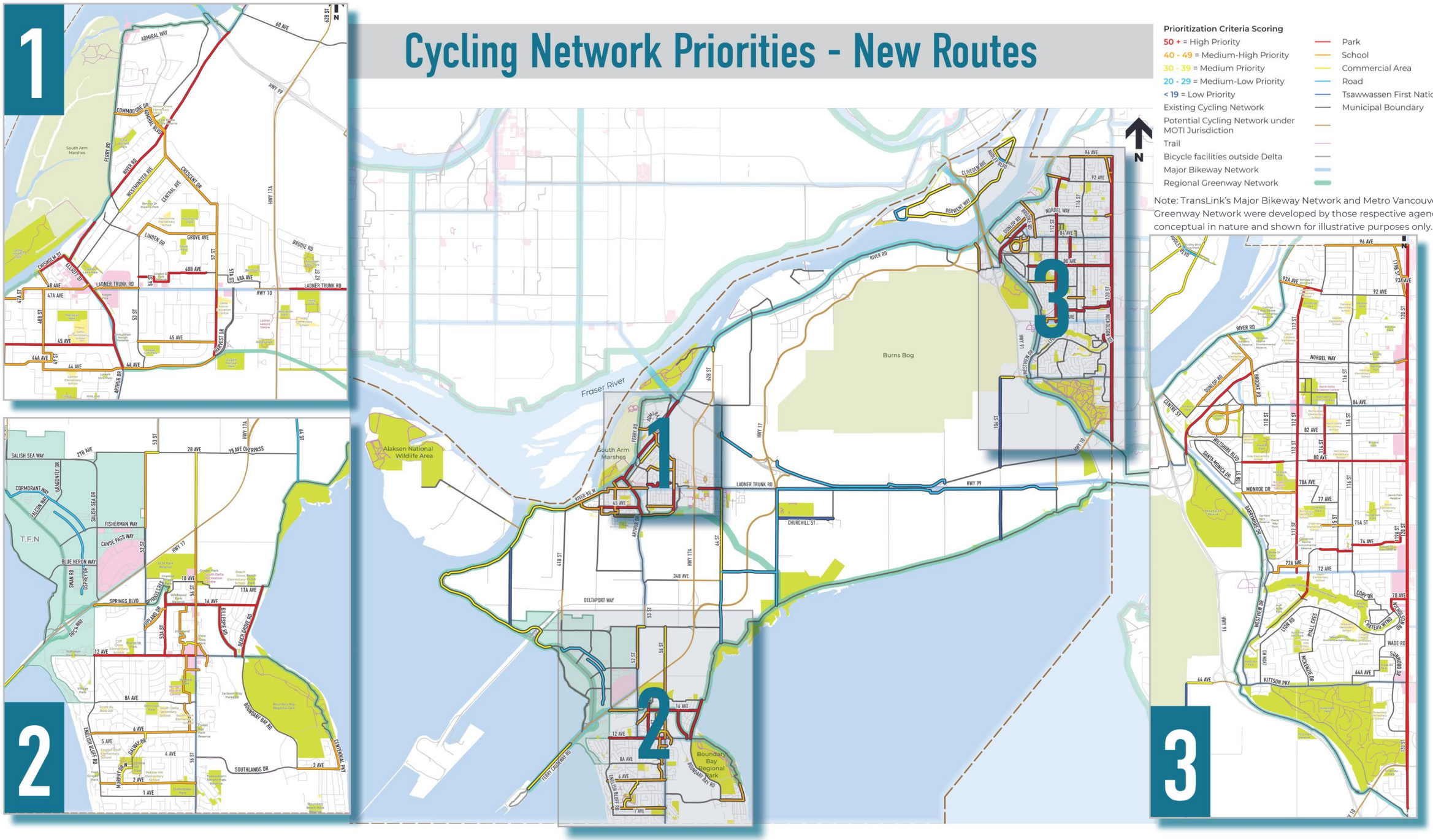
Table es-3: Number of Years Required to Complete High Priority Cycling Projects at Various Annual Funding Level Scenarios

Ultimate Cycling Network



Map es-1: Ultimate Cycling Network

Cycling Network Priorities - New Routes



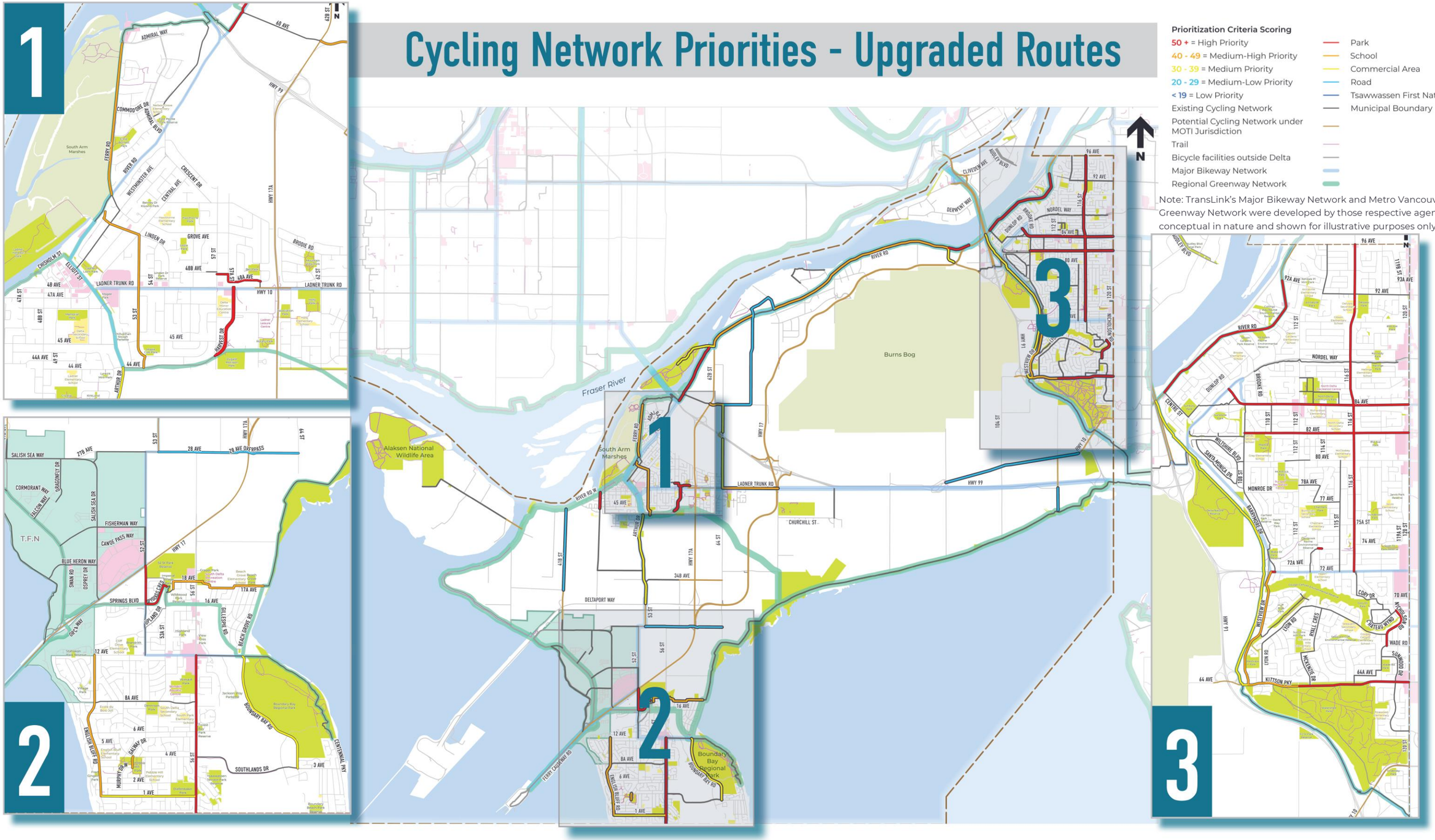
Prioritization Criteria Scoring

- 50 + = High Priority
- 40 - 49 = Medium-High Priority
- 30 - 39 = Medium Priority
- 20 - 29 = Medium-Low Priority
- < 19 = Low Priority
- Existing Cycling Network
- Potential Cycling Network under MOTI Jurisdiction
- Trail
- Bicycle facilities outside Delta
- Major Bikeway Network
- Regional Greenway Network
- Park
- School
- Commercial Area
- Road
- Tsawwassen First Nation
- Municipal Boundary

Note: TransLink's Major Bikeway Network and Metro Vancouver's Regional Greenway Network were developed by those respective agencies. They are conceptual in nature and shown for illustrative purposes only.

Map es-2: Priority Cycling Network – New Routes

Cycling Network Priorities - Upgraded Routes



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Map es-3: Priority Cycling Network – Upgraded Routes

1.0 INTRODUCTION

1.1 COMMUNITY CONTEXT

Delta is a municipality of just over 100,000 residents split across three communities – Ladner, Tsawwassen, and North Delta – separated by rich agricultural land and ecologically significant areas such as Burns Bog. Each community has its own cycling trip generators, including schools, commercial areas, recreation centres, local and regional parks, and transit connections. Delta also has several important regional transportation connections, including the Tsawwassen Ferry Terminal, Point Roberts border crossing, tunnel and bridge connections to Richmond and New Westminster, and on-street connections to neighbouring Surrey and Tsawwassen First Nation.

Delta's three urban areas are connected by highways and narrow, rural roadways, making intercommunity bicycle travel a challenge. At the same time, Delta has relatively flat topography and several picturesque shoreline trails, making it an ideal environment for recreational cycling. The city has the opportunity to provide more safe and comfortable network connections that would encourage people of all ages and abilities to cycle to and from work, school, and other daily needs.

This **Cycling Master Plan** represents the next step in encouraging and enabling cycling in Delta. The Cycling Master Plan aims to increase bicycle use and create a culture of cycling in Delta by developing an integrated network of off-street pathways and on-street bicycle facilities that are comfortable for everyone. This includes new infrastructure projects as well as supporting policy and programming components that can educate and promote cycling as a practical, convenient, and safe transportation and recreation option for residents and visitors of Delta.

INDIGENOUS CONTEXT

Delta is situated on Coast Salish territory, including the xʷməθkʷəy̓əm (Musqueam), Scəwaθn Məsteyəxʷ (Tsawwassen First Nation), and other Salishan language groups. Musqueam sχʷəy̓em̓ (ancient histories) describe inhabiting their traditional territory for thousands of years[1], while Tswassassen First Nation describes inhabiting the area since time immemorial.[2]

Today, Musqueam First Nation has over 60 hectares of territory in Ladner. Tsawwassen First Nation (TFN) ratified the first urban First Nations Treaty in British Columbia in 2009. As a result, the over 724 hectares of land between Ladner and Tsawwassen is multi-jurisdictional, with many interests to consider. Many cycling and walking routes run adjacent to and through TFN land, underlining the importance of working together to improve cycling. This includes the Great Blue Heron Way trail, a regionally significant multi-use pathway running along the shoreline, with further plans for enhancement driven by Elder Ruth Adams of the TFN. More information on the Great Blue Heron Way and connections with TFN are provided in **Section 3**.

Tsawwassen First Nation

[1] Source: musqueam.bc.ca/
[2] Source: tsawwassenfirstnation.com/about-tfn/our-nation/

1.2 PLAN OVERVIEW

The Cycling Master Plan is a visioning document with long-term goals that will help guide Delta's investments in cycling over the next 20 years. The plan also includes short-term action plan to build a complete, connected, and comfortable cycling network for people of all ages and abilities, with a clear focus on actions over the next 5-10 years.

The Cycling Master Plan establishes a vision and goals to improve cycling and outlines a series of strategies and actions based on three **Pillars** (see

Figure 1). Each Pillar includes a series of **Strategies** and more detailed **Actions** for how to best achieve these outcomes. The strategies and actions provide holistic guidance regarding improvements to policies, standards, infrastructure, and programming to ensure that cycling is a comfortable and convenient choice for everyone. **Section 3** of the plan outlines the pillars, strategies, and actions in greater detail.

Figure 1: Cycling Master Plan Pillars

The Cycling Master Plan is broken down into five sections:

1. **Introduction** highlights the overall purpose, process, and public engagement activities that have taken place to develop the Plan.
2. **Cycling in Delta Today** outlines the shaping influences that impact cycling in Delta, including land use and demographic characteristics, travel patterns, and opportunities and constraints for cycling.
3. **Building a Cycling Culture** outlines the plan's vision and goals, which build on Delta's overarching plans and policies. The vision and goals will guide cycling-related strategies and actions in Delta over the next 20 years and beyond.
4. **Action Plan** outlines the implementation and monitoring plan for the Cycling Master Plan. The Plan's strategies and actions have been prioritized over the short, medium and long-term, and performance measures have been developed to monitor implementation. This section also includes a summary of the high-level cost estimates for the Plan.
5. **Summary and Closing** provides an overview of the Plan and highlights where the City goes from here.

1.3 PURPOSE AND OBJECTIVES

The purpose of the Cycling Master Plan is to guide the development of safe and convenient cycling options over the next 20 years. This includes looking at on-street bicycle facilities, off-street pathways, and trails within the City.

By developing this Cycling Master Plan and promoting more cycling, Delta can work to reduce automobile dependence and greenhouse gas (GHG) emissions, increase physical activity and improve health outcomes, increase social connections, and reduce infrastructure demands.

The Cycling Master Plan focuses on:

- Enhancing the local network as well as strengthening inter-community and regional connections;
- Ensuring the City has the tools to implement projects and designs that will lead to the implementation of All Ages and Abilities bicycle routes and trails;
- Developing an implementation strategy to fund and build high priority facilities to fill gaps in the network;
- Ensuring maintenance schedules and repairs are targeted to efficiently maintain the infrastructure and allow residents to use bicycle routes and pathways year-round; and
- Educating and promoting cycling as a great transportation and recreation option for residents and visitors of Delta.

The Cycling Master Plan reflects evolving trends and best practices in bicycle planning and design. It also provides recommendations for encouraging cycling and making it safe, comfortable, and convenient to travel by all types of bicycle (including e-bikes, cargo bikes, bicycles with trailers, bicycles built for people with reduced mobility, and others). The goal is to make Delta more attractive, sustainable, equitable, and inclusive for people of all ages and abilities.

A PLAN FOR EVERYONE

One of the aims of the Cycling Master Plan is to develop a network that serves all areas of the City and provides equitable access for all residents. This means being inclusive of – and prioritizing – people of all ages, abilities, backgrounds, and identities.

CYCLING FOR ALL AGES AND ABILITIES

Delta's existing on-street cycling network is made up of painted bicycle lanes, signed routes, and paved shoulders. Cycling on shared facilities on quiet local roads is often comfortable for most people, but riding on unprotected, on-street facilities on major roads may not be.

The Cycling Master Plan focuses on creating a city-wide network of bicycle facilities that are physically separated from traffic and on streets with low traffic volumes. This is an **All Ages and Abilities (AAA)** approach – meaning the facilities are safe, comfortable, and equitable for a wide range of users, from young children to older adults and everyone in between. The plan will include a core network of AAA facilities, complemented by a network of supporting facilities which will broaden the network and serve more confident commuter cyclists.

Research from cities across North America has identified a spectrum of cyclists based on their interest in cycling and their level of tolerance for risk and traffic stress. As shown in **Figure 2**, the largest segment of the population is typically comprised of people who are "Interested but Concerned." [1] These people often own a bicycle but do not ride frequently due to concerns about the safety of cycling. Focusing on AAA bicycle facilities is critical to building a cycling culture where people of all ages – ranging from young children to older adults – feel comfortable cycling.

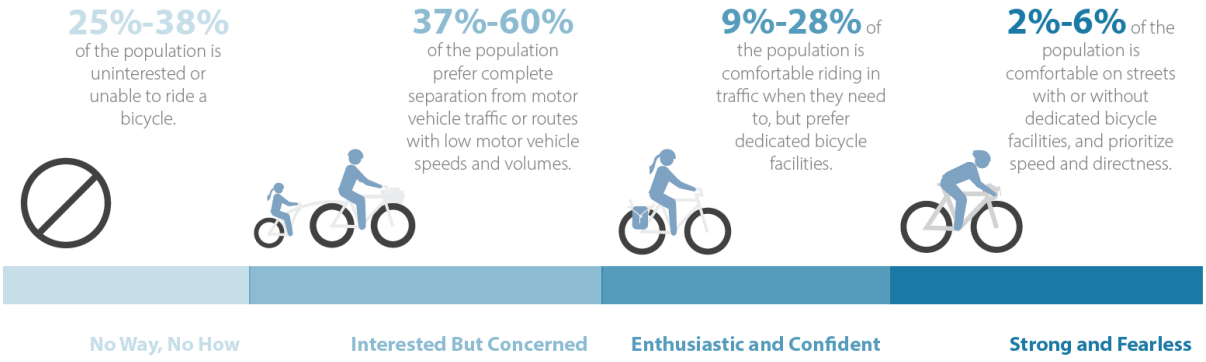


Figure 2: Bicycle Rider Spectrum

[1] Source: British Columbia Active Transportation Design Guide Chapter B.2. Note: the percentage of users for each category is shown as a range because the research is based on several different cities, each of which have their own unique contexts and types of bicycle users.

1.4 PLANNING PROCESS

The Cycling Master Plan was developed through an iterative four-phase process that involved exploring options, consulting community members and stakeholders, drafting ideas, sharing initial results, gathering and reviewing further community input, refining the content, and then creating a final plan (see **Figure 3**). The goal of this process was to create an implementable action plan to guide investments in cycling infrastructure and support programs to help make cycling a safe, convenient, and attractive transportation choice for everyone.

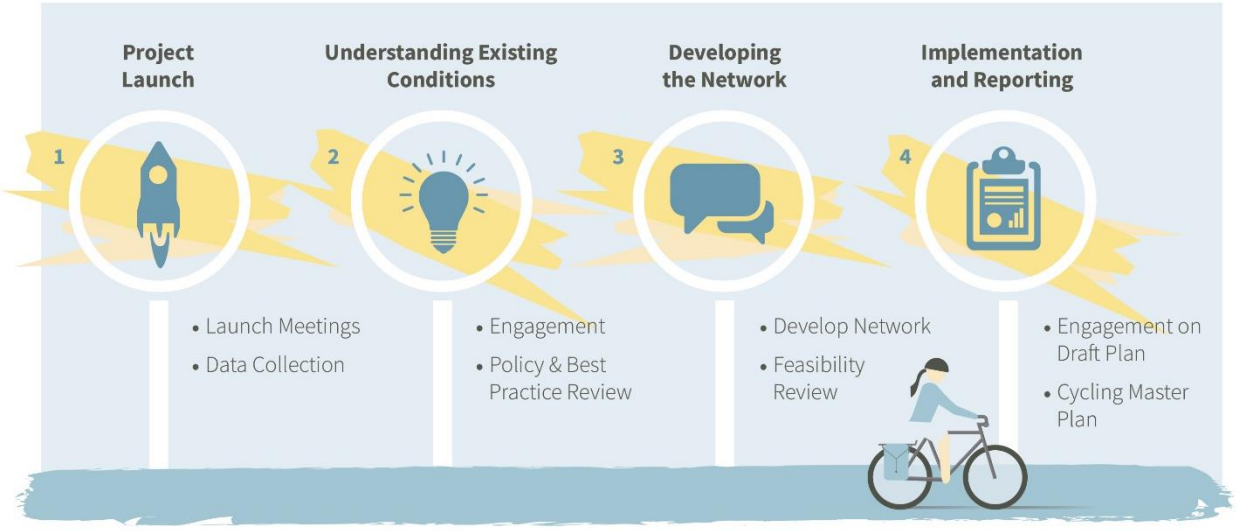


Figure 3: Planning Process

ENGAGEMENT

The Cycling Master Plan was launched to the public in January 2021 and included two round of public engagement that involved a multi-faceted engagement program, featuring online surveys, stakeholder workshops, public information meetings, and other engagement. Due to the on-going COVID-19 pandemic, in-person public engagement events were limited during the first round of engagement. However, the public were able to participate virtually in the planning process. In-person public engagement was possible during the second round of engagement.

For the first round of engagement, an online survey was open from January 7, 2021, to February 8, 2021, on Let's Talk Delta, the City's online engagement platform. The survey asked about commuting mode share, trip purpose, comfort levels while cycling in Delta, and COVID-19-related changes to travel patterns. It also asked respondents to identify issues or challenges for cycling in Delta, as well as things that would encourage people to cycle more. The survey received a total of 578 responses. Additionally, the survey included

an interactive mapping tool, allowing respondents to drop pins on a map of the City to indicate their favourite places to bike, cycling issues, trail issues, and suggestions for new cycling routes. The mapping tool received 387 total submissions from 58 different contributors.

For the second round of engagement, an online survey was available from June 15, 2022 to July 7, 2022 on Let's Talk Delta. The survey provided residents an opportunity to provide feedback on the draft plan. The webpage containing the survey generated 1,400 visits, resulting in 422 responses.

In addition to the online survey, several meetings were held with key partners and stakeholders. This included:

- A virtual stakeholder meeting with **HUB Cycling** on January 28, 2021. The group had a rich discussion and used a Mural board to locate specific areas of concern and suggestions to be considered in the Cycling Master Plan. Participants were directed to the City's online survey and Places tool to provide further commentary.
- Virtual meetings with the **Community Livability and Climate Action Advisory Committee** on January 20, 2021 and June 15, 2022. The group provided recommendations to be considered in the Cycling Master Plan and offered insight into certain cycling conditions in Delta such as high traffic volumes, regional and trail connections, filling gaps and building awareness and convenience in Delta.
- Two meetings with the **Mayor's Youth Council** were held on September 22, 2020, and June 22, 2021. The Council provided feedback on e-bikes and appreciated the recent cycling initiative of installing buffered bike lanes on 12 Avenue.
- Input was received from the **Ladner Village Renewal Advisory Committee**. They recommended that the Cycling Master Plan include improvements to walking and biking facilities accessing Ladner Village within a 10-minute/800 metre distance, to encourage people to bike and walk into the Village area to reduce parking needs.
- A virtual meeting with the **Community Resilience and Economic Recovery Support** team on March 9, 2021. The team provided comments for inclusion in the Cycling Master Plan such as a request for safe cycling routes to business parks as a form of traffic demand management, request for a AAA cycling facility running alongside the SFPR, request for MUPs to have clearly defined delineation of pedestrians and cyclists, and consultation with the business community for placement of bike racks.
- Input was received regarding **farm workers** in Delta. It was noted that hundreds of farm workers use bikes as their only mode of transportation and should be considered in the development of the Cycling Master Plan. Many of the farm workers in Delta are forced to use roads that have high traffic volumes and narrow road space. End-of-trip facilities were also recommended.
- Two **Public Information Meetings** were held on August 10 and 11, 2022 at City Hall and the Kennedy Recreation Centre, respectively.

- The draft plan was circulated and received input from **agencies**, including Tsawwassen First Nation, MOTI, Metro Vancouver, City of Surrey, and Delta Police Department.

A detailed summary of the first round of consultation is provided in **Appendix A**. A detailed summary of the second round of consultation is provided in **Appendix B**.

1.5 RELATED INITIATIVES

The Cycling Master Plan is closely linked to many other local, regional, and provincial plans and policies and initiatives that are guiding Delta's growth and development. **Appendix C** summarizes relevant plans and policies. This section highlights key initiatives that have a direct influence on the Cycling Master Plan.

OFFICIAL COMMUNITY PLAN

The Cycling Master Plan builds on the City's Official Community Plan (OCP), which laid out a commitment to creating a multi-modal transportation system. The OCP contains several policies related to cycling, including the opportunities to:

- Work with appropriate agencies to ensure all new or upgraded major road facilities include separated cycle/walkways where feasible, or provide reasonable connections to existing cycling network where not feasible (Policy 2.9.19);
- Continue to develop Delta's cycling network in accordance with recommended design guidelines (Policy 2.9.20);
- Improve cycling linkages between communities within Delta and regionally (Policy 2.9.21);
- Consider the needs of cyclists in road design and upgrading (Policy 2.9.22);
- Encourage the provision of cycling infrastructure and support programs, such as end-of-trip facilities for new developments within the community (Policy 2.9.23); and
- Encourage education and awareness campaigns to enhance cyclists' riding skills and road responsibilities and increase motorists' awareness of non-vehicle traffic such as cyclists who also use the road network (Policy 2.9.24).

Building on these commitments, the City developed the 2010 Cycling Infrastructure Prioritization Study, which provided Delta with an objective process to systematically identify and prioritize cycling infrastructure needs on an ongoing basis. The Cycling Master Plan is an update on this work from 2010.

TRANSPORT 2050

TransLink recently adopted Transport 2050. Transport 2050 includes several overarching goals, including creating a transportation network that provides convenient, reliable,

affordable, safe and comfortable, and carbon-free choices for everyone. Transport 2050 includes several strategies related to active transportation, including making active transportation the most convenient choice for most short trips. To do so, the plan identifies a Major Bikeway Network (MBN) of approximately 850 kilometres that builds on existing regional cycling networks and connects Urban Centres and major destinations (see **Figure 4**). The network will make it safer, more comfortable, and more convenient to use active transportation, including e-bikes and e-scooters, for longer distance trips between Urban Centres as well as shorter trips within communities.

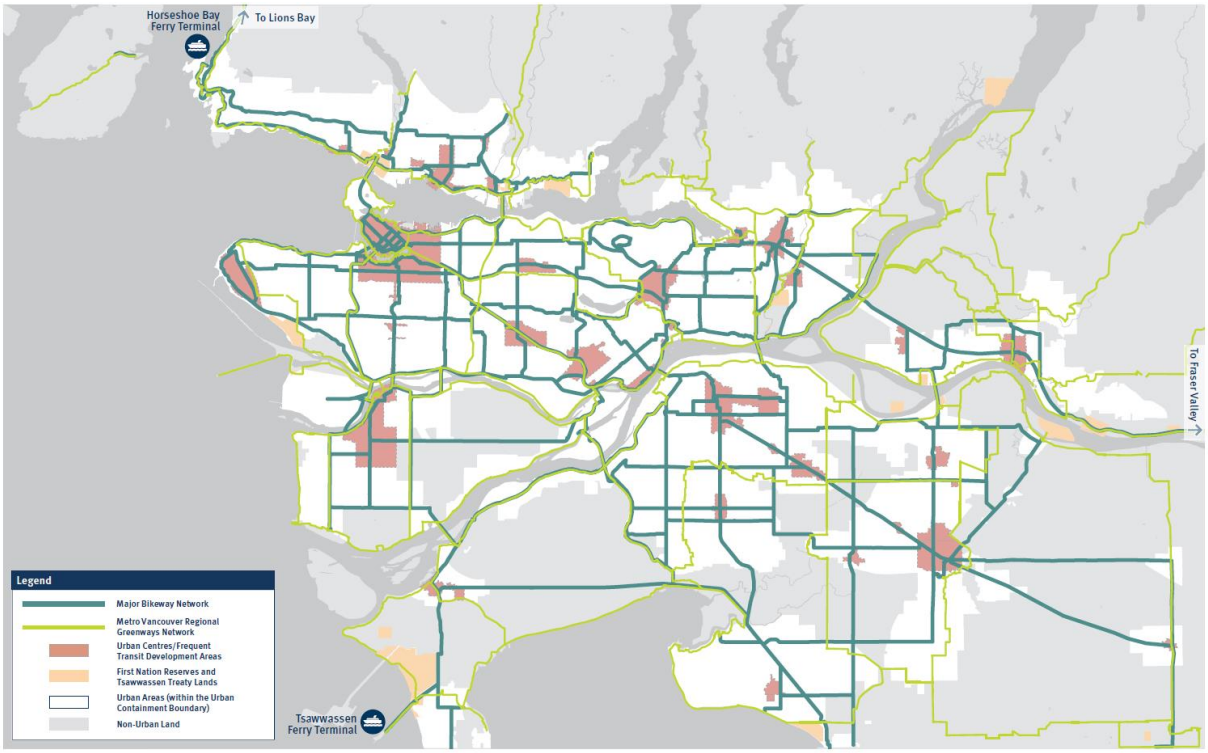


Figure 4: Major Bikeway Network (TransLink - Transport 2050)

METRO 2050 AND REGIONAL GREENWAYS 2050

Metro Vancouver recently adopted Metro 2050, Metro Vancouver's updated Regional Growth Strategy, and Regional Greenways 2050, which is the region's shared vision for a network of recreational multi-use paths for cycling and walking to connect residents to large parks, protected natural areas, and communities to support regional livability. Both plans identify a Regional Greenway Network (RGN), which is meant to include mixed-use routes for walking, running, rolling, riding horses, and cycling (see **Figure 5**). The Regional Greenways 2050 plan presents the following vision: "The region wide seamless network of recreational greenways and trails is the best way to experience the beauty of the region." The plan notes several inter-regional connections, including TransLink's MBN, Experience the Fraser, the Trans Canada Trail, and larger connections to other regional and international trails. The Metro Vancouver South Surrey Regional Greenway is part of the

RGN and is an important connection that terminates at 64 Avenue, although there is also an informal connection that extends to River Road. The City and Metro Vancouver should work together to identify improvement opportunities along this stretch. Metro Vancouver also operates the Delta South-Surrey Regional Greenway (DSSG) and the Dyke Trail in Boundary Bay Regional Park.

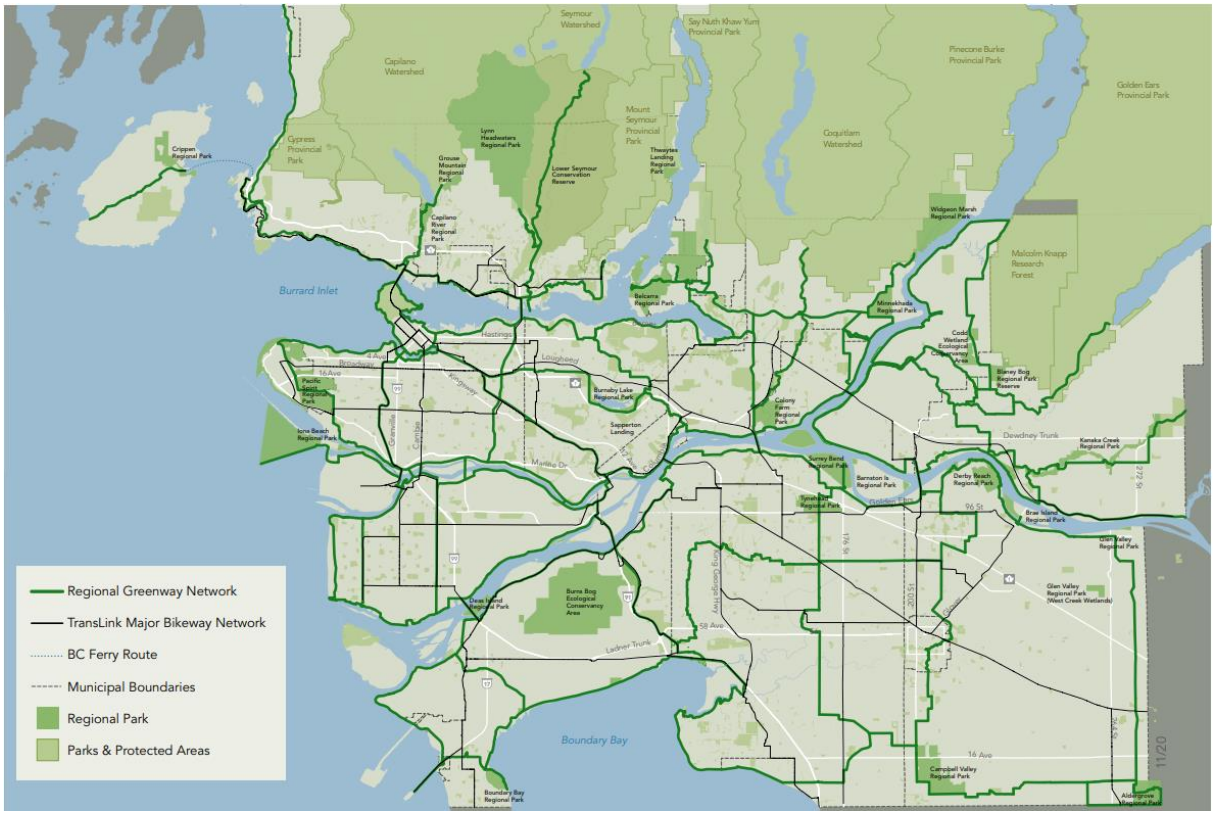


Figure 5: Regional Greenway Network (Metro Vancouver – Regional Greenways 2050)

EXPERIENCE THE FRASER PROJECT

In 2009, the BC Government provided Metro Vancouver and the Fraser Valley Regional District (FVRD) with $2 million to develop the Experience the Fraser Concept plan, A recreational, cultural and heritage project the plan that includes the Canyon to Coast Trail - a 550 km network of trails along the Lower Fraser River Corridor connecting Hope to the Salish Sea. The vision is for a continuous trail system on both sides of the Fraser River that stimulates investment for tourism initiatives across the two regions. ETF is a recreational, cultural and heritage project that spans 160 kilometres with 550 kilometres of trails and recreational blueways (of which 43% are already in place) along the Lower Fraser River Corridor connecting Hope to the Salish Sea (see **Figure 6**). The "Canyon to Coast Trail" is the foundation of the project.

As a part of the Canyon to Coast Trail, a series of portals and nodes are planned, with the west portal (connections to other regional trail networks and/or transportation modes)

being planned in Tsawwassen at the BC Ferries terminal. Delta's nodes are at the Tsawwassen ferry terminal, downtown Ladner and Tilbury, with an additional node in Tsawwassen First Nation.

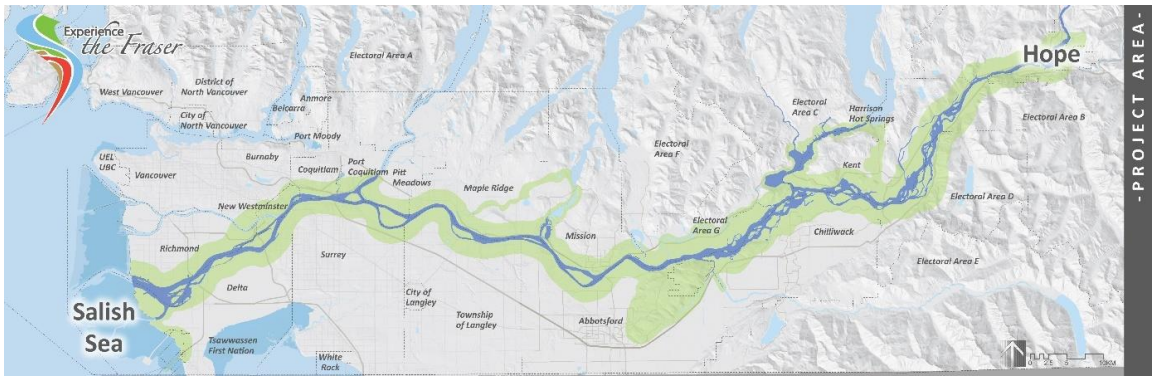


Figure 6: Experience the Fraser Project Area

GREAT BLUE HERON WAY

The Great Blue Heron Way (GBHW) is a vision of Tsawwassen First Nation (TFN) Elder Ruth Adams to connect TFN to neighbouring communities and First Nations via a multi-use, all ages and abilities network. The current route is 3 kilometres along the shoreline in TFN, but its proposed expansion is an important legacy of the TFN Neighbourhood Plan to educate and act as a welcoming cultural expression and regional reconciliation, bringing everyone living in TFN's traditional territories together.

The project was approved by TFN in 2014 and supported by Delta Council in 2015. TFN has been developing a Place-Making and Way-Finding strategy. In December 2020, the BC Government announced funding for the design of a 350-metre multi-use pathway connection between GBHW and the existing 27B Avenue multi-use pathway. The GBHW would connect to Delta via the George Massey tunnel, along the dike through to Tsawwassen First Nation, then towards Surrey via the Boundary Bay Dike Trail.

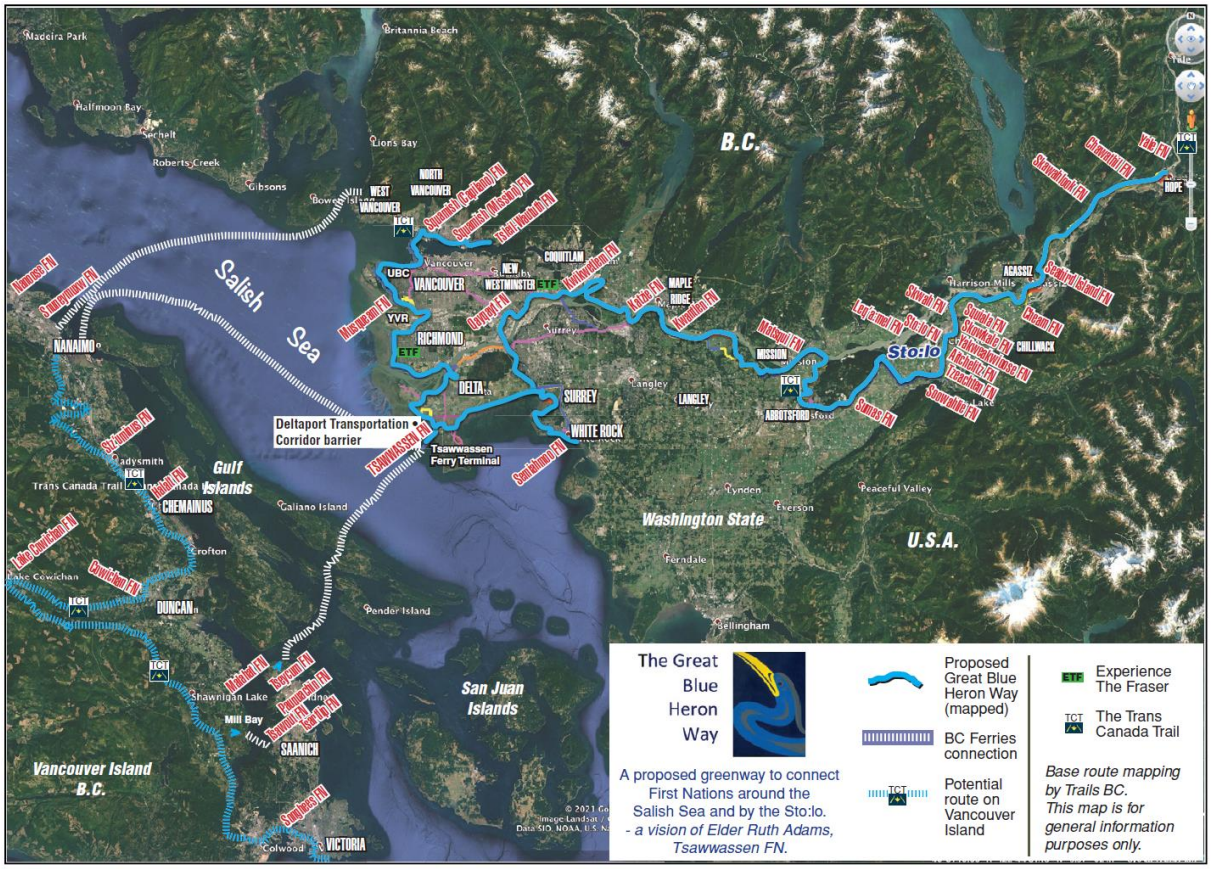


Figure 7: Conceptual Great Blue Heron Way Route (Trails BC and Elder Ruth Adams)

2.0 CYCLING IN DELTA TODAY

2.1 EXISTING CYCLING NETWORK

The City has made progress over the last decade to improve cycling through the continued development of the on-street and off-street cycling network. Delta's existing cycling network is made of both on-street and off-street facilities (see **Figure 8**).

On-street facilities include painted bicycle lanes, shared lanes, signed routes, and paved shoulders. Off-street facilities include both paved and unpaved multi-use trails. There are approximately 323 km of on-street cycling facilities and approximately 67 km of off-street cycling facilities in Delta.

390 KM OF BICYCLE FACILITIES AND GROWING

The City already has a well-developed cycling network, with over **390 km** of on-street and off-street cycling facilities. There are opportunities to improve these existing to provide a more comfortable experience for people of all ages and abilities.

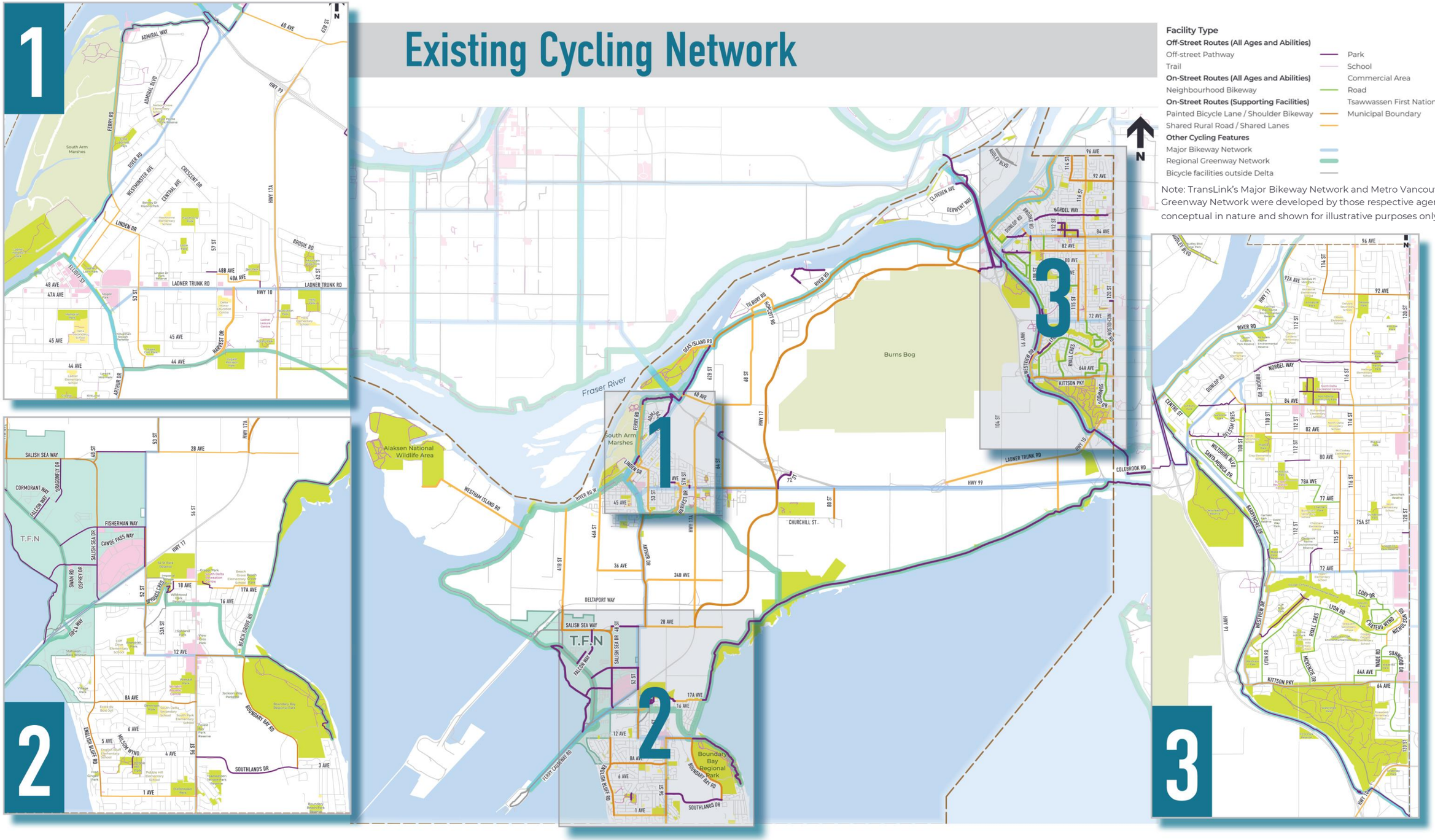
The City also has several supportive facilities and programs to encourage cycling. This includes bicycle wayfinding (e.g. signage, pavement markings, and physical/online maps) throughout the City, in-school education programs hosted by HUB Cycling, and facilities such as the Bike Pump Tracks at Holly Park in Ladner and North Delta Community Park. The Cycling Master Plan aims to build on this foundation.

