SHIFTING TOWARD TRANSIT IN SQUAMISH

FINAL REPORT
APRIL 2023

PREPARED FOR:

District of Squamish
37955 Second Avenue
Squamish, BC V8B 0A3

PREPARED BY:

THE UNIVERSITY OF BRITISH COLUMBIA

School of Community and Regional Planning (SCARP)

Ming-Wai Chung
Chris French
William Harris
Ben Mumford

The SCARP Studio
1933 West Mall
Vancouver, BC V6T 1Z2

Acknowledgments

Table of Contents

Executive Summary

Imagine a future where travelling in Squamish without a car is easy.

Context

The District of Squamish is a rapidly growing community located between Vancouver and Whistler, British Columbia. Through the *Squamish 2040 Official Community Plan (OCP)*, the *District's Community Climate Action Plan (CCAP)*, the *Squamish Transit Future Action Plan (TFAP)* and the *Low Carbon and Smart Growth Initiative*, the District of Squamish has set an ambitious vision for a low-emission and transit friendly future.

Working with the District of Squamish, and in consultation with stakeholders both in the community and in higher levels of government, this project has identified several opportunities for improving the local and interregional transit networks in Squamish. These opportunities reflect priorities voiced by community and government stakeholders and build on lessons learned from several communities on the leading edge of small city transportation.

The recommendations detailed in this report, and highlighted here, were designed and evaluated using a set of guiding principles. These principles include connectivity, sustainability, equity, health, and reconciliation. The recommendations aim to enhance connectivity between local and interregional transit services and networks, improve operations of the existing network, and ultimately encourage Squamish residents to consider sustainable modes of transportation.

Network Recommendations

Reconfigure the Transit Network to a "Trunk and Feeder" System:
The "Trunk and Feeder" network concept would see routes realigned and frequencies modified to enable more frequent service on routes serving areas with the greatest population, employment, and in accordance with the OCP growth strategy.

Create Mobility Hubs in Downtown Squamish and Garibaldi Village:
Mobility hubs integrate different sustainable transportation modes including public transit, car-sharing, cycling and walking in a given location. Creating hubs in Downtown Squamish and Garibaldi Village will enable sustainable connectivity across the community.

Connect Indigenous Communities to the Local Transit System:
Addressing inadequate transportation and access to goods and services for Indigenous communities, redesigning the local transit network to a Trunk & Feeder system will allow the introduction of service to an additional Squamish Nation Reserve.

Create Active Transportation Connections Between Dentville, Industrial Park, North Yards, and Brennan Park Community Centre:
Considering gaps in the transit network, access to these key destinations could be facilitated with active transportation connections designed for all ages and abilities (AAA) with end-of-trip facilities.

Policy Recommendations

Integrate Fares with Interregional Service Providers:
Fare integration between shared transportation services is essential to getting drivers out of their vehicles and on to transit. Proper integration is a tool for growing ridership, as well as removing barriers and complications in using transit.

Explore Locally Funded Service Opportunities:
Unconventional transit structures, including on-demand transit, may present an opportunity to work outside the BC Transit system in areas which do not adequately support conventional transit operations.

Create a Local Travel Survey:
Local travel surveys can fill gaps in the understanding of ridership patterns and work hand-in-hand with 'big data' solutions.

Novel and Alternative Funding Tools

Existing funding instruments - property tax and fare revenues - may struggle to accommodate increased operating costs associated with planned service increases and expansions in the community.

The District of Squamish can position itself alongside other municipalities to advocate for enabling legislation or permissions to pursue new revenue sources to improve local transit services.

Alternative funding sources identified and explored in this project include:
1. Dedicated Transit Funding in Property Tax
2. Municipal Parking Fees
3. Off-Street Parking Levies
4. Motor Fuel Tax
5. Vehicle Levies

Developing Interregional Service in the Sea to Sky Corridor

Consider Regional Government Control of an Interregional Route:
An interregional route under the control of the Squamish-Lillooet Regional District and operated through BC Transit offers the quickest possible path to achieving interregional transit between Pemberton and Metro Vancouver

Align Regional and Interregional Stops with Local Service and Mobility Hubs:
Interregional transit should be easily accessible for riders. Local and regional service should be aligned, while mobility hubs should provide easy access to transit for a people arriving through a variety of modes.

Provide Comfortable Transit Vehicles with Amenities to Encourage Use of Interregional Service:
Alternative bus models, outfitted with features that enhance personal comfort, are important features to encourage automobile users to take longer-range transit trips.

1: Context

Background

The District of Squamish is committed to a future that prioritizes human and ecological health and well-being. Key to this is reducing transportation emissions, which currently account for 52% of the community's emissions (District of Squamish, 2020). To support the reduction of transportation emissions, this project assembled a series of recommendations that will enhance public transit ridership through improved service quality and expanding the network to include a number of local destinations.

Squamish is one of British Columbia's fastest growing communities with the population increasing 22% over the past five census years from 19,497 to 23,819 (Statistics Canada, 2022). Improvements to public transit are critical to help Squamish accommodate this growth without increasing automobile reliance. The geography and layout of Squamish, especially a physical divide created by Highway 99 (Figure 1) poses challenges to shifting from automobile to transit usage. In addition, transit routes are often circuitous and indirect due to the design of the road network. Further, recreational and commuter journeys along the Sea to Sky region and into Metro Vancouver are not currently supported by public transit. These concerns were evident during initial engagement with community stakeholders, and there is a strong desire among many of these stakeholders for higher frequency transit with greater connectivity to regional destinations.

Best practices in transportation planning, academic literature, and engagement with several community organizations and stakeholders informed a set of guiding principles. These guiding principles were used to seek and evaluate lessons from other small community transit systems and to guide a series of recommendations which encompass network design, policy, funding tools, and interregional transit service options.
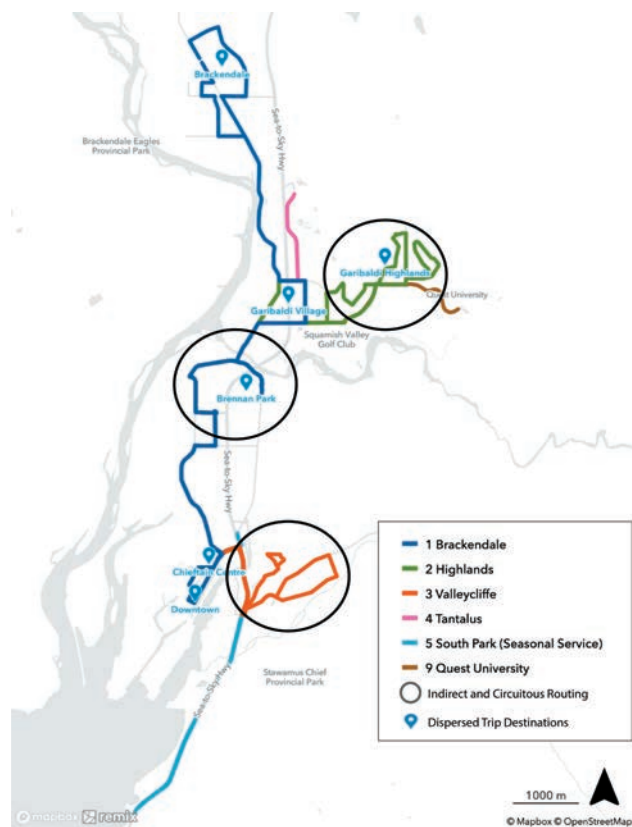
Figure 1: Geography of Squamish and Current Bus Routes

Project Objectives

The focus of this project was to research and identify strategies and actions to improve public transit service that will enable the District of Squamish to reduce dependency on private automobiles in the community.

Three core objectives:

Identify best practices in transit planning for small communities

Identify small community leaders in transit in Canada and abroad, distill how and why these communities have been successful, and relate these learnings to the challenges faced by Squamish.

Explore options to sustainably fund transit service in Squamish

Identify and propose linkages and opportunities related to sustainable density, parking management, and other creative funding models for transit in the community.

Examine the feasibility of an interregional transit system

Explore and identify actions and opportunities which could enable future interregional transit connections.

Approach

This project followed a two-phase approach to collect information and then formulate options which can inform Squamish's future transit planning and strategies. The first phase - discovery - focused on collecting information through a review of the current Squamish transit network and planning initiatives, discussions with community and government stakeholders, and a broad exploration of small community transit systems in Canada, the United States, and Europe. The second phase - define - built off of the first stage, critically examining lessons learned from other communities' transportation systems. This phase - presented in this report - led to a series of recommendations including network and policy options, analysis of funding tools, and a potential path towards interregional transport in the Sea to Sky region.

Phase I - Discovery

1 Best Practices in Transit Planning

An overview of best practices in transit planning was identified from professional and academic literature. This was used to determine aspects of network design, land use and density, and connectivity that are important to transit service. Recognizing Squamish's location on the unceded, traditional and ancestral territories of the Squamish Nation, a specific scan was also conducted to best understand how reconciliation can be embodied in transit planning.

2 Existing Conditions Analysis

This task was focused on an assessment of the existing Squamish transit system and local community. Data from both the District of Squamish and BC Transit was used to understand trends in ridership and service levels on each of Squamish's bus routes.

3 Stakeholder Engagement & Relationship Building

Discussions were held with community and government stakeholders. Key points from these meetings have been combined with an analysis of the district's 2021 transit survey – conducted as part of the TFAP – to inform our project's values and guiding principles. Discussions were held with BC Transit, OurSquamish Placemaking Society, Staff from the District of Squamish Planning Department, Staff from Squamish Nation, the Squamish Chamber of Commerce, and the Squamish-Lillooet Regional District. Details on these discussions are available in Appendix C.

4 Identifying Small Community Leaders in Transit Service

Small community leaders in transit service provision were identified and an initial analysis of lessons learned from their transportation systems was conducted. Phase I studied twenty different systems across Canada, the United States, and Europe. These case studies were assembled looking at existing official plans, transportation plans, and budgets openly available for the selected communities. Summaries of these systems are available in Appendix D.

5 Identifying Alternative Funding Tools for Transit Service

Eleven preliminary options for sustainable and alternative funding tools were evaluated. Each tool was assessed at a high level each for its ability to increase sustainable mode share, relative ease of implementation, impacts to equity, alignment with District Policies and Objectives, and capacity to generate revenue.

6 Deriving Guiding Principles

Guiding principles were derived for the assessment of project recommendations. This considered best practices, existing conditions, and stakeholder input.

Phase II - Define

The second phase of this project built on work completed in the first phase to complete a series of recommendations which could help Squamish continue to develop its transit network and ultimately reduce community automobile reliance. The following is a list of actions taken in this second project phase. Specific focuses included network design and integration, regional and interregional connections, funding and governance models, and fare structures. Challenges and successes identified from these meetings informed recommendations for Squamish.

1   **Local Network Recommendations**

Building on lessons learned from leading small community transit systems, a **future transit map and a series of recommendations** explore how different strategies and tools could be implemented in Squamish. The focus of these recommendations is on enhancing rider experience and generating ridership through a more cohesive and frequent transit network which meets the needs of a dispersed community.

2   **Local Policy Recommendations**

Complementing these network recommendations are a series of policy recommendations. These **propose three policies** that could enhance the rider experience in Squamish and ultimately increase transit ridership in the community. These policy recommendations consider lessons learned from other small communities and established best practices in transit planning.

3   **Alternative Funding Tools**

Detailed analysis of five alternative funding tools that could sustainably generate revenue for the operations of Squamish's transit network. Funding tools were evaluated for their ability to influence mode shift to sustainable methods of travel, ease of implementation, impact on equity, alignment with District policies and objectives, and revenue potential.

4   **Interregional Transit Service**

Considerations and options for implementing a future interregional network to connect the Sea to Sky region with Metro Vancouver. Includes a rationale, potential governance and funding options, basic network alignment, and desirable features which would enhance ridership and encourage a switch away from automobile journeys.

Guiding Principles

Phase I of the project identified five guiding principles to be used in evaluating possible changes and interventions to local transit policies and services. These guiding principles were identified through engagement with community and government stakeholders including the District of Squamish Planning & Sustainability Departments, BC Transit, Squamish-Lillooet Regional District, the Squamish Chamber of Commerce, OurSquamish Placemaking Society and Squamish Nation. The guiding principles are explained in detail below and are represented by their icons adjacent to recommendations in the report for those that may work to improve their inclusion in the Squamish transit network.

Connectivity

The transit system needs to connect people with local, rural and regional destinations to be competitive with private automobiles. Many activities and communities in Squamish are currently only accessible by car, or transit routes do not provide competitive travel times with personal vehicles to reach these destinations.

Sustainability

Public transit is a sustainable mode of transportation that that offers higher capacity than one private vehicle. This reduces the amount of road space required to carry passengers between destinations, reducing the impact on the natural environment and greenhouse gas emissions while improving air quality.

Equity

Public transit provides an opportunity to address challenges to Squamish's labour force - these include housing affordability and affordable access to work, school, and recreation. Enhancing equity necessitates particular attention to connectivity, frequency, and distribution of services and costs.

Health

Reducing automobile dependency and increasing public transit connectivity have positive impacts on community health. Connections to, from, and within the transit system should provide safe routes for users of all ages and abilities - recognizing the importance of transit to Squamish's youth and aging populations.

Reconciliation

Automobile dominated transportation systems and poorly connected public transit are shown to have detrimental effects on Indigenous health and cultural wellbeing. Our research and recommendations consider different conceptions of "good transit" to understand how the transit network can promote reconciliation and create a system that allows Indigenous people - both on and off reserve - to access housing, economic opportunities, sites of cultural significance, and the natural environment.
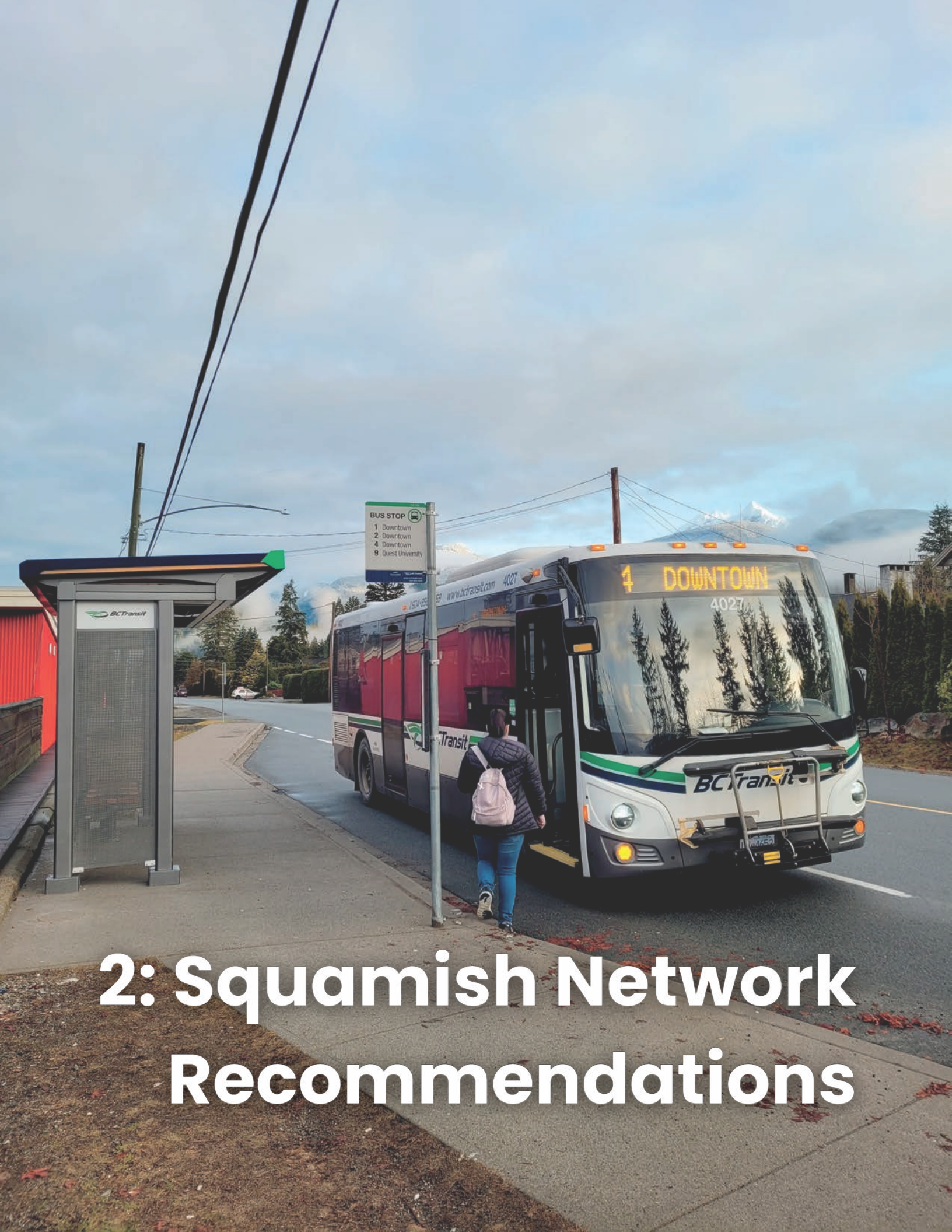
2: Squamish Network Recommendations

Transforming Transit in a Rapidly
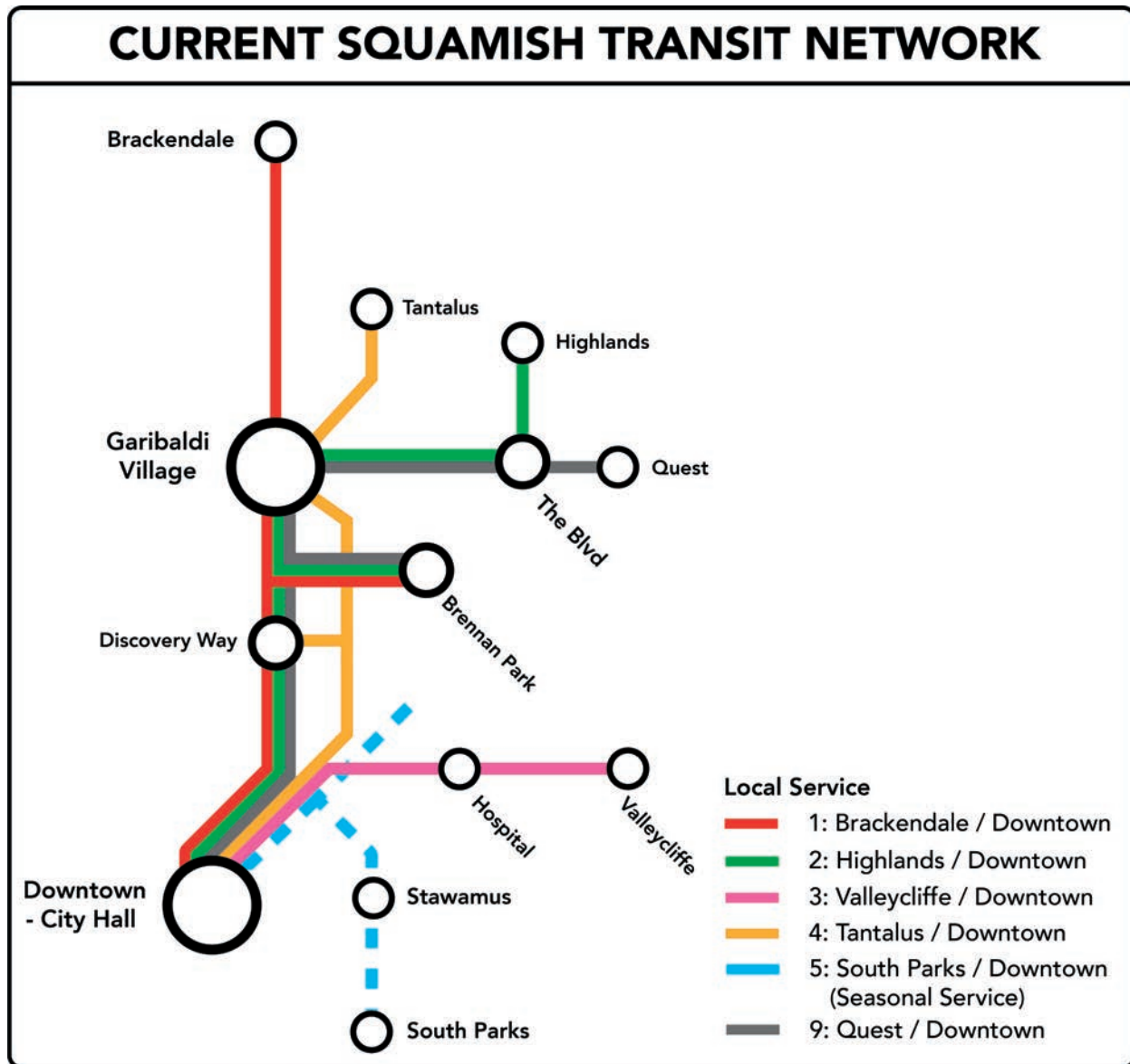
Figure 2: Current Squamish Local Transit Network

Growing Community

FUTURE SQUAMISH TRANSIT NETWORK

2.1

To Whistler / Pemberton

Brackendale

Waiwakum — **2.3** — Brackendale Interregional

Highlands

2.2 Garibaldi Village — Quest

The Blvd

Discovery Way — **2.4** — Brennan Park

2.2 Downtown Exchange

Hospital — Valleycliffe

Cleveland Ave — Stawamus — **2.3**

Oceanfront — South Parks

To Metro Vancouver

Frequent Transit Network
— 1: Brackendale / Downtown

Local Service
— 2: Highlands / Downtown
— 3: Valleycliffe / Downtown
— 4: Waiwakum / Quest
— 5: South Parks / Downtown

Interregional Service
— 99: Vancouver / Pemberton

Active Transportation
- - - New Multi-Use Paths

SQUAMISH TRANSIT NETWORK RECOMMENDATIONS:

2.1 Reconfigure the Local Transit System to a "Trunk & Feeder Concept"

2.2 Create Mobility Hubs in Downtown Squamish and Garibaldi Village

2.3 Connect Indigenous Communities to the Local Transit System

2.4 "Fill in the Gaps" with Active Transportation Infrastructure

Figure 3: Proposed changes to Squamish Transit Network

Four Recommendations for Squamish's Local Transit Network

Four recommended directions are proposed for the local transit network to address both the District of Squamish's goal to move beyond the car and make transit service an attractive, efficient alternative to vehicle travel using the guiding principles for this scope of work. These recommendations are presented below and illustrated in Figure 3, with further details provided in the following subsections.

2.1: Reconfigure the Local Transit System to a "Trunk & Feeder Concept"

The recommendations for the local transit network are based on an initial proposal to the network to a "trunk and feeder" concept adapted to fit the needs of Squamish. This will enable more frequent service on higher performing routes with a proposed realignment in accordance with the OCP growth strategy.

2.2: Create Mobility Hubs in Downtown Squamish and Garibaldi Village

Mobility hubs are locations where different modes of sustainable transportation including public transit, car-sharing, cycling and walking integrate with each other (City of North Vancouver, 2022). Creating hubs in Downtown Squamish and Garibaldi Village, both areas with diverse land uses and higher density development, will enable connectivity across the community by sustainable modes.

2.3: Connect Indigenous Communities to the Local Transit System

Inadequate transportation and access to goods and services for Indigenous communities has been connected to increases in cost of living and lower social mobility (Raerino, MacMillan & Jones, 2013). Redesigning the local transit network to a Trunk & Feeder System will allow the District of Squamish to introduce service to an additional Squamish Nation Reserve that can be carefully designed and implemented with the Nation to work towards reconciliation.

2.4: "Fill in the Gaps" with Active Transportation Infrastructure

The proposed network redesign does leave some residential communities without direct transit connections to Brennan Park Community Centre. Access to this key community destination could be facilitated with active transportation connections designed for all ages and abilities (AAA) with end-of-trip facilities.

2.1: Reconfigure the Local Transit System to a "Trunk & Feeder Concept"

What is a Trunk & Feeder System?

The basic design of a trunk-and-feeder system consists of a trunk line that acts as a spine while feeder routes connect into the trunk line. In addition, trunk-line stops do not necessarily need to be sited at every junction with feeder routes and it is possible that a feeder route slightly overlaps with a trunk route to pick up passengers (Sivakumaran et al., 2020). In comparison, a traditional system has more dispersed routes which do not follow a central spine.

Trunk and feeder system operating and user costs can be reduced through schedule coordination and system optimization (Sivakumaran et al., 2020). The transit system can be more cost-effective as it can reduce the total numbers of vehicles needed and overall runtime to provide service across the network. Wang (2018) mentioned that an idealized trunk-and-feeder can provide precise service to passengers, and they will benefit from shorter waiting time and shorter required distance between the feeder line stop and trunk line stop. With more direct lines running at higher frequencies and feeder lines reaching more potential ridership generators in less dense areas, trunk-and-feeder systems can attract more passengers and provide better connectivity to more destinations in the region.
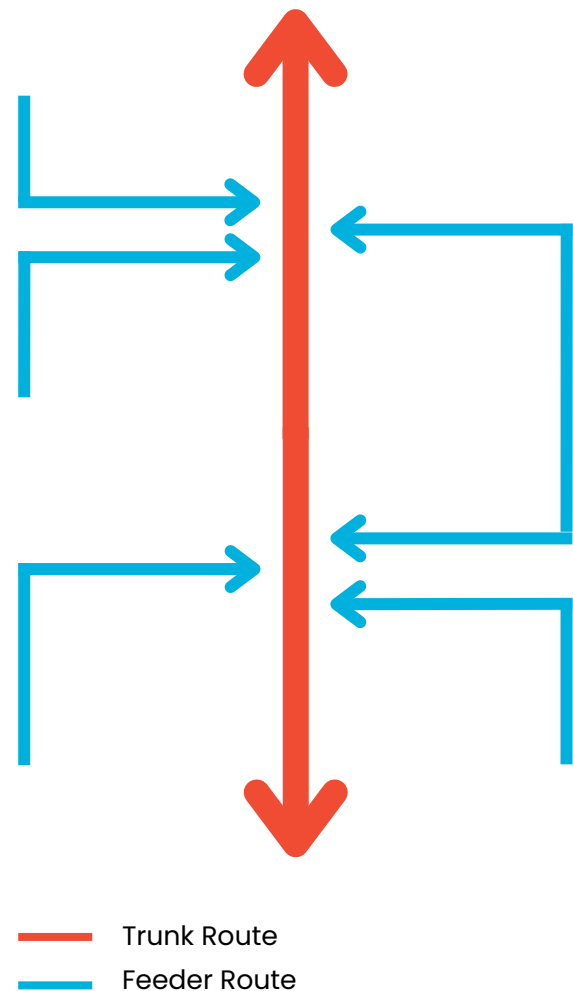

— Trunk Route
— Feeder Route

Figure 4: Basic design of a trunk & feeder transit system

2.1.1: Application in Squamish

Currently, Squamish has a frequent transit corridor that runs along Government Road, Queens Way, Buckley Avenue, and downtown Squamish. This corridor is currently served by routes 1, 2, 4 and 9, providing a convenient and reliable transportation option for residents and visitors who need to travel between downtown Squamish and Garibaldi Village Shopping Centre.

According to the Squamish Transit Future Action Plan 2021, BC Transit and the District of Squamish propose to extend the frequent transit network to Brackendale to serve key destinations on Government Road and Ross Road, including Don Ross Middle School and Brackendale Elementary School. Additionally, the frequent network is planned to extend to the east for better transit service for Garibaldi Highlands and the east of downtown to Valleycliffe.

Route 1: Brackendale / Oceanfront via Downtown

Upgrading Route 1 to act as the trunk line running at a higher frequency and connecting a reconfigured set of feeder lines (Routes 2, 3, 4, and 5) originating in and following similar routes from different neighbourhoods, is recommended. Route 1 was identified as the trunk line given its high ridership relative to other routes and its routing acts as a spine connecting communities in the north and south of Squamish. In addition, Route 1 would also be extended to the new Oceanfront Community on Howe Sound, south of Downtown Squamish, where a high-activity, mixed-use development is planned. Route 1 would also serve the two new mobility hubs in Downtown Squamish and Garibaldi Village. Establishing a frequent transit network along this corridor is somewhat aligned to existing planned service increases in the Squamish Transit Future Action Plan, but is instead served by one North-South route instead of multiple lines. Having one frequent route instead of multiple local routes serving the corridor can be easier for transit users to navigate the system. Together with the recommendation of establishing mobility hubs in Downtown and Garibaldi Village, the proposed network design encourages infrequent transit users to shift towards transit as they know where to transfer and what routes to take to get to their destinations.

Route 2: Highlands / Downtown via Brennan Park

The team recommends deviating Route 2 from Garibaldi Village to the Downtown Mobility Hub via Brennan Park and along Loggers Lane. This allows the route to act as a feeder into the high frequency route 1, but maintain a connection to Brennan Park Community Centre, a key destination for local residents. It will also be important to introduce service along Loggers Lane north of Downtown as this has been identified as an area for future development in the Official Community Plan.

Route 3: Valleycliffe via Stawamus

Maintaining the Valleycliffe route with new stops on Laurelwood Road adjacent to the emerging Waterfront neighbourhood and at Stawamus to provide service to Squamish Nation is recommended. The route acts as a feeder into the Downtown Mobility Hub where it can connect with frequent transit Route 1, other local routes and a future interregional service.

Route 4: Waiwakum / Quest University via Garibaldi Village

Rerouting Route 4 to run between Squamish Nation's Waiwakum Reserve near Brackendale and Quest University, and integrating it with the frequent and interregional transit networks at Garibaldi Village, is recommended. The route would also serve Don Ross Secondary School and future developments planned along Ross Road. It is recommended that the route operate at a reduced frequency in the short term due to low population densities along the line and classes at Quest University suspended indefinitely, with most service provided during peak hours for students at Don Ross Secondary School. As developments are completed and occupied along Ross Road, service could be adjusted as necessary.

The line's new routing from Waiwakum Reserve to Garibaldi Village will run from Depot Road along Highway 99, before turning left onto Dowad Drive to continue further south parallel to the Highway via Tantalus Road. Currently, there is no infrastructure to support buses turning left from Highway 99 onto Do-

wad Drive. As such, the team recommends that the District and BC Transit work with the Ministry of Transportation and Infrastructure to create a transit priority left turn lane that, when activated by a bus, would stop northbound traffic allowing the bus to safely cross the highway.

Route 5: Squamish South Parks / Stawamus / Downtown

A recommended change is to upgrade Route 5 to provide service year round to tourism destinations along Highway 99, including the Sea To Sky Gondola, Shannon Falls Provincial Park and Squamish Chief Provincial Park. These three destinations in particular attract locals and visitors to Squamish throughout the year and the service would provide an alternative to reaching them by car. Route 5 could also provide service to Squamish Nation's Stawamus Reserve, providing additional service for local Indigenous community members.

