Benchmarking the State of Cycling in Metro Vancouver

2019

HUB

TRANSLINK

FUNDER ACKNOWLEDGEMENTS

Benchmarking the State of Cycling in Metro Vancouver was made possible through funding from the BC Ministry of Social Development Employment Program (funded by the Governments of BC and Canada), the Real Estate Foundation of British Columbia, and TransLink. Special thanks to additional sponsors Bunt & Associates, Binnie, McElhanney, and Urban Racks.

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A Message from the HUB Cycling President

Benchmarking the State of Cycling in Metro Vancouver began as a vision of HUB Cycling's Board of Directors and we are pleased to see this important project reach fruition. It could not have been completed without the energetic support and involvement of TransLink and local governments throughout the region, who provided vital resources, data, and feedback.

For policy makers, researchers, and the public, this comprehensive report offers an up-to-date picture of our bicycle route infrastructure and its links to cycling trips and cycling safety.

Throughout the region, in areas where the network has grown and improved, the rate of collisions involving people who cycle has dropped, and cycling trips have increased significantly. The largest gains have been made where homes and key destinations are linked by a cohesive network of cycling routes Comfortable for Most People and where programs and policies encourage cycling and protect vulnerable road users.

There are now clear opportunities to expand and connect local networks; building on existing strengths to increase transportation equity with more facilities comfortable for all. Throughout Metro Vancouver, most trips are under 5 km and new trends such as e-bikes are making cycling accessible to more people. A regional approach to cycling offers the potential to create modern cycling connections within and between municipalities, for residents who work and live outside of the metropolitan core.

This report, along with a growing body of research from North America and Europe suggests that where cycling rates are highest, economies are most healthy, pollution and greenhouse gas emissions from transportation are lowest, collision rates involving vulnerable road users are lowest, and health outcomes are the best.

To meet demands for our future, we must take action today. With Benchmarking the State of Cycling in Metro Vancouver, we are pleased to offer regional and municipal authorities the data, direction, and rationale to guide substantive investment in regional cycling and achieve significant positive impacts on transportation, public health, the economy and environment.

Sincerely,

Derik Wenman
HUB Cycling President

Vancouver
Bicycle Coalition

A Message from the CEO of Translink

Metro Vancouver's Regional Transportation Strategy commits the region to designing our communities and transportation system in such away that half of all trips can be made through walking, cycling, and transit. This sustainable mode share goal has been around since the 1990s and remains as relevant as ever today. Beyond supporting regional objectives, with careful planning and strategic investments, cycling can contribute towards improving affordability, convenience, connectivity, and health outcomes for residents of communities across the region.

Metro Vancouver is growing. Over the coming years, an increasing number of people and goods will need to travel on an increasingly congested transportation network. At the same time, we face environmental factors and broader impacts on livability in the region, due to the specter of climate change. To combat this, we must leverage every tool in our toolbelt, and we know cycling is part of the solution:

1. Cycling is an affordable option for commuters and a cost-effective investment for helping the region meet ambitious goals for supporting more travel via sustainable modes.
2. Cycling is a zero-emission transportation option, as we take steps toward mitigating the worst impacts of climate change as identified by the global community of scientists.
3. Cycling is extremely space-efficient, and getting more people cycling frees up space on our crowded roads and transit system, which is particularly important during busy commute times but increasingly so at other times with the growing spread of congestion.

As the region's transportation authority, we've been making significant investments to continue the expansion of safe and reliable transportation services – now, and in the future. The Mayors' Council 10-Year Vision identified that the key to unlocking cycling's potential is to invest in traffic-protected bikeways that provide the safety and comfort needed to support cycling by people of all ages and abilities. We're also making cycling easier for customers by expanding our offering of bike parkades, making more space for bikes on SkyTrain, and updating policies to allow buses to transport e-bikes. The Phase One and Two Investment Plans have enabled funding to support this important work in partnership with local governments, and much remains to be done.

TransLink and HUB Cycling understand that we can only improve on what we are able to measure. The delivery of Benchmarking the State of Cycling in Metro Vancouver marks an important milestone by establishing a resource by which we can measure the progress of increasing cycling and improving cycling safety.

Sincerely,

Kevin Desmond
Translink Chief Executive Officer

Key Takeaways

Benchmarking the State of Cycling in Metro Vancouver was developed by HUB Cycling and TransLink to provide a snapshot of the extent and quality of bikeways across the Metro Vancouver region in 2019.

Additionally, this report notes trends related to the rates at which people living in Metro Vancouver are cycling, documents rates of collisions involving people cycling, and details the extent to which cycling-supportive policies and practices are in place.

Through reporting on the bikeway network and trends in cycling-related data, this report offers an up-to-date picture of cycling across the region and is meant to serve as a benchmark against which progress can be measured.

SOME OF THE KEY FINDINGS OF THIS WORK INCLUDE:	METRO VANCOUVER REGION
Bikeway Network (extent of bikeways measured in lane kilometres) (% of network Comfortable for Most) (% of population within 400m of a route Comfortable for Most)	2019 – **4,595 km** 2019 – **46%** 2019 – **65%**
Cycling Rates (% of commuters who cycle)	1996 – **1.7%** 2006 – **1.7%** 2016 – **2.3%**
Share of Trips by Females (% bicycle commuters that are female)	1996 – **27%** 2006 – **33%** 2016 – **35%**
Safety (collisions per million bike trips)	2008 – **21** 2017 – **23**

Region-wide, 46% of the cycling network is assessed as Comfortable for Most People, and about 65% of residents live within 400 metres of such a bikeway. The City of Vancouver leads the region, with 76% of its network classified as Comfortable for Most, and 90% of residents within 400 metres of such a route.

Females made up just 27% of people riding bikes in 1996, but that figure has climbed to 35% in 2016. The positive trend of more females cycling may suggest the regional bikeway network is being perceived as safer and more comfortable, and that it is growing in appeal and accessibility to a wider range of people.

The share of people cycling to work increased from 1.7% in 2006 to 2.3% in 2016, which was achieved by growing the number of bicycle commuters by nearly 65%. The share of commute trips by bike increased in many communities across the region, with seven of 23 local governments recording cycling rates higher than 2% in 2016, up from only three of 23 in 2006.

The collision rate involving people who travel by bicycle was relatively stable between 2008 and 2017 at 21 and 23 collisions per million trips, respectively. Collision rates vary across the region. Some subareas, like Burnaby/New Westminster and Vancouver/UBC, have rates that are lower than the regional rate, while all other areas have rates that are higher.

NEXT STEPS

This report on the state of cycling in Metro Vancouver provides the public, policy makers, and elected officials a valuable starting point for understanding the current state of the bikeway network across Metro Vancouver and where the region currently stands regarding cycling. Future updates to this work, which are planned to occur every few years, will allow the region to monitor progress with building out the regional bikeway network to help support regional goals for more and safer cycling.

Introduction

As a region, we have long-established goals supporting the delivery of transportation services and infrastructure to promote more daily travel by walking, cycling and transit.

This is reflected in regional planning documents, such as the Regional Transportation Strategy (2013), Mayors' Council 10-Year Vision (2014), and Cycling for Everyone – A Regional Cycling Strategy for Metro Vancouver (2011), and also reinforced by provincial guidance, including CleanBC (2018) and Move, Commute, Connect (2019).

Use of sustainable modes of transportation including walking, cycling and transit are on the rise in Metro Vancouver. While the increase in use of sustainable modes of travel from 24% of all trips in 2011 to 27% in 2017 is encouraging, a significant gap remains to be closed if regional aspirations for achieving a 50% sustainable mode share is to be reached.

There is an opportunity for cycling to play a significant role in supporting progress toward this target, since it is often a time-competitive option for many of the shorter distance trips occurring throughout the region on a daily basis. And with the array of benefits accompanying cycling - cleaner air, energy efficiency, reducing congestion on roadways and crowding on transit, and low-cost infrastructure - supporting more cycling is a strategy that makes sense.

The Mayors' Council 10-Year Vision and Regional Cycling Strategy recognized that **a well-connected network of bikeways protecting people cycling from motor vehicle traffic is needed to realize goals for more and safer cycling.** This report documents the extent and quality of the bikeway network and their influence on ridership and safety outcomes. This analysis will inform future planning decisions, supporting Metro Vancouver in meeting its goals.

What's included in this report

The information in this report is organized under the following headings:

Bikeway Network

measuring the extent and quality of designated bikeways

Cycling Rates

measuring the share of commute trips people make by bicycle, and changes over time

Share of Trips by Females

measuring the share of bicycle commuters that are female and changes over time, as a measure of perceived safety

Safety

measuring cycling injury and fatality rates, and changes over time

Supportive Policies and Practices

examining local government policies and programs that support cycling

These metrics provide a snapshot of existing conditions and their relationship to key outcomes, deliver useful guidance for targeting future investment, and serve as a foundation on which progress can be measured in future years.

How to use this report

This report provides information that will be of interest to partner agency staff, elected officials, and the general public. The main body presents an overview and key findings related to the bikeway network and other cycling-related data, mainly for the region as a whole. **Appendix A: Subarea Profiles** provides additional detail for the 23 local government jurisdictions within the Metro Vancouver region.

How this report was developed

Over the course of 2019, this report was developed through a collaborative process led by HUB Cycling and TransLink and involved substantial engagement with partner agency staff and HUB volunteers, including the following:

- **Project Team:** HUB Cycling project management and research staff led the development of this report.
- **Project Management Team:** Made up of representatives from TransLink, HUB Cycling, and academia, this group met regularly throughout the process and provided overall guidance and strategic direction for the project.
- **Partner agency staff:** Local and provincial government staff were engaged through standing committees managed by TransLink, including the Regional Transportation Advisory Committee (RTAC) and RTAC Transportation Planning Subcommittee (TPSC).

  The bulk of engagement occurred through regular meetings with TPSC who provided feedback on development of the bikeway classification system, provided available information on existing local policies, practices, and bikeways, and reviewed the bikeway classification results.
- **Project Working Group:** Comprised of staff from 12 partner agencies, this group took a deep dive into the mechanics of the project, providing expertise and technical support to the Project Team.
- **HUB Cycling Local Committees:** The ten Local Committees of HUB Cycling were engaged to provide local knowledge about bikeways within their subareas of the region.
- **HUB volunteers:** A group of over 40 HUB Cycling volunteers completed infield verification, measuring the extent and design details of cycling routes across the region and helped to enter those findings into the database.

Bikeway Classification System

A bikeway classification system was developed for this report to enable a consistent approach for describing bikeways across the Metro Vancouver region and to provide information about bikeways that will be useful to the public and local government agencies.

Typically, the foundation for describing bikeways is the type of infrastructure or "facility", however, this is insufficient without also considering the degree to which a bikeway exposes people to motor vehicle traffic. For example, bikeway facility types such as shared roadways, bike lanes, or bike accessible shoulders are relatively *more* comfortable if there are low motor vehicle traffic volumes and speeds; however, such facilities will be *less* comfortable if there are higher traffic volumes and speeds.

To classify the bikeway network for this report over 16,000 bikeway segments were reviewed and classified based on not only bikeway facility type, but also the exposure of people cycling to motor vehicle traffic, including posted speed limits, volume of motor vehicle traffic, and presence of on-street parking.[1]

Based on the above considerations, bikeway segments were objectively evaluated and placed into one of the following four comfort categories:

Comfortable for Most People
(green segments): These bikeways are either fully protected from motor vehicle traffic or are on shared roadways with low posted speed limits (i.e. 30 km/h or less) and low motor vehicle traffic volumes (i.e. less than 2,000 vehicles per day).

Comfortable for Some People
(yellow segments): Most of these bikeways are shared roadways where posted speed limits are higher (i.e. up to 50 km/h) and there is more motor vehicle traffic (i.e. up to 3,000 vehicles per day). Some painted bike lanes and bike accessible shoulders also fall into this category, as well as a small portion of bikeways that are protected from motor vehicle traffic but are narrower in width than is recommended by current design standards.

Comfortable for Few People
(orange segments): The majority of these bikeways are painted bike lanes or bike accessible shoulders on roadways with higher posted speed limits (i.e. 50 km/h or greater) and more traffic (i.e. more than 4,000 vehicles per day). Some shared roadways with higher posted speed limits and higher volumes of motor vehicle traffic also fall into this category.

Comfortable for Very Few People
(red segments): Many of these bikeways are shared roadways where posted speed limits are higher (i.e. greater than 50 km/h) and there are higher traffic volumes (i.e. 6,000 or more vehicles per day). Some painted bike lanes and bike accessible shoulders also fall into this category, including those with adjacent curbside parking and higher speed limits (i.e. greater than 50km/h).

Additional detail on the Bikeway Classification System can be found in Appendix C.

Glossary of Bikeway Facility Types

Bike Path

Uni or bi-directional, segregated off-road facility for the exclusive use of people cycling. May be paved or unpaved.

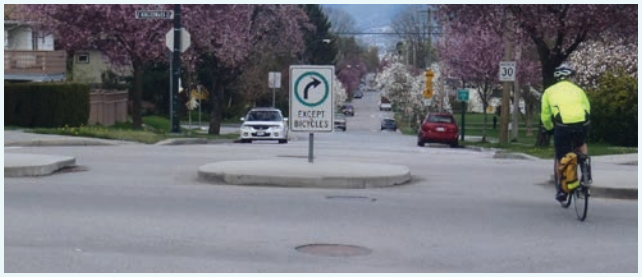
Protected Bike Lane

Exclusive on-road facility delineated by a vertical barrier element providing physical separation from motor vehicles, as well as separation from pedestrians.

Multi-Use Path

Off-road facility that allows for shared use by people cycling and walking. May be paved or unpaved

Shared Roadway



Bikes and motor vehicles share the roadway. May or may not involve diversion and calming of motor vehicle traffic, limiting exposure to motor vehicle traffic.

Bike Lane

On-road bikeway adjacent to a curb or a parking lane and delineated from motor vehicles by a painted line or similar markings.

Bike Accessible Shoulder

Signed and marked, designated on-road paved facility with no curb, located to the right of a general purpose travel lane, and separated by a white edge line or painted buffer. May be shared with pedestrians in rural settings.

ACKNOWLEDGING LIMITATIONS

It is worth recognizing some of the limitations of the bikeway classification system, as these are areas that could be considered for refinement as future updates to this work take place:

1. **Data Sampling:** With over 16,000 bikeway segments, an approach to classification that used sampling and assumptions was required. Substantial data was provided by local government staff and substantial field work was done by HUB volunteers to provide the most accurate assessment possible, however sampling and assumptions (particularly with regard to traffic volumes) were applied to classify many segments.

2. **Intersections:** Street crossings are important to the overall experience of cycling, because these are instances where paths of travel for people cycling and people driving intersect therefore where most vehicle-bike conflicts occur. Unfortunately, there is currently insufficient information readily available regarding conditions at intersections across the region. Collecting that information was beyond the scope of this project therefore assessment of intersections was not included as part of this work. Instead, this classification system identifies level of comfort by evaluating bikeway segments in between intersections.

3. **AAA Bikeways:** There are 23 local governments within Metro Vancouver, and there are various ways local governments describe their bikeway networks. One area where there is substantial attention in bikeway planning and design, but no accepted universal definition, is bikeways described as Comfortable for "All Ages and Abilities" (or AAA). AAA represents the highest level of design and comfort for people cycling, beyond the topmost range of the bikeway classification system used for this report which is "Comfortable for Most People". To illustrate the distinction, consider that the City of Vancouver classifies approximately 25% of their bikeway network as AAA, while in this report, 76% of Vancouver's network is classified as "Comfortable for Most."

Bikeway Network

In the decade from 2009 to 2019, the regional bikeway network nearly tripled, going from approximately 1,700 to 4,600 lane kilometres of bikeways.[2]

These improvements have enhanced cycling, providing continuous designated cycling connections throughout most of the region. However, for many areas of the region bikeways that are Comfortable for Most People tend to be much less continuous and connected than the overall bikeway network.

Figure 2 shows each designated cycling route in the region colour-coded by level of comfort.

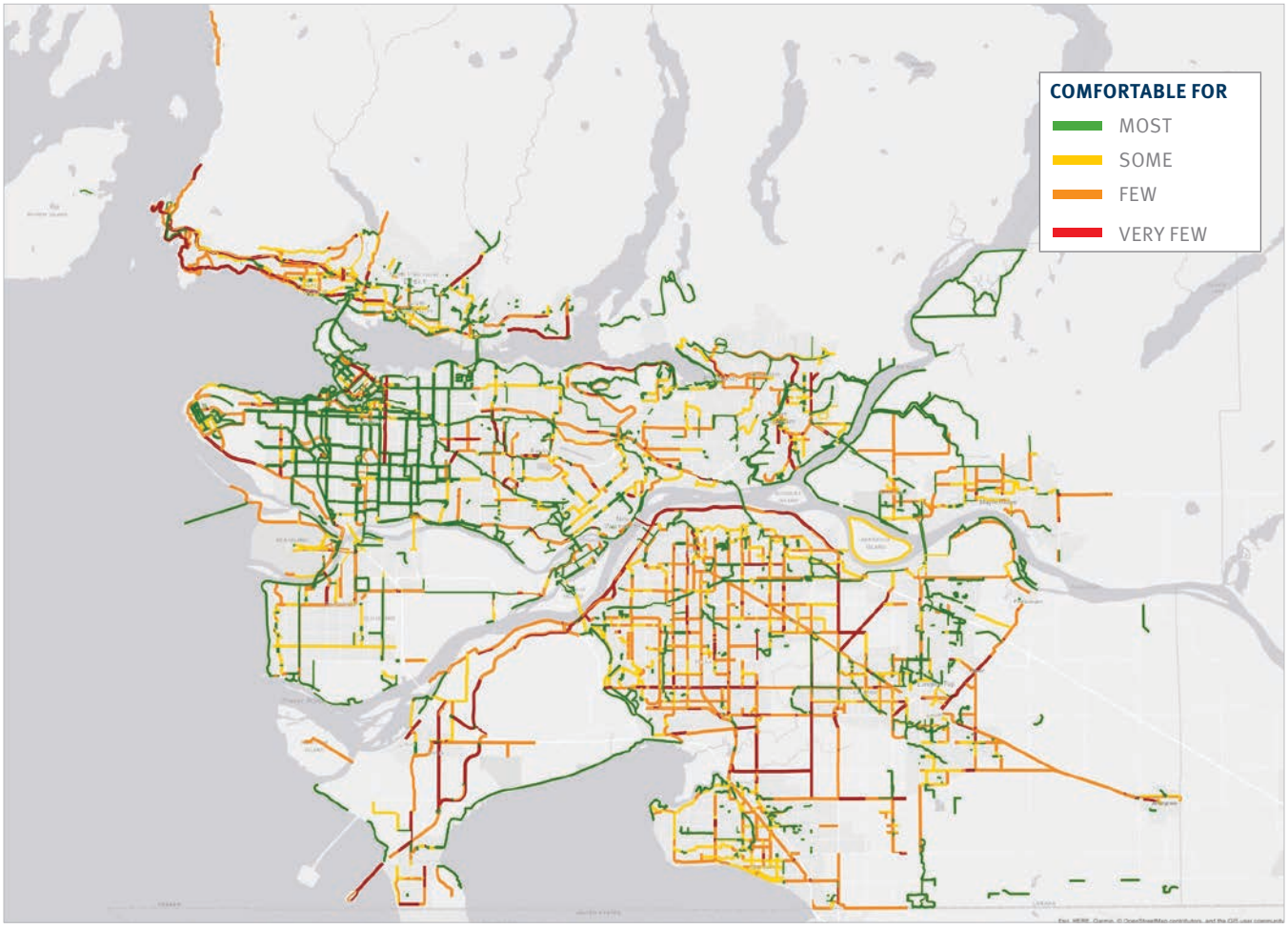


Figure 2 Metro Vancouver Bikeways By Level Of Comfort
Data Source:TransLink, Metro Vancouver municipalities

Figure 3 indicates that nearly half of the bikeway network (46%) is considered Comfortable for Most People, and that just over half (54%) is only comfortable for Some, Few, or Very Few People.

This suggests that over half of the current bikeway network could benefit from upgrades to become more comfortable and appealing for more people. Doing so could in turn grow the number of people cycling, by better supporting those who might be interested in taking up cycling or cycling more often, but who find their needs are not currently met with existing bikeways and roads.

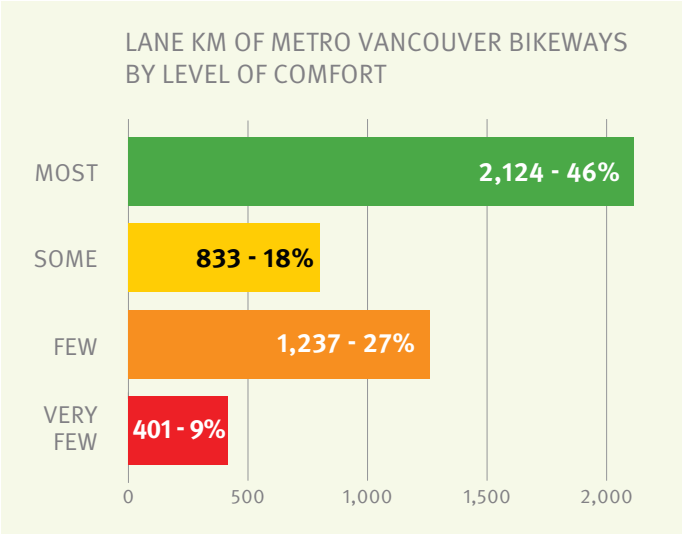


Figure 3 Data Source: TransLink, Metro Vancouver municipalities

Figure 4 further breaks down the bikeway network, showing the lane kilometres and level of comfort for each of six facility types.

Every bike path and protected bike lane in the region is considered Comfortable for Most People, but these route types constitute a small proportion of the entire network. Multi-use paths comprise the single most common route type in the region, and the majority of these are considered Comfortable for Most People, with a small fraction designated as Comfortable for Few or Very Few.

Bikeways on shared roads comprise over 30% of all bikeways in the region. About a quarter of all shared road bikeways, typically only those on quiet residential streets with low posted speed limits (i.e. 30 km/h) are considered Comfortable for Most. The remainder of bikeways on shared roads are classified as comfortable for Some, Few or Very Few due to their relatively higher posted speed limits and higher volumes of motor vehicle traffic.