CYCLING FACILITY COMFORT RATINGS

According to the HUB Cycling and TransLink Benchmarking the State of Cycling in Metro Vancouver report (2019), approximately 29% of Delta's cycling network is rated as "comfortable for most," which is below the regional average of 46% (see **Figure 9**). These comfortable routes are mostly multi-use pathways and trails along Roberts Bank, Boundary Bay, the Fraser River, and through Watershed Park. Approximately 19% of Delta's cycling facilities were rated as "comfortable for very few," meaning that cyclists must ride along roadways with high motor vehicle speeds and volumes.

The State of Cycling report acknowledges that there are significant challenges to providing comfortable cycling infrastructure in Delta, especially in rural areas, including right-of-way acquisition, ditch infills, and environmental compensation. This local context will need to be considered as the city develops a network of bicycle facilities that are safe, comfortable, and convenient for people of all ages and abilities.

Existing Cycling Network



Facility Type

Off-Street Routes (All Ages and Abilities)
- Off-street Pathway
- Trail

On-Street Routes (All Ages and Abilities)
- Neighbourhood Bikeway

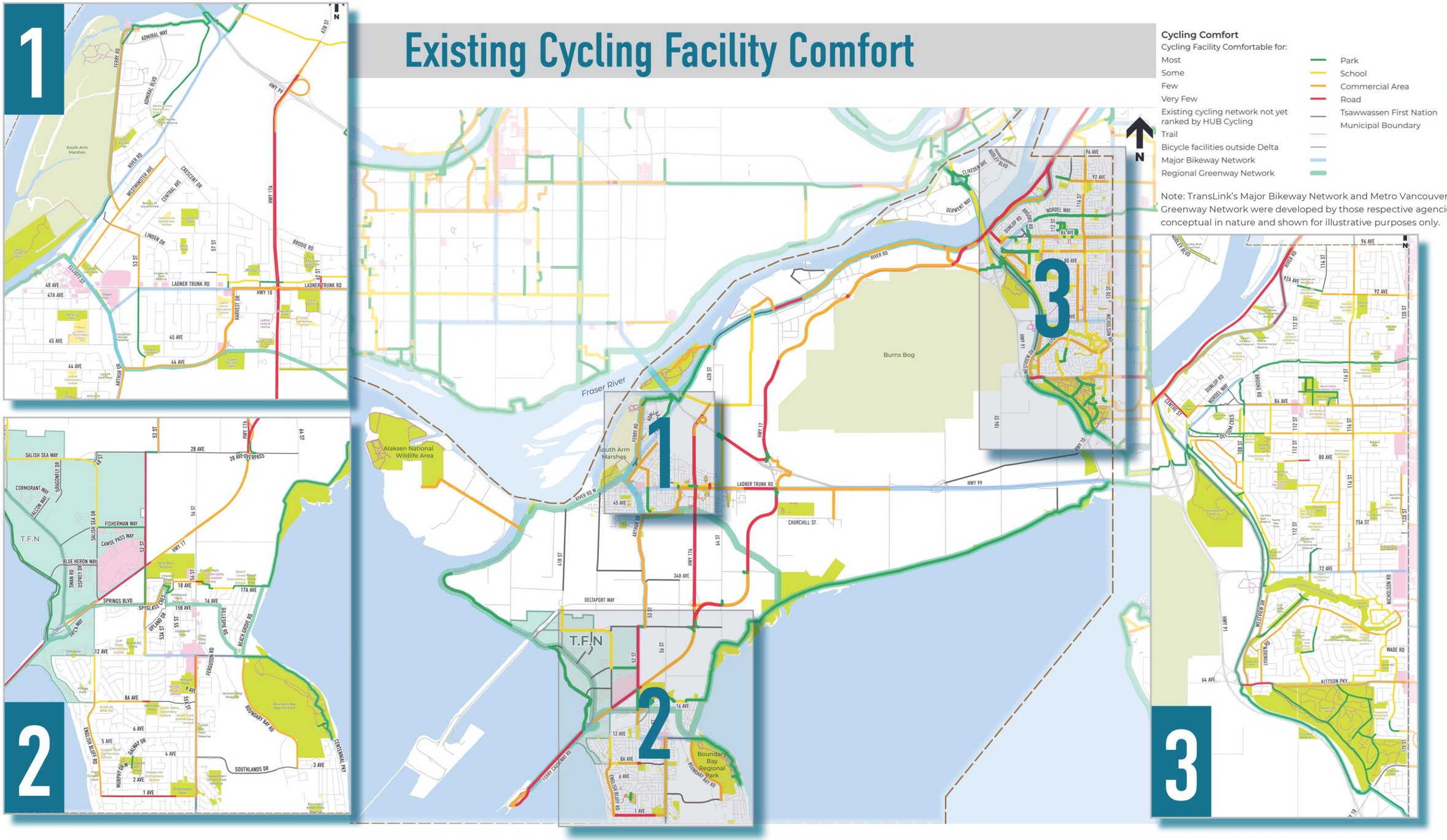
On-Street Routes (Supporting Facilities)
- Painted Bicycle Lane / Shoulder Bikeway
- Shared Rural Road / Shared Lanes

Other Cycling Features
- Major Bikeway Network
- Regional Greenway Network
- Bicycle facilities outside Delta
- Park
- School
- Commercial Area
- Road
- Tsawwassen First Nation
- Municipal Boundary

Note: TransLink's Major Bikeway Network and Metro Vancouver's Regional Greenway Network were developed by those respective agencies. They are conceptual in nature and shown for illustrative purposes only.

Figure 8: Existing Cycling Network

Existing Cycling Facility Comfort



Cycling Comfort

Cycling Facility Comfortable for:

- Most
- Some
- Few
- Very Few
- Existing cycling network not yet ranked by HUB Cycling
- Trail
- Bicycle facilities outside Delta
- Major Bikeway Network
- Regional Greenway Network
- Park
- School
- Commercial Area
- Road
- Tsawwassen First Nation
- Municipal Boundary

Note: TransLink's Major Bikeway Network and Metro Vancouver's Regional Greenway Network were developed by those respective agencies. They are conceptual in nature and shown for illustrative purposes only.

Figure 9: Existing Cycling Facility Comfort *(Source: Benchmarking the State of Cycling in Metro Vancouver. HUB Cycling & TransLink, 2019)*

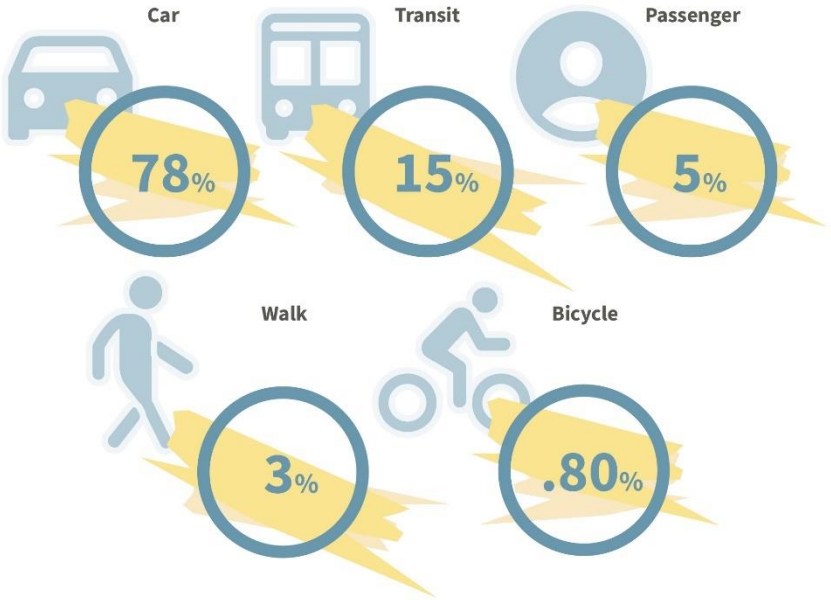
2.2 TRAVEL PATTERNS

Key existing travel patterns are summarized below. It is important to note that the location of Delta's residential areas in relation to local and regional employment centres makes commuter cycling a challenge. To grow the number of cyclists and better accommodate residents' needs and aspirations, the City is committed to making it safer, easier, and more enjoyable to cycle for all purposes in Delta.

Mode Share

Cycling accounted for less than 1% of Delta's commuting trips in 2016, well below the Metro Vancouver average of 2.3%. While this number is small, it only captures those commuting to work and does not reflect those who cycle recreationally.

Main Mode of Commuting to Work in Delta (2016)

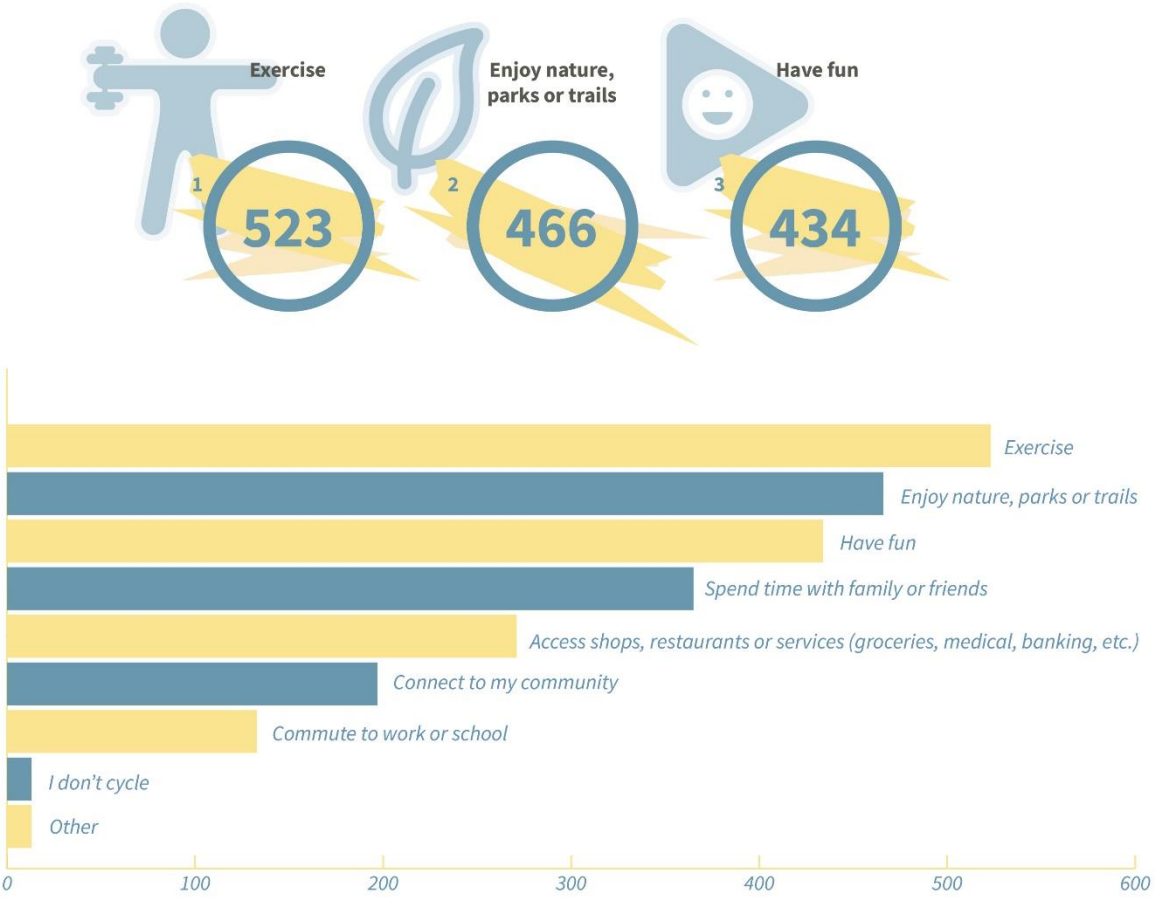


Source: Statistics Canada (2016)

Trip Purpose

Most Delta residents who cycle do it for exercise, enjoying nature, parks, or trails, and to have fun. Fewer respondents said they commute to work or school by bicycle, which aligns with the Statistics Canada data.

Purpose of Cycling Trips (2021)

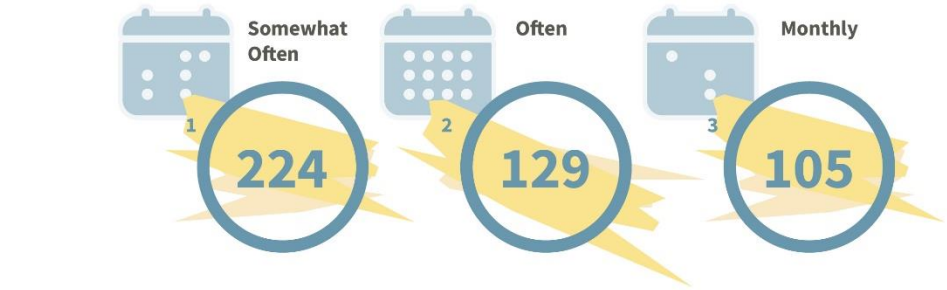


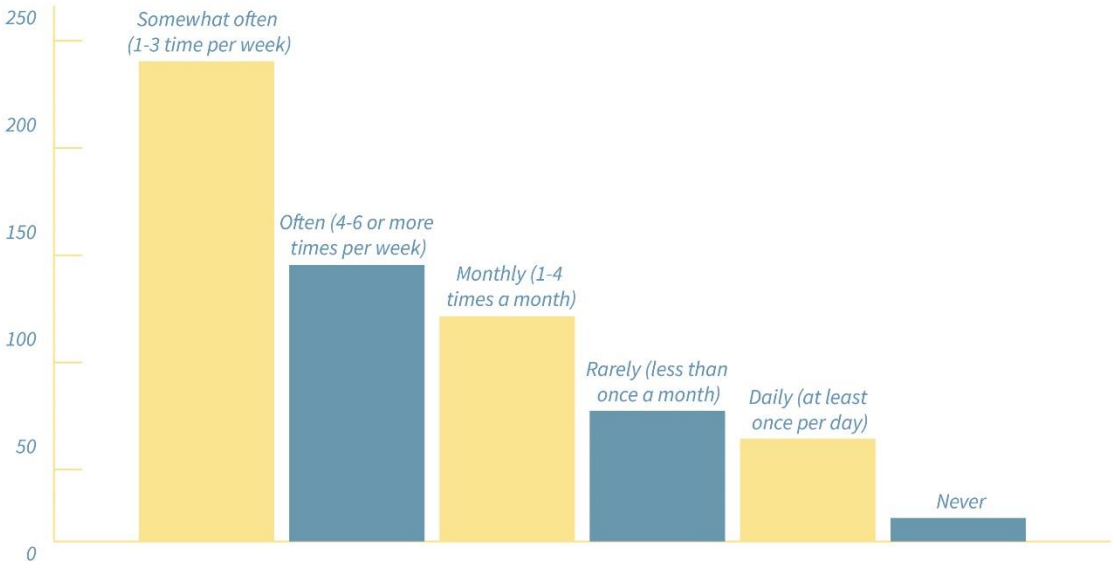
Source: Cycling Master Plan Survey #1 (2021)

Trip Frequency

Most survey participants cycle somewhat often (1-3 times per week), while nearly all respondents bike at least 1-4 times per month.

Cycling Trip Frequency (2021)

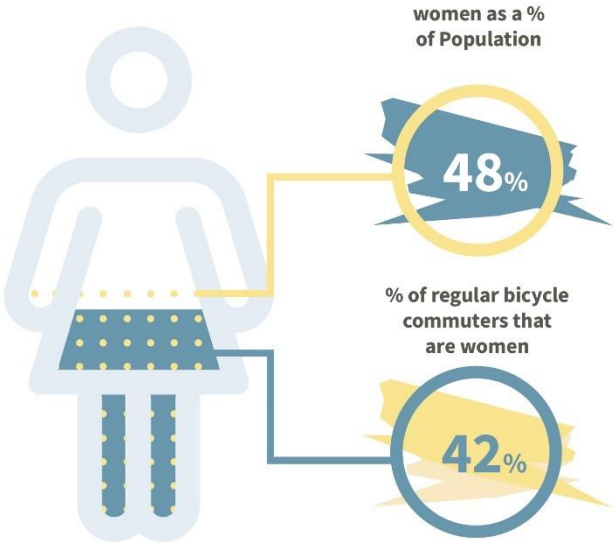




Source: Cycling Master Plan Survey #1 (2021)

Women Cycling

The proportion of women cycling is often an indicator of a safe cycling community. In Delta, women make up approximately 48% of the population and about 42% of regular bicycle commuters are women according to the 2016 Census. This is a higher proportion of women cycling than in many similar communities.

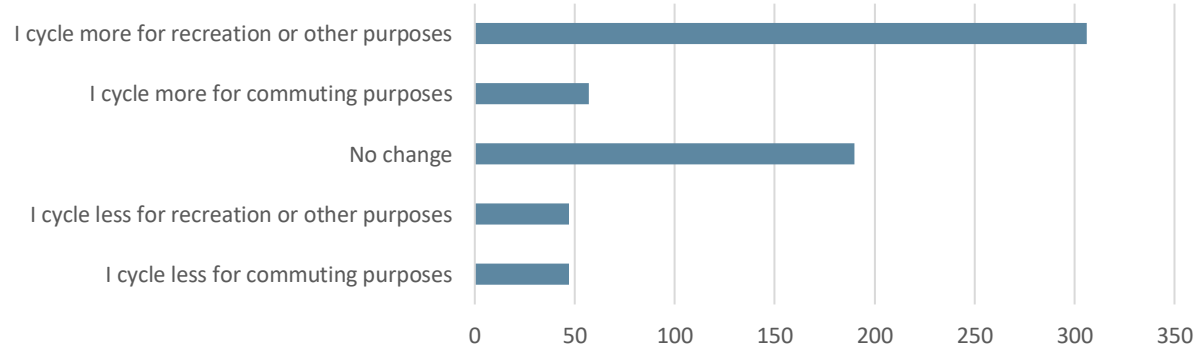


Source: Statistics Canada Census (2016)

COVID-19 Mobility Impacts

In cities across North America, travel patterns have changed dramatically because of the COVID-19 pandemic. Many cities around the world saw drastic decreases in both motor vehicle traffic volumes and transit use, both of which often decreased by 50% or more. In Delta, most survey respondents indicated cycling more for recreation and other purposes due to COVID-19.

Changes to Typical Transportation Habits due to COVID-19 Pandemic, 2021



Source: Cycling Master Plan Survey #1 (2021)

2.3 THE MARKET FOR CYCLING

Several analyses were completed to understand the market for cycling in Delta. 'Market' refers to the demand and potential for cycling.

DEMAND

A demand analysis was undertaken to understand overall active transportation demand in Delta. The first online survey helped to provide an understanding of the overall demand for cycling (see **Appendix A** for full summary of the first online survey). As noted above, traditional measures of understanding cycling demand, such as Statistics Canada's Census, only capture commute-based trips, which can significantly underestimate the overall demand for cycling.

The survey found that the most common reasons why people cycle are for exercise, followed by enjoying nature, parks and trails, and having fun (see **Figure 10**). Other reasons why people cycle include accessing shows, restaurants, or services; spending time with family or friends; and connecting to the community. Commuting to work or school was one of the lowest identified reasons why people choose to cycle in Delta. As noted above, the demand for recreational cycling also increased in Delta and around the world due to COVID-19.

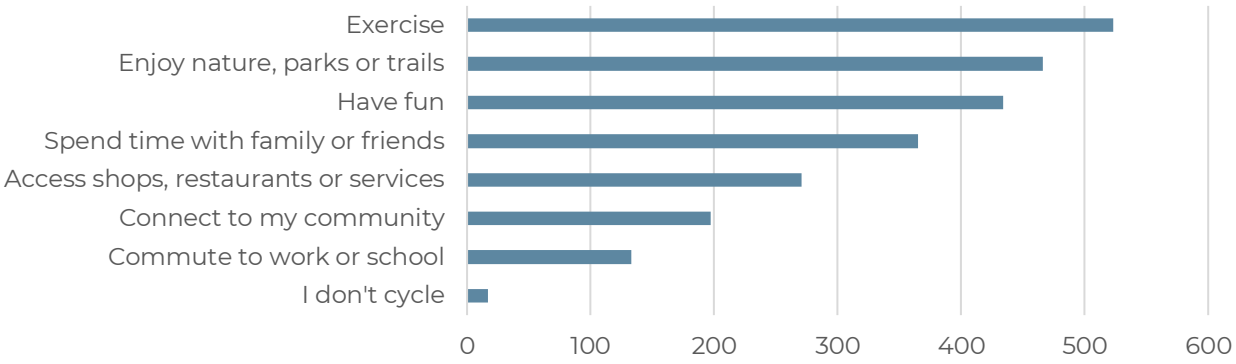


Figure 10: Reasons Why People Cycle in Delta

CYCLING POTENTIAL

An analysis was conducted of the cycling potential throughout the City. 'Potential' refers to identifying specific neighbourhoods with the most opportunities to increase cycling. This analysis examined a variety of factors that can help make cycling more attractive, such as road network density, road network connectivity, land use mix, permeability and topography. The results of this analysis show that the areas with the greatest cycling potential are in Delta's urban areas due to the dense, well-connected grid street network, higher population and employment densities, and mixed land uses (see **Figure 11**).

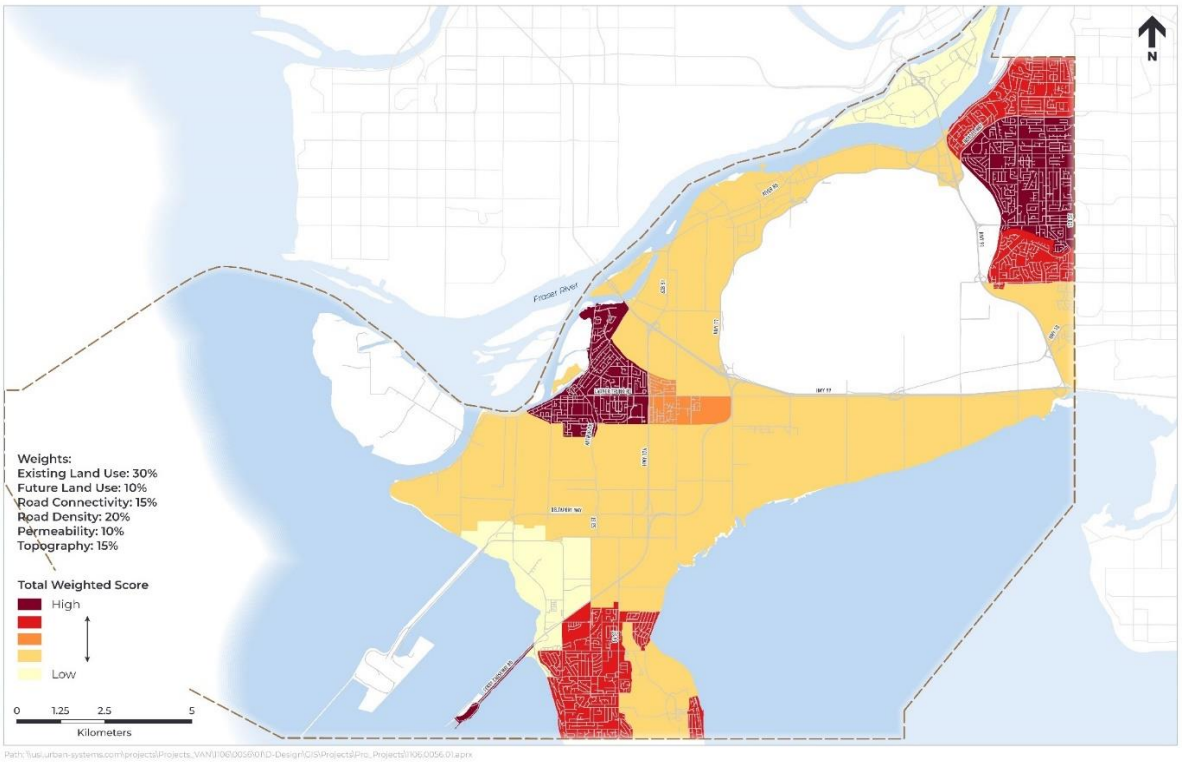


Figure 11: Cycling Potential in Delta

2.4 CHALLENGES AND OPPORTUNITIES

Through the first online survey, several challenges and opportunities for cycling in Delta were identified. The survey found that the top three issues or challenges for cycling were a lack of dedicated on-street bicycle lanes, lack of bicycle routes that are physically separated from traffic, and gaps in the cycling network (see **Figure 12**).

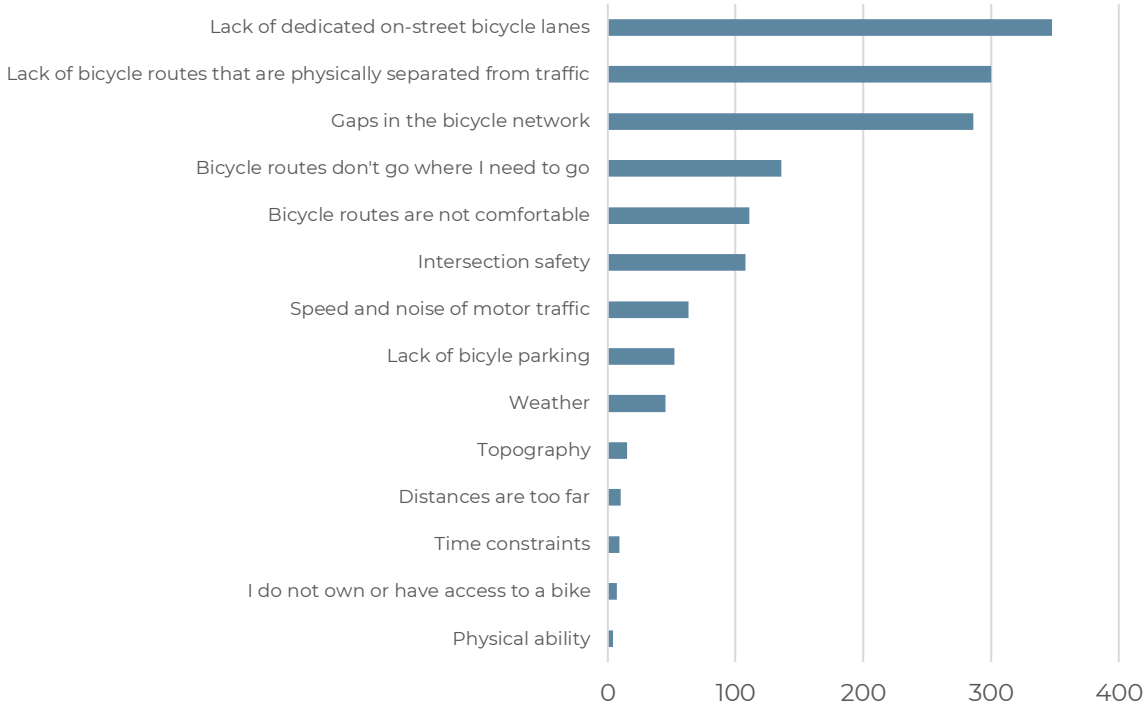


Figure 12: Issues or Challenges for Cycling

The survey found that the greatest opportunity to encourage people to cycle more was by providing more bicycle lanes that are physically separated from motor vehicles, filling in gaps in the cycling network, and providing more on-street painted bicycle lanes (see **Figure 13**). Providing more bicycle routes on quiet streets and ensuring bicycle routes are properly maintained were also seen as good ways to encourage more cycling.

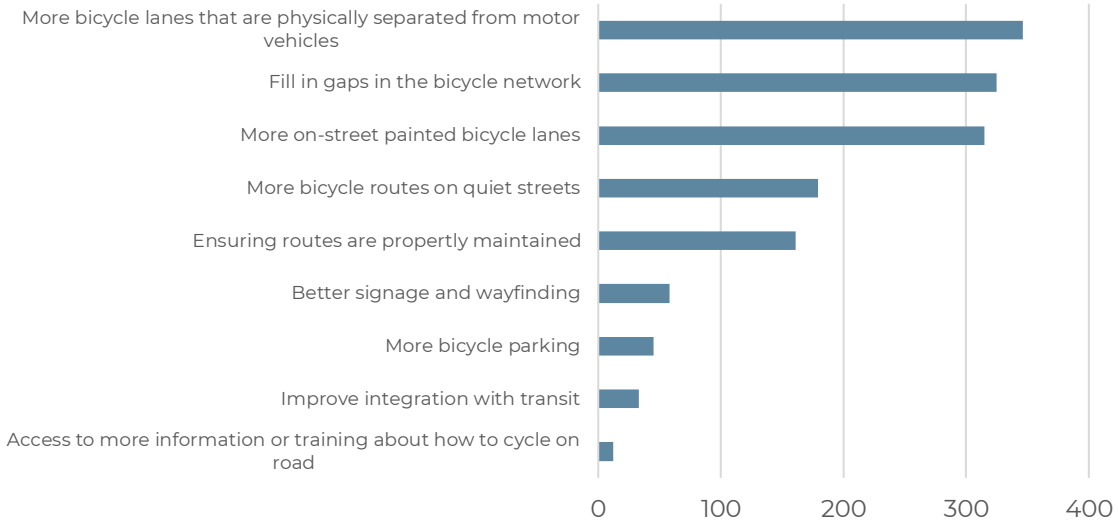


Figure 13: Opportunities to Encourage More Cycling

The online survey also provided an interactive mapping tool which was used to develop 'heat maps' showing where clusters of mapping pins appeared, including identified cycling issues (see **Figure 14**) and issues with the trail network (see **Figure 15**). A detailed summary of findings is provided in the Round One Public Consultation Results in **Appendix A.**

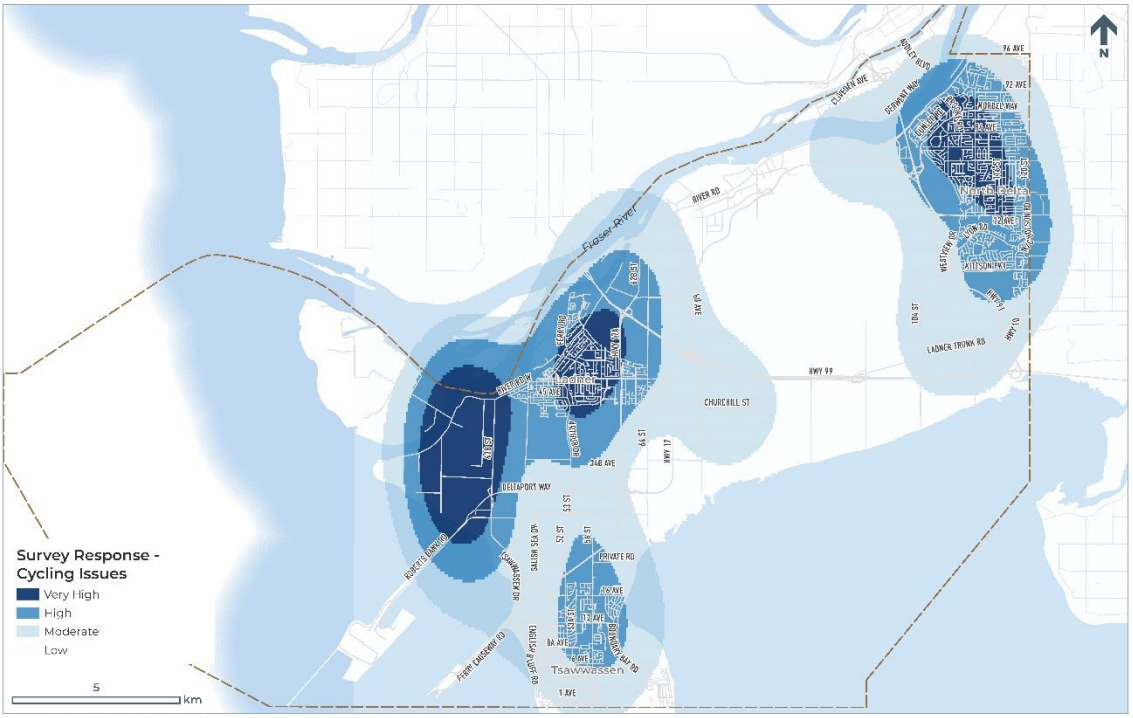


Figure 14: Cycling Issues

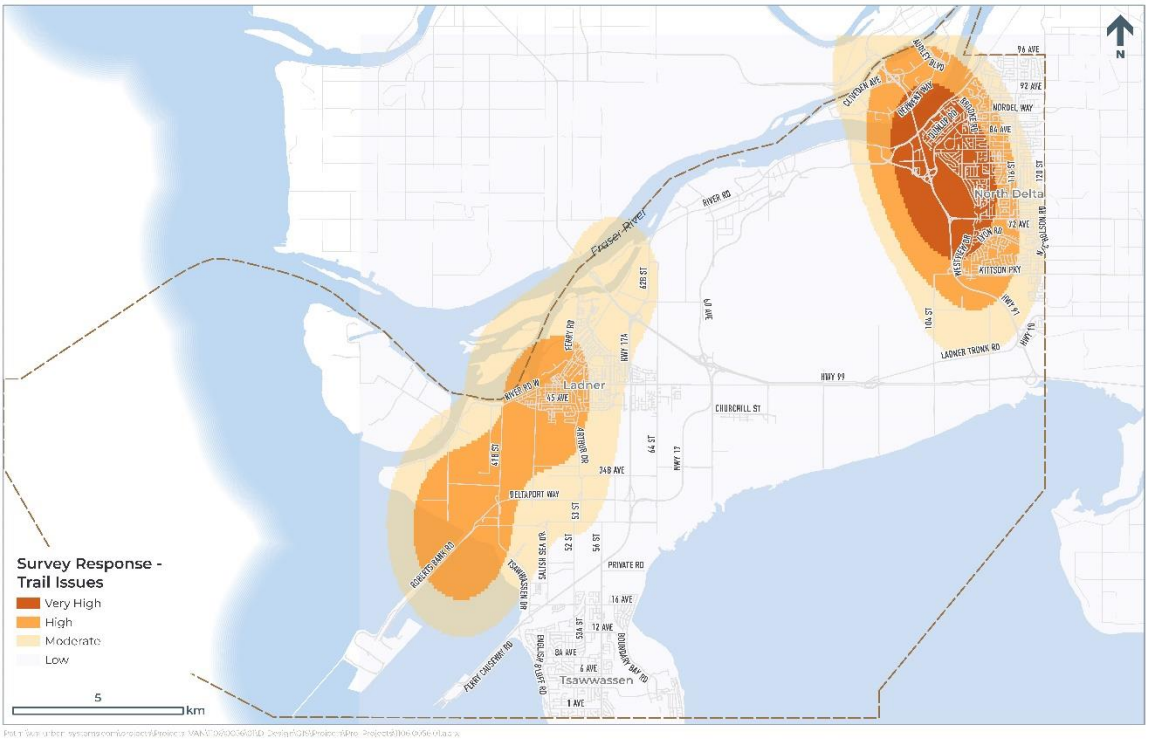
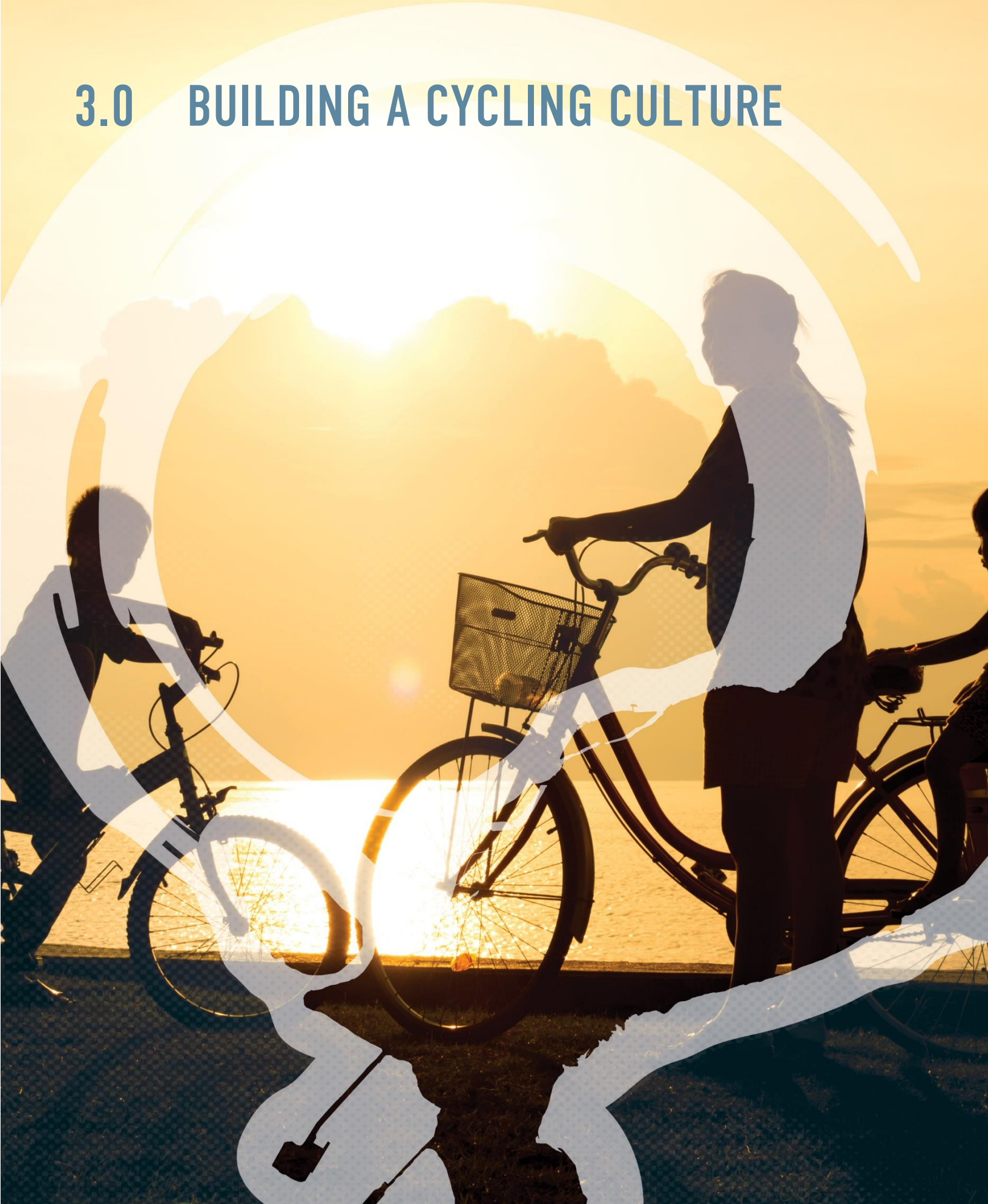


Figure 15: Trail Issues

3.0 BUILDING A CYCLING CULTURE



Building a cycling culture in Delta will require significant investments in a network of cycling infrastructure, in addition to new programs and policies to promote awareness, education, and safety of all road users. To guide future investments, a **vision** and **goals** have been developed. This vision and goals are supported by three **pillars**, each of which include a range of **strategies** and **actions**. This section outlines the proposed cycling network and introduces the supporting strategies and actions that will help to develop a cycling culture.

3.1 VISION

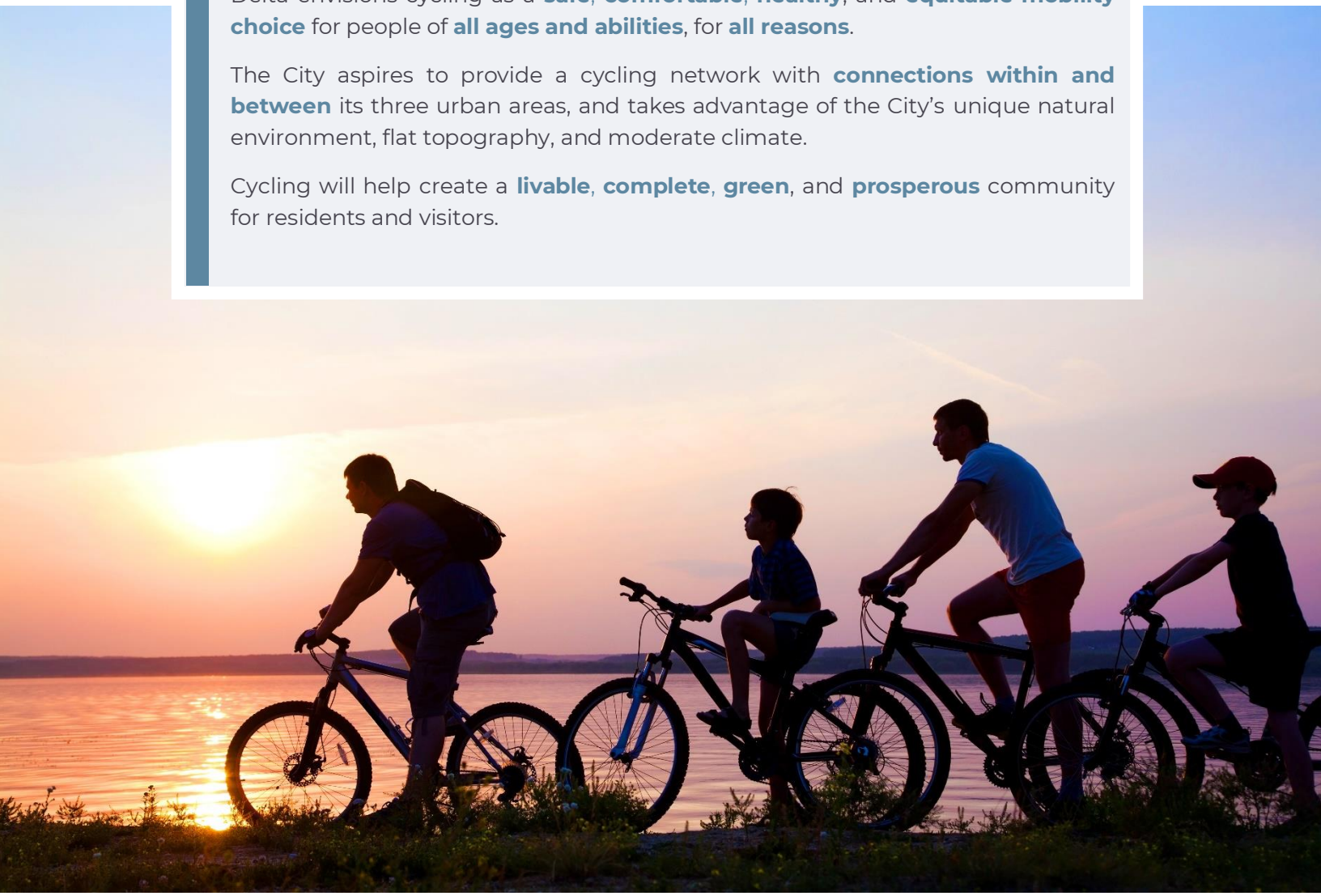
The Cycling Master Plan's vision and goals are intended to be long-range, holistic, and integrated with the overarching goals of Delta's three communities and the region as a whole. The vision and goals were developed based on existing plans and policies – such as Delta's Official Community Plan – along with feedback from City staff, community members, and stakeholders.