Reallocate Service Hours from and Eliminate Route 9: Quest University / Downtown

Eliminating Route 9 and reallocating its service hours to other local routes is recommended. For residents in the Quest University area and commuting between Quest University and Downtown Squamish, it is recommended to take Route 4 and transfer to either Route 1 or Route 2 at Garibaldi Transit Hub. With the expected service increase on Route 1, it is anticipated that the commuting time would remain approximately the same. Exact service reallocation to and improvements to service frequency on local transit routes will ultimately need to be decided between the District and BC Transit.

2.1.2: Lessons from Kitsap County, WA

Trunk lines operated by Kitsap Transit refer to the major bus routes that function as the backbone of the transit system. These routes connect major population centers and transportation hubs, including Washington State Ferries at the Bainbridge Island, Bremerton and Southworth terminals (Kitsap Transit, 2022). Compared to local feeder routes, the trunk lines operate at higher frequencies and longer hours, providing more reliable and frequent service for passengers traveling longer distances. Kitsap trunk routes and feeder routes are designed to connect to each other, and passengers can easily transfer from one line to another at junctions or transit centrs. As stated in Kitsap Transit's 2022-2027 Transit Development Plan, many of trunk and feeder routes are scheduled to meet Washington State Ferries at the Bainbridge Island, Bremerton and Southworth terminals, facilitating the connection between different modes of transportation (Kitsap Transit, 2022). Route 212 Bremerton / Silverdale West, which runs every 30 minutes from Monday to Saturday and serves Silverdale Transit Center and Bremerton Transportation Center, is an example of a trunk route. By providing reliable and efficient connections between major population centers and transportation hubs, Kitsap Transit's trunk lines like Route 212 play a crucial role in facilitating transportation and mobility in Kitsap County.

Figure 5: Kitsap Transit Bus (The Urbanist, 2021)
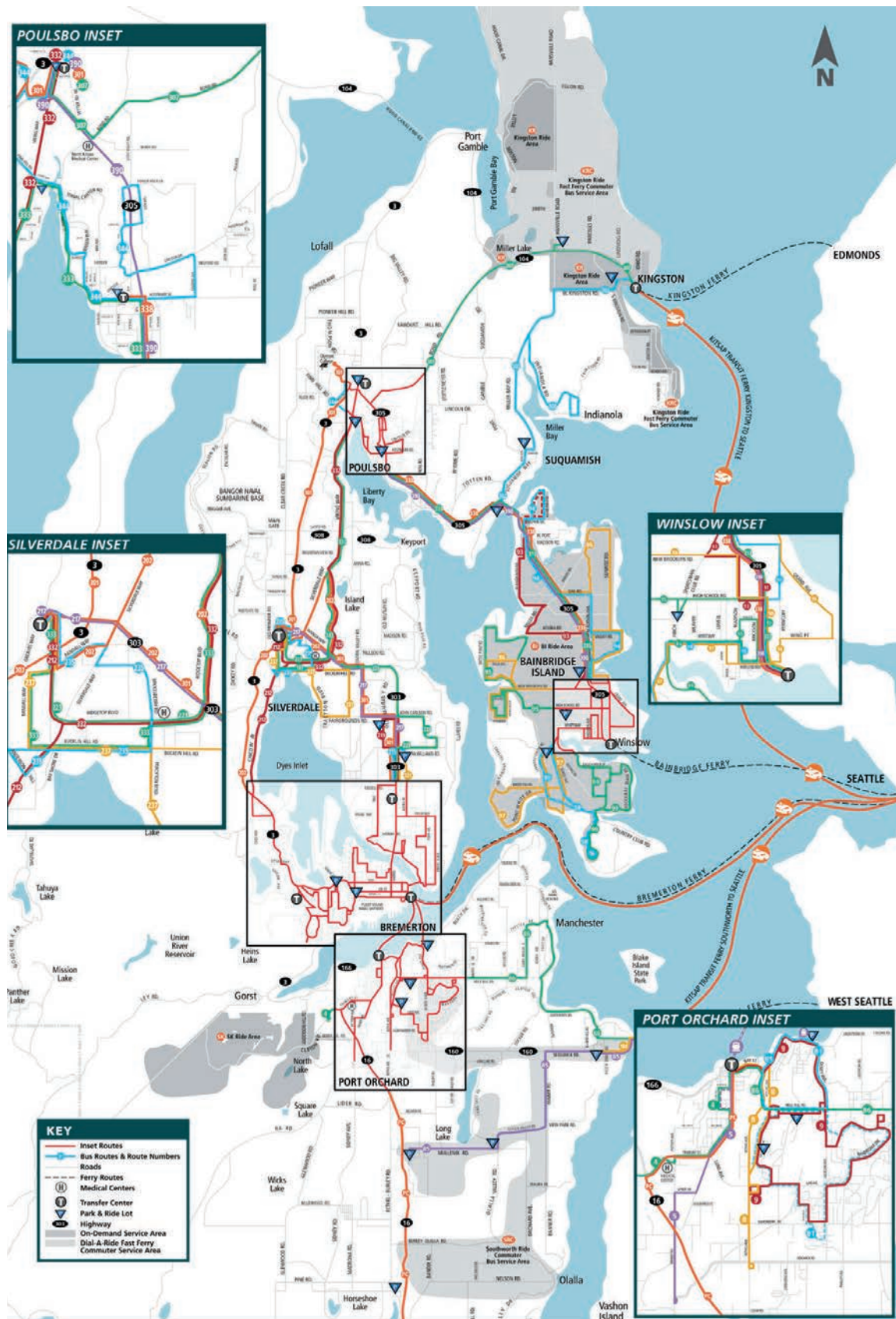
Figure 6: Kitsap County's Trunk & Feeder Transit Network (Kitsap Transit, 2022)

2.2: Create Mobility Hubs in Downtown Squamish and Garibaldi Village

What is a Mobility Hub?

Mobility hubs are locations where different modes of sustainable transportation including public transit, car-sharing, cycling, and walking integrate with each other (City of North Vancouver, 2022). Studies have highlighted the ability of mobility hubs in both rural and urban communities to improve accessibility and connectivity (Frank, Dirks & Walther, 2021; Anderson et al., 2017). Specifically to transit, mobility hubs can also function as exchange points between different routes on the local network and other interregional connections. This is highlighted and recommended in BC Transit's Infrastructure Design Guidelines (BC Transit, 2018).

2.2.1: Application in Squamish

The team recommends that these hubs in Downtown Squamish and Garibaldi Village be sited near high densities of residents and businesses to enable connectivity to other parts of the community by sustainable modes. It should be noted that the recommended site for the Downtown Mobility Hub is not located where the existing Downtown Transit Exchange is currently outside of District Hall, and closer to the railway crossing on Cleveland Avenue. The relocation of the downtown transit exchange from City Hall to the new mobility hub would minimize delay to interregional transit services, and serve as an ideal location for people walking and cycling as it is connected to the local active transportation network. Similarly, the Garibaldi Village Mobility Hub is located close to Highway 99 at the north end of Garibaldi Village, but is situated near the existing exchange point. The exact locations of these new mobility hubs are displayed in **Figures 7, 8 and 9**.
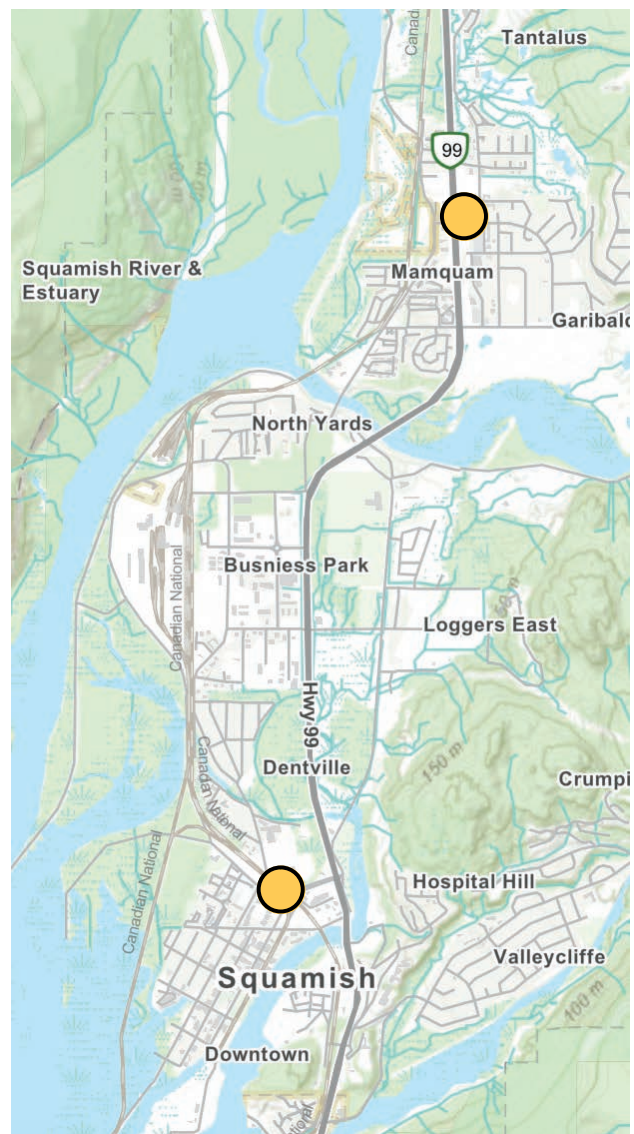
Figure 7: Locations of the new Mobility Hubs in Downtown Squamish and Garibaldi Village. Map obtained from the District of Squamish.

Downtown Mobility Hub Location with New Transit Network
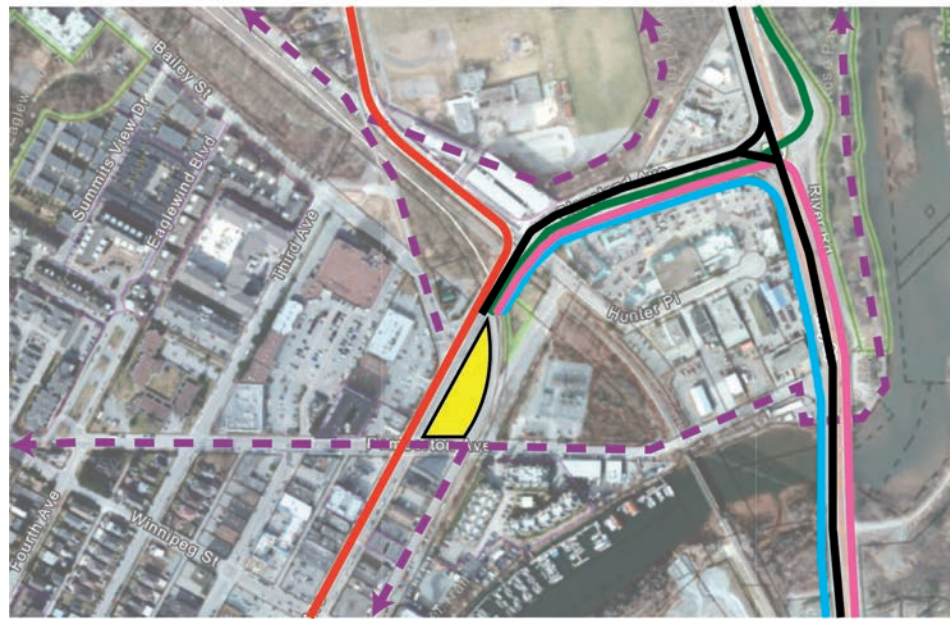
🟡	Downtown Mobility Hub (relocated from District Hall)	
- - -	Multi-Use Active Transportation Routes	

▬	1:	Brackendale / Downtown / Oceanfront (Frequent Transit Route)
▬	2:	Highlands / Downtown via Brennan Park
▬	3:	Valleycliffe
▬	5:	South Parks / Downtown
▬	99:	Sea-To-Sky (Interregional service to Pemberton, Whistler and Metro Vancouver)

Figure 8: Downtown Squamish Mobility Hub

Garibaldi Village Mobility Hub with New Transit Network

🟡	Garibaldi Village Mobility Hub	
- - -	Multi-Use Active Transportation Routes	

▬	1:	Brackendale / Downtown / Oceanfront (Frequent Transit Route)
▬	2:	Highlands / Downtown via Brennan Park
▬	4:	Waiwakum / Quest
▬	99:	Sea-To-Sky (Interregional service to Pemberton, Whistler and Metro Vancouver)

Figure 9: Garibaldi Village Mobility Hub

The mobility hubs would be constructed with a series of transit amenities including bus bays, transit priority measures, and operator facilities. Improving operator facilities at transit exchanges in particular can attract and retain bus operators to ensure a reliable and sustainable transit service (Zukowski, 2022). Beyond transit amenities, both passenger improvements such as real-time information systems, shelters and seating, and multimodal infrastructure need to be considered to enable fully sustainable commutes through mobility hubs. These improvements are discussed in further detail below.

Real-Time Information Systems

Real-time information is vital at mobility hubs to provide updated information on transit arrival and departure times, improve navigation to transit platforms and enhance the overall customer experience. Real-time information systems can be provided in the form of interactive kiosks or boards mounted on walls of shelters and buildings of mobility hubs (Los Angeles, 2016). Of note, a study focused on transit systems in Washington State identified that real-time information systems helped to increase ridership on regional transit networks (Shi et al., 2021).

Passenger Seating

One key feature of mobility hubs includes passenger seating, providing comfortable and convenient places for users while they are waiting for their connecting mode of transportation. Several considerations need to be made including the number of seats matching foot traffic and service demand, ensuring seats are accessible for all, aesthetics of the space to contribute a sense of placemaking, and siting of the seats to ensure they do not interrupt pedestrian flows (Aono, 2019; LA Urban Design Studio, 2016).

Passenger Shelters

Shelters, or in some cases passenger buildings provide a safe and comfortable place for passengers to wait for transit services (Bay Area Regional Collaborative, 2021). Additionally, shelters can protect passengers from adverse weather, such as rainstorms or extreme heat. The design of shelters should be aesthetically pleasing and functional, enhancing the overall customer experience.

The shelter displayed in Figure 10 is located at a mobility hub in Singapore and serves as an example of a suitable, modern and functional shelter. The shelter includes covered seating, a book collection, local artwork, and a green roof (Aono, 2019). Additionally, the shelter features technological amenities such as QR codes for downloading e-books, phone charging stations, and digital interactive boards with news, weather, and real-time bus arrival information (Kirk, 2017).

Multimodal Infrastructure

As Squamish continues to support the growth of the public transit system, it is critical for the District to recognize opportunities for active transportation connections to transit to enhance customer mobility, public health and economic development. Mobility hubs should be well connected to surrounding neighbourhoods with high-quality pedestrian and cycling networks.

Long-term, secure bicycle parkades should be constructed to enable first and last mile trips to or from transit by bicycle (APTA, n.d.). This has been extremely successful in European cities including the small city of Delft, NL, where 13,700 secure bicycle parking spaces have been provided at train stations and transit hubs and utilization hovers around 98% (Bruntlett & Bruntlett, 2021). Meanwhile, Washington DC constructed a long-term bicycle parkade at a major rail and transit station in 2010 to support a growing number of trips being taken by bicycle (NACTO, 2014). Assuming that the mobility hubs will also serve both local and regional transit connections in the future, these bicycle parkades could make fully sustainable commutes within Squamish, to Metro Vancouver and other Sea-To-Sky communities a reality.

Figure 10: Passenger shelter at a mobility hub in Singapore (Aono, 2019).

2.2.2: Lessons from Cochrane, AB

The Station at Cochrane Crossing functions as a mobility hub where the local Cochrane On-Demand Local Transit (COLT) system intersects with the On-It regional transit service to Calgary, and SWIFT Mini Thni service to Stoney Nakoda Nations. Transit passes are available for purchase for all transit companies at The Station to enable connectivity between all three services. The Station is accessible by foot on the downtown pedestrian network and is also served by Roll, a local shared micromobility service. The Station has a sheltered waiting area, public washrooms and an innovation centre with coworking spaces for the local community. The space also functions as a tourist information centre, and is a planned stop on a future passenger rail service connecting Cochrane to Calgary International Airport, the Cities of Calgary and Canmore, and Banff National Park (Tang et al. 2023).

Figure 11: Long-term bicycle parkade in Delft, NL (Bicycle Dutch, 2018).
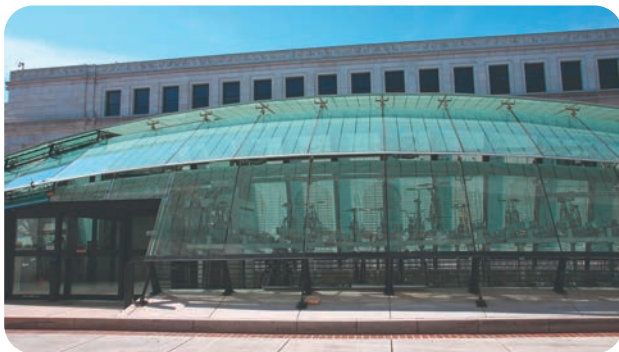
Figure 12: Long-term bicycle parkade at Union Station in Washington, DC (NACTO, 2014).

Figure 13: The Station at Cochrane Crossing (CANA, 2023).

Figure 14: Passenger waiting area at The Station at Cochrane Crossing (CANA, 2023).

Figure 15: Coworking space at The Station at Cochrane Crossing (CANA, 2023).
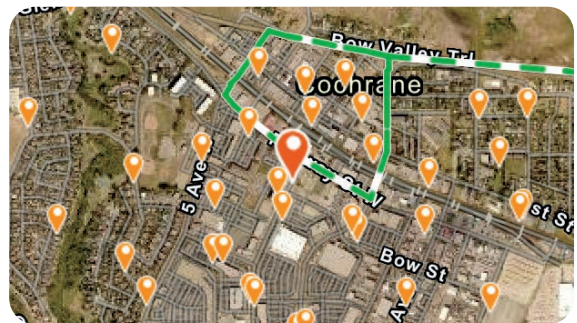
Figure 16: The Station at Cochrane Crossing is located in the middle of the town. Orange pins indicate COLT stops, while the green line represents the regional On-It connection to Calgary (Cochrane On-Demand Local Transit, 2023).

2.3: Connect Indigenous Communities to the Local Transit System

Limited Transportation Options Can Affect Indigenous Communities

Lack of connections and transportation in Indigenous communities can lead to lower health and well-being, as well as cause inequalities between children of indigenous and non-Indigenous backgrounds. Transportation isolation is linked to lower economic outcomes, as well as lack of social cohesion and participation in cultural activities (Raerino, Macmillan, Jones, 2013). Particularly, Indigenous seniors often have difficulty securing consistent and timely transportation, leading to isolation and lack of access to necessary goods (Nelson & Rosenberg, 2021). As well, inadequate transportation and connectivity for Indigenous communities has been connected to increases in cost of living and lower social mobility (Raibmon, 2005).

2.3.1: Application in Squamish

Extending transit service to selected Indigenous communities provides additional connectivity options for residents in communities currently isolated from Squamish. As part of the District of Squamish's ongoing reconciliation efforts with Indigenous communities, modifications to the bus network could increase accessibility to goods, services, as well as social connections for Squamish Nation members.

As part of the stakeholder engagement process, accessibility to goods and services for members of Squamish Nation was raised by their planning team. Particularly, difficulties reaching commercial destinations such as grocery stores were raised, as well as medical appointments and community events. The-

re was discussion of Squamish Nation operating its own shuttle buses, both within Squamish and to regional destinations. Finally, there was strong interest in connecting to other Squamish Nation communities and sites, notably in North Vancouver, which aligned with plans for a potential interregional transit service.

There are several Squamish Nation reserves in the District of Squamish with lower populations that are difficult to serve while maintaining appropriate ridership targets. However, connecting to the Stawamus reserve, at the south entrance of Squamish, and the Waiwakum reserve outside of Brackendale, could be achieved without much deviation of bus lines.

2.3.2: Lessons Learned from Powell River, BC

The City of Powell River operates various routes at different scales, from traditional urban routes to rural transit routes connecting distant sites on varying schedules. Service is provided to rural locations and reserves in two ways. Regional routes, such as the 12 and the 14, operate one to four trips per day in each direction, mostly on weekdays, depending on the season, and provide service to selected regions and key destinations.

As well, Powell River's urban routes have selected trips that provide limited service to locations that are not feasible to serve with every bus trip. For example, Route 1 has 4 trips per weekday that extend the route to Tla'amin Nation. There are also 3 trips per weekday that serve a small non-Indigenous community next to Cranberry Lake.

2.4: "Fill in the Gaps" with Active Transportation Infrastructure

2.4.1: Application in Squamish

The proposed realignment of the local transit network will require residents and patrons of businesses in Dentville, the Industrial Park and North Yards to make a transfer between routes 1 and 2 either at Downtown Squamish or Centennial Way at Government Road to reach Brennan Park Community Centre. This gap in the transit network could affect community members seeking to access the community centre via sustainable modes. It is important to make key community destinations, including Brennan Park Community Centre, accessible by alternative modes to achieve an overall reduction in community car dependency (Nieuwenhuijsen, 2020). The team recommends that the District of Squamish construct a series of cycling and walking connections between these communities and the recreation centre, while they also could connect future developments along Loggers Lane to the Industrial Park.

A series of existing trails could be paved, marked and signed as Multi-Use Paths (MUPs) in accordance with design standards in the BC Active Transportation Design Guide to provide a well-connected active transportation network in this part of Squamish. These existing trail connections include the Discovery Trail and an unmarked trail through Brennan Park from the community centre to Finch Drive. A new MUP along Finch Drive from the Discovery Trail to the Sea-To-Sky Connector Trail running parallel to Loggers Lane would provide an East-West connection between two existing active transportation routes and the new MUP to Brennan Park from Finch Drive. Meanwhile, a new bus stop at Centennial Way and Government Road would connect passengers on Route 1 to the community centre along an existing MUP parallel to Centennial Way, or via a transfer to Route 2 at the same stop.
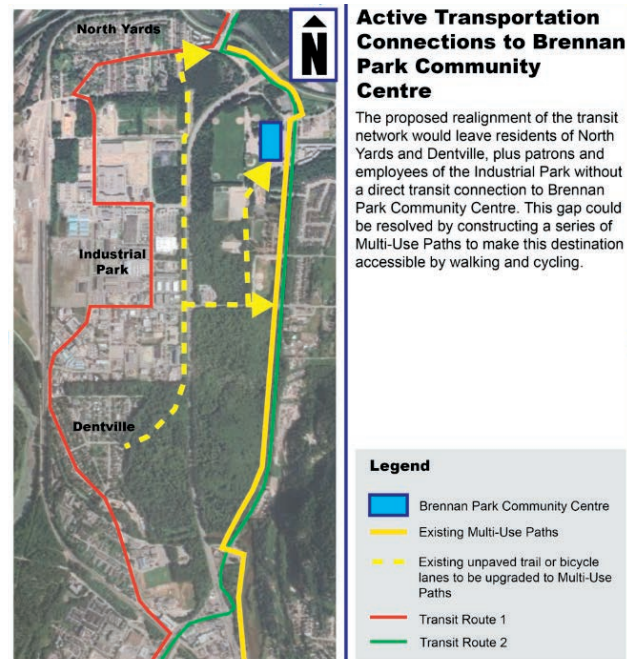
Figure 17: Proposed Active Transportation Connections to Brennan Park
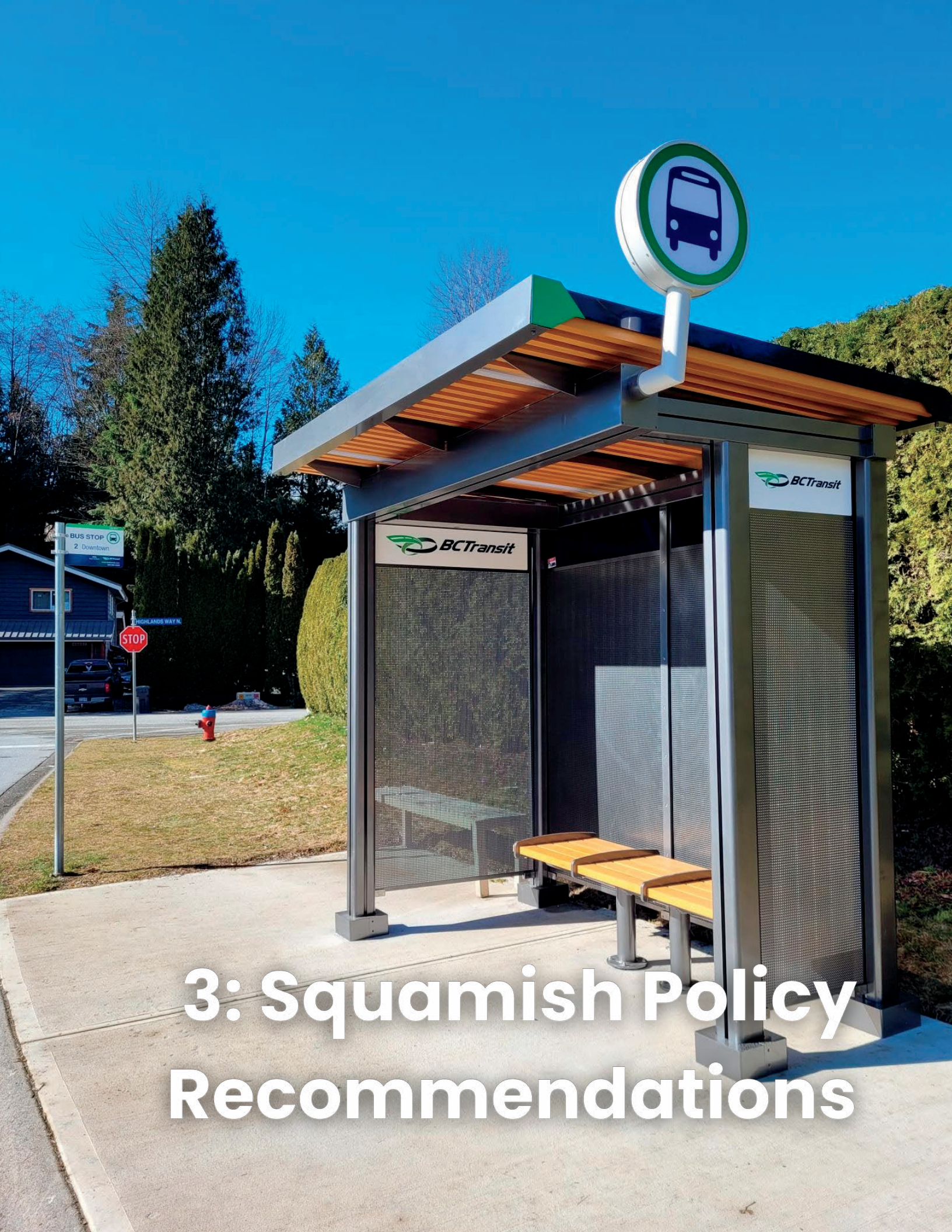
3: Squamish Policy Recommendations

Three Proposed Policy Directions for Local and Interregional Transit in Squamish

Three policy directions related to local and existing interregional transit services are proposed to work toward the District of Squamish's goal of moving beyond the car and making transit service an attractive, efficient alternative to personal vehicles. These directions are listed below and outlined in further detail on the following pages.

3.1: Integrate Fares with Interregional Service Providers

Integrating fares within a common system has been shown to be a strong tool towards growing transit ridership. Creating service agreements with existing interregional services such as Whistler Skylynx and Squamish Connector would reduce a key barrier to residents leaving their car behind to get to work. Fare integration between local transit and a future Sea-to-Sky interregional service is also a key consideration.

3.2: Explore Locally Funded Service Opportunities

Investigating unconventional transit structures in parts of Squamish with low bus ridership may offer opportunities for improved service, both within and outside of BC Transit's current service portfolio. On-demand transit has been proposed as a service option for low-density areas difficult to serve with conventional bus lines, and is currently being used in Powell River and Cranbrook.

3.3: Create a Local Travel Survey

Household travel surveys are used to collect valuable data about trip trends including popular origins and destinations, modal share and other information such as barriers to walking and cycling or support for projects and initiatives. Establishing a household travel survey can help align transit routes more closely with travel patterns.

3.1: Integrate Fares with Interregional Service Providers

Transit fare integration refers to a passenger's ability to transfer between different routes, modes or systems. While it is especially challenging to achieve fare integration in a large geographic area with multiple transportation operators, fare integration between shared transportation services is essential to getting drivers out of their vehicles and onto transit (Birch, 2017). In particular, fare integration has been demonstrated as a tool to grow ridership (Triana et al., 2022; Sharaby & Shiftan, 2012). Integrating fares between services reduces barriers to using public transit, enhances the customer experience, and can create consistency in an interregional network (Birch, 2017).

3.1.1: Application in Squamish

While challenging, it is recommended that the District of Squamish work with commercial shared transportation providers who service the community to integrate their fares with the local transit system until an interregional transit service can be established. 21.5% of all commute trips by Squamish residents are to a different Census Division than Squamish-Lillooet, highlighting the potential for fare integration between local and interregional transportation services to Metro Vancouver and other Sea To Sky communities to grow ridership on shared transportation services.

The local transit network, Squamish Connector and Whistler Skylynx collectively provide public transit service within, to or from the District of Squamish. The Squamish Connector and Whistler Skylynx together make nine to ten trips per day to Metro Vancouver depending on the time of year (Squamish Connector, 2023; Whistler Skylynx, 2023). Integrating fares between the local transit network and these services would reduce a key barrier to residents leaving their car behind to get to work.

The District could pursue one of two options to integrate fares between these three services:

1 **Allow Whistler Skylynx / Squamish Connector Passes to be Used on the Local Network at Given Times**

The District of Squamish would fully subsidize trips on the local transit network to reach the Connector or Skylynx stops between certain hours of the day. Passengers would show their ticket on the Connector or Skylynx to the bus driver.

2 **Create an Interregional Fare Agreement with Whistler Skylynx / Squamish Connector**

The District would be required to enter a legal agreement with Whistler Skylynx and Squamish Connector. Considerations would need to be made regarding governance and finance, including the division of roles and responsibilities, which operator subsidizes cross-boundary travel, and ridership and revenue impacts.

An additional potential challenge that the District of Squamish, BC Transit and interregional service providers will need to consider is technology. To address this challenge, the District could work with BC Transit, Whistler Skylynx and Squamish Connector to allow passengers to buy and store Skylynx and Connector fares on a smartphone application. This is better known as Mobility as a Service (MaaS), a type of service that uses a joint digital channel to let users plan and pay for a variety of mobility services (Karlsson et al. 2020). BC Transit is expected to launch Umo, a mobile fare wallet for transit passengers on all local transit systems outside of Metro Vancouver in the next two years (BC Transit, 2023). If Umo can be designed to incorporate local fare integration agreements with interregional services, ridership on local and interregional services

could grow and reduce greenhouse gas emissions from vehicles. Alternatively, the District may work with Whistler Skylynx and Squamish Connector to create a similar mobile platform.