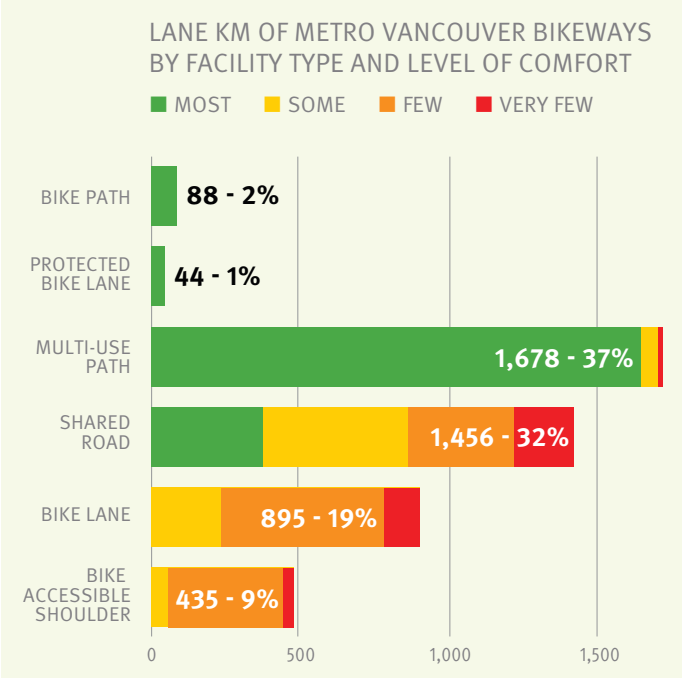


Figure 4 Data Source: TransLink, Metro Vancouver municipalities

Bike lanes and bicycle accessible shoulders comprise approximately 30% of the network and are all classified as either comfortable for Some, Few or Very Few. This reflects that fact that these bikeway facility types typically result in greater exposure of people cycling to motor vehicle traffic.

A NOTE ABOUT MULTI-USE PATHS

Multi-use paths are one of the facility types most preferred by people cycling, however research shows that such routes may still present injury risk. This is in part due to the mixing of pedestrian and cyclists who are traveling at different speeds, particularly in urban environments with higher volumes of people walking and cycling. Increased injury risk also arises from poor design, such as poor sight lines, lack of lighting at night, uneven surfaces, bollards and other barriers, and difficulties at intersections with roads.[3,4] Separate cycling and walking paths have been shown to be safer[5], but careful design can play a role in the safety of multi-use paths.

Figure 5 shows the geographic extent of bikeways classified as Comfortable for Most People, and it is estimated that about 65% of the Metro Vancouver population lives within 400 metres of such a route.

What is most apparent, is the extensive network of comfortable routes in the City of Vancouver that serve many of its neighbourhoods and provide some links to neighbouring municipalities. The City of Vancouver had the highest increase in cycling trips of any municipality in the region over the last decade, improving from 3.7% to 6.1% of commute trips. Elsewhere in the region, routes classified as Comfortable for Most are more fragmented and less likely to link homes to important destinations, thus limiting their utility and impact.

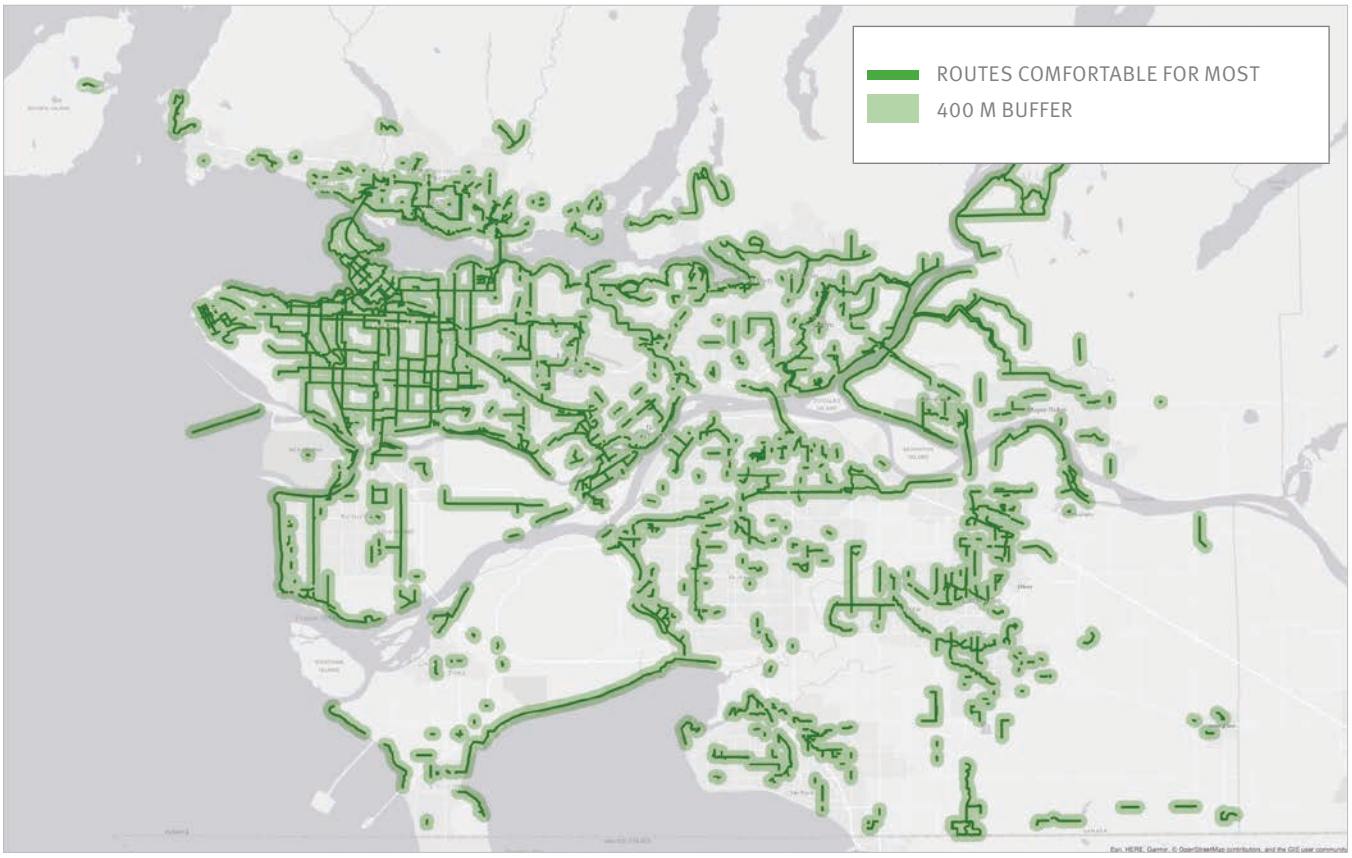


Figure 5 Geographic Area Within 400 M of A Bikeway Comfortable for Most. Data Source: TransLink, Metro Vancouver municipalities

Cycling Rates

More people are cycling more places in Metro Vancouver.

As shown in Figure 6, Census journey to work data shows that the percentage of commute trips regularly taken by bicycle grew to 2.3% in 2016 from 1.7% in 1996 and 2006.

This was accomplished by increasing the number of daily trips to work by bicycle across the region from 16,585 in 2006 to 27,235 in 2016, equating to a nearly 65% increase. Meanwhile, people cycle for more than just their commute and TransLink's trip diary survey showed that across the region there were about 128,000 total daily trips by bicycle in 2017.

Metro Vancouver (% of commuters who cycle)

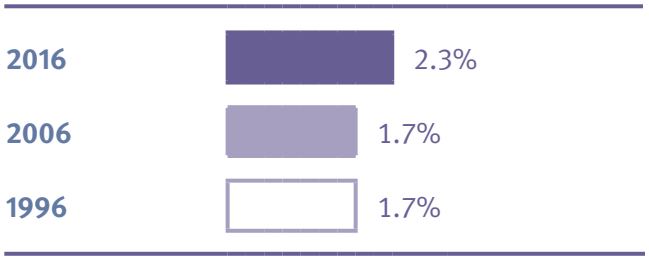


Figure 6 Data Source: Statistics Canada 1996, 2006, 2016

Metro Vancouver's regional cycling rate (2.3%) is significantly higher than the Canadian average (1.4%) and higher than comparable regions throughout Canada and the US, except Ottawa-Gatineau and Portland Metro which were both slightly higher at 2.4% and 2.6% respectively.

Census Metropolitan Area	Population (2016)	Density (pop/km2)	Cycling Rate (%)
Portland	2,800,000	338	2.6
Ottawa - Gatineau	1,323,783	195	2.4
Metro Vancouver	2,463,431	854	2.3
Montréal	4,098,927	890	2.0
Winnipeg	778,489	146	1.7
Calgary	1,392,609	272	1.5
Toronto	5,928,040	1,003	1.4
Québec CIty	800,296	234	1.3
Seattle	3,500,000	322	1.2
Kitchener - Cambridge - Waterloo	523,894	480	1.1
Edmonton	1,321,426	140	1.0
Boston	4,700,000	316	1.0
Hamilton	747,545	544	0.9

Figure 7 Cycling Rate Comparisons

Figure 8 shows that most municipalities in Metro Vancouver have experienced a rise in the share of commuters who bike to work in the decade from 2006 to 2016.

The five that had decreases registered relatively small drops. In 2016, seven of the 23 Metro Vancouver jurisdictions had ridership higher than 2% compared to only three in 2006.

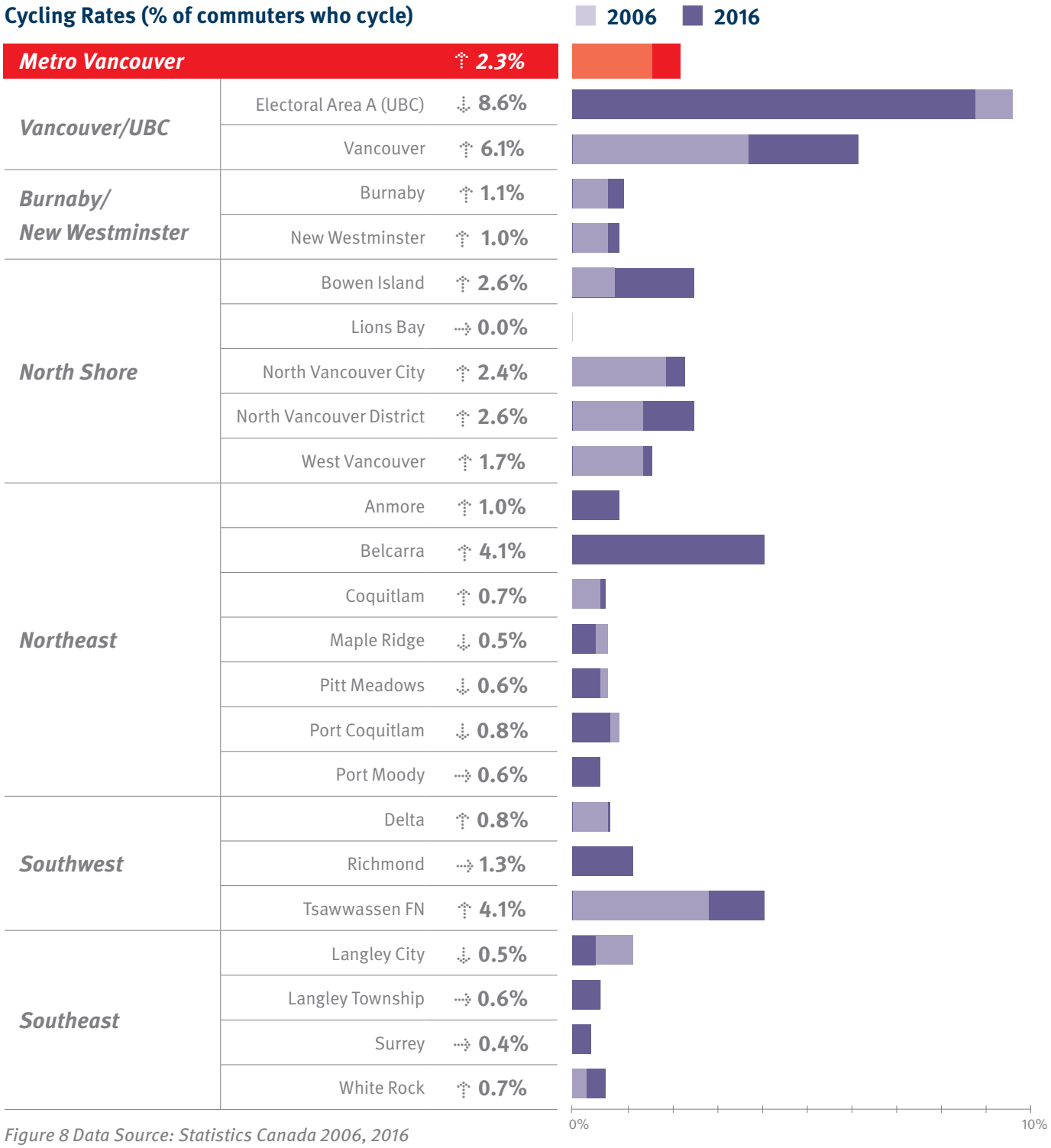


Figure 8 Data Source: Statistics Canada 2006, 2016

Share of Trips by Females

Perception of safety has been shown to influence the frequency with which males and females cycle.

Historically in North America, the number of bicycle trips made by males surpasses those made by females by 3:1. By contrast, in many Northern European cities with extensive networks of protected cycling facilities, the share of trips made by females on bicycles is closer to, or even higher than 50%. This makes the share of cycling trips made by females a useful indicator of perceptions concerning safety and comfort, as well as equity of the transportation system.

In 1996, according to Statistics Canada 73% or nearly three quarters of those who reported regularly travelling to and from work by bicycle were male, and 27% were female. By 2016, females comprised 35% of those who reported regularly travelling to and from work by bicycle, indicating that cycling by females had increased even more than cycling by males in this period. This suggests the cycling network in Metro Vancouver is offering more comfortable bikeways that appeal to a wider demographic.

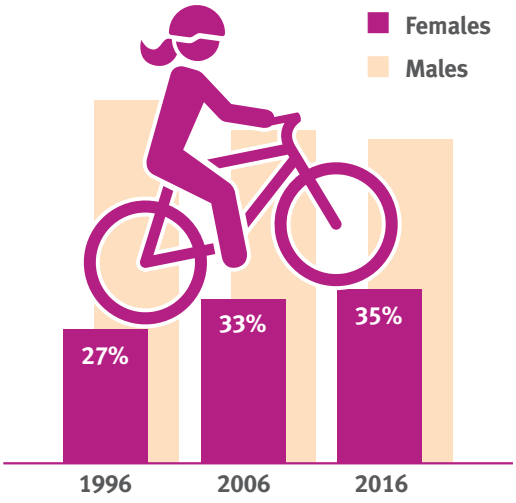


Figure 9 Share of bicycle commute trips by females and males

Safety

No measure of a community's cycling patterns is more important than its safety statistics. Ensuring our cycling network is as safe as possible is an important objective. A comparison across jurisdictions in North America and Europe shows that where more people cycle, cyclist fatality rates are typically lower.

When it comes to safety in Metro Vancouver, data in the years leading up to 2017 indicates an average of four cycling deaths per year, and an estimated death rate of 2.0 per 100 million kilometers cycled. Compared to Canada as a whole, our slightly lower death rate may be influenced by our higher cycling ridership (2.3% in 2016). Metro Vancouver's cycling death rate is similar to that of France, but comparisons to the Netherlands, Denmark and Germany show opportunities for improvement.

	BICYCLE MODE SHARE	CYCLIST DEATHS PER 100 MILLION KM CYCLED
Netherlands	26%	1.1
Denmark	18%	1.6
Germany	10%	1.6
France	3%	2.0
Canada	1.3%	2.4
USA	0.5%	5.5

Figure 10: Source: Buehler (2012); Statistics Canada 2006; TransLink (2011)

In the years leading up to 2008, Metro Vancouver had an annual average of 810 reported vehicle collisions involving cycling injuries, representing 21 injury collisions per million bicycle trips. And in the years leading up to 2017, the average injury collisions increased to 1,076, representing 23 injury collisions per million bicycle trips. This slight increase in the injury collision rate between 2008 and 2017 suggests that there has not yet been an improvement in safety commensurate with the increase in cycling.

Injury collision rates for cyclists vary across the region, with the Burnaby/New Westminster and Vancouver/UBC subareas having injury collision rates lower than the regional average for Metro Vancouver and other areas of the region having higher rates.

Ongoing investment in improvements to the cycling network will be needed to support meaningful progress toward the regional goal of 50% fewer people killed or injured while cycling by 2040, as spelled out in the Regional Cycling Strategy (2011).

Supportive Policies & Practices

Building robust cycling ridership and achieving safety goals requires more than constructing bikeways that are comfortable for a broad range of people. In this section we examine policies and practices undertaken by local, regional and provincial government agencies to support cycling.

To assess supportive policies and practices the **23 local government agencies across the region were surveyed, to understand which policies and plans are in place and what actions are being taken at the staff level to support cycling.** The findings are summarized below and detailed in Appendix A: Subarea Profiles.

OVERVIEW OF SUPPORTIVE POLICIES & PRACTICES IN PLACE ACROSS THE REGION'S 23 LOCAL GOVERNMENTS

BICYCLE NETWORK PLANS

17 local jurisdictions have an up-to-date, medium range (5 year) bicycle network plan.

CYCLING STRATEGIES

16 have an active transportation or cycling strategy detailing goals and performance objectives, programs to support cycling including for example, education, promotion, and enforcement, as well as monitoring and performance evaluation.

COMPLETE STREETS

2 have a Complete Streets Policy to support safe and convenient access, regardless of one's mode of travel.

VISION ZERO

3 have a Vision Zero Policy supporting sustained efforts to achieve zero traffic related injuries or fatalities for vulnerable road users.

TRAFFIC CALMING

17 implement traffic calming and traffic diversion on local streets commonly used by cyclists.

CONSTRUCTION ZONES

8 have traffic management procedures and policies designed to accommodate and provide safe and convenient passage for cyclists during construction.

EDUCATION

5 reached over 40% of students in grades 4 to 7 with cycling skills training over the period from 2016 to 2019, 3 agencies reached between 20% and 40% of students and 11 reached less than 20%, another 4 reached none or had no available data.

Within the region, Vancouver leads the way with a "High" rating on supportive policies, having adopted or scoring moderate to high on 6 or more of the 7 areas listed above. Meanwhile 10 other local jurisdictions in the region are rated as "Moderate", with 4 to 5 of the 7 supportive policies. Finally, there are 12 local jurisdictions that score "Low", with policies in place for 3 or fewer of the areas. Overall Metro Vancouver has thus been rated as low since more than half of local jurisdictions in the region have opportunities to adopt more cycling-friendly policies.

Cycling Education & Training

Education is an important component of an effective cycling strategy. TransLink and local governments have been ongoing sponsors of local active transportation organizations that deliver cycling related education, such as HUB Cycling, Better Environmentally Sound Transportation (BEST), Hub for Active School Travel (HASTe) and Pedal Energy Development Alternatives (PEDAL).

Some of the programs funded include:

- Streetwise courses (cycling skills and safety training for adults)
- Cycling education for youth through schools
- Newcomer Bike Host programs
- Bicycle maintenance education
- Safe routes to school progr ams and projects

To benchmark progress on cycling related education we have focused on cycling skills training to youth in grades 4 to 7. This is a key target group since those youth who have the skill to ride by age 13 are more likely to continue into adulthood. We endeavoured to identify the percentage of students in grades 4 to 7 that had received cycling skills education between 2016 and 2019. Over the 2016 to 2019 period, TransLink invested approximately $60,000 annually, and local governments invested over $240,000 allowing educators to reach over 15% of the 84,000 students in grades 4 to 7. Throughout Metro Vancouver between 2016 and 2019, several local governments took the lead including Bowen Island, New Westminster, City of North Vancouver, Pitt Meadows, and Surrey, all of which provided cycling skills training to over 40% of those students.

Regional and Provincial Support for Cycling

In Metro Vancouver, over the last 10 years it is estimated that overall funding for cycling grew from less than 1% to roughly 1.5% of total transportation spending. That investment supported cycling to deliver 2.3% of all commute trips in the region by 2016, up from 1.7% in 2006.

Recognizing the value of investing in cycling, the Mayors' Council 10-Year Vision (2014) identified the need for significant additional regional funding dedicated to cycling. TransLink is now working with local government partners to deliver this by supplying funding for cycling infrastructure, education, and promotion through local government cost-share programs. Whereas in the years leading up to 2017, there was approximately $1.5 million in annual TransLink funding to support regional cycling, that amount increased to $7.5 million in 2017 and approximately $14 million in 2018 and 2019. This regional funding supplements funding that local governments are putting toward cycling, which is estimated to be more than double the regional share.

At the provincial level, with the recent adoption of CleanBC (2018) and Move, Commute, Connect (2019), a new target has been set to double the share of all trips by walking and cycling by 2030. To achieve this, they have identified a range of strategies related to policy, infrastructure, and incentives that benefit cycling. Two early actions were the development of the BC Active Transportation Design Guide and establishment of the BC Active Transportation Grants Program, which respectively provide guidance on best practices for designing bikeways and make funding available to local governments to develop cycling network plans and implement cycling projects.

It is anticipated that the benefits of these local regional and provincial policies and investments will be captured in future updates to this benchmarking report, in the form of new bikeways that are Comfortable for Most People, and trends showing a continued increase in more and safer cycling.

Next Steps

photo credit: Charlotte Grenson

This benchmarking effort illustrates that while the Metro Vancouver region has made progress on cycling over the past years – expanding the bikeway network, improving cycling mode share, and increasing the share of cycling commute trips made by females – more work remains to be done.

The data shows that where an extensive cycling network is developed that is Comfortable for Most and supported by a range of supportive policies and practices, that a number of **key outcomes emerge:**

- The share of trips made by bicycle tends to increase;
- The rate of collisions involving people riding bicycles is relatively lower; and
- Cycling becomes accessible to more people.

In order to support ambitious regional and provincial goals for more travel by sustainable modes, including cycling, local, regional and provincial agencies must continue to invest in safe and comfortable cycling infrastructure supported by programs and policies to encourage cycling and improve traffic safety. This report is an important resource that can be used by planners, politicians and the public to:

- Examine links between cycling network design, the number of trips made by bicycle and collision rates involving cyclists;
- Guide planning and design decisions aimed at improving our regional cycling network as well as policies and practices that support increased and safer cycling; and
- Support ongoing research and a range of applications from print maps to online trip planning tools.

As the regional bikeway network continues to grow, ongoing collaboration and integration will be needed, to ensure bikeways are well connected, and that travelling by bicycle within and across municipal boundaries is comfortable, seamless, and intuitive. Partners working together on clearly articulated goals and approaches will be needed for the region to fully realize its cycling potential.

This benchmarking report has established an important foundation, upon which progress and success can be measured. It is anticipated that this work will be updated every few years in order to track the growth and development of the bikeway network and quantify and report on our progress toward more and safer cycling.