VISION

Delta envisions cycling as a **safe**, **comfortable**, **healthy**, and **equitable mobility choice** for people of **all ages and abilities**, for **all reasons**.

The City aspires to provide a cycling network with **connections within and between** its three urban areas, and takes advantage of the City's unique natural environment, flat topography, and moderate climate.

Cycling will help create a **livable**, **complete**, **green**, and **prosperous** community for residents and visitors.



3.2 GOALS

Delta's OCP identifies six community goals. To ensure that the Cycling Master Plan is aligned with and supports the City's overarching goals, these six goals have been carried forward and adapted for the Cycling Master Plan, as outlined below:

GOAL	OCP GOAL STATEMENT	CYCLING MASTER PLAN GOAL
Livable	*Delta will be sustainable, healthy and safe, and a place in which today's quality of life will also be enjoyed in the future.*	Delta will be a community where it is safe, fun, efficient, and affordable to travel by bicycle, and where cycling is an important part of a sustainable multi-modal transportation system.
Complete	*Delta will be a community in which people of all ages, family structures, backgrounds and interests can live, work and play.*	Delta's cycling network will be complete and will connect to all major destinations within and between each of Delta's three urban areas, including schools, parks, commercial areas, and employment areas.
Green	*Delta will protect the natural environment, agricultural lands, and heritage features.*	Delta's cycling network will promote sustainable and non-polluting forms of transportation as a way to improve environmental outcomes as well to connect to Delta's beautiful and unique parks, beaches, waterfront trails, rural areas, and natural spaces so all residents and visitors can easily access nature.
Planned	*Delta will foster development in a planned and integrated manner that respects natural systems, manages urban growth, preserves built and natural heritage, provides transportation choices and reinforces neighbourhood identity.*	Delta will plan and prioritize investment in an objective and systematic way to strategically focus on projects with the greatest community benefits and cost-benefit to the community, including considering ease of implementation.
Prosperous	*Delta will provide a wide range of economic opportunities and sustain a healthy and diverse economy.*	Delta residents and visitors will be able to access a wide variety of businesses by bicycle, and bicycle tourism will provide increased economic opportunities.
Involved	*Delta will balance competing interests and values, maintain fairness and equity and involve all residents and stakeholders in decision-making processes.*	Delta will continue to engage with the community as it moves forward with implementing the Cycling Master Plan.

3.3 BUILDING THE NETWORK

Developing a complete and connected network of cycling facilities that are suitable and comfortable for all users is an important component of meeting the Cycling Master Plans' vision and goals and building a culture of cycling. By designing a cycling network that is visible, intuitive, and connected, residents and other cyclists can enjoy cycling in Delta for a variety of trip types.

The development of the network was informed by a feasibility review, discussions with City staff, and public and stakeholder engagement at key milestones throughout the process. This section summarizes the process to develop Delta's cycling network.

STEP 1: ASSESSING EXISTING CONDITIONS

An assessment of the current cycling network was conducted based on available data. This involved developing an inventory of all existing on-street bicycle facilities and off-street pathway by facility type and by comfort level based on the TransLink and HUB State of Cycling report. With this inventory of the existing cycling network, a GIS analysis was conducted to identify barriers (such as watercourse, rail, and highways) as well as gaps in the network. Input from the first round of public engagement was also used to identify barriers and gaps as well as locations where improvements to bicycle facilities were desired.

STEP 2: ESTABLISH GUIDING PRINCIPLES

Delta's proposed cycling network was developed based on a series of three overarching network planning principles:

- **A Comfortable Network.** The proposed cycling network focuses on developing a core All Ages and Abilities ("AAA") network, complemented by supporting non-AAA facilities. The purpose of an AAA network is to provide an interconnected system of bicycle facilities that are comfortable and attractive for all users. The AAA cycling network will include three types of bicycle facilities that are most effective at increasing ridership: neighbourhood bikeways, separated bicycle lanes, and multi-use trails. These facilities are the most preferred types of facilities by all users and are proven to be the safest types of facilities. While a major guiding principle of Delta's proposed cycling network is to provide AAA facilities, it is important to note that there is still a place for complementary, non-AAA facilities such as painted bicycle lanes to support the AAA network.
- **A Complete Network.** The proposed cycling network ensures all areas within Delta are within a close distance to a designated and complete bicycle route. This involves developing a minimum city-wide grid that ensures that most residents in all urban centres of the City are within 400 metres of a designated bicycle route. The minimum grid network includes both the AAA network and the supporting network.

- **A Connected Network.** Providing direct AAA routes to Delta's urban centres, commercial, business, employment and educational destinations is an important component of making cycling an attractive transportation option. A network of "spines" was identified to provide high quality and direct north-south and east-west connections to connect each of the City's major Community Core Areas as well as major employment areas and future development areas (see **Figure 16**).

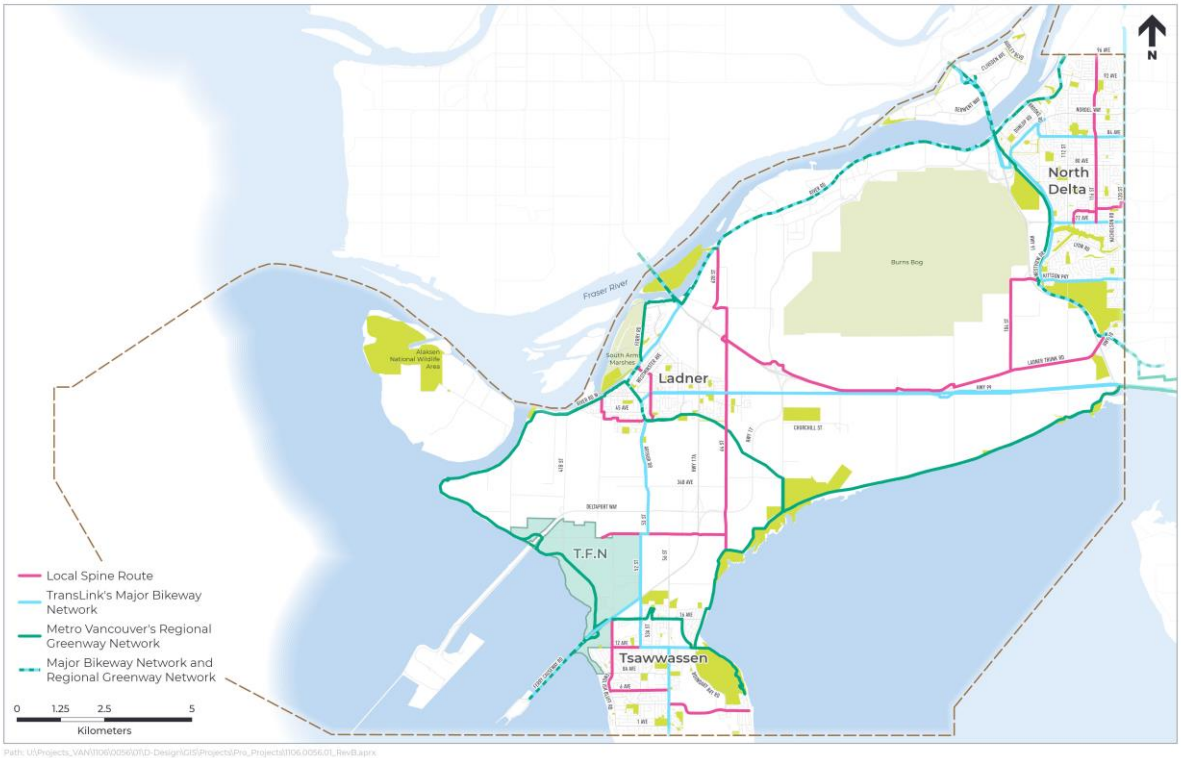


Figure 16: Conceptual Spine Network

STEP 3: REVIEW AND ASSESS FEASIBILITY OF BICYCLE ROUTES

The process of selecting bicycle route involved reviewing and assessing the feasibility of each route based on a range of factors. This started with identifying type of bicycle routes based on the following classification:

- Spine Network
- All Ages and Abilities Network
- Supporting Network

During the first round of public engagement, the public was invited to identify important destinations (see **Figure 17**) and suggestions for new cycling routes (see **Figure 18**). This input was considered to identify candidate cycling routes.

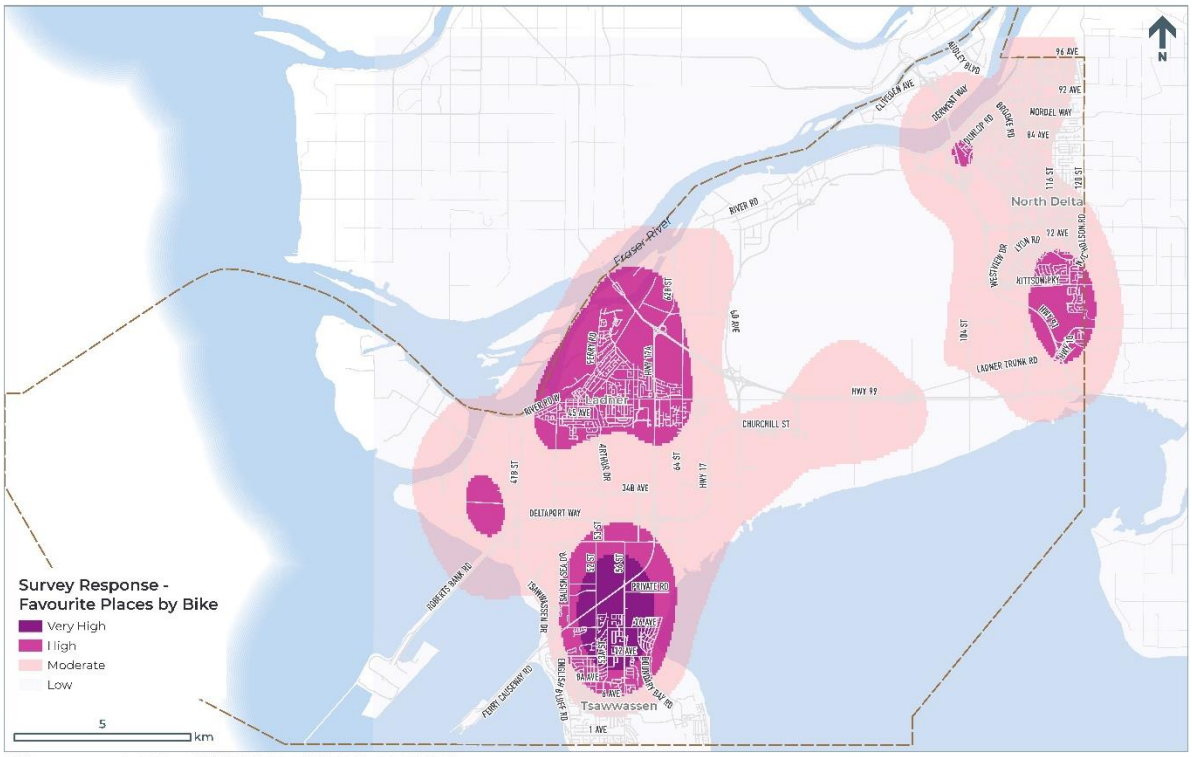


Figure 17: Favourite Places by Bike

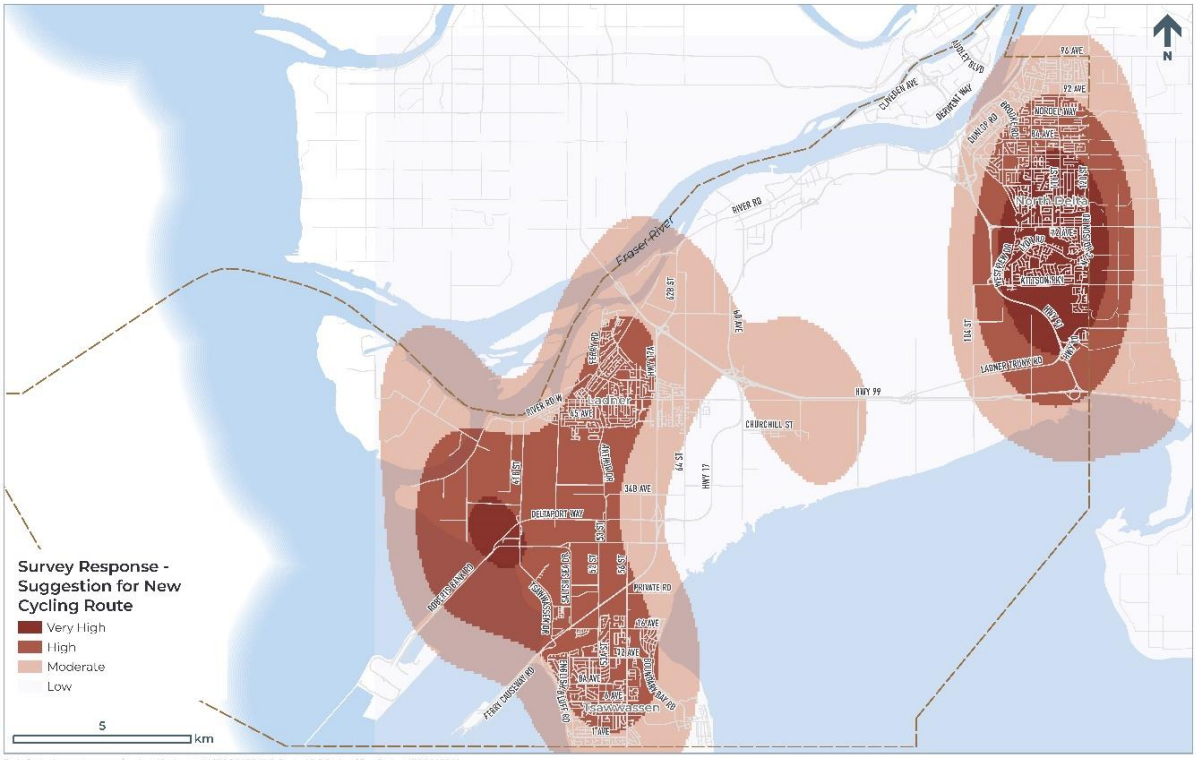


Figure 18: Suggestions for New Cycling Route

STEP 4: IDENTIFY POTENTIAL FACILITY TYPES

Proposed bicycle facility types in Delta are described below, including AAA facilities and supporting facilities. Adding cycling infrastructure can help improve cyclist safety and comfort. While all types of bicycle facilities provided some safety benefits compared to streets with no infrastructure, AAA facilities such as multi-use pathways, protected bicycle lanes, and neighbourhood bikeways have been shown to have the greatest safety benefits (see **Figure 19**). Each facility type is briefly introduced below.

Figure 19: Bicycle Facility Types

ALL AGES AND ABILITIES FACILITIES

- **Multi-use pathways** are off-street facilities that are physically separated from motor vehicles. They provide sufficient width to be used by people walking, cycling, and other forms of active transportation such as in-line skating and jogging. Multi-use pathways can have paved or unpaved surfaces. Paved or firm surfaces are often preferable for people cycling and people with mobility aids or strollers. Multi-use pathways are an effective facility on roads or off-street locations where right-of-way is available. They can be installed parallel to a major roadway, within a park, or along a utility corridor or rail line.
- **Bicycle pathways** are also off-street facilities similar to multi-use pathways. However, they are separated from pedestrian facilities and allow only cycling and other active modes such as in-line skating, scooters, and skateboarding.
- **Protected bicycle lanes** are physically separated from motor vehicle travel lanes but are located on-street within the roadway surface. Separated bicycle lanes combine the benefits of increased comfort offered by multi-use pathways due to their separation from motor vehicle traffic, with the benefits of route directness provided by on-street facilities. They also provide separation between people walking and people cycling. Separated bicycle lanes are generally appropriate on street with higher motor vehicle volumes (greater than 4,000 vehicles per day) and high motor vehicle speeds (greater than 50 km/h).
- **Neighbourhood bikeways** are shared bicycle routes on streets with low motor vehicles volumes (less than 1,500 vehicles per day) and low motor vehicle speeds (30 km/h or less). Neighbourhood bikeways are often found on low volume streets that run parallel to major roads or within neighbourhoods on residential streets connecting existing trails. These streets are typically enhanced to varying degrees to prioritize bicycle traffic. In cases where the existing streets have relatively low motor vehicle volumes and speeds, the only improvements required may be signage and pavement markings identifying the road as a bicycle route, and enhancements to crossings where the neighbourhood bikeway intersects with major roads. However, they can and should be further enhanced with traffic calming measures such as traffic circles and traffic diverters if motor vehicle volumes and speeds are higher.

SUPPORTING FACILITIES

- **Painted bicycle lanes** are separate travel lanes designated for the exclusive use of cyclists and marked by a painted line, a reserved for bikes symbol, and signage.
- **Buffered bicycle lanes** are painted bicycle lanes with extra painted lines that create a wider buffer between cyclists and motor vehicles.
- **Paved shoulders** are separate travel lanes designated for the use of cyclists the operational needs of motorists and marked by a painted line and signage.

STEP 5: SELECT PREFERRED ROUTES AND FACILITY TYPES

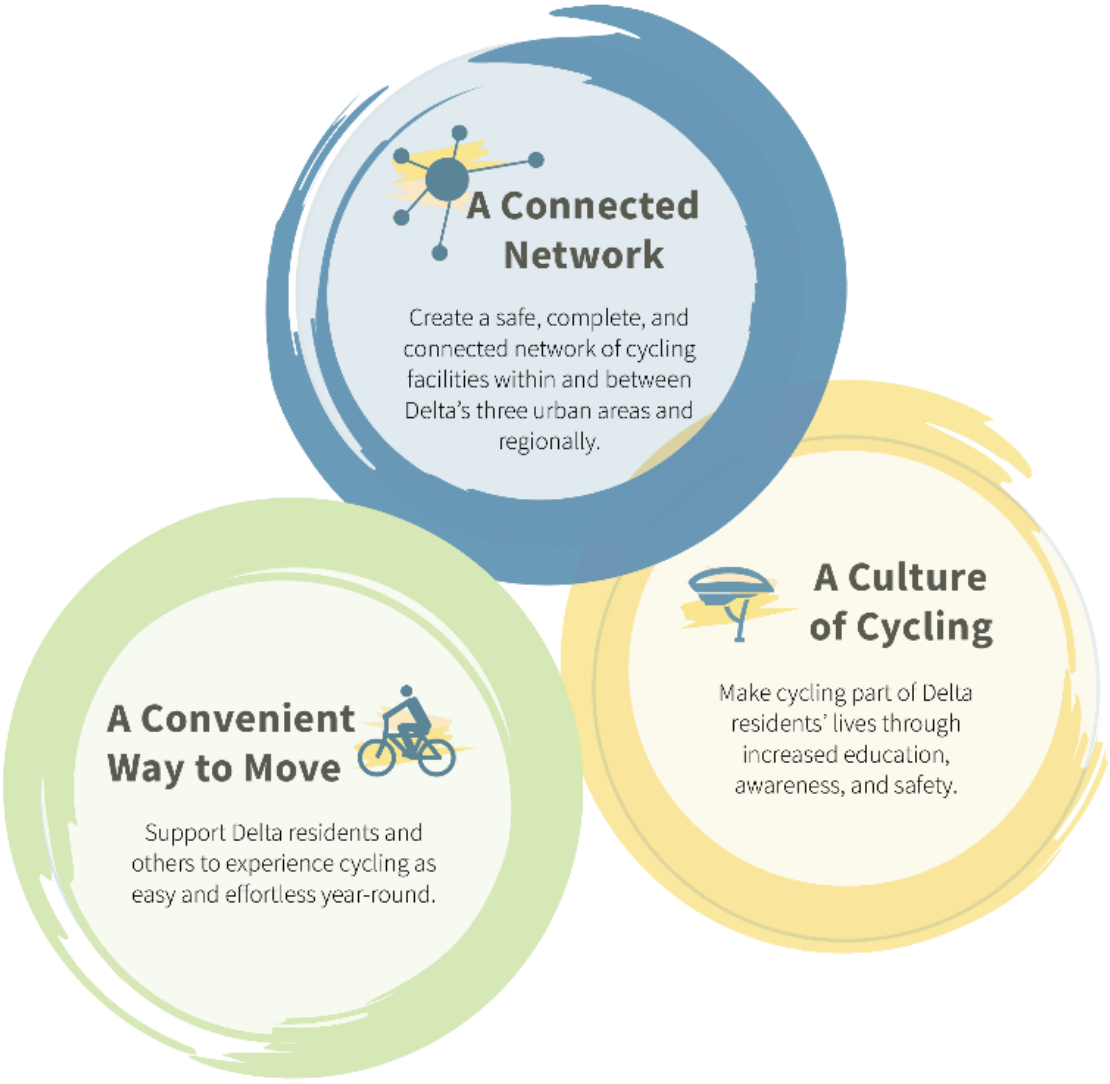
More detailed investigations were conducted for the proposed cycling network to better understand the current conditions of the potential routes and assess alternative routes and facility types. A variety of considerations were factored into this assessment, including:

- **Road Classification:** The City's existing road network classification was reviewed to determine if corridors were local, collector, or arterial roads and whether they were designated as part of the Major Road Network (MRN) and/or whether they were part of a designated truck route or transit route.
- **Existing Roadway and Right-of-Way Width:** Recommendations were developed based on the ability to implement cycling facilities within the existing road width or, for off-street multi-use pathways, within the available right-of-way width. The intent was to focus on facilities that were implementable within these existing widths. The assessment also considered the number of motor vehicle lanes and opportunities to remove or narrow the width of existing motor vehicle lanes.
- **Existing and Planned Cycling Facilities:** The City's existing cycling network data and HUB State of Cycling data was reviewed to identify if the facility would be new or an upgrade. In addition, TransLink's Major Bikeway Network and Metro Vancouver's Regional Greenway Network were also reviewed.
- **Traffic Volumes and Speed:** Daily traffic volumes and speeds were reviewed where data was available. For corridors with higher traffic volumes and speeds, greater separation was recommended to ensure the cycling facility is comfortable for everyone. For corridors with low traffic volumes and speeds, neighbourhood bikeways were considered.
- **On-Street Parking:** Cycling facilities directly adjacent to on-street parking without a door zone buffer are not considered comfortable for everyone (with the exception of parking protected bicycle lanes, which are located between the sidewalk and the on-street parking lane). It is generally preferable to implement bicycle facilities on street without on-street parking; however, if on-street parking was present and would need to be removed, this was identified in the feasibility assessment.
- **Network Connectivity:** Recommendations were developed to ensure continuity of facilities to the extent possible, including providing consistent facility types along an entire corridor where possible.
- **Land Use Context:** Recommendations were identified based on land use context, with consideration for different implementation challenges in urban contexts compared to rural contexts.

The preferred bicycle routes and facility types were ultimately selected based on the results of each of these steps, with input provided from the public through the public engagement to help confirm proposed bicycle routes.

3.4 PILLARS, STRATEGIES, AND ACTIONS

As noted in Section 1, the framework for Delta's Cycling Master Plan consists of three Pillars. The concept of "Pillars" builds off the City of Delta's *Foundation for the Future*. The Pillars in the Cycling Master Plan consider public and stakeholder feedback as well as a review of existing conditions. Each Pillar includes a series of Strategies as well as more detailed Actions for how to best achieve these outcomes. The content for each of the Pillars, Strategies and Actions is built off survey responses and best practice approaches in other jurisdictions.



PILLAR 1: A CONNECTED NETWORK

A Connected Network aims to create a safe, comfortable, complete, and connected network of cycling facilities within and between Delta's three urban areas as well as to foster regional connections. Establishing a complete network of cycling facilities is fundamental to creating a culture of cycling in Delta.

Delta already has an extensive cycling network of on-street and off-street bicycle facilities, and many residents make use of the numerous routes recreationally. However, there are many gaps in the network and limited number of facilities that are comfortable for people of all ages and abilities. The City can improve connectivity by better connecting key destinations within each of Delta's three communities, establishing spines that connect the communities to one another, and better linking Delta to the region. This will help to improve the ease of moving around the community, increase recreational opportunities, and make traveling by bicycle safer and a more practical transportation choice. The long-term ultimate cycling network is shown in **Figure 20** and explained in further detail below.

What We Heard

Through the public engagement process, input was received noting key issues such as a lack of dedicated on-street bicycle lanes, lack of bicycle routes that are physically separated from traffic, and gaps in the cycling network. When asked "what would most encourage you to cycle more," the top responses included more bicycle lanes that are physically separated from motor vehicles, filling in the gaps in the cycling network, and more on-street painted bicycle lanes.

Strategies

Five strategies have been developed to develop **a connected network**, as described in further detail below.

Strategy 1A: Develop All Ages and Abilities (AAA) Urban Centre Cycling Networks

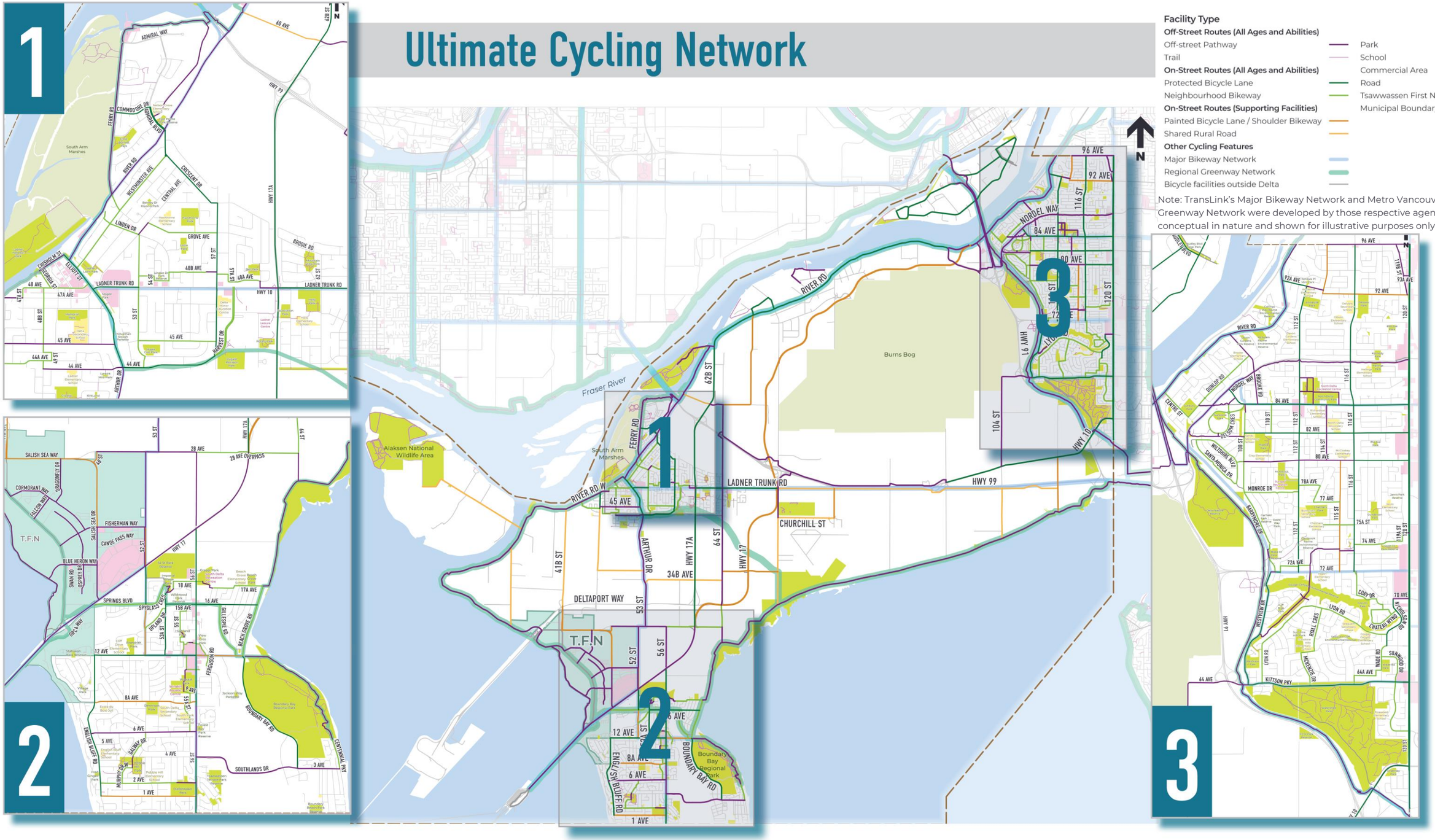
Strategy 1B: Improve Cycling Connections Between Delta's Urban Centres and Industrial Areas

Strategy 1C: Improve Regional Connections

Strategy 1D: Address Barriers to Cycling

Strategy 1E: Integrate Transportation and Recreation

Ultimate Cycling Network



Note: TransLink's Major Bikeway Network and Metro Vancouver's Regional Greenway Network were developed by those respective agencies. They are conceptual in nature and shown for illustrative purposes only.

Figure 20: Ultimate Cycling Network

STRATEGY 1A: DEVELOP ALL AGES AND ABILITIES (AAA) URBAN CENTRE CYCLING NETWORKS

OVERVIEW

Providing a complete and connected network is critical to creating a culture of cycling in Delta. While there already exists a network of bicycle facilities, they range in comfort levels and are rarely suitable for people of all ages and abilities. There are also significant gaps in the network. Expanding and enhancing Delta's cycling network can improve comfort while cycling and is consistent with community desires. Numerous survey responses emphasized the need for physically separated facilities, increased safety on major roads, and more comfort for families.

The starting point for the development of Delta's cycling network is to ensure that it is complete, connected, and comfortable within each of Delta's three urban areas. Through the development of the 'urban centre cycling networks' in Ladner, Tsawwassen, and North Delta, the cycling network can provide access for residents to connect to major destinations in the City, including schools, parks, commercial areas, and major employment areas (see **Figure 21** to **Figure 23**).

TransLink has also recently announced a new grant funding stream focused on rapid implementation of cycling networks within designated Urban Centres in Metro Vancouver's Regional Growth Strategy. The only Urban Centre currently designated in Delta is Ladner Municipal Town Centre. Delta has been engaging with TransLink to identify other key areas in Delta, as well as in Tsawwassen First Nation.

There are a range of provincial, national, and international design guidelines that the City should follow to ensure cycling facilities are being designed to reflect current best practices to ensure that a high-quality user experience is provided. Existing facilities should be enhanced to meet AAA facility standards.

ACTIONS

- **Action 1A.1:** Advance 'rapid implementation' approaches to implementing urban centre cycling networks using low-cost, adjustable materials.
- **Action 1A.2:** Upgrade existing bicycle facilities to ensure they are comfortable for people of all ages and abilities.

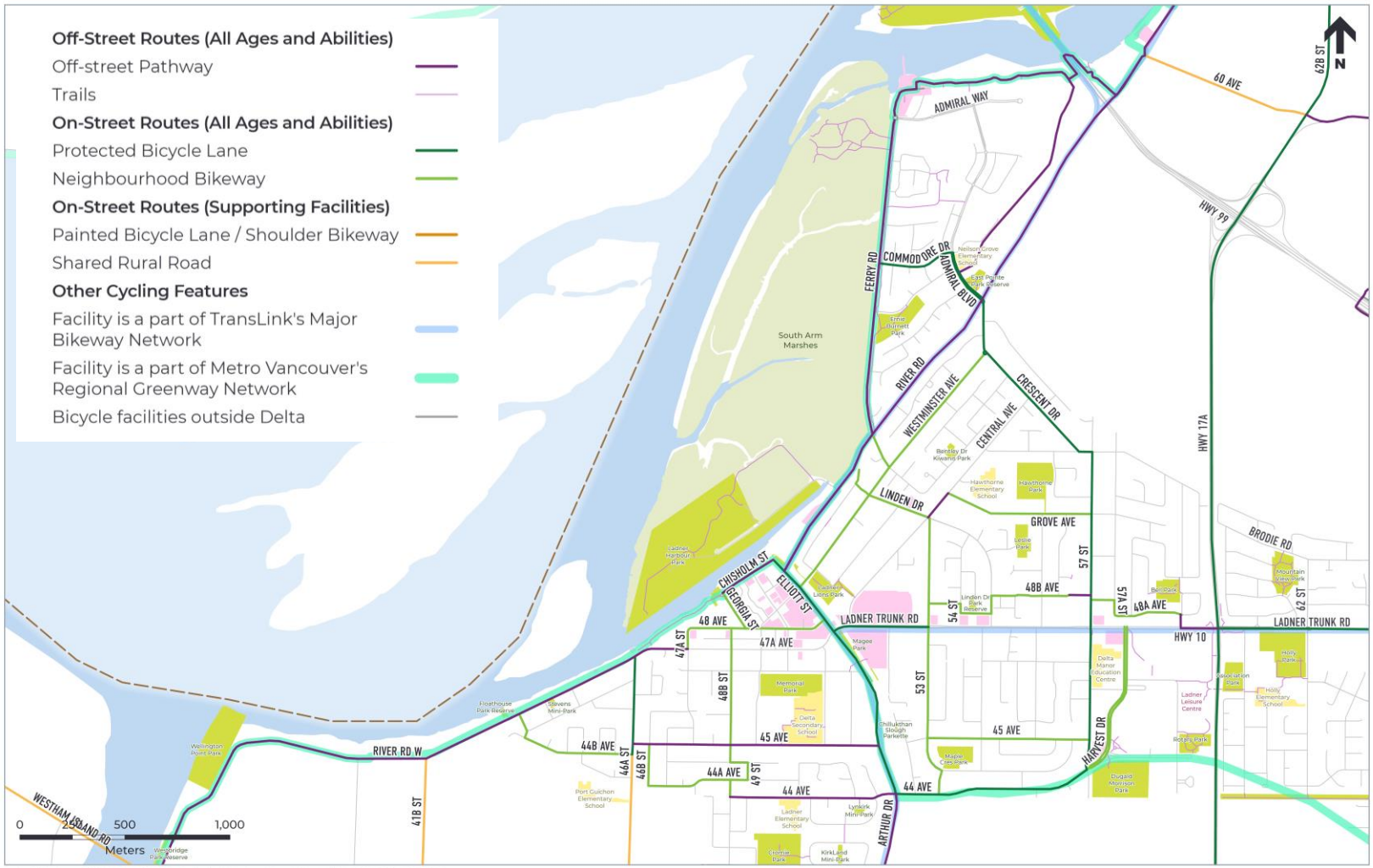


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Figure 21: Ultimate Cycling Network - Ladner

Note: TransLink's Major Bikeway Network and Metro Vancouver's Regional Greenway Network were developed by those respective agencies. They are conceptual in nature and shown for illustrative purposes only.

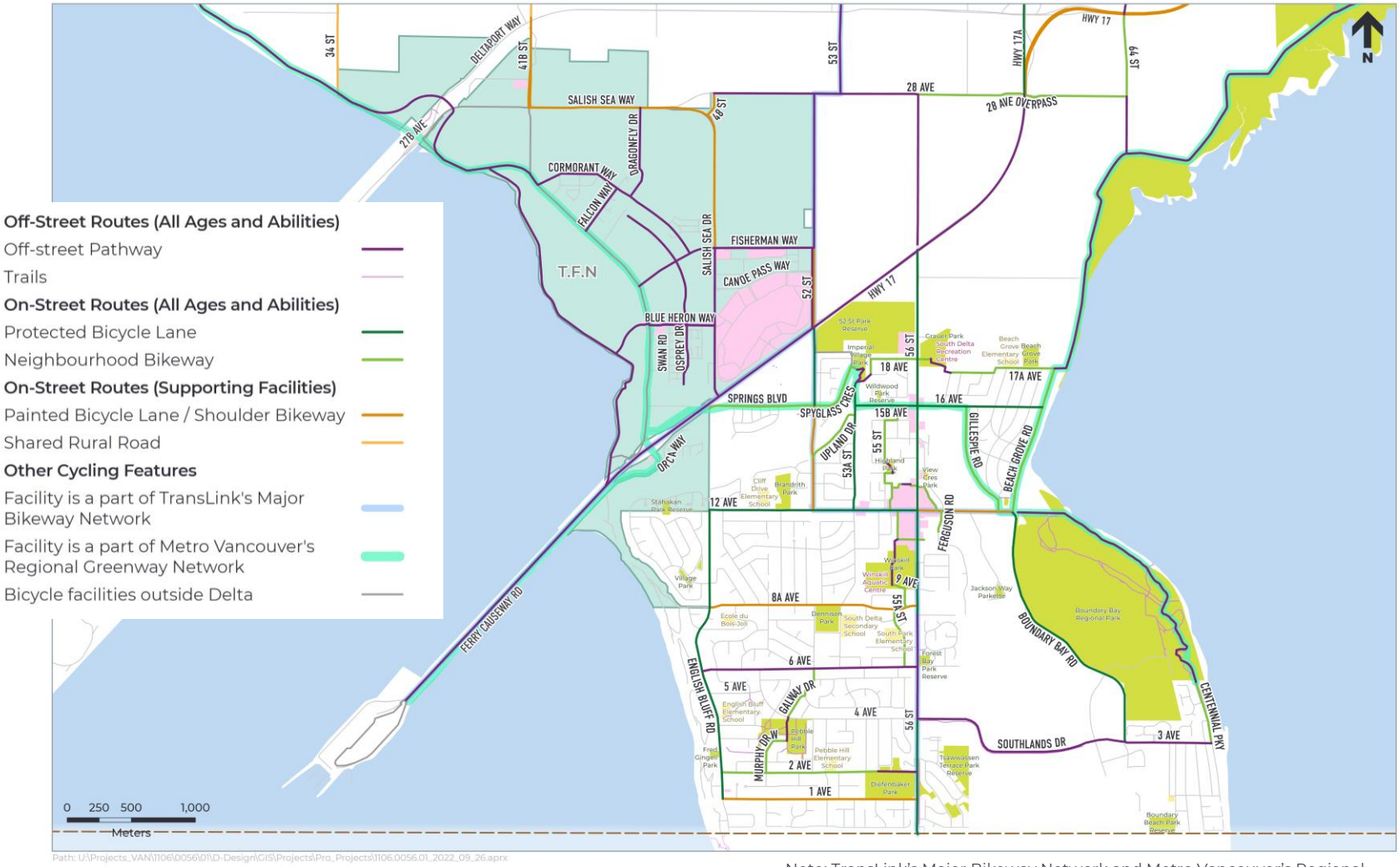


Figure 22: Cycling Network - Tsawwassen

Note: TransLink's Major Bikeway Network and Metro Vancouver's Regional Greenway Network were developed by those respective agencies. They are conceptual in nature and shown for illustrative purposes only.

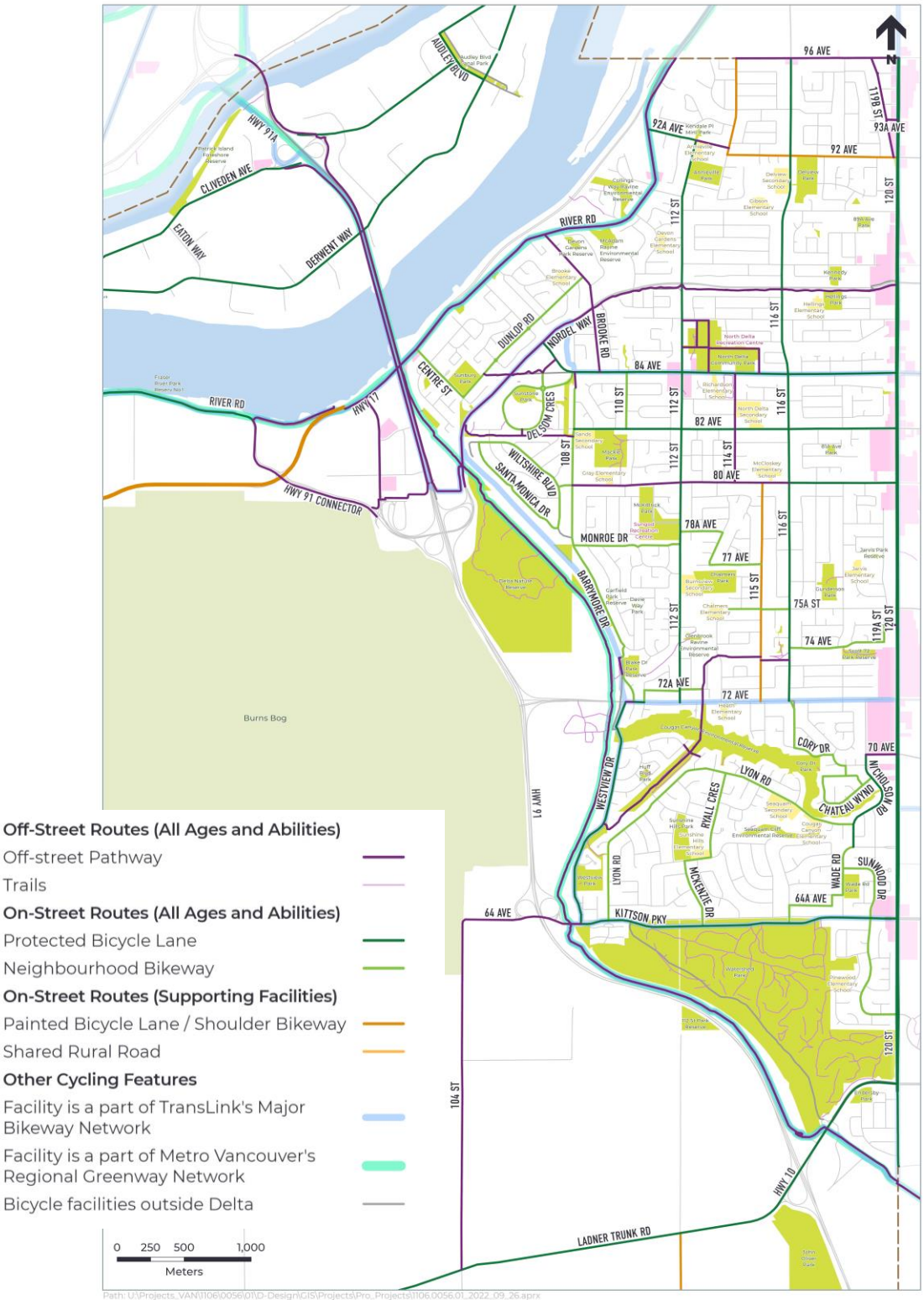


Figure 23: Ultimate Cycling Network - North Delta

Note: TransLink's Major Bikeway Network and Metro Vancouver's Regional Greenway Network were developed by those respective agencies. They are conceptual in nature and shown for illustrative purposes only.

STRATEGY 1B: IMPROVE CYCLING CONNECTIONS BETWEEN DELTA'S URBAN CENTRES AND INDUSTRIAL AREAS

OVERVIEW

Recognizing that each of Delta's urban areas are distinct communities that are spread apart from each other, the long-term cycling plan focuses on improving cycling connections between these urban areas. There are currently few connecting cycling routes that are comfortable for people of all ages and abilities, aside from the dike connection from Tsawwassen to North Delta. The connections are often on narrow, rural roads that have high volumes of truck and/or agricultural traffic and face challenging crossings at highways and railways. Making these connections also requires covering large distance and will be costly.

The City can improve connectivity by providing new AAA cycling facilities between the urban centres and improve existing infrastructure to be comfortable for all users. Some of these connections will require other partners, such as TransLink and/or the Ministry of Transportation and Infrastructure (MOTI), to support funding and/or construction.

As many of the connecting roads support truck routes and farm vehicles, in order to maintain road access and implement AAA bicycle facilities, a spine approach to connect the urban areas is recommended (as shown in **Figure 16**). The spine would take place along one chosen corridor and, through policy guidance, would redirect truck traffic, reduce speed limits and enhance infrastructure. All other connecting routes would remain as supporting facilities.