3.1.2: Lessons from Cochrane, AB

Similar to Squamish, a large portion of local residents in Cochrane commute to Calgary for work (Statistics Canada, 2022). Cochrane is connected to Calgary by On-It, a private transportation service that is funded through a public-private partnership. The "Cochrane Commuter" offers an easy and affordable option to either Downtown Calgary or the University of Calgary/Brentwood LRT Station. Four round trips operate per weekday to and from Downtown Calgary, and seven roundtrips operate per weekday to and from the University of Calgary / Brentwood LRT Station (On-It Regional Transit, 2022).

For Cochrane residents who want to take the Cochrane Commuter to and from Calgary, On-It passes can be used to ride the Cochrane On-Demand Local Transit (COLT) system for free between 5:45 and 9:30 in the morning, and 3:00 and 8:00 in the evening (Cochrane On-Demand Local Transit, 2022). This allows passengers to only pay once for their trip each way between Cochrane and Calgary and remove the barrier of paying two different fares. Passengers purchase their On-It pass and show it to the driver of their COLT bus when they leave board the closest stop to their home and travel to The Station at Cochrane Crossing where they transfer to the On-It service. This fare integration is enabled through a public-private partnership, where the Town of Cochrane pays a flat rate for service hours to be provided on the route, and partially recovers the costs through fares (Tang et al., 2023).
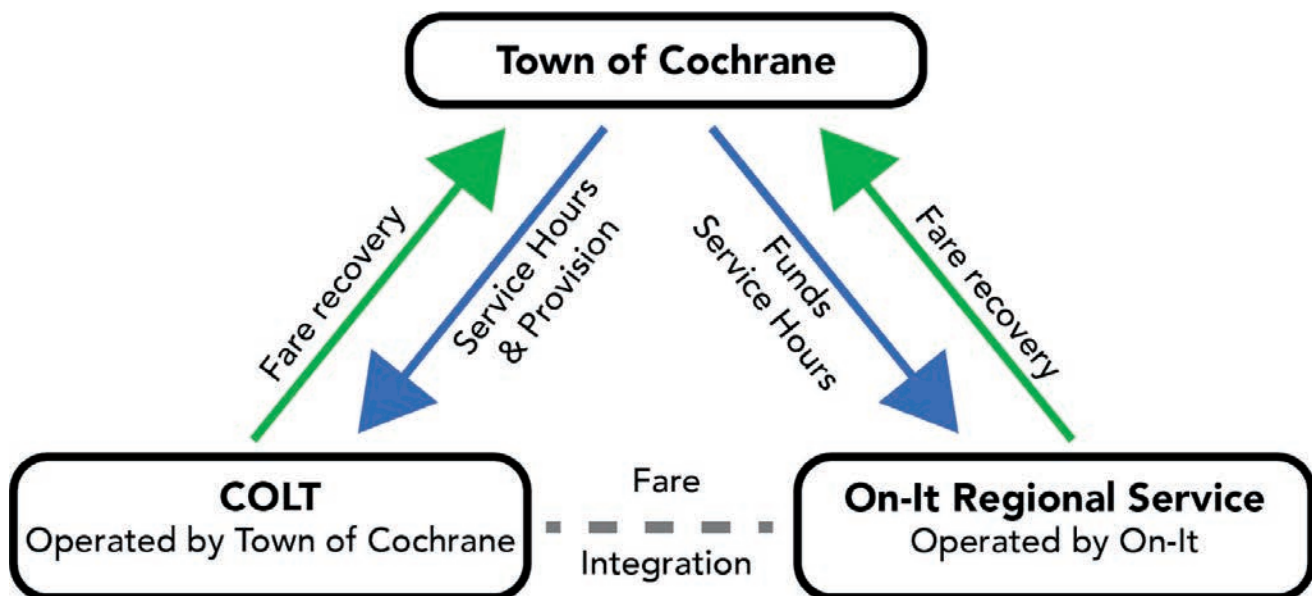
Figure 18: Fare integration is achieved between local and regional transit services in Cochrane, AB

3.2 Explore Locally Funded Service Opportunities

Investigating unconventional transit structures in parts of Squamish with low bus ridership may offer opportunities for improved service, both within and outside of BC Transit's current service portfolio.

3.2.1: Application in Squamish

Certain areas of Squamish have low transit ridership numbers and do not lend themselves well to linear, efficient bus lines. Valleycliffe has a winding road network and difficult slopes, forcing buses to take indirect routes to major destinations. Parts of Garibaldi Highlands are difficult to serve, with some households quite distant from the area's boulevards. With Quest University recently announcing it would be suspending classes in April, the future of this major transit destination is uncertain (Global News, 2023) . Unless major infrastructure or land use transformations were to occur, use of these lines will remain limited to captive riders who lack other options. In this context, it is reasonable to suggest that these lines will never reach ridership levels on par or near other Squamish bus lines.

3.1.2: Lessons from Powell River

Recognizing that certain portions of Powell River cannot feasibly be served by conventional fixed route bus service, the City opted to radically transform its network (Fergusson, 2023). A pilot project in 2021 introduced the Zunga Bus, an on-demand service operated with a small Ram ProMaster vehicle. In partnership with Spare Labs, a microtransit software company, users hail the Zunga Bus using a mobile app.

The service operates 7 days per week, from 11:00 am to 6:30pm, with a 30 minute driver break in the early afternoon. The Zunga Bus has so far been funded separately from BC Transit using the Built in Canada Innovation Program, as well as funds from the Climate Action Reserve Fund (Toop, Scaletta & Cooper, 2022).

Figure 19: Zunga Bus in Powell River (Zunga Bus)

The Zunga Bus was well-received by the community, with the pilot project extended thereafter. A consultant analysis delivered in 2022 recommended enhancing the service with a second bus, as well as possibly replacing the underperforming Powell River Route 3 with Zunga Bus (Toop, Scaletta & Cooper, 2022).

A parallel point of Powell River's approach has been transforming the popular Route 1 into a Frequent Transit Network "trunk" line. This route will form the spine of Powell River's transit system, delivering high frequency service in areas where conventional transit is feasible. The Zunga Bus will be free to focus on serving more difficult parts of the city (Toop, Scaletta & Cooper, 2022).

3.3 Create a Local Travel Survey

Household travel surveys are used to collect valuable data about trip trends including popular origins and destinations, modal share and other information such as barriers to walking and cycling or support for projects and initiatives (North Vancouver, 2020).

3.3.1: Application in Squamish

The team has created a series of proposed network recommendations based on takeaways from transit services in other small communities in North America and best practices in transit network design learned from a literature review. However, these new route alignments may not truly reflect origins and destinations for trips within Squamish. In turn, the team recommends that the District establish a household travel survey so that transit routes can align more closely with travel patterns. Further, it is important that a household travel survey be routinely updated to monitor changes to transportation trends and patterns in the community. This recommendation is in line with the 2031 Multimodal Transportation Plan and Community Climate Action Plan to routinely collect mode share data and monitor travel trends in the community.

4: Alternative Funding Tools

Current Transit Funding

Local transit service in Squamish is cordially funded by the District of Squamish and BC Transit through a legislated cost-share formula under the *British Columbia Transit Act.* The District and BC Transit are responsible for 53% and 47% of the conventional operating costs respectively. In addition, the District and BC Transit are responsible for 33% and 67% of the operating costs for custom transit respectively. Each year, the District and BC Transit enter an Annual Operating Agreement that assigns the base cost of operating transit service in the community. The total operating cost for both of these transit services to be covered by the District of Squamish is $1,520,076 in fiscal year 2023 (Gunn, 2022).

Why explore alternative funding tools?

The District of Squamish's share of operating costs is currently borne out of property tax and fare revenues. The *Squamish Transit Future Action Plan* calls for a doubling of service hours to increase service frequencies on certain routes and expand the geographic coverage of the transit network (BC Transit, 2022). As shown in ***Table 1***, this service increase will require the District of Squamish to double the annual financial contribution allocated to transit operating funding (Gunn, 2022). In addition, a new transit maintenance facility could be constructed as early as 2027 to meet these increased frequency targets, expected to cost the District an additional $500,000 each year. Continuing to rely on fare revenues and property tax alone will place a heavy burden on local taxpayers to cover increased operating costs associated with planned service increases and expansions in the community. Exploring additional funding sources and creating a diversified revenue portfolio can help meet the financial demand associated with increased provision of public transit service operations.

Eleven funding tools that could be used to cover the local share of transit operating costs were studied in Phase I with a high level analysis of how they may impact the local community. After reviewing these eleven different tools, Dedicated Transit Funding in Property Tax, Municipal Parking Fees, Off-Street Parking Levies, Motor Fuel Taxes and Vehicle Levies were analyzed further in Phase II.

Table 1: Transit Operating Costs in Squamish

Current Operating Costs	**$1,520,076.00**
Double Service Hours *(Transit Future Action Plan)*	x2
Annual Operation Cost (2027)	$3,040,152.00
New Transit Facility Annual Cost (2027)	+$500,000.00
Total Annual Costs (2027)	**$3,540,152.00**

Each tool was analyzed against the following criteria under the unique context of the District of Squamish:

Ability to Increase Mode Share

Ease of Implementation

Impacts on Equity

Alignment with District Policies & Objectives

Revenue Potential

And assessed accordingly:

Negative impact and/or low potential

Balanced impact and/or moderate potential

Positive impact and/or high potential

Findings from Alternative Funding Tools

Of the initial eleven funding tools explored in Phase I, further analysis was conducted for Dedicated Transit Funding in Property Taxes, Municipal Parking Fees, Off-Street Parking Levies, Motor Fuel Taxes, and Vehicle Levies.

Mode Share

Of the five additional tools examined, Municipal Parking Fees, Off-Street Parking Levies and Motor Fuel Taxes have the highest capacity to induce mode shift from private vehicles to public transit and other sustainable modes.

Implementation

Dedicated Transit Funding in Property Taxes and Municipal Parking Fees have existing legislation that enable the District of Squamish to start increasing their revenue for public transit operations. It is recommended that the District collaborate with other municipalities in the Sea To Sky region and advocate for enabling legislation for Off-Street Parking Levies, Motor Fuel Taxes and Vehicle Levies to be collected and put toward transit funding.

Equity

Off-Street Parking Levies have the least impact on equity-deserving groups.

Alignment with District Policies and Objectives

In general, all five of the revenue tools explored align well with the District's Policies and Objectives.

Revenue Potential

Estimates for revenue from each tool were derived based on a number of assumptions and factors and used existing data where possible. Based on the limited revenue calculations conducted, a total of **$5,029,620.00** could be generated within the parameters of this analysis to fund public transit operations in the District of Squamish.

Table 2: *Combined revenue from estimates generated for each of the five funding tools within study parameters*

Funding Tool	Estimated Revenue (per Year)
Dedicated Transit Funding in Property Tax	$1,750,000
Municipal Parking Fees	$1,588,710
Off-Street Parking Levies	$235,000
Motor Fuel Tax	$1,053,910
Vehicle Levies	$402,000
Total	**$5,029,620**

Implementation and Legislation

The revenue options available to smaller municipalities to fund transit service are relatively limited in comparison to larger Canadian cities and metropolitan regions. Therefore, tools that would require Provincial legislative amendments or permissions were judged to partially meet this objective rather than be completely excluded.

The District of Squamish must position themselves alongside other municipalities to advocate for enabling legislation or permissions to pursue new revenue sources to improve local transit services. It is also in the interest of the Province to allow municipalities to pursue alternative funding tools that could enable equitable and affordable transportation in communities across British Columbia to increase the financial resiliency of local transit system. Further, enabling municipalities to use alternative sources of revenue to fund transportation operations is of great importance to providing affordable, sustainable transportation options to address the climate crisis. Such legislation will allow local governments to provide efficient, reliable and convenient public transit options and induce mode share away from personal vehicles. Providing sustainable alternatives to the automobile, reducing car dependency and financial tools to make driving an unattractive mode of travel are key actions to achieve lower transportation emissions.

4.1: Dedicated Transit Funding in Property Tax

Dedicated funding for transit in property taxes is a common tool used throughout Canada for funding public transit. In British Columbia, local governments are empowered to collect annual property taxes on all owned or leased properties and use these taxes to fund local services. The District of Squamish already generates funds for transit using property taxes – currently this is $0.11 per $1,000 assessed value going to transit. The District could potentially increase the portion of property taxes going towards transit with minimal barriers to implementation and good alignment with District policies and objectives. Additional analysis is provided to determine how dedicated transit funding in property tax in particular could contribute to the establishment of an interregional transit service managed by the SLRD.

Mode Share

Dedicated funding in property taxes is a stable source of funding for the transit system. This can generate modal switch as the transit system is able to deliver predictable and sustainable transit service in the long-term. The travel impacts of property taxes are negligible as they are generally publicly accepted as a common method of funding transit (Litman, 2022). However, large property tax differences between jurisdictions could, in the long-term, affect regional development patterns (Litman, 2014).

Implementation

At a local-municipal scale, dedicated funding in property tax towards public transit is easily implemented. Legally, the process to implement increases or changes to the levy and collection of property taxes is within the control of the District of Squamish Council and subject to the British Columbia Transit Act and the Assessment Act (British Columbia Transit Act, 1995). Local political acceptance of greater portions of property tax being dedicated towa-

rds transit represents a potential barrier. At the current rate of $0.11 per $1,000 assessed value (District of Squamish, 2022); the average detached house in Squamish (valued at around $1.39 million) generates about $158 for transit each year.

Implementation of dedicated funding for transit in property tax is more complicated at a regional level. Under the *Local Government Act*, regional districts, like the Squamish-Lillooet Regional District (SLRD), are unable to directly collect property taxes. Instead, regional districts must requisition their member municipalities and the Provincial Surveyor of Taxes (for unincorporated areas) to tax on the Regional District's behalf in order to meet its funding needs (Local Government Act, 2015). This means that the SLRD would not be able to implement a regional transit tax – as is used by larger transit authorities like TransLink (SCBTA, 2022). However, regional districts can still adjust their requisitions on a year-to-year basis to avoid any funding shortfalls. It is critical that a regional transit bylaw be implemented in this case, with the bylaw making clear what requisitions will occur.

Equity

The use of property taxes to fund transit is generally viewed as equitable. Property taxes are one of the few tools that may be able to capture the increased home values provided by improved transit service to residential areas (Litman, 2014).

The primary equity concern with property tax increases is that these may increase the cost of living for low-income households. This is especially notable as some households may be land-rich, having inherited property or having retired, while having low-incomes. Generally, this equity concern is balanced by property tax discounts or exemptions. Home Owner Grants, from the provincial government, assist some residents in paying their property taxes. More signific-

ant grants are available for seniors, veterans, persons with disabilities, and the spouses or relatives of recently deceased owners. Additionally, the Disability Benefits Program Act allows some households to defer property taxes (District of Squamish, 2022).

If considering dedicated transit funding in property taxes at the regional scale, it should also be noted that SLRD contains areas which would not benefit from interregional / regional transit services.

Alignment with District Policies and Objectives

The *Squamish 2040: Official Community Plan* highlights the need to finance transportation upgrades and amenities as the District continues to grow. Property tax offers a stable way to do so, and increases could be minimal given the growing number of residences and increasing assessment values of residences in the District. Increases in property tax are aligned with the policy 20.15a:

- *Policy 20.15a: Sustainably fund alternative transportation infrastructure and amenities as Squamish grows.*

Dedicated funding in annual property taxes offer a consistent and sustainable source of operational funding for transit in the District of Squamish with predictable and steady future revenues.

In addition, increases in property tax are aligned with Big Move #6 of the *Community Climate Action Plan:*

- *Big Move #6: Squamish readies the organization, continues to learn, and lays the foundation for deep reductions.*

Big Move #6 identifies funding sources that could be used by the District of Squamish to fund work towards deep emission reductions - one such funding source is property tax. Dedicated funding from property tax to support public transit would contribute to reductions of transportation emissions and should form part of District strategies to increase transit ridership.

Currently, annual property taxes are used by the District of Squamish to fund a variety of activities including transit. Increasing revenue generation from property taxes offers a means to achieve OCP objecti-

ves without introducing new funding mechanisms.

Revenue Potential

Dedicated transit funding in property taxes could be a key contributor to improving transit in Squamish and establishing an interregional transit service in the Sea to Sky corridor. In BC, dedicated funding in property taxes is most notably used by TransLink in Metro Vancouver, but also to fund a range of BC Transit operated bus services. Similar to any interregional service in the Sea to Sky Corridor – property tax is currently used to fund BC Transit's Fraser Valley Express (Route 66) bus service. The property tax funding for this service currently equates to about $0.15 per $1,000 assessed property value (City of Abbotsford, 2019). While this is greater than the amount per $1,000 assessed value that Squamish currently dedicates to transit, the following projections suggest that the increase to property taxes in Squamish would not be as significant.

Figures 20, 21: BC Assessment Trends - Squamish

As of the 2021 Census, Statistics Canada recorded 9,906 private dwellings in the District of Squamish, this is a significant increase on the 7,574 recorded in the 2016 Census (Statistics Canada, 2017; Statistics Canada, 2022). Along with this growth in absolute numbers of properties, BC Assessment data shows generally increasing property values as displayed in Figures 20 and 21 (British Columbia Assessment Authority, 2022).

A scenario approach to consider potential increases for an interregional transit service. For the year 2019/20, BC Transit estimated the cost of operating a Vancouver - Squamish - Whistler Interregional Service to be $3,310,000. This proposal included eight transit vehicles and 15,100 annual service hours. The local contribution to this service would be $1,750,000.

The following scenario shows necessary portions of property taxes dedicated to transit to reach an annual funding increase of **$1,750,000**. These increases would be similar to property tax contributions borne by residents of Metro Vancouver. Notably, Metro Vancouver does not rely exclusively on property tax to fund transit and instead draws upon a diverse range of funding tools. As of 2022, SCBCTA was authorized to levy property tax of $0.2239 / $1,000 on residential properties. It was also authorized to tax at a rate of $1.3242 / $1,000 on major industry; $0.7159 / $1,000 on light industry; and $0.7131 / $1,000 on commercial businesses. These amounts are notably higher than Squamish's current funding for the SLRD which are shown in Figure 22.

DISTRICT OF SQUAMISH
BYLAW NO. 2913

SCHEDULE A

Property Class Tax Rates per $1,000 of Taxable Assessed Value:

Classification	Column A General Municipal	Column B Squamish-Lillooet Regional District	Column C Regional Hospital
01 Residential	2.2928	.1863	.0332
02 Utilities	40.0000	.6521	.1162
04 Major Industry (Port)	27.5000	.6334	.1129
04 Major Industry (Port Improvement	22.5000	.6334	.1129
04 Major Industry	30.1641	.6334	.1129
05 Light Industry	8.7585	.6334	.1129
06 Business & Other	5.8925	.4564	.0813
07 Forests-Managed	5.8925	.5589	.0996
08 Recreation & Non Profit	2.2928	.1863	.0332
09 Farm	2.2928	.1863	.0332

Figure 22: District of Squamish - Property Class Tax Rates, 2022.

Funding an SLRD managed interregional transit system entirely through property tax would require slight increases to the tax rates currently dedicated towards SLRD funding. These increases are shown in *Table 3* and were assembled using data from the 2022 BC Assessment Trends and from the 2021 Census of Canada. These figures consider exclusively Squamish and Whistler as SLRD data would not be appropriate given that the scope of a regional transit system does not cover the entire regional district.

Table 3: *Scenario Model of Transit Funding from Property Tax*

	Current Property Tax Rate (SLRD) (Tax / $1000)	Metro Vancouver Property Tax Rate (TransLink) (Tax / $1000)	Future Property Tax Rate (SLRD) (Tax / $1000)	Percent Change (SLRD)	Actual Increase (Tax / $1000)
Residential	$0.1863	$0.2239	$0.2489	+33.6%	$0.06263
Major Industry	$0.6334	$1.3242	$1.3242	+109.1%	$0.6908
Light Industry	$0.6334	$0.7159	$0.7159	+13.0%	$0.0825
Commercial Business	$0.4564	$0.7131	$0.7131	+56.2%	$0.2567

4.2: Municipal Parking Fees

Municipal parking fees, better known as paid parking, are charges levied on on-street or municipally-owned off-street parking spaces, with options of introducing different types of parking over time. Paid parking has been considered by the District of Squamish for several years and the potential outcomes are closely aligned to many local policies and objectives. Combined with improvements in alternative modes of transportation, parking pricing can be an effective tool to reduce car dependency.

Mode Share

The connections between parking pricing and modal share has been well documented. Paid parking is effectively a form of transportation demand management as drivers are directly charged for using on-street spaces. Charging for parking creates an incentive not to drive and encourages more trips to be taken by sustainable modes, including transit that can result in additional fare revenue (Willson & Shoup, 1990; Ison & Mulley, 2014). In addition, parking pricing can encourage people to reduce their vehicle ownership (Litman, 2022).

While paid parking presents an opportunity to move toward a greater sustainable mode share, its impact may not be fully realized until other forms of mobility are seen as viable alternatives to driving. Modal shifts to walking and cycling may occur at a higher rate than transit as improvements funded by additional revenue from municipal parking fees could take up to three years through BC Transit's Transit Improvement Process.

Implementation

Municipalities across the province are allowed through existing legislation to implement paid parking. Parking is a politically contentious issue in communities across the Province, yet many municipalties of all sizes in British Columbia already charge parking fees on municipally-owned parking spaces. Paid parking is best implemented as part of a comprehensive parking management program that al-

so includes other tools, user information and enforcement practices. Initial implementation costs may be high to install and begin operating pricing systems, plus additional transaction costs to motorists. However, maintenance costs over the long term could be expected to be minimal (Litman, 2022).

Recognizing that paid parking is best implemented as part of a broader strategy and as highlighted by both a previous study and the Parking Strategy, special projects funding would be required for consultants to craft a paid parking program (Chau et al. 2022, District of Squamish, 2016). The program would need to consider the areas of the town where the paid parking is implemented and in what forms. Squamish staff are expected to bring forward a report to Council in the near future to seek endorsement of a strategy for introducing paid parking, making this tool an attractive opportunity for funding local transit service.

Equity

On-street parking in Squamish is currently provided for free to motorists and creates an incentive to drive. Similar to a fuel tax, this can be considered fair as valuable parking spaces are currently provided with no charge to motorists and automobile travel comes with uncompensated external costs including air pollution and reduced road safety (Traynor, 1994). If revenue is used directly to improve public transit service, it can be argued that this tool is also a fair imposition on motorists to the degree that they benefit from reduced congestion as more people move by public transit (Litman, 2022).

The effect of this tool on lower income community members in Squamish is uncertain. Typically, lower income households tend to own fewer vehicles and drive less (Litman, 2022). The overall impact would vary on specific conditions such as the rate of vehicle ownership in low income households, the availability and quality of transportation alternatives including public transit and the actual fee charged for parking. Nonetheless, this tool is fundamentally regressive because the relative burden of parking costs increases as household income decreases. Regardless of income,

this tool would place a higher burden on those who make more trips by car, though this inequity could be justified due to the modal shift objectives it can achieve (Cooper, 2022).

Alignment with District Policies and Objectives

Implementing paid parking is in line with many of the District's strategic policies, plans and objectives including the Squamish 2040: Official Community Plan, Community Climate Action Plan and Parking Strategy 2016-2020. A potential concern that needs to be considered is the effect of paid parking in commercial areas of the District on businesses working toward recovery from the COVID-19 pandemic. However, there is no significant data to support a commonly held belief that more vehicles in commercial areas leads to more business (Cooper, 2022).

Squamish 2040: Official Community Plan
- *Policy 20.12c - Explore options for paid parking and actively manage on-street parking through parking enforcement and education programs:*

Implementing a paid parking program would require District staff to actively manage on-street parking in the community to respond to changes in demand through appropriate pricing (Shoup, 2017). Monitoring and evaluation of parking prices relative to demand can also ensure a stable revenue source as curbside space is optimized to its full potential.

Community Climate Action Plan
- *Big Move #2: Move Beyond The Car; Dis-incentivize private vehicle use (a critical component of incentivizing mode shift); Action: Develop and implement a strategy to price parking along parts of the core transit network:*

Developing and implementing a strategy to price parking along the core transit network can contribute modal shifts to public transit, walking and cycling.

2016-2020 Parking Strategy
- *Objective: Effectively utilize the current supply of Downtown parking stalls:*

Paid parking would allow the District to set competitive curbside prices to ensure appropriate turnover and optimize parking occupancy at different times of the day, week and year in Downtown Squamish.

Revenue Potential

Although the cost to initiate a paid parking program may be significant to the District of Squamish, parking fees represent a relatively stable source of revenue that could be used to fund transit service (Litman, 2022). The amount of revenue that could be generated is also dependent on what paid parking programs and regulations are implemented across the town, including paid parking at the meter or permit parking and the cost of purchasing permits. For the purposes of this revenue analysis, paid parking at the meter in the downtown commercial area is considered.

Downtown Commercial Area:
The Downtown Parking Study was conducted in 2017 to determine parking occupancy rates, turnover and average parking duration. In the process, the District created an inventory of on-street parking spaces (District of Squamish, 2017b). The following revenue analysis considers a number of different options for pricing on-street parking spaces in the Downtown Area.

Parking revenue for on-street spaces in the Downtown Commercial Area were evaluated based on spaces counted and average parking occupancy observed as part of the study. The price options for this analysis were set at $0.50 increments and ranged between $0.50 per hour and $3.00 per hour. Based on average occupancy observed in the Downtown Parking Study and assuming that parking was priced at the meter for 9 hours per day, 7 days per week between 9:00am and 6:00pm, the District could collect between $264,785 and $1,588,710 annually for transit service funding. The calculation for these estimates can be found in *Table 4* on the following page.

Additional Revenue Considerations
Revenue estimates provided may decrease over time due to a strong correlation between paid parking and its capacity to incentivize modal shift away from private vehicles. As more transit improvements become realized through additional funding by paid parking, overall demand for parking may decrease through less trips being taken by car. Therefore, these revenue estimates should be considered with caution.

Table 4: Revenue Potential from Paid Parking Generated from On-Street Spaces in Downtown Squamish
*Interpret revenue estimates with caution. See previous page for explanation.

Parking Space Inventory	Rate per Hour	Operating Hours	Total Revenue per Day at Peak Occupancy	Total Revenue per Year	Average Occupancy Factor	Approximate Total Revenue per Year
279	$0.50	9AM-6PM	$1,255.50	$458,257	0.578	$264,785
279	$1.00	9AM-6PM	$2,511.00	$916,515	0.578	$529,570
279	$1.50	9AM-6PM	$3,766.50	$1,374,723	0.578	$794,355
279	$2.00	9AM-6PM	$5,022.00	$1,833,030	0.578	$1,059,140
279	$2.50	9AM-6PM	$6,277.00	$2,291,288	0.578	$1,323,925
279	$3.00	9AM-6PM	$7,533.00	$2,749,545	0.578	$1,588,710

4.3: Off-Street Parking Levies

An off-street parking levy is a form of property tax on non-residential parking spaces in a jurisdiction (Litman, 2022). This levy has been implemented in a number of jurisdictions around the world to fund transit operations including Nottingham, UK and Sydney, Australia and is actively being contemplated by the City of Toronto (Litman, 2022; City of Toronto, 2023).

Mode Share

The impact of off-street parking levies on mode share will vary to the extent that they are applied and the District's overall flexibility on off-street parking requirements (discussed under "Implementation"). With enabling local regulations, the levy could prompt commercial property owners to either price or reduce the number of parking spaces on their lot, making alternative transportation modes more attractive for accessing local businesses (Litman, 2022). However, reduced provision of off-street parking spaces alone will not suffice to reduce driving demand and requires co-location of transit services and other sustainable transportation options (Chau et al. 2022). Improved transit service provided from additional funding generated by the off-street parking levy could meet this requirement to entice mode shift.

The most notable impact of off-street parking levies on transportation mode shift was reported from Nottingham, UK. Since 2012, the City has imposed a £379 annual levy on 25,000 parking spaces. The levy generated over £25 million that was dedicated to improving the city's transportation infrastructure and has propelled the public transit mode share to over 40%, and reduced carbon emissions from transportation by 33% (Litman, 2022).

Implementation

Under the Community Charter, off-street parking levies are not currently a legislated means for municipalities to generate revenue. The team urges the District of Squamish to advocate for this tool alongsi-

de other municipalities given its high revenue potential and limited impact on broader equity in the community. If enabling legislation was granted, there could be high initial implementation costs including the creation of an additional field in property tax records. This activity would require significant time resources the District would need to create an inventory of all off-street spaces on individual non-residential property tax parcels. Other implementation considerations include possible exemptions on certain property types and if it would be applicable to either or both paid and unpaid parking (City of Toronto, 2023). However, ongoing costs after implementation would be low (Litman, 2022).

There is also a strong case for smaller BC communities to advocate for enabling legislation together to allow them to collect off-street parking levies. Though not the exact same form of revenue, the *South Coast British Columbia Transportation Authority Act* allows TransLink to collect parking taxes on the sale of off-street parking rights in Metro Vancouver (TransLink, 2023). This form of parking tax would not be effective in smaller communities because commercial property owners do not often experience high enough parking demand to incentivize off-street parking fees. With particular respect to Squamish, the 2031 Multi-Modal Transportation Plan highlights that the majority of off-street parking is free. An off-street parking levy in smaller communities could offer a "middle of the road" solution for BC municipalities to similarly fund their transit operations.

Equity

While there are no perceivable equity concerns to the community at large, the introduction of an off-street parking levy may have marginal impacts on some property owners. Costs would be borne by commercial property owners that could have small spiraling effects including slightly higher retail prices and parking pricing, the latter of which may be counterbalanced by improved transit services that reduce the need for a private vehicle (Litman, 2022).

The District could also establish a minimum area threshold in order to protect smaller businesses and property owners who may be impacted by parking levies (City of Toronto, 2023).

Alignment with District Policies and Objectives

Pursuing off-street parking levies is closely tied to strategies and objectives in the District's *Community Climate Action Plan* and *Squamish 2040: Official Community Plan.*

Community Climate Action Plan
- *Strategy of Big Move #2: Dis-incentivizing Private Vehicle Use*

An action within this strategy is to update parking requirements to maximize land use efficiency and increase residential and employment density through a reduction in parking minimums and establish maximums for specific uses along the transit network. An abundance of free off-street parking spaces in Squamish encourages private vehicle ownership and use (Chau et al. 2022). If an off-street parking levy was imposed, non-residential property owners may seek to lower the number of non-residential parking stalls in commercial and industrial areas to reduce the assessed annual fees. In addition, developers of new commercial properties may opt to limit the number of off-street parking spaces.

Squamish 2040: Official Community Plan
- *Policy 19.4b - Encourage compact land use patterns that support complete communities, infill development, a diversity of transportation options and a greater mix of land uses*

This levy would encourage compact development with limited off-street parking provision, enabling and promoting sustainable, alternative transportation options throughout the community including walking, cycling and public transit.

- *Policy 20.12c - Explore options for paid parking and actively manage on-street parking through parking enforcement and education programs*

In the absence of off-street paid parking on most non-residential properties in the District of Squamish, an off-street parking levy presents a suitable alternative where revenue potential is not being realized.