Regional Statistics

	Total Lane km's of Bikeways	Network (% of Network Comfortable for Most)	Population Close to Comfortable Network (% within 400m)	Cycling Rates (% of commuters who cycle)	Share of Trips by Females (% of bicycle commuters that are female)	Safety (Collisions per million bike trips*)	Supportive Policies and Practices**
Metro Vancouver Region	4,595	46%	65%	2.3%	35%	23	Low
VANCOUVER/UBC							
Electoral Area A (UBC)	79	45%	81%	8.6%	36%	20	Moderate
Vancouver	638	76%	90%	6.1%	39%		High
BURNABY/NEW WESTMINSTER							
Burnaby	331	50%	68%	1.1%	24%	16	Low
New Westminster	89	63%	84%	1.0%	23%		Moderate
NORTH SHORE							
Bowen Island	1	100%	N/A	2.6%	20%	27	Moderate
Lions Bay	7	0%	0%	0.0%	0%		Low
North Vancouver City	82	58%	90%	2.4%	26%		Moderate
North Vancouver District	133	50%	52%	2.6%	25%		Moderate
West Vancouver	222	18%	51%	1.7%	22%		Low
NORTHEAST							
Anmore	17	100%	N/A	1.0%	0%	52	Low
Belcarra	6	100%	N/A	4.1%	0%		Low
Coquitlam	168	51%	51%	0.7%	23%		Moderate
Maple Ridge	117	36%	36%	0.5%	32%		Moderate
Pitt Meadows	186	81%	53%	0.6%	27%		Moderate
Port Coquitlam	154	56%	79%	0.8%	22%		Low
Port Moody	102	65%	72%	0.6%	21%		Moderate
SOUTHWEST							
Delta	371	29%	42%	0.8%	42%	28	Low
Richmond	308	48%	51%	1.3%	27%		Moderate
Tsawwassen FN	14	56%	49%	4.1%	N/A		Low
SOUTHEAST							
Langley City	47	44%	66%	0.5%	23%	36	Low
Langley Township	349	50%	60%	0.6%	27%		Low
Surrey	1,133	28%	52%	0.4%	26%		Low
White Rock	41	3%	23%	0.7%	36%		Low

* Collision rates are reported only at the subarea level because of uncertainty in the cycling trip data for smaller population municipalities within each subarea. Collisions rates were calculated using ICBC collision data and daily bike trips reported through TransLink's Trip Diary. Lions Bay, Tsawwassen First Nation, Bowen Island, Anmore and Belcarra were included in the sub-area collision rate although no cyclist collision data was reported for these local jurisdictions.

** Rankings within this category are based on the number of approved policies and high to moderate ranked initiatives in the 7 categories listed in the Supportive Policies and Practices Section; High is 6 or 7, Moderate is 4 or 5 and Low is 3 or less.

End Notes and Bibliographic References

1. There are other factors that influence comfort including for example lighting and pavement quality. Consideration of these elements was beyond the scope of this study.
2. Lane kilometres refers to the length of cycling infrastructure in each direction. A kilometre of bi-directional multi-use path or two-way shared roadway would thus be measured as two lane kilometres of infrastructure.
3. Harris, A. M., Reynolds, C. C., Winters, M., Cripton, P. A., Shen, H., Chipman, M. L., Cusimano, M. D., Babul, S., Brubacher, J.R., Friedman, S. M., Hunte, G., Monro, M., Vemich, L., Teschke, K. (2013). Comparing the effects of infrastructure on bicycling injury at intersections and non-intersections using a case–crossover design. Inj Prev, 19: 303-310.
4. O'Donnell, E., Knab, A., & Athey, L. (2007). Sidewalks and Shared-Use Paths: Safety, Security, and Maintenance. Institute for Public Administration College of Human Services,Education & Public Policy University of Delaware.
5. Teschke, K., Harris, A., Reynolds, C. C., Winters, M., Babul, S., Chipman, M., Cusiman, M. D., Brubacher, J. R., Hunte, G., Friedman, S., Monro, M., Shen, H., Vemich, L., Cripton, P. A. (2012). Route Infrastructure and the Risk of Injuries to Bicyclists: A Case-Crossover Study. American Journal of Public Health, 102:12 2336-2343.

Appendices

Appendix A: Subarea Profiles

The following section provides an overview of the state of cycling in local jurisdictions throughout Metro Vancouver, grouping them within six geographic subareas:

- North Shore: Bowen Island, North Vancouver City, North Vancouver District, West Vancouver, Lions Bay
- Vancouver/UBC: Vancouver, Electoral Area A (UBC)
- Burnaby/New Westminster: Burnaby, New Westminster
- Northeast: Coquitlam, Port Coquitlam, Port Moody, Anmore, Belcarra, Pitt Meadows, Maple Ridge
- Southwest: Richmond, Delta, Tsawwassen First Nation
- Southeast: Surrey, White Rock, Langley City, Langley Township

For local jurisdictions with each subarea, the following information is reported:

Bikeway Network

- Lane kilometres of bikeways by level of comfort (2019)
- Lane kilometres of bikeways by facility type and level of comfort (2019)
- Share of population within 400 metres of a bikeway classified as Comfortable for Most People (2019)

Cycling Rates

- Share of commute trips that people regularly complete by bicycle (Census Canada, Journey to Work, 1996, 2006, 2016)

Share of Trips by Females

- Share of bicycle commuters who are female (Census Canada, Journey to Work, 1996, 2006, 2016)

Safety

- Rate of collisions (as reported to ICBC, 2013-2017) for every million trips taken by bicycle in each subarea (as measured through TransLink's Trip Diary, 2017)

Supportive Policies and Practices

- An up-to-date bicycle network plan approved by Council or Senior Staff and which covers a period of at least 5 years.
- An up-to-date cycling or active transportation strategy that includes goals and objectives for key performance measures, planned investment in the cycling network and supporting policies and plans including, but not limited to, bicycle parking and end of trip facilities, cycling education, encouragement, enforcement, and monitoring and evaluation.
- Council approved policies and action plans concerning Complete Streets (an approach and guiding principles to achieve safe and comfortable access for people of all ages and abilities, regardless of what mode of transportation they use).
- Council approved policies and action plans concerning Vision Zero (an aim to achieve a roadway system with no fatalities or serious injuries involving those using the roadway network).
- Policies and procedures to calm motor vehicle traffic, reducing traffic speeds to enhance safety and comfort, in particular for vulnerable road users.
- Construction zone traffic management policies that require those undertaking construction to accommodate and minimize detours for people on bikes.
- The share of grade 4-7 students that received cycling skills training between 2016 and 2019.

Regional Summary

	Total Lane km's of Bikeways	% of Network Comfortable for Most	% Within 400m of Route Comfortable for Most	% of Commuters who Cycle	% of Bicycle Commuters who are Female	Collisions per Million Bike Trips*	Supportive Policies and Practices**
Metro Vancouver	4,595	46%	65%	2.3%	35%	23	Low
Vancouver/UBC							
Electoral Area A (UBC)	79	45%	81%	8.6%	36%	20	Moderate
Vancouver	638	76%	90%	6.1%	39%		High
Burnaby/New Westminster							
Burnaby	331	50%	68%	1.1%	24%	16	Low
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Lions Bay	7	0%	0%	0.0%	0%		Low
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North Vancouver District	133	50%	52%	2.6%	25%		Moderate
West Vancouver	222	18%	51%	1.7%	22%		Low
Northeast							
Anmore	17	100%	N/A	1.0%	0%	52	Low
Belcarra	6	100%	N/A	4.1%	0%		Low
Coquitlam	168	51%	51%	0.7%	23%		Moderate
Maple Ridge	117	36%	36%	0.5%	32%		Moderate
Pitt Meadows	186	81%	53%	0.6%	27%		Moderate
Port Coquitlam	154	56%	79%	0.8%	22%		Low
Port Moody	102	65%	72%	0.6%	21%		Moderate
Southwest							
Delta	371	29%	42%	0.8%	42%	28	Low
Richmond	308	48%	51%	1.3%	27%		Moderate
Tsawwassen FN	14	56%	49%	4.1%	N/A		Low
Southeast							
Langley City	47	44%	66%	0.5%	23%	36	Low
Langley Township	349	50%	60%	0.6%	27%		Low
Surrey	1,133	28%	52%	0.4%	26%		Low
White Rock	41	3%	42%	0.7%	36%		Low

* Cycling safety is based on the number of collisions involving motor vehicles and people riding bicycles for every million trips made by bicycle. Collision data is from ICBC and cycling trips from TransLink's Trip Diary. Collision rates are reported only at the subarea level because of uncertainty in the cycling trip data for the smaller population municipalities within each subarea. Lions Bay, Tsawwassen First Nation, Bowen Island, Anmore and Belcarra are included in the sub-area collision rate although no cyclist collision data was reported for these local jurisdictions.

**Rankings within this category are based on the number of approved policies and high to moderate ranked initiatives in the 7 categories listed in the Supportive Policies and Practices Section; High is 6 or 7, Moderate is 4 or 5 and Low is 3 or less.

Subarea – Vancouver/University of British Columbia (UBC)

Area: 130 KM2
Population: 647,900
Bikeway Network: 717 lane kilometres

The City of Vancouver has earned its reputation as an emerging cycling city, thanks to ongoing development of its network of cycling routes. Marked by significant projects such as protected bike lanes downtown, on major bridges, and a robust network of Neighbourhood Street Bikeways, the city, along with the UBC campus in Point Grey (officially part of the regional Electoral District 'A') leads the region as a cycling-friendly jurisdiction.

Subarea Summary Table

	Network (% of Network Comfortable for Most)	**Population Close to Comfortable Network** (% within 400m of a route Comfortable for Most)	**Cycling Rates** (% of commuters who cycle)	**Share of Trips by Females** (% of bicycle commuters who are female)	**Safety** (Collisions per million bike trips)[1]	**Supportive Policies and Practices**[2]
Metro Vancouver	46%	65%	2.3%	35%	23	Low
Electoral Area A (UBC)	45%	81%	8.6%	36%	20	Moderate
City of Vancouver	76%	90%	6.1%	39%		High

Table 1 Source: ICBC, Statistics Canada Journey to Work 2016, Metro Vancouver Municipalities, TransLink

Bikeway Network

Between 2011 and 2019, Vancouver and UBC made significant additions to their bikeway networks. Together their networks grew from around 370 to over 710 lane kilometres of cycling facilities, nearly doubling in length. This subarea benefits from a highly connected grid network of local streets. As such, both jurisdictions have managed to achieve a basic interconnected grid of bikeways that are Comfortable for Most People and serve many neighbourhoods.

Despite significant gains, gaps and weaknesses remain visible in the map below:

- Improvements are needed to achieve continuous and comfortable connections between Vancouver and UBC;
- There are notable gaps east-west through the centre of downtown Vancouver;

[1] Collision rates are reported at the subarea level because of uncertainty in the cycling trip data for small municipalities within each subarea.

[2] Rankings within the Supportive Policies and Practices category are based on the number of approved policies and high to moderate ranked initiatives in the 7 categories listed in the Supportive Policies and Practices Section; High is 6 or 7, Moderate is 4 or 5 and Low is 3 or less.

- There are gaps east-west in midtown (between 14th and 28th Ave) and south Vancouver (between 45th and 59th Ave);
- There are gaps and less comfortable routes at the outer edges, particularly along the eastern, southern and western edge of each community.
- Many cycling routes include jogs and while relatively direct, are less so that adjacent collector and arterial streets; and
- Outside of the downtown area, few major streets with office, shop, or school destinations have bicycle facilities Comfortable for Most.

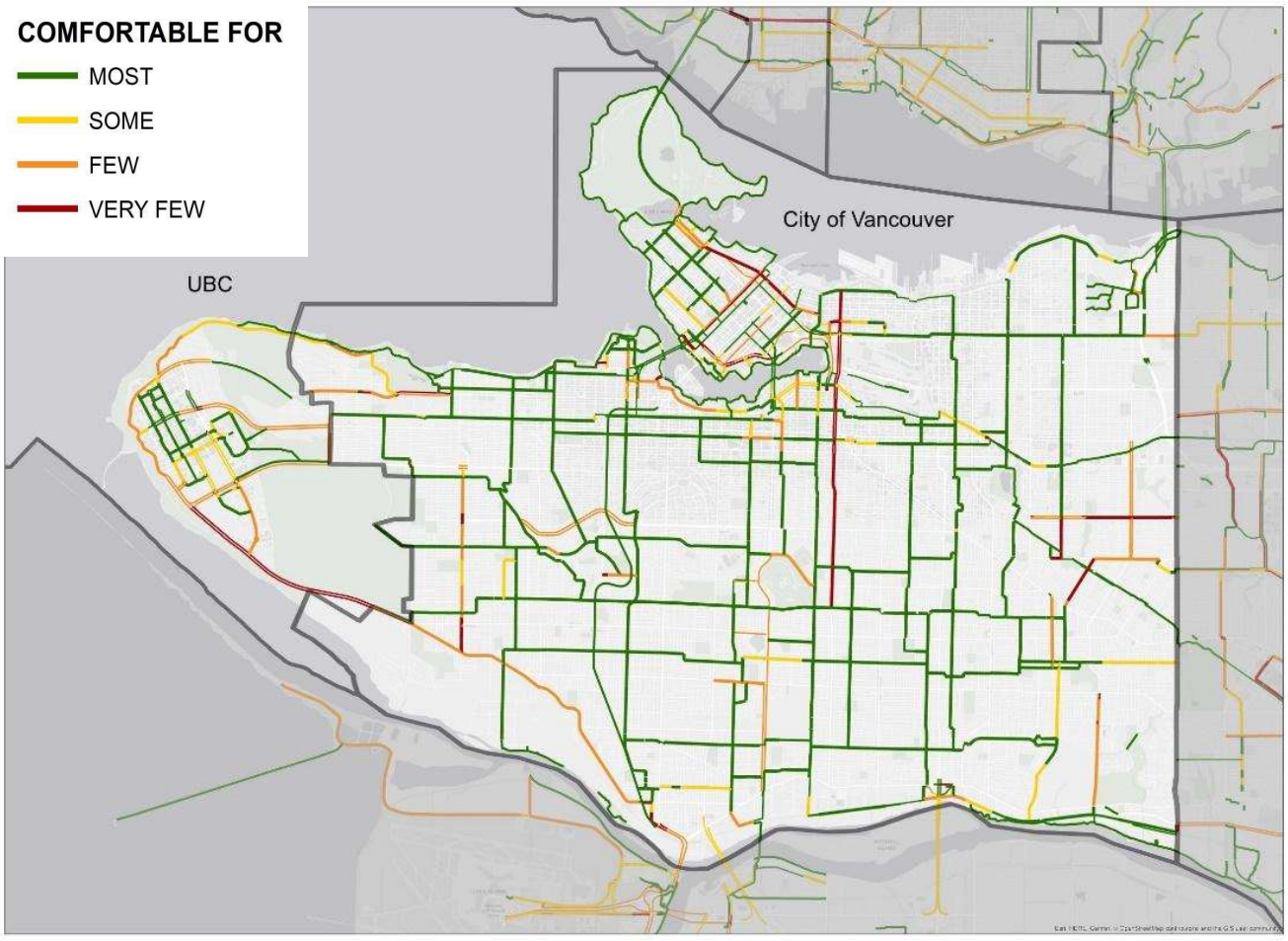


Figure 1:City of Vancouver/UBC Designated Bikeways by Level of Comfort
Based on Data received from TransLink, Metro Vancouver Member Municipalities, and Province of BC.

The majority of Vancouver's bikeways (76%) are considered Comfortable for Most People. This is significantly higher than at UBC (45%), where the proportion of bikeways that are comfortable is similar to Metro Vancouver as a whole (46%). Approximately 190 km of bikeways in this subarea are comfortable for only Some, Few or Very Few people.

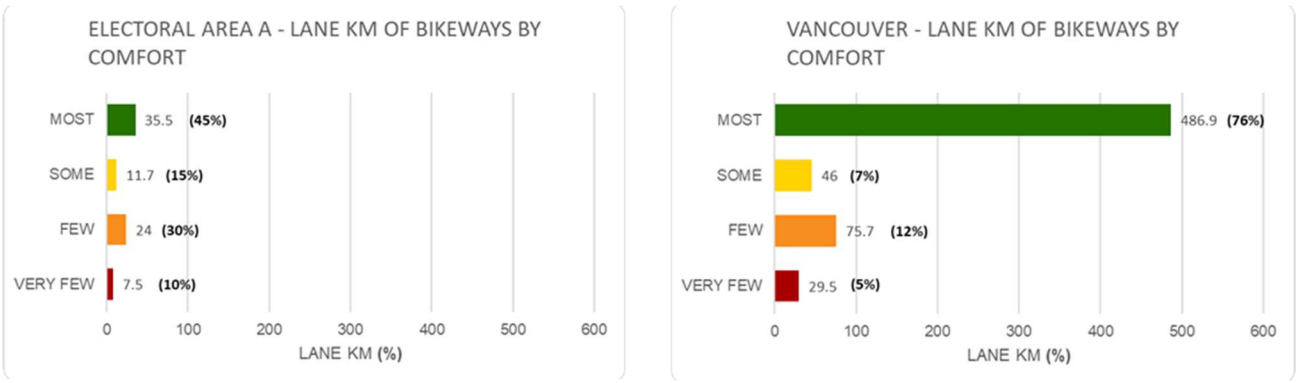


Figure 2 - Based on Data received from TransLink, Metro Vancouver Member Municipalities, and Province of BC.

The following Figure shows the lane kilometres for each type of cycling facility in the Vancouver-UBC subarea and how each lane kilometre is classified in terms of its comfort level. The majority of bike paths, protected bike lanes, multi-use paths and shared roadways in Vancouver-UBC are considered Comfortable for Most people. A small percentage of multi-use paths and shared roads are only comfortable for Some, Few, and Very Few people. The majority of bike lanes and bike accessible shoulders are comfortable for Few, with a small proportion comfortable for Some and Very Few.

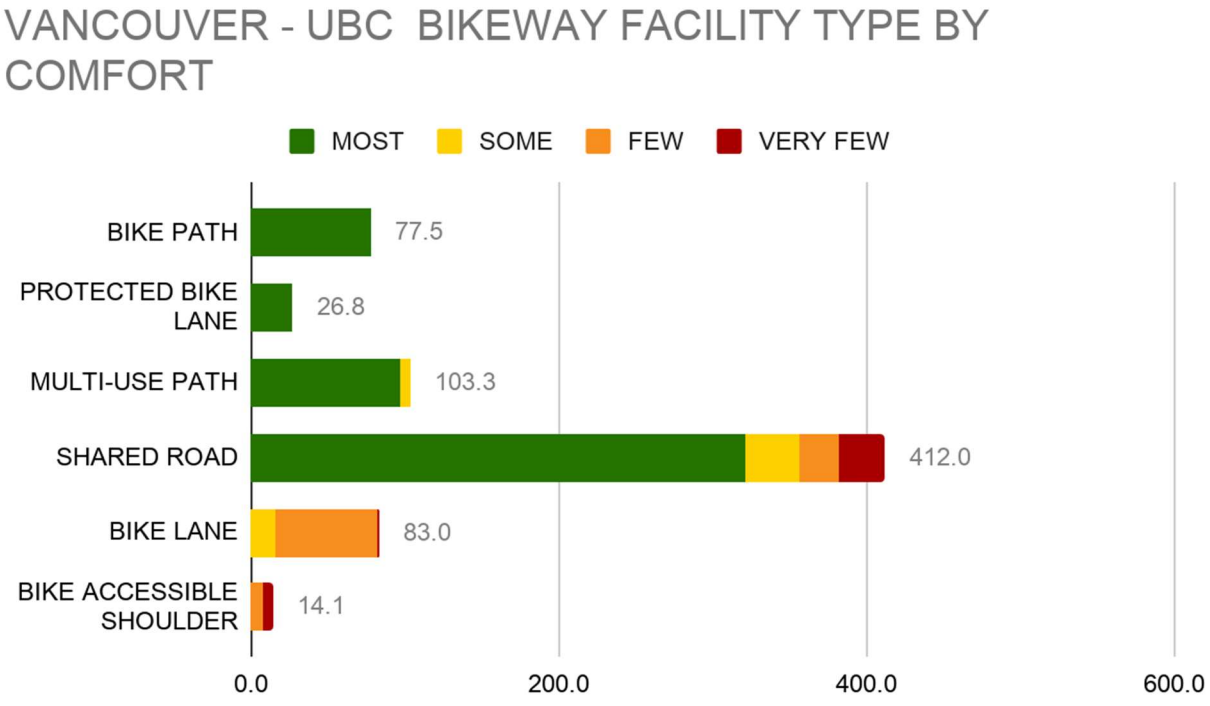


Figure 3: Based on Data received from TransLink, Metro Vancouver Member Municipalities, and Province of BC.

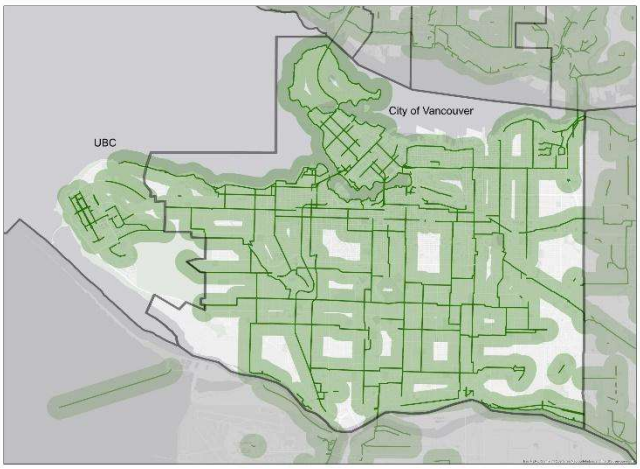


Figure 4 – Percent of Population Within 400 M of a Bikeway Comfortable for Most

A high proportion of residents in Vancouver and UBC (around 90 %) are within 400 metres of a bikeway that is Comfortable for Most. While this metric may appear high, other factors such as connections to key destinations, directness, intersections and topography also need to be taken into account in designing an effective cycling network.

Cycling Rates

The percentage of people who regularly commute by bicycle in the City of Vancouver increased significantly in the last 20 years. Between 1996 and 2006 cycling rates remained relatively unchanged, climbing from 3.3% of all commute trips to 3.7% in a decade. Ten years later, in 2016, that number grew significantly, rising to 6.1%, the highest percentage of commute trips made by bicycle of any major city in Canada.