Many connections between urban centres are on rural roads with ditches on one or both sides. The plan includes two strategies to provide separated facilities on roadways with ditches, including either infilling the ditch with culverts to create a multi-use pathway, or acquiring a statutory right-of-way along the agricultural lands parallel to the roadway to create a multi-use pathway. It is noted that these connections, along with off-street pathways along the hydro corridor and a bridge over Cougar Canyon, are very expensive undertakings.

ACTIONS

- **Action 1B.1:** Develop a network of cycling facilities connecting the centres of North Delta, Ladner and Tsawwassen to one another.
- **Action 1B.2:** Advance 'rapid implementation' approaches to implementing 'spine' connection using low-cost, adjustable materials.
- **Action 1B.3:** Review municipal truck routes to ensure that key cycling connections between the centres of North Delta, Ladner and Tsawwassen include AAA cycling facilities.
- **Action 1B.4:** Review and reduce speed limits along chosen connections to support AAA bicycle facilities and connections between the centres of North Delta, Ladner and Tsawwassen to one another.

STRATEGY 1C: IMPROVE REGIONAL CONNECTIONS

OVERVIEW

The City of Delta is uniquely positioned within Metro Vancouver as the gateway to Vancouver Island and Gulf Islands via the Tsawwassen BC Ferries terminal. Delta has flat topography and is home to a unique natural landscape along the water and with many parks, making the city a regional destination. By increasing the connectivity to Delta by bicycle, more people will visit Delta by bicycle and more Delta residents will be encouraged to travel outside of Delta by bicycle. As the Ministry of Transportation and Infrastructure (MOTI) continues to promote bicycle use and infrastructure development, Delta should work closely with MOTI and neighbouring municipalities to ensure connectivity between one another and the region.

In addition, TransLink has established a Major Bikeway Network (MBN) and Metro Vancouver has identified a Regional Greenways Network (RGN) to provide regional cycling connections for transportation and recreational purposes, respectively. The City should work with these agencies to coordinate improvements. In particular, the City should encourage Metro Vancouver to provide wayfinding signage along the RGN and to improve the South Surrey Regional Greenway, including coordinating long-term planning and capital improvements between 64 Avenue and River Road and the need to investigate the possibility of a 4-metre-wide multi-use pathway as a priority.

The Tsawwassen First Nation has also laid the foundations and vision for the Great Blue Heron Way which brings Indigenous culture and recreation to the nation, Delta and the region as a whole. The Great Blue Heron Way wants to connect Tsawwassen First Nation with other nations in the region. Delta has provided support for this important initiative. The City will continue to work with each of these partners to improve regional connections.

ACTIONS

- **Action 1C.1:** Work with TransLink to identify and address gaps in the Major Bikeway Network.
- **Action 1C.2:** Work with Metro Vancouver to identify and address gaps and support the buildout of the Regional Greenway Network.
- **Action 1C.3:** Work with the City of Surrey to ensure connection between North Delta and Surrey.
- **Action 1C.4:** Work closely with Tsawwassen First Nation to continue to support the development of the Great Blue Heron Way and to improve connections to, from, and across Tsawwassen First Nation lands.

STRATEGY 1D: ADDRESS BARRIERS TO CYCLING

OVERVIEW

There are several barriers to cycling in Delta, including major road crossings, highway crossings, rail corridors, and waterways. Addressing barriers to cycling will not only directly improve the experience of current cyclists but also encourage more cyclists to make use of the network. In addition, improving crossings for cyclists will improve safety and make cycling a more attractive and practical transportation choice.

Many existing bridges, underpasses, and overpasses have facilities for people cycling; however, they may not necessarily feel comfortable or safe, or provide the most direct route. The City should continue to work with its partners to provide safer and more convenient cycling facilities on bridges, underpasses, and overpasses. This includes ensuring facilities meet current design standards in terms of width, clearance, and appropriate railings. Overall, cycling facilities designed to overcome major barriers should be designed using AAA principles. To enhance the connectivity and convenience of the proposed cycling network, the installation of new underpasses and overpasses may be considered as part of the implementation of the Cycling Master Plan.

ACTIONS

- **Action 1D.1**: Improve existing cycling facilities and develop separated crossings over watercourses, rail, and major roads.
- **Action 1D.2:** Develop a spot improvement program to implement minor network improvements and work with stakeholders to make safety and network connectivity improvements throughout the City.

A Connected Network

STRATEGY 1E: INTEGRATE TRANSPORTATION AND RECREATION

OVERVIEW

Delta is well-known for its unique recreational opportunities and destinations including its extensive dike system. However, the network is not necessarily connected to recreation destinations, nor does it allow for a comfortable experience for all users. Currently, farm vehicles have the right of way on infrastructure such as dikes. Farming is a vital component of Delta's community and economy, so ensuring access for farm vehicles is a priority. However, as the number of people cycling increases, there are also an increasing number of conflicts with cyclists. Several survey comments referenced farm road infrastructure as an area they would like to see improvements in. This strategy recognizes the significant market opportunity to increase cycling by focusing on recreational cycling use and improving connections between recreational cycling facilities and on-street cycling facilities.

ACTIONS

- **Action 1E.1:** Work with regional partners to provide well-integrated connections to adjacent communities and regional trails.
- **Action 1E.2:** Ensure recommendations from the Cycling Master Plan are included in updates to other Delta planning documents.
- **Action 1E.3:** Address dangerous crossings (railway, highway, etc.) on recreational routes.

PILLAR 2: A CONVENIENT WAY TO MOVE

For cycling to become a more attractive and competitive way to move around Delta, it needs to be as safe and convenient as possible. Strategies aimed at improving the user experience in the Cycling Master Plan relate to the types of supporting infrastructure that is needed to support the convenient and comfortable use of the cycling network across Delta.

This strategy aims to support Delta residents and others to experience cycling as easy and effortless year-round. This can be done through a variety of approaches, such as providing short-term and long-term bicycle parking, supporting multi-modal connections, leveraging new technologies, and maintaining the network year-round.

Providing a convenient and high-quality experience for people every time they use cycling routes will help to make cycling a more desirable transportation option.

What We Heard

Through the public engagement process, input was received noting the importance of maintaining the existing cycling network year-round, including a need to improve pavement quality and maintenance of streets. This includes addressing potholes as well as drainage and flooding issues, with a specific focus on farm roads, back roads, rural and quiet streets. Other issues include bike theft as a deterrent to cycling, along with the need for bike lockers in facilities and transit exchanges, additional bike parking for business, more bike racks, and bike stations that can include bike repair tools and air pumps.

Strategies

Five strategies have been developed to create **a convenient way to move**, as described in further detail below.

Strategy 2A: Provide More Bicycle Parking and End-of-trip Facilities

Strategy 2B: Enable Multi-modal Connections

Strategy 2C: Leverage New Technologies

Strategy 2D: Keep the Network in a State of Good Repair

Strategy 2E: Update Guidelines and Standards

A Convenient Way to Move

STRATEGY 2A: PROVIDE MORE BICYCLE PARKING AND END-OF-TRIP FACILITIES

OVERVIEW

Bicycle parking and end-of-trip facilities are critical to encourage people to bicycle as a primary mode of transportation by providing a secure place to leave their bicycle and a place to tidy up and/or change upon arriving at their destinations. At its most basic, this means locking a bicycle to something within the street right-of-way. The fear of theft or vandalism is a significant barrier to biking regardless of the cost of an individual's bicycle. There are different types of bicycle parking, which can be suitable in different situations depending on the duration of the stay. As a result, providing safe and secure bicycle parking at key locations in Delta is important for facilitating cycling.

Other end-of-trip facilities, such as changing rooms, showers, and storage space for equipment can also make cycling more convenient as well as to help build a culture for cycling within a specific development or place of employment. This is particularly important in cities that experience variable weather conditions including rain and snow, as more gear is required at certain times of year and having a place to store it has a significant impact on convenience.

The City's Zoning Bylaw outlines requirements for the amount of required bicycle parking spaces based on land use along with development and maintenance standards. In the future, the Zoning Bylaw could be enhanced by differentiating between short-term and long-term bicycle parking requirements or including considerations for e-bike plug-ins or emerging types of bicycles, such as cargo bikes and bicycles with trailers. The bylaw could also be amended to provide guidance for end-of-trip facilities such as showers and clothing lockers.

Short-term and long-term bicycle parking is provided at various locations throughout the City. However, many survey responses noted a desired for more bicycle parking and end-of-trip facilities, and that the fear of bicycle theft is a significant deterrent to cycling.

ACTIONS

- **Action 2A.1:** During future Zoning Bylaw updates, consider providing guidance for short-term and long-term bicycle parking, e-bike plug-ins, new and emerging types of bicycles, and other end-of-trip facilities.
- **Action 2A.2:** Provide more bicycle parking and end-of-trip facilities at City of Delta owned and operated facilities, throughout the City and at special events.
- **Action 2A.3:** Support local businesses in providing bicycle parking and end-of-trip facilities throughout the City.
- **Action 2A.4:** Support local partners in providing temporary bicycle parking at special events.

STRATEGY 2B: ENABLE MULTI-MODAL CONNECTIONS

OVERVIEW

Every transit trip begins and ends with some form of active transportation, either walking or cycling. Improving cycling access and connections to transit and improving the customer experience at bus stops and exchanges can help to not only promote transit but also to encourage more cycling, thereby extending the reach and convenience of both modes. While TransLink is responsible for funding, planning, operating, and maintaining transit services throughout Metro Vancouver, the City works to ensure residents can access transit stops and that there are amenities in place to make their transit experience more comfortable.

There are several infrastructure treatments and amenities under municipal jurisdiction that can improve the transit customer experience, including ensuring transit stops are accessible and providing amenities such as shelters, benches, and lighting.

All TransLink buses are equipped with bicycle racks that hold two bicycles of most sizes and styles. Having the ability to bring a bicycle on the bus or park it securely allows people cycling to include transit in their journey and extend the reach of their trip. It also allows them to more quickly reach destinations that are not immediately adjacent to a transit route. In addition to TransLink buses, MOTI also operates the free George Massey Tunnel Shuttle for cyclists on a year-round basis.

ACTIONS

- **Action 2B.1:** Improve cycling network connections to transit services, particularly regional transit routes and the Frequent Transit Network (FTN).
- **Action 2B.2:** Work with MOTI to improve service frequency and capacity of the George Massey Tunnel Shuttle in the near-term, and to ensure improved multi-modal connections with the George Massey Tunnel Replacement Project over the medium-term.
- **Action 2B.3:** Work with TransLink and BC Ferries to ensure short-term and long-term bicycle parking is provided at high activity bus stops, bus exchanges (including the Ladner Exchange and South Delta Exchange), and the Tsawwassen Ferry Terminal.
- **Action 2B.4:** Work with TransLink to consider opportunities to increase the capacity for bicycles on high demand routes such as the connections to the Tsawwassen Ferry Terminal, including increased transit frequency.

STRATEGY 2C: LEVERAGE NEW TECHNOLOGIES

OVERVIEW

In recent years, the transportation sector has witnessed an unprecedented increase in both the pace and scale of new technological innovations. Included in these new technologies are Autonomous Electric Vehicles (AEVs), public bike share (both docked and dockless), e-scooter share, microtransit (or On-Demand Transit), and Mobility as a Service (MaaS).

Specific to cycling, new technologies include e-bikes and other forms of micromobility, which are rapidly growing in popularity and have the potential to accelerate the shift to sustainable transportation modes, while also bringing new types of users to Delta's cycling network. This makes micromobility highly relevant to the Cycling Master Plan.

Micromobility refers to small human and/or electric-powered transportation modes, including electric bicycles (e-bikes), electric kick scooters (e-scooters), and other small, one-person electric vehicles such as electric skateboards, skates, and self-balancing boards. **Appendix D** includes a summary of the impacts of e-bikes and micromobility in Delta.

Bicycle-related technologies are growing and making cycling more accessible for many, particularly through the COVID-19 pandemic. In addition, the number of electric scooters is growing, and these devices are making use of cycling facilities. The B.C. government recently announced a micromobility pilot in the Province. Delta will continue to plan and consider future integration of new mobility modes within the active transportation network.

ACTIONS

- **Action 2C.1:** Consider new mobility devices (electric bikes, bike share, electric scooters, scooter share, electric skateboards, one-wheel vehicles, etc.) in facility and parking design, including electric plug-ins.

STRATEGY 2D: KEEP THE NETWORK IN A STATE OF GOOD REPAIR

OVERVIEW

Cycling infrastructure should be well maintained and usable for people of all ages and abilities throughout the year. While the installation of new infrastructure to promote and encourage cycling is often seen as a top priority, ongoing rehabilitation and maintenance of existing and new infrastructure needs to be an equally important focus. On-going maintenance is necessary to keep infrastructure functional and usable over time.

Maintenance needs to be considered at all stages of the planning and the design process. Maintenance is necessary to keep active transportation facilities functional and usable throughout all seasons, which ensures that facilities are universally accessible throughout the year.

Cycling facilities should be regularly monitored and repaired to ensure they are adequate for riding. Sufficient budget should be allocated for their upkeep. For example, where cyclists are using a road with high traffic volumes, shoulders may need to be swept more frequently than where traffic volumes and speed are lower.

ACTIONS

- **Action 2D.1:** Ensure all new capital projects consider ongoing funding for operations and maintenance.
- **Action 2D.2:** Design cycling routes to facilitate drainage, street sweeping, deicing, and snow removal.
- **Action 2D.3:** Ensure cycling routes have a seasonal maintenance program to remove leaves and other debris from cycling routes.
- **Action 2D.4:** Develop an inspection program to ensure adequate cycling facility surface conditions.

STRATEGY 2E: UPDATE GUIDELINES AND STANDARDS

OVERVIEW

Design guidance for cycling infrastructure has rapidly evolved across North America in the past several years. The Transportation Association of Canada (TAC) recently published an updated Geometric Design Guide for Canadian Roads and MOTI published the B.C. Active Transportation Design Guide, which provides detailed guidance on all aspects of active transportation planning and design.

Delta's Subdivision and Development Standards Bylaw currently outlines standards for all new and upgraded streets in the City. These standards are typically implemented through redevelopment. However, these standards were developed prior to the B.C. Active Transportation Design Guide, and many standard cross-sections do not include adequate requirements for cycling infrastructure that is comfortable for people of all ages and abilities.

The City should update and adopt a revised Subdivision and Development Standards Bylaw with revised recommendations to ensure its road design standards are consistent with current best practices for bicycle facility design. This will ensure that all new infrastructure is built to provincial best practice standards, creating a consistent and comfortable cycling network.

ACTIONS

- **Action 2E.1:** Update the Subdivision and Development Standards Bylaw to reflect current best practices and provincial guidance.
- **Action 2E.2:** Ensure all new plans, projects and developments integrate with the cycling network and are designed according to best practices.
- **Action 2E.3:** Include cycling infrastructure on all new and upgraded roads.

PILLAR 3: A CULTURE OF CYCLING

While the installation of new cycling routes is critical to increase the number of people cycling in Delta, a range of 'soft' support measures are also important to encourage more cycling. These measures can help to provide education and raise awareness about cycling in Delta and help achieve the goal of building a culture of active living. This pillar includes a range of strategies and actions that address support measures such as education, encouragement, and heightened awareness. These are all done with the intent of making cycling a safe, fun, and accessible part of everyday life.

Some of the ways the City can work to create an active culture and increase awareness and promotion of cycling routes is through education and encouragement initiatives, building awareness of routes and destinations, promoting active school travel and family-oriented activities, and creating cycle tourism opportunities.

What We Heard

Through the public engagement process, input was received noting the importance of education, awareness, and other initiatives to encourage cycling in Delta. Survey respondents indicated that cyclists and motorists should be better informed and educated on the rules of the road and cycling etiquette. Respondents also noted that drivers need to be more aware and educated of the rules of the road and potential conflicts with cyclists. Other comments related to opportunities to create fun cycling routes or adventures.

Strategies

Five strategies have been developed to create **a culture of cycling**, as described in further detail below.

Strategy 3A: Raise Education and Awareness

Strategy 3B: Make it Easy to Find the Way

Strategy 3C: Make Cycling Safe for Families and Promote Active School Travel

Strategy 3D: Promote Bicycle Tourism

Strategy 3E: Create and Promote Recreational Touring Loops

STRATEGY 3A: RAISE EDUCATION AND AWARENESS

OVERVIEW

Although "hard" measures such as infrastructure is critical to encouraging active transportation, a range of "soft" support measures are also recommended to encourage people to cycle in Delta. Education and awareness initiatives are important and cost-effective measures to enable Delta residents to feel safer and more comfortable using cycling routes and are important actions in addition to providing and enhancing cycling routes.

Education initiatives geared towards all road and pathway users are important components of implementing the Cycling Master Plan. Education initiatives can include developing materials and tools that educate all road users on how to use cycling routes as well as supporting programs that teach skills and awareness of road safety for all road users. Education initiatives are both important as well as cost-effective measures to enable residents to feel more safe and comfortable cycling throughout Delta. These initiatives provide information for all road users about how to interact with vulnerable road users and may contribute to increased compliance among all parties. While infrastructure is not built overnight, education items are often "quick wins".

In addition, awareness and promotion of cycling routes and trails are important components that support the implementation of new infrastructure. Community-wide communications and marketing through radio advertisements, transit shelter advertisements, and website and social media content can be effective tools for reaching out to residents, increasing awareness and interest in cycling. Awareness initiatives can include providing information to the public on the benefits of cycling, and hosting events to promote cycling.

ACTIONS

- **Action 3A.1:** Use and encourage City-wide campaigns to deliver positive messaging to promote cycling and to educate all road users on how to share the road.
- **Action 3A.2:** Celebrate cycling-related events and new infrastructure projects.
- **Action 3A.3:** Support programs and initiatives that educate and encourage people to use cycling routes.
- **Action 3A.4:** Develop videos, pamphlets and other tools to educate all road users on new and enhanced cycling infrastructure and how to use them.
- **Action 3A.5:** Support events and festivals that encourage cycling.
- **Action 3A.6:** Work with organizations to find opportunities to encourage and promote cycling.

STRATEGY 3B: MAKE IT EASY TO FIND THE WAY

OVERVIEW

A seamless, consistent, and easy-to-understand system of trip planning tools, signage, and wayfinding for cycling is important. It can make the transportation network easier to navigate, identify the location of important destinations, and provide information about route type. Most importantly, wayfinding helps people make decisions about how to navigate a neighbourhood or area.

Providing wayfinding and network information, including signage, pavement markings, and maps, that help people make decisions about how to navigate the cycling network is key to help make it easy to find the way to destinations. Wayfinding is intended to make the cycling and trails network easier to navigate, identify the location of important destinations, and provide information about route type. Wayfinding and other bicycle-related signage (e.g. Share the Road signs) also help raise drivers' awareness of cyclists using the roadway. Branding and naming routes in coordination with signage can also be an effective form of wayfinding.

Wayfinding should be seamless, consistent and easy to understand to be effective. In 2013, TransLink developed the Wayfinding Guidelines for Utility Cycling in Metro Vancouver, and the City has implemented some recommendations of these guidelines. The City also regularly publishes its Delta Routes Map, which is available online. and is currently piloting wayfinding signage on select routes.

ACTIONS

- **Action 3B.1:** Continue to implement the recommendations of TransLink's Wayfinding Guidelines for Utility Cycling in Metro Vancouver.
- **Action 3B.2:** Continue to regularly update the Delta Routes Map as new infrastructure is implemented and make this available online.

STRATEGY 3C: MAKE CYCLING SAFE FOR FAMILIES AND PROMOTE ACTIVE SCHOOL TRAVEL

OVERVIEW

Active and Safe Routes to School is a term used to describe an international movement to improve children's safety as they walk and bicycle to school. The initiative is built on five program elements, called the "5 E's" of safe routes to school: engineering, education, encouragement, enforcement, and evaluation.

School Travel Planning is also an important part of *Move. Commute. Connect: B.C.'s Active Transportation Strategy*, which states that the Province will provide funding to promote Learn to Ride programs and safe and active routes to school planning to ensure that everyone, including youth, know how to use active transportation to get around safely and easily.

The City, together with Delta School District 37, have developed Safe Routes to School maps for all elementary schools throughout Delta. The City should continue to partner with Delta School District 37 to fund, support, and actively direct a coordinated School Travel Planning initiative. Safe routes to school programming can go beyond Safe Routes to School maps to also include incorporate cycling and safety as part of the school curriculum, in-school bicycle skills training, and promotion / competitions for Walk / Bike to School week.

Investing in School Travel Planning at a City-wide level would result in greater social attention and understanding of the impacts of mode choice; greater safety for those who are using active school transportation; and a gradual shift in mode choice away from family vehicle use. This is in line with community desires as there were numerous survey comments regarding family safety and safe routes to school.

ACTIONS

- **Action 3C.1:** Continue to support programs and initiatives including Active and Safe Routes to School.
- **Action 3C.2:** Support School Travel Planning to reduce traffic at school sites and to encourage more active school travel among students.

STRATEGY 3D: PROMOTE BICYCLE TOURISM

OVERVIEW

Promoting cycling from a tourism perspective can provide a variety of benefits to the local economy. Bicycle tourism is also an important part of *Move. Commute. Connect: B.C.'s Active Transportation Strategy*, which states that the Province will partner with British Columbia's tourism sector to promote active transportation as an enjoyable, healthy, and sustainable way to enjoy the province. As a gateway to Metro Vancouver, with close proximity to a Vancouver Island and Gulf Island gateway, and its unique natural landscape, Delta has opportunity to attract bicycle tourists as the gateway.

More broadly, cycling can contribute to the development of a healthy and diverse economy. Bicycle-supportive neighbourhoods, employers, and other destinations throughout Delta can encourage residents to support local businesses. Neighbourhoods and destinations that are accessible and attractive for active transportation users can attract more visitors, who will in turn be patrons of local services and amenities. For employment areas, cycling infrastructure provides more choice for people travelling to work, which is essential for individuals who may not have access to a vehicle. Furthermore, having options that support residents who use active forms of transportation in their neighbourhoods and to other destinations can decrease traffic congestion and increase the attractiveness and vibrancy of the area for both locals and visitors.

The City should partner with local organizations to promote cycling options and activities for visitors. For example, bicycle friendly businesses can increase awareness about cycling by establishing initiatives that encourage visitors, as well as residents and employees, to cycle to shops and restaurants. Promoting cycling tours in Delta can help to increase bicycling and grow local businesses such as restaurants, breweries, farmers markets and other arts and cultural attractions.

ACTIONS

- **Action 3D.1:** Develop and implement a bicycle tourism initiative in partnership with local businesses and Tourism Delta.
- **Action 3D.2:** Use and encourage region-wide campaigns to deliver positive messaging to promote bicycle tourism.
- **Action 3D.3:** Collaborate with Tsawwassen First Nation to continue to support and promote the Great Blue Heron way.
- **Action 3D.4:** Work with BC Ferries to identify opportunities to promote bicycle tourism and improve cycling accommodation on its vessels.

A Culture of Cycling

STRATEGY 3E: CREATE AND PROMOTE RECREATIONAL TOURING LOOPS

OVERVIEW

To help promote recreation and economic development for residents and visitors, the City should develop and promote a series of recreational touring loops that provide continuous connections to key destinations throughout the community. Survey comments expressed recreational cycling as a priority. Loops can be developed within each of Delta's urban areas as well as connections between these areas and can help to reinforce related initiatives such as the Great Blue Heron Way and Experience the Fraser projects. These loops can make it easier for residents to navigate the cycling network and can also be an important bicycle tourism opportunity for Delta. However, touring loops should consider potential conflicts with agricultural vehicles on rural roads. Separated off-street facilities are preferred where feasible for touring routes. Education and awareness for cyclists about the use of rural roads in agricultural areas and along the dike is also important. **Figure 24** outlines a conceptual network of loops throughout the City.

ACTIONS

- **Action 3E.1:** Develop and promote recreational touring loops throughout the City. while ensuring bicycle routes are designed to avoid conflicts with agricultural equipment and vehicles.

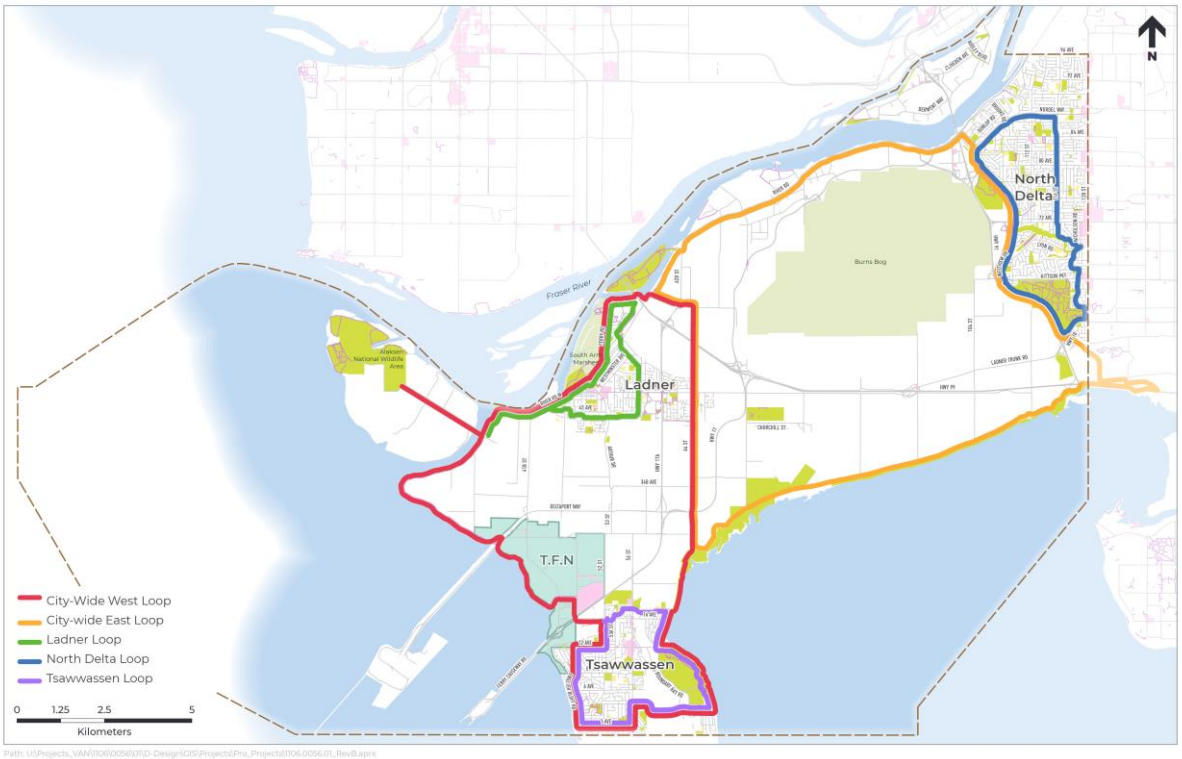


Figure** 24**: Potential Touring Loops

4.0 IMPLEMENTATION PLAN

The Cycling Master Plan outlines a range of projects and policies to enhance and encourage cycling in Delta. The strategies and actions developed as part of the Cycling Master Plan are intended to guide the City's policy, planning, programming, and capital investment decisions as well as on-going public engagement, operations, and maintenance activities in support of building a cycling culture over the next 20 years.

While the Cycling Master Plan has been developed as a long-term plan, it will require significant financial investment, staff resources, and coordination between municipal departments, other levels of government, and external agencies and stakeholders. This section presents an implementation plan, including prioritization of the actions and network improvements.

The Cycling Master Plan is intended to be a flexible and living document. For the proposed cycling network, there is some level of flexibility regarding the specific locations, corridors, and facility types that are recommended. The Plan presents recommendations and suggestions based on feedback received as part of the public engagement process, technical analysis, and current best practices in cycling facility design. However, the City will need to review the feasibility and desirability of each recommended infrastructure project, and the implementation of the identified projects within the Cycling Master Plan will require ongoing public engagement as these new projects are considered

4.1 IMPLEMENTATION PRINCIPLES

The implementation strategy for the Cycling Master Plan is based on several principles that the City should consider as it moves forward with implementing the actions of the Plan.

- **The Cycling Master Plan is one step towards implementing the vision for cycling in Delta; it is not the last step.** The strategies and actions in the Cycling Master Plan are intended to lay the groundwork for implementation over the long-term. However, it is important to recognize that successful implementation will require ongoing, long-term, significant investment and resources. This includes investments in new infrastructure, upgrades and improvements to existing infrastructure, ongoing maintenance of both existing and new facilities, dedicated resources for the development of new standards and policies, and funding for new programming, education and awareness initiatives, and staff resources. Achieving the vision and goals will require the ongoing support of the City and its partners, along with sustained investment in active transportation.
- **The Cycling Master Plan is a flexible and living document.** For the ultimate cycling network plan, there is some level of flexibility for the specific locations and corridors that are recommended. The Plan presents recommendations based on public input and technical analysis; however, the City will need to review the feasibility and desirability of each infrastructure project. As this Plan is a long-term,

strategic document, it is anticipated that additional projects will emerge over time to reflect changing priorities.

- **The City should monitor, review, and update the Cycling Master Plan on a regular basis, as needed.** As the City begins implementing the strategies and actions of the Cycling Master Plan, a monitoring and reporting strategy will be needed to measure and communicate progress towards achieving the vision and goals. Reporting back on the indicators identified with each of the goals in the Cycling Master Plan is one of the ways the City can report on progress made in implementing the Plan. As the City moves forward with implementing the Plan, the document will need to be updated to reflect the changing priorities and conditions over time.
- **The City will engage in further public consultation to implement the recommendations included in the Cycling Master Plan.** Many of the initiatives require more detailed input and technical work. The City should work closely with partners, residents, and stakeholder groups to move forward with priorities in the Cycling Master Plan.
- **The City should incorporate the short-term priorities into its 5-year Capital Plan, and a new investment strategy should be developed for the long-term.** Finally, there should be an annual review as part of the financial planning and municipal budgeting process, with a full review of the Cycling Master Plan recommended every 5 years.

COVID-19 RESPONSE

The Cycling Master Plan was developed during the global COVID-19 outbreak. COVID-19 has changed mobility patterns in cities across the world, including Delta, and has created opportunities for rapid implementation of cycling infrastructure to create physical distancing opportunities.

Wherever possible, the City should seek to rapidly implement projects identified in the Cycling Master Plan through 'quick build' approaches using lower cost, interim materials that allow for fast and flexible implementation. The City should also seek all opportunities to leverage additional stimulus funding from TransLink and other senior levels of government.

4.2 PRIORITIZING ACTIONS

This section groups and prioritizes each action identified under the pillars and themes of the plan. **Table 1** to **Table 3** provide guidance with respect to:

- **Priority**: Each action is identified as either high, medium, or low priority. Many actions will be implemented on an ongoing basis. As noted above, these priorities

may change over time and should be adaptable to maximize efficiencies and funding opportunities as they arise.

- **Method of Implementation**: This column identifies how each action will be implemented: as a capital project, through ongoing operations and maintenance, or as a policy or programming initiative.

PILLARS, STRATEGIES, & ACTIONS	PRIORITY			METHOD OF IMPLEMENTION		
	High	Medium	Low	Capital	Operations and Maintenance	Policy and Programming
PILLAR 1: A CONNECTED NETWORK						
STRATEGY 1A: DEVELOP ALL AGES AND ABILITIES (AAA) URBAN CENTRE CYCLING NETWORKS						
Action 1A.1: Advance 'rapid implementation' approaches to implementing urban centre cycling networks using low-cost, adjustable materials.	✓			✓	✓	
Action 1A.2: Upgrade existing bicycle facilities to ensure they are comfortable for people of all ages and abilities.	Ongoing			✓		
STRATEGY 1B: IMPROVE CYCLING CONNECTIONS BETWEEN DELTA'S URBAN CENTRES AND INDUSTRIAL AREAS						
Action 1B.1: Develop a network of cycling facilities connecting the centres of North Delta, Ladner and Tsawwassen to one another.	Ongoing			✓		
Action 1B.2: Advance 'rapid implementation' approaches to implementing 'spine' connection using low-cost, adjustable materials.	✓			✓	✓	
Action 1B.3: Review municipal truck routes to ensure that key cycling connections between the centres of North Delta, Ladner and Tsawwassen include AAA cycling facilities.		✓				✓
Action 1B.4: Review and reduce speed limits along chosen connections to support AAA bicycle facilities and connections between the centres of North Delta, Ladner and Tsawwassen to one another.		✓				✓
STRATEGY 1C: IMPROVE REGIONAL CONNECTIONS						
Action 1C.1: Work with TransLink to identify and address gaps in the Major Bikeway Network.			✓			✓
Action 1C.2: Work with Metro Vancouver to identify and address gaps and support the build out of the Regional Greenway Network.			✓			✓
Action 1C.3: Work with the City of Surrey to ensure connection between North Delta and Surrey.	Ongoing					✓
Action 1C.4: Work closely with Tsawwassen First Nation to continue to support the development of the Great Blue Heron Way and to improve connections to, from, and across Tsawwassen First Nation lands.	Ongoing					✓
STRATEGY 1D: ADDRESS BARRIERS TO CYCLING						
Action 1D.1: Improve existing cycling facilities and develop separated crossings over watercourses, rail, and major roads.	Ongoing			✓		
Action 1D.2: Develop a spot improvement program to implement minor network improvements and work with stakeholders to make safety and network connectivity improvements throughout the City.	✓			✓	✓	✓
STRATEGY 1E: INTEGRATE TRANSPORTATION AND RECREATION						
Action 1E.1: Work with regional partners to provide well-integrated connections to adjacent communities and regional trails.	Ongoing					✓
Action 1E.2: Ensure recommendations from the Cycling Master Plan are included in updates to other Delta planning documents.	Ongoing					✓
Action 1E.3: Address dangerous crossings (railway, highway, etc.) on recreational routes.	Ongoing			✓		

Table 1: Implementation Plan – A Connected Network

PILLARS, STRATEGIES, & ACTIONS	PRIORITY			METHOD OF IMPLEMENTION		
	High	Medium	Low	Capital	Operations and Maintenance	Policy and Programming
PILLAR 2: A CONVENIENT WAY TO MOVE						
STRATEGY 2A: PROVIDE MORE BICYCLE PARKING AND END-OF-TRIP FACILITIES						
Action 2A.1: During future Zoning Bylaw updates, consider providing guidance for short-term and long-term bicycle parking, e-bike plug-ins, new and emerging types of bicycles, and other end-of-trip facilities.	Ongoing					✓
Action 2A.2: Provide more bicycle parking and end-of-trip facilities at City of Delta owned and operated facilities, throughout the City and at special events.	Ongoing			✓		
Action 2A.3: Support local businesses in providing bicycle parking and end-of-trip facilities throughout the City.	Ongoing					✓
Action 2A.4: Support local partners in providing temporary bicycle parking at special events.	Ongoing			✓	✓	✓
STRATEGY 2B: ENABLE MULTI-MODAL CONNECTIONS						
Action 2B.1: Improve cycling network connections to transit services, particularly regional transit routes and the Frequent Transit Network (FTN).	✓			✓		
Action 2B.2: Work with MOTI to improve service frequency and capacity of the George Massey Tunnel Shuttle in the near-term, and to ensure improved multi-modal connections with the George Massey Tunnel Replacement Project over the medium-term.	✓		✓			✓
Action 2B.3: Work with TransLink and BC Ferries to ensure short-term and long-term bicycle parking is provided at high activity bus stops, bus exchanges (including the Ladner Exchange and South Delta Exchange), and the Tsawwassen Ferry Terminal.		✓				✓
Action 2B.4: Work with TransLink to consider opportunities to increase the capacity for bicycles on high demand routes such as the connections to the Tsawwassen Ferry Terminal, including increased transit frequency.			✓			✓
STRATEGY 2C: LEVERAGE NEW TECHNOLOGIES						
Action 2C.1: Consider new mobility devices (electric bikes, bike share, electric scooters, scooter share, electric skateboards, one-wheel vehicles, etc.) in facility and parking design, including electric plug-ins.	Ongoing			✓	✓	✓
STRATEGY 2D: KEEP THE NETWORK IN A STATE OF GOOD REPAIR						
Action 2D.1: Ensure all new capital projects consider ongoing funding for operations and maintenance.	Ongoing				✓	✓
Action 2D.2: Design cycling routes to facilitate drainage, street sweeping, deicing, and snow removal.	Ongoing				✓	
Action 2D.3: Ensure cycling routes have a seasonal maintenance program to remove leaves and other debris from cycling routes.	✓				✓	✓
Action 2D.4: Develop an inspection program to ensure adequate cycling facility surface conditions.		✓			✓	✓
STRATEGY 2E: UPDATE GUIDELINES AND STANDARDS						
Action 2E.1: Update the Subdivision and Development Standards Bylaw to reflect current best practices and provincial guidance.	✓					✓
Action 2E.2: Ensure all new plans, projects and developments integrate with the cycling network and are designed according to best practices.	Ongoing					✓
Action 2E.3: Include cycling infrastructure on all new and upgraded roads.	Ongoing					✓

Table 2: Implementation Plan – A Convenient Way to Move

PILLARS, STRATEGIES, & ACTIONS	PRIORITY			METHOD OF IMPLEMENTION		
	High	Medium	Low	Capital	Operations and Maintenance	Policy and Programming
PILLAR 3: A CYCLING CULTURE						
STRATEGY 3A: RAISE EDUCATION AND AWARENESS						
Action 3A.1: Use and encourage City-wide campaigns to deliver positive messaging to promote cycling and to educate all road users on how to share the road.	Ongoing					✓
Action 3A.2: Celebrate cycling-related events and new infrastructure projects.	Ongoing					✓
Action 3A.3: Support programs and initiatives that educate and encourage people to use cycling routes.	Ongoing					✓
Action 3A.4: Develop videos, pamphlets and other tools to educate all road users on new and enhanced cycling infrastructure and how to use them.		✓				✓
Action 3A.5: Support events and festivals that encourage cycling.	Ongoing					✓
Action 3A.6: Work with organizations to find opportunities to encourage and promote cycling.	Ongoing					✓
STRATEGY 3B: MAKE IT EASY TO FIND THE WAY						
Action 3B.1: Continue to implement the recommendations of TransLink's Wayfinding Guidelines for Utility Cycling in Metro Vancouver.	Ongoing			✓		✓
Action 3B.2: Continue to regularly update the Delta Routes Map as new infrastructure is implemented and make this available online.	Ongoing					✓
STRATEGY 3C: MAKE CYCLING SAFE FOR FAMILIES AND PROMOTE ACTIVE SCHOOL TRAVEL						
Action 3C.1: Continue to support programs and initiatives including Active and Safe Routes to School.	Ongoing					✓
Action 3C.2: Support School Travel Planning to reduce traffic at school sites and to encourage more active school travel among students.	Ongoing					✓
STRATEGY 3D: PROMOTE BICYCLE TOURISM						
Action 3D.1: Develop and implement a bicycle tourism initiative in partnership with local businesses and Tourism Delta, while ensuring bicycle routes are designed to avoid conflicts with agricultural equipment and vehicles.			✓			✓
Action 3D.2: Use and encourage region-wide campaigns to deliver positive messaging to promote bicycle tourism.			✓			✓
Action 3D.3: Collaborate with Tsawwassen First Nation to continue to support and promote the Great Blue Heron way.	Ongoing					✓
Action 3D.4: Work with BC Ferries to identify opportunities to promote bicycle tourism and improve cycling accommodation on its vessels.			✓			✓
STRATEGY 3E: CREATE AND PROMOTE RECREATIONAL TOURING LOOPS						
Action 3E.1: Develop and promote recreational touring loops throughout the City.		✓		✓		✓

Table 3: Implementation Plan – A Cycling Culture

4.3 NETWORK PRIORITIZATION

The Cycling Master Plan includes a network of recommended cycling facilities over the long-term. The implementation priorities identified in the previous section identify developing a city-wide network of cycling facilities that is comfortable for people of all ages and abilities as on-going priorities. This section provides the City with a prioritization process to identify priorities to improve the cycling network by identifying high, medium, and low priorities for implementation.

An objective, systematic, GIS-based prioritization methodology was developed for the Cycling Master Plan. The prioritization methodology includes a Multiple Account Evaluation (MAE) that assesses each cycling facility on each individual criterion. The MAE methodology includes eight criteria (see **Table 4**).

Each criterion contains scoreable information about a facility's ability to address an existing or future need. Each criterion was scored on a five-point scale, and criteria were assigned weightings (see **Figure 25**). The results were combined to generate an overall score for each new or upgraded cycling facility in the City. **Figure 26** shows the new cycling routes by priority, while **Figure 27** shows the priority scores for upgrading existing routes to a higher order facility. The scores on these maps translate to the following priority labels:

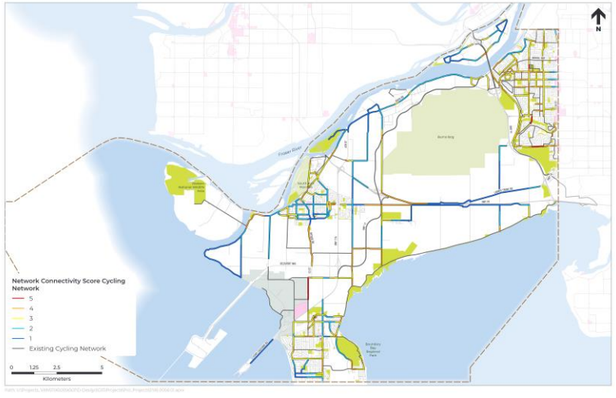
- **50+** = High Priority
- **40-49** = Medium-High Priority
- **30-39** = Medium Priority
- **20-29** = Medium-Low Priority
- **<20** = Low Priority

By combining these criteria into an aggregated score, a ranked project list can be developed that reflects each project's relative priority level for implementation. The results of the analysis are not intended to be cast-in-stone but, rather, to provide a flexible tool to assist the City in its on-going decision making. Each of the criteria are described in further detail below.