Revenue Potential

There is high revenue potential with this tool as the District could set the levy at any rate desired within the bounds of new legislation required by the Province. For example, under an assumption that there are 1-2 off-street parking spaces in Squamish per capita, and each space is charged a levy of $50 or $100 each year, it could generate $100 or $200 per capita each year respectively (Litman, 2022). To illustrate this potential in depth, five distinct commercial properties with a high inventory of off-street parking spaces in particular were examined. If the District were to introduce a $50 levy on all off-street, non-residential parking spaces, $117,500.00 could be generated from these five properties alone. At $100 per space, this figure would double to $235,000.00 to put toward public transit operations. These estimates are provided by each site in *Table 5.*

Figure 23: Garibaldi Village Shopping Centre is a large shopping centre with over 700 off-street parking spaces. An off-street parking levy could generate significant revenue from over-parked sites in Squamish. Photo taken from *Colliers (2022).*

Table 5: Revenue Generation Potential from Off-Street Parking levies on Five Non-Residential Properties in Squamish

Location	Zoning	Spaces	$50 Levy	$100 Levy
Garibaldi Village	CD-19	720	$36,000.00	$72,000.00
Walmart	C-9	500	$25,000.00	$50,000.00
Chieftain Centre	C-4	375	$18,750.00	$37,500.00
Squamish Station	C-4	303	$15,150.00	$30,300.00
The Home Depot	I-11	452	$22,600.00	$45,200.00
Total Annual Revenue			**$117,500.00**	**$235,000.00**

Figure 24: The Walmart parking lot has 500 parking spaces. If a $50 off-street parking levy per space was assessed on off-street parking spaces in the District of Squamish, this lot alone would generate $25,000.00 for public transit funding. Photo taken from *The Squamish Chief*.

4.4: Motor Fuel Tax

Motor fuel taxes are assessed on fuels sold for use in internal combustion engines, which are used in most automobiles (British Columbia Ministry of Finance & Ministry of Energy, Mines and Petroleum Resources, 2021). The rates depend on where the fuel is purchased and used in British Columbia (British Columbia Ministry of Finance & Ministry of Energy, Mines and Petroleum Resources, 2021).

🚌 Mode Share

Higher fuel prices can incentivize individuals to switch from driving their personal vehicles to using alternative modes of travel, including transit (Litman, 2012). In turn, public policymakers often utilize motor fuel taxes to encourage the use of transit (Office of the Auditor General of British Columbia, 2013). The additional funds generated can be invested in the transit system, ensuring that transit services meet curr-

ent and future demand (Office of the Auditor General of British Columbia, 2013). As shown in Figure 18, proactive investment in the transit system can lead to compounding benefits, including dedicated lanes and stops and improved service, ultimately encouraging more ridership (National Association of City Transportation Officials [NACTO], n.d.).

The effectiveness of increasing motor fuel taxes to encourage mode shifts may diminish after a certain point (Office of the Auditor General of British Columbia, 2013). This is because raising gas prices through taxation may decrease gas consumption, resulting in reduced funding for public transit over time, as demonstrated by the case with TransLink in Metro Vancouver (Office of the Auditor General of British Columbia, 2013). Therefore, more strategic thinking will be necessary to ensure a sustainable shift in the mode of transportation.
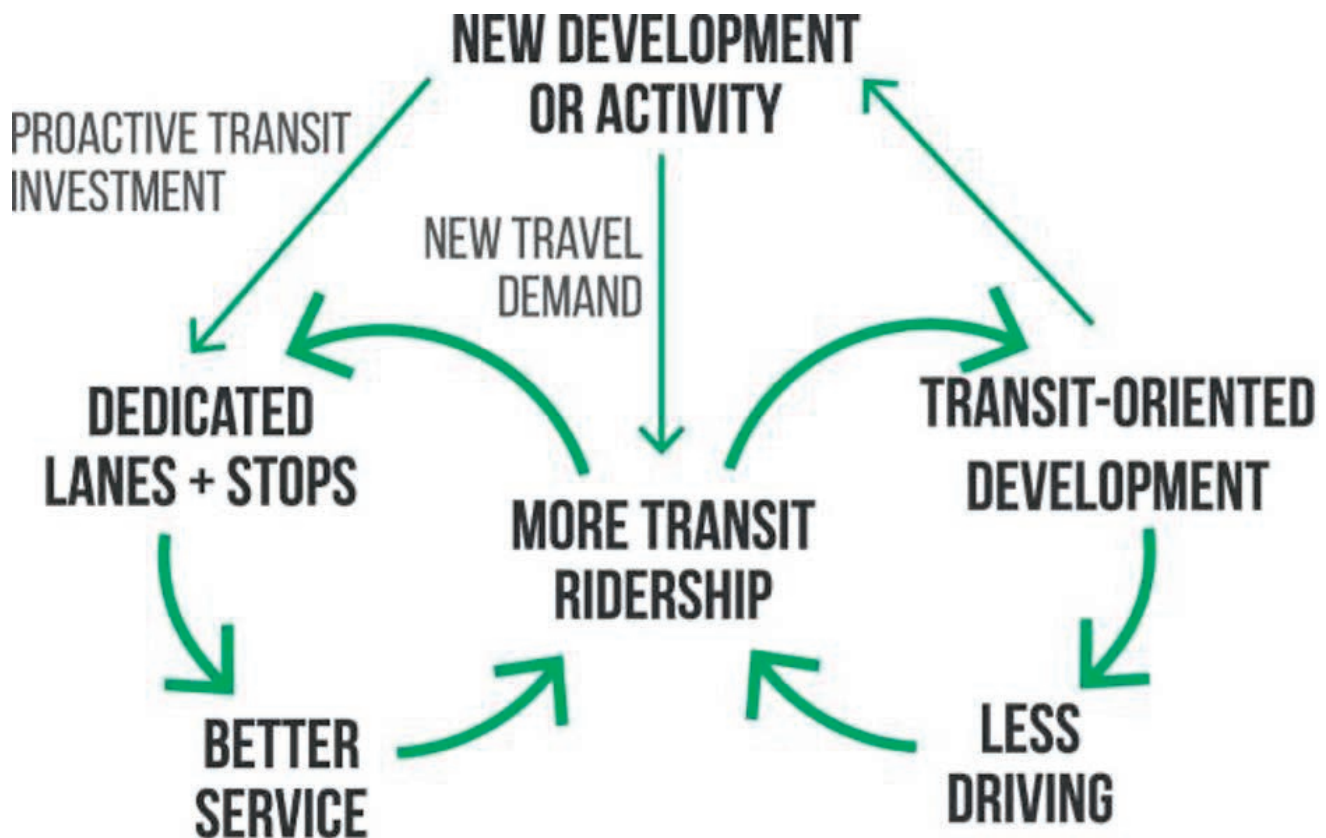

Figure 25: Compounding benefits of proactive transit investment (NACTO, n.d.)

Implementation

Currently, the motor fuel tax on clear gasoline and diesel fuel in British Columbia consists of provincial and dedicated taxes (British Columbia Ministry of Finance & Ministry of Energy, Mines and Petroleum Resources, 2021). According to the *Motor Fuel Tax Act,* dedicated motor fuel taxes only apply in certain regions of the province. Other than the Vancouver area and Victoria area, the rest of the province only has to pay a dedicated motor fuel tax of 6.75¢ per litre of clear gasoline and clear diesel to the British Columbia Transportation Financing Authority (BCTFA). Even though Squamish doesn't have to pay the 18.50¢ of dedicated motor fuel tax to TransLink, it has been found that retail prices for regular gasoline and diesel at gas stations in Squamish are similar to those in Metro Vancouver (British Columbia Utilities Commission Staff, 2021). As such, despite not currently assess a motor fuel tax, motorists are paying the equivalent or even more than in Metro Vancouver, presenting a strong case for the province to enable legislation for this tool's use in the Sea To Sky region.

According to the *Motor Fuel Tax Act*, the provincial government sets the fuel tax rates for gasoline and diesel for the entire province. As such, the District of Squamish does not have the authority to impose its own fuel tax rate without an amendment to the *Motor Fuel Tax Act.* Currently, motor fuel purchasers in Squamish only have to pay a dedicated motor fuel tax of 6.75¢ per litre of clear gasoline and clear diesel to the BCTFA as the rest of municipalities across the province other than Vancouver area and Victoria area.

Equity

Motor fuel taxes can have both positive and negative impacts on equity. Revenue generated from increased motor fuel taxes can be used to fund public transit, benefiting marginalized groups who rely on public transit with enhanced and more convenient transit services. However, increasing motor fuel taxes might increase transportation costs for low-income households and disadvantaged groups, especially for those who live in an area without access to transit ser-vices and who face difficulties using conventional transit services without assistance (Sterner, T., 2012).

In order to address these equity concerns, the provincial government has a fuel tax refund program for persons with disabilities to help reduce their transportation costs. Eligible individuals may receive a fuel tax refund up to $500 each calendar year for a qualifying vehicle registered in the program and a 25% discount off their ICBC basic Autoplan insurance (British Columbia Government, n.d.). Additionally, with the Sales to First Nations and the Fuel Tax Exemption Program, First Nations individuals and bands are exempt from motor fuel tax when they purchase fuel on First Nations land (British Columbia Ministry of Finance, 2018). British Columbia also established an exempt fuel retailer program to recognize this exemption (British Columbia Ministry of Finance, 2018).

Alignment with District Policies and Objectives

The introduction of a Motor Fuel Tax is well aligned to a number of strategic objectives in the *Community Climate Action Plan* and *Squamish 2040: The Official Community Plan.*

Community Climate Action Plan
- *Strategy of Big Move #2: Dis-incentivizing Private Vehicle Use*

Implementing an additional motor fuel tax can would increase the costs of driving and dis-incentivize the use of automobiles as a means of traveling in Squamish. Residents, visitors and businesses alike may consider more sustainable modes including walking, cycling and public transit. In turn, greenhouse gas emissions from transportation in Squamish would be reduced and residents may save money on transportation when traveling by other modes.

Squamish 2040: The Official Community Plan
- *Policy 20.13a - Reduce single occupancy vehicle (SOV) use and support the transition away from fossil fuels*

Reducing SOV use can alleviate traffic congestion and improve air quality. Fuel tax supports the transition away from fossil fuels by increasing the costs of gasoline and diesels.

- *Policy 20.16a - Establish alternative transportation funding sources to support walking, cycling, public transit, and other alternative transportation*

Fuel tax can provide a significant source of funding to support different modes of transportation. Diversifying funding sources ensure the sustainable development of transportation infrastructure and implementation of transportation planning initiatives.

Revenue Potential

In 2004, former Squamish Mayor Ian Sutherland suggested that a 3% per litre levy in the Sea to Sky region would raise approximately $750,000 per year. The number of registered vehicles and potential revenue from a motor fuel tax both have both increased while the population of Squamish has grown (ICBC, 2023). As such, further analysis was conducted to determine a general estimate of how much revenue could be generated with updated data.

Assuming that the average size of a gasoline tank for a personal vehicle is 60.5 L (US Energy Information Administration, n.d.), the local vehicle population of 13,400 personal vehicles (ICBC, 2023) and a $0.05 fuel tax was assessed per litre of gasoline, the District could collect $1,053,910.00 per year. This assumption also considers that each vehicle, on average, would require refueling at least every two weeks over a year. Actual revenue generated by a motor fuel tax would depend on the rate assessed and fluctuations in the volume of gasoline sales. The calculation for this estimate is displayed below in *Table 6*.

Figure 26: A gasoline station on Highway 99 south of Downtown Squamish. A Motor Fuel Tax could generate over $1M in revenue to contribute to transit service. Photo taken from *MapQuest*.

Table 6: Revenue Potential from a Motor Fuel Tax in Squamish

No. of Vehicles	Average Tank Size (L)	Total L from All Vehicles	Refuels per Year	Fuel Tax Rate (per L)	Total Revenue
13,400	60.5	810,700	26	$0.05	$1,053,910.00

4.5: Vehicle Levies

A vehicle levy is a tax or surcharge directly added to an existing provincial vehicle registration fee. The revenue from this additional fee can be entirely reserved for a specific use such as transit or collected for any use by the municipality. Vehicle levies can be collected and priced differently depending on the region and vehicle type.

Precedent examples of vehicle levies being assessed to fund transit service exist Montréal are charged an annual fee on their vehicle registration. The City of Toronto also had a vehicle levy in place for 3 years, from 2008 to 2011 (Kitchen & Slack, 2016). More than 30 US states collect vehicle levies for transportation improvements, though these funds are not earmarked for public transit (Litman, 2012).

Mode Share

Vehicle levies are a fixed fundraising tool collecting from vehicle owners, and have limited to no impact on mode share. In contrast to a fuel tax, vehicle levies are fixed no matter how much a vehicle is driven. As such, users who have already paid the levy are not directly incentivized to use public transit more often because they have already paid the levy (Litman, 2022). However, vehicle levies may have a small effect in dissuading people from purchasing a second vehicle for their household, though the size of this effect depends on the amount levied. Levies can also be targeted towards vehicles of different types and characteristics, such as axle count, age, or engine size (Kitchen & Slack, 2016).

Implementation

Vehicle levies are not currently possible to implement. Changes to provincial legislation would be required, notably the BC Motor Vehicle Act, which governs registration fees collected by the Insurance Corporation of British Columbia (ICBC). Municipalities with a dedicated interest in using vehicle levies to fund transit service would need to advocate for legislation from the provincial governme-

nt. However, the possibility of vehicle levies is not new and has been proposed multiple times in recent years by TransLink as an alternative source of funding for Metro Vancouver. TransLink aimed to implement a Transportation Improvement Fee (functionally a vehicle levy) and would have cost Metro Vancouver motorists between $15 to $122 a year, depending on a number of different proposals. Despite multiple attempts to impose vehicle levies, they did not come to fruition due to opposition by or within the Provincial Government and the regional Mayors Council (Bernard, 2016).

Should the provincial government eventually legislate vehicle levies, the simplest distribution structure would be a distribution of funds collected by ICBC to municipalities in which vehicles were registered. The exact fee collected in each region would likely be determined by the respective municipal council(s), possibly within bounds set by the province. Councils would be free to set their own fee based on financial need and existing transit service provided. However, implementation and collection of a vehicle levy is simple should it be legislated by the province with minimal additional administration and oversight required. Reserving funds collected for transit would improve public acceptability and transparency, at the risk of reduced flexibility (Kitchen & Slack, 2016). This enforced budgetary rigidity would particularly be problematic in smaller municipalities.

Equity

Generally, vehicle levies are considered to be equitable. Automobile use leads to significant external costs for governments in the form of infrastructure and maintenance, as well as societal environmental costs. A vehicle levy thus operates as a reimbursement of these costs from motorists towards transit users, who have lower external costs to local governments (Litman, 2012). That said, vehicle levies are far from a perfect form of equalizing these costs, as levies do not consider vehicle usage in the cost calculation. This is particularly problematic as lower-income motorists generally drive less total distance than higher-income

motorists. As such, lower-income motorists would be paying a proportionally higher rate to register their vehicle (Litman, 2012). However, higher-income households are also more likely to own and register more vehicles (Cooper, 2022).

Customizing the levy towards specific axle counts, engine sizes or gross vehicle weight may better target vehicles which have higher external costs, but it can also discriminate against specific groups. Particularly in rural areas, larger engines or heavier vehicles may be necessary. In these cases, a fee that scales with larger vehicles may just function as a heavier tax.

Alignment with District Policies and Objectives

Introducing a vehicle levy is aligned with a number of goals and policies in the *Community Climate Action Plan* and *Squamish 2040: Official Community Plan*.

Community Climate Action Plan
- *Strategy of Big Move #2: Dis-incentivizing Private Vehicle Use*

While this levy does not provide any direct incentive to a motorist to reduce the amount they drive, the sum of funds generated for, and subsequent improvement in, public transit service could make taking the bus more attractive. Advocating for, and eventually implementing vehicle levies within Squamish could also function as an incentive for households to own and register less personal vehicles.

- *Strategy of Big Move #2: Improve Public Transit in Squamish*

This funding tool would also provide an additional source of funds for public transit, as well as diversify existing sources from property taxes and fare revenues.

Squamish 2040: Official Community Plan
- *Policy 20.16a: Establish alternative transportation funding sources to support walking, cycling, public transit, and other alternative transportation*

In order to realize the goals outlined in Squamish's Transit Future Action Plan, new and diversified sources of income are necessary to implement necessary transit improvements.

- *Objective 20.19.a: Increase transit ridership and pr-*

ovide affordable transportation choice for all residents and neighbourhoods.

Disincentivizing vehicle ownership within Squamish aligns with multiple goals of the Squamish 2040 OCP to move towards a car-last future.

Revenue Potential

The potential revenue from vehicle levies is within the small to moderate range, as existing levies are around $20-60 (Litman, 2012). However, depending on the actual number of vehicles registered in a community, they could contribute a significant amount of revenue to put toward transit operation funding in addition to other sources. Currently, the Province of British Columbia has the lowest vehicle registration fee in Canada at $64.00 per year. Yet, the Province of Québec charges a base rate of $202.74 per vehicle with a minimum vehicle levy of $30 earmarked for transit across the province. This levy for transit operation funding is higher for residents of the Island of Montréal at an additional $45.00.

As vehicle levies are not currently part of provincial legislation, it is difficult to predict what kind of levy would eventually be implemented. However, if BC was to allow municipalities to levy $30.00 like in Québec for transit service, the District of Squamish could generate $402,000.00 per year for transit funding.

Table 7: Revenue from a $30.00 vehicle levy. Vehicle registration data obtained from ICBC Vehicle Population Data (2023).

Vehicles Registered in Squamish	Annual Levy	Annual Revenue from Levy
13,400	$30.00	$402,000.00

5: Interregional Transit Service

From Vancouver to Pemberton: Interregional Transit Service for the Sea to Sky Corridor

The Sea to Sky Corridor, running from Vancouver to Whistler, is currently unserved by public transportation. As Squamish, and other communities in the Sea to Sky corridor, seek to reduce automobile reliance, this lack of interregional transit service creates a significant barrier to reduced car dependency. An interregional service in the Sea to Sky corridor is achievable and would be aligned with planning goals and public desires. This section of the report therefore explores future interregional service options including potential ridership, governance and funding models, stop locations, and desirable amenities. Figure 27 is a conceptual diagram which denotes the stop locations of a new interregional service in Squamish with connection points to the local transit system as proposed in our network recommendations.

SEA TO SKY INTERREGIONAL

SQUAMISH STOPS

- Pemberton
- Whistler
- **Brackendale** (H)
  Connections to Route 4
- **Garibaldi Village Exchange**
  Connections to Routes 1, 2, 4
- **Squamish Industrial** (H)
- **Downtown Squamish Exchange**
  Connections to Routes 1, 2, 3, 5
- **Stawamus** (H)
  Connections to Route 5
- **Squamish South Parks** (H)
  Connections to Route 5
- West Vancouver
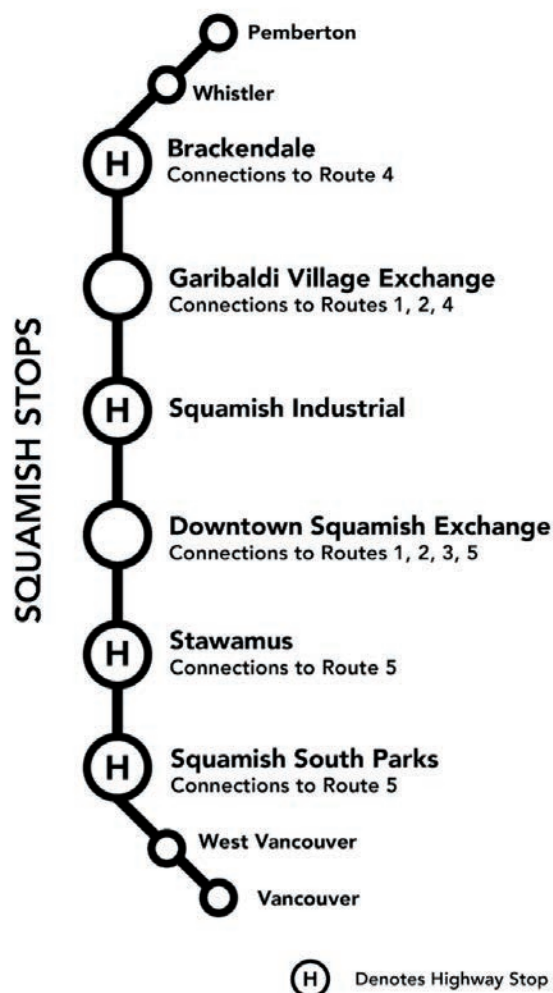- Vancouver

(H) Denotes Highway Stop

Figure 27: Conceptual Diagram of Interregional Transit Service with Stops in Squamish

5.1: Rationale for Interregional Transit

Historical Interregional Service

The Squamish Commuter (Route 98) was a pilot project operated by the Resort Municipality of Whistler (RMOW), District of Squamish, and BC Transit (BC Transit, 2015). The service started in January 2005 and ran for a period of five years (BC Transit, 2015). The costs of the service were shared between RMOW and District of Squamish until 2008 when provincial funding became available for year-round service (BC Transit, 2015). This public service was complemented by the private Greyhound Canada bus service. This Greyhound service was the primary interregional bus service link between Squamish and Whistler. It ran six trips per day in each direction with Route 98 specifically designed to fill the gaps during time slots not served by Greyhound (Squamish Chief, 2021).

In 2010, a fare increase was implemented to help cover increasing operational costs of Route 98 (BC Transit, 2015). This, combined with concerns about funding sources and the stability of the service, contributed to the cancellation of the service (BC Transit, 2015). Later in 2018, Greyhound Canada decided to suspend bus service in the Western part of Canada due to a decline in ridership, and the impacts of a changing transportation environment which includes deregulation, as well as competition from subsidized transportation options such as VIA Rail and publicly owned bus service (Greyhound Canada, 2021).

Existing Interregional Services

There are two private services currently operating interregional routes in the Sea to Sky corridor - the Squamish Connector and Whistler Skylynx. Both services have relatively similar fares at approximately $30.00 for a one-way ticket. The Whistler Skylynx offers two more trips each day and has more onboard amenities on their coach buses, whereas the Squamish Connector offers more stops in Squamish, the North-Shore and along HWY 99 (Squamish Connector, 2023; Whistler Skylynx, 2023).

This project examined these existing services operating in the Sea-To-Sky region to determine transit stop locations, bus schedules, and any desirable amenities that may make an interregional public transit route an attractive alternative to driving between Vancouver, Squamish, and Whistler. Notably, regional transit service already exists between Whistler and Pemberton and is provided by BC Transit (BC Transit, 2023).

Previous Planning Efforts

2015 Sea To Sky Transit Future Plan

BC Transit's 2015 *Transit Future Plan (TFP)* for the Sea To Sky region devoted a significant amount of space to discussion to the possible expansion of regional and interregional transit in the area. At that time, the regional network was limited to service between Pemberton and Whistler. A future regional connection between Whistler and Squamish was planned, as well as an interregional connection between Squamish and Metro Vancouver. The *TFP* recommended the exploration of two deliverables in the short term, between 2015 and 2020, including undertaking a Sea to Sky Corridor transit study and exploring the development of a Sea to Sky Corridor regional governance structure (District of Squamish, 2015) .

2017 Sea to Sky Corridor Regional Transit Study

Commissioned as part of the 2015 *Transit Future Plan* objectives, the Corridor Transit Report (BC Transit, 2017) aimed to explore the feasibility of the proposals made in these objectives. The Corridor Transit Report was published following a public engagement process as well as a market demand analysis. This report recommends a detailed interregional transit system proposal, including stops, vehicle count, schedule, possible fare options, and an implementation action plan.

Progress Towards Interregional Transit Since 2017

According to the proposed timeline included in the 2017 Sea to Sky Corridor Regional Transit Study, interregional service was originally intended to be implemented in September 2019. Based on an interview conducted with BC Transit (2023), the delay in implementing an interregional transit service in Squamish can be attributed to unmet funding commitments from the Ministry of Transportation and Infrastructure as well as debates over municipal governance and funding commitments. Even though no significant barriers have been identified from the planning perspective, the lack of funding resources have prevented this project from moving forward. However, it is possible that other factors including the COVID-19 pandemic and other political challenges have contributed to the delay of this project.

F**igure 28**: Squamish Connector running on Sea-to-Sky Highway

Renewing the Conversation on Interregional Transit Service in Squamish

There is now a growing demand to re-engage in discussions around the implementation of interregional transit service in Squamish. Initial engagement for this project which involved the District of Squamish Planning Staff, OurSquamish, Squamish Chamber of Commerce, and Squamish Nation suggested strong interest in interregional transit connections. This stakeholder demand is backed up by market demand projections which suggest that there has been an increase in potential riders since the 2017 Sea to Sky Corridor Regional Transit Study. This renewed interest in interregional transit service highlights the need to revisit the conversation, as well as to evaluate the feasibility of putting the service in place given current market conditions and transportation trends.

Market Demand for the Sea to Sky Corridor has increased since 2011

Market demand projections for the Sea to Sky Corridor were prepared in 2017 for BC Transit by SNC-Lavalin. These were conservative estimates using data drawn from the 2011 National Household Survey and from extrapolations of historical ridership numbers (BC Transit, 2017). Since 2011, the population, workforce, and number of commuters living in the Sea to Sky region has significantly increased (Statistics Canada, 2022), likely increasing market demand. Graphic projections in Figures 29 and 30 were extrapolated from the 2017 market demand projections, considering increases in workforce size and changes in census divisions of employment recorded in the 2021 Census of Canada.

Squamish-Metro Vancouver Market

Squamish-Metro Vancouver: Market Demand – 2017 and 2021 Adjusted by Increase of Population in Labour Force

Squamish-Metro Vancouver: Market Demand – 2017 and 2021 Adjusted by Changes in Census Division of Employment

Squamish-Whistler Market

Squamish-Whistler: Market Demand – 2017 and 2021 Adjusted by Increase of Population in Labour Force
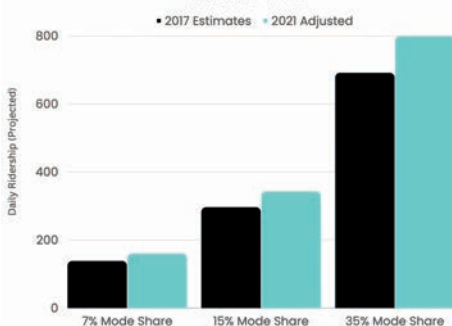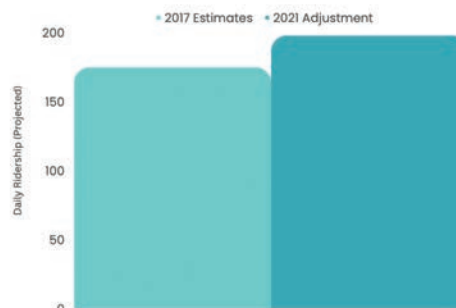
Squamish-Whistler: Market Demand – 2017 and 2021 Adjusted by Changes in Census Division of Employment

Figures 29 and 30: 2017 projections and 2021 data adjustments to Squamish-Metro Vancouver Market Demand. (7%, 15%, and 35% Mode Share). These figures do not account for seasonal tourism and other non-commuter ridership.

Between the 2011 National Household Survey and 2021 Census, Squamish saw a 15.6% increase in the population within the labour force. Along with this increase in the labour force, there has been a 66.2% increase in commuters commuting to census divisions outside of Squamish. These adjustments are factored into the following tables (Statistics Canada, 2022).

Table 8: *Squamish - Market Demand Adjustments at 7%, 15%, and 35% Mode Share*

Adjusted - Increase in Workforce			
Mode Share	7%	15%	35%
2017 Estimated Daily Ridership	138	296	691
2021 Adjusted Daily Ridership	160	342	799
Adjusted - Changes in Commuter CSD Destination			
Mode Share	7%	15%	35%
2017 Estimated Daily Ridership	138	296	691
2021 Adjusted Daily Ridership	229	492	1148

Figures 31 and 32: 2017 projections and 2021 data adjustments to Squamish-Whistler Market Demand

The 2017 market demand study derived 2017 ridership estimates from historical ridership data of the 98 Squamish Commuter (BC Transit, 2017). Since the 2017 estimates, both Squamish and Whistler have seen increases in the labour force populations and changes in the commute patterns. These 2021 data adjustments use figures from both municipalities, weighted by population.

Table 9: *Squamish-Whistler Market Demand Adjustments*

Adjusted - Increase in Workforce	
2017 Estimated Daily Ridership	175
2021 Adjusted Daily Ridership	198
Adjusted - Changes in Commuter CSD Destination	
2017 Estimated Daily Ridership	175
2021 Adjusted Daily Ridership	243

5.2: Governance and Funding of Interregional Transit

Governance and funding options for interregional service have proved to be a barrier to implementing interregional transit service. This section considers potential funding arrangements and mechanisms for cost sharing based on BC Legislation and the agreements in place with other regional and interregional transit systems operating in British Columbia.

5.2.1: Regional District Governance of an Interregional Transit Service

Squamish and other communities in the Sea to Sky region should pursue an interregional transit route under the control of the Squamish-Lillooet Regional District (SLRD). The advantage of this approach is the potential speed of implementation - which is far quicker than that of a transit commission. Taking lessons from other interregional systems in BC - in particular the Okanagan-Similkameen System, our team further recommends that there be a clear regional transit bylaw in for the Sea to Sky region. This bylaw would codify the required requisitions from each community to fund transit and establish the cost-sharing basis. Furthermore, our team recommends that any future interregional service connecting the Sea to Sky region to Metro Vancouver enter a long-term agreement with TransLink. This would allow better integration of the services in the future. The potential governance approaches are introduced in *Table 10*, and detailed following and in Appendix F.

Table 10. Governance Options for Establishing an Interregional Service

Transit Commissions	Regional District Control *Recommended Approach*	Long-Term Agreement
Transit commissions are a fully regional approach to governance which can give representation to all local partners collaboration on a regional transit system. This approach is currently only seen in the Victoria Regional Transit Commission, serving the Capital Regional District.	Regional district's can enter agreements with their constituent municipalities and BC Transit to provide regional transit service. This effectively operates in a similar model to BC Transit's local service. This approach is currently used in Okanagan-Similkameen Regional District, Fraser Valley, and on other regional routes in BC.	Long-term agreements are similar to regional district control, but entail multiple regional district governments coming to an agreement to share costs and responsibilities on an interregional route. This approach has been recommended by BC Transit for Nanaimo-Cowichan interregional service.

Regional District Ownership (Recommended Approach)

Regional District control of regional transit is an approach taken by several regional districts throughout British Columbia. This governance approach offers the Sea to Sky region the quickest possible implementation process as:

- This governance approach is covered by existing legislation through the Local Government Act and British Columbia Transit Act which enable Regional Districts to make agreements with the public authorities including BC Transit (Local Government Act, 2015).
- The regional government simply enters agreements with BC Transit in the manner any other local partner would. These entail entering a Transit Service Agreement, Master Operating Agreement, and Annual Operating Agreements. In these agreements, the regional government takes-on responsibilities for approving service plans, accounting for revenue, maintaining local transit infrastructure, and marketing the service.