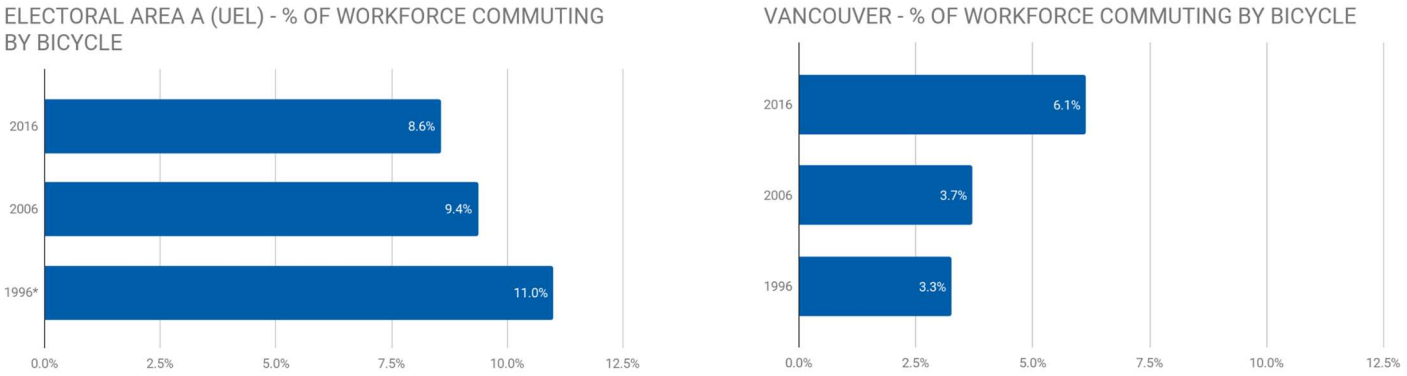


Figure 5: Source: Statistics Canada Journey to Work 1996, 2006, 2016
** 1996 numbers only reflect University Endowment Lands*

Since 1996, the percentage of commute trips by bicycle at UBC has dropped -- from 11% to 8.6%. There are a number of probable reasons for the drop, including:

- The introduction of the Universal Transit Pass (U-Pass) in 2003 which gave all UBC students (many of whom are employed and would be reflected in journey to work data) access to unlimited rides at a fraction of the cost of a standard transit pass.
- Changes to the boundaries of Electoral Area 'A' in 2001 which added sparsely populated areas such as small islands in Howe Sound and largely car dependent areas on the North Shore inside its geographic boundaries.
- Increased residential development at UBC, particularly after 2006, that were either more suitable for walking commutes (jobs on campus) or transit commutes (jobs considerably farther away).

These factors may explain why the cycling rate has continued to drop since its peak in 1996. Nonetheless it remains the highest of any jurisdiction in Metro Vancouver.

Share of Trips by Females

In City of Vancouver and at UBC in 1996, the proportion of people travelling to work by bicycle who are female has increased significantly. These increases suggest a growing number of females, and by extension a broader cross section of the population, are feeling comfortable riding on cycling networks in Vancouver and at UBC.

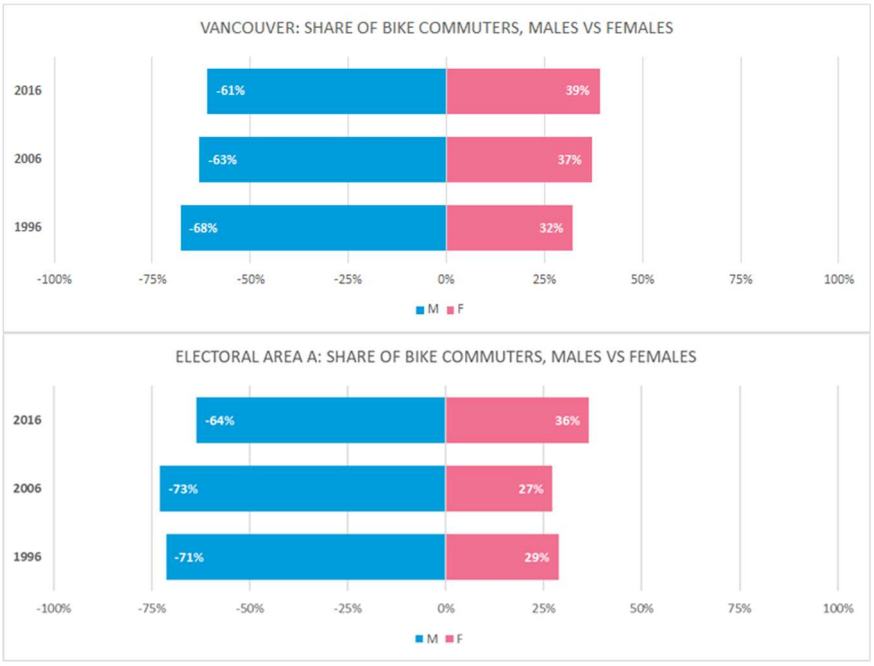


Figure 6- Source: Statistics Canada Journey to Work 1996, 2006, 2016

Safety

For the Vancouver and UBC subarea, the rate of collisions involving people cycling was 20 per million bike trips in 2017, less than the region as a whole, which had a rate of 23 per million bike trips. Additionally, if the Vancouver/UBC subarea were compared to the rest of the region (i.e. Vancouver/UBC cycling trips and collisions were not considered in the calculation) then the regional collision rate would increase to 26 per million bike trips. This lower injury rate for the subarea suggests that Vancouver's preponderance of cycling routes separated from traffic or with traffic diversion and posted speeds of 30 kmh is having a positive effect on safety.

Supportive Practices and Policies

Municipality	Bicycle Network	AT/Cycling Strategy	Complete Streets	Vision Zero	Traffic Calming	Construction Zone Traffic Management	Cycling Education[3]
EAA (UBC)	Yes	Yes	No	No	Yes	Yes	Low
Vancouver	Yes	Yes	Yes	Yes	Yes	Yes	Low

Table 2 - Source: UBC, City of Vancouver

The City of Vancouver has a number of policies and actions supportive of cycling:

- In 2012, Council approved Transportation 2040, a long-range transportation plan. The plan included a vision to make cycling safe, convenient, comfortable, and fun for people of all ages and abilities. It includes policies for expanding and improving the cycling network, parking and end of trip facilities, integration with other modes, providing a public bike share system, education, encouragement, and enforcement.
- As part of Transportation 2040, five-year priorities for cycling network expansion and improvements were developed and have been updated every two to three years.
- In Transportation 2040, Council identified a sustainable mode share target of two-thirds of all trips by Vancouver residents to be made by walking, cycling, and transit by 2040. In 2019, Council recognized a Climate Emergency which identified a "Big Move" to advance the sustainable mode share target ten years earlier and achieve two-thirds of all trips by walking, cycling, and transit by 2030.
- In 2017, Council approved a Complete Streets policy framework, which includes an approach and guiding principles to "ensure safe and comfortable access for people of all ages and abilities, regardless of what mode of transportation they use".
- In 2017, the City of Vancouver developed design guidelines for all-ages-and-abilities ('AAA') cycling to consider when planning and designing cycling routes. The guidelines consider the facility type and widths, motor vehicle speeds and volumes, lighting, separation of modes, surfaces, grades, and intersection design.
- In 2019, the City of Vancouver developed an Engineering Design Manual that includes design principles and geometric standards for cycling facilities.
- As a part of Transportation 2040, the City of Vancouver declared a safety goal of zero traffic-related fatalities. In 2016, Moving Towards Zero: Safety Action Plan was developed with a strategy to advance the safety target. Other efforts to improve cycling safety included a Cycling Safety Study (2015) involving an action plan to address key safety challenges facing people riding bicycles.
- Policies to calm motor vehicle traffic in neighbourhoods were established a number of years ago in Vancouver. Neighbourhood traffic management and calming measures in Vancouver are focused around schools, community centres, bikeways, and local streets with speeding concerns.

[3] The percentage of students in grades 4-7 receiving cycling skills training at least once between 2016 and 2019 is rated as follows, Low less than 20%, Medium 20%-40%, High over 40%

- In an effort to improve mobility, access, and safety for people on bicycles travelling through construction zones, the City of Vancouver developed guidelines for managing construction impacting cycling routes. The guideline was recently updated in 2019.
- Approximately 15% of Vancouver students in grades 4-7 received cycling skills training at least once in the period from 2016-2019.

Electoral Area A (UBC) has established various policies and actions supportive of cycling:

- As part of its cycling strategy, UBC made a commitment to upgrade and expand its cycling infrastructure, bikeshare program, secure bike parking, showers, and other end of trip facilities.
- UBC requires that construction projects impacting campus roadways and cycle routes provide a traffic management plan that will accommodate and minimize detours for people on bikes.
- Approximately 12% of students in grades 4-7 in Electoral Area A received cycling skills training at least once in the period from 2016-2019.

Key Takeaways

- Although Vancouver/UBC stands out as the subarea with the highest cycling mode share, and a relatively well-connected network of comfortable routes, there are a number of notable gaps in the network of routes Comfortable for Most including:
    - East-west through the centre of downtown;
    - Connections to UBC;
    - East-west in midtown (between 14th and 28th Ave);
    - South Vancouver (between 45th and 59th Ave); and
    - Along the eastern, southern and western edges of the subarea.
- Because the majority (over 80%) of UBC and City of Vancouver's cycling networks consist of Neighbourhood Street Bikeways on quiet local streets that run parallel to arterial roads and off-street paths, the network does not directly connect to many commercial destinations, which tend to be on arterial streets. In addition, the network is less visible and sometimes less direct as compared to other travel modes.
- The City of Vancouver scores well on policies that support expanding and improving cycling facilities for all ages and abilities, as well as the overall safety of its roadway network. An area where Vancouver (and UBC) fall short relative to other municipalities is in the share of students in grades 4-7 receiving cycling skills training during the last 4 years (approximately 15% and 12% respectively).

Subarea – Burnaby/New Westminster

Area: 106.24 km2
Population: 303,751
Bikeway Network: 420 lane kilometres

The geography of this subarea offers hilly challenges for cycling, with high ground on both sides of Highway 1, and steep slopes to Burrard Inlet to the north, and to the Fraser River to the south and east. Traffic-protected cycling routes, such as the BC Parkway and Central Valley Greenway however, connect both cities to downtown Vancouver and the Northeast and Southeast subareas. Burnaby's 'urban trails' or multi-use paths also offer off-road alternatives for both recreational and commuter cycling.

As commuting and housing patterns continue to change and destinations outside the downtown core become more commonplace for workers in the region, these two municipalities will need to consider a number of strategies to increase the number of trips people make by bicycle, including for example:

- Offering continuous, connected and comfortable cycling routes linking local origins and destinations and neighbouring municipalities;
- Promoting use of electric assist bicycles in order to overcome hills with this subarea; and
- Continuing efforts to concentrate employment, residential and mixed-use development within neighbourhoods designed to facilitate walking and cycling.

Subarea Summary Table

	Network (% of Network Comfortable for most)	Population Close to Comfortable Network (% within 400m of a route Comfortable for Most)	Cycling Rate (% of commuters who cycle)	Share of Trips by Females (% of bicycle commuters who are female)	Safety (Collisions per million bike trips)	Supportive Policies and Practices[4]
Metro Vancouver	46%	65%	2.3%	35%	23	Low
Burnaby	50%	68%	1.1%	24%	16	Low
New Westminster	63%	84%	1.0%	23%		Moderate

Table 3 - Source: ICBC, Statistics Canada Journey to Work 2016, Metro Vancouver Municipalities, TransLink

[4] Rankings within this category are based on the number of approved policies and high to moderate ranked initiatives in the 7 categories listed in the Supportive Policies and Practices Section; High is 6 or 7, Moderate is 4 or 5 and Low is 3 or less.

Bikeway Network

Between 2011 and 2019, Burnaby and New Westminster's bikeway networks grew from approximately 270 km to over 420 lane kilometres of cycling facilities, a growth of about 55%. These improvements have enhanced cycling connectivity in the vicinity of town centres and have achieved continuous designated cycling connections North-South and East-West through each municipality.

However, the density of the network is low and the comfort of cycling routes tends to vary. There are very few continuous routes that are considered Comfortable for Most. Burnaby and New Westminster have thus had little success in attracting increased ridership. To attract more people, including those of all ages and abilities, both cities will need to prioritize continuous, connected cycling facilities Comfortable for Most people and linking key origins and destinations.

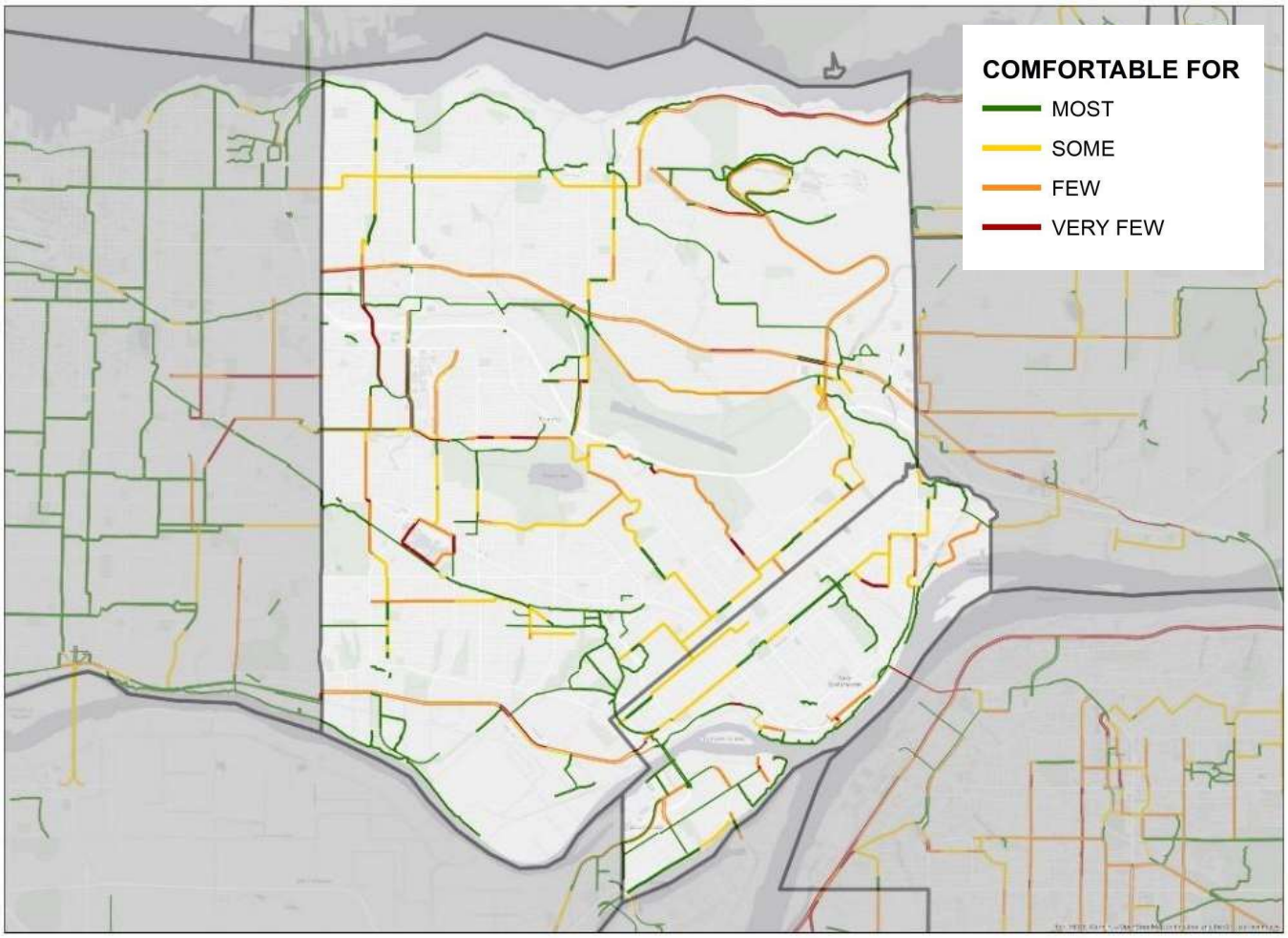
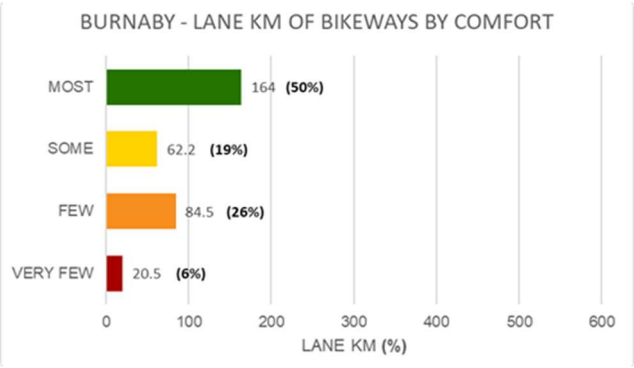


Figure 7 Burnaby/New Westminster Designated Bikeways by Level of Comfort
Based on Data received from TransLink, Metro Vancouver Member Municipalities, and Province of BC.

Burnaby and New Westminster, at 50% and 63% respectively, have a higher share of bikeways classified as Comfortable for Most, relative to the regional benchmark of 46%. At just over 331 lane kilometres of bikeways, Burnaby's network is over three times longer than New Westminster's. And, while Burnaby has almost three times the length of routes classified as Comfortable for Most, it has five times the distance of routes that are classified as comfortable for Some, Few and Very Few. In both Burnaby and New Westminster, lower quality routes are scattered throughout the network, creating barriers to cycling for most people.



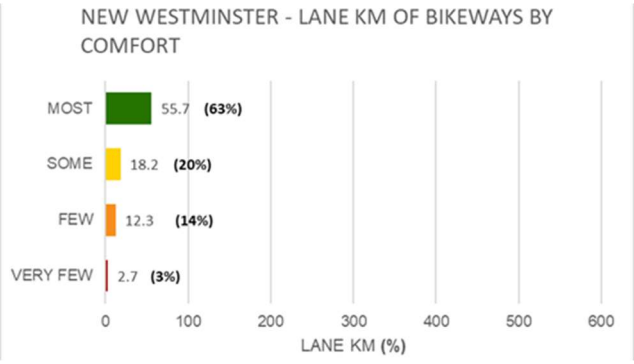


Figure 8 - Based on Data received from TransLink, Metro Vancouver Member Municipalities, and Province of BC.

Figure 9 shows the lane kilometres for each type of cycling facility in Burnaby and New Westminster, and how each lane kilometre is classified in terms of comfort. There are very few segregated bike paths and protected bike lanes in this subarea. Instead, the majority of segregated routes are multi-use paths. The majority of segregated bikeways are classified as Comfortable for Most, with the exception of around 5-10 kilometres of multi-use paths that are comfortable for Some and Very Few, due, in large part to their proximity to high speed, high volume motor vehicle traffic. Of those bikeways not physically separated from motor vehicle traffic, only a small portion of shared roads are Comfortable for Most. The remaining shared roads and all of the bike lane and bike accessible shoulders are classified as comfortable for Some, Few, or Very Few.

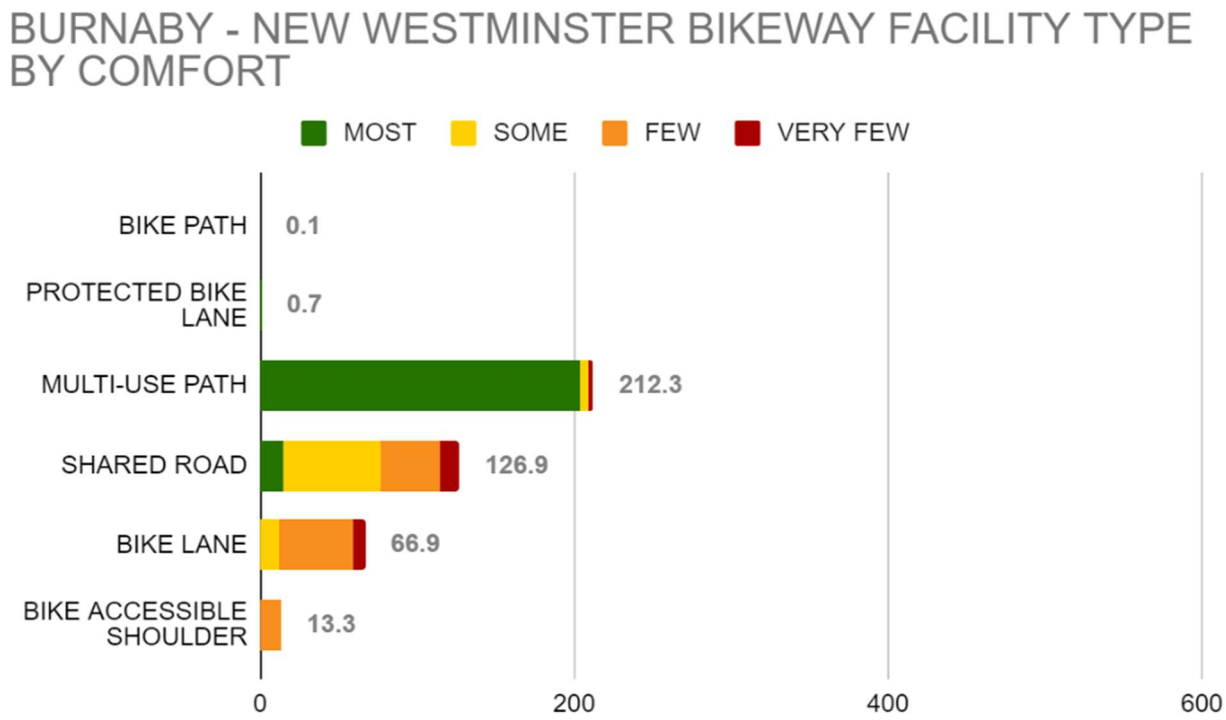
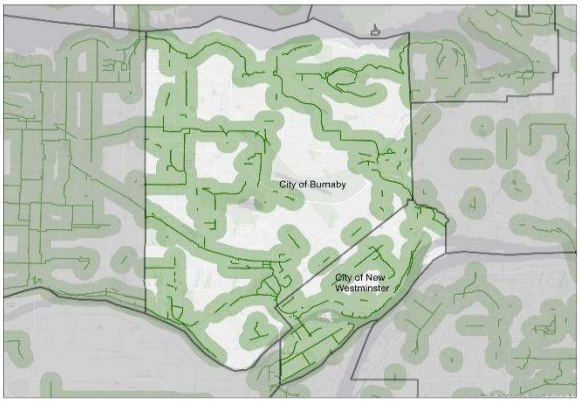


Figure 9 - Based on Data received from TransLink, Metro Vancouver Member Municipalities, and Province of BC.