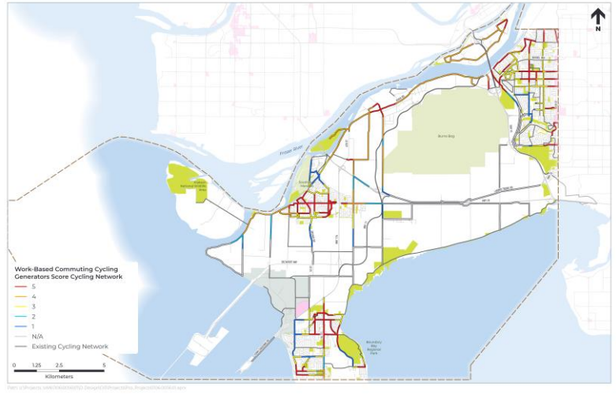
Criterion / Description/Description	Scoring
Network Connectivity	**Weighting 4.0**
Connects to two or more existing or committed bicycle routes	5 points
Connects to one existing or committed bicycle routes	4 points
Within 500 metres of an existing or committed bicycle route	3 points
Within 500 – 1,000 metres of an existing or committed bicycle route	2 points
Greater than 1,000 metres from an existing or committed bicycle route	1 point
Work-Based Commuting Cycling Generators	**Weighting 2.0**
Within 500 metres of major commercial use or Civic Precinct	5 points
Within 500 metres of major light industrial use	4 points
Within 500 – 1,000 metres of major commercial use or Civic Precinct	3 points
Within 500 – 1,000 metres of major light industrial use	2 points
Within 1,000 – 1,500 metres of major commercial use, major light industrial use or Civic Precinct	1 point
School-Based Commuting Cycling Generators	**Weighting 1.5**
Within 500 metres of public secondary school	5 points
Within 500 metres of public elementary school	4 points
Within 500 – 1,000 metres of public secondary school	3 points
Within 500 – 1,000 metres of public elementary school	2 points
Within 1,000 – 1,500 metres of public secondary school	1 point
Recreational Cycling Generators	**Weighting 1.0**
Within 500 metres of major regional park or recreation centre	5 points
Within 500 metres of local park	4 points
Within 500 – 1,000 metres of major regional park or recreation centre	3 points
Within 500 – 1,000 metres of local park	2 points
Within 1,000 – 1,500 metres of major regional park or recreation centre	1 point
Multi-Modal Integration	**Weighting 1.0**
Within 500 metres of transit exchange/shuttle pick-up/ferry terminal	5 points
Within 500-1,000 metres of transit exchange/shuttle pick-up/ferry terminal	4 points
Within 1000-2,000 metres of transit exchange/shuttle pick-up/ferry terminal	3 points
Beyond 2,000 metres of transit exchange/shuttle pick-up/ferry terminal, and on bus route	2 points
Beyond 2,000 metres of transit exchange/shuttle pick-up/ferry terminal, and within 500 metres of bus route	1 point
Regional Significance	**Weighting 2.0**
On both MBN and RGN	5 points
On MBN Only	4 points
On RGN Only	3 points
On Local Spine Route	2 points
Other Local Routes	1 point
Cycling Potential	**Weighting 2.0**
Located in Highest Potential Cycle Zone	5 points
Located in Higher-Moderate Potential Cycle Zone	4 points
Located in Moderate Potential Cycle Zone	3 points
Located in Moderate-Lower Potential Cycle Zone	2 points
Located in Lowest Potential Cycle Zone	1 point
Level of Protection	**Weighting 1.5**
Protected Bicycle Lane	5 points
Off-Street Pathway	4 points
Local Street Bikeway	3 points
Painted Bicycle Lane / Painted Shoulder	2 points
Shared Rural Road	1 point
Maximum points possible	**75 points**

Table 4: Prioritization Criteria

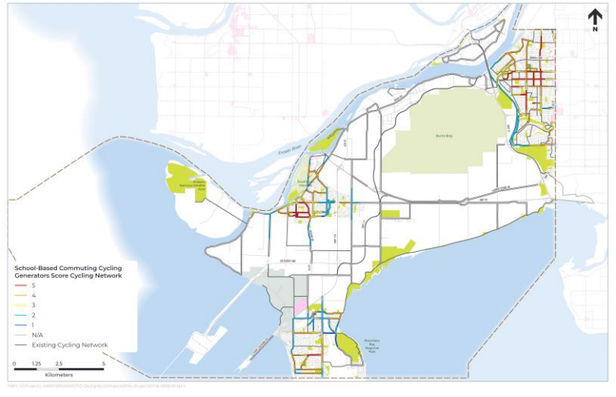
NETWORK CONNECTIVITY



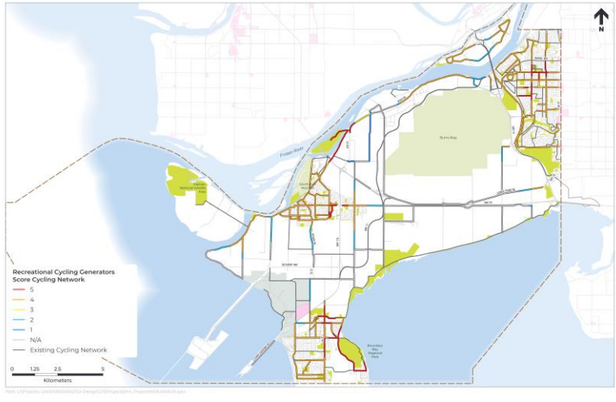
WORK-BASED COMMUTING GENERATORS



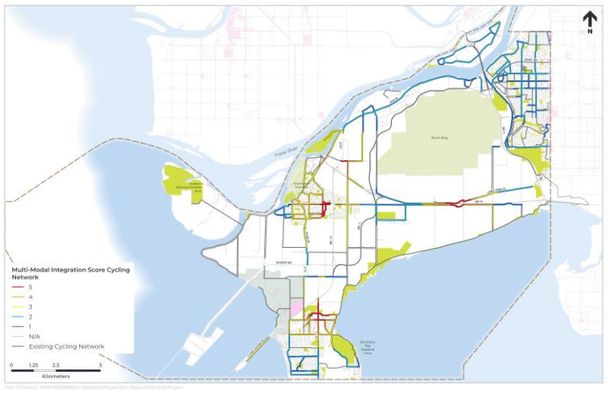
SCHOOL-BASED COMMUTING GENERATORS



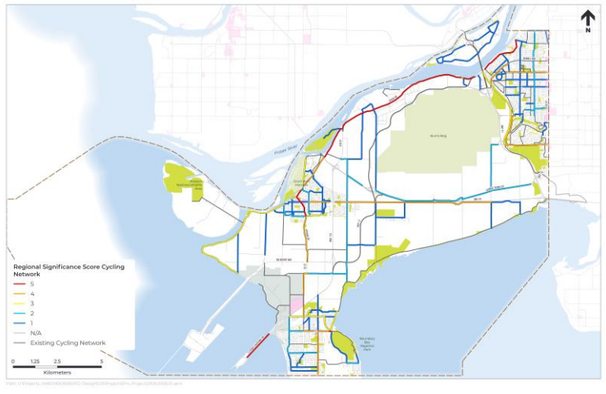
RECREATIONAL CYCLING GENERATORS



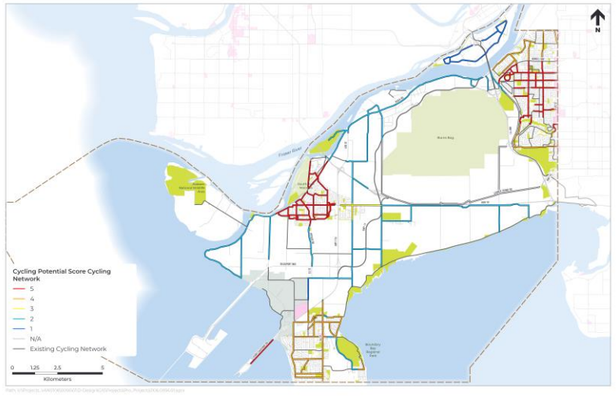
MULTI-MODAL INTEGRATION



REGIONAL SIGNIFICANCE



CYCLING POTENTIAL



LEVEL OF PROTECTION

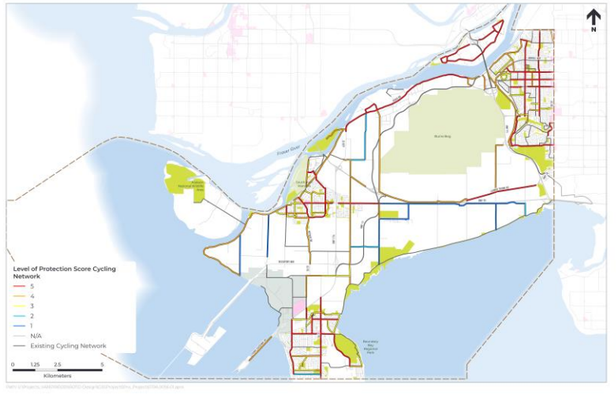
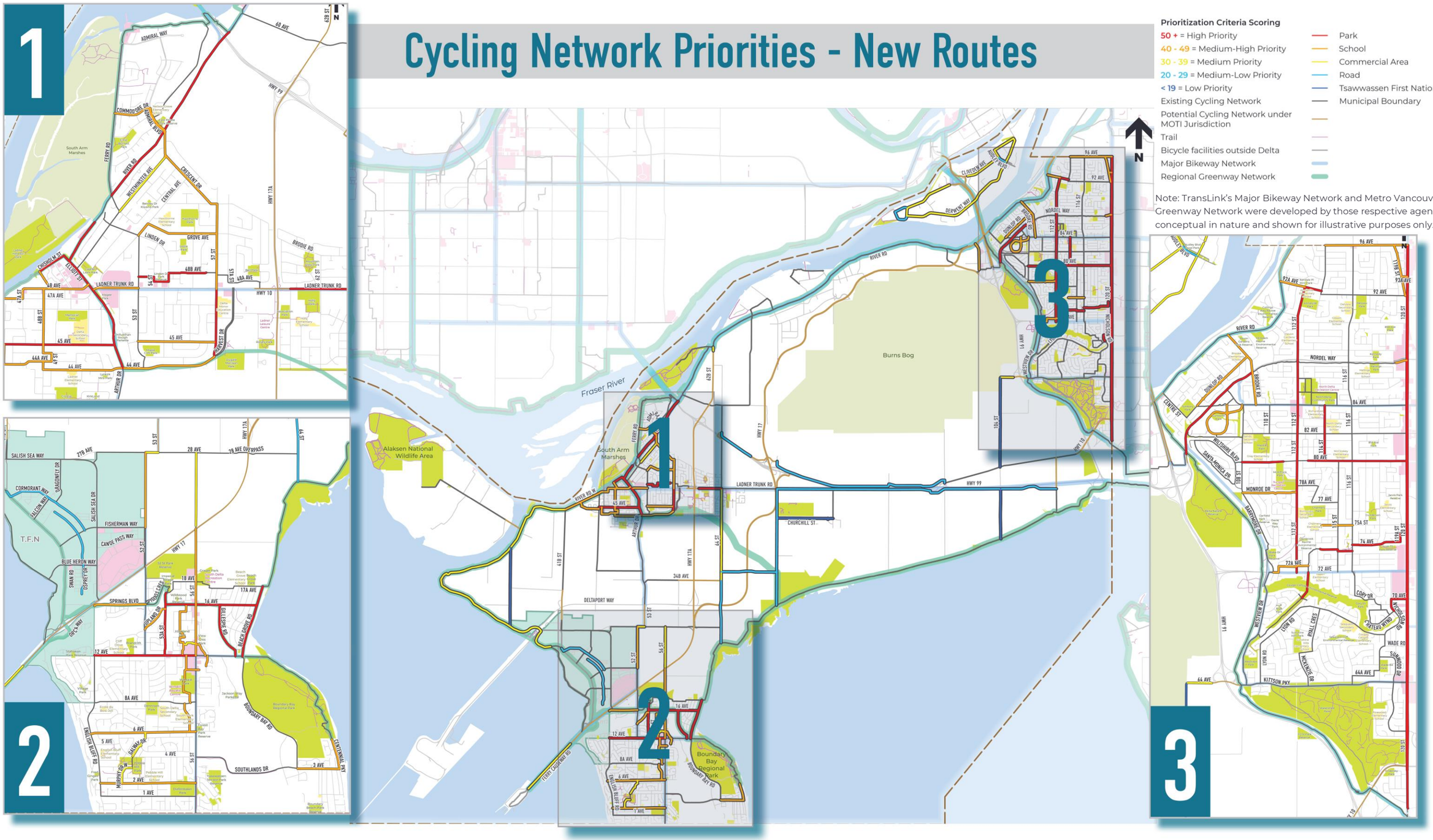


Figure 25: Prioritization Results - Individual Criteria

Cycling Network Priorities - New Routes



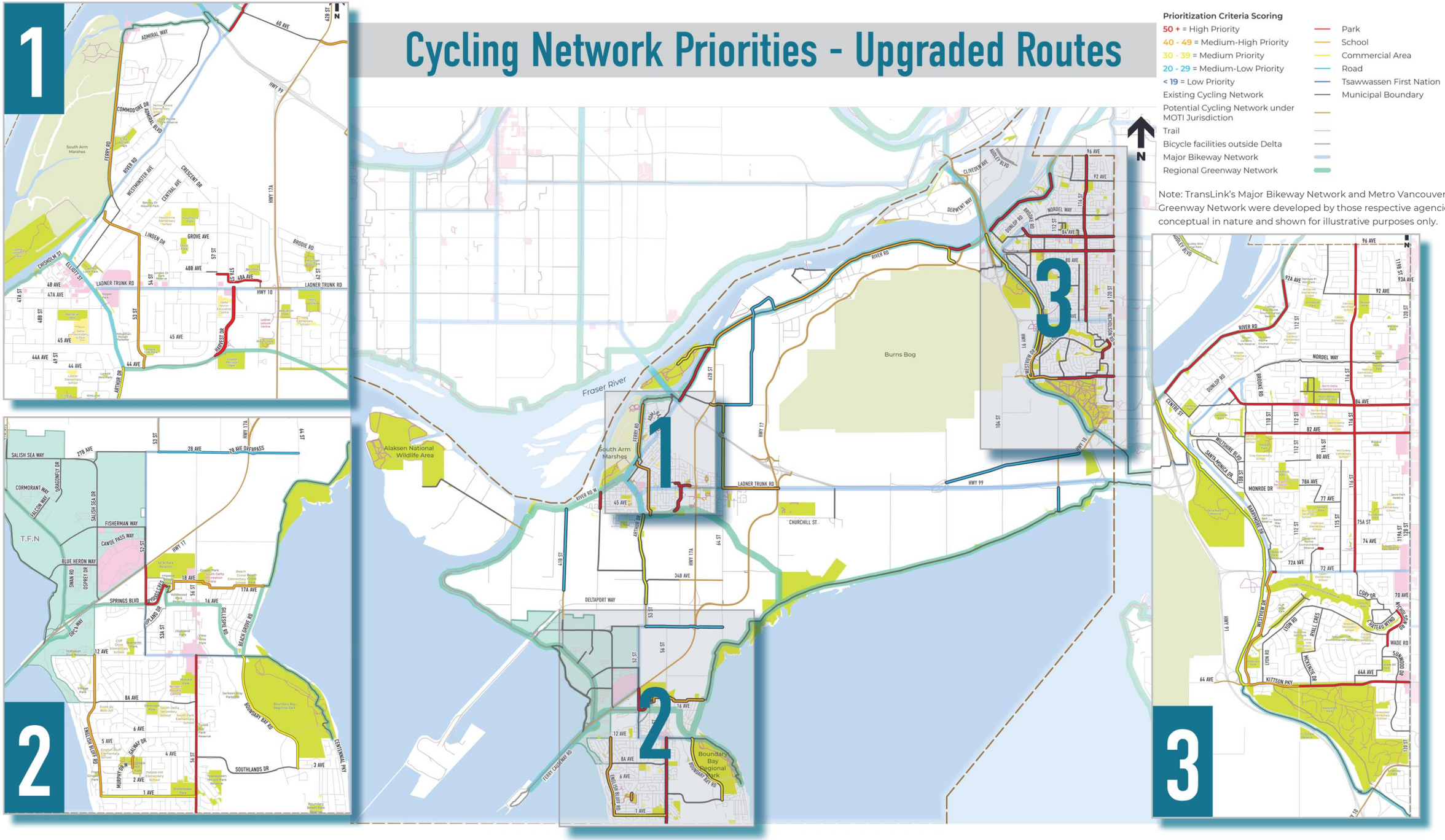
Prioritization Criteria Scoring

- 50 + = High Priority
- 40 - 49 = Medium-High Priority
- 30 - 39 = Medium Priority
- 20 - 29 = Medium-Low Priority
- < 19 = Low Priority
- Existing Cycling Network
- Potential Cycling Network under MOTI Jurisdiction
- Trail
- Bicycle facilities outside Delta
- Major Bikeway Network
- Regional Greenway Network
- Park
- School
- Commercial Area
- Road
- Tsawwassen First Nation
- Municipal Boundary

Note: TransLink's Major Bikeway Network and Metro Vancouver's Regional Greenway Network were developed by those respective agencies. They are conceptual in nature and shown for illustrative purposes only.

Figure 26: Prioritization Results – New Routes

Cycling Network Priorities - Upgraded Routes



Note: TransLink's Major Bikeway Network and Metro Vancouver's Regional Greenway Network were developed by those respective agencies. They are conceptual in nature and shown for illustrative purposes only.

Figure 27: Prioritization Results - Upgraded Routes

4.4 COST ESTIMATES AND FUNDING SCENARIOS

The Cycling Master Plan includes order-of-magnitude capital cost estimates for the implementation of cycling facilities. The cost estimates presented are based on typical unit costs and recent construction and maintenance pricing in the City of Delta and elsewhere in the Region and Canada (see **Table 5**)

Facility Type	Unit Cost ($/km)	Assumptions
Neighbourhood Bikeway	$40,000	Assuming improvements limited to signage, pavement markings, and traffic calming devices. Excludes property impacts.
Protected Bicycle Lane (within curb width)	$250,000	Assuming road space reallocation, new pavement markings, and lost cost buffer separation. Excludes property impacts and signal modifications.
Protected Bicycle Lane (widening required)	$1,250,000	Excludes property impacts.
Off-Street Pathway (upgrade)	$300,000	Assuming paving and lighting. Excludes property impacts.
Off-Street Pathway (new)	$500,000	Assuming no curb and gutter or drainage modifications required. Excludes lighting and property impacts.
Off-Street Pathway (utility relocation/ditch infill required)	$1,000,000	Excludes property impacts.

Table 5: Unit Costs

The cost estimates have been provided to identify the relative cost for planning purposes and should not be used for budgeting purposes. Wherever possible, the City should continue to seek out new opportunities to work with developers, other agencies and levels of governments to establish cost-sharing agreements, or to seek grant opportunities to offset total project costs.

Cost estimates have been developed for bicycle facilities on City-owned roadways. Cost estimates do not include any bicycle facilities under the jurisdiction of the Ministry of Transportation & Infrastructure. The total capital cost to implement on the Cycling Master Plan is approximately $105 million (see **Table 6**).

The timeframe of the Cycling Master Plan depends on annual funding levels. As outlined in Section 4.3, routes have been prioritized as high, medium-high, medium, medium-low, and low priority. **Table 6** the high-level cost estimates by priority and facility type (new vs. upgraded routes).

Priority	New Routes		Upgraded Routes		Total	
	KM	$	KM	$	KM	$
High (50+)	40	$16,405,000	29	$13,152,000	69	$29,557,000
Medium-High (40-49)	30	$12,530,000	20	$8,059,000	50	$20,589,000
Medium (30-39)	29	$14,730,000	16	$8,497,000	45	$23,227,000
Medium-Low (20-29)	24	$11,350,000	17	$15,577,000	41	$26,927,000
Low (<20)	10	$4,420,000	0	-	10	$4,420,000
Total	134.4	$59,435,000	88.8	$45,285,000	223.2	$104,720,000

Table 6: Cost Estimates by Type of Facility

Table 7 breaks down the high-level cost estimates by priority and sub-area. Of the three main communities, North Delta has the largest share of cycling projects, with just over $25 million worth of projects. The largest portion of facilities are in the "connections" area, which covers by far the largest distance. However, for the most part, these are lower priority facilities compared to those located in Ladner, North Delta, and Tsawwassen.

Priority	Ladner		North Delta		Tsawwassen		Connections	
	KM	$	KM	$	KM	$	KM	$
High (50+)	10	$5,187,000	41	$18,340,000	11	$4,010,000	7	$2,018,000
Medium-High (40-49)	15	$4,631,000	12	$5,406,000	13	$6,190,000	10	$4,361,000
Medium (30-39)	0	-	5	$1,453,000	10	$3,475,000	30	$18,300,000
Medium-Low (20-29)	0	-	0.3	$64,000	0	-	40	$26,862,000
Low (<20)	0	-	0	-	0	-	10	$4,417,000
Total	25	$9,818,000	58.0	$25,263,000	37.3	$13,675,000	103	$55,958,000

Table 7: Cost Estimates by Sub Area

Various funding scenarios were reviewed for the five-year capital planning cycle. The funding scenarios were identified to illustrate potential cycling network development of high priority projects over the short-term (five years). This included scenarios of $100,000 annual funding (status quo) as well as increased funding levels to $250,000, $500,000, $1,000,000, $2,000,000, and $3,000,000 annually. While the City may not necessarily invest at those full levels directly itself, the City may be able to leverage other funding opportunities to help invest at higher levels.

As demonstrated in **Table 8**, if the City continues to spends $100,000 per year, it will take several hundred years to complete the high priority cycling projects identified in this plan (and much longer to complete all routes). However, increasing annual funding levels will significantly speed up this process – for example, spending $3,00,000/year over, including leveraging external funding sources, would complete the high priority network in only 10 years. Furthermore, if the City prioritizes only the new cycling facilities rather than upgrading existing facilities, this will further accelerate the process. This would allow the City to build out a robust cycling network and focus on upgrading existing facilities over the medium and long term.

Priority	Annual Funding Scenarios					
	$100,000/ year	$250,000/ year	$500,000/ year	$1,000,000 / year	$2,000,000 / year	$3,000,000 / year
All High Priority Projects	300 years	120 years	60 years	30 years	15 years	10 years
New High Priority Projects Only	160 years	64 years	32 years	16 years	8 years	5 years

Table 8: Number of Years Required to Complete High Priority Cycling Projects at Various Annual Funding Level Scenarios

4.5 FUNDING AND LEVERAGE STRATEGIES

This section describes some potential funding strategies and sources that the City may consider to help leverage its investments and maximize its ability to implement active transportation network, amenity, and policy improvements. The City should regularly check with all levels of government to keep up to date on current funding opportunities. Delta should pursue all available sources of funding for transportation facilities and programs, including the programs identified below.

Note: as funding opportunities change regularly, the information in this section is subject to change.

FEDERAL

Green Municipal Funds are managed by the Federation of Canadian Municipalities, with a total allocation of $550 million. This fund is intended to support municipal government efforts to reduce pollution, reduce greenhouse gas emissions and improve quality of life. The expectation is that knowledge and experience gained in best practices and innovative environmental projects will be applied to national infrastructure projects.

Infrastructure Canada manages several programs that provide funding for environmental and local transportation infrastructure projects in municipalities across Canada. 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 Federal Government recently announced the **National Active Transportation Grant** program, which will fund $400 million in active transportation across Canada over the next five years.

PROVINCIAL

The Provincial Government administers the **Active Transportation Infrastructure Funding** program (previously known as BikeBC). Funded projects promote active transportation to work, school, or errands. Funded projects can also generate tourism-related traffic based on their proximity to amenities and points of interest for tourists and

through linkages to other communities. To ensure maximum success at obtaining grant funding, the City should have grant-ready concepts pre-developed for application.

The Province provides cost-share funding of up to $500,000 per project. Funding is offered based on applicant's community profile. Indigenous governments or partnership between local government(s) and an Indigenous government may apply for up to 80% of total projects. Municipal or regional governments may apply up to 70% of total eligible project costs depending on the community's population size. More information can be found online at:

https://www2.gov.bc.ca/gov/content/transportation/transportation-environment/active-transportation/funding/indigenous-local-governments.

Union of BC Municipalities' **Community Works Fund** is one of three funding streams of the Renewed Gas Tax Agreement between Canada, British Columbia, and the Union of BC Municipalities. The fund provides predictable, long-term and stable funding to local governments for investment in infrastructure and capacity building projects. Project examples include public transit, active transportation, parks, trails, bicycle facilities, cultural infrastructure, and long-term infrastructure plans. Funding is delivered twice annually to local governments, with the amount of funding determined by a per capital formula. More information can be found online at:

https://www.ubcm.ca/EN/main/funding/renewed-gas-tax-agreement/community-works-fund.html

ICBC provides funding for road improvements, including pedestrian and bicycle infrastructure, particularly where these have the potential to reduce crashes, improve safety, and reduce claims costs to ICBC. Funding is available through ICBC's Road Improvement Program. Other ICBC programs include the Speed Watch Program (through the Community Policing Centres), Speed and Intersection Safety Program, Counter Attack, Operation Red Nose and Road Sense Speaker Program for Schools. Funding is available annually, with the application deadline typically in February. More information can be found online at:

www.icbc.com/about-icbc/community-relations/Pages/community-grants.aspx.

REGIONAL

TransLink administers the **Bicycle Infrastructure Capital Cost Sharing Program** (BICCS), which is intended to encourage municipalities to construct more bicycle routes and remove physical barriers to cycling. Funding is available in both "block allocations" on a per capita basis, and "regional needs" funding is based on a set of criteria including safety, network contribution, demand and adherence to guidelines Funding through TransLink's BICCS program is typically up to 50% of the project cost.

5.0 SUMMARY AND CLOSING

Delta's Cycling Master Plan provides a visionary document for the City, taking a long-range, holistic, and integrated approach while also incorporating the overarching goals of Delta's three communities and the region as a whole. The Cycling Master Plan provides both aspirations to reach for, and a short-term blueprint to make cycling more attractive and feasible in the City of Delta.

The Cycling Master Plan is just one step towards implementing the vision for cycling in Delta, and it is not the last. The themes and actions identified in the Plan are intended to lay the groundwork for implementation over the long-term. However, it is important to recognize that implementation will require investment and resources. This includes investments in new infrastructure, upgrades to existing infrastructure, ongoing maintenance of existing and new facilities, resources for development of new standards and policies, funding for new programming and public education, and staff resources. It will also require ongoing coordination between local planning processes and between various stakeholders and levels of government, especially when it comes to implementing inter-jurisdictional projects.

The Cycling Master Plan has been developed based on extensive technical work and engagement with the Delta community. Through this public engagement process, hundreds of community members provided input into the development plan at various phases. The City of Delta would like to thank all community members for their participation in the process and their valuable input developing the Cycling Master Plan.

APPENDIX A

ROUND ONE PUBLIC CONSULTATION RESULTS

Delta Cycling Master Plan

Round One Public Consultation Results

INTRODUCTION

An online survey was available on the Let's Talk Delta website for all interested Delta residents to complete between January 7, 2021 and February 7

2021. The survey was designed to better understand current conditions for cycling in Delta, including commuting mode share, trip purpose, comfort levels, and COVID-19-related changes to travel patterns. It also asked respondents to identify issues or challenges for cycling in Delta, as well as things that would encourage people to cycle more. In addition, the survey included an interactive map, where respondents were able to drop markers on a map of the City to indicate their favourite places to bike, cycling issues, trail issues, and suggestions for new cycling routes across Delta.

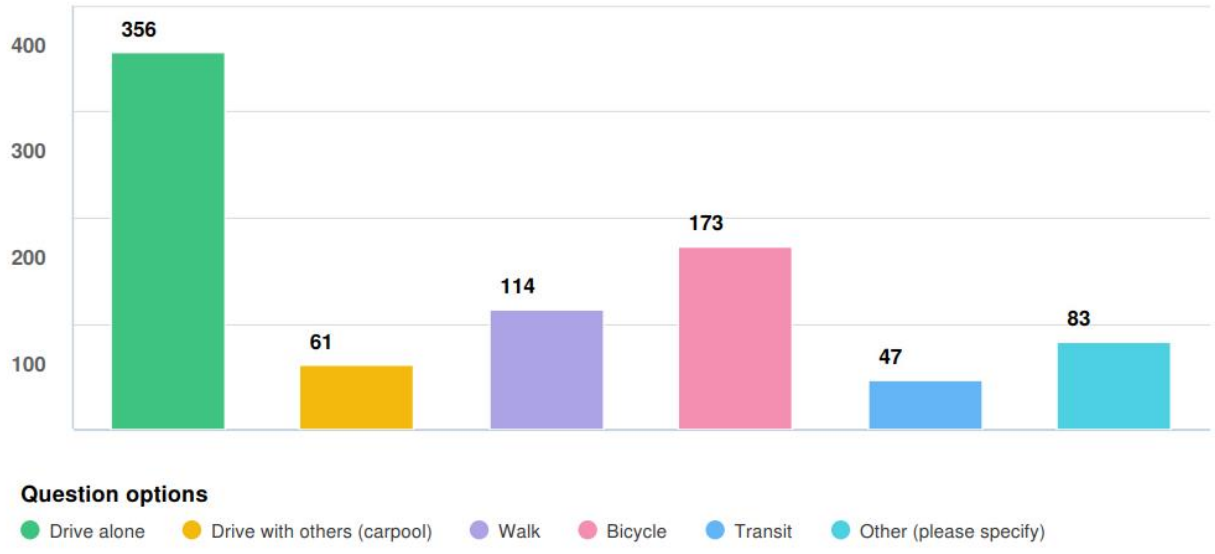
The survey received 1,719 views, resulting in 578 responses. The mapping tool received 387 total submissions from 58 different contributors. The results of the online survey will be used to inform the draft Delta Cycling Master Plan, along with the results of additional community engagement and network analysis review. The following is a summary of what we heard through the online survey.

1 CLOSED-ENDED QUESTIONS

1.1 MODE SHARE

Q1. What is your usual mode of transportation for your daily commute? (select all that apply)

Survey respondents were asked to identify their usual mode for transportation for their daily commute. *Driving alone* was identified as a top mode of transportation among respondents, receiving a total of 356 responses, followed by *bicycle* with 173 responses. *Driving with others (carpool)* and *Transit* were among the lowest modes of transportation for daily commute among respondents with responses of 61 and 47, respectively.

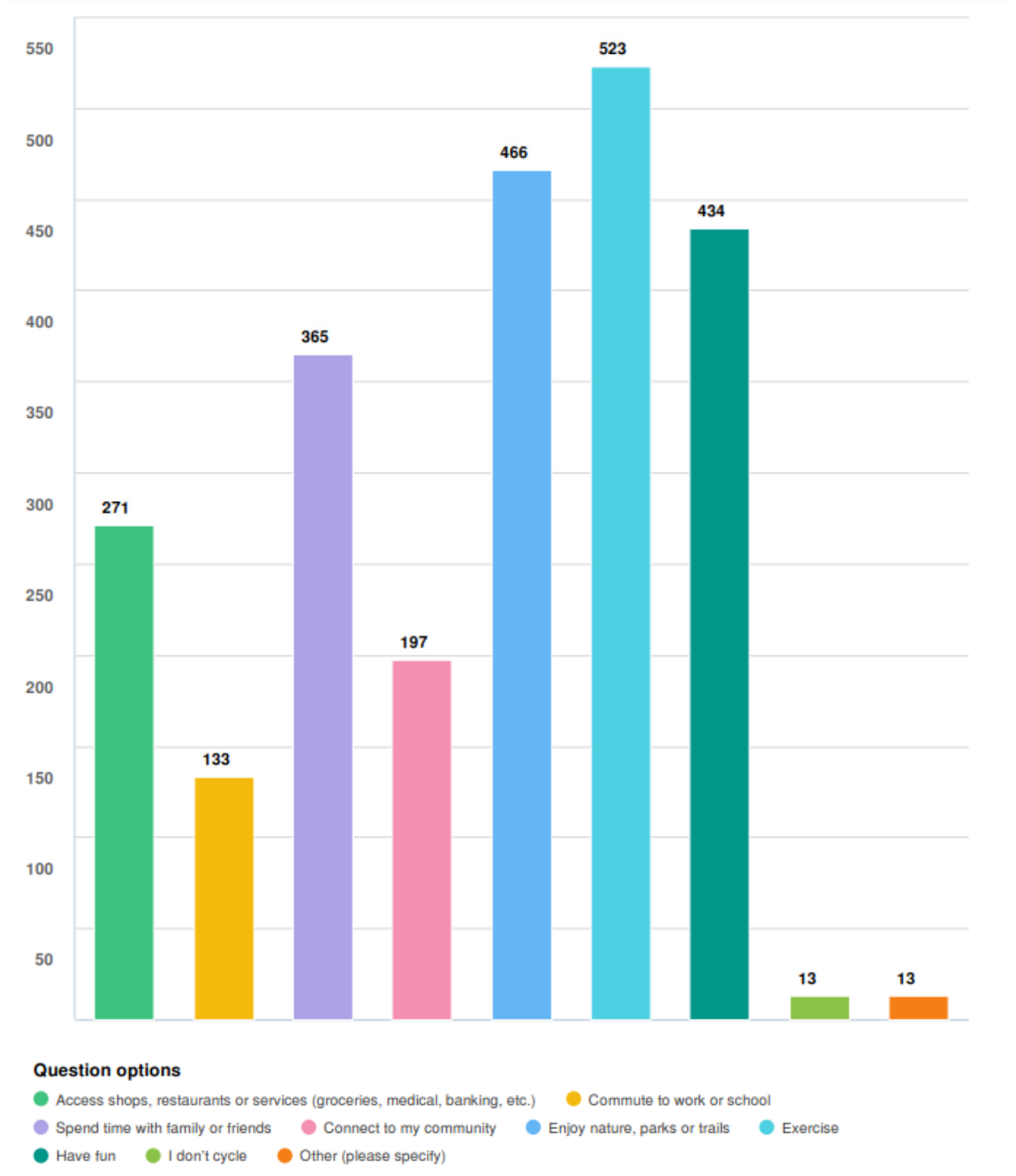


Mandatory Question (577 response(s))
Question type: Checkbox Question

1.2 TRIP PURPOSE

Q2. When I cycle, it's to: (select all that apply)

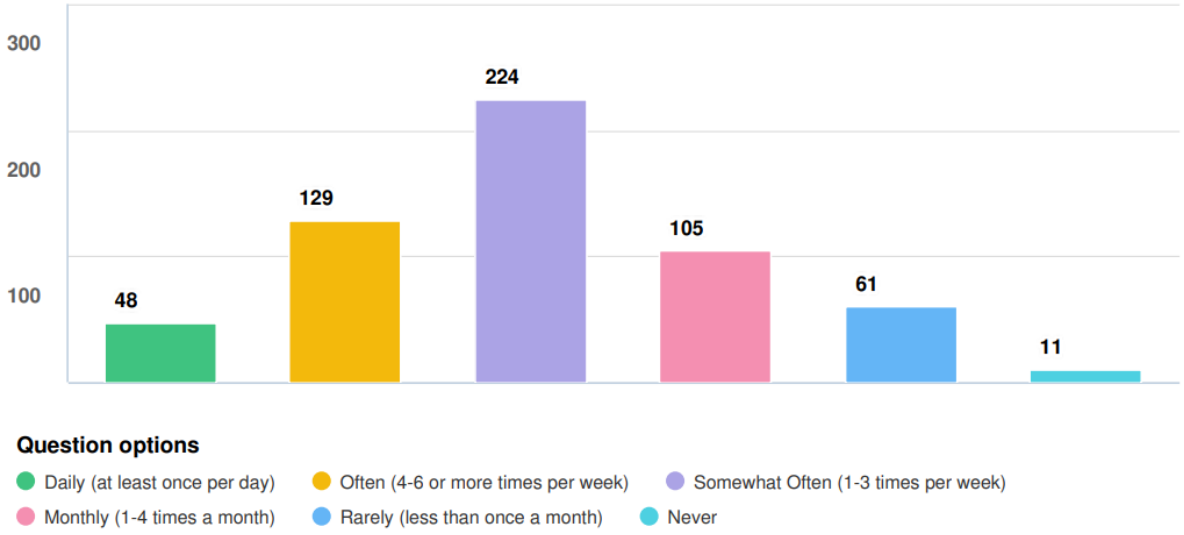
Survey participants were then presented with a list of nine topics areas to choose from as to why they cycle. *Exercise* was identified as one of the top priorities for cycling among participants with 523 responses, followed by *enjoying nature, parks or trails* with 466 responses and *have fun* with 434 responses. *I don't cycle* and *other* were the lowest surveyed responses among participants with 13 responses each.



1.3 TRAVEL PATTERNS

Q3. When thinking of all trip purposes in Question 2, how often do you cycle? (select one)?

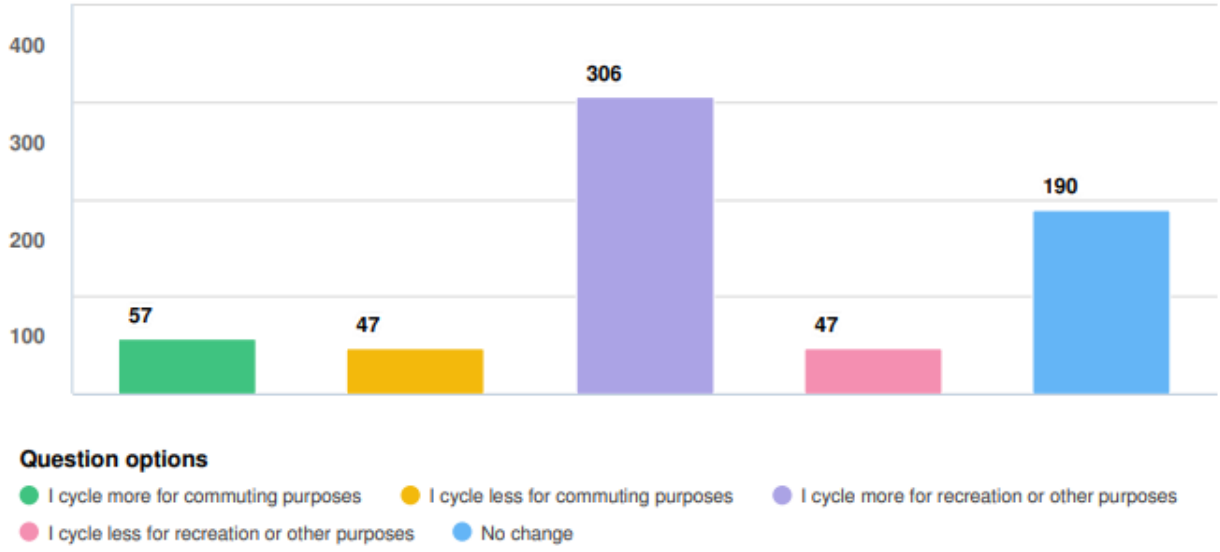
Surveyed participants were asked how often they cycle. The most common response was *cycling somewhat often (1-3 times per week)* with 224 responses. *Never* was among the lowest choice with 11 responses.



Mandatory Question (577 response(s))
Question type: Checkbox Question

Q4. Since the COVID-19 pandemic, have your typical transportation habits changed?

Surveyed participants were asked how their transportation habits have change since the COVID-19 pandemic, with the top response being *I cycle more for recreation or other purposes* (396 responses), followed by *no change* (190 responses). *I cycle less for commuting purposes* and *I cycle less for recreation or other purposes* were among the lowest selected choices at 47 responses each.

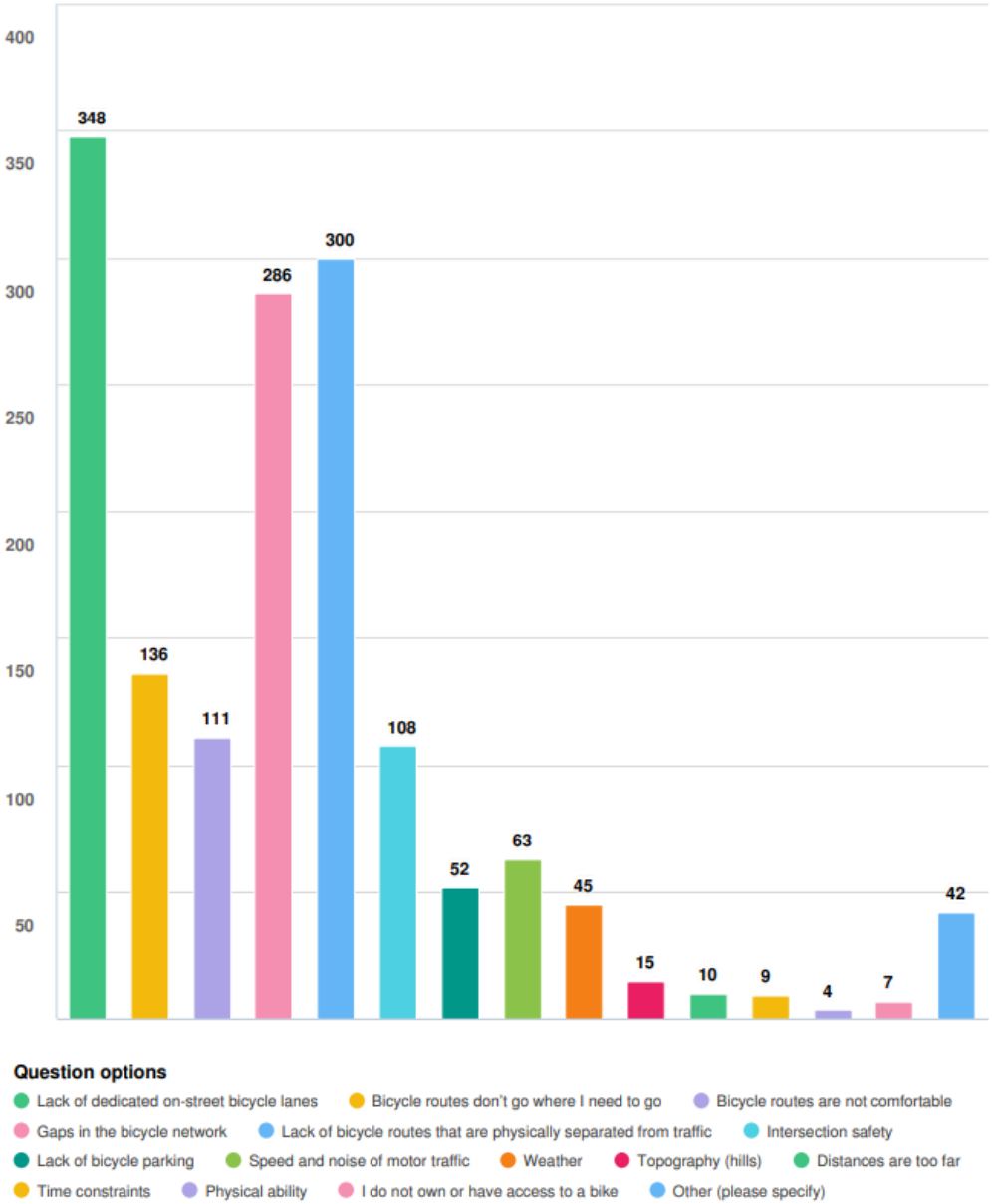


Mandatory Question (577 response(s))
Question type: Checkbox Question

1.4 CYCLING ISSUES AND COMFORT

Q5. What are the main issues or challenges for cycling in Delta? (Select up to three)

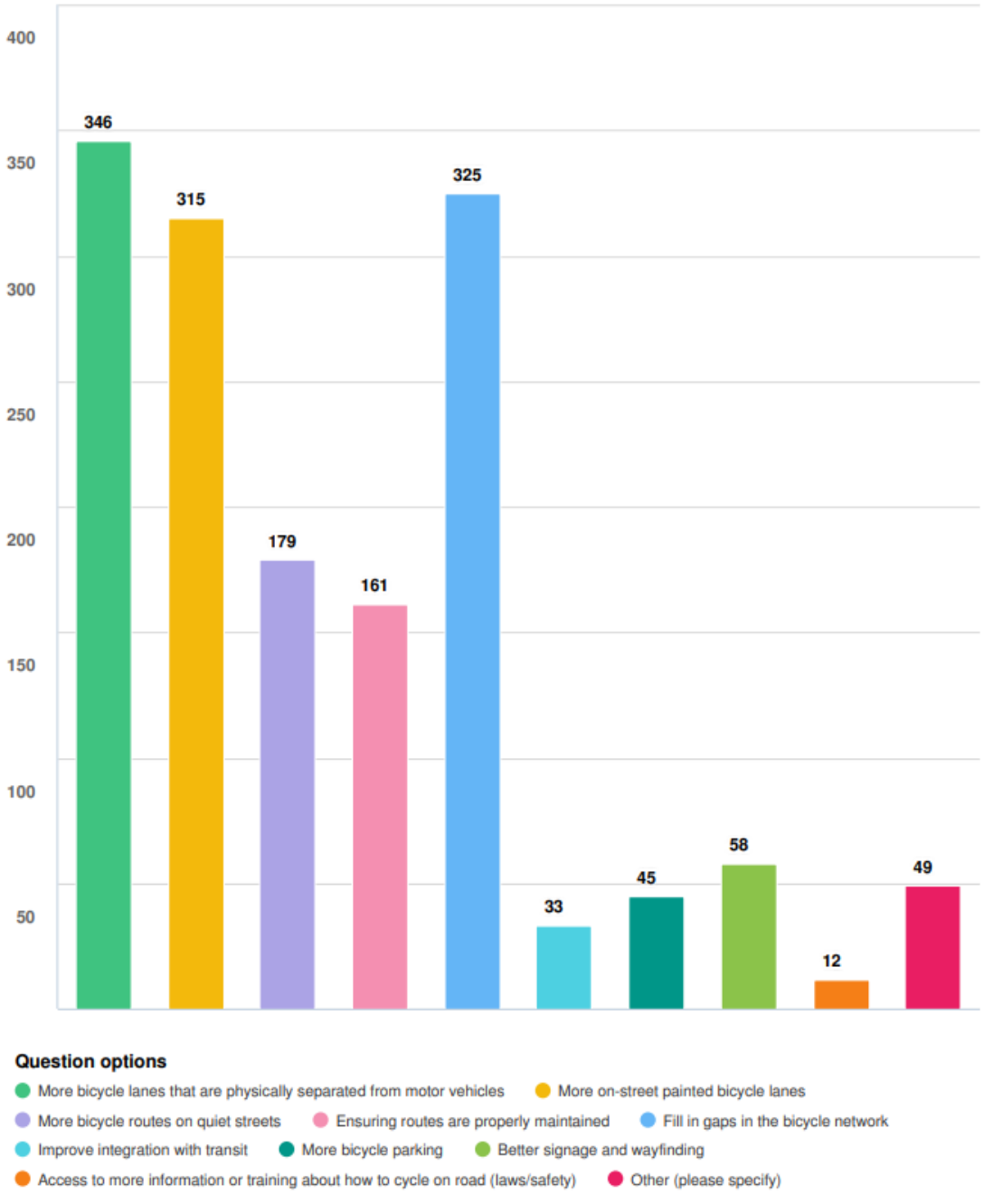
When asked to identify the main issues or challenges for cycling in Delta, 348 of respondents selected *lack of dedicated on-street bicycle lanes* and 300 respondents chose *lack of bicycle routes that are physically separated from traffic*. *Gaps in the bicycle network* was another key issue among respondents.