However, it is important to note that regional government control does not have the same capabilities and capacities of a Transit Commission. Regional districts typically are not empowered to levy taxes, and instead must rely on requisitions from municipal governments (Local Government Act, 2015). In Squamish, this requisition is currently taken from property taxes – which are levied by the District of Squamish with a small portion going to the regional government. Low-level implementation of regional transit would only cause slight adjustments to requisitioned amounts. However, greater integration of local and regional systems, and a larger regional or interregional transit system, would increase the management and funding responsibilities of the SLRD and therefore increase the requisition amount.

Transit Commissions (Alternate Approach)

Transit commissions are a fully regional approach to governance which can offer long-term benefits for regional governance and funding. Currently, there is only one transit commission operating with BC Transit - the Victoria Regional Transit Commission (VRTC) which provides service to the municipalities of the Capital Regional District. The VRTC is responsible for both local decision making and local funding – which in the case of VRTC are achieved through fare revenue, property taxes, and a motor fuel tax (BC Transit, 2021).

The path to creating a transit commission is complex and designed for areas with greater populations and density than the Sea to Sky region. This approach could become more attractive should the region continue at high-rates of population growth and densification. Transit commissions offer clear benefits for:

- Municipal and local representation: each constituent locality is given a seat or seats on the transit commission.
- Greater transit planning capacity: transit commissions can govern both local and regional transit – reducing the staff requirements for transit planning, eliminating complications associated with integrating regional and local transit, and better balancing regional and local priorities (BC Transit, 2021).
- A greater array of available funding tools, with the legal ability to levy taxes at a regional scale (British Columbia Transit Act, 1996). In the long run, this could allow a more appropriate cost sharing model which better balances the funding capacities of the constituent municipalities and is better able to sustainably fund transit.

Long-Term Agreement (Alternate Approach)

A long-term agreement for interregional transit brings together two transit providers in agreement to jointly govern and fund an interregional service. Like the regional district governance model, this benefits from good flexibility in governance and ensures local service decisions remain nested with the pre-existing governance bodies. At the same time, this type of agreement would ideally allow SLRD / BC Transit to shift some costs of an interregional service to TransLink.

While desirable, it should be noted that current BC Transit services linking into Metro Vancouver and TransLink do not have joint funding and governance agreements. Notably, the local cost share of BC Transit's Route 66 - the Fraser Valley Express - is split between Abbotsford and Chilliwack. The Fraser Valley Express Sub-Regional Transit Service Area Bylaw establishes that the City of Abbotsford takes on 63.8% of the route's cost while the City of Chilliwack takes on 36.2% (City of Abbotsford, 2019).

5.2.2: Lessons from Okanagan-Similkameen: Transit Service Bylaw

Governance and funding of regional transit in the Regional District of Okanagan-Similkameen (RDOS) is currently nested in the regional district's government. The RDOS Board of Directors makes all decisions about transit fares, routes, and service levels as well as guiding the Transit Future Plan (RDOS, 2015) - acting as the local partner to BC Transit.

Decisions by the RDOS are further governed by a Transit Service Bylaw enacted in 2016. This Bylaw details the provision of transit services for routes connecting three electoral areas, and the towns of Oliver and Osoyoos to Penticton. The Bylaw includes an apportionment of costs between the towns and electoral areas for the service with the Towns of Oliver and Osoyoos responsible for over 50% of the local system costs under BC Transit's legislated cost-sharing formula. It also specifies the operating boundaries of the services and appropriate cost recovery methods that can be used to cover each community's share including fare revenue, property tax and municipal gr-

ants (Regional District of Okanagan-Similkameen, 2016).

Note that this Bylaw includes a clause that limits the amount of transit operating costs that can be requisitioned from each community to no more than $75,000 each year. However, this may limit the level of service that can be provided on this transit network connecting several Southern Okanagan communities. Should the SLRD enact a similar Bylaw, the team recommends that such a clause be more fluid so that a Sea To Sky Interregional Service be able to adapt to development and economic trends in regional communities (Regional District of Okanagan-Similkameen, 2016).

Turning to interregional agreements, current service between Penticton and Kelowna is operated fully through an operating agreement held by the RDOS. While this removes some of the complications associated with collaborating between two regional districts (the RDOS and the Regional District of Central Okanagan), it has caused significant barriers to further integration. As the Sea to Sky Region looks towards interregional transit, it should consider formal agreements with TransLink to connect the Sea to Sky Region with Metro Vancouver.

Figure 33: Bus operating on the local Penticton network within the RDOS system. Photo taken from *The Penticton Herald (2019)*.

5.2.3: Lessons from Okanagan-Similkameen: Clear Process for Integration

Sea To Sky communities with local service should agree to a Terms of Reference which state that local changes must be made in line with regional changes. Transit riders should also have easy access to all information with riders' guides and online services and applications showing the linkages between the services clearly. Finally, the municipalities should collaborate to ultimately achieve fare integration – this may be simplified as BC Transit rolls-out Umo, its mobile wallet and smart card fare system.

In Okanagan-Similkameen, BC Transit has identified shortcomings in the full integration of regional services with local routes. Notably, the administrative transit knowledge and customer-facing aspects of transit remain nested in the municipalities. In the past, this resulted in riders' guides and schedules which were municipality specific, leaving riders unable to easily access information about the transit service available in adjacent communities.

Similarly, driver hours and the service levels of local routes were not coordinated between local systems. This resulted in differences in service frequency between adjacent municipalities. For customers, this meant a less cohesive experience, more time potentially spent waiting, and less convenience when using the regional bus service compared to driving. For transit planning, this resulted in an overcomplicated and time-consuming planning process to ensure any changes within municipal transit systems did not result in disjointed regional-local connections.

Since 2015, BC Transit has worked to rectify the above shortcomings in the Okanagan-Similkameen Transit System and achieve greater system integration (BC Transit, 2015). At the simplest level, this meant publishing riders' guides which show the entire regional system and local systems – ensuring riders know which connections they can make, and how long these would take. At a more complicated level, BC Transit has pushed for the local municipalities to endorse Terms of Reference which acknowledge that local changes must be made in line with regional changes. BC Transit has also recommended that the municipalities of the Okanagan-Similkameen pursue full fare integration as part of achieving a more cohesive experience for regional transit riders in the future.
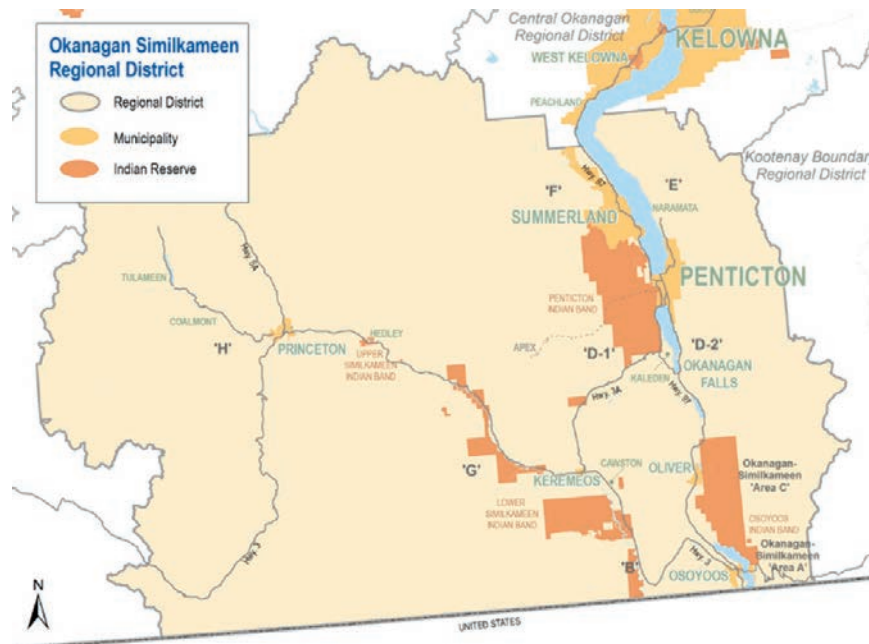

Figure 34: Okanagan-Similkameen Regional District (BC Transit, 2015)

5.3: Interregional Stop Locations

In setting a vision for a future interregional transit service along the Sea to Sky highway, transit stop locations should be determined early in the planning process. Each municipality has its own geography and population distribution to contend with in deciding how many stops are to be within its limits, as well as where to place them.

BC Transit Proposed Stop Locations

Based on findings in the Sea To Sky Corridor Public Engagement Report prepared by BC Transit, the following stops for an interregional line were selected. Participants in the survey also highlighted the three most important factors in an interregional service, which were regular and frequent service, reliability and minimized travel time. Stops in and around Squamish are shown below in Table 11, as well as visually in Figure 35.

At the time of publication by BC Transit, these stop locations were mostly for discussion purposes, though they now provide an excellent starting point for analysis. For the sake of comparison, Squamish and its surroundings were proposed to be served by 6 stops, while Whistler would be served by 6 stops as well. Outside of these, the route was then proposed to stop at Britannia Beach, Furry Creek, Lions Bay, Kelvin Grove Way, Sunset Beach, Horseshoe Bay, Park Royal, and finally Downtown Vancouver. The terminus location in Downtown Vancouver was not y-

et decided, and more discussion with Translink was necessary. If no location is accepted, the line may truncate at Park Royal or end at Lonsdale Quay, in North Vancouver.

My Way or the Highway?

Being built lengthwise along Highway 99, Squamish is uniquely positioned to have a large number of residents able to easily access a future interregional line. Of the six stops proposed by BC Transit around Squamish, three are directly along Highway 99: South Squamish Parks, Brackendale at Depot Road, and Squamish Nation at Stawamus.

Highwayside stops are fast and convenient. They do not require the bus to make any deviation from its route, and require little additional infrastructure to implement. However, they have several drawbacks from a passenger perspective. Notably, standing beside a highway is generally an extremely unpleasant experience. While convenient, bus stops next to highways lack the amenities and comfort that lead people to select transit as their everyday mode choice. Several communities interviewed as part of case studies relayed their hesitance to use highway stops. These are generally regarded to have less of an impact on development and densification than transit stops within neighbourhoods.

Table 11. BC Transit Proposed Bus Stop Details (BC Transit, 2017)

| Stop Location	Notes
Brackendale	New bus stops on Highway 99 at Depot Road. Explore Park & Ride opportunities.
Garibaldi Village	Use existing stops on Garibaldi, Diamond Head, and Mamquam.
Squamish Industrial Park	May wish to use roundabout on Commercial Way only (would require a new bus stop). If using commercial way, discovery way, and industrial way, no new stops are required.
Downtown Squamish	Bus Stop Information update required
Squamish Nation	Potential for new stops on Hwy 99 or at Casino / Totem Hall
South Squamish Parks	Potential for new stop somewhere within the overflow parking lot on the west side of the highway - challenges with parking management and bus turnaround. Could integrate with future ferry movement at Darrell Bay. Transit signal priority for left turn at Hwy 99.
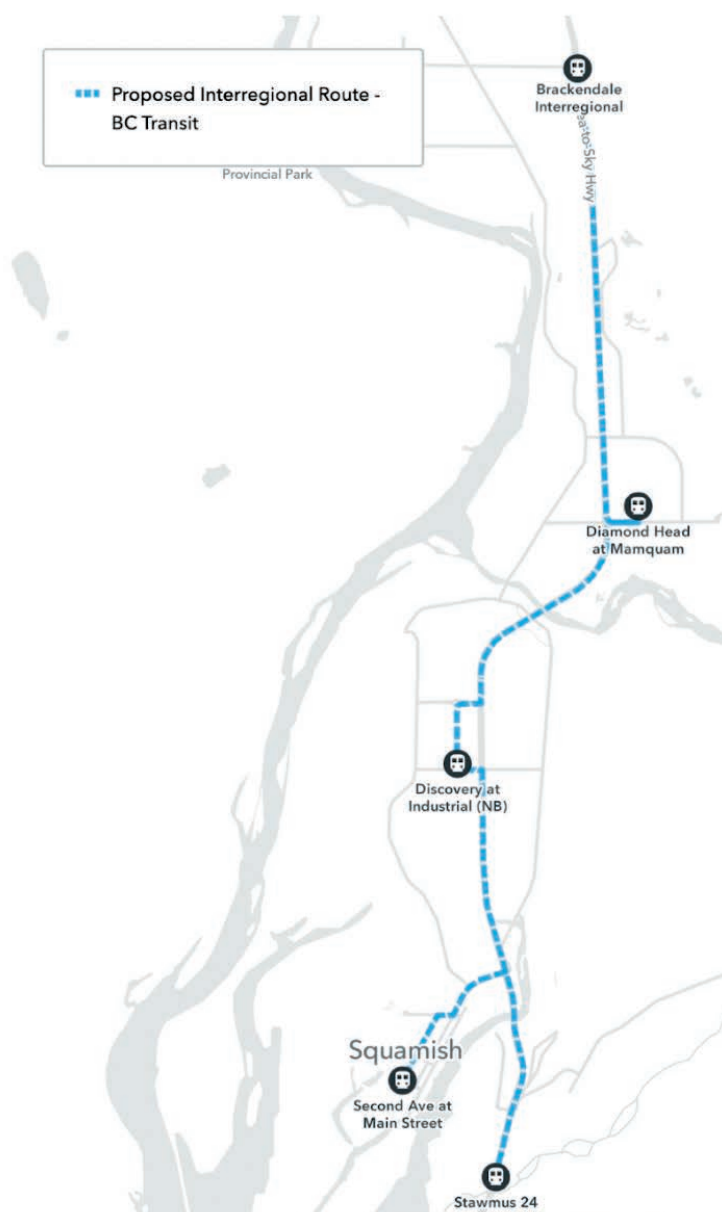
Figure 35: Rendering of proposed BC Transit Interregional route and stops in Squamish
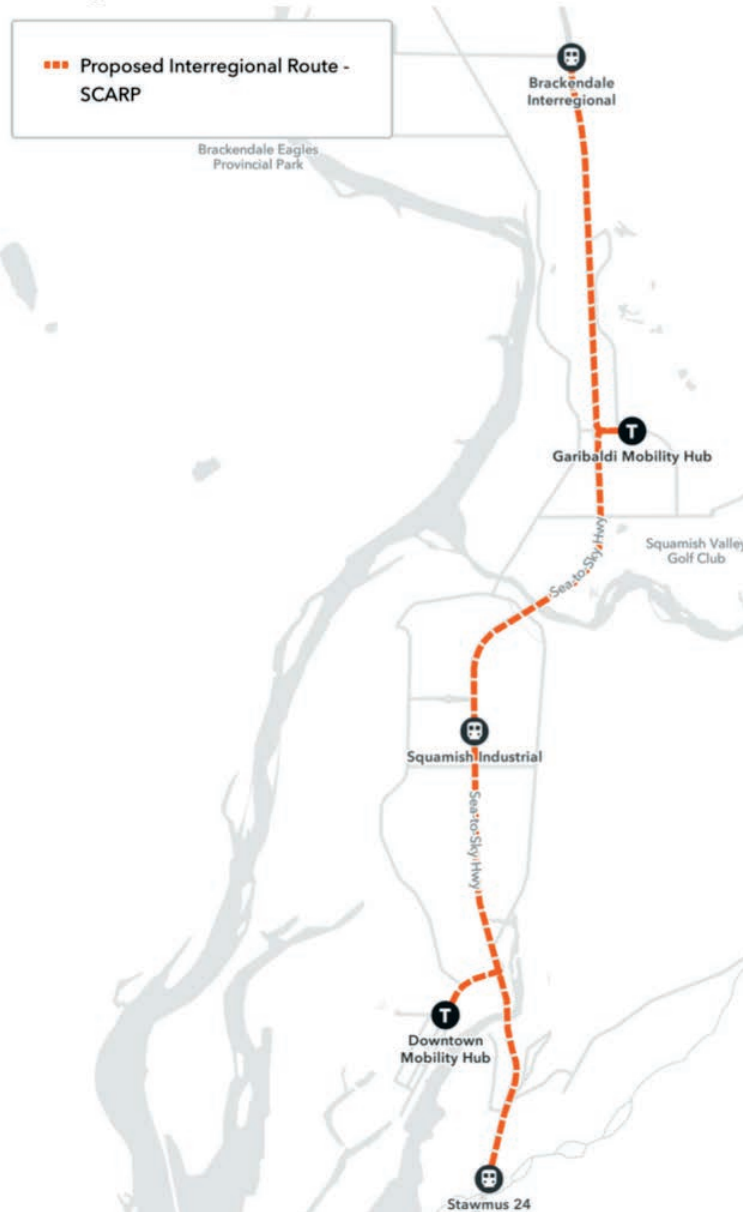

Figure 36: Revised Sea To Sky Interregional Transit Service Stops in Squamish drawing on best practices and recommendations from this project

Interregional Transit Stop Reflection

In designing the future route, there is a clear balance to be navigated between speed and access. More stops will provide service for more residents but at the cost of a higher runtime and reduced convenience that could make the service uncompetitive with driving. To do so, the proposed line must remain somewhat competitive in runtime. The bus would have a strong built-in advantage for users aiming to go to and from Metro Vancouver due to high parking costs in the region. Stops that add to the route's runtime significantly should be avoided or at the very least minimized to areas that would reach many residents. Further, it is important to consider that an interregional bus service would provide transportation to those that depend on public transit and have no alternative, the "captive" market. Additional stops can be essential to serve those that do not have a vehicle and do not live a walkable distance from other stops on Highway 99.

5.3.1: Align Regional and Interregional Stops with Local Service and Mobility Hubs

Six years later, BC Transit's 2017 service proposal holds up relatively well. The stop locations within Squamish remain relevant but some significant deviations from the service's natural path could result in longer trip times, a key barrier to attracting ridership. An approximate trip duration for a vehicle driving from the stop at Stawamus to Brackendale at Depot Road is 20 minutes following the BC Transit proposed route. This is approximately double the time of simply driving along Highway 99 the length of Squamish, not including time spent at each transit stop. In particular, the need to detour into Downtown Squamish to serve the existing transit exchange in front of the library adds significant time. The team's proposed stop locations are somewhat similar to those in the existing study with small changes. These changes notably align stops with proposed mobility hubs/transit exchanges downtown and at Garibaldi Village.

South Squamish Parks

New stop to be negotiated and likely placed in the Sea to Sky Gondola parking lot or nearby.

Stawamus / Squamish Nation

New bus stop to be located on the highwayside at the intersection of Valley Drive and Highway 99. Considering most residents of Stawamus live within 250 meters of Highway 99, as well as the low number of residents, a highwayside stop is recommended. Deviation within Stawamus to the Totem Hall is not recommended, as it would lead to runtime increases as the northbound bus would need to wait for a left-turn signal. The inclusion of this stop aligns with District of Squamish reconciliation goals, as well as the transportation needs of the community, relayed by Squamish Nation representatives.

Downtown Squamish

The interregional stop must provide connectivity to downtown Squamish businesses as well as to local transit, and should be located at the transit exchange. In the Squamish Network Recommendations section, this report calls for a new mobility hub at the corner of Pemberton Avenue and Cleveland Avenue. An interregional bus stop at this hub would reduce how far the bus would be required to drive into downtown. It would also provide a turnaround point as well as prevent detours on days when Cleveland Avenue is closed for special activities further south.

Squamish Industrial Park

Should the frequency of the 1 Brackendale be increased to every 15 minutes, as recommended by this report and by the *Squamish Transit Future Action Plan*, this bus stop is likely not necessary. The frequent service on the 1 will allow users to get off at Garibaldi Village or Downtown Squamish and still easily reach destinations in the Industrial Park. However, the Walmart located on Discovery Way is a unique destination, and access to a wholesale grocery store is difficult for some residents of the Sea to Sky corridor. Considering the detour to serve this area is not major, it could still be included.

Garibaldi Village

Similar to the Downtown Squamish, this bus stop should be located at the future Garibaldi Village transit exchange. This report calls for a new mobility hub to be located at the north end of Garibaldi Village shopping center, on the corner of Garibaldi Way and Tantalus Road. Constructing this exchange and having the interregional line stop there would provide excellent access to shops and connectivity to local transit lines.

Brackendale Interregional

The new bus stop is recommended to be at the corner of Highway 99 and Depot Road, as suggested by BC Transit's report. It is important to note that for users, this is likely the most inconvenient stop among those in Squamish. However, there is no other option that does not involve a significant detour across the railway tracks. As well, finding a turnaround point would present a challenge potentially resulting in further delay in Brackendale. For residents that live too far to walk to this stop, frequent passage of the 1 bus line will allow them to connect to the interregional at Garibaldi Village.

5.4: Desirable Amenities

Improved amenities, both aboard buses and at stops, would enhance the rider experience and make interregional transit more attractive to customers switching away from private automobile travel. This section proposes a variety of options which are not currently used in BC Transit interregional bus service, but which could be piloted in the Sea to Sky region.

Figure 37: A BC Transit Nova Bus LFS Suburban model with front door only.

5.4.1: Provide Comfortable Vehicles with Onboard Amenities

It is BC Transit's policy to operate a standardized fleet of buses on transit systems across the province, including on many of the interregional routes around the province. This allows BC Transit to reallocate vehicles to meet different demands of transit systems in communities across the Province. However, some passengers may find conventional buses uncomfortable for longer transit trips and it is therefore important to consider alternative vehicles to

serve a long-haul route between Metro Vancouver, Squamish and other Sea to Sky communities. On most interregional routes in the Province, it is common for BC Transit to deploy standard 40ft buses with regular seating and two doors for boarding and alighting. Some interregional routes have standard 40ft buses with only one door and include more seating with overhead luggage racks for item storage designed for longer trips, including the Cowichan Commuter that operates between Victoria and Duncan (BC Transit, 2023). This same vehicle is used on TransLink's longer suburban routes in Metro Vancouver (Tung, 2019). Classified as a "Suburban" bus, this vehicle should be a minimum consideration for a Sea To Sky interregional service to provide comfort to passengers through additional seating.

A new interregional service that connects geographically distant communities along the Sea To Sky corridor could present the case for BC Transit to pilot a new type of transit vehicle more suited to long commutes. Alternative buses could also provide attractive onboard amenities for passengers but also need to consider accessibility for people with disabilities in Sea To Sky communities. Nonetheless, the team has provided a few alternative buses and onboard amenities to serve as an additional consideration in providing an attractive interregional transit service along the Sea To Sky corridor.

Table 12. *Summary of Features of Proposed Alternative Buses for Interregional Service*

Make & Model	Passenger Seats	Additional Amenities
Setra S415 LE	49	• Overhead Luggage Racks • Heating & Air Conditioning • Low Floor Entry • Accessible Ramp • Kneeling for Passengers • Wheelchair Space
Setra S416 LE	53	• Overhead Luggage Racks • Heating & Air Conditioning • Low Floor Entry • Accessible Ramp • Kneeling for Passengers • Wheelchair Space
Alexander Dennis Enviro 200	46	• Can be outfitted with comfortable leather seats • Heating & Air Conditioning • Low Floor Entry • Accessible Ramp • Kneeling for Passengers • Wheelchair Space

Setra LE Business Buses

Setra is a bus manufacturer that is wholly owned by Daimler and mainly sells transit vehicles to European cities, but has recently started providing motor coaches to commercial operators in the United States. Setra manufactures a line of "Intercity" buses including the S 415 LE and S 416 LE that have ample seating, overhead luggage racks, heating and air conditioning to provide comfort to passengers on long-haul routes. The buses also have low floor entry with the ability to kneel and space and ramps for passengers using wheelchairs ensuring accessibility for all customers (Setra, 2023).

Alexander Dennis Enviro200

Alexander Dennis is a bus manufacturer that primarily caters to European markets but has been selling the double-deck Enviro500 in North America over the past decade (BC Transit, 2023). Conversely, the Enviro200 is a single-deck alternative that may be an attractive model to pilot on the Sea To Sky interregional service. While these buses do not have overhead luggage racks, they can be outfitted with comfortable leather seats and have similar accessibility features (Alexander Dennis, 2021).

Figure 38: Setra S 415 LE (Setra, 2023)

Figure 40: Alexander Dennis Enviro200 (Alexander Dennis, 2021)

Figure 39: Interior of a Setra S 415 LE (Setra, 2023)

Figure 41: Interior of an Alexander Dennis Enviro200 (Alexander Dennis, 2021)

Additional Onboard Amenities

Additional amenities onboard intercity and long-haul buses can increase the comfort of passengers and contribute to higher levels of ridership (Schwieterman, Fischer & Smith, 2008). The team has provided discussion on wireless internet connections and charging ports for mobile devices as additional considerations that could be installed on Sea To Sky interregional transit vehicles to make the service attractive.

Wireless Internet

Wireless internet is a common feature on interregional and regional transit vehicles in transit systems across Canada. TransLink's new double-decker buses that operate on longer regional routes in Metro Vancouver have Shaw wifi (TransLink, 2021), while On-It's Cochrane Commuter service has wireless internet connections on their coach buses (Tang et al. 2023). Providing wireless internet on a long distance interregional service between Metro Vancouver, Squamish and other Sea To Sky communities would allow passengers to access entertainment and communicate with others while on the move.

Charging Ports for Mobile Devices

BC Transit's new fleet in the Victoria Regional Transit System, expected to arrive in the final quarter of 2022, will come with USB ports to allow passengers to recharge their devices while riding the bus (Bell, 2023). A similar amenity on the Sea To Sky interregional service would allow passengers to charge their electronic devices on a long haul route and could be especially important for those connecting with a pick up at the end of their journey.

5.4.2: Create Mobility Hubs at Interregional Stops

As transportation services and infrastructure evolve rapidly, interregional mobility hubs offer an opportunity to integrate different sustainable transportation options, enhancing connectivity across the region. Mobility hubs enhance customer experience and the resiliency of the transportation system through integrating public and private transit services (Bay Area Regional Collaborative, 2021). The team recommends that smaller mobility hubs be created at interregional transit stops in addition to larger ones proposed at Downtown Squamish and Garibaldi Village to enhance passenger comfort and convenience, and enable fully sustainable mobility throughout the Sea To Sky Region and beyond.

Figure 42: Potential Multimodal Mobility Hub (Kitsap Transit, 2022)

6: Conclusion

Reflection

A number of opportunities for improving the local and interregional transit networks in Squamish have been identified to enable the community to move beyond the car. These opportunities were derived through engagement with different stakeholders in Squamish, including the District of Squamish, Squamish-Lillooet Regional District, BC Transit, OurSquamish, Squamish First Nation, and the Squamish Chamber of Commerce. By listening to these stakeholders, this project was able to prioritize higher-urgency projects that address the needs of the community. Additionally, four small community leaders in North America were consulted to identify lessons for Squamish, including suggestions for the design of the transit network, policy recommendations and funding models.

The five guiding principles established through this project, which include connectivity, sustainability, equity, health, and reconciliation, have been used to evaluate proposed changes to transportation policies and service design. By focusing on these principles, the team envisions the future of the transportation system in Squamish to be more accessible, convenient, efficient, and equitable. The recommendations proposed in this report aim to improve the connectivity between local and regional transit services and networks, disincentivize the use of private vehicles while encouraging local residents to consider more sustainable modes of transportation. Additionally, the recommendations will help the District of Squamish implement the policies outlined in Squamish 2040: Official Community Plan, the Community Climate Action Plan and 2031 Multimodal Transportation Plan among other key strategies with a collective goal of a low-carbon future. The future of the transit system in Squamish is optimistic with tangible improvements that can pave the way to a more sustainable community.

Network Recommendations

Reconfigure the Transit Network to a "Trunk and Feeder" System:
The "Trunk and Feeder" concept would see routes realigned and frequencies modified to enable more frequent service on routes serving areas with the greatest population, employment, and in accordance with the OCP growth strategy.

Create Mobility Hubs in Downtown Squamish and Garibaldi Village:
Mobility hubs integrate different sustainable transportation modes including public transit, car-sharing, cycling and walking integrate in a given location. Creating hubs in Downtown Squamish and Garibaldi Village will enable connectivity across the community by sustainable modes.

Connect Indigenous Communities to the Local Transit System:
Addressing inadequate transportation and access to goods and services for Indigenous communities, redesigning the local transit network to a Trunk & Feeder System will allow the introduction of service to an additional Squamish Nation Reserve.

Create Active Transportation Connections Between Dentville, Industrial Park, North Yards, and Brennan Park Community Centre:
Considering gaps in the transit network, access to these key destinations could be facilitated with active transportation connections designed for all ages and abilities (AAA) with end-of-trip facilities.

3: Policy Recommendations

Integrate Fares with Interregional Service Providers:
Fare integration between shared transportation services is essential to getting drivers out of their vehicles and on to transit; it presents a tool for growing ridership and removing barriers and complications in using transit.

Explore Locally Funded Service Opportunities:
Unconventional transit structures, including on-demand transit, may present an opportunity to work outside the BC Transit system in areas which do not support conventional transit operations.

Create a Local Travel Survey:
Local travel surveys can fill gaps in the understanding of ridership patterns and work hand-in-hand with 'big data' solutions.

4: Innovative and Alternative Funding Tools

Existing funding instruments - property tax and fare revenues - may struggle to accommodate increased operating costs associated with planned service increases and expansions in the community. The District of Squamish could position themselves alongside other municipalities to advocate for enabling legislation or permissions to pursue new revenue sources to improve local transit services.

Alternative funding sources analyzed in this report that Squamish could pursue include:
1. Dedicated Funding in Property Tax
2. Municipal Parking Fees
3. Off-Street Parking Levies
4. Motor Fuel Tax
5. Vehicle Levies

5: Developing Interregional Service in the Sea to Sky Corridor

Consider Regional Government Control of an Interregional Route
An interregional route under the control of the Squamish-Lillooet Regional District and operated through BC Transit offers the quickest possible path to achieving interregional transit.

Align Regional and Interregional Stops with Local Service and Mobility Hubs
Interregional transit should be easily accessible for riders. Local changes should be made in line with regional changes while mobility hubs should provide easy access to transit for a people arriving through a variety of modes.

Provide Comfortable Transit Vehicles with Amenities to Encourage Use of Interregional Service
Alternative bus models, outfitted with features that enhance personal comfort, are important features to encourage automobile users to take longer-range transit

Create Mobility Hubs at Interregional Transit Stops
The interregional service, as proposed by this project, would make stops at the Downtown Squamish and Garibaldi Village mobility hubs. However, to enable fully sustainable commutes along the Sea To Sky corridor and beyond, mobility hubs with similar features but at a smaller scale should be provided.