About 68% of residents in Burnaby and 84% of residents in New Westminster are within 400 metres of a bikeway that is Comfortable for Most. However, because of gaps in the network, cycling in Burnaby and New Westminster has attracted few people to cycle, except those who are willing to ride in mixed traffic.



72 %

ROUTES COMFORTABLE FOR MOST
400 M BUFFER

Figure 10 - Percent of Population Within 400 M of a Bikeway Comfortable for Most

Cycling Rates

The percentage of commute trips by bicycle in Burnaby and New Westminster has remained relatively stable over the last 20 years, increasing slightly to 1.1% and 1.0% respectively in 2016. Burnaby and New Westminster are thus well below the region-wide percentage of people who regularly commute by bicycle (2.3%).

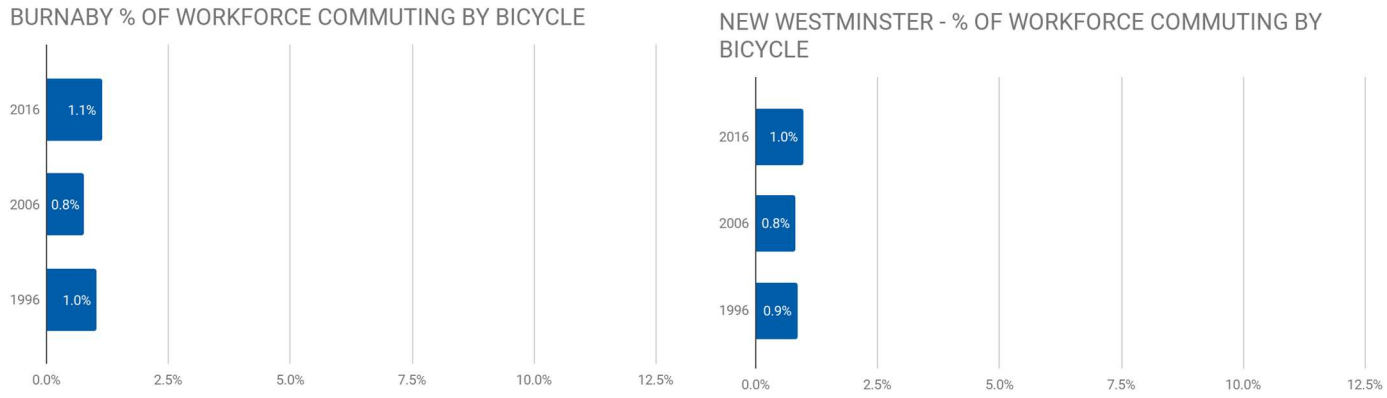


Figure 11- Source: Statistics Canada Journey to Work 1996, 2006, 2016

Share of Trips by Females

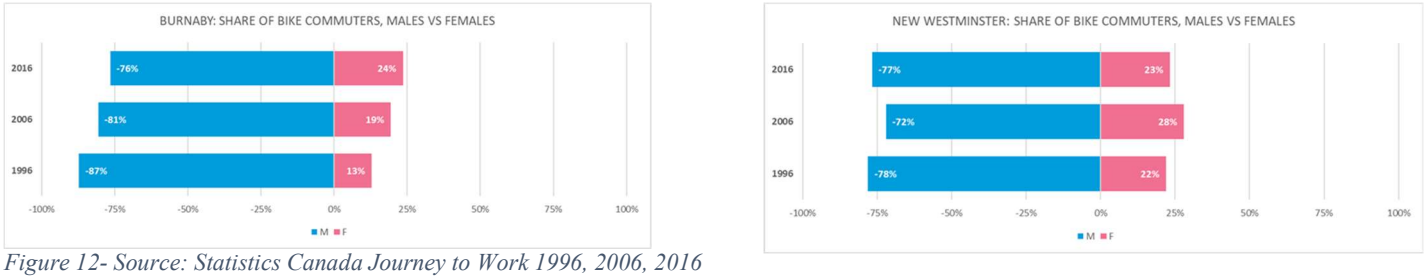


Figure 12- Source: Statistics Canada Journey to Work 1996, 2006, 2016

In Burnaby and New Westminster, while the proportion of commuting trips made by women has increased somewhat, both municipalities remain well below the regional benchmark of 35% These numbers suggest a strong imbalance remains, with trips by males outnumbering those made by females by a factor of 3 to 1.

Safety

For the Burnaby and New Westminster subarea, the rate of collisions involving people on bikes was 16 for every 1 million bike trips in 2017, less than for Metro Vancouver, (23 collisions reported for every 1 million bike trips). Those that do ride thus face a relatively low risk of collision with motor vehicles. This may be due in part, to Burnaby and New Westminster's success to date in creating a multi-use path network that has relatively infrequent intersections with arterial roads. However, based on evidence from research undertaken in Metro Vancouver and elsewhere, people riding bicycles on multi-use paths may still face relatively high rates of falls and collisions that go unrecognized and unreported, since they do not involve a motor vehicle and as such, are not reported to ICBC, nor reflected in this analysis. (Teschke et. al, 2012)

Supportive Practices and Policies

Municipality	Bicycle Network	AT/Cycling Strategy	Complete Streets Policy	Vision Zero Policy	Traffic Calming Policy	Construction Zone Traffic Management	Cycling Education[5]
New Westminster	Yes	Yes	No	No	Yes	In Progress	High
Burnaby	In Progress	No	No	No	Yes	No	Low

Table 4 - City of New Westminster, City of Burnaby

New Westminster has established various policies and actions supportive of cycling:

- As part of its Master Transportation Plan endorsed by Council in 2015, New Westminster established a bikeway network plan and an associated cycling strategy.
- New Westminster has an adopted policy for reducing the volume of motor vehicles and traffic calming on bikeways that involves, for example, a 30 km/h speed limit, speed humps, and traffic diversion.
- The municipality is developing a policy requiring construction projects impacting municipal roadways and cycle routes to provide a traffic management plan accommodating and minimizing detours for people on bikes.
- Approximately 83% of New Westminster students in grades 4-7 (the highest percentage of any municipality in Metro Vancouver) received cycling skills training at least once in the period from 2016-2019.

Policies and actions supportive of cycling in Burnaby include:

- Ongoing efforts to design bikeways to slow speeds and reduce volumes of motor vehicle traffic.
- Burnaby is in the process of updating its bikeway plan as part of its transportation plan.
- The City does not have a Complete Street policy, however in its Town Centres Burnaby requires implementation of traffic protected bikeways as part of any new development.
- Approximately 10% of Burnaby students in grades 4-7 received cycling skills training at least once in the period from 2016-2019.

[5] The percentage of students in grades 4-7 receiving cycling skills training at least once between 2016 and 2019 is rated as follows, Low less than 20%, Medium 20%-40%, High over 40%

Key Takeaways

- Although a relatively high proportion of the populations of both Burnaby and New Westminster live within 400 metres of a bikeway Comfortable for Most, the network is fragmented, creating barriers for existing and would be cyclists. To address this challenge, a top priority would be upgrading existing routes so that they are Comfortable for Most.
- Burnaby requires developers to construct protected bike lanes fronting major development sites within each of its four Town Centres. In the long run, this approach will achieve a robust network that is comfortable for people of all ages and abilities. In the meantime, investment is needed to provide interim facilities that bridge gaps providing improved cycling connections that are attractive to a broad range of existing and potential cyclists.
- Other municipalities in the region should follow New Westminster's lead in prioritizing cycling skills training for students in grades 4-7

Subarea - North Shore

(City of North Vancouver, District of North Vancouver, District of West Vancouver, Bowen Island, Lions Bay)

Area: 312.5 KM
Population: 186,320
Bikeway Network: 445 KM

While the North Shore has become synonymous with the best terrain in the world for mountain biking, those steep slopes are no ally of cycling for transportation. This geographic challenge is being addressed through selection of routes that take advantage of the most gradual inclines, increasing adoption of electric-assist bicycles, and improved integration with transit. Some recent initiatives that stand out include the Green Necklace and Spirit Trail multi-use paths, upgrades to cycling on the Ironworkers Memorial bridge, bike parking facilities at the Bowen Island ferry terminal, and improved access for bikes to the SeaBus.

All of these initiatives have helped many North Shore communities to achieve gradual, sustained growth in their cycling ridership. Yet, further improvements in the quality and connectivity of cycling routes are needed to continue increases in ridership.

Subarea Summary Table

	Network (% of Network Comfortable for Most)	**Population Close to Comfortable Network** (% within 400m of a route Comfortable for Most)	**Cycling Rates** (% of commuters who cycle)	**Share of Trips by Females** (% of bicycle commuters who are female)	**Safety** (Collisions per million bike trips)	**Supportive Policies and Practices**[6]
Metro Vancouver	46%	65%	2.3%	35%	23	Low
Bowen Island	100%	N/A	2.6%	20%	27	Moderate
Lions Bay	0%	0%	0.0%	0%		Low
City of North Vancouver	58%	90%	2.4%	26%		Moderate
North Vancouver District	50%	52%	2.6%	25%		Moderate
West Vancouver	18%	51%	1.7%	22%		Low

Table 5 - Source: ICBC, Statistics Canada Journey to Work 2016, Metro Vancouver Municipalities, TransLink

Bikeway Network

Between 2009 and 2019, the North Shore bikeway networks underwent significant expansion. The North Shore now has over 445 lane kilometres of cycling facilities, an increase of over 450% since 2009. These improvements have enhanced cycling connectivity, providing continuous designated cycling connections for North-South and East-West travel through each municipality. However, the comfort of cycling routes tends to vary and there are very few comfortable and continuous routes linking key origins and destinations. North Shore communities have achieved steady increases in cycling rates, but have had little success in

[6] Rankings within this category are based on the number of approved policies and high to moderate ranked initiatives in the 7 categories listed in the Supportive Policies and Practices Section; High is 6 or 7, Moderate is 4 or 5 and Low is 3 or less.

attracting a higher percentage of females to ride. To attract more people of all ages and abilities, North Shore communities will need to prioritize upgrades that are Comfortable for Most People.

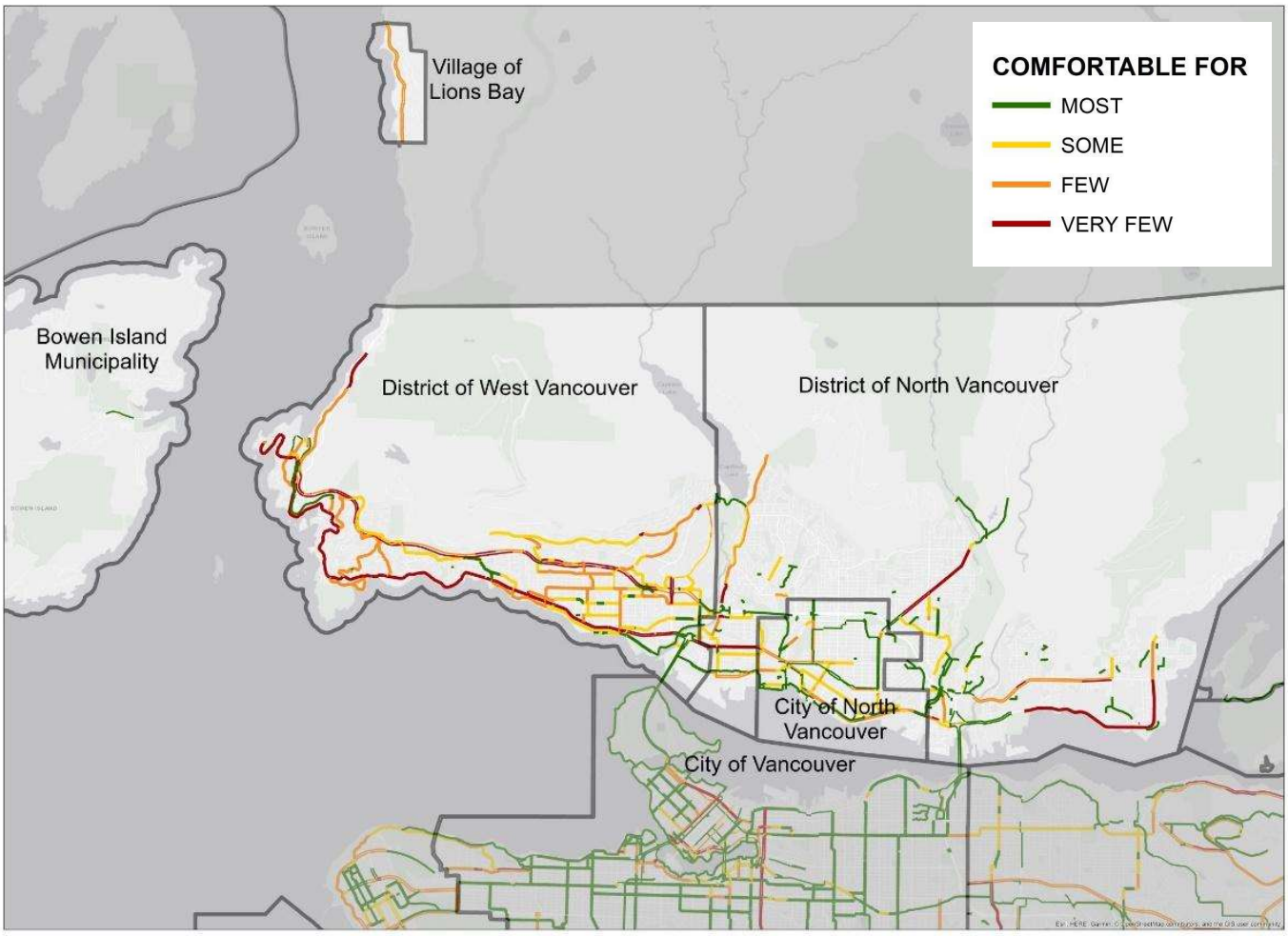
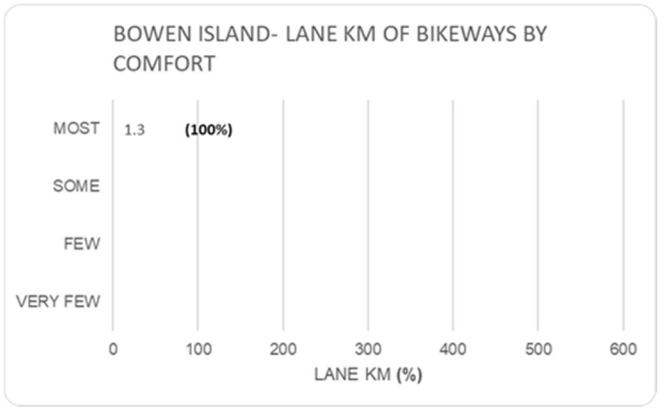
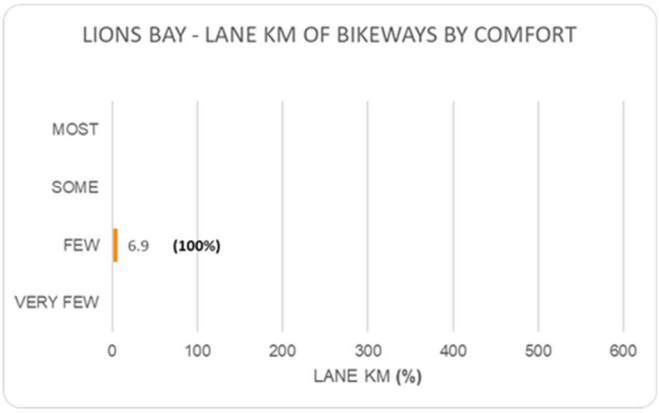


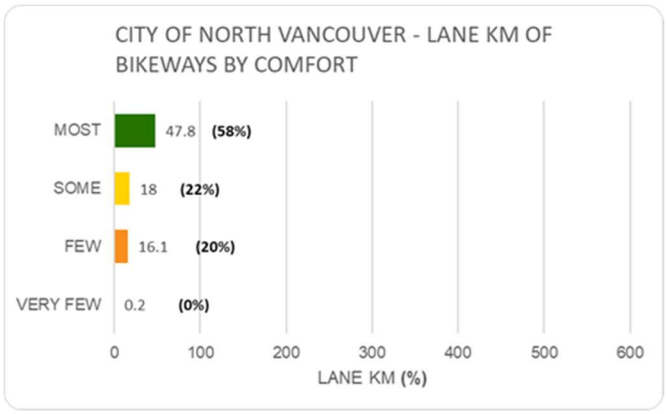
Figure 13 - North Shore Designated Bikeways by Level of Comfort
Based on Data received from TransLink, Metro Vancouver Member Municipalities, and Province of BC.

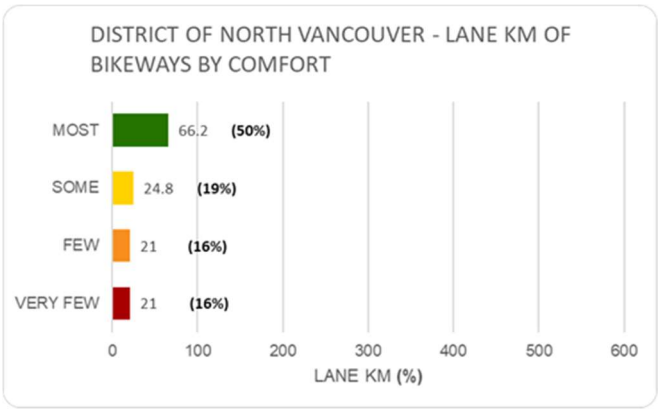
On the North Shore, the percentage of the network considered Comfortable for Most varies considerably. In the City and District of North Vancouver, it is 58% and 50% respectively, both above the regional benchmark of 46%, while 18% of West Vancouver's network is Comfortable for Most. Of the remaining 42% of the City's network, less than 0.1% is comfortable for very few, a feat matched by very few other jurisdictions in the region. In the Districts of North and West Vancouver by contrast, 16% and 27% of their respective networks are classified as comfortable for very few people.

Bowen Island and Lions Bay have 100% and 0% of their cycling networks that are Comfortable for Most respectively, though both have very limited networks. Improvements to end-of-trip facilities on Bowen Island such as covered bike parking at the ferry terminal are encouraging fewer motor vehicle trips by Bowen residents. Lions Bay however, has an extremely limited network, challenging terrain, and unforgiving conditions along Highway 99 -- factors serving as significant barriers to utilitarian cycling.









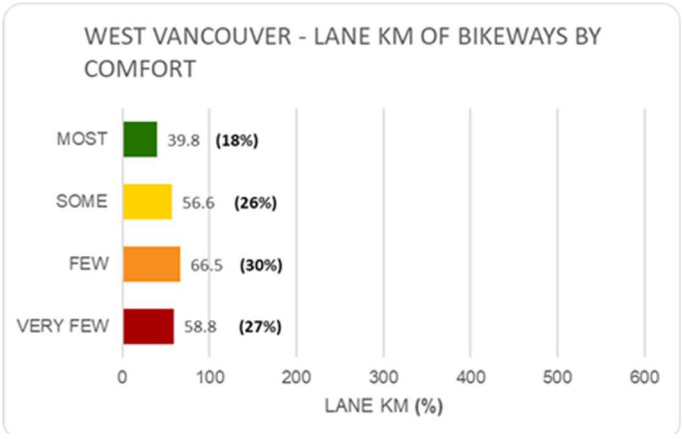


Figure 14 - Based on Data received from TransLink, Metro Vancouver Member Municipalities, and Province of BC.

The following Figure shows the lane kilometres for each type of cycling facility on the North Shore. There are less than 10 lane kilometres of segregated bike paths and protected bike lanes in this subarea and approximately 132 lane kilometres of multi-use paths. The vast majority of these facilities are characterized as Comfortable for Most.

The majority of the network is comprised of shared roadways, bike lanes and bike accessible shoulders that are not physically separated from motor vehicle traffic. Amongst these facilities, only a small portion of shared roads are Comfortable for Most. The remaining shared roads and all of the bike lane and bike accessible shoulders are classified as comfortable for Some, Few, or Very Few.

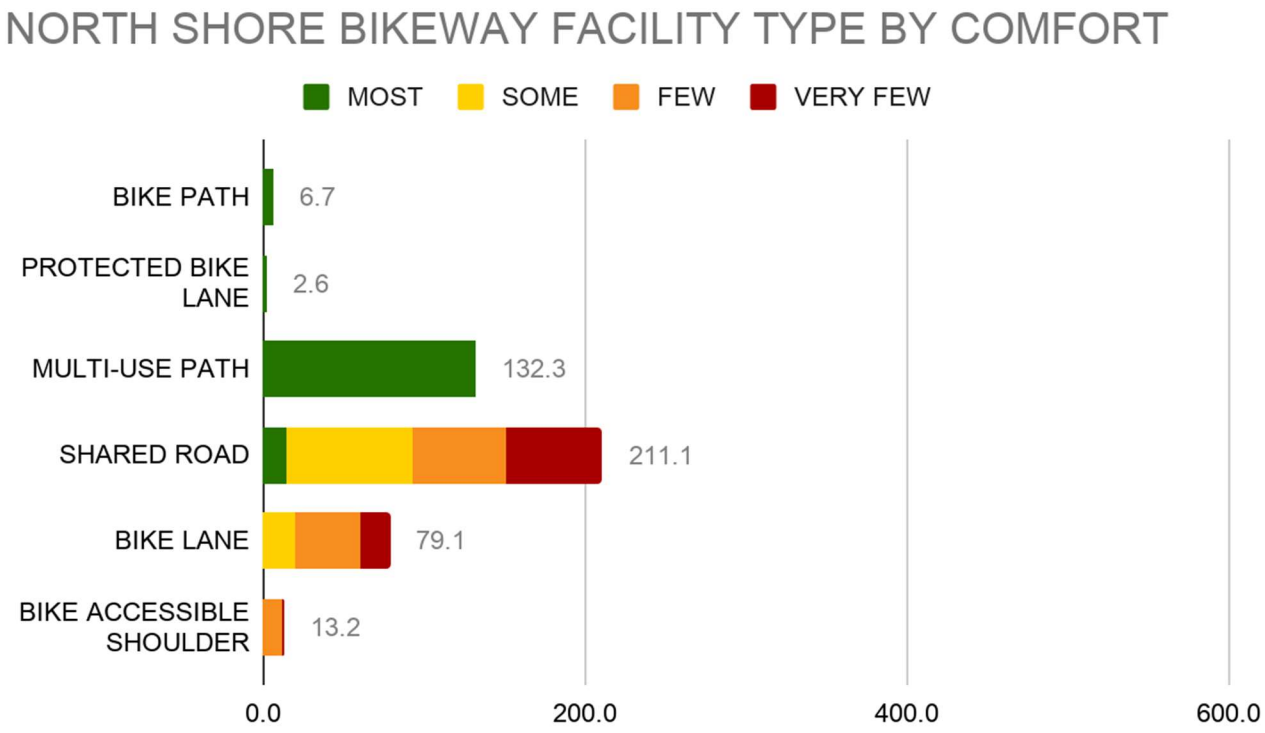


Figure 15- Based on Data received from TransLink, Metro Vancouver Member Municipalities, and Province of BC.