Mandatory Question (577 response(s))
Question type: Checkbox Question

Q6. What would most encourage you to cycle more in Delta? (Select up to three)

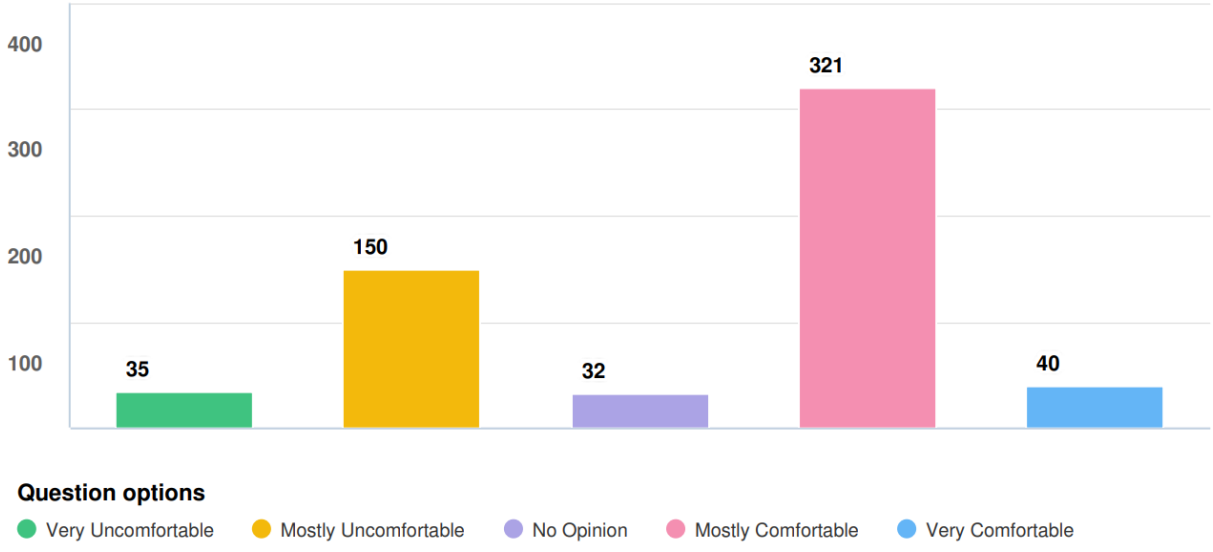
Among surveyed respondents, *more bicycle lanes that are physically separated from motor vehicles* (346 responses), *fill in gaps in the bike network* (325 responses), and *more on-street painted bike lanes* (315 responses), were the top responses. *More bicycle routes on quiet streets* (179 responses) and *Ensuring bicycle routes are properly maintained* (161 responses) were also seen as good ways to encourage more cycling.



Mandatory Question (577 response(s))
Question type: Checkbox Question

Q7. How comfortable do you feel cycling in Delta? (select one)

When asked to identify how comfortable participants felt when cycling in Delta, those who responded to this question selected *mostly comfortable* as their top choice with 321 responses. 150 respondents selected *mostly uncomfortable* and another 35 chose *very uncomfortable*, and only 35 feel *very comfortable,* indicating there is still significant work to be done.



Mandatory Question (577 response(s))
Question type: Checkbox Question

2 OPEN-ENDED QUESTIONS

Question 8 was open-ended, asking respondents to "*Please provide any general feedback that you may have*." These responses have been analyzed and classified into four different themes, as outlined below. There were also several location-specific comments that have been summarized below.

2.1 THEME 1: INFRASTRUCTURE (200 COMMENTS)

- **Overall pavement quality and maintenance (58 comments)**
  Many respondents felt there is a need for improve pavement quality and maintenance of street which includes too many potholes and addressing drainage and flooding issues. 31 respondents also indicated that farm roads, back roads, rural, and quiet streets are currently poorly maintained, and the pavement quality should be improved. Comments also addressed issues surrounding connectivity of farm roads and back roads.

- **Lack of safe bicycle facilities and cycling routes (38 comments)**
  Many respondents felt there should be more safe cycling lanes and routes that they can bicycle on across communities and neighbourhoods. 10 respondents indicated that there are many gaps in cycling infrastructure and existing bike paths as the continuity in the routes need to be fully completed to be safe.

- **Physical separation of cycling infrastructure from motor vehicles (33 comments)**
  Respondents noted that with increasing traffic, there needs to be a larger focus on cycling safety by physically separating bicycle infrastructure from motor vehicles.

- **Paved shoulders and farm road infrastructure (18 comments)**
  Respondents indicated that there is a lack of paved shoulders in general along the cycling network. 6 respondents also stated that there is no dedicated infrastructure for cycling along farm roads and that there is potential for a bike trail network along farm roads.

- **Street sweeping and debris (14 comments)**
  Respondents stated that there was an overall lack of street sweeping on cycling lanes to remove any debris such as glass, rocks, gravel, leaves to maintain cycling lanes.

- **Road infrastructure too narrow (6 comments)**
  Surveyed respondents indicated that currently, roads are too narrow and major streets that are too busy, making existing designated bike lanes difficult to cycle on.

- **Improve cycling infrastructure to be all ages and abilities (AAA) (5 comments)**
  Respondents stated that there is need for all cycling infrastructure to be improved to accommodate people of all ages and abilities.

2.2 THEME 2: CONNECTIONS (75 COMMENTS)

- **Improve safety and accessibility of cycling connection between Delta, Ladner, and Tsawwassen (19 comments)**
  Participants noted the need for safe, accessible cycling connections with dedicated bicycle infrastructure to encourage cycling between the three communities. Suggestions included a connection from Kittson Parkway to 104 Street to Ladner Trunk Road, River Road, and Highway 17. Respondents also highlighted improved connectivity between North and South Delta.

- **Improved connectivity within Delta (18 comments)**
  Respondents mentioned that connectivity within Delta communities should be improved to help attract more cyclists across the Lower Mainland and provide better connections to local businesses.

- **Improve connection and safety for cyclists accessing the ferry terminal (8 comments)**
  Surveyed respondents indicated the importance of a safe connection to the ferry terminal, as there is a lack of protection from speeding motorists.

- **Improved connectivity with dyke system routes (7 comments)**
  Respondents indicated that there is a need to improve connectivity with dyke system routes and improve them to meet all ages and abilities (AAA) status.

2.3 THEME 3: SAFETY (117 COMMENTS)

- **Cycling safety for families and family-oriented communities (37 comments)**
  Respondents currently felt that cycling in Delta needs to be improved to accommodate families to feel safe through all ages and abilities facilities (AAA). Currently parents do not feel comfortable allowing their children to cycle to school.

- **Cycling safety comfort levels (18 comments)**
  Currently respondents felt limited to only cycling on quiet streets due to the lack of safety along major roads. This is largely due to lack of cycling lanes, speeding traffic, and noise levels.

- **Signage and wayfinding (13 comments)**
  Respondents felt that there is a need to improve the current signage and wayfinding to provide more clarity for motorists and cyclists.

- **Cyclists and pedestrian conflicts (11 comments)**
  Currently respondents felt limited to cycling on sidewalks due to safety concerns when traveling on the road. This results in conflict concerns with pedestrians.

- **Shared-road use (9 comments)**
  Respondents felt that shared road use for cyclists with motor vehicles currently is dangerous and provides unsafe cycling conditions.

2.4 THEME 4: GENERAL COMMENTS (92 COMMENTS)

- **Cyclists' education and etiquette (16 comments)**
  Respondents indicated that cyclists should be better informed and educated on the rules of the road and cycling etiquette, which includes travelling at appropriate and safe speeding along multi-use pathways, not ignoring traffic signals, wearing helmets, and cycling on sidewalks.

- **Bike theft, bike parking, bike lockers (14 comments)**
  Participants noted that they felt bike theft is often a deterrent from cycling. Several surveyed respondents suggested bike lockers in facilities and transit exchanges, additional bike parking for business, more bike racks, and bike stations that can include bike repair tools and air pumps.

- **Driver awareness and education (12 comments)**
  Surveyed respondents noted that drivers need to be more aware and educated of the rules of the road and potential conflicts with cyclists. One respondent noted that information needed to be conveyed to motorist to not park in bike lanes.

- **Prioritization of recreational and commuting cyclists (8 comments)**
  Surveyed respondents noted that recreational and commuter cyclists should be prioritizing when selecting and improving bike lanes and bike paths over avid competitive cyclists.

2.5 LOCATION-SPECIFIC COMMENTS (422 COMMENTS)

1. **River Road West (65 comments)**
   Respondents noted there is a need for a designated cycling lane as well as addressing safety and pavement concerns along River Road West. This includes repair and maintenance of potholes, crumbling asphalt, debris, and road widening. Additional comments indicated that the bike lane is not continuous along the entire road. Better access required to key destinations such as Wellington Park, Brunswick Point, and the Dyke.

2. **Dyke Path (41B Street – 33A Avenue – 34 Street) (49 comments)**
   a. Surveyed respondents indicated the needed for safety improvements along the dyke. E-bikes should have proper speed control limits and better cycling etiquette with respect to pedestrians.

b. Respondents called for improvements to the dyke access as well as a bridge or pedestrian crossing at the south end of 34th Street at Brunswick Point Dyke
c. Comments indicated that there needs to be improved pavement quality and repaving along streets such as 41B street, 33A Avenue and 34 Street.
d. Comments also highlighted that improvements of the pavement quality for the dyke need to be improved for recreational cycling. Concerns of dyke access were also brought up within comments.
e. A few comments suggested a bike lane separated from pedestrians along the dyke.

3. **Westham Island (35 comments)**
   Linked very closely to River Road West survey comments. Indicated that the cycling path on the bridge connection to Westham Island is unsafe and requires regular maintenance of the pavement and widening of the road. Request to improve cycling lanes and widen shoulder on Westham Island and improve access to the Westham Island Dyke.

4. **Ladner Trunk Road (23 comments):**
   It was stated that it is important to connect North Delta and South Delta by integrating designated cycling lanes and approving the access along Ladner Trunk Road. Respondents also requested wider and better maintained paved shoulder for cycling, continuity in the bike lane, more signage, and speed enforcement.

5. **56th Street (24 comments)**
   a. Surveyed respondents indicated that 56th street needs to become safer for cyclists and pedestrians. Safety concerns from heavy, speeding traffic.
   b. Respondents called for widening of the north-south cycling lane as well as improvements towards the lack of continuity for cyclists.
   c. Other comments indicated the lack of shoulder, need for improved pavement quality, and that there should be a no right hand turn on red lights at 56th street.

6. **52nd Street (17 comments)**
   a. Surveyed respondents indicated that bike lanes are currently not continuous with major gaps and want the access to be improved. It was also indicated that cyclists needed to cross two travel lanes to stay on the bike route.
   b. Respondents also stated that there is currently a lack of a shoulder area and that the pavement quality can be improved. One comment stated that the city should look to implement an overpass to connect East and West Ladner.

7. **Highway 10 (Scott Road connection) (17 comments)**
    a. Respondents indicated that there are safety issues along highway 10 that needed to be improved and a designated cycling lane should be installed on Scott Road and Highway 10. Other comments also indicated the need for regular maintenance, that the shoulder area is limited, and the bike lane requires widening.
    b. Other comments suggested that the bridge crossing on Highway 10 over Highway 99 needs maintenance as it is a key connection into Surrey and Scott Road. Overall respondents called for improved connectivity between North Delta and Surrey.

8. **12th Avenue (14 comments)**
    a. Comments indicated that there a need for a painted cycling lane or dedicated bike paths.
    b. Respondents also noted that at the intersection of 12th Ave and 56th Street, there needs to be improvements for cyclists as they often use pedestrian paths, which confuse motor vehicles making right hand turns.
    c. One respondent also indicated the needed for removing all the leaves using street sweepers along the cycling lane.
    d. One respondent indicated the need for a AAA facility for children to cycle to school.

9. **72nd Street near Boundary Bay Airport (13 comments)**
    a. Respondents indicated that the pavement quality headed towards Boundary Bay Airport is heavily damage due to heavy trucks and that there is a lack of a shoulder.
    b. It was also noted that there is an unsafe crossing on the east side of the BNSF tracks ending at 72nd Street. Other comments also suggested that the path along the west side of the rail tracks should be upgraded to connect to North Delta across the Railway through Westview Drive
    c. Comments also highlighted the need for connecting cycling routes to the south of 72nd street and improved North-South route at the bottom of North Delta hill by the bog.

10. **Arthur Drive (13 comments)**
    a. Surveyed respondents indicated that the bike lane along Arthur Drive is not continuous and ends abruptly at 34B Avenue and should be consistently maintained.

b. Other comments included improving the cycling access, changing Arthur Drive to a one-way street, widening of the cycling lane, improving street lighting, cycling path under constant construction.

11. Highway 17 (13 comments)

a. Respondents indicated that there is currently a safety issue and need for a marked cycling lane that is physical separated from motor vehicles.
b. Comments also indicated that there are currently maintenance issues along the highway including removing debris on the highway.
c. There are unsafe cycling issues at highway crossings due to the traffic headed to the ferry and malls.

12. Alex Fraser Bridge (10 comments)

Comments indicate that the access to Alex Fraser Bridge is confusing and the bike lane requires maintenance. Respondents have also indicated that the pathway under Alex Fraser Bridge and the ice rink floods frequently resulting in the rainwater mixing with sewage water overflow.

13. 64th Street (6 comments)

Comments indicated that there is a need for a dedicated biking lane along 64th street as there is currently no safe access. Other comments include improve pavement quality and conducting regular maintenance of the road, the lack of shoulder and seasonal flooding problems. There is also a worry about speed traffic as drivers need to become more educating regarding cycling safety.

14. Watershed Park (6 comments)

Comments indicated that Watershed Park should have better drainage to prevent seasonal flooding on the cycling lane parallel to Highway 91. Comments also indicated that there should be a dedicated cycling lane with shared access and better signage or wayfinding.

15. 112th and 116th Street (13 comments)

a. Respondents noted that the majority of 112th Street and 116th Street currently has a cycling route that is mainly shared-use road that should be converted into designated cycling routes and found that parking is often obstructing the existing cycling lanes.
b. Comments also indicated that there is a lack of continuity for the existing cycling lanes and that North Delta is missing several sidewalks.

16. Millennium Trail (8 comments)

Respondents noted that there is a need to have a separated cycling lane from pedestrians from the Millennium Trail to Boundary Bay Dyke. Other respondents noted that there is a lack of signage along the trail, narrow shoulder and lack of continuity along the path.

17. Boundary Bay Dyke (7 comments)

Respondents noted that there is a need for a multi-use pathway along Boundary Bay Dyke Trail and should have better surface treatment along the trail like the City of Surrey. Comments also indicated the need to repair and maintain the gravel at Boundary Bay Dyke, better enforcement of leashes on dogs, cycling facilities separated from pedestrians and cycling speed limits.

18. Boundary Bay Road (6 comments)

a. Respondents noted that the pathway along Boundary Bay Road should be elevated and designated for only pedestrians between Centennial Beach and Southlands. Comments also indicated the need for a cycling lane along Boundary Bay Road.
b. Respondents noted that pedestrians and cyclists are currently travelling on the street to properly social distance due to COVID.
c. Comments indicated that the roads need repaving especially near Boundary Bay Airport
d. One respondent stated that the current yellow markers create unsafe cycling conditions along the path of Boundary Bay Road and 12th Avenue

19. Brunswick Point (6 comments)

Surveyed respondents noted that the access along the tracks at the port needs to be improved and that there should be a cycling bridge under or beside the tracks and an overpass at the beach. Other comments highlighted the importance of physical separation from cyclists and motor vehicles.

20. English Bluff (6 comments)

Surveyed respondents indicated that there is dangerous cycling lane near 12th and that there is a need to reduce traffic speeds by adding traffic calming like speed bumps. Other comments suggested unsafe conditions such as vehicles parking in cycling lanes, unclear signage, blind driveways and prevent vehicles from parking between 8th Avenue and 52nd Street. One comment suggested the need for a bike path under the power lines from English Bluff to Downtown Tsawwassen.

21. 46 A Street (6 comments)

Respondents have requested for an extension of a safe cycling route and development of an overpass of Deltaport Way to better improve connectivity between Ladner and Tsawwassen. Other comments include wanting parking lanes to act as a physical separation from motor vehicles and cyclists.

22. Highway 91 (4 comments)

a. Poor connectivity travelling from Kitson west to the golf course.
b. Improve cycling connection on Highway 91A and traffic safety concerns.
c. Cycling route east of Highway 91 between Highway 10 and Highway 17 should have increased elevation and improved weather surfacing from seasonal flooding.

23. Tunnel Access (4 comments)

Respondents requested for more options to get through the tunnel by cycling and proposed a cycling route as part of the new Deas bridge and tunnel crossing.

24. Nordel Way (4 comments)

Respondents requested that there should be more signage for cyclists should not have to dismount at every crossing and just proceed with caution. Other comments suggested the need to improve flooding conditions along bike lanes near the West side of the rail tracks beside Great Pacific Forum.

25. Deas Island (4 comments)

Respondents requested for more access to parks such as Deas Island and requested a paved area from Riverhouse to Deas Park. One respondent indicated that the Deas Island Trail Network should be mixed use.

26. 36th Avenue (4 comments)

Respondents requested for more access for a repaving of the road, addition of a cycling lane, lack of a paved shoulder and comments of the existing area to be too narrow along 36th Avenue between Arthur Drive and 41B Street.

3 MAPPING TOOL RESULTS

As noted above, respondents utilized the City's interactive mapping tool (Places), which allows respondents to drop markers on a map of the City to indicate their favourite places to bike, cycling issues, trail issues, and suggestions for new cycling routes across Delta. Individual respondents were able to place as many pins as they wanted to, with 58 unique respondents dropping a total of 387 pins. Respondents also had the option of providing additional details in comments for each pin. The full results are currently available online at the following link: https://letstalk.delta.ca/cyclingmasterplan/maps/places-survey-optional

The following sections include **heat maps** showing where clusters of mapping pins appeared on the interactive mapping tool. These maps help to indicate response patterns for each question, highlighting areas that are most important to target for the Cycling Master Plan. Additionally, detailed comments have been summarized below and will be utilized during the development of the proposed cycling network.

3.1 HIGH-LEVEL FINDINGS

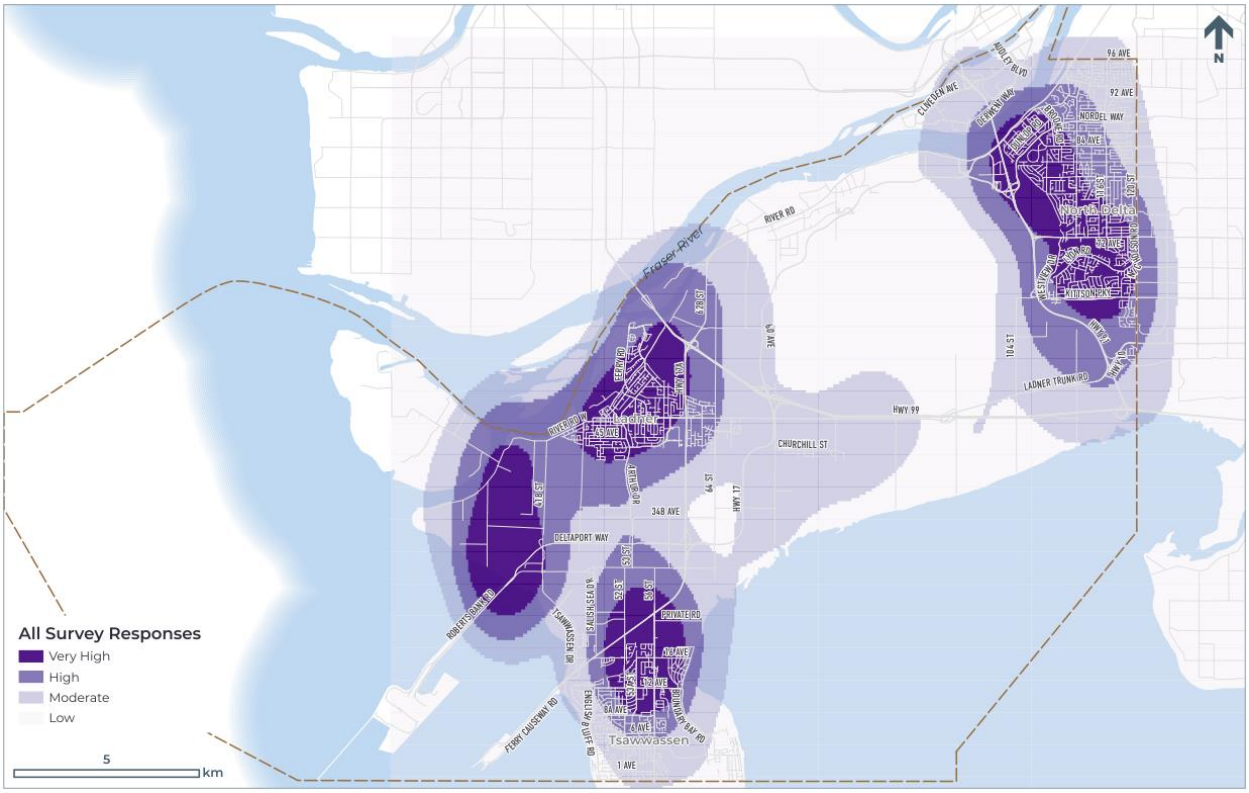


Figure 1: Overall Summary of Survey Mapping Pin Locations

Figure 1 provides an overall summary of all pins dropped on the map. High-level findings have been summarized by geographic area below:

- **Ladner area**
  - Respondents indicated Westham Island bridge is currently very unsafe (slippery with gaps between planks). Upgrade is desired, along with possibility to explore trail availability along outer edges of the island (currently private or blocked off).
  - Respondents indicated River Rd W is in poor condition, narrow and with high traffic volumes. Desire for dedicated bicycle facility.
- **Tsawwassen area**
  - Several comments across all survey categories requesting a connection for Brunswick Point Trail across Deltaport Way. Along with this, many requests for a bridge across the ditch from Brunswick Pt Trail to 34 St (especially as an alternative to the missing crossing at Deltaport Way).
  - Cycling issues comments around road condition and desire for bicycle facilities on 56 St.
  - Highway 17: respondents requested a protected bicycle lane for the causeway to the ferry terminal due to high cyclist and vehicle volumes, and a connection point from Hwy 17 to Great Blue Heron Way as currently a roadside barrier prevents this. Other respondents noted high amounts of roadside debris and highlighted that the highway shoulders are unsafe for all but experienced cyclists and should not be marked as such unless they are upgraded to separated lanes.

- **North Delta**
  - Many comments centered on Bog Greenway Trail / Delta-South Surrey Regional Greenway (access, condition, connections to rest of network and other trails)
  - Connections to facilities in Surrey, across Scott Rd, is a common theme (accounting for this in plans and connections to Delta's existing facilities)
  - Calls for 116 St / 112 St cycling facility improvements, along with other corridors (82 Ave, 75A Ave, 80 Ave).
  - Accessibility concerns with baffle gates on multi-use pathways for tandems, bicycles with trailers, and non-standard bicycles (such as cargo e-bikes).

- **Rural Areas**
  - Several rural roads between Ladner and Tsawwassen were identified as popular routes with poor pavement conditions and a lack of facilities (34 St, 33A Ave, 41B St, 53 St).
  - Many comments centered on discontinuous facilities along Ladner Trunk Road, and the desire for an east-west connection (whether that is a separated facility

along Ladner Trunk Rd, or a parallel route using rural roads with dedicated facilities).

- Lots of opportunities for "quick wins" in **Tsawwassen** and **North Delta** with neighbourhood bikeways and small connections, crosswalks, signage, etc. added to network – many comments requesting these (a large portion coming from HUB contributors)

3.2 NEW CYCLING ROUTE SUGGESTIONS (62 COMMENTS)

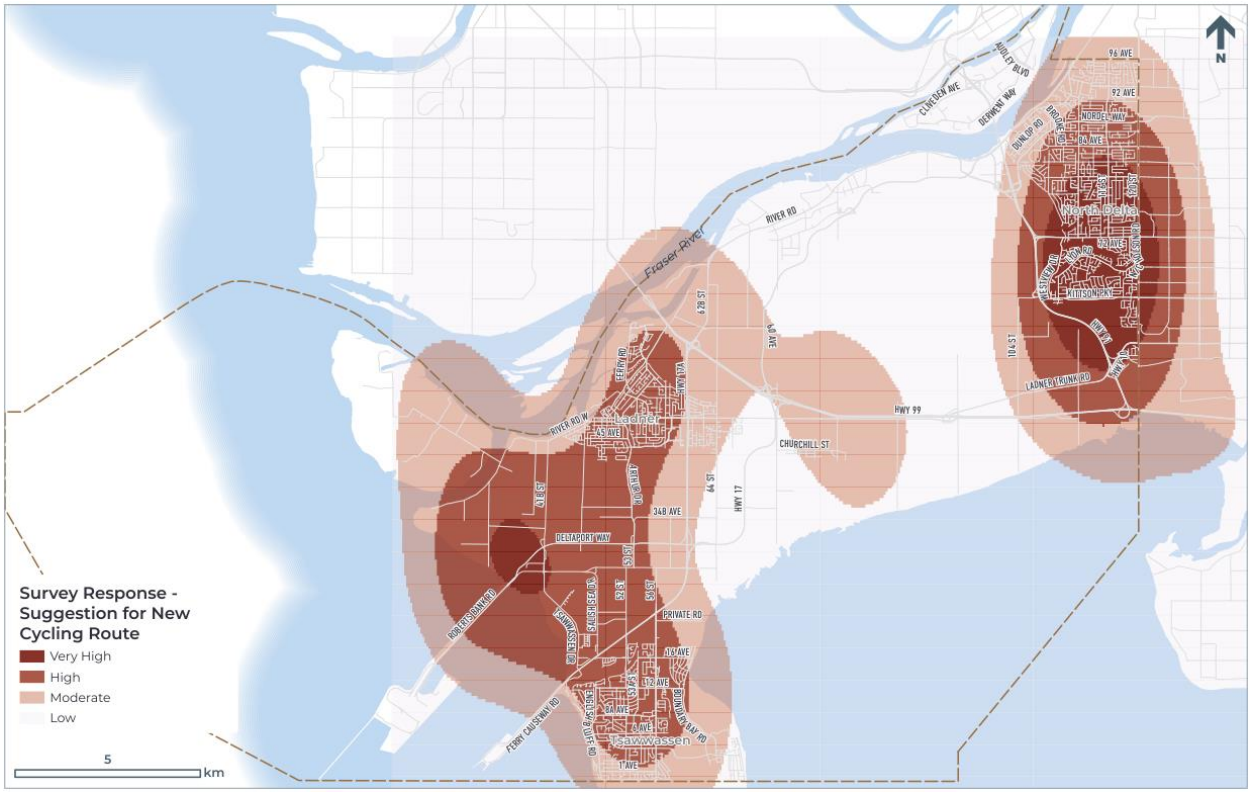


Figure 2: Suggestions for New Cycling Route (Survey)

Figure 2 shows the areas where new cycling routes were most often suggested. Detailed comments include:

- **Opportunities for trails along outside of Westham Island (4 comments)**
  Two respondents highlighted the possibility for high value trails along the north, east and south sides of Westham Island, although these are dependent on access (the north and south exterior roads are gated or marked as private). The desire for a connection along the west side to Frew Rd was mentioned.

- **Bridges and overpasses to dyke trails north and south of Deltaport Way (7 comments)**
  Respondents requested connections (bridges, overpasses or even culverts) from 31 Ave and 34 St to join the Brunswick Point Trail. Three comments also requested an overpass over Deltaport Way for a continuous dyke connection west to east (Brunswick Pt Trail and Great Blue Heron Way).

- **46A St connecting Ladner to Tsawwassen Mills (3 comments)**
  Suggestions to secure the 46A overpass and ROW for a future cycling route. Identified by respondents as a calmer cycling N/S cycling route, especially for older cyclists.

- **Bicycle facilities on key roads within Tsawwassen (7 comments)**
  Desire for bicycle lanes on 12 Ave (key commuter route), 53A St (connections to 52 St and 8A Ave) and 56 St (5 comments requesting high visibility cycling facilities, extending north of Hwy 17 to 28 Ave).

- **Bicycle facilities along Ladner Trunk Road as east-west connector (2 comments)**
  Respondents suggested busy vehicular streets are often the most direct cycling routes and emphasized investing in Ladner Trunk Rd as it is a continuous east-west connector.

- **Suggestions for alternate east-west cycling routes to Ladner Trunk Road (3 comments)**
  According to respondents, Burns Drive requires more lighting but would provide an alternative for essential workers commuting by bicycle. 44 Ave from 80 St to 96 St would be an excellent bicycle connection from Churchill St to Hornby Ave, instead of Ladner Trunk Rd. Extending the bicycle lane on 44 Ave could form a continuous loop around Ladner.

- **Connections and improvements to Bog Greenway Trail (4 comments)**
  Respondents suggested an overpass from 112 St over Hwy 91 connecting to the Bog Greenway Trail and Water Tower Trail as an alternative to the Hwy 10 intersection. 112 St would be an excellent cycling connection between the Bog Greenway Trail and the Boundary Bay Dyke Trail.

- **Watershed Park trail improvements and suggestions (3 comments)**
  Respondents indicated desire for signage along Pinewood Trail to connect into Surrey, and desire for connection from Artesian Trail to 64 Ave. Suggestion to use the “Lower Trail” in combination with Westview Dr or Lyons Rd, and the North Delta Greenway as a viable alternative to the Bog Greenway Trail which is prone to flooding.

- **Coordination with City of Surrey cycling routes through North Delta (3 comments)**
  Respondents mentioned that a pathway between Nicholson Rd and 68 Ave (cycling route in Surrey) would connect to the Lyon Rd cycling route in Delta, and that protected facilities along 80 Ave would extend the planned City of Surrey cycling upgrades into Delta, providing a direct route to the Alex Fraser bridge. 70 Ave cycling facilities were desired, to connect Nicholson Rd with the 70 Ave facilities in Surrey.

- **Desire for cycling facility along 28 Ave to cross Hwy 17 (3 comments)**
  Identified by respondents as an excellent potential connection across Hwy 17 to 64 St and East Ladner, but currently unsafe.

- **Specific North Delta cycling recommendations (12 comments)**
  - Trail connection from Westview Dr to Lyon Rd is safest and most direct instead of continuing to 64 Ave.
  - North-South connection from 64 St to Nicholson St is more direct and quieter via Sunwood Dr and the pathway to Baker Rd, instead of Wade Rd.
  - Cycling or multi-use facility along Scott Road (120 St) between Wade Rd and 66 Ave (120m) would connect Delta and Surrey.
  - Crosswalk and signage desired to connect pathways between east and west sides of Scott Rd (120 St) at Cougar Creek.
  - Desire to connect existing 115 St bike route across 72 Ave and along 115A St to 116 St (existing shared use facility).
  - Possibility to construct a parallel bicycle route along 72A Ave if short segments of multi-use pathway constructed on 72 Ave (connect Blake Dr and York Cr, as an example). Request to consider this during widening of 72 Ave. (2 comments)
  - Recommended connection between Madner Lane and 116 St crosswalk with off-street pathway.
  - Desire for an east-west connection between 75A Ave and 112 St near Chalmers Elementary.
  - Recommendation to include 75A Ave (120 St to Chalmers Elementary) as a bicycle route.
  - Recommendation to add protected cycling facilities along 112 St as north-south connector.
  - Desire for protected bicycle facilities along 82 Ave – popular commuter route with low utilization of on-street parking.

3.3 CYCLING ISSUES (132 COMMENTS)

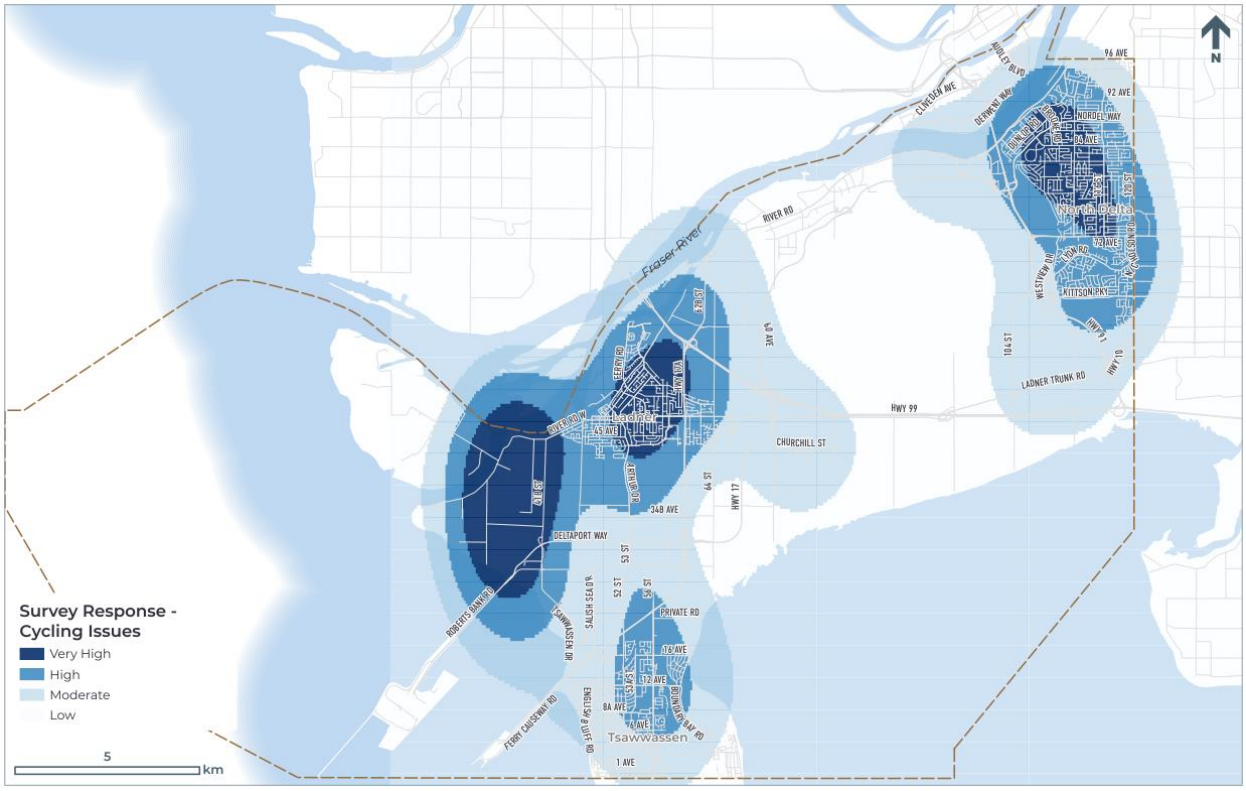


Figure 3: Cycling Issues (Survey)

Figure 3 shows the areas where cycling issues were most often reported. Detailed comments include:

- **Connection between Orca Way and Springs Boulevard, Tsawwassen (3 comments)**
  Respondents indicated this connection previously existed as a cycling route but is now discontinuous due to construction and/or private property access. Desired re-connection.

- **Highway 17 (7 comments)**
  Respondents requested a protected bicycle lane for the causeway to the ferry terminal due to high cyclist and vehicle volumes, and a connection point from Hwy 17 to Great Blue Heron Way as currently a roadside barrier prevents this. Other respondents noted high amounts of roadside debris and highlighted that the highway shoulders are unsafe for all but experienced cyclists and should not be marked as such unless they are upgraded to separated lanes.

- **Ladner Trunk Rd (6 comments)**

Respondents indicated the bike lane is discontinuous while approaching the Harvest Dr bike route, that the Hwy 17A crossing is dangerous for cyclists using vehicle lanes, and that the existing facilities are narrow with poor road surface conditions.

- **No connection for Brunswick Point Trail across Deltaport Way (7 comments)**
  Several respondents requested an overpass or alternate route to connect the dyke trails across Deltaport Way. Respondents also noted the current crossing at 34 St is often unusable.

- **Lack of wayfinding on existing bicycle routes or connections (2 comments)**
  Respondents indicated a lack of wayfinding along Salish Sea Way and at the 48A Ave connection to Ladner Trunk Rd near 59 St.

- **Westham Island Bridge unsafe for cyclists (3 comments)**
  Respondents indicated that gaps between planks are larger than bicycle tires, that the bridge deck is very slippery, and that requiring riders to dismount would not work. Even minor improvements would be beneficial to cyclists safely crossing the water.

- **River Rd and River Rd West (18 comments)**
  Respondents indicated that River Rd and River Rd W are in poor condition, are narrow, and have high traffic volumes. Desire for dedicated bicycle facility or viable marked alternative routes, as respondents voiced that where bike lanes exist, they are discontinuous, and that shared lanes do not work well. Several comments also mentioned poor sight lines near Wellington Point Park, and unsafe crossings to access the dyke. North of Hwy 99 there is often roadside debris, and requests to extend cycling routes further north on River Rd. Two respondents indicated riding along River Rd is one of the only options to connect from the Alex Fraser Bridge to Ladner and Tsawwassen, but that it is very dangerous due to high truck volumes, narrow shoulders, and a lack of lane markers or lighting.

- **Rural roads in poor condition near between Ladner and Tsawwassen (11 comments)**
  The following rural roads were identified by respondents as excellent and preferred cycling routes, but with hazardous pavement conditions: 34 St, 33A Ave, 41B St, 53 St. Burns Dr was identified as having high amounts of roadside debris near the landfill.

- **Dangerous crossings identified at several intersections (3 comments)**
  Crossing from Maple Ln bike route to 44 Ave has low visibility, crosswalk desired.

Crossings at 48A Ave / 53 St and 48B Ave / 57 St are requested, to continue 48A and 48B Ave as parallel route to Ladner Trunk Rd (quieter and safer).

- **Issues identified at the Burns Dr / 64 St underpass under Hwy 99 (3 comments)**
  Respondents identified that the bike route sign leading to the underpass from Burns Dr was not replaced after construction, that the underpass is frequently flooded and needs drainage improvements, and that there is no mirror on the south side.

- **Improvements desired at Hwy 99 Fraser River Crossing (3 comments)**
  Respondents identified that the current shuttle pickup location is unpleasant and should be moved to the Chamber of Commerce building, and that a cycling option will be essential for any future river crossing option pursued by MOTI.

- **Bicycle facilities desired along alternate routes to Ladner Trunk Rd (4 comments)**
  Two respondents identified 72 St as a recreational route to the dyke and a popular commuter route connecting east-west corridors 36 St and Churchill St. Respondents identified it lacks bicycle lanes and has poor road surface conditions. The 80 St railway overpass was commented to be unsafe due to narrow widths – "share the road" signage desired at minimum. 44 Ave was highlighted as an excellent alternative to Hwy 10, but with poor existing road surface conditions.

- **Confusion on where to cycle along Nordel Way, west of Hwy 91 (2 comments)**
  Respondents indicated it is unclear where cyclists are expected to ride (in the lane or on the sidewalk) and voiced that four lanes are not required for current traffic volumes and should be converted to include cycling facilities.

- **Baffle gates on multi-use pathways in North Delta impede cyclists with trailers, tandem bicycles, or non-standard bicycle types (8 comments)**
  One respondent suggested widening, staggering at twice the current distance, or removing the baffle gates from problem locations and in general within Delta. Locations identified by respondent:
    - Pathway parallel to Modesto Pl
    - 108 St parallel bike path at 82 Ave crossing, 84 Ave crossing, Sullivan Pl pathway connection, and connection to Nordel Way from 85A Ave
    - Nordel Way bike route at Shepherd Way, 112 St, 116 St, and North Delta Greenway

- **Discontinuity and intersection challenges on Nordel Way bike route (7 comments)**

According to respondents, 800 metres of the 3.5km long pathway requires cyclists to walk bikes along sidewalks. Suggestion to improve intersections and ensure cyclists can stay on their bikes for the length of the pathway (by allowing cycling on sidewalks, converting to multi-use paths, or another means). At 120 St, signage is desired to direct cyclists towards City of Surrey cycling facility on northeast corner.

- **Lack of cycling facilities on high volume corridors in North Delta (4 comments)**
  Respondents highlighted 112 St (particularly near Chalmers Elementary, where students are currently forced onto the sidewalk), 82 Ave, 75A Ave (connection to Surrey cycling route), and 80 Ave (specifically between popular north-south connectors 115 St and 114 St) as segments requiring facilities. It was voiced that curb extensions along 80 Ave are hazardous to cyclists if no protected facilities exist.

- **Poor allocation of on-street parking relative to cyclist traffic in North Delta (5 comments)**
  116 St, 112 St, 80 Ave, Lyon Rd and Nicholson Rd were identified by respondents as preferred cycling routes requiring more space for protected facilities, which could be achieved by removing one side of under-utilized on-street parking. 112 St was specifically identified as being difficult to use with children due to parked vehicles.