Figure 43: Route 2 Highlands in Squamish

102 738

BUS STOP

1 Brackendale
2 Highlands
3 Valleycliffe
4 Garibaldi
9 Quest University

SQUAMISH | BCTransit

www.bctransit.com
604·892·5559

7: Appendices

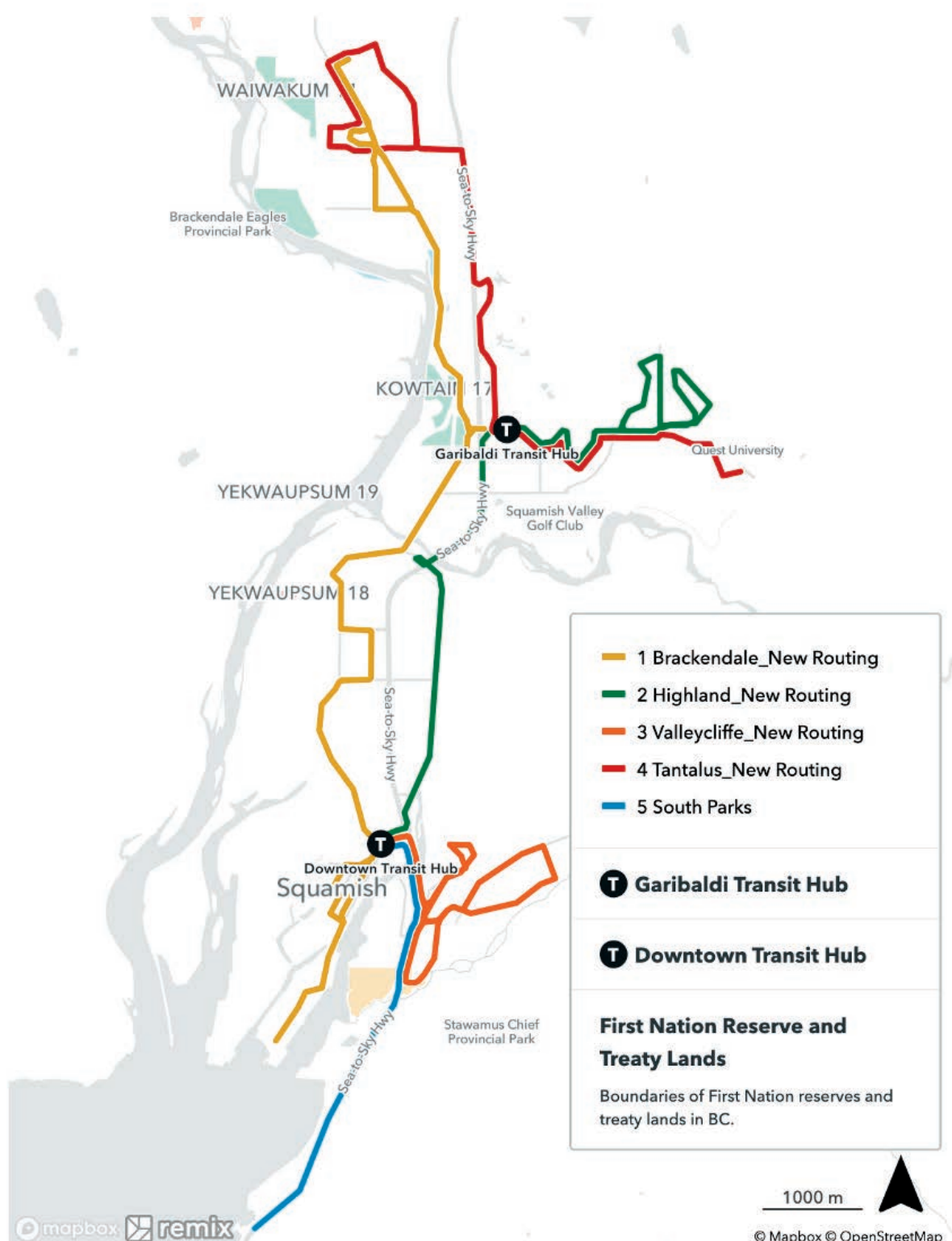# Appendix A - Proposed Routing of Reconfigured Local Transit Network

Figure 44: Map of Proposed Routing for Reconfigured Local Transit Network

Appendix B - Literature Review

A literature review of both professional and academic sources was conducted to research best practices in transit planning. Specifically, an examination of factors that enable transit to be an attractive alternative to automobiles was conducted with an additional scan of resources that discussed challenges to and opportunities for sustainable transit operations. A supplementary review of resources that discuss how transit service can assist indigenous peoples was also conducted to identify guidance that could be useful in working toward reconciliation with Sḵwx̱wú7mesh Úxwumixw (Squamish Nation).

Creating Attractive Transit Service

General Guidelines

TransLink's transit service guidelines are founded on three principles of providing service that is accountable, balanced and collaborative. The guidelines stress the importance of creating demand-oriented service that aligns with regional growth areas to meet demand and grow ridership. In addition, they outline that transit networks should be designed so that it is useful, emphasizing reliable travel times, convenient connection points, and appropriate times and frequencies to ensure that service is a convenient and comfortable choice for residents. Finally, TransLink stresses that transit service should be productive and efficient while balancing regional goals to ensure equity, efficiency and effectiveness, with emphasis on how these can create a fiscally sustainable transit system or reduce cost overruns (TransLink, 2018).

BC Transit has service design standards that usually define features including service span (the time when transit operates), frequency of routes or groups of routes, walking distance to bus stops, level of accessibility, and how new routes are planned for additional service areas. These service design standards guide local governments and BC Transit staff for managing stakeholder expectations for levels of transit service to be provided and inform decisions regarding transit network and route design (BC Transit, 2020). Their network design principles are summarized here:

- Service should be focused on major activity centres and residential areas in urban areas
- Routes should be direct and as frequent as possible to compete with automobile travel
- Routes should connect residents to local neighbourhood centres and transit trips between neighbourhood centres should be able to be completed with no more than one transfer
- Transit service should be connected to other modes and services including local pedestrian and cycling networks, interregional service, passenger rail and custom transit services
- Bus routes should operate on arterial and collector roads with limited interference with local road networks
- Future roads and arterials should be designed to accommodate bus infrastructure
- Transit routes should also be within the following distances from specific trip generators:
  - 400m from 90% of urban residences
  - 250m from all future medium and high-density residential developments, and
  - 150m from all designated senior's residences and major institutional facilities
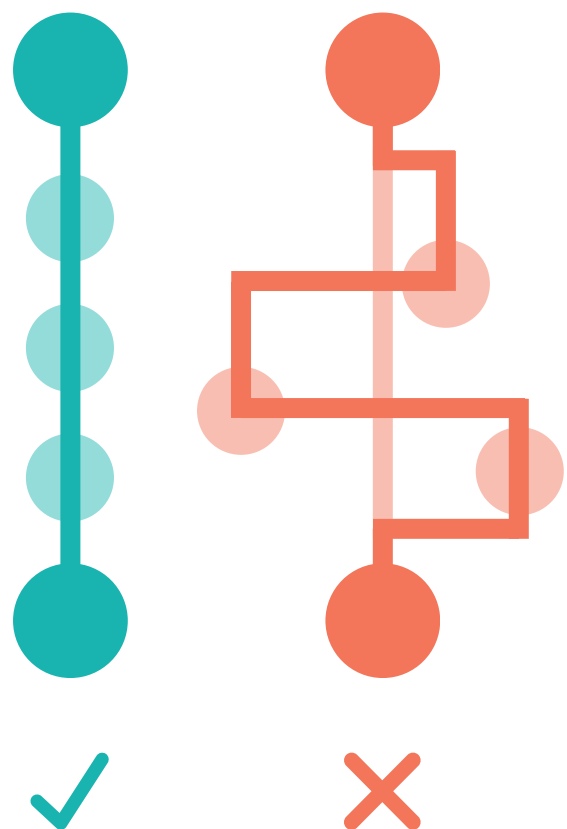
Appendix B - Literature Review (Cont.)

Similarly, TransLink's service design principles are intended to "improve services for nearly all riders" (TransLink, 2018, p. 34). Service design is intended to improve the needs of residents who cannot drive, or provide a compelling option for those who can and encourage mode shift from cars to transit. According to TransLink's guidelines, transit routes and networks should be designed to achieve the following principles:

- Make service simple;
- Operate routes along a direct path;
- Minimize route deviations;
- Operate major transit routes along arterials;
- Make routes symmetrical;
- Serve well-defined markets;
- Coordinate services effectively;
- Provide consistent service;
- Space individual bus stops appropriately; and
- Maximize ridership through the design of the route (TransLink, 2018).

BC Transit also stresses the importance of creating attractive transit stop amenities to enable a better transit user experience. Bus stops are not just where customers and transit vehicles meet, but form the most visible indicators of transit service in a community. A range of amenities may be considered for implementation at bus stops including passenger and wheelchair landing pads, bus stop signs, shelters, seating, bike storage, lighting, real-time schedule information, security cameras and newspaper or vending boxes (BC Transit, 2018). Shi et al. (2021) found that adding or upgrading stop amenities in King County, Washington increased transit boardings and that bike hoops, real-time information systems and shelters were the most impactful to increasing boardings at individual transit stops.

Transit Planning in Small or Rural Communities

With respect to rural transit investment, there are two captive markets: the physically and cognitively disabled that require specialized transit, also known as paratransit, while the other captive market consists of residents that can drive, but do not have access to a car as either a driver or a passenger. The non-captive market is the choice transit user where conventional transit exists and as such, they have the option to drive or take a bus if the bus takes them where and when they want to go (Beck & Mis, 2010).

Burkhardt (2005) contends that rural transit system schedules need to be coordinated with each other in order to become an attractive alternative to the car. People with special transportation needs benefit from greater amounts of transportation and higher quality services when providers coordinate services. Likewise, coordinated rural services for residents in small communities make public transit more visible (Burkhardt, 2005).

With respect to stop amenities, transit systems in small communities typically provide little or no passenger facilities. However, quality pedestrian access routes to transit stops are very important both in terms of basic provision (e.g. sidewalks and pathways) and maintenance (e.g. snow and ice removal). Passenger shelters at transit stops are desirable, especially in more exposed areas and along less frequent routes, but require funds that may have higher priority uses (Transport Canada, 2009).

Figure 45: Creative and Informal Bus Stop Amenity in Squamish

Appendix B - Literature Review (Cont.)

Creating Transit Oriented Communities

The literature on the intertwined relationship between land use and transportation is replete but with contradictory perspectives. However, most scholars concede that the nature of this relationship is important and has a great impact on the livability of a community (Polzin, 1999). Land use characteristics create different levels of demand for transit service, and no single land use characteristic or combination of characteristics provides an indicator of how a transit service will perform in each setting. Transit supportive land use and demand can be described through "6 Ds" (TransLink, 2012):

Destinations – The number and types of major destinations along a corridor, which could include major bus exchanges, schools and town centres. Accessibility to regional activities has a strong impact on household travel patterns (Ewing, 1995), and the density and regional location of a person's workplace significantly influences ridership (Barnes, 2005).

Distance – Refers to walkability and can be measured through things like the number of intersections per hectare within walking distance of a transit corridor. Greater levels of intersection density (i.e., more intersections) result in lower levels of overall travel by cars and influence higher sustainable mode shares (TransLink, 2012).

Design – Measures how "human" the public realm is, such as sidewalks on the street, building orientation, and location of parking spaces. Improving the pedestrian network, creating high-quality gathering spaces, and strengthening street activity significantly improve the public realm and increase pedestrian volumes (City of Melbourne, 2004).

Figure 46: Low Density Single Family Home Neighbourhood in Squamish

Density – Can be measured in terms of number of residents and jobs per hectare within walking distance of a transit corridor. Transit ridership demand increases when going from very low to moderate densities (TransLink, 2012).

Diversity – Refers to the mix of land uses along transit corridors which may include residential, commercial, industrial or retail. Some strategies to increase transit ridership through diverse land use planning could include increasing a community's retail floor area ratio and employment space in mixed communities (TransLink, 2012; Ewing & Cervero, 2010; Frank et al., 2008).

Demand Management – Types of transportation demand management initiatives along a transit route including paid parking or parking availability (TransLink, 2012). Hard measures may include transit improvements, curbside management and reducing parking spaces, while soft measures may consider individual travel planning (TransLink, 2012). An individual travel planning exercise was conducted in one local neighbourhood by the City of North Vancouver and resulted in a 10% increase in active transportation and transit trips among residents (City of North Vancouver, 2018).

Appendix B – Literature Review (Cont.)

With respect to density, the Oregon Department of Transportation provides guidance for minimum densities to support different levels of transit service:

In small and rural communities, economic viability is a critical test for any public transit service. A minimum density of demand (hourly passengers per bus) is required for transit to be cost-effective—but sprawling, unfocused land uses with highly dispersed origins and destinations make this difficult. Only when clusters of trips share a common start or end point (and preferably both) is transit likely to be truly viable. From a land use perspective, transit needs concentrations of residential land uses, workplaces, schools, medical and retail destinations (Transport Canada, 2009).

Table 13: Minimum Densities for Transit Service (ODoT, 2018)

LEVEL OF TRANSIT SUPPORTED	MINIMUM DENSITY / INTENSITY	OTHER REQUIREMENTS
Demand-responsive	4.0 Households/gross acre in service area	This type of service is in addition to ADA paratransit service within 3/4 mile of fixed route service
Route deviation or other hybrid fixed-route / demand-responsive	2.5 Households/gross acre in service area	N/A
Local bus, 60-minute peak headway	3.0 Households/gross acre within walking distance	N/A
Local bus, 20- to 30-minute peak headway	4.5 households/gross acre within walking distance	N/A
Local bus, 10- to 15-minute peak headway	10.0 households/gross acre within walking distance	N/A
Commuter Bus*	2.0 households/gross acre over 20 square mile catchment **OR** 8.0 households/gross acre over 2 square mile catchment area **PLUS** employment anchor with 40.0 jobs/gross acre	Large employment anchor (e.g. a downtown with 20 million square feet of non-residential uses)
Streetcar / Light Rail	6.0 households/gross acre in corridor of 25-100 square miles **OR** 8.0 households/gross acre within walking distance **PLUS** employment anchor with 50.0 jobs/gross acre	Large employment anchor (e.g. a downtown with 20 million square feet of non-residential uses)
Commuter Rail	1.5 households/gross acre over 20 square mile catchment area **OR** 8.0 households/gross acre within walking distance **PLUS** employment anchor with 40.0 jobs/gross acre	Large employment anchor (e.g. a downtown with 25 million square feet of non-residential uses)

Appendix B - Literature Review (Cont.)

Funding Transit Service

Funding Transit – The Basics

To fulfill the ambition of creating a future society with sustainable cities and urban areas where focus is given to the local environment and resident wellbeing, cost increases for public transit could be expected to continue (Ljungberg 2016). Infrastructure needs for various modes of transport also increase dramatically with city size. In communities still developing their public transit systems, large capital investments are typically still needed to expand the network while maintenance and operation costs are somewhat lower. As networks grow, capital investments generally go down, while costs for operation and maintenance increase with the size of the network (Ardila-Gomez et al., 2016).

Cost recovery for a transit system is an agency's ability to use revenue to cover the costs for providing a service. Other than fare revenue, transit agencies fund their operations using local, provincial and federal government money (Harmony & Northeast Corridor Commission, 2018). These existing financing mechanisms are limited in their capacity to generate revenue because they are based on traditional sources of property tax, user fees and transit fares. This is insufficient because of the huge and sunk costs of capital investments and the high expenses for operation and maintenance (Ardila-Gomez et al., 2016). As such, cities may easily find themselves in an underfunding trap where they lack sustainable revenue to implement transportation improvements or maintain operations to provide long-term savings and benefits (Litman, 2022).

Alternative Funding Sources

Alternative sources of revenue for transit service are becoming more extensively studied. Cooper (2022) provided the City of Edmonton with a report that outlines a series of alternative revenue sources to fund public transit service. The report includes transportation based revenue sources including fuel

taxes and parking fees, and real estate based revenue sources such as benefit area taxes and dedicated transit funding in property taxes. Similarly, Litman (2022) lists a series of generic funding mechanisms that can be used to fund transit service but strongly encourages communities to use parking levies on non-residential parking spaces, vehicle levies and employee levies. These tools in particular could generate considerable revenue, distribute costs broadly, and have a logical connection to transit improvements (Litman, 2022). Additional options provided by DeGood (2012) include sales taxes, development contributions and land sales.

However, Ljungberg (2016) cautions against using fuel taxes as personal automobiles are likely to become fuelled in other means, and not with today's easily taxable fuels including gasoline. Instead, the study suggests road pricing as an alternative source of funding for transit that can also induce mode shift. Each vehicle should be required to pay the cost it causes on the transport system, and in a future with new user and fuel technologies, it could be possible from both a practical and economical perspective (Ljungberg, 2016). Yet, Litman (2022) contends that congestion pricing tends to be costly and politically difficult to implement and revenues may be modest in a Canadian context since tolls are only collected on a small portion of total vehicle travel.

Figure 47: BC Transit Farebox

Appendix B – Literature Review (Cont.)

Transit Funding & Equity

In order to achieve a transit funding scheme that is equitable, transit service providers need to consider who in the community needs service, understand travel patterns, analyze how a scheme affects system accessibility and financial sustainability, and determine how to avoid fraud and other unintended consequences (Harmony & Northeast Corridor Commission, 2018).

Lowe & Hall (2019) highlight that when working to identify an equitable funding scheme, transit services need to consider the differences between outcome, opportunity and market equity. Outcome equity is when spending is such that it results in equal service levels regardless of revenue contribution patterns. Opportunity equity is where all spending is equal, but transit service levels may not be spatially even. Market equity is often employed at broader regional scales, and is when benefits received (transit service hours) are proportional to their revenue contributions (Lowe & Hall, 2019).

Additional considerations to make when funding and providing transit service are horizontal, vertical and geographic equity. Horizontal equity refers to whether members of a group are treated the same by the financing mechanism and is often equated with the market equity idea of a beneficiary to pay. Vertical equity considers equity across different groups, and is often operationalized through the ability-to-pay principle. Geographic equity is based off of the idea of a fair funding allocation by a designated spatial unit (Lowe & Hall, 2019).

Reconciliation

Literature studying the impact of access to public transit in Indigenous communities is limited. Transportation is considered a social determinant of health and well-being (Raerino et al., 2013). "Good transportation" is defined differently between colonial settlers and Indigenous populations. Transportation for indigenous populations needs to be examined through safety and access as a system that pays attention to women's use of transit services and does not replicate settler-colonial violence (Perry et al. 2021). In order to achieve a just urban transportation system, all urban inhabitants including low-income, indigenous residents, must be served. Areas with low-income and low service, which may include Indigenous reserves, can end up in a poverty cycle and inhibit social mobility among residents (Adli et al., 2019).

Perry et al. (2021) explored the effects of declining transit options on rural, northern and Indigenous communities and found limited transit created an over-dependence on cars, which limited their participation in the economy, cultural activities and poor health outcomes. Hoover et al. (2012) found increased environmental contamination from transportation emissions impacts indigenous cultural knowledge reproduction as oral traditions are not passed down, resulting in a loss of language and culture through abandoned activities. They also found increased rates of cancer related to localized transportation emissions (Hoover et al., 2012).

Appendix B - Literature Review (Cont.)

Public transit service presents opportunities to address the spatial effects of colonization. Indigenous reserves are often isolated from communities rendering them car dependent with higher living costs (Raibmon, 2005). Automobile dependence also affects indigenous relationships with the physical and natural environment (Raerino et al., 2013). In a study of inclusion of indigenous elders in age-friendly cities, indigenous seniors reported difficulty in arranging transportation, specifically custom or accessible transit options, and less access to automobiles. An action plan was created by the City and included the reduction of HandyDART wait times as a key initiative focused on aging in place (Nelson & Rosenborg, 2021).

The Canadian Institute of Planners (2019) has a policy on planning practice and reconciliation. The policy emphasizes that planning methods need to be community-driven, inclusive and representative of all ages and genders. Plans must be generated using methods that empower community members to share concerns and identify solutions using their individual and community strengths, reflect emotional experiences embodied in storage and traditional knowledge, and prioritize land stewardship. Planners working with indigenous communities should understand the jurisdictional and legal context of planning practices as it relates to treaties and rights of indigenous people, respect their diversity and self-determination, and demonstrate respect for Indigenous values, cultural practices and decision-making. In addition, planners need to understand the legacies of colonialism on individual nations, and practice with cultural safety and humility through active listening, learning and understanding to confront and eliminate biases (Canadian Institute of Planners, 2019).

In summary, there is a need to promote Indigenous representation and empowerment in crafting transportation strategies. In addition, transit planning needs to consider the effect transportation systems have on indigenous family wellbeing and health, and prioritize fair access for indigenous youth to education and employment opportunities.

Appendix C - Stakeholder Engagement

In order to understand the perceptions and priorities of different stakeholders when it comes to transit in Squamish, engagement meetings were conducted with various concerned groups. Introduced by the project partners, the group had the chance to meet virtually with six of the eight community stakeholders identified within the Proposal. Regrettably, we were unable to meet with the other two stakeholders due to communication difficulties.

Specific meeting questions and topics were sent to stakeholders before each meeting. Though the questions vary from meeting to meeting, the general view taken was to explore the group's views on:

- Values and guiding principles that steer their work
- The current state of transit in Squamish
- Shortfalls and weaknesses of transit in Squamish, both in terms of general service and specific areas
- Future projects and initiatives planned
- The possibility of introducing on-demand and interregional transit, and the relative importance to the group of the two proposals

Table 14: Engagement Details

Community Stakeholder	Status	Partners in attendance
District of Squamish Planning Department	Meeting held at Squamish Town Hall on November 8 2022, 2:30pm	Kerry Hamilton, Planner
Squamish First Nation	Meeting held virtually on November 16 2022, 10:00am	Julia Stafford, Project Manager for the Climate Action Strategy Renata Rovelo, Project Manager for the Climate Action Strategy
BC Transit	Meeting held virtually on November 17 2022, 1:00pm	Rob Ringma, Senior Manager Bronson Bullivant, Senior Transit Planner
OurSquamish	Meeting held virtually on November 18 2022, 4:00pm	Sarah Ellis, President David Lee, Board of Directors Micki Buie, Board of Directors and Secretary
Squamish Chamber of Commerce	Meeting held virtually on November 28 2022, 3:00pm	Nicole Etherington, Manager Abby Majendie, President
BC Ministry of Transportation & Infrastructure	No response to emails sent by District of Squamish project partners and SCARP team members	N/A
Squamish-Lillooet Regional District	Meeting held virtually on January 30 2023, 3:30pm	Craig Dalton, Chief Administrative Officer
Sea-To-Sky School District (No. 48)	No response to emails sent by District of Squamish project partners and SCARP team members	N/A

Engagement Highlights

District of Squamish Planning Department

In a meeting with a representative from the Planning Department, it became clear that there is a strong desire to create transit corridors within Squamish, where the land use and development pattern supports transit as a core principle. Bringing in transit planning at the beginning of development planning could achieve this, in addition to safer and more convenient pedestrian travel to and from bus stops. This way, the zoning and land use will serve and support the bus lines themselves, rather than the current situation, where the buses attempt to serve as many destinations as possible and are deviated from major corridors to serve a minor street according to demand.

From a geographical perspective, infill housing development is expected in and around existing neighborhoods, with some empty parcels still existing downtown. The planning department also showed a strong interest in reducing car use in new developments by limiting parking, as well as supporting mixed-use zoning that would create commercial nodes along the bus lines. In reducing parking minimums, the Planning Department intends for future residents to be able to access Metro Vancouver without the use of a personal vehicle, accounting for long-discussed interregional transit to become a reality in the near future.

Figure 48: Bench created by OurSquamish at a local transit stop. (OurSquamish, 2022)

Appendix C – Stakeholder Engagement (Cont.)

Squamish Nation

As part of an initial discussion with Squamish Nation representatives, a meeting was held with two non-community member employees working on a Climate Action Strategy - Julia Stafford and Renata Rovelo. Though more engagement with Squamish Nation community members is currently expected to be pursued before the final report, several key insights were obtained through this meeting. It is found that the existing transit system does not accommodate the transportation needs of some of the Squamish Nation members. From a logistics perspective, weaknesses in accessing grocery stores, travelling between reserves, reaching cultural events, and connecting with the land were highlighted. Both of the interviewees also expressed the concern about racial discrimination on public transportation that faced by Indigenous peoples and communities. Multiple avenues were raised for improving the transit network, including several that were heard from other stakeholders, such as better access to trailheads.

There is an existing desire by the District of Squamish to include Squamish Nation and reconciliation within transit decisions. Considering indigenous ways of knowing and core values in planning, as well as consulting and including Squamish Nation members in discussions and decision-making process, are essential to sustainable relationship building and collaboration in the future.

Interestingly, Squamish Nation has plans to create its own shuttle system, providing rides to cultural events, or to transport elders to their medical and social appointments. Generally, it was heard that transit in its current state is unattractive and seen as a secondary option, due to reduced comfort, dignity, and convenience.

BC Transit

As a core planning partner and near-equal financial contributor to Squamish transit, meetings with representatives of BC Transit unearthed specific issues, both technical and financial, that had not yet been discussed. The runtime and routing of bus lines was discussed, as was the recent Squamish TFAP, which was developed collaboratively between the District and BC Transit. There is strong optimism that the transit network can be expanded in the next few years. Building a second transit hub north of downtown, a key step of the TFAP, is also expected to improve runtimes and general efficiency.

From a funding perspective, drafting and approving a TFAP is a key step to securing the necessary financial backing to expand the network. However, the convoluted process by which BC Transit's funding commitments are approved by the provincial government poses a challenge for Squamish, as it requires budgeting for transit expansion well before knowing whether the provincial portion will be approved.

BC Transit is in the process of conducting a pilot project covering on-demand transit in Kelowna, after which a standard formula for roll-out to other communities will be developed and possibly launched. Though this process works slowly, it aims to obtain economy of scale benefits from operating a uniform system across the province. That said, on-demand transit is not a certainty to be approved, and is at best a few years away. As well, BC Transit representatives caution that while there is excitement for on-demand transit, it is not a catch-all solution, and is generally lower performing than conventional transit. However, some of the more rural areas of Squamish that aren't suited for normal bus lines may be targets for on-demand transit.

OurSquamish

The main values that arose during our meeting with the non-profit OurSquamish was a desire for better equity and accessibility in public space, as well as connectivity with both regional destinations and improved access to recreational locations such as trailheads.

As part of their existing work in placemaking, such as the locally made transit stop benches, OurSquamish partners echoed the lack of urban public spaces and infrastructure that supports efficient, affordable and convenient transportation options within Squamish. For mobility, they highlighted the lack of sidewalks and bike lanes in some parts of the city as barriers for equity, excluding people who cannot or choose not to drive.

OurSquamish members showed a strong interest in interregional transit to and from Metro Vancouver, as well as general regional connections to Whistler and other recreational destinations. Though the Squamish Connector shuttle is in place, the limited scheduling options prevent it from being a dependable option for those who occasionally need to commute into Vancouver.

Squamish Chamber of Commerce

In speaking with Nicole Etherington and Abby Majendie of the Squamish Chamber of Commerce, it is found that trying to find consensus on transportation issues among different types of businesses can be challenging, as they have different needs are affected by transportation policies in various ways. That said, there is clear support from the Chamber and its members for policies that support transit and active transportation.

From the perspective of attracting labor and to fill employee vacancies, an improved and expanded transportation network offering non-automobile options is attractive to the business community. The possibility of an employee transit pass is also an appealing one, something the district of Squamish is intending to examine once electronic fare purchasing is rolled out by BC Transit.

The three top priorities for Squamish businesses were highlighted to be labor difficulties, childcare, and affordable housing, with transportation being a distant fourth. In effect, the often prohibitive cost of moving to and living in the area is a huge barrier to businesses seeking to expand, as cost is a massive barrier to hiring people not already living in Squamish.

Squamish-Lillooet Regional District

It became clear during our meeting with the Squamish-Lillooet Regional District (SLRD) that the organization sees itself taking the role of convening and collaborating with its municipalities. Currently, the main priorities of the SLRD lie in land use planning and managing regional growth through the Regional Growth Strategy.

Though Craig Dalton and the SLRD fully support transportation improvements, there is little budget space and staff time to advance this issue. The SLRD does have some funding set aside to support transit, but it would be limited to small grants for transit planning. There is a strong desire to support a future interregional transit project, should the municipalities be willing to bring the issue forward. If the municipalities decide to go down this route, the SLRD is willing to take the lead on organizing and negotiating regional transit with the province. Otherwise, it will continue in its current role of bringing municipalities together to find solutions for common issues.

Appendix D - Case Studies from Interim Report

 Project Phase 1 examined 20 different case studies in Canada, the United States, and Europe. These transit systems were selected based off their ridership, network service models, and funding mechanisms.
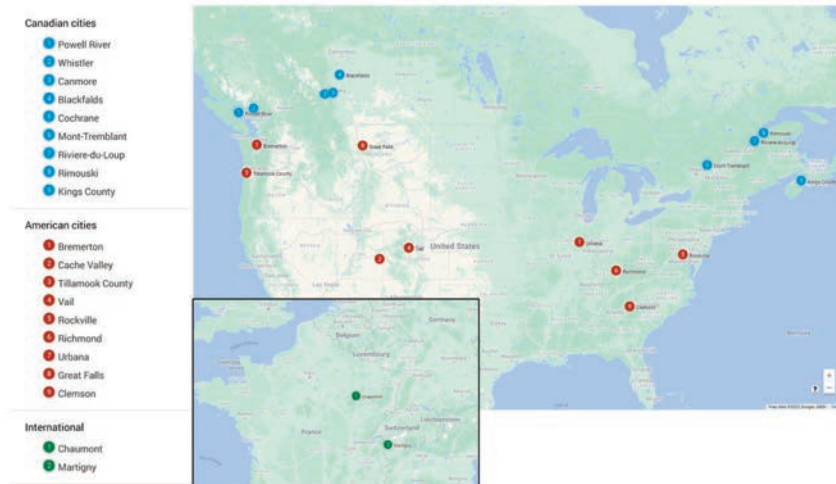

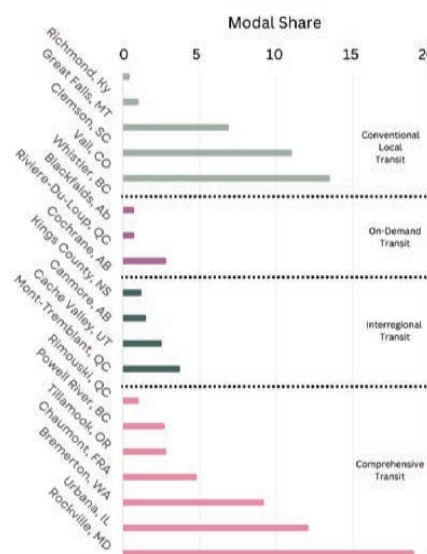**Figure 49**: Geographic Distribution of 20 Local and International Case Studies

Figure 50: Percentage of Commuters Using Different Modes of Transportation in the Selected Locations

Key takeaways from these case studies include:

1. The strengths of "hub and spoke" network models to link interregional transit, high-frequency transit corridors, and low-frequency rural bus services. Examples of this include Bremerton and Kitsap, Washington; Tillamook County, Oregon; and Canmore Alberta.