About 62% of residents on the North Shore are within 400 metres of a bikeway that is Comfortable for Most. However, the percentages vary considerably from 90% in the City of North Vancouver, 52% in the District of North Vancouver, 51% in West Vancouver, and as low as 0% in Lions Bay. The percentage of people living within 400 metres of a bikeway on Bowen Island is not available given the dispersed nature of the population and the limited bikeway network. Because of gaps in the network of routes Comfortable for Most, this subarea tends to appeal to people who are willing to ride in mixed traffic.

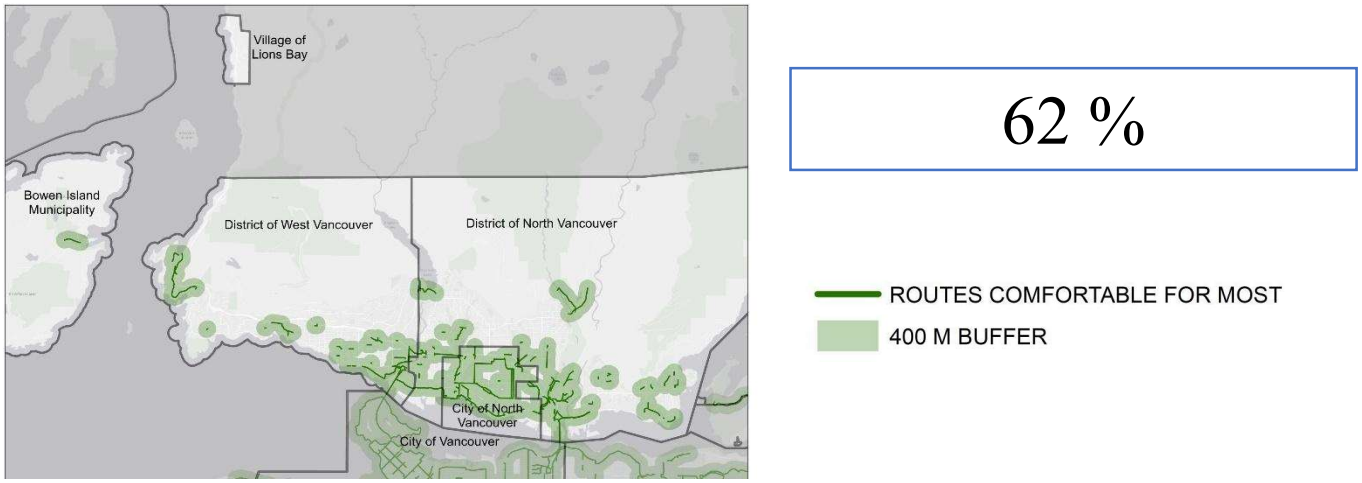
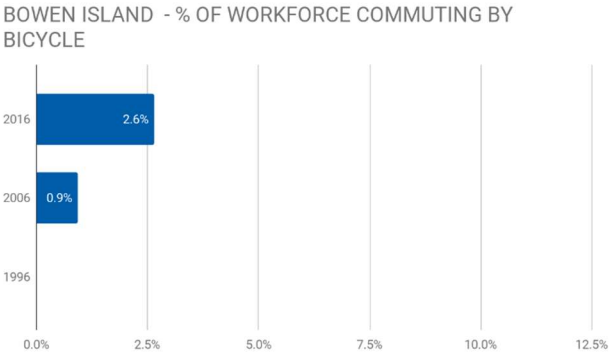
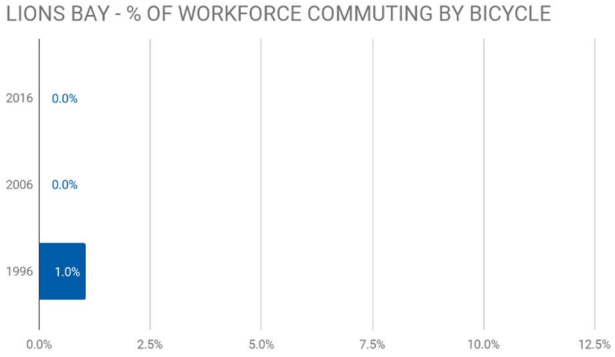


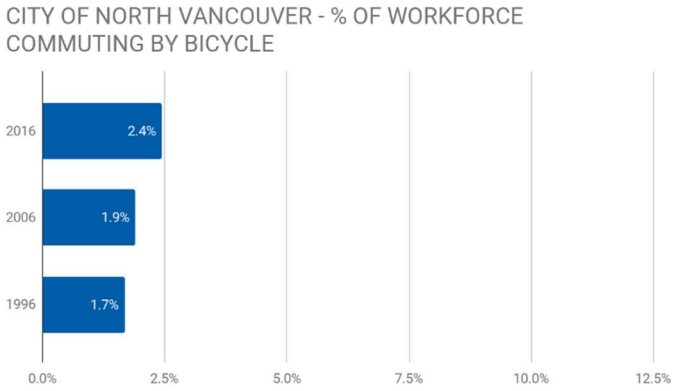
Figure 16 - Percent of Population Within 400 M of a Bikeway Comfortable for Most.
Based on Data received from TransLink, Metro Vancouver Member Municipalities, Province of British Columbia, and Statistics Canada

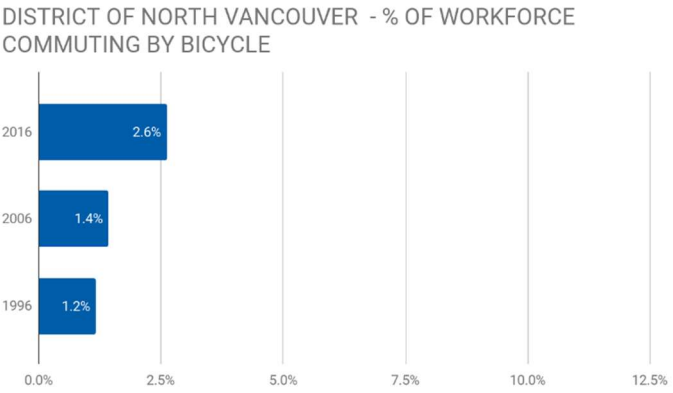
Cycling Rates

The share of commute trips by bicycle has grown steadily in most communities on the North Shore. Since 1996 the percent of the workforce commuting regularly by bicycle in the City has increased from 1.7% to 2.4%. While in the District of North Vancouver that percentage has more than doubled to 2.6% in 2016. Bowen too has increased to 2.6%. Each of these jurisdictions have a cycling rate that is higher than the regional average of 2.3%. West Vancouver has seen less growth, going from 1.2% to 1.7% in 2016. Lions Bay is the only community to experience a drop in its cycling rate, likely due to its topography, isolation and lack of comfortable alternatives to the rudimentary cycling facilities on Upper Levels Highway.









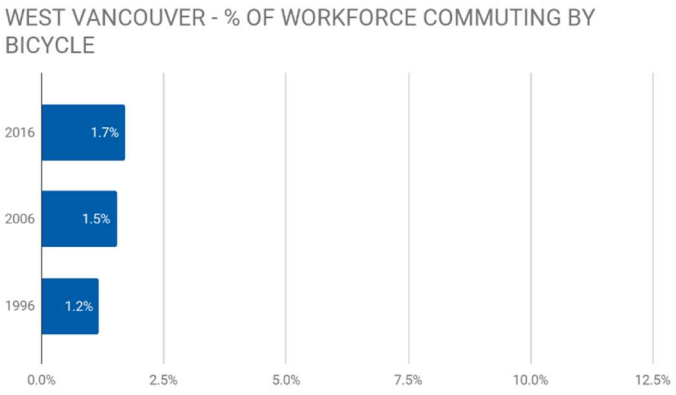


Figure 17- Source: Statistics Canada Journey to Work 1996, 2006, 2016

Share of Trips by Females

On the North Shore in 1996, there was no jurisdiction where more than 30% of people who were regularly commuting by bicycle who were female. By 2016, the share of those commuting regularly by bicycle who were female remained lower than the regional average of 35%. The City of North Vancouver currently has the highest share of cycling trips by females at 26%. This strong imbalance, with trips by males outnumbering those made by females by a factor of 3 to 1, may be attributed to gaps in the network of routes that are Comfortable for Most.

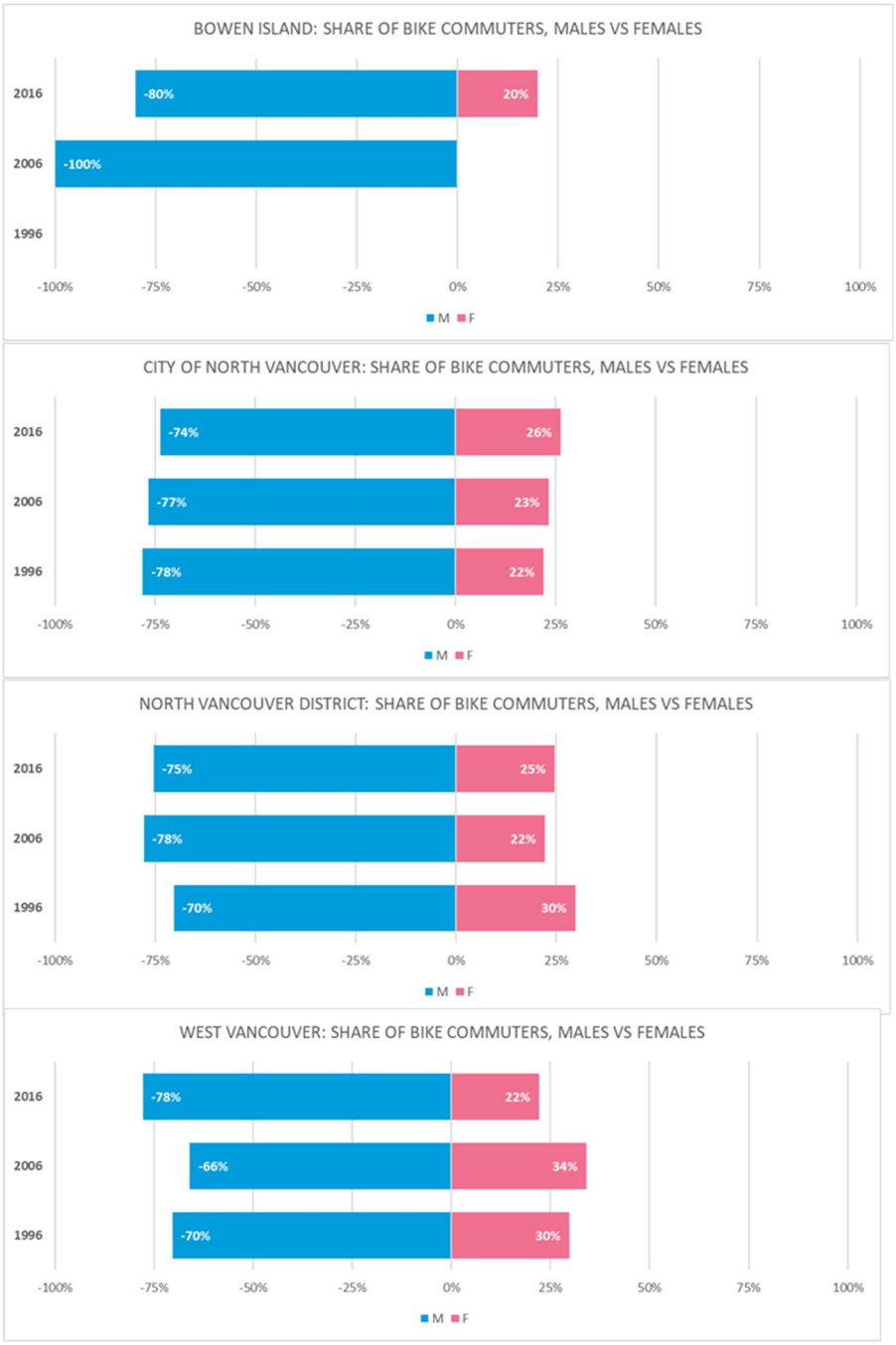


Figure 18 - Source: Statistics Canada Journey to Work, 1996, 2006, 2016
(Note that Lions Bay is not included since it has no reported Journey to Work trips by bicycle)

Safety

For the North Shore subarea, the rate of collisions involving people cycling was 27 per million bike trips in 2017, slightly higher than Metro Vancouver's rate of 23 per million bike trips. To reduce the collision rate for people riding bicycles, North Shore municipalities must focus investment in cycling infrastructure proven to support improved safety (Teschke et al, 2012).

Supportive Practices and Policies

Municipality	Bicycle Network	AT/Cycling Strategy	Complete Streets	Vision Zero	Traffic Calming	Construction Zone Traffic Management	Cycling Education[7]
Bowen Island	Yes	Yes	Yes	Yes	No	No	High
Lions Bay	No	No	No	No	Yes	No	N/A
North Vancouver City	Yes	Yes	No	In Progress	Yes	No	High
North Vancouver District	Yes	Yes	No	No	Yes	Yes	Low
West Vancouver	Yes	Yes	No	No	No	No	Low

Table 6 - Source: City of North Vancouver, District of North Vancouver, District of West Vancouver, Bowen Island Municipality

Municipalities in the North Shore subarea have developed a number of policies and practices supportive of cycling:

- The City and District of North Vancouver, West Vancouver and Bowen Island each have a municipal bikeway network plan and cycling strategy covering at least a 5-year period and which were approved by Council.
- Bowen Island has a Council-approved Complete Streets policy. While not termed 'Complete Streets', it updates road standards to require multi-use paths on all trunk and main roads, wide shoulders on all rural roads, and standards and proposed connections to support active transportation connections between neighbourhoods. As such this policy covers the intent and key elements of a Complete Street concept within a rural context.
- Both the City of North Vancouver and Bowen Island have embraced Vision Zero policies. The City is in the process of developing its policy. In the case of Bowen, the policy is not explicit, but is supported through active transportation infrastructure, reallocation of road space, and efforts to educate and raise awareness amongst road users.
- Traffic Calming policies have been adopted by the City and are standard practice in the District of North Vancouver. Both jurisdictions reduce speed limits on bicycle routes to 30 km/h on local roads and to 40 km/h on collectors. Speed limits on local roads are supported through physical measures to reduce motor vehicle volumes and slow traffic.
- Only the District has a policy that requires those undertaking construction to implement traffic management that accommodates and minimizes detours for people on bikes.

[7] The percentage of students in grades 4-7 receiving cycling skills training at least once between 2016 and 2019 is rated as follows, Low less than 20%, Medium 20%-40%, High over 40%

- Over 40% of students in City of North Vancouver and on Bowen in grades 4-7 received cycling skills training at least once in the period from 2016-2019, while in the District the corresponding percentage was 5% and West Vancouver was 7%.

Key Takeaways

- In order to overcome challenges with steep terrain, North Shore municipalities should consider means to augment and supplement incentives like the Province's Scrap-It program which offers a rebate of up to $850 for those who exchange their motor vehicle for an electric assist bicycle. To support this transition, the North Shore should invest in cycling facilities designed to accommodate e-bikes, for example by segregating bicycles wherever possible and by increasing the width of facilities to accommodate passing.
- Thanks to encouragement and advocacy from HUB Cycling North Shore Local Committee as well as ongoing investment by local municipalities, this subarea has achieved one of the highest growth rates in its cycling network over the last 10 years. Yet, despite this investment, the network of routes that are Comfortable for Most remains fragmented on the North Shore. Ongoing investment is needed if the North Shore hopes to achieve a complete and continuous network of routes that are Comfortable for Most and which link key origins and destinations.

Subarea - Northeast

(Coquitlam, Port Coquitlam, Port Moody, Village of Anmore, Village of Belcarra, Maple Ridge, Pitt Meadows)

Area: 563.7 KM2
Population: 335,129
Bikeway Network: 750

Automobiles dominate transportation in the Northeast subarea. But transit expansion, changing demographics, and increasing delays due to congestion are making cycling an increasingly attractive option for trips within the subarea and as 'last-mile' connections to transit facilities. Currently, cycling facilities in the Northeast are largely unconnected and sparse. New protected routes, such as the multi-use path between the Pinetree Way and Lafarge Lake Skytrain stations are creating a cycling network for the Tri-Cities area, but more safe routes to major destinations are needed to create useful connections within and beyond municipal borders.

The next challenge for the Northeast region will be ensuring new cycling routes and upgrades to existing facilities both trend toward the safe, all ages and abilities level of design likely to build ridership. With the municipalities in this region increasing housing density near transit hubs, expanding and improving cycling connections to major destinations within the subarea will be one of the best ways to increase cycling rates.

Subarea Summary Table

	Network (% of Network Comfortable for Most)	**Population Close to Comfortable Network** (% within 400m of a route Comfortable for Most)	**Cycling Rate** (% of commuters who cycle)	**Share of Trips by Females** (% of bicycle commuters who are female)	**Safety** (Collisions per million bike trips)	**Supportive Policies and Practices**[8]
Metro Vancouver	46%	65%	2.3%	35%	23	Low
Anmore	100%	N/A	1.0%	0%	52	Low
Belcarra	100%	N/A	4.1%	0%		Low
Coquitlam	51%	51%	0.7%	23%		Moderate
Maple Ridge	36%	36%	0.5%	32%		Moderate
Pitt Meadows	81%	53%	0.6%	27%		Moderate
Port Coquitlam	56%	79%	0.8%	22%		Low
Port Moody	65%	72%	0.6%	21%		Moderate

Table 7- Source: ICBC, Statistics Canada Journey to Work 2016, Metro Vancouver Municipalities, TransLink

[8] Rankings within this category are based on the number of approved policies and high to moderate ranked initiatives in the 7 categories listed in the Supportive Policies and Practices Section; High is 6 or 7, Moderate is 4 or 5 and Low is 3 or less.

Bikeway Network

The Bikeway network in the Northeast remains fragmented at present. Current cycling conditions are likely to be intimidating to most people, due to an overall lack of separation from the vehicle traffic on major streets and arterials throughout this subarea.

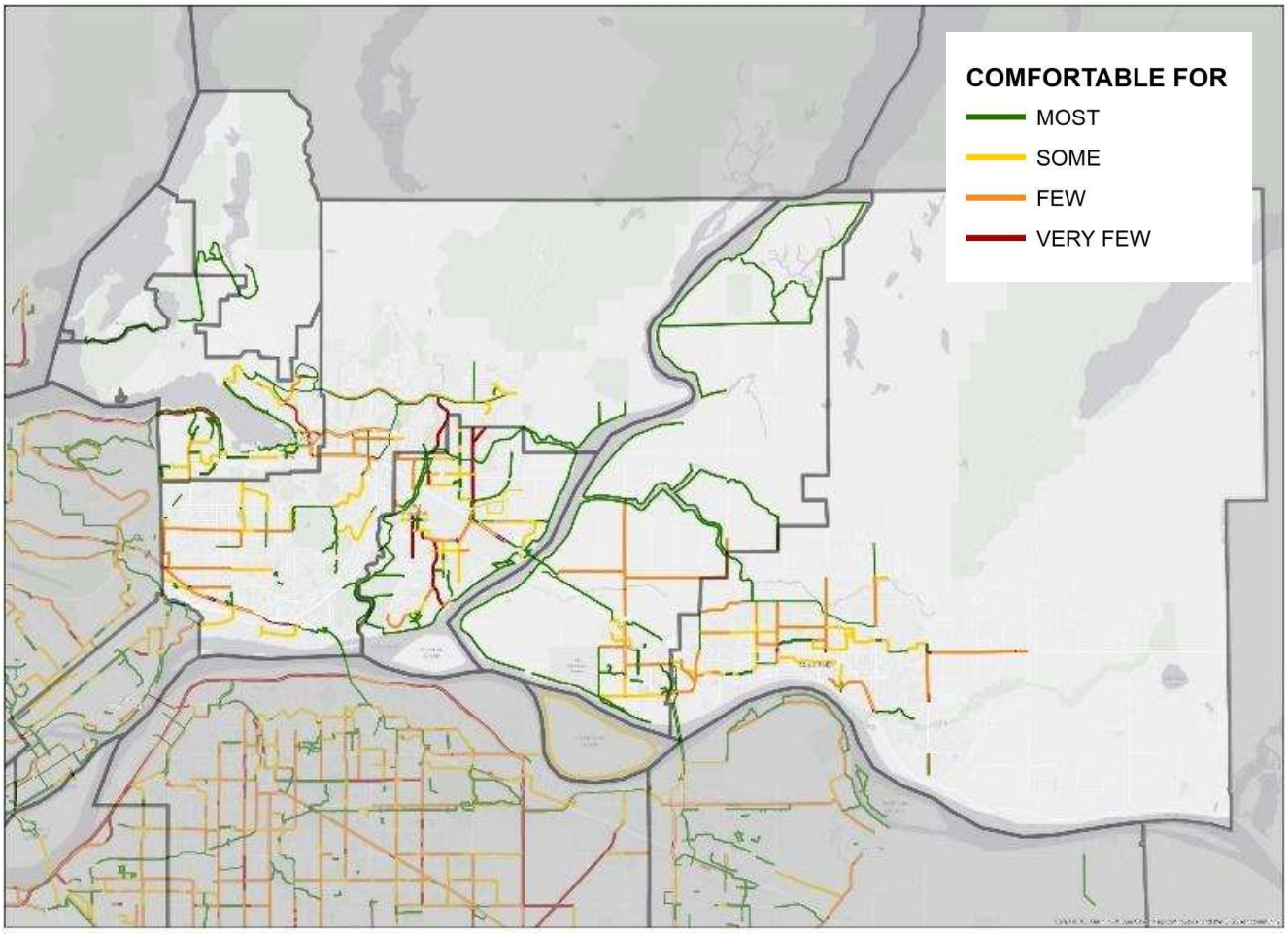
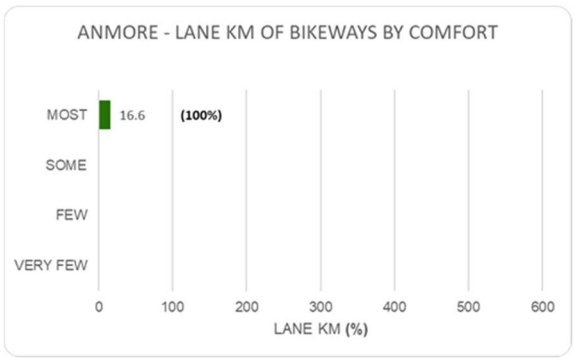
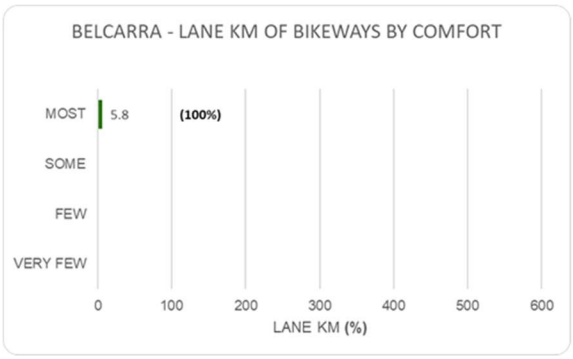
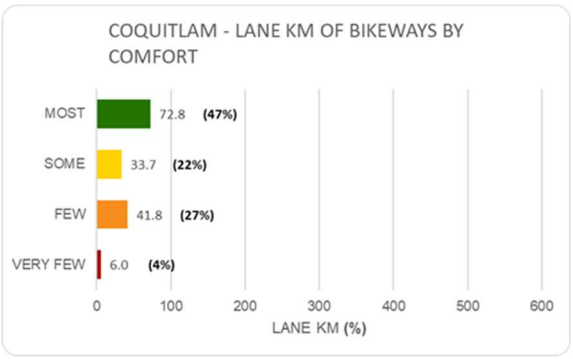


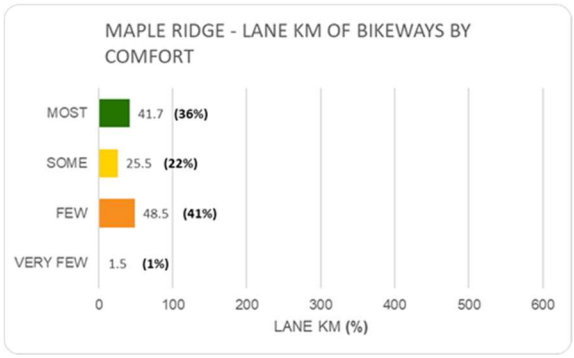
Figure 19 - Northeast Designated Bikeways by Level of Comfort
Based on Data received from TransLink, Metro Vancouver Member Municipalities, and Province of BC.