3.4 TRAIL ISSUES (55 COMMENTS)

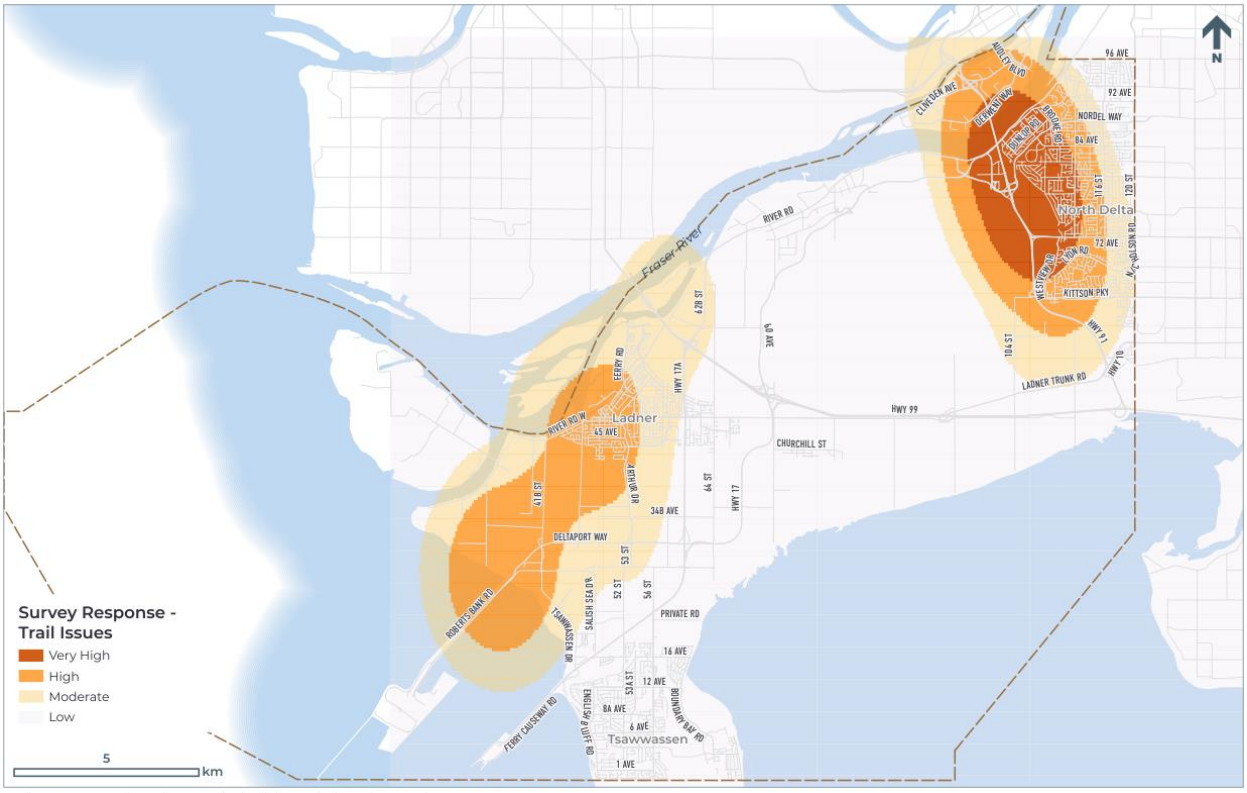


Figure 4: Trail Issues (Survey)

Figure 4 shows the areas where trail issues were most often suggested. Detailed comments include:

- **No connection for Brunswick Point Trail across Deltaport Way (4 comments)**
  Respondents requested an overpass or alternate route to connect the dyke trails across Deltaport Way. This was a common comment across numerous categories.

- **Watercourse crossing from Brunswick Point Trail to 34 St is unusable (4 comments)**
  Respondents noted that this popular connection to Ladner from the dyke is unusable, and a bridge crossing over the ditch is required.

- **Discontinuity in dyke trail near River Rd W and 46A St intersection (4 comments)**
  Respondents noted a fence currently blocks the trail, forcing commuters to come down to River Rd W before re-joining the trail at a later point.

- **Lack of safe travel routes to Ladner schools (2 comments)**

Ladner Elementary, Delta Secondary, and their surrounding areas were identified by respondents as lacking safe connections by bicycle.

- **Millennium Trail issues and improvements (4 comments)**
  Respondents indicated a desire for separating cyclists and pedestrians due to high volumes. Poor lighting was indicated at the Hwy 99 underpass and neighbouring forested area, as well as a gravel section due to construction, north of Hwy 99, which has yet to be repaved. One respondent desired general widening and paving of the trail.

- **Bog Greenway Trail (Delta-South Surrey Regional Greenway) issues (11 comments)**
  It was indicated that the trail is completely flooded during winter and unrideable, in addition to being poorly maintained and washed out in sections. The connection to 72 Ave is not maintained either. Localized flooding issues were also identified on both sides of Nordel Way, and along the neighbouring Alex Fraser bike route connector next to Planet Ice.

- **Westview Drive / North Delta Greenway issues and improvements (4 comments)**
  A safe railway crossing and trail connection to Bog Greenway requested from Westview Dr adjacent to Magnolia Ct. 72 Ave underpass along North Delta Greenway was highlighted as being poorly maintained. “Underpass trail is very important for cycling as crossing 72 Ave at street level is impossible.”

- **Alex Fraser Bike Route issues (4 comments)**
  Highlighted issues include rough joints in the concrete sidewalk along the bridge, snow being plowed into the bike route during winter, overgrown vegetation on sidewalks near Cliveden Avenue, and an unsafe crossing for cyclists at the eastbound on-ramp from Cliveden Avenue.

3.5 FAVOURITE PLACES BY BIKE (138 COMMENTS)

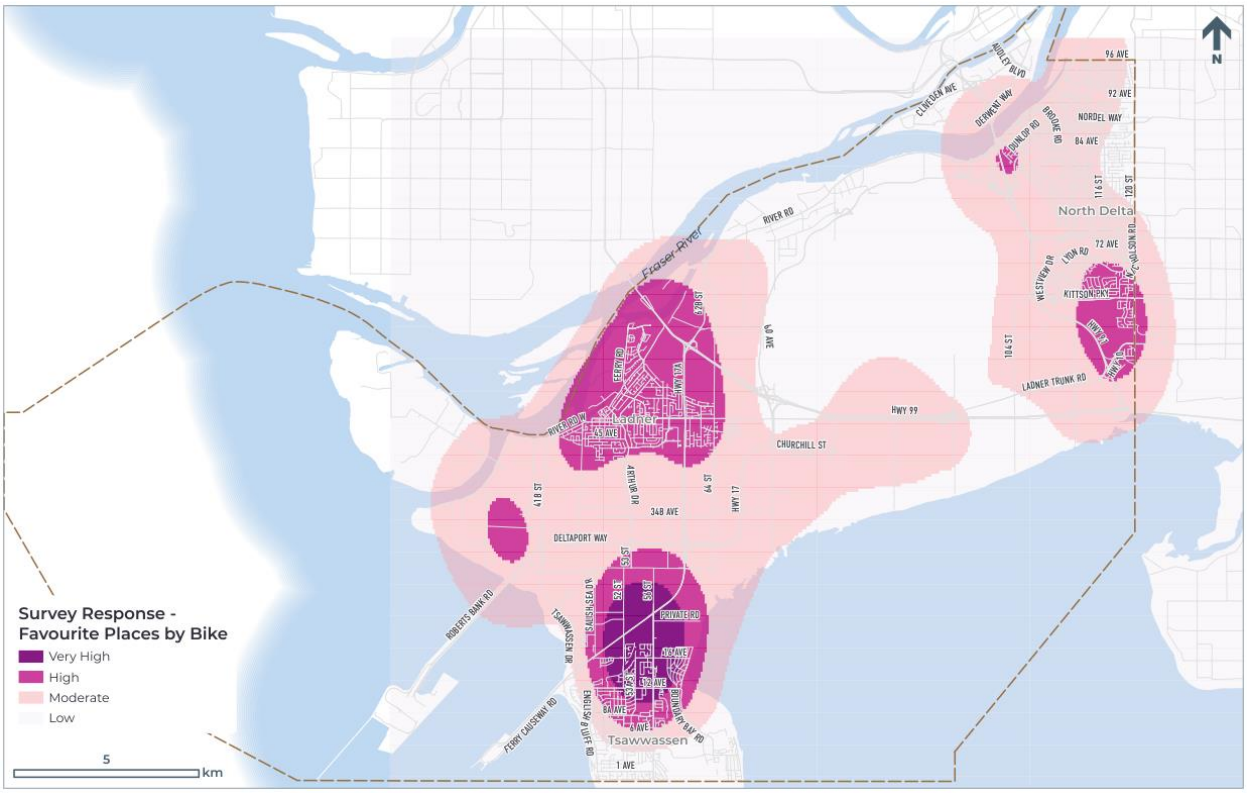


Figure 5: Favourite Places by Bike (Survey)

Figure 5 shows the areas that respondents most often selected as they favourite places to visit by bike. Detailed comments include:

- **Popular Cycling Routes**
  Most of the comments identified popular and/or heavily used cycling routes

- **River Rd W, Brunswick Pt Trail, and Boundary Bay Dyke**
  All identified as popular routes along the dykes for scenic riding.

- **Tsawwassen favourite locations include:**
  - 12 Ave
  - 16 Ave
  - The 52 St Highway 17 crossing
  - Spyglass Ct and trails around Imperial Village Park
  - 56 St north of 16 Ave
  - English Bluff Rd, popular for routes circling Tsawwassen
  - Beach Grove Rd

- Salish Sea Way/Dr

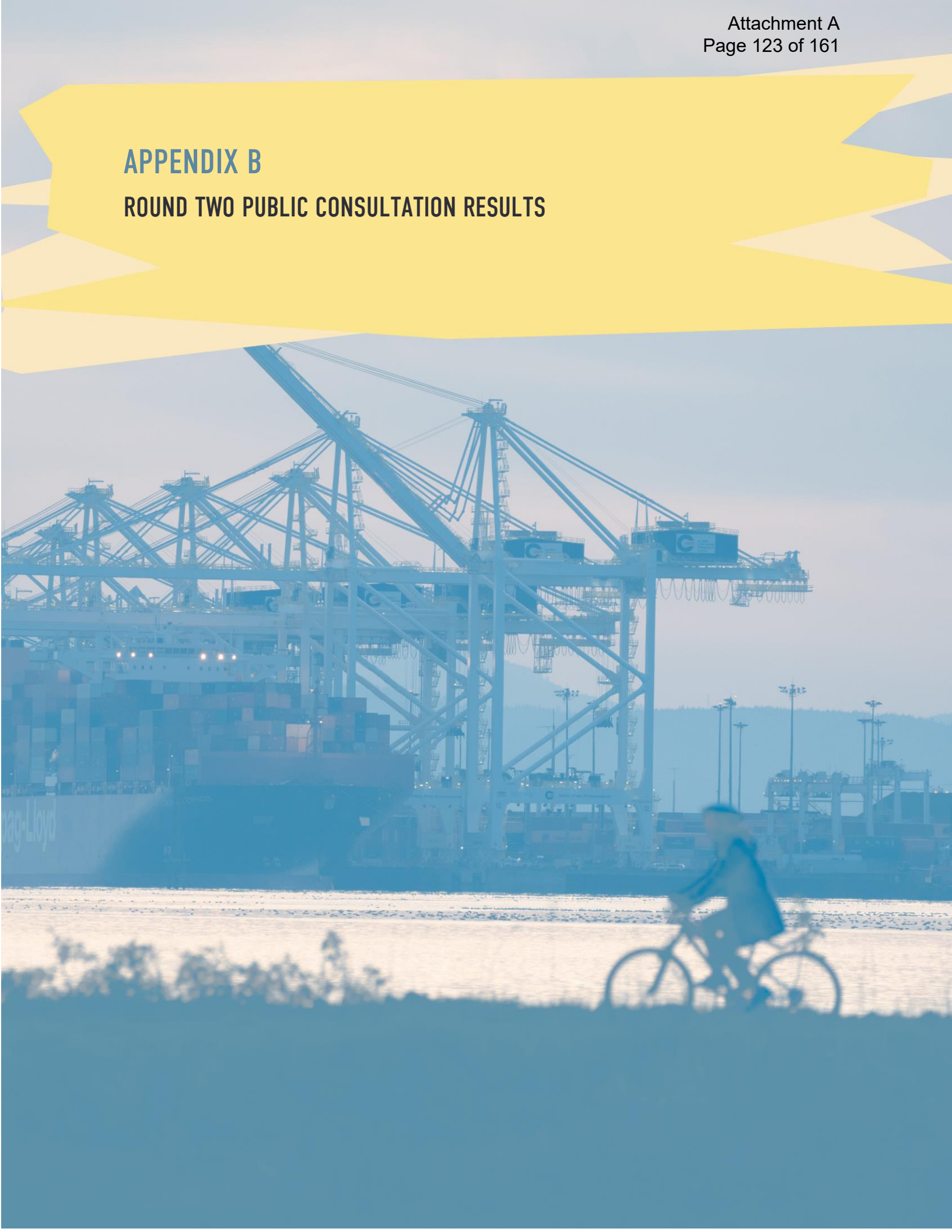
- **Ladner favourite locations include:**
  - The dyke along River Rd W
  - 46A St, a country bike route often used by greenhouse employees on a daily basis
  - 48 Ave, Georgia St, Chisholm St, and Bridge St – although there are concerns from respondents in this area relating to bicycle parking security and the availability of bike racks for errands and shopping.
  - Ladner Trunk Rd – identified as popular, but with stresses and concerns around cycling on this road without dedicated cycling facilities.
  - 64 St

- **North Delta favourite locations include:**
  - North Delta Greenway, popular for riding and running.
  - 116 St
  - Lyon Rd – a popular loop, with the bridge connecting to Chateau Wynd identified as a useful shortcut. Concerns were voiced around vehicles speeding, and the use of baffle gates on either side of the connecting bridge.
  - The "Lower Trail" in Watershed Park, a popular connection to Mud Bay
  - 64 Ave
  - Sunwood Dr
  - Wade Rd
  - Nordel Way Bike Route – intersection safety was identified as a challenge, as respondents stated signage currently directs cyclists to dismount at intersections.

- **Favourite connecting and/or rural roads include:**
  - Millennium trail and connections to the Alex Fraser Bridge and Deas Island
  - 34B Ave, 36 Ave, 72 St, Churchill St, 80 St – a continuous linkage of E/W connecting roads
  - Burns Dr – identified as a quiet alternative to Ladner Trunk Rd
  - 104 St – popular and identified as lacking cycling facilities
  - River Rd

APPENDIX B

ROUND TWO PUBLIC CONSULTATION RESULTS



Delta Cycling Master Plan

Round Two Public Consultation Results

INTRODUCTION

The purpose of the second Cycling Master Plan public consultation was to allow residents to provide feedback on the recommendations made by the Cycling Master Plan. The public consultation was conducted through the Let's Talk Delta website from June 15, 2022, to July 7, 2022.

The survey includes three questions, two closed-ended, and one open-ended. The first question asked residents which cycling route(s) they feel should be prioritized. The second question required residents to rank strategies recommended by the Cycling Master Plan in order of importance to them. Lastly, residents were given the option to provide any additional feedback on the Cycling Master Plan through a general feedback submission form.

The webpage containing the survey generated 1,400 visits, resulting in 422 responses. The three questions received the following responses for each:

- Q1 – 239 responses
- Q2 – 383 responses
- Q3 – 239 responses

The following is a summary of the results generated in the survey.

1 CLOSED-ENDED QUESTIONS

1. Delta Bike Routes by Priority

Q1. The Cycling Network Map identifies cycling routes and infrastructure that we want to implement moving forward. Based on the map, which route(s) do you feel should be prioritized?

Respondents were asked to identify which out of the 3 routes to be prioritized. *Figure 1* depicts routes categorized by each region along with the allotted votes that the route received. Tsawwassen was identified as the top route to be prioritized, receiving a total of 120 responses, followed by Ladner with 114 responses. North Delta received the lowest votes for priority, receiving 100 responses.

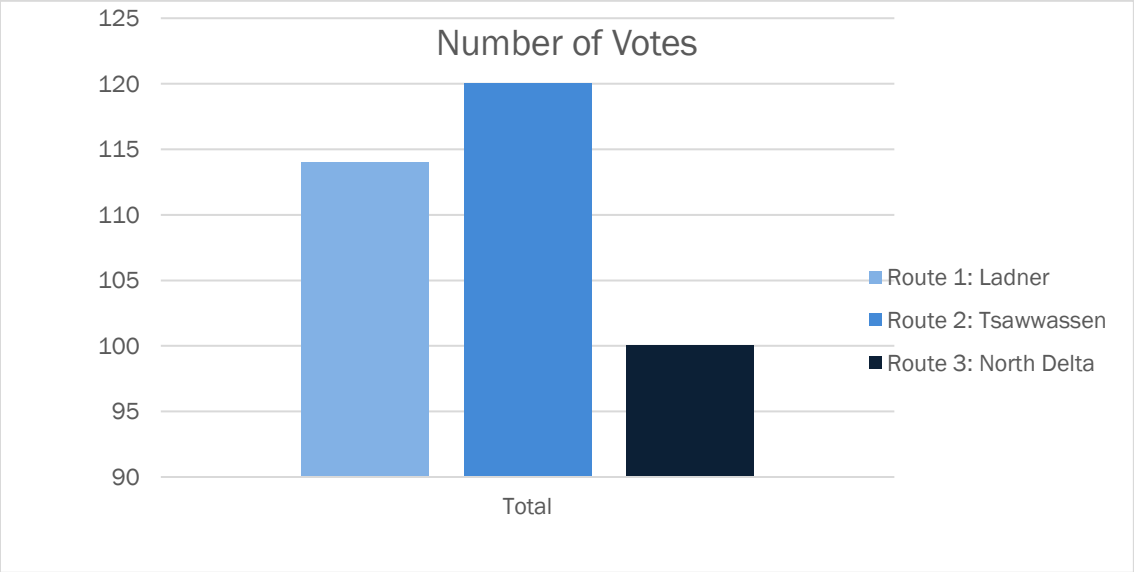


Figure 1 Votes for Routes

Please note, that data gathered from this question can be skewed for the following reasons:

- 23 respondents voted for all 3 routes
- 51 respondents voted for Route 1: Ladner & Route 2: Tsawwassen
- 27 respondents voted for Route 1: Ladner & Route 3: North Delta
- 23 respondents voted for Route 2: Tsawwassen & Route 3: North Delta

In Q1, 52% of residents chose to input multiple routes in their answers, it's possible to conclude that residents prioritize not only a singular route but connectivity among the routes. This finding could mean residents are looking to lessen the barrier between each of Delta's three regions through greater accessibility from the cycling paths proposed in the survey.

2. Rank of Strategies (15 options)

Q2. How would you rank these strategies recommended by the Cycling Master Plan in order of importance? (Rank the Top 3)

STRATEGY	RANK	AVG. RANK
Strategy 1A: Develop All Ages and Abilities (AAA) Urban Centre Cycling Networks	1	3.23
Strategy 1B: Improve Cycling Connections Between Delta's Urban Centres and Industrial Areas	2	3.57
Strategy 3C: Make Cycling Safe for Families and Promote Active School Travel	3	4
Strategy 1C: Improve Regional Connections	4	4.21
Strategy 2D: Keep the Network in a State of Good Repair	5	4.67
Strategy 1D: Address Barriers to Cycling	6	4.74
Strategy 3E: Create and Promote Recreational Touring Loops	7	5.09
Strategy 3B: Make it Easy to Find the Way (ie. Wayfinding signs)	8	6.07
Strategy 1E: Integrate Transportation and Recreation	9	6.19
Strategy 2A: Provide More Bicycle Parking and End-of-trip Facilities (ie. Bike Racks)	10	6.28

Table 1 Ranking of Strategies

Residents were asked to rank the strategies recommended by the Cycling Master Plan Residents. The table above shows the Top 10 ranked strategies with *Strategy 1A: Develop All Ages and Abilities (AAA) Urban Centre Cycling Networks* receiving the highest average of 3.23, followed by *Strategy 1B: Improve Cycling Connections Between Delta's Urban Centres and Industrial Areas* with an average rank of 3.57, and *Strategy 3C: Make Cycling Safe for Families and Promote Active School Travel* receiving an average rank of 4. The findings indicate that the residents want to prioritize cycling facilities that are safe for all ages and abilities, as well as have cycling connections that are will connected throughout Delta. These findings are also in line with the findings from the first LetsTalkDelta Public Consultation.

OPEN-ENDED QUESTIONS

3. Additional Feedback

Q3: Please provide any additional feedback on the Cycling Master Plan

In analyzing residents' feedback, five common themes were found to be present in the majority of the 239 responses to Q3. The themes include comments regarding infrastructure, safety, connection, education, and inclusivity.

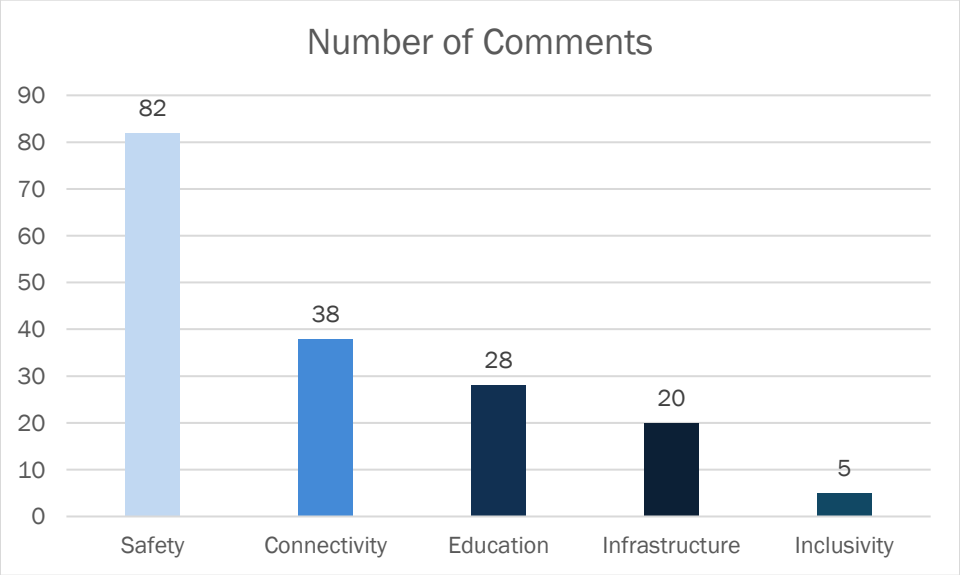


Figure 2 Comments per Theme

Theme 1: Safety (82 Comments)

Out of all the themes, safety seems to be the major concern for residents in regard to the Cycling Master Plan.

- **Feeling unsafe with the current cycling infrastructure**

  Many residents feel that the existing cycling infrastructure where cyclists have to share the road with vehicles can be improved to ones that provide physical separation between cyclists and vehicles.

- **Bike paths not suitable for riding**

  Residents are concerned with the maintenance of bike paths.

Theme 2: Connectivity (38 comments)

- Residents are looking for a safe route that connects to Ladner, Tsawwassen, and North Delta
- Routes connecting to Delta's natural attractions: dyke system, Westham Island, Centennial Beach, The Bog, Fraser River, and Watershed Park
- Routes connecting to the Ferry terminal system to encourage walk-in passengers

- Routes connecting to Delta hotspots: Ladner Village, Tsawwassen Mills, Social Heart Loop

Theme 3: Education (28 comments)

- Residents commented that all cyclists should learn proper etiquette when sharing the bike path with other cyclists or pedestrians
- With the popularity of e-bikes and e-scooters, cyclists should have rules in regard to speed
- Cyclists and drivers should be aware of how to share the road and navigate.

Theme 4: Infrastructure (20 comments)

- Residents advocating for bike paths to be separate from roads with vehicular traffic
- Residents looking for bike loops and trails to be enjoyed with friends and family
- To improve and maintain current cycling paths

Theme 5: Inclusivity (5 comments)

- Bike paths to be accessible for cyclists of all ages and skill levels
- To be mindful of different modes of cycling – bikes, e-bikes, scooters, and roller blades when implementing the plan

LOCATIONS MENTIONED IN THE SURVEY

LOCATIONS	COMMENTS
River Road	21
Connecting cycling routes to Ladner, Tsawwassen, North Delta	15
Ladner Trunk Road	11
56th Street	10
Arthur Drive	8
53/53A Street	6
Highway 17	5
Highway 10	4
46th Street	2

APPENDIX C

SUMMARY OF RELEVANT PLANS AND POLICIES

PROVINCIAL PLANS AND POLICIES

CleanBC (2018)

The Province's CleanBC initiative lays out a framework for climate action including green buildings, cleaner industry and waste, green jobs, and sustainable transportation. CleanBC targets include reducing greenhouse gas (GHG) emissions by 40% by 2030, 60% by 2040, and 80% by 2050 compared to 2007 levels. Transportation reductions account for 32% of the total GHG reductions identified in the plan for 2030. CleanBC's transportation components are designed to make sustainable transportation accessible for everyone, regardless of age, ability, ethnicity, or gender. Key initiatives include incentivizing a shift to zero-emission vehicles and encouraging the use of transit and active transportation.

Move, Commute, Connect – B.C.'s Active Transportation Strategy (2019)

B.C.'s Active Transportation Strategy lays out the Province's intent to promote and invest in active transportation. The strategy contains several short-, medium-, and long-term initiatives that aim to double the percentage of trips taken with active transportation by 2030. Initiatives include expanding education and encouragement programs, reviewing the Motor Vehicle Act, promoting Vision Zero principles, improving active transportation facilities and end-of-trip facilities, incorporating active transportation in provincial highway design, partnering with the tourism sector to promote active transportation, and expanding active transportation funding, which resulted in the updated B.C. Active Transportation Infrastructure Grants Program.

British Columbia Active Transportation Design Guide (2019)

The B.C. Active Transportation Design Guide is a comprehensive set of planning and engineering guidelines offering recommendations for the planning, selection, design, implementation, and maintenance of active transportation facilities across the province. The Design Guide covers pedestrian, cycling, and multi-use facilities, intersection design, amenities, wayfinding, multi-modal integration, new mobility, and post implementation considerations such as monitoring and maintenance.

George Massey Crossing Upgrade (Ongoing)

The George Massey Tunnel connects Delta and Richmond under the Fraser River at Highway 99. People walking and cycling are not currently permitted in the tunnel and must take a designated shuttle. The Ministry of Transportation and Infrastructure (MOTI) is working with key partners and stakeholders to develop and evaluate crossing options for a replacement crossing to address congestion, transit prioritization, and active transportation. The business case was submitted in December 2020 and includes the two shortlisted options: an immersed tube tunnel and a long-span bridge. Each option would include dedicated active transportation facilities to improve connectivity and convenience. The Province is currently reviewing the submission and consulting with partners before making a final decision.

REGIONAL PLANS AND POLICIES

Metro Vancouver 2040: Shaping Our Future – Regional Growth Strategy (2011), Metro Vancouver

Metro Vancouver 2040 sets out goals, strategies, and policies to guide the future growth of the region in order to accommodate the additional 1 million people and over 500,000 jobs expected over the next 25 years. It provides the land use framework for transportation, economic, housing, utility (water, liquid waste and solid waste), environmental, and climate change planning. Key goals include channeling growth into vibrant, livable Urban Centres, supporting land use and transportation patterns that improve the region's ability to adapt to climate change, building complete communities, and integrating land use and transportation planning to support sustainable transportation choices, enable the safe and efficient movement of goods and people, and reduce greenhouse gas emissions.

Metro 2050: Regional Growth Strategy Update (Under Development), Metro Vancouver

Metro Vancouver is currently updating the Regional Growth Strategy to reflect significant drivers of change and integrate the strategy with Transport 2050. The updated strategy (Metro 2050) is anticipated to be complete in 2022.

Regional Greenways 2050, Metro Vancouver

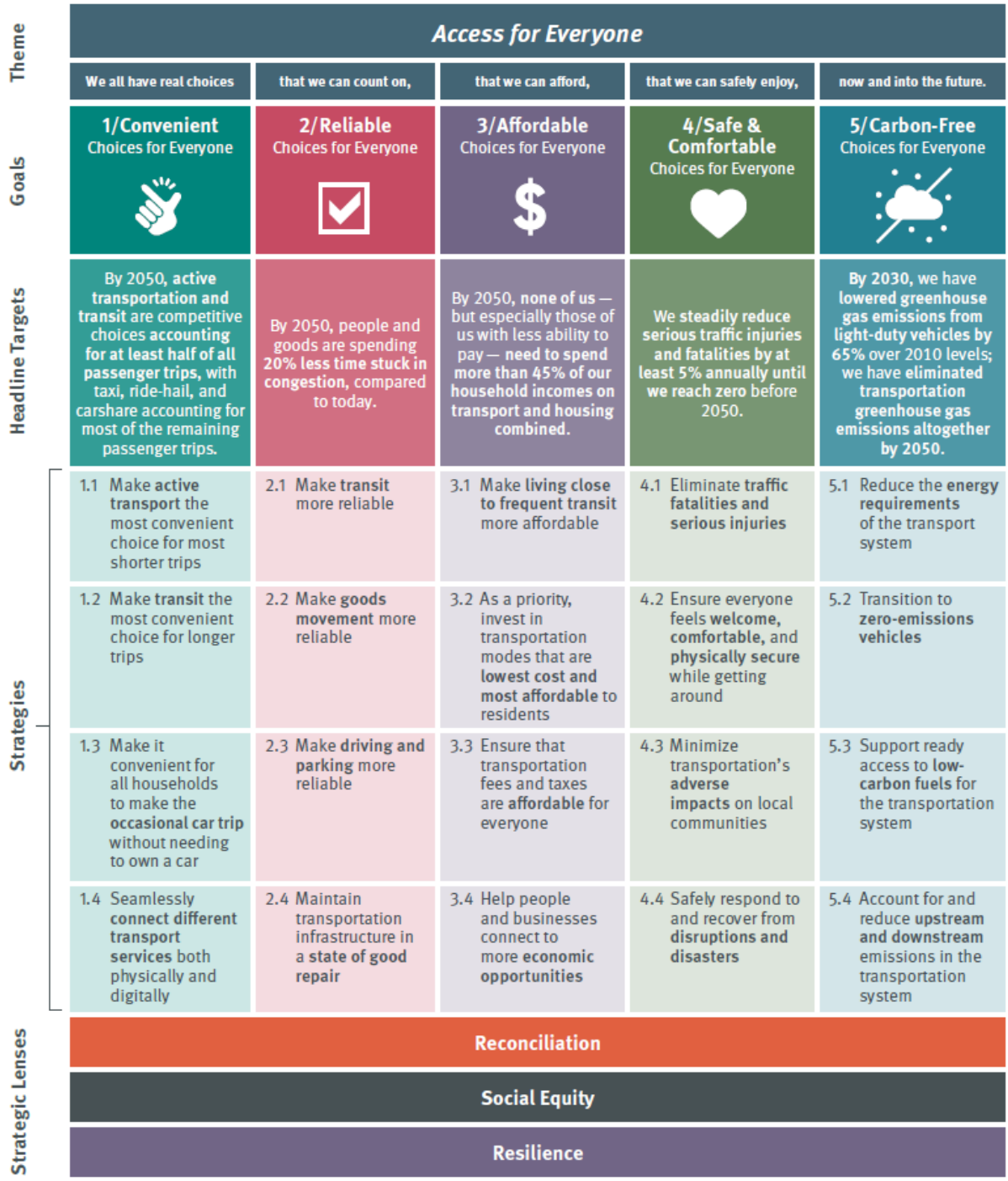
Metro Vancouver's Regional Greenways 2050 plan sets out a strategy to connect residents to large parks, protected natural areas, and communities to support regional livability. The Regional Greenway is meant to include mixed-use routes for walking, running, rolling, riding horses, and cycling. The plan presents the following vision: "The region wide seamless network of recreational greenways and trails is the best way to experience the beauty of the region." The plan notes several inter-regional connections, including with TransLink's MBN, Experience the Fraser, the Trans Canada Trail, and larger connections to other regional and international trails.

Climate 2050: Strategic Framework (2018, revised 2019), Metro Vancouver

Climate 2050 is Metro Vancouver's long-term strategy for transitioning to a carbon neutral and climate resilient region. It sets out new emissions targets based on the latest UN research and aligned with federal, provincial and many Metro municipality targets (45% below 2010 levels by 2030, carbon neutrality by 2050). Climate 2050 also launched a process to development a series of "Roadmaps" setting goals and actions in 10 areas: ecosystems, infrastructure, health, buildings, transportation, industry, energy, land-use and growth management, agriculture, and waste. Regarding transportation, the strategy calls for infrastructure investments and changes to land-use policy that prioritize walking, cycling. and transit; transitioning almost all remaining personal vehicle trips to low carbon emission vehicles; and investing in low carbon fuels (e.g. renewable diesel, renewable natural gas, and electricity). Finally, it calls for adapting infrastructure to mitigate against the impacts of sea level rise and more frequent flooding.

Transport 2050: Regional Transportation Strategy Update, TransLink

Transport 2050 is a shared strategy for transportation in Metro Vancouver for the next 30 years, outlining transportation projects, services, and policies. The final plan was adopted in January 2022. It covers all modes and explore new and emerging technologies, such as automated, connected, electrified, and shared transportation. Transport 2050's primary theme is *Access for Everyone* and it identifies a series of goals, targets, and strategies, as shown below. The plan's vision reads: "*In 2050, everyone can easily connect to the people, places, and opportunities that they need to thrive — because we all have real choices, that we can count on, that we can afford, and that we can safely enjoy for generations to come. Our transportation system supports an inclusive, future-ready region that has meaningfully advanced reconciliation*."



Regional Transportation Investments: A Vision for Metro Vancouver (2014), Mayors' Council on Regional Transportation

Building from Transport 2040, the Mayors' Council prepared a plan called Regional Transportation Investments: a Vision for Metro Vancouver in 2014, which furthered the

commitment to Invest, Manage, and Partner in transit investments across Metro Vancouver over the next 10 years. The plan's Map of 10-Year Investments shows extending the 96 B-Line (now the RapidBus R1) to White Rock Centre via King George Boulevard and 152 Street in Surrey.

Regional Transportation Strategy: Strategic Framework (2013), TransLink

Following Transport 2040 and Metro 2040, TransLink prepared a Strategic Framework for the Regional Transportation Strategy (RTS) in 2013 to guide planning and development of the transportation systems, with a goal of supporting the Regional Growth Strategy as well as regional economic and provincial objectives. The RTS set a target of 50% of all trips to be made by walking, cycling, and transit by 2040. The overarching goal is getting people and goods where they need to go as reliably, safely, efficiently, and cleanly as possible. The RTS lays out three key transportation levers to achieve this, including investing strategically to maintain and expand the transportation system, managing the transportation system to be more efficient and user-focused, and partnering at the local, regional, provincial levels to make it happen.

Transport 2040 (2008), TransLink

In 2008, the Mayors' Council prepared Transport 2040, which was designed to identify the strategies for Metro Vancouver's transportation future over the next 30 years through rolling 10-year implementation plans. Transport 2040 outlines demographic, economic, traffic, and climate trends. It established six strategic goals and four strategies to achieving those goals, including investing in sustainable transportation, optimizing the region's assets, and finding innovative funding streams.

Cycling for Everyone: A Regional Cycling Strategy for Metro Vancouver (2011), TransLink

The Regional Cycling Strategy provides guidance on how cycling can contribute to realizing the goals of Transport 2040. The Strategy is intended to provide a common framework for action by TransLink, municipalities, and other partners. The vision is that by 2040, Metro Vancouver is renowned locally and globally as a cycling-friendly region where cycling is a desirable and mainstream transportation option because it is safe, convenient, comfortable, and fun for people of all ages and all cycling abilities. It sets goals for more cycling (15% of all trips less than 8 km are made by bicycle by 2040) and safer cycling (50% of all cycling trips are made by females and 50% fewer people are killed or seriously injured while cycling by 2040).

South of Fraser Area Transit Plan (2007), TransLink

The South the Fraser Area Transit Plan (SOFATP) outlines a long-term vision and near-term priorities for transit service in the municipalities of White Rock, Surrey, Delta, and the City and Township of Langley. The SOFATP guides transit service and infrastructure investments and helps ensure coordination between transit and land use in the area. The plan's goals include creating a transit network that provides effective connections between regional

and municipal town centres and is attractive enough to raise the percentage of people using transit to 11.5% by 2031. The long-term vision for the involves a fundamental alteration of the network from a "suburb" to downtown Vancouver-oriented network to a new grid network of services, more focused on urban-style internal South of Fraser trips. This includes establishing bus or light rail rapid transit and a supporting network of frequent transit corridors that connects all town centres in the sub-region. A technical SOFATP monitoring report was released in 2015, outlining progress to date.

Experience the Fraser (ETF) Plan

In 2009, the BC Government provided Metro Vancouver and the Fraser Valley Regional District (FVRD)with $2.0 million to develop a concept plan – Experience the Fraser – for a continuous trail system on both sides of the Fraser River that stimulates investment for tourism initiatives across the two regions. EFT is a recreational, cultural and heritage project that spans 160 kilometres with 550 kilometres of trails and recreational blueways (of which 43% are already in place) along the Lower Fraser River Corridor connecting Hope to the Salish Sea. The "Canyon to Coast Trail" is the foundation of the project.

As a part of the Canyon to Coast Trail, a series of portals and nodes are planned, with the west portal (connections to other regional trail networks and/or transportation modes) being planned in Tsawwassen at the BC Ferries terminal. Delta's nodes are at the Tsawwassen ferry terminal, downtown Ladner and Tilbury, with an additional node in Tsawwassen First Nation.

In 2012, the FVRD conducted a follow up study to review existing and future trail components of the ETF route. One key finding of the study was that the Concept Plan's proposed "interim" route would not be cost effective to bring up to adequate trail standard, so the focus should be on implementing the "vision" route. The FVRD study contains a series of detailed trail implementation maps, with one for each jurisdiction as well as one regional map.

Delta City Council moved to support the EFT in June 2012. However, as there is no overall program funding available, should grant opportunities arise, support of EFT allows Delta to tap into associated grants via an overall vision for the community.

LOCAL PLANS AND POLICIES

Official Community Plan

Delta's Official Community Plan prioritizes an efficient road network and promotes alternate transportation modes. To do so, Delta has the objective of making the road network and alternate transportation routes safe for everyone in partnership with other agencies and in consultation with neighbourhoods and community groups.

As an alternate mode of transportation, cycling is being promoted through the provision of safe and attractive facilities. Delta has established policies that support cycling:

- Work with the appropriate agencies to ensure all new or upgraded major road facilities include separated cycle/walkways where feasible, or provide reasonable connections to existing cycling network where not feasible;
- Continue to develop Delta's cycling network in accordance with recommended design guidelines;
- Improve cycling linkages between communities within Delta and regionally;
- Consider the needs of cyclists in road design and upgrading;
- Encourage the provision of cycling infrastructure and support programs, such as end-of-trip facilities, for new developments within the community; and
- Encourage education and awareness campaigns to enhance cyclists' riding skills and road responsibilities and increase motorists' awareness of non-vehicle traffic such as cyclists or horseback riders who also use the road network.

Parks, Recreation & Culture – 2018/2019 Strategic Work Plan

Delta's PRC includes Trail Network and Pedestrian Brides as a short-term priority as they provide active transportation, recreation and sport opportunities. Delta recognizes that limited annual funding is provided for maintenance on trail surfaces and as an increased focus comes to provide safe and accessible trail systems, more funding is integral to meeting this objective. As a result, Delta is prioritizing the replacement of both the existing and decommissioned pedestrian bridges at Ladner Harbour Sewage Lagoon and trail linkages throughout Delta in the coming years.

City of Surrey Cycling Plan – 2012

The City of Surrey developed a cycling plan to support cycling as a realistic transportation choice by making connections, providing door-to-door service, managing and maintaining the network, and promoting cycling. The City of Surrey has cycling connections to North Delta via Nordel Way (88 Ave), 92 Ave and 84 Ave, as well as connections to South Delta via the Boundary Bay Trail, Colebrook Rd/125A St, Highway 10 and 64 Ave.

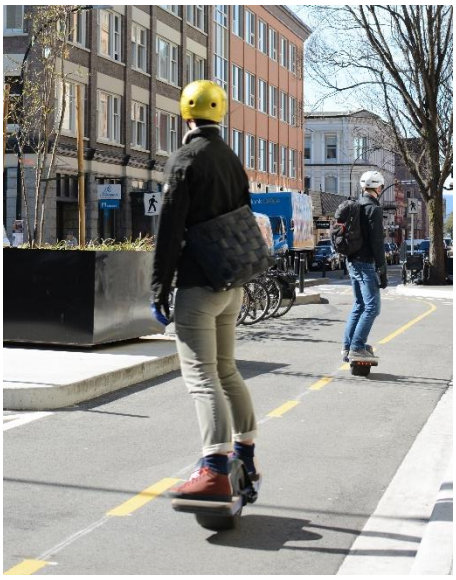
APPENDIX D

IMPACTS OF E-BIKES & MICROMOBILITY

IMPACTS OF E-BIKES & MICROMOBILITY

E-bikes and other forms of micromobility are rapidly growing in popularity and have the potential to accelerate the shift to sustainable transportation modes, while also bringing new types of users to Delta's cycling network. This makes micromobility highly relevant to the Cycling Master Plan. This appendix outlines key micromobility trends, regulations, and design implications for Delta's cycling network.

WHAT IS MICROMOBILITY?



Micromobility refers to small human and/or electric-powered transportation modes, including electric bicycles (e-bikes), electric kick scooters (e-scooters), and other small, one-person electric vehicles such as electric skateboards, skates, and self-balancing boards. The specific definition of micromobility has been widely debated in the past few years. SAE International has developed a standard taxonomy and classification of powered micromobility vehicles (SAE J3194™), as shown in Figure 1. SAE classifies by vehicle weight, width, top speed, and power source, noting that powered micromobility vehicles must:

- Be fully or partially powered
- Have a curb weight ≤ 227 kg (500 lb)
- Have a top speed ≤ 48 km/h (30 mph)

The SAE typology system excludes solely human-powered vehicles and is focused on human transport rather than goods movement – other vehicles such as electric cargo bikes may also fall under the broader umbrella of micromobility. SAE notes that the top speed of 48 km/h is solely for the purpose of categorization, and that these vehicles should be operated at speeds deemed safe by local regulations and required by regulatory authorities. The top speed for micromobility in the BC context is much slower, as described in the regulation section below.

TYPES OF POWERED MICROMOBILITY VEHICLES[1]

	Powered Bicycle	Powered Standing Scooter	Powered Seated Scooter	Powered Self-Balancing Board	Powered Non-Self-Balancing Board	Powered Skates
						
Center column	Y	Y	Y	Possible	N	N
Seat	Y	N	Y	N	N	N
Operable pedals	Y	N	N	N	N	N
Floorboard / foot pegs	Possible	Y	Y	Y	Y	Y
Self-balancing[2]	N	N	N	Y	N	Possible

[1]All vehicles typically designed for one person, except for those specifically designed to accommodate additional passenger(s)
[2]Self-balancing refers to dynamic stabilization achieved via a combination of sensors and gyroscopes contained in/on the vehicle

Figure 1: Types of Powered Micromobility Vehicles[1]

CYCLELOGISTICS

With the growth in e-commerce and on-demand services like food delivery, the number and type of urban deliveries is increasing, as is the competition for curbside uses such as on-street parking and loading areas. Delivery companies have begun optimizing goods movement routes and shifting to smaller, more delivery vehicles, including cargo bicycles, e-bikes, and even e-scooters.

Cyclelogistics is the integration of bicycles into the goods movement network. This emerging goods movement system is well established in Europe and is growing in North America, including in Metro Vancouver. Cyclelogistics can involve a range of bicycle types, from small deliveries on standard bicycles to cargo bikes making larger deliveries to multiple destinations.

Vancouver-based Shift Delivery uses electric cargo bikes, while on-demand courier and food delivery services such as Uber Eats, Door Dash, Domino's Pizza, and others are using a combination of bicycles, e-scooters, and cars. Compared to delivery trucks, e-bikes and e-cargo bikes spend less time looking for parking and require smaller spaces, which can free up more on-street parking to be reallocated to other uses. Cyclelogistics tend to be most successful in dense urban areas where there is a high need for deliveries within a relatively compact area.

E-bikes play a key role in cyclelogistics as they enable the faster and easier transportation of goods in an urban environment. Electrification is especially useful for facilitating the use of larger, heavier cargo bikes. E-cargo bikes have also seen an emergence in passenger transportation in many urban areas – for example, there has been a rise in electric cargo bikes usage for transporting children to school and running daily errands.