2. The use of on-demand transit to provide accessible rural transit. This is applicable where public transit cannot reasonably service stops within walkable distances of all residents without significant compromises to transit frequency and route efficiency. Transit systems in Powell River, BC; Rimouski, Quebec, Rockville, Maryland; and Tillamook County, Oregon have all implemented on-demand options to cover areas without transit supportive densities.

3. The ability of on-demand systems to create affordable, regional service options in rural areas. This was seen in Blackfalds, Alberta; Cochrane, Alberta; and Riviere-du-Loup, Quebec.

4. Providing public transit service to dispersed destinations including parks, recreational facilities, culturally significant sites, and dispersed employment destinations. Recognizing the importance of reconciliation, these can also include Indigenous reserves. Systems which service these destinations can be seen in Whistler, BC; and Powell River, BC.

5. The use of highly subsidized or free fares to enhance transit equity while increasing revenue collection from other mechanisms – these include property taxes, payroll taxes, parking taxes, fuel taxes, and other alternative mechanisms. These approaches were common across multiple case studies.

Appendix D - Case Studies from Interim Report (Cont.)

Conventional Local Transit

Clemson, South Carolina is a university town with a population of about ~18,000 and commuter transit ridership of about 6.9% (United States Census Bureau, 2022). The system currently includes four routes which connect the city's residential areas, downtown, and university campus (City of Clemson, 2014). Recognizing community concerns about traffic congestion in and around the university, and the many low- and moderate-income students dispersed throughout the town – the system currently follows a zero-fare model. Funding for this system is therefore provided by state and federal grants and through Clemson University fees.

Great Falls, Montana operates seven fixed route, local bus services for a city of ~60,000. All routes radiate from a main transfer point in the city's downtown and the routes generally follow 30-minute headways. Notably, this system uses generally cheap fares to incentivize ridership – with regular single ride fares coming in at $1, or $0.75 for students and $0.50 for seniors (Great Falls Transit District, 2022).

Richmond, Kentucky is a community of ~36,000 (United States Census Bureau, 2022) located about 30-miles south of the city of Lexington, KY. Currently the city operates a deviated-route transportation service with 28-stops arranged in a 12-mile, 90-minute loop (City of Richmond, 2021). Requests for route deviations must be made 24-hours in advance. Current bus fares are low, $1 for adult fares and $0.50 for students. System funding is provided by the federal US Department of Transportation Grants and the state of Kentucky.

Vail, Colorado is a ski resort town of about ~5,600 with a pedestrianised core and extensive transit system. Notably, Vail operates 9 fixed routes with as often as 10-minute frequencies during ski season (Town of Vail, 2022). These transit routes are generally direct as the town has developed along a narrow valley with medium density mixed-uses in the main village. This bus system operates on a zero-fare model and is largely funded by parking revenues and lift ticket taxes (Dupuis B. , 2022).

Whistler, British Columbia currently operates 9 year-round routes, 2 seasonal routes, and 1 interregional route serving a population of around 14,000 (BC Transit, 2022). Combined with the pedestrianised nature of Whistler Village, this results in a high modal share for transit, walking, and biking – nearly 40% (Resort Municipality of Whistler, 2018). Bus routes are centred around a main bus exchange in Whistler Village with most routes aligned along straight corridors. Funding for this extensive system is provided by parking charges.

On-Demand Systems

Blackfalds, Alberta operates a local and regional on-demand bus service which services the ~10,500 residents of Blackfalds and connects them to regional stops within the City of Red Deer (Town of Blackfalds, 2022). The primary goal of this system is providing equitable mobility for all households despite the town having been built as suburban, highway-oriented development. The net operating cost of the service is low, around $210,000 annually and is funded wholly through property taxes (Town of Blackfalds, 2020).

Appendix D - Case Studies from Interim Report (Cont.)

Cochrane, Alberta is a rapidly growing town west of Calgary. Recognizing its budget limitations, the town has successfully implemented a popular on-demand service which addresses the mobility needs of seniors, youth, and people living with disabilities (Federation of Canadian Municipalities, 2020). This on-demand system has allowed the city to provide over 150 transit stops and overcome the difficulties of providing service in an area with low-densities and suburban cul-de-sac and looped street patterns (Cochrane On-Demand Local Transit, 2022). Recognizing the city's continued growth – the city believes it can rapidly increase service levels as needed by contracting additional transit vehicles (Federation of Canadian Municipalities, 2020).

Rivière-du-Loup, Quebec has operated an on-demand service for its ~20,000 residents since 2001. This service is available six-days per week and covers the entirety of the town as well as rural destinations on its edges (Transport Vas-y, n.d.). On-demand trips are booked through phone reservations and must be booked hours in advance (Transport Vas-y, n.d.). Funding for the system is provided through a cost share between the province and town where the town pays about 20% (Dubé, 2016).

Interregional and Medium- to Long-Range Systems

Canmore, Alberta and its ROAM Transit system provide local bus services in Canmore and regional bus services to the resort city of Banff. Currently, about 1.5% of commuter journeys use ROAM Transit (Statistics Canada, 2017), but the town is working to increase its share – this is enabled by relatively frequent headways (about every 30-minutes for local buses and every 30-40 minutes for regional service) and a zero-fare, free ridership model (ROAM Transit, 2022). Funding for this system and its future upgrades comes from both property taxes and a paid parking program (Town of Canmore, 2022).

Cache Valley Transit District, in North Central Utah, has been recognized as a "proactive leader in community transit" since 2011 (Cache Valley Transit District, 2022). Currently, the system accounts for 2.5% of commuter journeys in Cache Valley (United States Census Bureau, 2022), Utah and, as part of its efforts to encourage modal shift and promote equitable mobility – operates on a zero-fare model (Cache Valley Transit District, 2022). The system includes 16 bus routes both within the main population centre – the City of Logan – and servicing nearby towns up to 15-miles away. Transportation planning emphasizes connectivity to Utah State University and areas identified as clusters of low-income or aging people (LSC Transportation Consultants, 2017). To facilitate this system and its zero-fare model, funding for the Cache Valley Transit District comes from sales tax and senior government grants. Sales tax currently accounts for 65.8% of revenues and is assessed as $0.00325 per dollar spent in Cache Valley (Cache Valley Transit District, 2022).

Kings County, Nova Scotia comprises ~63,000 spread across a large, 2,120km2 area in Western Nova Scotia – this results in almost 200km of road distance between the Northernmost and Southernmost stops (County of Kings, 2012). Currently, Kings Transit Authority seeks to maximize connectivity to all communities in this area by running five fixed routes. All five routes are generally aligned to the highway, with detours made to connect to major employment centres. Bus frequencies suffer from the large distances, with frequencies falling during off peak-hours to two-hour headways (Kings Transit Authority, 2022). Notable, the availability of additional transit vehicles is used to boost frequencies up to half-hour headways during rush hours. However, at this time, the main user-base of the system is aging people over 65 who may have mobility challenges. Funding for this system is 46% municipal funds and 54% provincial – municipal funds currently come from gas taxes (County of Kings, 2020).

Appendix D - Case Studies from Interim Report (Cont.)

Mont-Tremblant, Quebec is a town located between Montreal and the ski resorts of the Laurentides. The town's singular bus line provides transit services to its ~11,000 residents and connectivity between the town and the popular Mont-Tremblant Resort located about 12-kilometers to the North (Mont-Tremblant - Transport en Commun, n.d.). Currently the system operates on a zero-fare model and is funded directly by the city without provincial assistance – this is largely through property taxes and parking fees (Ville de Mont-Tremblant).

Comprehensive Systems

Bremerton, Washington has generally high public transit ridership, around 9.3% in a community of ~38,000 (United States Census Bureau, 2022). This is facilitated by Kitsap County's extensive public transit system which includes ferry services, local and regional fixed route buses, as well as on-demand services in rural areas. Ferry services provide a critical link as Kitsap County Transit connects several communities in the Western Puget Sound (Kitsap Transit, 2022). Additionally, this provides a key connection to nearby Seattle. Local and regional buses are also important aspects, with local "feeder" routes having hourly frequencies, and trunk line routes running as often as half-hour frequencies. This system benefits from extensive federal funds, made available due to Naval Base Kitsap – Bremerton, a major employer and defence establishment in the county.

Chaumont, France operates a system of six local bus lines and an on-demand regional service connecting the town to outlying villages. Together, this system accommodates about 4.8% of commuter travel (Institut national de la statistique et des études économiques, 2022). Notably, local bus lines are arranged in a way which provides neighbourhood to neighbourhood connectivity (in contrast to other town's use of highway-side pickup locations), these lines vary from 25- to 45-minute frequencies. The on-demand regional service arrives with variable frequencies often ranging from 2- to 3-hours. This can be reduced by requesting ahead of time a route – but is limited as the service connects over 20 separate villages (Cmonbus, Agglomération de Chaumont). To encourage usage and equity, fares are deeply subsidized – to about 1€ per ride while students and seniors benefit from zero-fare trips (Cmonbus, n.d.). Funding therefore relies on a payroll taxation system, paid directly by employers in the region (Agglomération de Chaumont, 2022).

Martigny, Switzerland is a town with a population of about 21,000 (Martigny en chiffres, 2021). These residents are served by three forms of public transportation including a national rail network, regional bus network, and three local bus routes (Voyageurs, n.d.). Local bus lines vary in frequency – up to 15-minute frequencies along the highest priority corridor (Ville de Martigny, n.d.) while regional transit operates on a more sporadic frequency – about 6-times daily for regional bus services (CarPostal, n.d.). Due to the dense development pattern of the town itself, interregional connections are a priority and the town of Martigny currently contributes more to regional services (720,000 CHF to rail and 680,000 to regional bus) as it does to its local bus service (1,400,000 CHF) (Ville de Martigny, 2022).

Appendix D - Case Studies from Interim Report (Cont.)

<u>Penticton, BC</u> currently operates local, regional, and interregional bus services through BC Transit. At a regional scale, this transit system operates with the objective of connecting the communities of the Regional District of Okanagan-Similkameen in a cost-effective, convenient, and integrated manner (BC Transit, 2015). To achieve this goal, BC Transit operates six regional bus routes and one interregional bus which connects the City of Penticton to the City of Kelowna in a neighbouring regional district. Governance and funding of the regional service is currently nested in the Regional District of Okanagan-Similkameen (RDOS). The RDOS Board of Directors makes all decisions about transit fares, routes, and service levels as well as guiding the Transit Future Plan (RDOS, 2015). The Transit Future Plan sets out goals for the transit system as well as investment strategies to achieve these goals. Like other BC Transit Services, funding is then provided on a cost-share between the local government and BC Transit, with the cost being split 53% to 47% respectively (BC Transit, 2015). In the South Okanagan-Similkameen regional system, RDOS acts as the local government funding source, providing funds which it in turn requisitions from its constituent municipalities.

<u>Powell River, BC</u> has 3 major routes and 3 rural routes serving a community of roughly 14,000 people. These fixed routes cover major trip generators throughout the community, resulting in high deviation and limiting bus frequencies. Incorporating reconciliation into the transportation network, Powell River's system extends to provide limited service to the Tia'amin Reservation (BC Transit, n.d.). To overcome challenges associated with a lack of mixed-use development and a low-density urban form, the City has piloted an on-demand bus service. This has been positively received by Council despite its currently limited-service area (City of Powell River, 2022). Currently, Powell River's conventional transit services are run through a cost-share agreement with BC Transit. Under this agreement Powell River covers 53% of operating costs while BC Transit covers 47% - the city portion is mainly derived from property taxes (BC Transit, n.d.).

<u>Rimouski, Quebec</u> provides conventional fixed bus routes and on-demand transit services for its population of roughly 50,000. The three conventional bus routes follow loop patterns and attempt to maximize the population served (Guilbault, 2022). This is complicated by large tracts of single-family residential land and extremely limited mixed-use zoning. An on-demand service supplements fixed route service, and there is an emphasis on using this to connect users to conventional bus lines (Société des Transports de Rimouski, n.d.). These services are funded 43% by the city of Rimouski with 30% picked up by the province and 27% by user fares (Radio-Canada, 2021).

<u>Rockville, Maryland</u> is a small city of ~67,000 located in the Interstate 270 Technology Corridor between Baltimore and Washington, DC. It is notable for its high commuter transit usage – 19% (United States Census Bureau, 2022) which is facilitated by five different local and regional transit services. Notably, the WMATA Rockville Station provides a direct commuter rail connection to Bethesda, MD and Washington, DC beyond (City of Rockville, 2021). This station operates as a hub for 15 of the 19 local bus routes running within the city. But, in recognition that large areas of the city follow suburban cul-de-sac street patterns and the effects of this on walkability to transit stops, there is also an on-demand service (Montgomery County Department of Transportation, 2020). This extensive system of regional, local, and on-demand transit services requires extensive funding, and Rockville benefits from inclusion in two large transportation authority's systems with a combined funding of ~$5 billion. Under the funding formula, the city provides only a small percentage of funding – calculated as a function of its population density, average weekday ridership, and number of stations. These are financed through property taxes and parking fees (Montgomery County Division of Transit Services, 2022) (Washington Metropolitan Area Transit Authority, 2022).

Tillamook County Transportation District covers ~1,100 square miles of Western Oregon serving a population of about 28,000 (United States Census Bureau, 2022). This transportation system provides a mix of four local bus routes, three regional routes, and an on-demand dial-a-ride service to maximize connectivity of all county residents to major trip generators and to regional centres including Portland (Kittelson and Associates Inc., 2016). The local bus services are concentrated in denser populated areas while on-demand services cover more rural, non-highway aligned areas of the county. This system has operational partnerships with two local Indigenous Bands for the provision of services on band lands (Kittelson and Associates Inc., 2016). Funding is currently drawn from county-wide property taxes (27%), state and federal funding (22%), and minor funding from timber sale revenues, payroll taxes, and contracts with Indigenous Bands (Kittelson and Associates Inc., 2016).

Urbana, Illinois is a university city notable for its high share of public transit commuters – 12.1% - in a community of ~39,000 (United States Census Bureau, 2022). The Champaign-Urbana Mass Transit District which covers Champaign County and the city of Urbana provides local bus service, paratransit, rural bus service, and an on-demand "Safe Ride" service for late night service around the University of Illinois (Champaign-Urbana Mass Transit District, 2022). This range of services is provided at low-cost to riders, with the majority of funding coming from property taxes – currently assessed at 28¢ per $100 assessed property value.

Appendix E - Funding Tools Not Selected for Further Analysis

Real Estate Based Tools

Benefit Area Tax

A form of property surtax that is linked between the value of transit access and properties within the transit service area. Conventional, wealth-based property taxes remain with this surtax representing a small portion of total property taxes (Cooper, 2022).

Evaluation Criteria:
- Mode Shift: Can support new ridership through reinvestment of revenue to provide enhanced transit service but could have unintended land use effects such as resident relocation to avoid the tax that could lower ridership (Cooper, 2022).
- Implementation: The District would need to decide the scale to apply the tool. Requires changes to the Community Charter to allow local governments (i.e. Squamish) to establish benefitting area taxes (TransLink, 2020).
- Equity: Improves equity by creating a link between benefits received and taxes paid, and the incidence of the tax is likely to avoid most parties with limited ability to pay (Cooper, 2022).
- Alignment with District Policies & Objectives: Support OCP Policy 20.16a by establishing an alternative transportation funding source to support public transit. There is no specific policy or guidance that would necessarily support the introduction of a benefit area tax.
- Revenue: Revenue generated from a benefit area tax would depend on the assessed rate and geographical area selected. However, revenue from the tax under any structure is likely to be moderate and stable (Cooper, 2022).

Precedents: Benefit Area Taxes are applied in two forms in Halifax, NS. At the regional scale, all property owners are charged the "regional transportation rate" that covers expenses for express routes, park and rides, and harbour ferry services. Locally, residents are charged a "local transit rate" if they live within one kilometre of a conventional or community transit stop (Cooper, 2022; City of Halifax, 2022).

Dedicated Development Cost Charges for Transit Improvements

A dedicated fee on new developments for costs related to public transit infrastructure investments such as new bus stop amenities or vehicles. Under existing provincial legislation, development cost charges may not be used to fund day-to-day operations of municipal services (e.g. not the cost of a bus driving a route, but could fund a new bus) (Litman, 2022).

Evaluation Criteria:
- Mode Shift: Charges may result in transit improvements that make it a more effective and attractive mode of travel, However, if fees are set too high they may discourage more compact, infill development. In turn, this could result in increased sprawled development and induce automobile travel (Litman, 2022).
- Implementation: The District of Squamish already collects development cost charges and community amenity contributions. Implementation would require changes to the District's Development Cost Charges (DCC) Bylaw 2911.
- Equity: Developers benefit from high quality transit service because new development increases demand for public transit service. However, introducing this fee may pass on the costs to purchasers or tenants of new developments, reducing housing affordability (Litman, 2022).
- Alignment with District Policies & Objectives: Supports OCP policy 20.2c to use DCCs and developer contributions to finance transportation infrastructure upgrades.
- Revenue: Revenue depends on the amount of development occurring within Squamish, so it may range from small to moderate. However, it could be useful in a funding equation for funding new infrastructure to support interregional commuter service to Metro Vancouver and Whistler.

Precedents: Most municipalities in British Columbia collect development cost charges or transportation impact fees (Litman, 2022).

Appendix E – Funding Tools Not Selected for Further Analysis (Cont.)

Transportation Based Tools

Road Usage Charges

Drivers are charged fees that are dependent on the distance they travel (Cooper, 2022). They may also be implemented at smaller scales, such as in a specific zone as proposed in Vancouver's Climate Action Emergency Plan (Chan, 2022).

Evaluation Criteria:

- Mode Shift: RUC tends to reduce affected automobile travel, especially when implemented with public transit improvements or existing, efficient and reliable alternative mobility options to driving (Litman, 2022).
- Implementation: Despite advances in technology that can reduce operating costs, implementation is expensive and requires politically sensitive provincial legislation. There is often significant public opposition to any tolls unless revenues are used to support either road or public transit improvements (Litman, 2022).
- Equity: Road Usage Charging, or road tolls more broadly, is considered equitable because it charges drivers for the congestion and roadway costs they impose, but are easily criticized as unfair depending on where they are installed (Litman, 2022). As highlighted by Cooper (2022), user fees "tend to be regressive because they represent a greater share of total income for lower income households" (p. 52). However, this could be addressed with a low-income rebate or price structure (Cooper, 2022).

- Alignment with District Policies & Objectives: It is relatively unclear how road usage charging would impact local transportation as it would depend on how it is implemented, but overall aligns with District objectives. Advocating for a regional road usage charging model in conjunction with other communities in the Lower Mainland and Sea-To-Sky region may support regional transit, and therefore support CCAP Big Move #2 strategy to improve regional transportation. If implemented locally with the vision of creating a car last community in Squamish, it may support more sustainable trips within the community, still supporting CCAP Big Move #2 to shift beyond the car and OCP policy.
- Revenue Potential: Road Usage Charging has the potential to provide substantial transit revenue that is flexible and reliable in the long run. Revenue is dependent on where and to what extent such a system may be rolled out. In the context of Squamish this may be best coordinated with the Squamish-Lillooet Regional District, Metro Vancouver and the Province to capture regional trips along the Sea-To-Sky corridor and generate more revenue. However, a smaller scope within Squamish may generate low to moderate revenue for funding local transit service to be incorporated within a funding algorithm and shift local trips to active modes.

Precedents: London, Singapore and Stockholm all use Road Usage Charging for driving on urban roads during peak periods. New York City is also planning to introduce the first Road Usage Charging program that will charge motorists to enter congested areas of Manhattan (Litman, 2022).

Appendix E - Funding Tools Not Selected for Further Analysis (Cont.)

Other Tools

Regional Sales Surtax

Many US jurisdictions rely significantly on sales taxes to fund public transit service (Litman, 2022). A regional sales surtax would be levied on existing sales taxes within Squamish for the purpose of funding transit service.

Evaluation Criteria:
- Mode Shift: Sales taxes do not affect travel mode shares.
- Implementation: BC already has a provincial sales tax. There tends to be significant public opposition to tax increases, and a referendum to increase regional sales taxes by 0.5% in Metro Vancouver to fund transit service in 2015 was unsuccessful (Willmott, 2017). Applying a similar regional sales surtax in Squamish for the purpose of funding public transit service would require enabling legislation decided through a referendum, which would most likely fail.
- Equity: Sales taxes tend to be regressive, but could be justified to the degree that transit benefits consumers in moving throughout the community (Litman, 2022).
- Alignment with District Policies & Objectives: Introducing a sales surtax does not align with any particular District policies, apart from employing a variety of tools to fund transit improvements per OCP objective 20.15a.
- Revenue: A regional sales surtax could generate any amount of revenue depending on the rate set. Revenues from taxes on sales of particular products may be modest (Litman, 2022).

Precedents: A November 2016 plebiscite administered in Los Angeles County, CA resulted in voters approving a 0.5% sales tax increase to generate $870 million annually to expand transit and active transportation networks (Litman, 2022).

Employee Levy

This levy is paid by employers located in areas with high quality transit service or amenities, such as along a Frequent Transit Network in a municipality. This levy is often only imposed on larger employers (Litman, 2022).

Evaluation Criteria:
- Mode Shift: Changes to mode share would likely be minimal
- Implementation: Could require provincial legislation to enable such a levy to be collected, and would involve moderate costs for initial set up similar to other business taxes and fees (Litman, 2022).
- Equity: Incidence of this levy may substitute for wages, reduce total employment, or even shift employment locations if a large levy is applied in commercial areas of the District. However, it is considered to be relatively fair as commuters create traffic congestion and demand for public transit (Litman, 2022).
- Alignment with District Policies & Objectives: Supports OCP objective 20.15a and policy 20.16a to establish an alternative funding source to support public transit operations, but given that it could have impacts on equity for individual employees it actually does not align well with many objectives in the OCP and CCAP.
- Revenue: Small to moderate revenues may be expected depending on the number of employees covered, and the rate of the levy (Litman, 2022).

Precedents: A 0.6% payroll tax is collected by many employers in larger cities in Oregon to finance public transit service (Litman, 2022).

Appendix E - Funding Tools Not Selected for Further Analysis (Cont.)

Advertising

Most transit agencies and municipalities collect revenues from transit vehicle and bus stop advertising (Litman, 2022). Despite its relative insignificance in funding transit operations and improvements, this tool has been included for consideration since it is easy to expand or implement with new infrastructure such as bus shelters, or new buses.

Evaluation Criteria:
- Mode Shift: No direct impacts to mode share.
- Implementation: Since Squamish already uses advertising at bus stops, expansion should be relatively easy in coincidence with new bus shelters and transit vehicles.
- Equity: No direct impacts to equity.
- Alignment with District Policies & Objectives: No direct correlation with any District policies or objectives as advertising at bus stops as a form of revenue is already established.
- Revenue: Doubling or even tripling revenue may not provide significant increases in revenue, but may be used as part of a funding algorithm (Litman, 2022).

Precedents: The District already uses advertising at bus shelters and transit stops.

Appendix F - Additional Interregional Transit Governance Considerations

Regional District Control

This governance approach is covered by the Local Government Act and British Columbia Transit Act which enable Regional Districts to make agreements with the public authorities including BC Transit (Local Government Act, 2015).

1. Constituent municipalities of a regional district come to an agreement that the regional district will approach BC Transit to initiate a regional transit service.
2. The regional government works with BC Transit to draft a Transit Service Area Agreement, Master Operating Agreement, and other necessary agreements. BC Transit and the regional government must also agree to Annual Operating Agreements.
3. A regional transit bylaw should be used to codify requisitions by the regional government from its constituent municipalities to fund the agreed upon levels and costs of transit service.

Transit Commission

This governance approach requires its own legal mandate which would be achieved through the following steps (BC Transit, 2017; BC Transit, 2021).

1. Expression of Interest: The local governments would each submit a formal expression of interest to participate in a transit commission to the BC Transit Board of Directors. The BC Transit Board would then initiate the process.
2. Developing the Commission: A joint team between the region and BC Transit would be established. This team would develop a service plan, funding model, and governance proposal for the future transit commission.
3. Local Approval: With the proposal completed, the constituent local governments would now approve this in their respective councils.
4. BC Transit Approval: The BC Transit Board of Directors would then approve the proposal (developed in point 2) and make recommendations to the Provincial government to do so.
5. Provincial Government Regulation: The Province would enact the regulations to set up the Commission and appoint its members. Members must be appointed by the Lieutenant Governor in Council from persons holding an elected office on a municipal council or regional district board. The provincial minister responsible must designate the chair of the transit commission.
6. Commission Established: The Regional Transit Commission would be established and would then approve a service plan, tariffs and fares, taxation strategy, and related regulations. The commission would make recommendations to BC Transit regarding its capital and operating budgets.
7. Provincial Government Legislation: The Provincial Government would enact legislation to approve the relevant taxes requested by the Regional Transit Commission. For example, to enact a motor fuel tax, the Provincial Legislature would make appropriate changes to the Motor Fuel Tax Act allowing a fuel tax in the commission's area.

Appendix G – References

- (n.d.). "Regional Districts: Governance and Procedures" in Local Government Act [RSBC 2015] c.1.
- Adli, S. C. (2019). Justice in public transport systems: A comparative study of Auckland, Brisbane, Perth, and Vancouver. Cities, 90, 88-99.
- Adli, S., Chowdhury, S., & Shiftan, Y. (2019). Justice in public transport systems: A comparative. Cities, 90, 88-99.
- Agglomération de Chaumont. (2022). Budget: Transports.
- American Public Association of Transportation. (n.d.). Bicycle & Transit Integration: A Practical Transit Agency Guide to Bicycle Integration and Equitable Mobility. Tech. rep. Retrieved from https://www.apta.com/wp-content/uploads/Bike_Transit_Integrartion_Booklet_APTA-SUDS-UD-RP-009-18.pdf
- Anderson, C. (2017). Incorporating Equity and Resiliency in Municipal Transportation Planning: Case Study of Mobility Hubs in Oakland, California. Transportation Research Record: Journal of the Transportation Research Board, 2653, 65–74. Retrieved from https://journals.sagepub.com/doi/abs/10.3141/2653-08
- Aono, S. (2019). Identifying Best Practices for Mobility Hubs.
- Ardila-Gomez, A., & Ortegon-Sanchez, A. (2016). Sustainable urban transport financing from the sidewalk to the subway: Capital, operations, and maintenance financing. World Bank Group. Retrieved from https://doi.org/10.1596/978-1-4648-0756-5
- Barnes, G. (2005). The Importance of Trip Destinations in Determining Transit Market Share. Journal of Public Transportation, pp. 8(2), 1-15. Retrieved from www.nctr.usf.edu/jpt/pdf/JPT%208-2%20Barnes.pdf
- Bay Area Regional Collaborative. (2021). Bay Area Regional Mobility Hubs Implementation Playbook.
- BC Transit. (2015). Transit Future Plan Okanagan-Similkameen. Retrieved from https://www.rdos.bc.ca/assets/COMMUNITY-SERVICES/Transit/5530-SOK-TF-ExecSummary-WEB.pdf
- BC Transit. (2015). Transit Future Plan Sea to Sky.
- BC Transit. (2017). Sea to Sky Corridor Regional Transit Study.
- BC Transit. (2017). Sea to Sky Transit Corridor - Public Engagement Report Phase 1.
- BC Transit. (2020). Prince George Transit Future Action Plan - Service Design Standards. Retrieved from https://www.bctransit.com/documents/1529712546287
- BC Transit. (2021). Cowichan Valley Regional District / Regional District of Nanaimo Interregional Transit Service Discussion Document. Retrieved from https://www.bctransit.com/documents/1529712254607
- BC Transit. (2022). Fares. Retrieved from Whistler Transit System: https://www.bctransit.com/whistler/fares
- BC Transit. (2022). Fares. Fares. Retrieved from https://www.bctransit.com/whistler/fares
- BC Transit. (2022). Schedules & Maps. Retrieved from Whistler Transit System: https://www.bctransit.com/whistler/schedules-and-maps
- BC Transit. (2022). Sea To Sky. Retrieved from BC Transit: https://www.bctransit.com/sea-to-sky/home
- BC Transit. (2023). Our Fleet. Retrieved from https://www.bctransit.com/about/fleet
- BC Transit. (2023, February 5). Powell River Regional Transit System. Retrieved from BC Transit: https://www.bctransit.com/powell-river/home
- BC Transit. (2023). Umo. Retrieved from https://www.bctransit.com/umo. Umo. Retrieved from https://www.bctransit.com/umo.
- BC Transit. (n.d.). Powell River Regional Transit System. Retrieved from BC Transit: https://www.bctransit.com/about/funding-and-governance/regional

Appendix G – References

- Beck, W., & Mis, M. (2010). Right-Sizing Transit: What is a reasonable level of transit investment? Transportation Association of Canada. Retrieved from https://www.ruralontarioinstitute.ca/uploads/userfiles/files/Right%20Sizing%20Transit-What%20is%20a%20reasonable%20level%20of%20investment%20TAC%20Sept2010.pdf
- Bell, J. (2023). BC Transit deploying dozens of new lower-emission busses. Times Colonist. Retrieved from https://www.timescolonist.com/local-news/bc-transit-deploying-dozens-of-new-lower-emi
- Bernard, R. (2016). Vehicle levy could once again be on the table for Metro Vancouver. CityNews Vancouver. Retrieved from https://vancouver.citynews.ca/2016/03/04/vehicle-levy-could-once-again-be-on-the-table-for-metro-vancouver/
- Birch, L. (2017). Transit fare integration: Lessons for Toronto from around the world. Institute on Municipal Finance and Governance, Munk School of Global Affairs.
- British Columbia Assessment Authority. (2022). BC Assessment Maps. Retrieved from https://bcagis.maps.arcgis.com/apps/MapSeries/index.html?appid=ba3d56fb4c144727896b25989bdf00d2
- British Columbia Government. (n.d.). Refund for Persons with Disabilities. Retrieved from https://www2.gov.bc.ca/gov/content/taxes/sales-taxes/motor-fuel-carbon-tax/refund-disabilities
- British Columbia Ministry of Finance & Ministry of Energy, Mines and Petroleum Resources. (2021). Tax Rates on Fuels. Retrieved from https://www2.gov.bc.ca/assets/gov/taxes/sales-taxes/publications/mft-ct-005-tax-rates-fuels.pdf
- British Columbia Ministry of Finance. (2018). Sales Tax Act - Motor Fuel Tax - Fuel Tax Refund Program for First Nations - Policy MFT-CT-002. Retrieved from https://www2.gov.bc.ca/assets/gov/taxes/sales-taxes/publications/mft-ct-002-sales-first-nations-fuel-tax-exemption-program.pdf
- British Columbia Transit Act [RSBC 1996]. (n.d.). c.38.
- Bruntlett, M., & Bruntlett, C. (2021). Curbing Traffic: The Human Case for Fewer Cars in Our Lives. Island Press.
- Burchell, J., Ison, S., Enoch, M., & Budd, L. (2019). Implementation of the workplace parking levy as a transport policy instrument. Journal of Transport Geography, 80, 102543. doi:10.1016/j.trangeo.2019.201543
- Burkhardt, J. (2005). Successful coordinated transportation services in rural communities: Transit: Bus, rural public and intercity, and paratransit. Transportation Research Record, 1903, 54-61.
- Cache Valley Transit District. (2022). Cache Valley Transit. Retrieved from https://cvtdbus.org
- CANA Group of Companies. (2023). The Station at Cochrane Crossing. The Station at Cochrane Crossing.
- Canadian Institute of Plannera. (2019). Policy on Planning Practice and Reconciliation.
- CarPostal. (n.d.). Retrieved from À propos de CarPostal: https://www.postauto.ch/fr/%C3%A0-propos-de-carpostal
- Champaign Urbana Urbanized Area Transportation Study. (n.d.). Long Range Transportation Plan. Retrieved from https://ccrpc.gitlab.io/lrtp2045/existing-conditions/land/
- Champaign-Urbana Mass Transit District. (2022). Maps. Retrieved from https://mtd.org/maps-and-schedules/maps/
- Chan, K. (2022). It's official: Vancouver City Council puts an end to the road tolls plan. It's official: Vancouver City Council puts an end to the road tolls plan. Daily Hive: Urbanized. Retrieved from https://dailyhive.com/vancouver/abc-vancouver-city-council-rejects-road-tolls-decision-final.
- Chau, A., Ko, F., Senghera, J., & Ruhland, C. (2022). Moving Beyond The Car. In Prepared for District of Squamish from School of Community & Regional Planning students. Retrieved from https://scarp.ubc.ca/media/3200