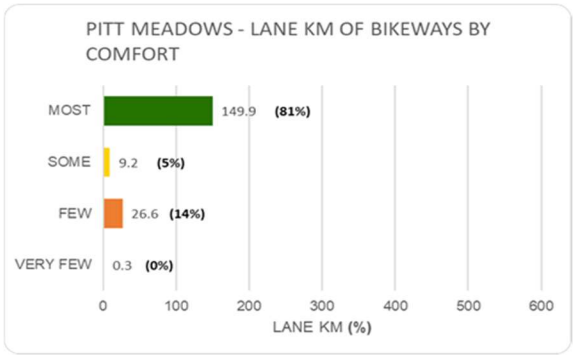
Separated routes such as the Traboulay PoCo Trail, Shoreline Trail, Dyke trail system, Pitt River Regional Greenway, and Great Trail (formerly the TransCanada Trail) offer a number of safe, comfortable cycling options for recreational riders, but links to key destinations and transit hubs will need to be improved to significantly impact cycling's low ridership to date.

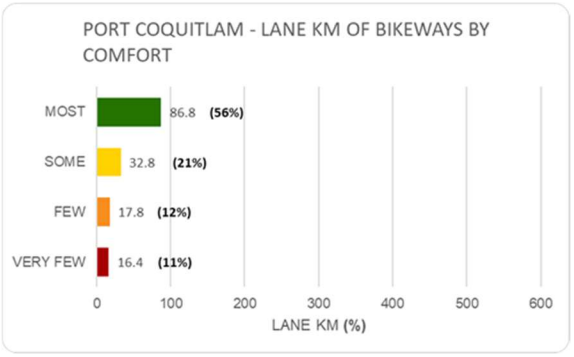












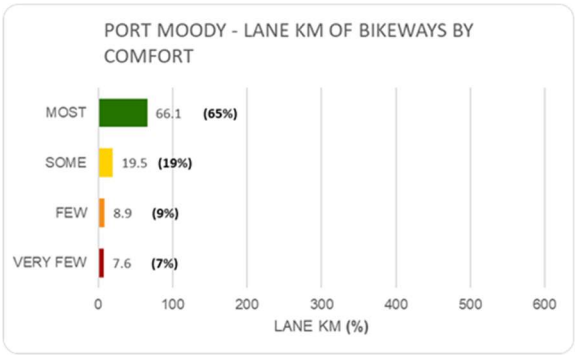


Figure 20 - Source Based on Data received from TransLink, Metro Vancouver Member Municipalities, and Province

The following Figure shows the lane kilometres for each type of cycling facility in the Northeast sector. There are less than 5 lane kilometres of segregated bike paths and protected bike lanes in this subarea and approximately 435 lane kilometres of multi-use paths. The vast majority of these facilities are characterized as Comfortable for Most.

A smaller portion of the network is comprised of shared roadways, bike lanes and bike accessible shoulders that are not physically separated from motor vehicle traffic. Amongst these bikeways only a small fraction of shared roads are Comfortable for Most. The remaining shared roads and all of the bike lane and bike accessible shoulders are classified as only comfortable for Some, Few, or Very Few.

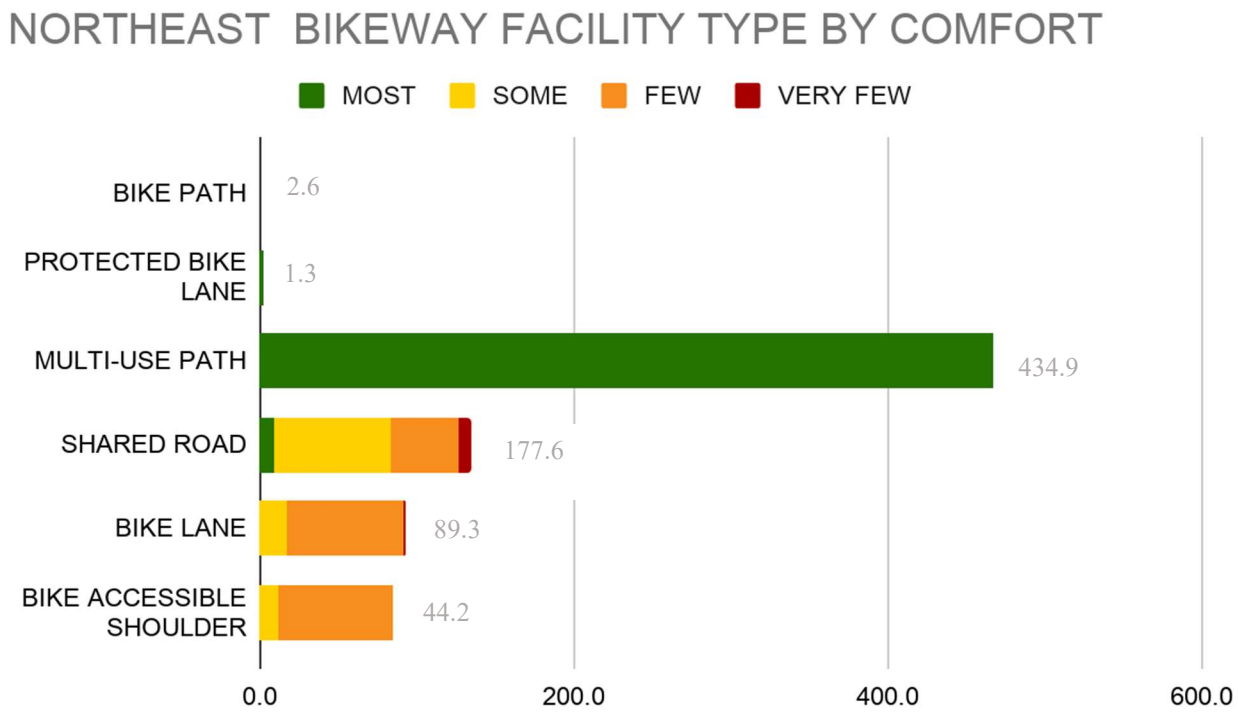


Figure 21 - Based on Data received from TransLink, Metro Vancouver Member Municipalities, and Province of BC.

About 54% of residents in the Northeast subarea are within 400 metres of a bikeway that is Comfortable for Most, below the regional average of 65%. The percentage that live within 400 metres of a route Comfortable for Most varies across this subarea with Port Coquitlam and Port Moody above the regional average and Pitt Meadows, Coquitlam, and Maple Ridge sitting below. Percentages for Anmore and Belcarra are not available.

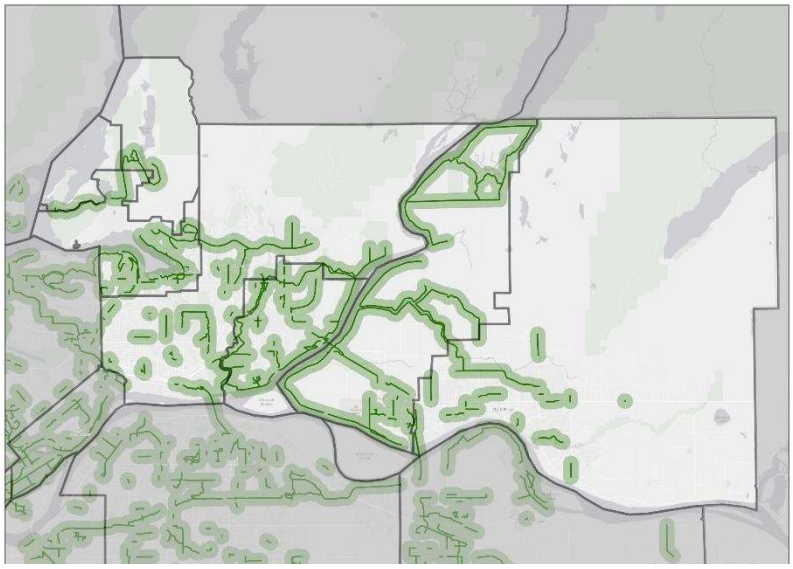


Figure 22 - Percent of Population Within 400 M of a Bikeway Comfortable for Most.
Based on Data received from TransLink, Metro Vancouver Member Municipalities, Province of British Columbia, and Statistics Canada

Cycling Rates

The percentage of people who regularly commute by bicycle in the Northeast remains below the regional average. Only Port Moody registered an increase in the past decade, with levels stable or dropping slightly in the other municipalities in the subarea. Belcarra stands out, with the 2016 census showing cycling at 4.1% in the small community.

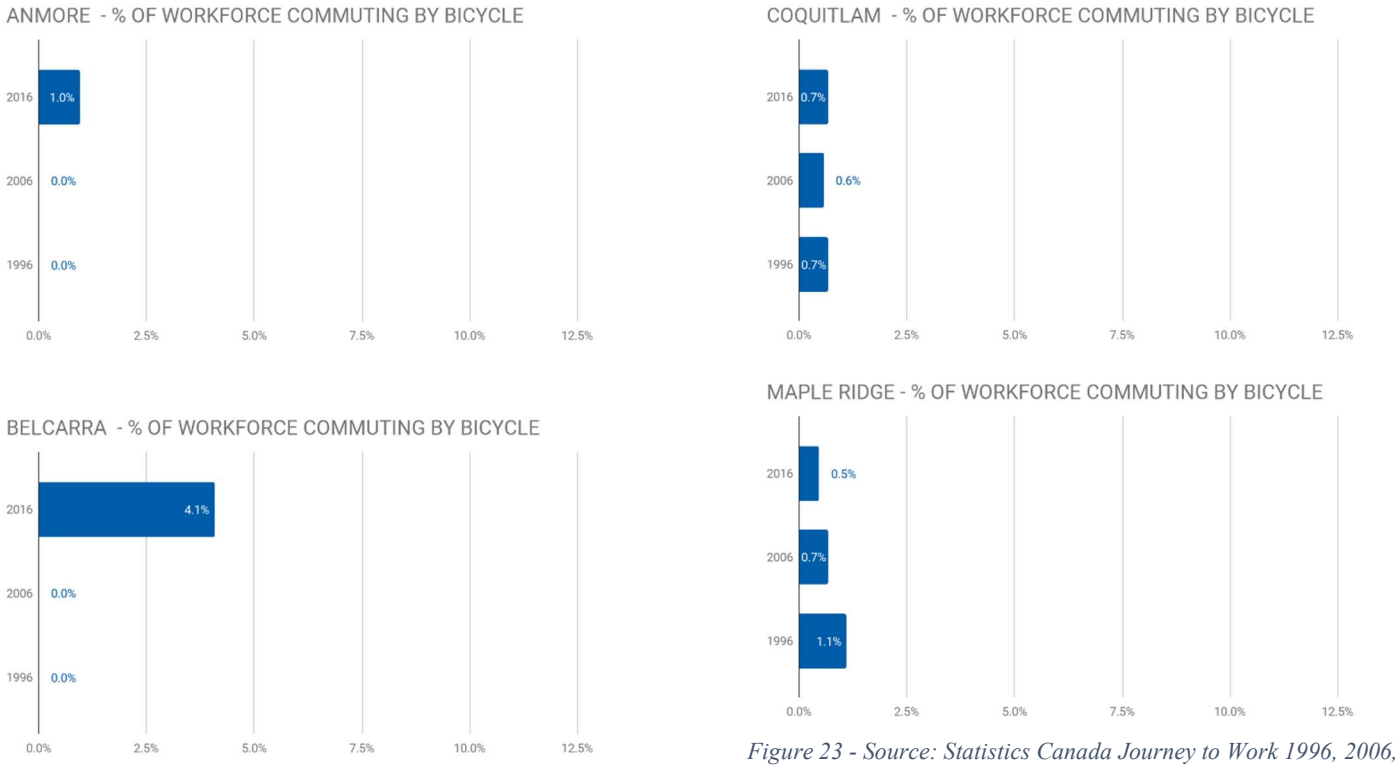
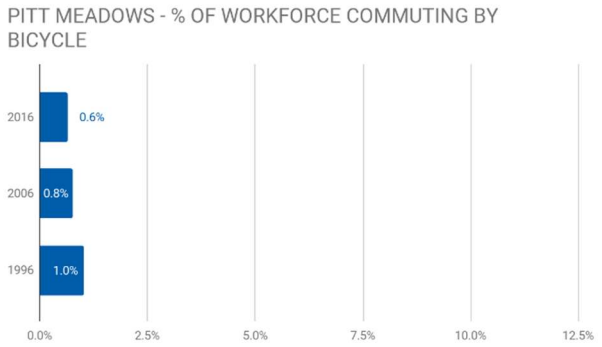
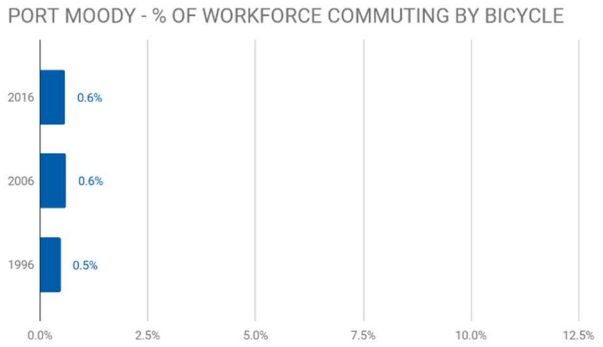


Figure 23 - Source: Statistics Canada Journey to Work 1996, 2006, 2016





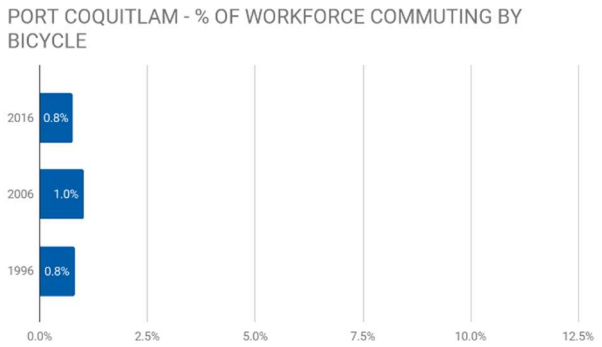


Figure 24- Source: Statistics Canada Journey to Work 1996, 2006, 2016

Share of Trips by Females

The low share of females commuting by bicycle in the Northeast subarea is indicative of the type of cycling facilities available. The current ratio is roughly 3 males riding for every female. A wider network of connected bikeways that are Comfortable for Most people to use could support more cycling among females.

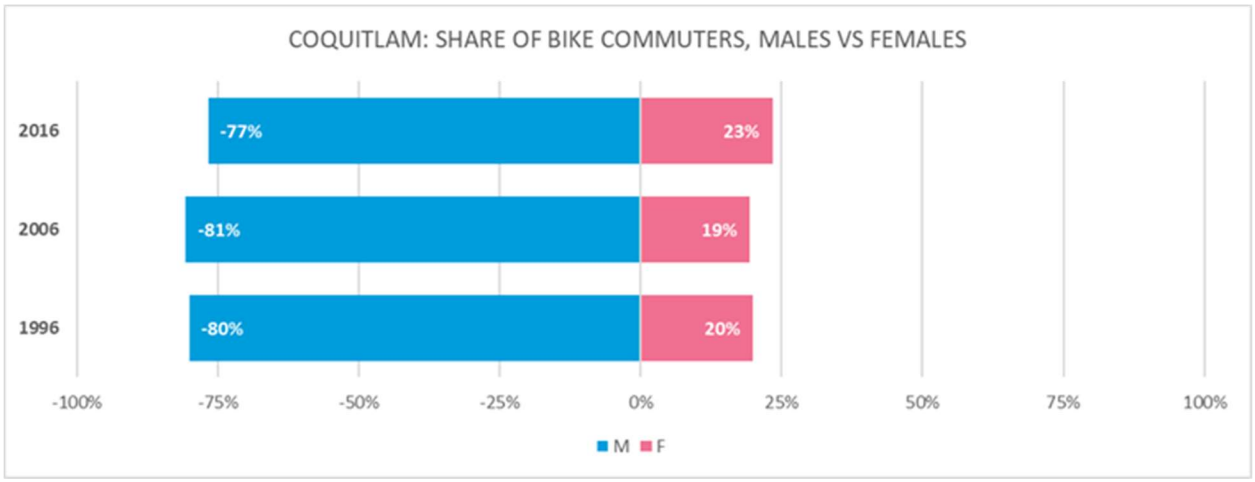
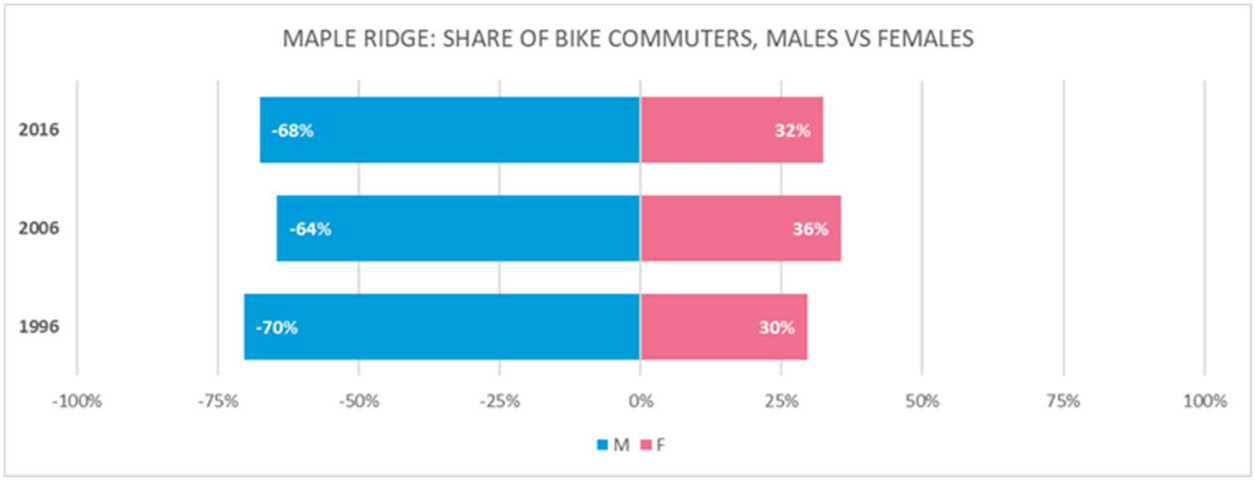
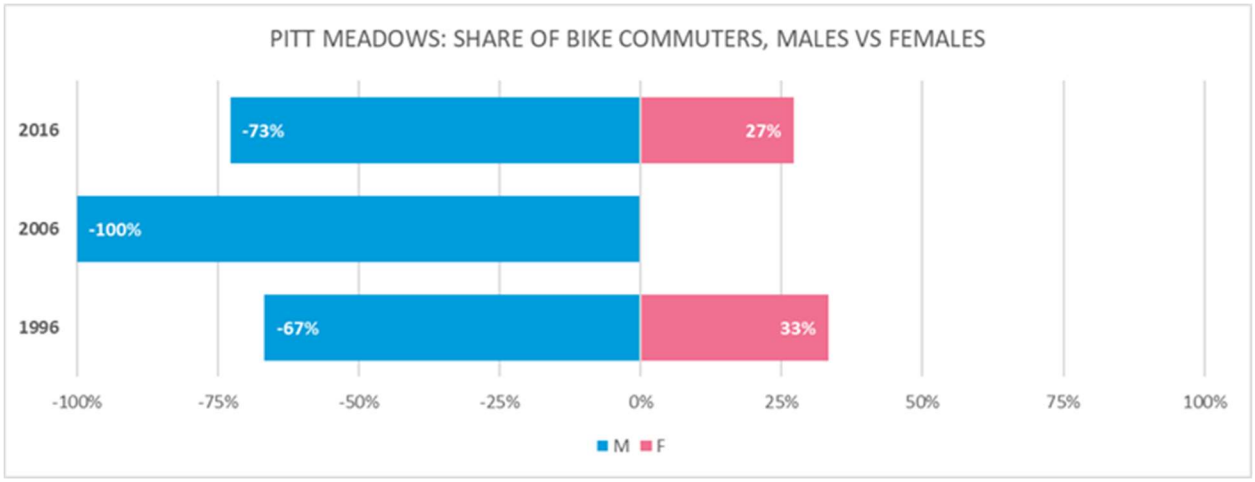