GROWING MICROMOBILITY MARKET

Personal E-bike Sales

E-bikes are rapidly growing in popularity around the world, with over 150 million e-bikes sold worldwide over the past decade.[2] In the Netherlands, 2018 marked the first time that 50% of all sales were e-bikes[3]. Electric micromobility sales have been buoyed by an 82% decrease in battery costs between 2012 and 2020, allowing purchase prices to go down.[4] The global e-bike market was valued at over $16.3 billion in 2017 and is expected to reach $23.8 billion by 2025[5].

Similar trends have been taking place in BC over the last few years, with sales of e-bikes up 85% in 2019 and significant increases in sales and ridership. Further, the pandemic led to retailers and distributors experiencing a 25% to 40% increase jump in sales without a corresponding increase in production.[6] With COVID-19, In other markers, the pandemic contributed to e-bike sales going up 190%+, with some cities seeing huge increases in bikeshare ridership and overall cycling numbers, as e-bikes offer a practical alternative to transit and driving while maintaining physical distancing.[7]

Recently, the provincial government has shown support for this trend by subsidizing the purchase of e-bikes. For example, in 2020, the Province announced that people who trade in a vehicle to scrap will have access to a rebate of $1,050 toward the purchase of any type of new e-bike (an increase of $200 from the 2019 rebate). Additionally, the Province is introducing a one-year pilot project that enables a rebate of up to $1,700 for business owners toward the purchase of a cargo e-bike. PST on e-bikes has also been eliminated.

Shared Micromobility

Additionally, shared micromobility (bicycle, e-bike, and e-scooter sharing systems) are also rapidly growing in popularity. Several systems are currently operating throughout the province. Bike and e-scooter share can make multi-modal transportation more convenient by allowing one-way trips that facilitate ‘last mile’ connections to transit. These systems are well suited to dense urban areas.

The National Association of City Transportation Officials (NACTO) found that from 2010-2016, there were 88 million trips taken on bike share systems across the US. Since then, growth has skyrocketed: in 2019 alone, people took 136 million trips. A huge proportion of this increase has been due to the emergence of e-scooter share services. In total over the past decade, a third of a billion trips were taken on shared bikes and scooters.

In Metro Vancouver, bike share adoption (both electric and pedal) has been relatively slow. The City of Vancouver’s Mobi bike share system has fared relatively well, but small

companies such as U-bicycle have found limited success in neighbouring municipalities. HOPR operates at the University of British Columbia's Vancouver campus and has seen some success but is constrained to the university campus only due to technological limitations. The City and District of North Vancouver are currently preparing to launch a joint e-bike share pilot, with Lime chosen as the operator for the two-year pilot project.

No shared micromobility systems are currently operating in Delta, but they may form part of the transportation system in the future, offering more mobility options to seamlessly connect within urban areas and connect people to transit for longer trips between Ladner, Tsawwassen, and North Delta.

REGULATION IN BC

E-Bikes

In Canada, e-bikes are currently defined at the provincial level, with Transport Canada repealing its definition of "power assisted bicycle" from the Motor Vehicle Safety Regulation in February 2021[8]. In BC, the Motor Vehicle Act (MVA) defines "motor assisted cycles" (i.e. e-bikes), noting that the device must have pedals/hand cranks allowing them to be propelled by human power and have a prescribed max speed. The BC Motor Assisted Cycle Regulation (MACR) notes that the motor must be electric, is capped at 500 watts of power, and must not be capable of propelling the device at a speed greater than 32 km/h on level ground. Motor assisted cycles can be either pedelecs (pedal-assisted), power assisted bicycles (throttle actuated), or scooter-style e-bikes (which are throttle actuated and resemble a moped/electric scooter), as long as they meet the requirements of the MACR.

ICBC notes that e-bike users are subject to the same rights and duties as the driver of a motor vehicle, and they should follow bicycle safety rules (see MVA Section 183 – Rights and duties of operator of cycle)[9]. Users must be 16 or older and wear a bicycle helmet. No driver's licence or registration is required. E-bikes are permitted wherever non-motorized bicycles are permitted in BC, except where prohibited by local bylaws. For example, the City of Vancouver prohibits e-bikes on the Seawall pathway.

In 2019, BC Parks implemented an e-bike policy "to help protect sensitive wildlife, ecosystems and cultural values" that follows the e-bike classification system shown in Table 1[10]. This policy allows pedal-assist e-bikes to ride wherever cycling/mountain biking is already permitted within BC Parks, but notes that people with Class 2 and 3 e-bikes (throttle actuated e-bikes) can only ride on trails and/or roads designated for motorized vehicles, depending on the park. This is despite the fact that Class 2 e-bikes are legally

considered motor assisted cycles under the BC MVA and MACR. This underlines the complexity and nuance in regulating e-bikes in BC.

Table 1: BC Parks E-Bike Classification[11]

Class	Max Continuous Motor Wattage	Max Speed Before Motor Cut-off	Motor Actuator Method
Class 1	500 W	32 km/h	Pedal-assist only (no throttle)
Class 2	500W	32 km/h	Pedal assist and/or throttle actuated
Class 3	500W	45 km/h	Pedal assist and/or throttle actuated

E-Scooters and Other Micromobility Vehicles

Prior to 2021, micromobility devices were unregulated under the Motor Vehicle Act, making them illegal to operate on public roadways in BC. Nonetheless, e-scooters and other forms of electric micromobility have become an increasingly common sight on roads and pathways throughout Delta and the rest of the province.

In response, the Province has launched an **electric kick scooter pilot project** that allows six BC communities (Vancouver, the City and District of North Vancouver, West Vancouver, Kelowna, and Vernon) to enact bylaws to allow for use of electric kick scooters (e-scooters) on roads in their communities. The pilot program came into effect on April 5, 2021. E-scooters are still illegal to operate in any community that is not participating in the pilot project and in any pilot community that has not yet enacted bylaws for the pilot project. Furthermore, the pilot is limited to e-scooters – other one-person electric micromobility devices were not included and remain illegal to operate on BC roadways.

The MVA Electric Kick Scooter Pilot Project Regulation outlines the pilot community bylaw requirements and e-scooter rules and safety. E-scooters cannot have a continuous power output rating that in total exceeds 500 watts and cannot be capable of propelling the e-scooter at a speed that exceeds 24 km/h on a clean, paved, and level surface. Several other design specifications are laid out in the regulation[12].

The Province notes that generally, the rules of cycling in BC apply to the use of e-scooters, and the pilot regulations specify that e-scooters must be operated in accordance with provincial regulation and bylaws of the pilot community. On roadways with speed limits of 50km/h or less, e-scooters should use designated lanes for cycling or, where none exist, ride as near as possible to the right side of the street. Where the speed limit is greater than 50km/h, e-scooters must be ridden only in designated bicycle facilities. Sidewalk use is prohibited unless cycling is permitted there by traffic control device or bylaw. Municipalities can dictate whether e-scooters are permitted within municipal parks and lands.

Shared Micromobility

Regulating shared micromobility comes with several additional considerations for municipalities. Best practices include establishing where in the right-of-way devices can be used and parked, requiring business licenses, registering devices, controlling fleet sizes, and setting vehicle speed limits (including variable speeds in high pedestrian areas).[13] For example, Ontario has established a best practices document for its municipalities to follow to allow e-scooters.[14] A detailed review of shared micromobility regulation is beyond the scope of this appendix.

MICROMOBILITY BENEFITS & CHALLENGES

Benefits

There are several benefits to accommodating micromobility in the cycling network:

- E-bikes have significant potential to replace motor vehicle trips and encourage new riders: they can make cycling more accessible for both commuting and recreation by flattening hills, reducing the effort required to cycle, and enabling longer travel distances.
- Research has shown that e-bike trips tend to be about 30% to 60% longer that standard bicycle trips, with users reporting trip lengths of 10km or more[15,16]. This can encourage a different, more diverse group of people to travel by bicycle.
- In addition, e-bikes can be a low-cost compared to a personal vehicle, utilitarian way to travel[17]. When compared to traditional bicycles, e-bikes have been shown to provide significant physical activity, similar to those of cyclists.[18]
- Shared micromobility provides access to large sums of data that can inform policy and infrastructure decisions.

Challenges

There are also several real and perceived barriers to micromobility uptake and to incorporating micromobility vehicles into the already complex mix of urban street users. Figure 2 illustrates some typical challenges that a micromobility user may experience when navigating a typical street.

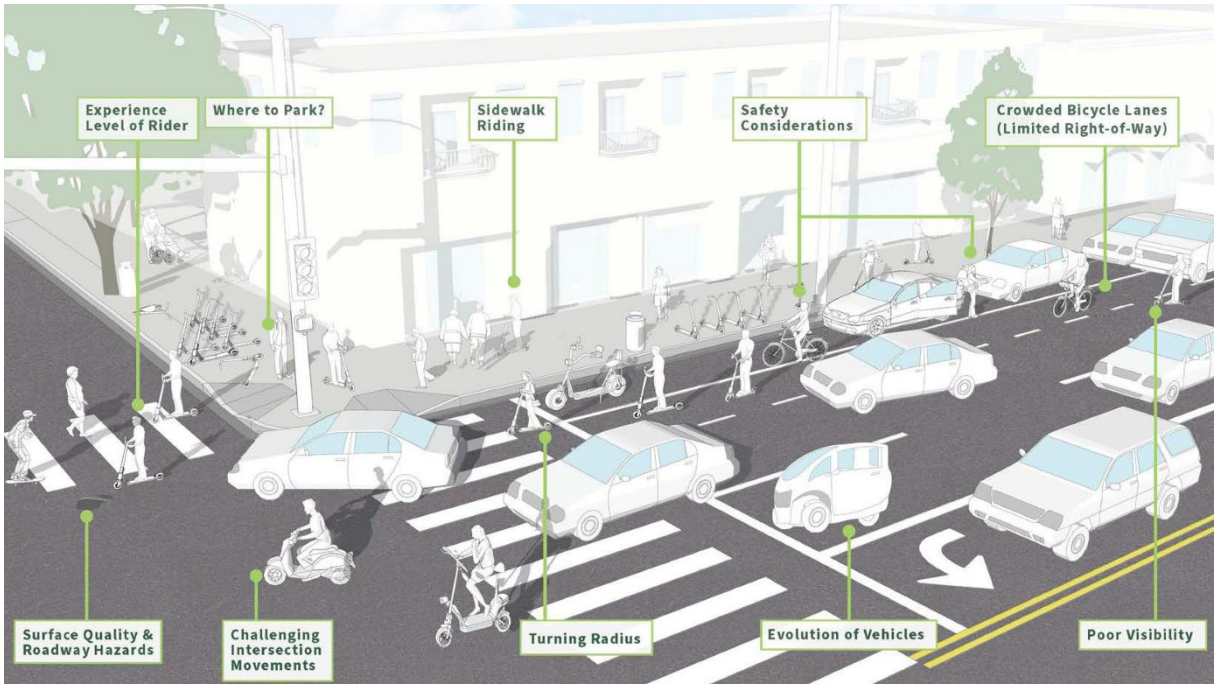


Figure 2: Challenges faced by micromobility users (source: Source: Fehr & Peers, via ITE Micromobility Facility Design Guide)

These challenges are expanded on below:

- Experience and skill: Micromobility vehicles are appealing to many people, including those who have little to no experience riding them, especially in busy urban environments. Designated on-street facilities allow for separation from vehicles and pedestrians, minimizing potential for conflict and the seriousness of injuries.
- Risk of injury for new or reckless users. Some studies have indicated that e-scooter share trips have a higher injury and fatality rate than bike share trips. This is often more common in the first few trips, as users are new to the device and may not be accustomed to its operating speed and vehicle design, making users more prone to accidents.[19] The learning curve can be steep but short.[20]
- Sidewalk riding: When riding environments are not ideal, users tend to gravitate to the sidewalk, creating hazards for pedestrians.

- Parking: Without designated zones for parking, micromobility devices can create tripping hazards or block the path of travel on sidewalks or roadways. E-bikes may be frustrating and/or risky to navigate within current road and parking infrastructure[21].A common request from e-bike users is abundant and secure parking that has the capability to charge[20].
- Safety considerations: Conflicts for micromobility devices are unique due to their relative speed and spatial relationship with motor vehicles, bicycles and pedestrians. Helmet usage is typically lower for shared mobility users programs, and a high number of users never wear helmets.[22]
- Crowded bicycle facilities and limited right-of-way: Micromobility vehicles attract additional riders into the bicycle lane, creating crowded facilities with limited room to pass.
- Surface quality and roadway hazards: Potholes, debris and wet weather conditions are particularly dangerous for micromobility vehicles with small wheels.
- Intersection movements: Signal timings may not be appropriate for micromobility vehicles to safely cross due to speed.
- Turning radius: It is important to consider safe turning radii; however, more research needs to be done on the vehicle type, size and speed and their respective turning radius.
- Evolution of vehicles: The pace at which micromobility devices are changing and disrupting the industry and transportation networks is unprecedented; transportation planning and design must take into account the increasing demand for these vehicles in the future. Increased demand also creates the need for more secure e-bike parking, including charging infrastructure.
- Visibility: Some micromobility devices may be less visible due to their lower profile, lack of taillights and faster speed. Users have also reported concern over other road users not anticipating their higher speeds and their having to learn how to navigate within an ecosystem they may have previously familiar with, especially in relation to cyclists[21].
- Equity and Access. Equity challenges, as recruitment of e-scooters in pilots around the world to date have relied on potential users having access to certain materials, including smartphones and a credit or debit card. There is also a high purchase price for personal e-bikes. However, the price has been dropping due to battery costs and government subsidy, as noted above. When compared to motor vehicles, they are highly affordable. A survey on e-scooters found user concerns about safety, expense, and not being able to wear normal clothes[23]
- Regulation challenges: The onus is on the municipality to enforce and regulate emerging technologies not included in the MVA.

- Equity and Low-incomes: Allocating shared micromobility in a way that serves low-income communities offers new opportunity to those who experience longer and more costly commute times that are often outside of 9-5 transit service.[24] However, low-income neighbourhoods also tend to be the most underserved, and the actual use of shared mobility by low-income populations is minimal.[2526] If introduced to areas where public transportation exists only to fill a gap, that line's service could be reduced or removed, negatively impacting the community.[27]

Ultimately, most user concerns center around the lack of device knowledge to work within the system with other road users, and lack of infrastructure to support a safe and convenient ride. While users reported concerns around personal e-bike and e-scooter theft, parking, and cost, shared micromobility may be able to lessen some of these barriers. In a literature review on bikeshare, it was found that bikeshare users were most frequently motivated by convenience[28] In addition, most bikeshare users reported being motivated by their bikeshare network for perceived ability to save money and time[29].Both docked and dockless shared micromobility have the potential to alleviate concerns of theft, parking and cost for users, while still offering the convenience and savings they seek. However, shared micromobility puts an onus on the municipality to regulate and enforce the parking of the devices and to ensure the right-of-way is clear from barriers.

DESIGN AND POLICY IMPLICATIONS

The growth in e-bike and micromoblity usage must be considered when planning and designing active transportation facilities and supporting infrastructure. These emerging modes have implications for facility design, secure short- and long-term storage, and charging requirements. The challenge for the City of Delta is to accommodate emerging transportation modes in a way that integrates seamlessly into the local transportation network and ensures safe and equitable access for all. It is important to note that micromobility is evolving rapidly and materials can become outdated very quickly, so transportation professionals should stay up to date with the latest resources.

Facility Design

Several organizations have addressed micromobility policy and planning considerations, but facility design and maintenance guidance remains limited. In response, the Institute of Transportation Engineers (ITE)'s Pedestrian and Bicycle Standing Committee recently released a Micromobility Facility Design Guide[30] to provide guidance on how to design roadways to safely accommodate the micromobility vehicles. Figure 4 summarizes some of these design solutions, including potential design challenges that micromobility users

experience as well as the challenges other road users may face caused by micromobility users.

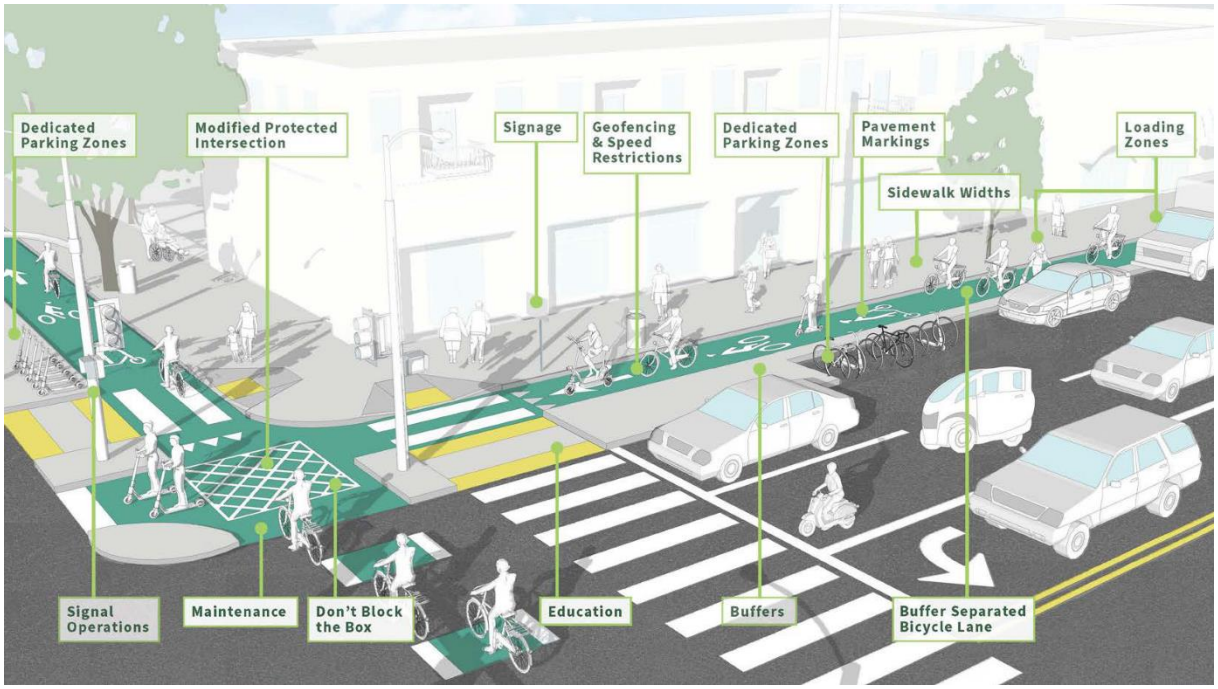


Figure 2: Micromobility design solutions (source: Source: Fehr & Peers, via ITE Micromobility Facility Design Guide)

Table 2 below indicates how some of the challenges described earlier may be addressed through these design solutions. The design solutions are explained in more detail below.

Table 2: Challenges and Solutions in Designing Streets for Micromobility Vehicles (source: ITE)

Design Challenges *(Generally identified in Figure 2)*	**Potential Solutions** *(Generally identified in Figure 4)*
Experience Level of Rider	Modified Protected Intersection Don't Block the Box Buffer Separated Bicycle Lane Education
Where to Park?	Dedicated Parking Zones Signage
Sidewalk Riding	Signage Education Geofencing and Speed Restrictions Sidewalk Widths
Safety Considerations	Geofencing and Speed Restrictions Loading Zones Buffers Education Signal Operations
Crowded Bicycle lanes (Limited Right-of-way)	Pavement Markings
Surface Quality & Roadway Hazards	Maintenance
Intersection Movements	Signage Education Signal Operations
Turning Radius	Modified Protected Intersection
Evolution of Vehicles	Although it is uncertain what the future of micromobility vehicles will look like, the possibility of futuristic vehicles in the coming years should be kept in mind when designing infrastructure.
Visibility	Modified Protected Intersection Signal Operations

Consideration should be given to the design and use of roadway facilities as micromobility usage increases. The following solutions outline the purpose and outcome of micromobility design solutions.

Dedicated Parking Zones

On- or off-street designated parking zones allows for micromobility devices to be stored in an area that is out of the way of motor vehicles and pedestrians, minimizing the potential for conflict. Parking zones can have charging infrastructure and act as an opportunity to educate users on rider etiquette.

Increased parking zones can assist in the sharing of space between micromobility and active transportation devices. According to NACTO's Shared Micromobility Guidelines [19], micromobility operators are increasingly balancing their fleet to encourage the use of "corrals" and designated micromobility parking zones in crowded or higher volume areas, while also allowing parking in the furniture zone of sidewalks.

In-Street Corral
(Credit: Seattle DOT)

Docking Points
(Credit: NACTO)

Modified Protected Intersection

Protected intersections promote comfort and safety for micromobility users as they separate them from pedestrians and motor vehicles. Wider active transportation facilities can assist in the sharing of space between micromobility and active transportation devices.

Signage and Pavement Markings

Clear signage on speed restrictions, dismount zones, and general rules can help to create safe and desired behaviour for micromobility users. Signage and complementary paint markings can improve compliance of users and increase safety on the roadway. For example, pavement markings can alert users to walk their vehicle in high pedestrian areas. Some jurisdictions are moving away from "bicycle facility" branding to a more inclusive "mobility lane" designation.

Striping can help indicate to micromobility users where to wait when crossing an intersection so they don't interfere with cross traffic, and Two-stage turn boxes provide micromobility users an area to queue to turn at signalized intersections outside the path of vehicles and other micromobility vehicles or bicycles.

Education is complementary to design infrastructure and assists users on rules and regulations for operating the devices. Education can be included in pamphlets, signage, and pavement markings, as well as enforcement measures.

Source: Duron Netsell, Street Smarts Design + Build

Marked Location on Sidewalk
(Credit: NACTO)

Geofencing and Speed Restrictions

In areas of high pedestrian activity, geofencing can be an effective means to ensure riders abide by speed restrictions. Geofencing requires the device to decelerate and gradually accelerate upon exiting the slow zone. Geofencing technology is currently not precise enough to restrict sidewalk riding, but areas can be designated as slow, no riding or where parking/trip ending can occur, and accompanied by an alert to the user.

Sidewalk Widths

Wide sidewalks that accommodate riding, parking and pedestrians are ideal. Additionally, space between the walking area and curb where micromobility devices can be parked allows for less potential for conflict or tripping hazards.

Loading Zones

Micromobility is also used for commercial purposes, such as freight, e-commerce and deliveries. Loading zones provide an area that allows for commercial and passenger loading activities to occur outside of a bicycle lane, minimizing conflicts.

Signal Operations

Micromobility vehicle speeds should be considered when evaluating signal timing. For example, if restricting the speed of devices, the devices should be able to travel through the intersection comfortably.

Maintenance

To ensure the safe use of micromobility, maintenance for pavement and curb ramps is essential. Regular resurfacing and repairing pavement degradation can improve overall user comfort and experience.

Stormwater grates and utility manholes should ideally be placed out of the path of travel for micromobility.

Buffers

Buffers between the travel lane and bicycle lane, that may also be used by micromobility vehicles, minimizes conflict by providing additional separation between motor vehicles.

Buffer separated bicycle lanes provide a vertical separation between the bicycle lane and the motor vehicle lane, which makes less-experienced micromobility users feel more comfortable. There are varying levels of protection including bollards, delineators, curbs, median islands, landscaping, and parked vehicles.

End-of-Trip Requirements

To ensure devices are parked in an appropriate location, most shared micromobility providers require the user to park in a designated zone and attach a photo for proof. This ensures that there will be no concerns with clutter or barriers in the right of way.

Barriers to e-bike adoption include fear of theft due to a lack of secure storage and “range anxiety” resulting from limited charging opportunities. These can be addressed through the inclusion of specific e-bike requirements in the City’s off-street parking regulations.

The B.C. Active Transportation Design Guide (BCAT) recommends that 50% of long-term and 10% of short-term bicycle parking be designed to accommodate e-bikes by providing an electrical outlet. Providing secure bicycle parking at key destinations, as well as at workplaces and multi-family residences, can also encourage e-bike uptake.

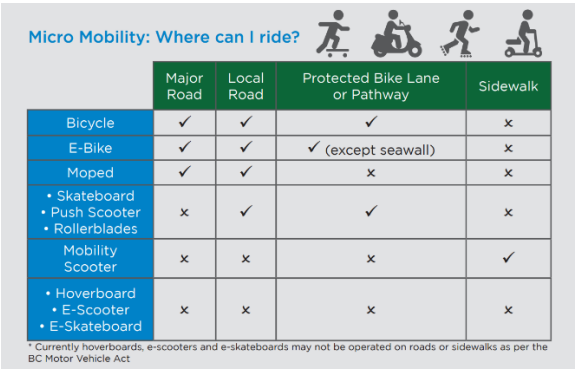
Regulating Where to Ride

As discussed above, it is important to consider where within the right-of-way each micromobility vehicle should be permitted to travel. Micromobility vehicles travel too quickly to operate on pedestrian facilities and should be prohibited from dedicated pedestrian-only facilities such as sidewalks. Like standard bicycles, micromobility users are vulnerable when mixed with motor vehicles on the roadway. Ideally, they should operate within AAA bicycle facilities. However, this then introduces a mix of users and speeds to the bicycle facility.

It has been common practice for a municipality to adopt regulation for micromobility devices either through a Streets and Traffic bylaw update or separately to enforce shared mobility businesses. This type of regulation can clearly set the municipalities expectations for parking, MVA compliance (helmets, breaks, front and rear and lights), and device specifications and capabilities. City of Calgary and City of Kelowna have been leaders in adopting micro-mobility regulation in Canada.

The uptake of micromobility devices should also be accompanied by an education and communication plan to ensure safety. Cities can communicate where to ride and other safety rules online or on public bicycle maps (see Figure 3). Shared micromobility companies can also send push notifications to their users on safety features and rules of

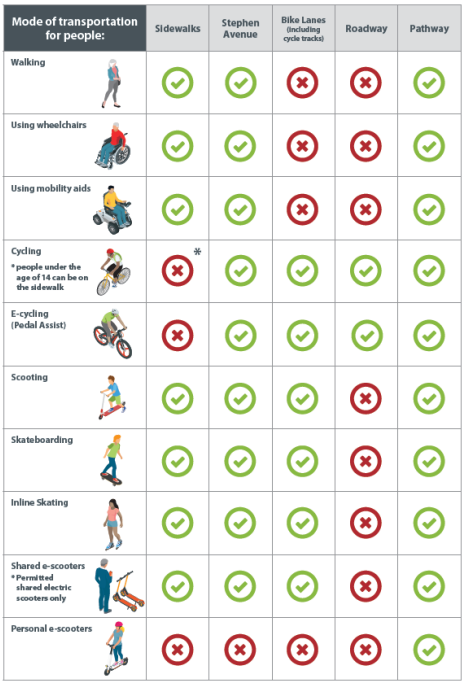
the road.



Micro Mobility: Where can I ride?

	Major Road	Local Road	Protected Bike Lane or Pathway	Sidewalk
Bicycle	✓	✓	✓	×
E-Bike	✓	✓	✓ (except seawall)	×
Moped	✓	✓	×	×
• Skateboard • Push Scooter • Rollerblades	×	✓	✓	×
Mobility Scooter	×	×	×	✓
• Hoverboard • E-Scooter • E-Skateboard	×	×	×	×

* Currently hoverboards, e-scooters and e-skateboards may not be operated on roads or sidewalks as per the BC Motor Vehicle Act



Mode of transportation for people:	Sidewalks	Stephen Avenue	Bike Lanes (including cycle tracks)	Roadway	Pathway
Walking	✓	✓	×	×	✓
Using wheelchairs	✓	✓	×	×	✓
Using mobility aids	✓	✓	×	×	✓
Cycling * people under the age of 14 can be on the sidewalk	× *	✓	✓	✓	✓
E-cycling (Pedal Assist)	×	✓	✓	✓	✓
Scooting	✓	✓	✓	×	✓
Skateboarding	✓	✓	✓	×	✓
Inline Skating	✓	✓	✓	×	✓
Shared e-scooters * Permitted shared electric scooters only	✓	✓	✓	×	✓
Personal e-scooters	×	×	×	×	✓

Figure 3: Examples of Micromobility Regulation in Vancouver[1] and Calgary[31,32]

END NOTES

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APPENDIX E

DETAILED CYCLING NETWORK MAPS

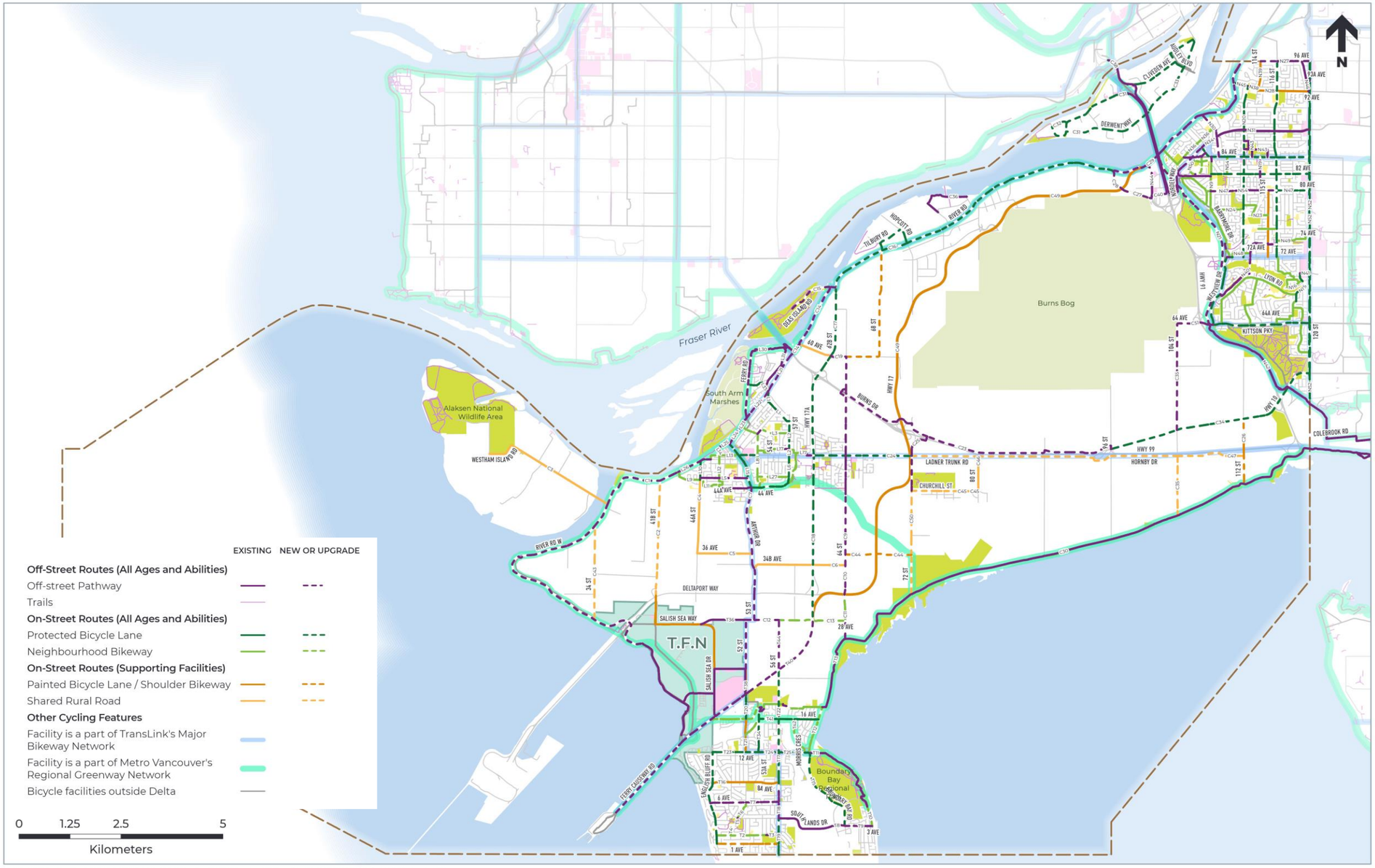

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Figure 28: Ultimate Cycling Network (Overview) showing Existing and Proposed Routes with Segment IDs

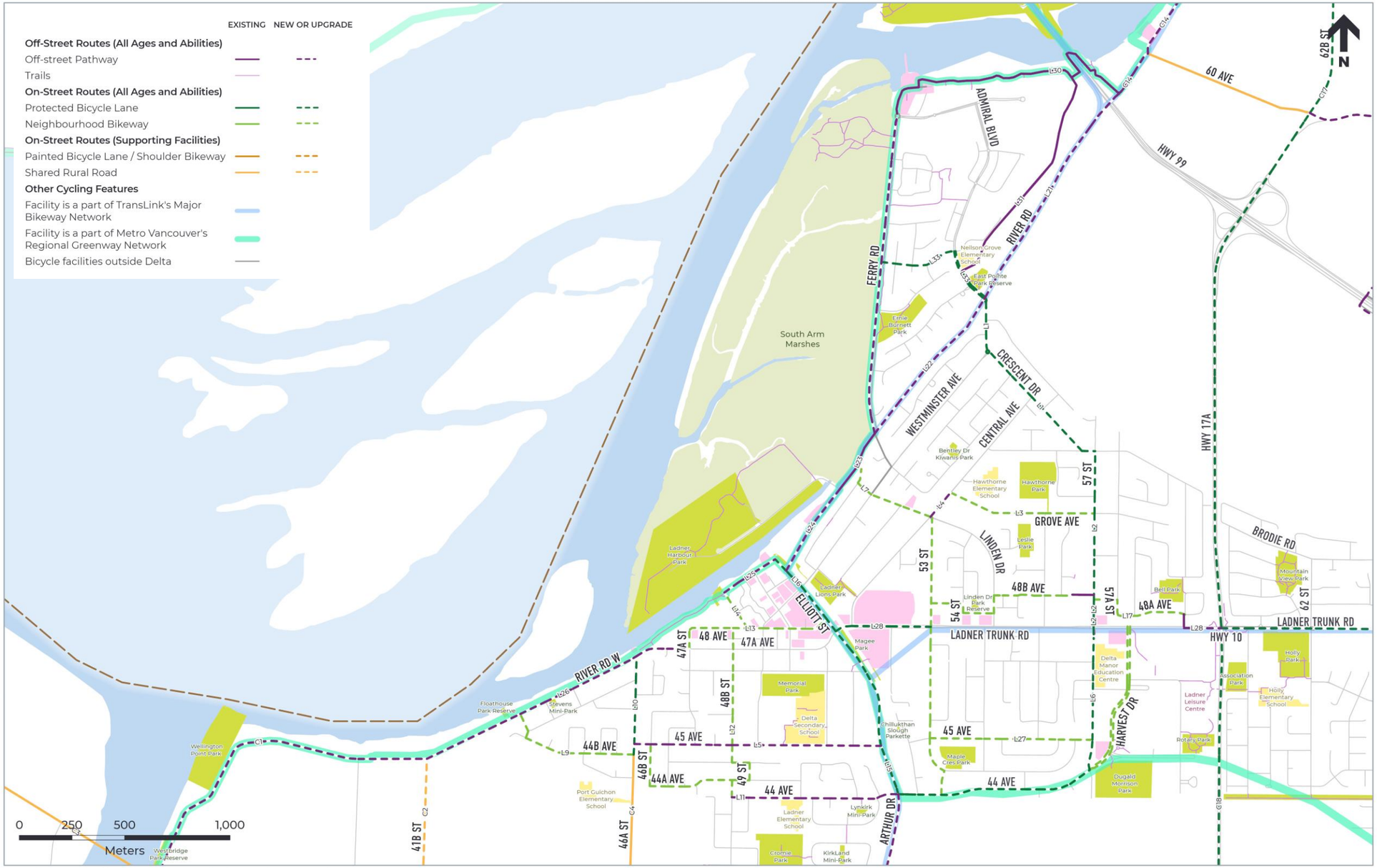

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Figure 29: Ultimate Cycling Network (Ladner) showing Existing and Proposed Routes with Segment IDs

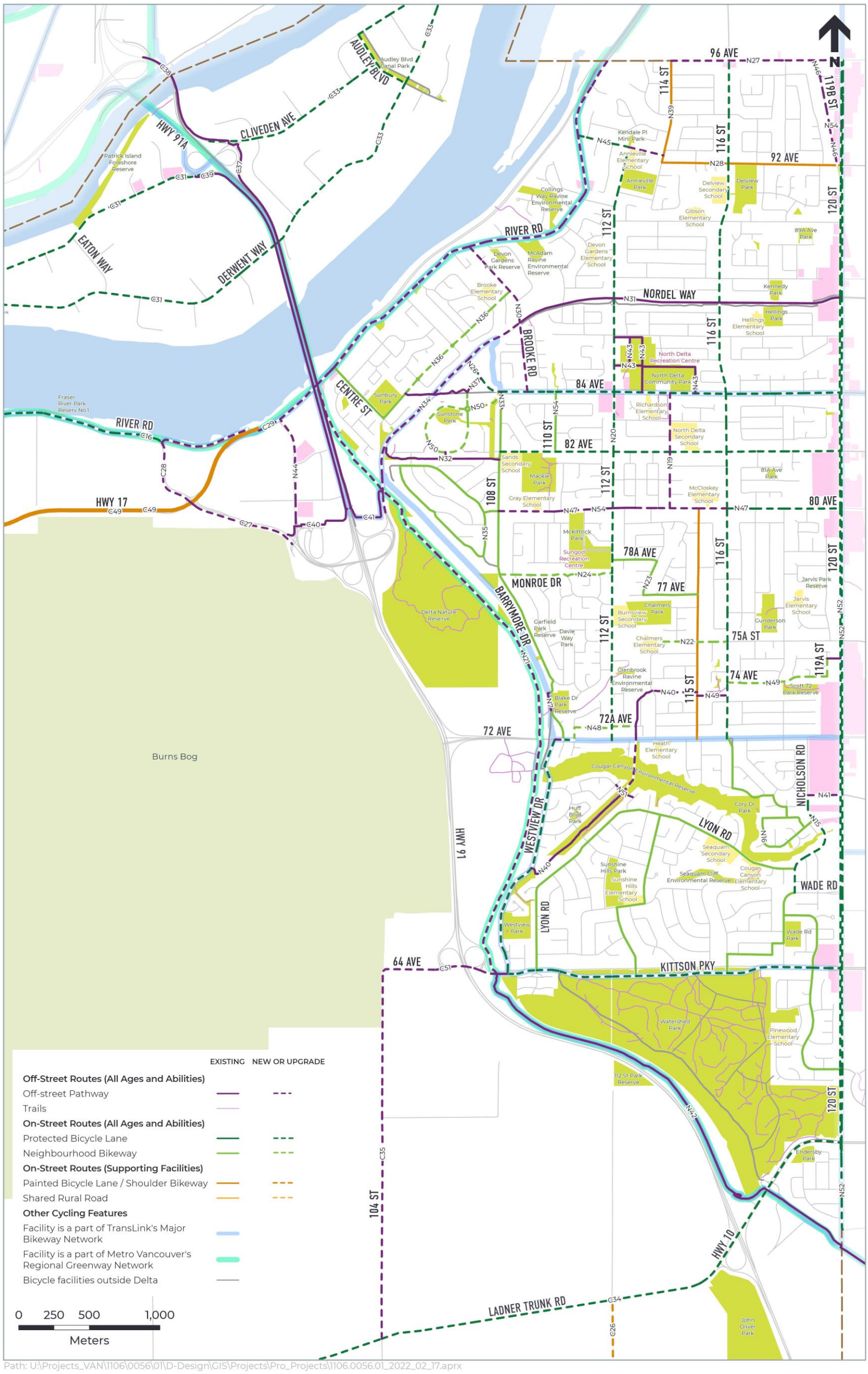

Figure 30: Ultimate Cycling Network (North Delta) showing Existing and Proposed Routes with Segment IDs

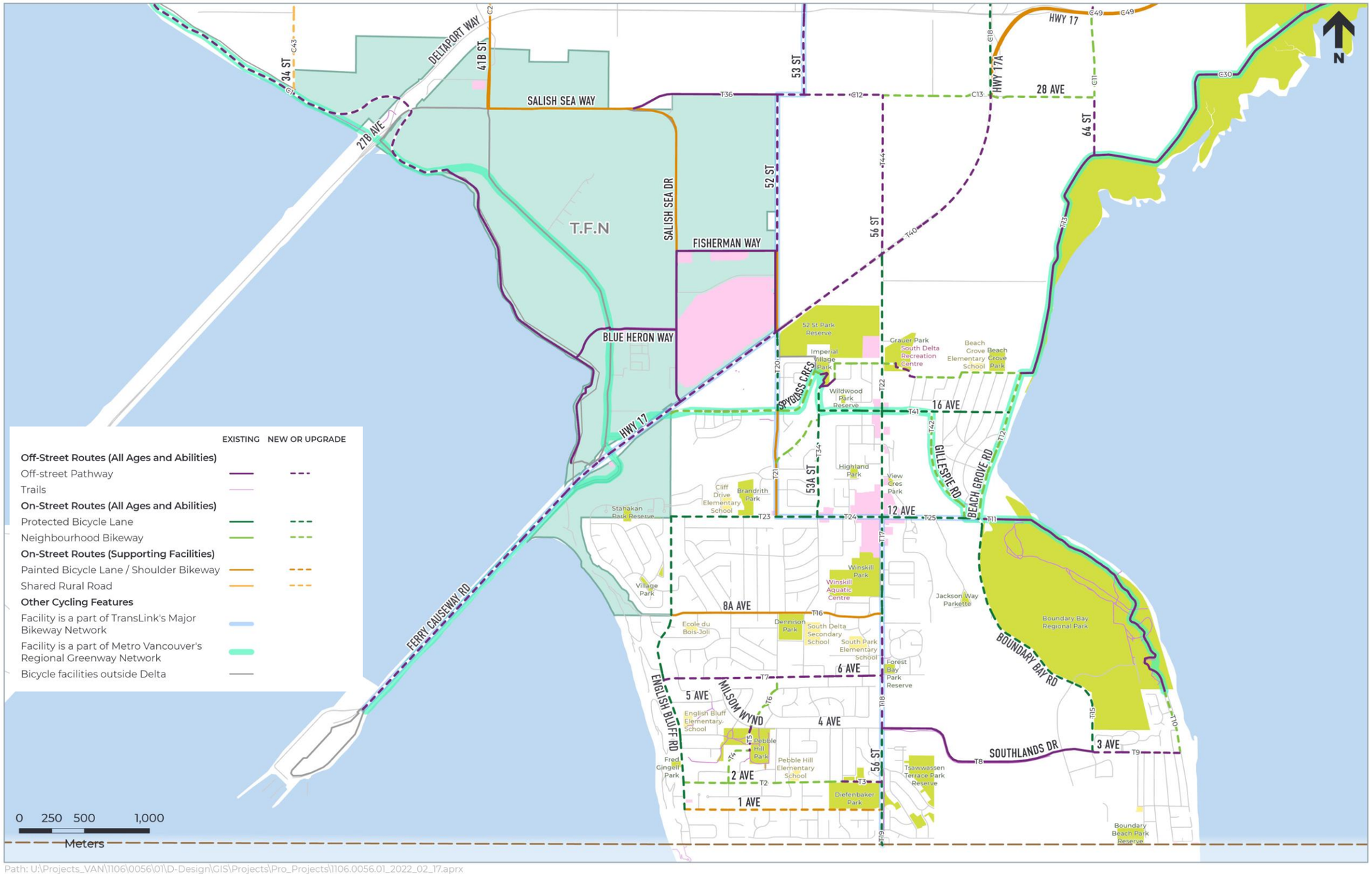

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Figure 31: Ultimate Cycling Network (Tsawwassen) showing Existing and Proposed Routes with Segment IDs