Appendix G - References

- City of Abbotsford. (2019). City of Abbotsford and Fraser Valley Regional District - Transit Expansion Initiatives. Retrieved from https://abbotsford.civicweb.net/document/55543/
- City of Abbotsford. (2019). City of Abbotsford and Fraser Valley Regional District - Transit Expansion Initiatives. Retrieved from https://abbotsford.civicweb.net/document/55543/
- City of Clemson. (2014). Map & Schedules. Retrieved from https://www.catbus.com/
- City of Clemson. (2019). 2024 Comprehensive Plan. Retrieved from https://www.clemsoncity.org/Portals/0/CoCDepartments/Planning%20and%20Codes/Comp%20Plan%20Updates%2010-16-2019/Chapter%208-%20Transportation%20-%20Final%20PC%20Draft.pdf
- City of Halifax. (2022). Tax Rates. Tax Rates. Retrieved from https://www.halifax.ca/home-property/property-taxes/tax-rates
- City of Los Angeles. (2016). Mobility Hubs: A Reader's Guide. Retrieved from http://www.urbandesignla.com/resources/docs/MobilityHubsReadersGuide/hi/MobilityHubsReadersGuide.pdf
- City of Melbourne. (2004). Places for People. Places for People. Retrieved from www.melbourne.vic.gov.au/AboutCouncil/PlansandPublications/Pages/PlacesforPeople2004.aspx
- City of North Vancouver. (2018). GoCNV. GoCNV. Retrieved from https://www.cnv.org/city-services/streets-and-transportation/sustainable-transportation/gocnv
- City of North Vancouver. (2020). 2019 North Shore Transportation Survey Report. North Vancouver.
- City of Powell River. (2014). Sustainable Official Community Plan. Powell River, BC.
- City of Powell River. (2022). Powell River Transit Analysis & Recommendations. Powell River.
- City of Richmond. (2021). Vision 2040 Richmond. Retrieved from https://buildrichmondky.com/wp-content/uploads/2021/11/CompPlan.Adopted.20211026.pdf
- City of Rockville. (2021). Comprehensive Plan of the City of Rockville, Maryland. Retrieved from https://www.rockvillemd.gov/DocumentCenter/View/46399/City-of-Rockville-Comprehensive-Plan-Optimized?bidId=
- City of Toronto. (n.d.). 2023 Operating Budget Briefing Note: Potential Implementation 2023. Retrieved from https://www.toronto.ca/legdocs/mmis/2023/bu/bgrd/backgroundfile-233982.pdf
- Citygreen. (n.d.). Jurong Smart Bus Station Singapore. Retrieved from https://citygreen.com/case-studies/jurong-smart-bus-station-singapore/
- clutch Blog. (2021, January 28). A Quick Guide to Motor Vehicle Registration in Canada. Retrieved from Clutch Blog: https://blog.clutch.ca/posts/motor-vehicle-registration
- Cmonbus. (n.d.). Tarifs et titres de transport. Retrieved from Cmonbus: réseau de transport en commun de l'agglomération de Chaumont: https://www.cmonbus.com/fr/eB0-Tarifs-et-titres-de-transport.html
- Cmonbus, Agglomération de Chaumont. (n.d.). Cmon guide de bus 2022-2023.
- Cochrane On-Demand Local Transit. (2022). Services. Retrieved from Cochrane On-Demand Local Transit: https://ridecolt.ca/services/
- Cochrane On-Demand Local Transit. (2022). Services. Services. Retrieved from https://ridecolt.ca/services/
- Cochrane On-Demand Local Transit. (2023). Bus Stops. Bus Stops. Retrieved from https://ridecolt.ca/bus-stops/
- Cooper, D. (2022). Sustainable Funding Tools for Edmonton Transit. Leading Mobility Consulting. Retrieved from https://www.leadingmobility.com/s/sustainable-funding-tools-report.pdf
- Cooper, D. (2022). Sustainable Funding Tools for Edmonton Transit. Leading Mobility Consulting. Retrieved from https://www.leadingmobility.com/s/sustainable-funding-tools-report.pdf

Appendix G - References

- County of Kings. (2012). Kings 2050 Background Paper 9: Transportation. Retrieved from https://www.countyofkings.ca/upload/All_Uploads/Living/services/planning/Kings2050/Reports/Background%20Reports/Transportation/2050%20Transportation%20Background%20Paper%20with%20Maps.pdf
- County of Kings. (2020). Kings Transit Authority 2020/21 Operating and Capital Budgets. Retrieved from https://www.countyofkings.ca/upload/All_Uploads/COUNCIL/Meeting_Documents/COTW/2020/2020-03-17%20COTW/reports/kta.pdf
- de Araujo, R. G. (2020, November). Martigny, two thousand years in the Alps. Retrieved from itsukatrip: https://itsukatrip.com/en/martigny-two-thousand-years-in-the-alps/
- DeGood, K. (2012). Thinking outside the farebox: Creative Approaches to Financing Transit Projects. Transit for America.
- Dennis, A. (2021). Enviro200. Retrieved from https://www.alexander-dennis.com/media/85871/enviro200.pdf
- District of Squamish & BC Transit. (2022). Transit Future Action Plan.
- District of Squamish. (2011). 2031 Multimodal Transportation Plan.
- District of Squamish. (2016). 2016-2020 Parking Strategy.
- District of Squamish. (2017). 2017 Downtown Parking Study. ISL Engineering.
- District of Squamish. (2017). Squamish 2040: Official Community Plan.
- District of Squamish. (2020). Climate Community Action Plan.
- District of Squamish. (2020). Low & Smarth Growth Neighbourhood Incentive Programs.
- District of Squamish. (2022). 2022 Transit Future Action Plan and Free Summer Weekend Transit.
- District of Squamish. (2022). District of Squamish Official Community Plan Bylaw 2500,2017.
- District of Squamish. (2022). Property Taxes.
- District of Squamish. (N/A). Cycling in Squamish. Retrieved from https://squamish.ca/assets/Squamish_cycling_map.pdf#page=2
- Dubé, M.-A. (2016, April 26). Transport Vas-Y, votre transport collectif local! Retrieved from Rumeur du Loup: https://www.rumeurduloup.com/transport-vas-y-votre-transport-collectif-local/
- Dupuis, B. (2022). Opinion: Should Whistler make transit free forever? Pique News Magazine.
- Dupuis, B. (2022). Opinion: Should Whistler make transit free forever? Pique News Magazine. Retrieved from https://www.piquenewsmagazine.com/opinion/opinion-should-whistler-make-transit-free-forever-5709206
- Ewing, R. (1995). Beyond Density, Mode Choice, and Single-Purpose Trips. Transportation Quarterly, pp. 49(4), 15-24.
- Ewing, R., & Cervero, R. (2010). Travel and the Built Environment: A Meta-Analysis. Journal of the American Planning Association, 76 (3), 265-294.
- Federation of Canadian Municipalities. (2020). Innovative on-demand transit system gets Cochrane, AB, residents where they're going. Retrieved from Green Municipal Fund: https://greenmunicipalfund.ca/case-studies/case-study-innovative-demand-transit-system-gets-cochrane-ab-residents-where-theyre
- Fergusson, D. (2023, February 9). Interview with Powell River. (C. French, B. Mumford, W. Harris, & M.-W. Chung, Interviewers)
- Fournier, M.-C. (2019, December 2). Transports en commun gratuits : une réalité dans une trentaine de villes de France. Retrieved from FranceBleu.fr: https://www.francebleu.fr/infos/transports/transports-en-commun-gratuits-ce-qui-existe-ailleurs-en-france-1575304553
- Frank, L., Bradley, M., Kavage, S., Chapman, J., & Lawton, T. (2008). Urban form, travel time and cost relationships with tour complexity and mode choice. Transportation (Dordrecht), pp. 35(1), 37-54.

Appendix G – References

- Frank, L., Dirks, N., & Walther, G. (2021). Improving rural accessibility by locating multimodal mobility hubs. Journal of Transport Geography, 94, 103111. doi:10.1016/j.jtrangeo.2021.103111
- Global News. (2023). Quest University in Squamish, B.C. to close in April. Global News - The Canadian Press.
- Google. (2022, December 2). Map of North America and Western Europe. Retrieved from https://www.google.com/maps/d/edit?mid=1P0NjE_jKS-ja_hlAQ5AhVroECzNST6g&usp=sharing
- Great Falls Transit District. (2022). Home. Retrieved from https://www.gftransit.com/
- Guilbault, J.-P. (2022, March 8). Citébus de Rimouski : comment faire entrer le réseau en 2022. Retrieved from Radio-Canada ICI Bas-Saint-Laurent: https://ici.radio-canada.ca/nouvelle/1866899/refonte-autobus-rimouski-citebus-urbanisme-str-circuits-infrastructures
- Gunn, D. (2022). Transit 2022-23 Annual Operating Agreement and transit provision. Retrieved from https://squamish.civicweb.net/FileStorage/F4C301555FCB4DFD8A8466B8385C9598-Tr
- Harmony, X. & Northeast Corridor Commission. (2018). Fare policy and vertical equity: The trade-off between affordability and cost recovery. Journal of Public Transportation, pp. 21(2), 41-59. Retrieved from https://doi.org/10.1007/s1116-007-9236-6
- Hoover, E., Cook, K., Sanchez, K., Waghiyi, V., Miller, P., Dufault, R., . . . Carpenter, D. (2012). Indigenous Peoples of North America: Environmental Exposures and Reproductive Justice. Environmental Health Perspectives, pp. 120(12) 1645-1649.
- Institut national de la statistique et des études économiques. (2022). Dossier complet - Commune de Chaumont.
- Insurance Corporation of British Columbia. (2023, February 24). Vehicle Population - Passenger Vehicles-2021. Retrieved from Tableau Public: https://public.tableau.com/app/profile/icbc/viz/VehiclePopulation-PassengerVehicles-2021/2021PassengerVehicles
- Ison, S. &. (2014). Parking: Issues and Policies. Emerald. Retrieved from https://doi.org/10.1108/S2044-994120145
- Jobs & Careers | Tremblant. (n.d.). Retrieved from Mont-Tremblant Resort: Mont-Tremblant Resort
- K. Raerino (Ngāti Awa, T. A. (2013). Indigenous Maori perspectives on urban transport patterns linked to health and wellbeing. Health & Place, 23, 54-62.
- Karlsson, I. C., Mukhtar-Landgren, D., Smith, G., Koglin, T., Kronsell, A., Lund, E., . . . Sochor, J. (2020). Development and implementation of mobility-as-a-service – A qualitative study of barriers and enabling factors. Transportation Research. Part A, Policy and Practice, 131, 283–295. doi:10.1016/j.tra.2019.09.028
- Kentucky River Foothills Development Council Inc. (n.d.). Transportation Services. Retrieved from https://foothillscap.org/programs/transportation-department/
- Kings Transit Authority. (2022). My Kings Transit. Retrieved from http://www.kbus.ca
- Kirk, M. (2017). Singapore May Have Designed the World's Best Bus Stop. CityLab. Retrieved from https://www.citylab.com/commute/2017/03/singaporemay-have-designed-the-worlds-best-bus-stop/518226/
- Kitchen, H., & Slack, E. (2016). More Tax Sources for Canada's Largest Cities: Why, What, and How? Toronto: Institute on Municipal Finance and Governance. Retrieved from https://tspace.library.utoronto.ca/handle/1807/81209
- Kitsap Transit. (2022). 2022-2027 Transit Development Plan. Retrieved from https://www.kitsaptransit.com/uploads/pdf/planning/2022-2027transitdevelopmentplan.pdf

Appendix G – References

- Kitsap Transit. (2022, February 24). Kitsap Transit - Current System Map. Retrieved from https://www.kitsaptransit.com/uploads/pdf/system-maps/current-system-map-february24.pdf
- Kitsap Transit. (2022). Kitsap Transit Long-Range Transit Plan - ArcGIS StoryMap. Retrieved from https://storymaps.arcgis.com/stories/09da1c685c8c41c7bcc660d3ec232ae3
- Kitsap Transit. (2022). Long Range Transit Plan Report. Retrieved from https://www.kitsaptransit.com/uploads/pdf/planning/lrtpreport_6dec2022.pdf
- Kittelson and Associates Inc. (2016). Tillamook Country Transportation District: Transit Development Plan. Retrieved from https://www.nworegontransit.org/wp-content/uploads/2018/10/TCTD-LRTDP-FINAL.pdf
- Lignes urbaines. (n.d.). Retrieved from Cmonbus: réseau de transport en commun de l'agglomération de Chaumont: https://www.cmonbus.com/fr/DOb-Lignes-urbaines.html
- Litman, T. (2012). Transit price elasticities and cross-elasticities. Victoria Transport Policy Institute.
- Litman, T. (2014). Evaluating Public Transportation Local Funding Options. Journal of Public Transportation, 17(1)2014.
- Litman, T. (2022). Local funding options for public transportation. Retrieved from https://vtpi.org/tranfund.pdf
- Ljungberg, A. (2016). Marginal cost-pricing in the Swedish transport sector – an efficient and sustainable way of funding local and regional public transport in the future? Research in Transportation Economics, 59, 159–166. doi:10.1016/j.retrec.2016.05.005
- Local Government Act. RSBC 2015. c.1. (n.d.).
- Lowe, K., & Hall, E. (2019). New starts, growing inequities: Federal and local public transit funding. Public Works Management & Policy, 24, 301–314. doi:10.1177/1087724X18808533
- LSC Transportation Consultants. (2017). Cache Valley Short-Range Transit Plan. Retrieved from https://cvtdbus.org/wp-content/uploads/2018/09/CVTD-SR-Transit-Plan-Accessible.pdf
- Martigny en chiffres. (2021, 12 31). Retrieved from Ville de Martigny: https://www.martigny.ch/fr/martigny-chiffres-3072.html
- Modification circuit 31. (2022, June 22). Retrieved from Société des Transports de Rimouski: https://www.rimouskibus.com/n/modification-circuit-31
- Montana Department of Transportation. (2018). Great Fall Areas- Long Range Transportation Plans. Retrieved from https://www.mdt.mt.gov/publications/docs/brochures/great-falls-transportation-plan.pdf
- Montgomery County Department of Transportation. (2020). Ride on Flex Microtransit Performance Assessment. Retrieved from https://www.montgomerycountymd.gov/DOT-Transit/Resources/Files/timetables/Flex%20Microtransit%20Performance%20Assessment%20-%20Final%20Report%20-%20Updated%202_11_2021.pdf
- Montgomery County Division of Transit Services. (2022). Transit Services FY23 Budget. Retrieved from https://www.montgomerycountymd.gov/OMB/Resources/Files/omb/pdfs/FY23/psp_pdf/53-TransitServices-FY2023-APPR-Publication-Report.pdf
- Mont-Tremblant - Transport en Commun. (n.d.). Retrieved from Zenbus: http://zenbus.net/publicapp/web/tcmt?line=546280001&itinerary=774600028
- Morrall, J., & Bolger, D. (1996). The relationship between downtown parking supply and transit use. The relationship between downtown parking supply and transit use.
- National Association of City Transportation Officials. (2014). Bike Parking and Storage at Transit. Island Press. Retrieved from https://nacto.org/wp-content/uploads/2014/09/NACTO_Bike-Parking_Transit.pdf

- National Association of City Transportation Officials. (n.d.). Reliability matters . Retrieved from Transit Street Design Guide: https://nacto.org/publication/transit-street-design-guide/introduction/why/reliability-matters
- Nelson, S. &. (2021). Age-Friendly Cities and Older Indigenous People: An Exploratory Study in Prince George, Canada. Canadian Journal on Aging, 41(2).
- Nelson, S., & Rosenberg, M. (2021). Age-Friendly Cities and Older Indigenous People: An Exploratory Study in Prince George, Canada. Canadian Journal on Aging, 41.
- Ng, W. (2014). Assessing the impact of parking pricing on transportation mode choice and behavior. Assessing the impact of parking pricing on transportation mode choice and behavior.
- Nieuwenhuijsen, M. (2020). Urban and Transport Planning Pathways to Carbon Neutral, Liveable and Heathy Cities; A Review of the Current Evidence. Environment International, 140 - 105661. Retrieved from https://doi.org/10.1016/j.envint.2020.105661
- Northwest Oregon Transit. (2022). Tillamook Country Transportation District.
- O'Connell, L., Siria, B., & Grossardt, T. (2002). Bringing Fixed-Route Transit Service to Small Cities and Towns: Potential Contribution of Existing Demand-Response Brokerages. Journal of the Transportation Research Board.
- Office of the Auditor General of British Columbia. (2013). An audit of the management of major capital projects. Retrieved from https://www.bcauditor.com/online/pubs/812/825#
- On-It Regional Transit. (n.d.). On-It Regional Transit. Retrieved from Cochrane Commuter: https://www.onitregionaltransit.ca/cochrane-commuter/
- Oregon Department of Transportation. (2018). Transit Development Plan Guidebook. Transit Development Plan Guidebook. Retrieved from https://www.oregon.gov/lcd/Publications/TDP-Guidebook.pdf
- Perry, A., Thorpe, J., & Duhamel, K. (2021). Missing the Bus: Indigenous Women and Two-Spirit Plus People and Public Transit in Western Canada. Missing the Bus: Indigenous Women and Two-Spirit Plus People and Public Transit in Western Canada. Retrieved from https://chrr.info/wp-content/uploads/2022/02/Perry-Duhamel-Thorpe-et-al-KSG-Final-Report-15-December-2021.pdf
- Plourde, G. (2022, September 6). Tremblant offrira un transport en commun zéro émission et gratuit dès 2023. Retrieved from CIME Laurentides: https://laurentides.cime.fm/nouvelles/505986/tremblant-offrira-un-transport-en-commun-zero-emission-et-gratuit-des-2023
- Polzin, S. E. (1999). Transportation land-use relationship: Public transit's impact on land use. Journal of Urban Planning and Development, 125, 135–151. doi:10.1061/(ASCE)0733-9488(1999)125:4(135)
- qathet Regional District. (2018). Fare Structure Review. Powell River, BC.
- Radio-Canada. (2021, December 14). Transport en commun à Rimouski : le nombre de trajets de bus doublerait. Retrieved from https://ici.radio-canada.ca/nouvelle/1847549/rimouski-citebus-str-circuits-trajets-autobus-bus-transport-commun-bonification
- Raerino, K., MacMillan, A., & Jones, R. (2013). Indigenous Maori perspectives on urban transport patterns linked to health and wellbeing. Health & Place, 23, 54–62.
- Raibmon, P. (2005). Handicapped by distance and transportation: Indigenous Relocation, Modernity and Time-Space Expansion. American Studies.
- Regional District of Nanaimo. (2021). Annual Operation Agreement. Retrieved from https://rdn-pub.escribemeetings.com/filestream.ashx?DocumentId=17391
- Regional District of Okanagan-Similkameen. (2015). RDOS Area "D" Governance Study. Retrieved from https://www.rdos.bc.ca/assets/admin/Area-D-Governance/TransitFactSheet.pdf

Appendix G - References

- Regional District of Okanagan-Similkameen. (2016). South Okanagan Transit Service Bylaw. Retrieved from https://www.rdos.bc.ca/assets/bylaws/Community Services/Sout-Okanagan-Transit-BylawBL2741.pd
- Resort Municipality of Whistler. (2018). Let's Move Whistler: An Active Transportation Plan. Retrieved from Resort Municipality of Whistler: https://www.whistler.ca/services/transportation/enhancing/lets-move-whistler-active-transportation-plan
- Resort Municipality of Whistler. (2018). Official Community Plan. Retrieved from Resort Municipality of Whistler: https://www.whistler.ca/ocp/reconciliation-lilwat-nation-and-squamish-nation
- ROAM Transit. (2022, November 12). Canmore Local. Retrieved from ROAM Transit: https://roamtransit.com/schedules-routes/canmore-local-route-five/
- Schwieterman, J. F. (2008). The Growth of Intercity Bus Service. Chaddick Institute for Metropolitan Development.
- Setra. (n.d.). The Multi-Class 400: Welcome to Infinite Possibilities. Brochure. Retrieved from https://www.lectura-specs.com/en/datasheet-viewer/68434
- Sharaby, N., & Shiftan, Y. (2012). The impact of fare integration on travel behavior and transit ridership. Transit Policy, 21, 63–70. doi:10.1016/j.tranpol/2012.01.015
- Shi, X. M., A., V., Hurvitz, P. M., Mooney, S. J., Zhou, C., & Saelens, B. E. (2021). Does improving stop amenities help increase bus rapid transit ridership? Findings based on a quasi-experiment. Transportation Research Interdisciplinary Perspectives, 10, 100323. doi:10.1016/j.trip.2021.100323
- Shoup, D. (2017). The High Cost of Free Parking. Routledge.
- Sivakumaran, K. L. (2012). Cost-saving properties of schedule coordination in a simple trunk-and-feeder transit system. Transportation Research Part A: Policy and Practice, 46(1) 131-139.
- Société des Transports de Rimouski. (n.d.). Taxibus. Retrieved from Société des Transports de Rimouski: https://www.rimouskibus.com/pages/taxibus
- South Coast British Columbia Transit Authority. (2022). Bylaw Number 144-2022. Retrieved from https://www.translink.ca/-/media/translink/documents/about-translink/governance-and-board/bylaws/144_2022_property_tax_bylaw.pdf
- Squamish Connector. (2023). Retrieved from https://www.squamishconnector.com/. Retrieved from https://www.squamishconnector.com/.
- Stafford, J., & Rovelo, R. (2022, November 16). (C. French, W. Harris, B. Mumford, & M.-W. Chung, Interviewers)
- Stantec. (2015). Town of Blackfalds 2015 Transportation Master Plan. Blackfalds.
- Statistics Canada. (2017). 2016 Census of Population. Retrieved from https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/index-eng.cfm
- Statistics Canada. (2022). 2021 Census of Population. Retrieved from Statistics Canada: https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E
- Tang, Y. (2023, February 9). Interview with Town of Cochrane. (C. H. French, Interviewer)
- Tang, Y., French, C., Harris, W., Chung, M., & Mumford, B. (2023, February 9). Interview with Town of Cochrane. Personal.
- Toop, E., Scaletta, A., & Cooper, D. (2022). Powell River Transit Analysis and Recommendations.
- Town of Blackfalds. (2020). Blackfalds On-Demand Local Transit Frequently Asked Questions. Retrieved from https://www.blackfalds.ca/Home/DownloadDocument?docId=b598dfcd-c11a-42a6-ab6f-c736eff08e97
- Town of Blackfalds. (2022). Blackfalds On-Demand Local Transit. https://www.blackfalds.ca/Home/DownloadDocument?docId=cc1f871c-dd74-49d0-b205-2f97b6cd1013 .

Appendix G – References

- Town of Blackfalds. (2022). Land Use Bylaw. https://blackfalds.municipalwebsites.ca/ckfinder/connector?command=Proxy&lang=en&type=Files&currentFolder=%2FGovernment%2FPlanning%20and%20Development%2F&hash=c245c263ce0eced480effe66bbede6b4d46c15ae&fileName=LUB%201268_22%20Revised%20July%207%2C%202022.p.
- Town of Canmore. (2016). Canmore Municipal Development Plan. Retrieved from Town of Canmore: https://canmore.ca/municipal-services/residents-development-planning/planning-reference/guiding-documents
- Town of Canmore. (2022, November 11). Paid Parking Program. Retrieved from Town of Canmore: https://canmore.ca/projects/transportation-projects/paid-parking-fare-free-transit
- Town of Canmore. (2022, November 10). Town of Canmore. Retrieved from Town of Canmore: https://canmore.ca/
- Town of Cochrane. (2017). Connecting Cochrane (Transportation Master Plan.
- Town of Vail. (2009). Vail Transportation Master Plan. Vail, CO.
- Town of Vail. (2022, May 17). Code of Ordinances. Retrieved from Town of Vail: https://codelibrary.amlegal.com/codes/vailco/latest/vail_co/0-0-0-1
- Town of Vail. (2022). Recreation Path System. Retrieved from Town of Vail: https://www.vailgov.com/government/departments/public-works/parks-recreation-and-open-space/recreation-path-system
- Town of Vail. (2022). Town of Vail - Transportation Services. Vail, CO.
- BC Transit (2018). Infrastructure Design Guidelines. Infrastructure Design Guidelines. Retrieved from https://www.bctransit.com/documents/1507213417526
- Kitsap Transit. (2022). 2022 - 2027 Transit Development Plan. Retrieved from https://www.kitsaptransit.com/uploads/pdf/planning/2022-2027transitdevelopmentplan.pdf
- On-It Regional Transit. (2022). Cochrane Commuter. Cochrane Commuter. Retrieved from https://www.onitregionaltransit.ca/cochrane-commuter/
- TransLink. (2012). Transit-Oriented Communities Design Guidelines. Transit-Oriented Communities Design Guidelines. Retrieved from https://www.translink.ca/-/media/translink/documents/plans-and-projects/managing-the-transit-network/transit_oriented_communities_design_guidelines.pdf
- TransLink. (2018). Transit Service Guidelines. Retrieved from https://www.translink.ca/-/media/translink/documents/plans-and-projects/managing-the-transit-network/transit-services-guidelines-public-summary.pdf#view=fitH
- TransLink. (2020). Evaluation of Land Capture and Urban Development as Sources of Revenue for TransLink. Evaluation of Land Capture and Urban Development as Sources of Revenue for TransLink. Retrieved from https://tenyearvision.translink.ca/-/media/translink/documents/plans-and-projects/ten-year-investment-plan/funding/land-value-capture-report.pdf
- Translink. (2021). Free WiFi rollout begins on Translink Vehicles. Retrieved from https://www.translink.ca/news/2021/october/free%20wifi%20rollout%20begins%20on%20translink%20vehicles
- Translink. (2022). 2022 Investment Plan. Retrieved from https://www.translink.ca/-/media/translink/documents/plans-and-projects/ten-year-investment-plan/vision/2022_investment_plan.pdf
- TransLink. (2023). Taxes & Charges. Retrieved from https://www.translink.ca/about-us/about-translink/taxes-and-charges#:~:text=Cha
- Transport Canada. (2009). Improving Travel Options in Small Communities. Improving Travel Options in Small Communities. Retrieved from https://publications.gc.ca/collections/collection_2010/tc/T22-184-2009-eng.pdf

Appendix G - References

- Transport Vas-y. (n.d.). Retrieved from Accès au service: https://www.transportvasy.qc.ca/index.php
- Traynor, T. L. (1994). The effects of varying safety conditions on the external costs of driving. Eastern Economic Journal, 20(1), 45-60.
- Triana, S., Sjafruddin, A., Karsaman, R. H., & Kaderi, S. (2022). Integration of mass public transport fare in the Jakarta area. IOP Conference Series. Earth and Environmental Science, 1065, 12056. doi:10.1088/1755-1315/1065/1/012056
- Tung, A. (2019). New Express buses improve accessibility on long-haul, suburban routes. TransLink - The Buzzer Blog.
- U.S. Energy Information Administration. (n.d.). Use of Gasoline. Energy Explained. Retrieved from https://www.eia.gov/energyexplained/gasoline/use-of-gasoline.php.
- United States Census Bureau. (2022). 2022 Census - QuickFacts. Retrieved from https://www.census.gov/quickfacts/fact/table/US/PST045221
- City of North Vancouver. (2022). Mobility Strategy. Mobility Strategy. Retrieved from https://www.cnv.org/-/media/City-of-North-Vancouver/Documents/Transportation-Resources/Mobility-Strategy-2022.ashx
- Ville de Martigny. (2022). Budget 2023.
- Ville de Martigny. (n.d.). Transports. Retrieved from Ville de Martigny: https://www.martigny.ch/fr/transports-publics-1036.html
- Ville de Mont-Tremblant. (n.d.). Budget 2022.
- Voyageurs. (n.d.). Retrieved from TMR SA: https://www.tmrsa.ch/voyageurs/
- Wang, Y. (2018). Data-Driven Optimization Models for Feeder Bus Network Design. The University of Wisconsin-Milwaukee.
- Washington Metropolitan Area Transit Authority. (2022). FY 2023 Proposed Budget. Retrieved from https://www.wmata.com/about/records/upload/FY2023-Proposed-Budget-Final-12-7-21.pdf#page=89
- Washington State Employment Security Department Labor Market Information Divison. (n.d.). Kitsap County Profile. Retrieved from https://esd.wa.gov/labormarketinfo/county-profiles/kitsap
- Whistler Skylynx. (2023). Retrieved from https://yvrskylynx.com/. Retrieved from https://yvrskylynx.com/.
- Williamson, C. (2018). NYC MTA On The Go Interactive Kiosks to Make Navigation Easy. Design Milk.
- Willmott, K. (2017). Taxpayer governmentality: Governing government in Metro Vancouver's transit tax debate. Economy and Society, pp. 46(2) 255-274.
- Willson, R. &. (1990). Parking subsidies and travel choices: assessing the evidence. Transportation, 17 141-157.
- Zukowski, D. (2022). Transit agencies can't hire enough drivers to keep the buses running. Smart Cities Dive. Transit agencies can't hire enough drivers to keep the buses running. Smart Cities Dive. Retrieved from https://www.proquest.com/docview/2718014024?accountid=14656&pq-origsite=summon
- Zunga Bus. (n.d.). Hanna on the Zunga, image. Retrieved from https://zungabus.ca/wp-content/uploads/2021/02/Hanna-on-the-Zunga.jpg