Figure 25 - Source: Statistics Canada Journey to Work 1996, 2006, 2016





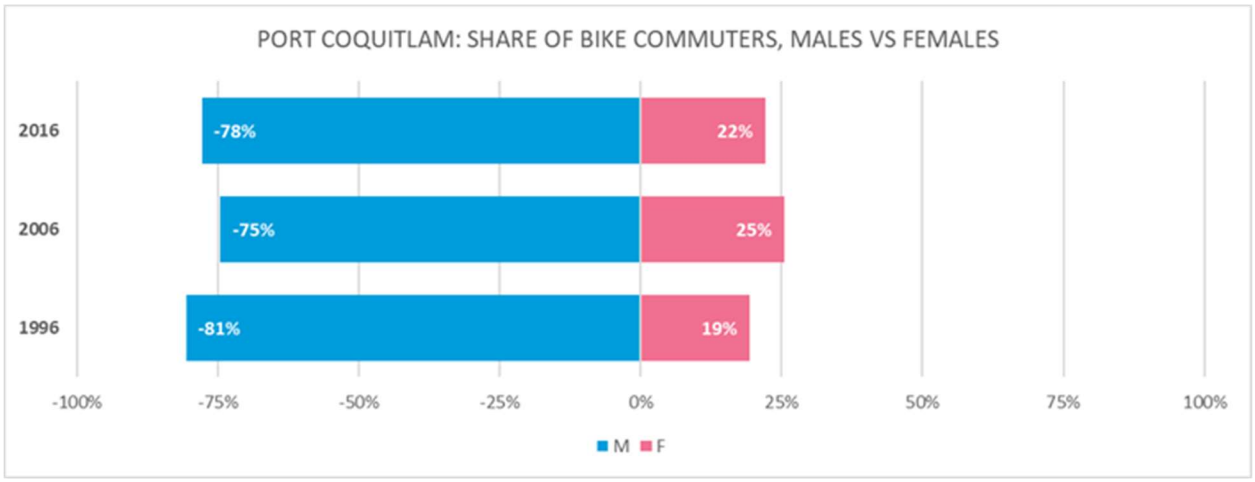


Figure 26 - Source: Statistics Canada Journey to Work 1996, 2006, 2016

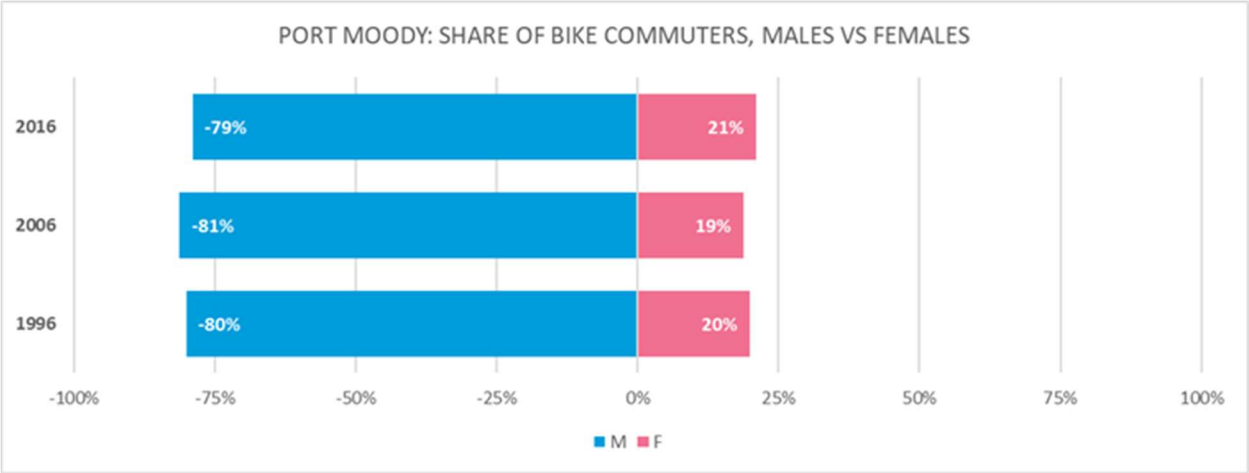


Figure 27 - Source: Statistics Canada Journey to Work 1996, 2006, 2016

Safety

In the Northeast sector, the rate of collisions involving people cycling was 52 for every 1 million bike trips in 2017, significantly higher than Metro Vancouver's rate of 23 collisions reported for every 1 million bike trips. To reduce the collision rate for people riding bicycles, municipalities in the Northeast sector must focus investment in cycling infrastructure proven to support improved safety and on improved connections between key origins and destinations.

Supportive Practices and Policies

Municipality	Bicycle Network	AT/Cycling Strategy	Complete Streets	Vision Zero	Traffic Calming	Construction Zone Traffic Management	Cycling Education[9]
Coquitlam	Yes	Yes	No	No	Yes	No	Low
Port Coquitlam	Yes	No	No	No	Yes	Yes	Low
Port Moody	Yes	Yes	No	No	Yes	No	Medium
Anmore	No	No	No	No	No	No	?
Belcarra	No	No	No	No	No	No	?
Maple Ridge	Yes	Yes	No	No	Yes	No	Medium
Pitt Meadows	Yes	Yes	No	No	Yes	Yes	High

Table 8 - Source: City of Coquitlam, City of Port Coquitlam, City of Port Moody, Village of Anmore, Village of Belcarra, City of Maple Ridge, City of Pitt Meadows

- Coquitlam, Port Coquitlam, Port Moody, Maple Ridge and Pitt Meadows each have an up-to-date, Council approved municipal bikeway network plan. Of this group, only Port Coquitlam does not have an approved Cycling Strategy that includes a wider range of policies and programs aimed at supporting increased participation in active transportation.

[9] The percentage of students in grades 4-7 receiving cycling skills training at least once between 2016 and 2019 is rated as follows, Low less than 20%, Medium 20%-40%, High over 40%

- None of the municipalities in this subarea have Council approved Complete Street or Vision Zero policies, an unfortunate oversight given that the collision rate involving cyclists and motor vehicles is 65% higher than the regional benchmark.
- On the other hand, Coquitlam, Port Coquitlam, Port Moody, Maple Ridge and Pitt Meadows have each established policies to support traffic calming on local streets.
- Only Coquitlam, Port Coquitlam and Pitt Meadows have established policies that require those undertaking construction to implement traffic management accommodating and minimizing detours for people on bikes.
- The percentage of students in grades 4-7 receiving cycling skills training at least once in the period from 2016-2019 was as follows, data for Anmore and Belcara is not available, Port Moody 21%, Port Coquitlam 16%, Coquitlam 11%, Pitt Meadows 60%, and Maple Ridge 37%.

Key Takeaways

- In the Northeast subarea the share of trips that people make by bicycle, the share of females who regularly ride a bicycle to work and the percent of residents that live within 400 metres of a bikeway are all largely below the regional average. Municipalities in this subarea must focus investment on infrastructure proven to support improved safety and in particular on improved connections to rapid transit as well as other key destinations.
- The collision rate involving cyclists is more than two times higher than the regional average in the Northeast subarea. Given this situation, municipalities should give consideration to enacting Complete Streets and Vision Zero policies and practices as well as strengthening traffic calming and other means to control speeds on the 314 lane kilometres of bikeways (over 40% of the total bikeway network) that are not physically separated from motor vehicle traffic.

Subarea - Southwest

(Richmond, Delta, Tsawwassen First Nations)
Area: 316 KM2
Population: 301,363
Cycling Network: 693 KM

With the exception of some areas in Tsawwassen, the Southwest subarea is relatively flat and conducive to cycling. Yet cycling rates in this subarea are below the regional average. This subarea includes extensive rural areas (including important lands in the Agricultural Land Reserve), urban centres in Tsawwassen, Ladner, North Delta, Steveston, and Richmond Centre, with largely suburban land use in residential neighbourhoods. The variety of land uses as well as barriers imposed by water bodies and highways create unique challenges when building an extensive and connected network of bikeways Comfortable for Most people.

Delta, Tsawwassen First Nation and Richmond have succeeded in establishing extensive multi-use paths along rail right of ways, river shorelines, and oceanfront locations. These routes make stunning facilities inviting recreational use but have limited value for utilitarian cycling. Consequently, an opportunity remains to establish a network of comfortable and continuous routes linking residential neighbourhoods with shops, services, worksites, and transit.

Subarea Summary Table

	Network (% of Network Comfortable for Most)	Population Close to Comfortable Network (% within 400m of a route Comfortable for Most)	Cycling Rate (% of commuters who cycle)	Share of Trips by Females (% of bicycle commuters who are female)	Safety (Collisions per million bike trips)	Supportive Policies and Practices[10]
Metro Vancouver	46%	65%	2.3%	35%	23	Low
Delta	29%	42%	0.8%	42%	28	Low
Richmond	48%	51%	1.3%	27%		Moderate
Tsawwassen First Nation	56%	49%	4.1%	N/A		Low

Table 9 - Source: ICBC, Statistics Canada Journey to Work 2016, Metro Vancouver Municipalities, TransLink

Bikeway Network

Relatively flat geography gives this subarea a key advantage in creating cycling-friendly routes. In the last ten years, improvements including the Canada Line Pedestrian Bicycle Bridge over the Fraser to Vancouver, Richmond's Crabapple Ridge and Parkside Neighbourhood Street Bikeway, traffic protected routes along Railway, Shell Road Trail, Westminster Highway and Number 2 Road (south of Steveston Highway), as well as waterfront trails in Richmond, Delta and on Tsawwassen First Nation Lands have greatly increased opportunities for residents and visitors to enjoy cycling.

[10] Rankings within this category are based on the number of approved policies and high to moderate ranked initiatives in the 7 categories listed in the Supportive Policies and Practices Section; High is 6 or 7, Moderate is 4 or 5 and Low is 3 or less.

Sprawl and auto-centric infrastructure presents significant impediments to increasing the number of trips made by bicycle in these communities. In the coming years, investment will be needed to create a network of cycling routes that are Comfortable for Most and which traverse downtown Richmond, Ladner and Tsawwassen providing links to surrounding residential neighbourhoods and adjacent communities. Increased bicycle parking and safe bicycle connections to transit hubs and Rapid Transit stations and Tsawwassen Ferry terminal should be examined as well, as this subarea has a tremendous opportunity to raise bicycle ridership as a part of multimodal trips.

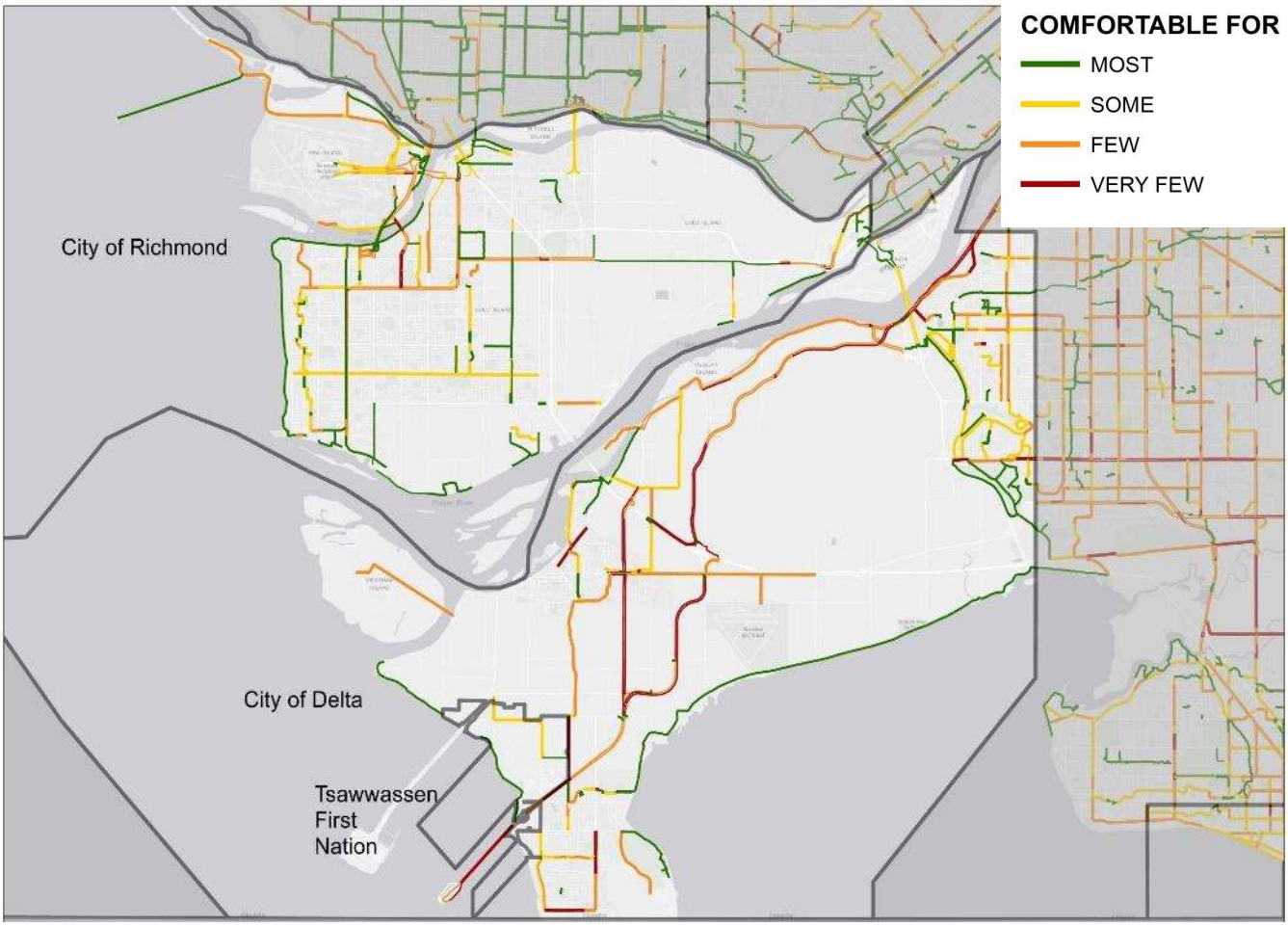
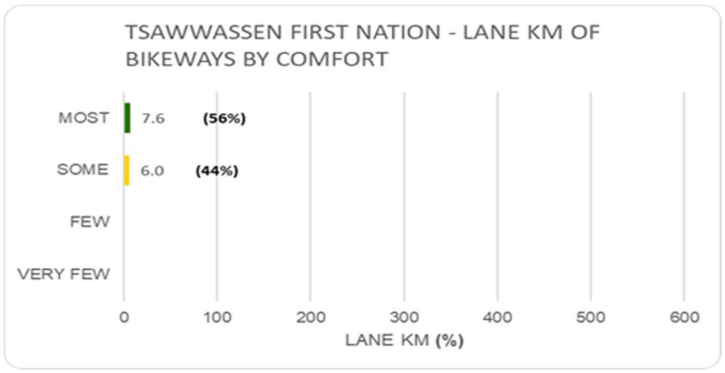
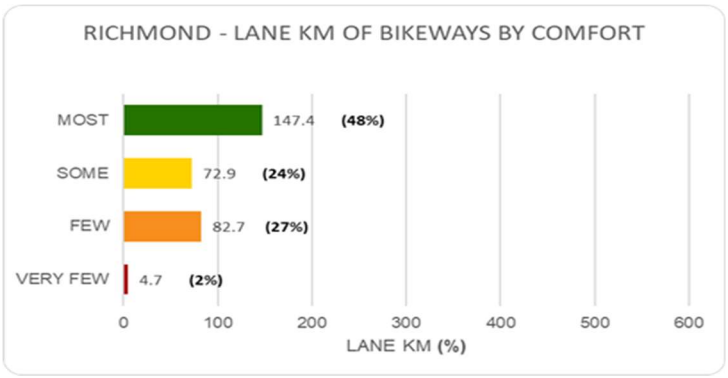


Figure 28 - Southwest Designated Bikeways by Level of Comfort
Based on Data received from TransLink, Metro Vancouver Member Municipalities, Province of British Columbia, and Statistics Canada

The percentage of routes Comfortable for Most that exist in Richmond, and Tsawwassen First Nation lands, are both above the regional benchmark of 46%. Delta by contrast sits below the regional average, and has a relatively high proportion of bikeways that are classified as comfortable for Very Few. Delta can address this challenge by implementing bikeways on quiet streets with traffic calming or by combining wide shoulders and multi-use paths beside busier rural roadways (where road right-of-way allows)[11].

The combination of multi-use paths and bike accessible shoulders serves a wide range of users, from those comfortable travelling in close proximity to motor vehicle traffic to those who are less comfortable with traffic and who are willing to tolerate a less direct route. In a rural setting, multi-use paths can be appropriate since low volumes of bicycle and pedestrian traffic as well as infrequent intersections, driveways and obstacles within the pathway allow the potential to mitigate some of the factors that tend to increase the incidence of injury to cyclists on multi-use paths within more urbanized setting.





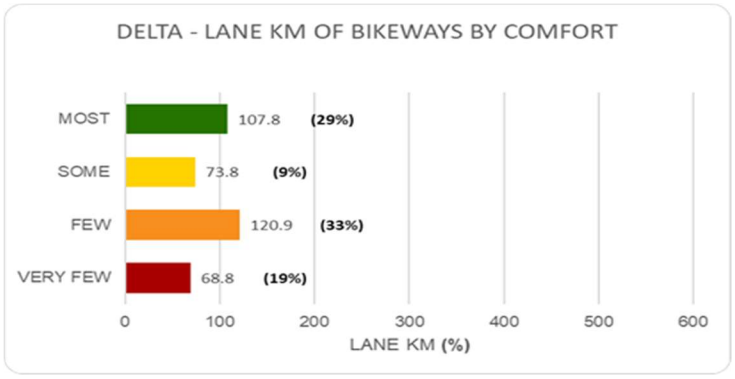


Figure 29 - Based on Data received from TransLink, Metro Vancouver Member Municipalities, and Province of BC.

[11] Since Delta is a unique community with large rural areas, this could explain some of the gaps in the cycling network, as many cycling upgrades in Delta that would be considered comfortable for most or some would require extensive civil works such as ditch infills, environmental compensation, right of way acquisition, etc. in order to accommodate both cyclists and wide agricultural vehicles. Delta also has a low population to land area ratio (when compared to other municipalities), which may also explain why they are below the regional benchmark for comfortable routes.

Figure 30 shows the lane kilometres for each type of cycling facility in the Southwest subarea. There are no segregated bike paths or protected bike lanes in this subarea and approximately 280 lane kilometres of multi-use paths. The vast majority of these facilities are characterized as Comfortable for Most.

The majority of the network is comprised of shared roadways, bike lanes and bike accessible shoulders that are not physically separated from motor vehicle traffic. Amongst these bikeway types, only a small portion of shared roads are Comfortable for Most. The remaining shared roads and all of the bike lane and bike accessible shoulders are classified as comfortable for Some, Few, or Very Few.

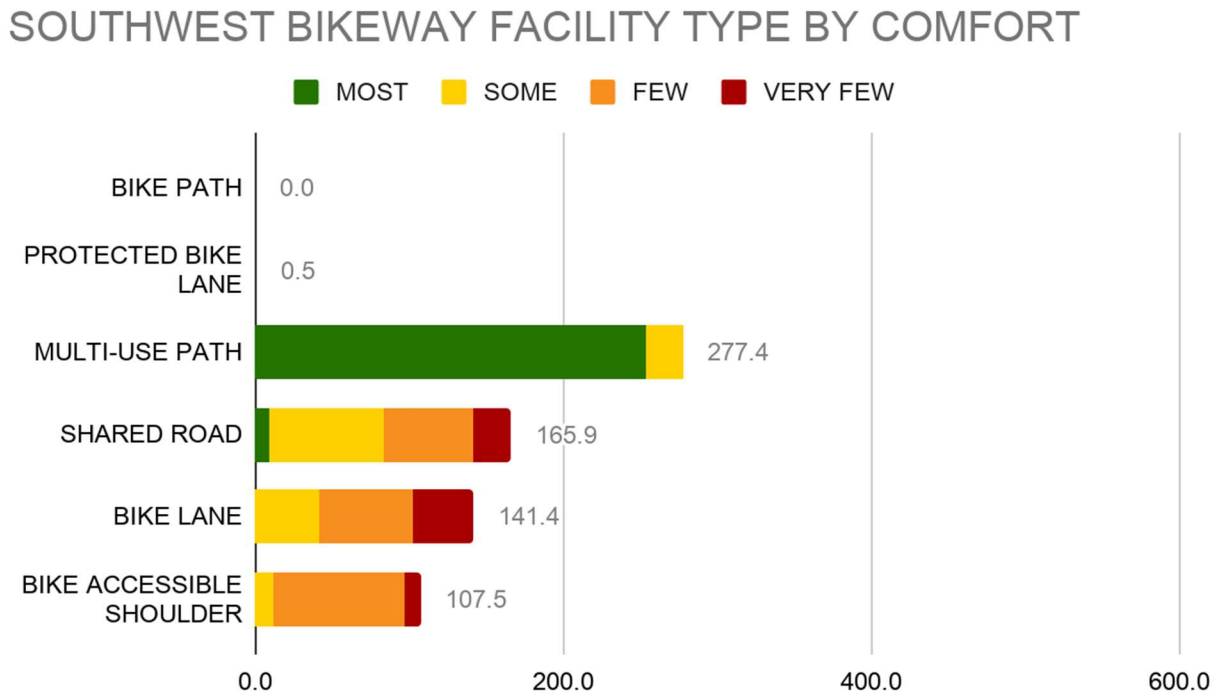


Figure 30 - Based on Data received from TransLink, Metro Vancouver Member Municipalities, and Province of BC

Figure 31 indicates that about 48% of residents in the Southwest subarea are within 400 metres of a bikeway that is Comfortable for Most, these rates vary with Richmond and Tsawwassen First Nation above and Delta below this mark. In all cases these local jurisdictions are below the regional benchmark of 65% of residents within 400 metres of a route Comfortable for Most. Because of limited access to, and gaps within the network of comfortable routes, this subarea tends to appeal to people who are willing to ride in close proximity to higher speed motor vehicle traffic without any physical separation.

Figure 31 - Percent of Population Within 400 M of a Bikeway Comfortable for Most.
Based on Data received from TransLink, Metro Vancouver Member Municipalities, Province of British Columbia, and Statistics Canada

Cycling Rates

The percentage of commute trips regularly made by bicycle has remained steady or has dropped in Richmond and Delta. Tsawwassen First Nation by contrast has achieved a significant increase. Since 1996 Richmond has seen its cycling rate drop slightly from 1.7% to 1.3%. Cycling rates in Delta dropped from 0.9% in 1996 to 0.8% in 2016. Tsawwassen First Nation meanwhile has gone from 2.9% in 2006 to 4.1% in 2016.

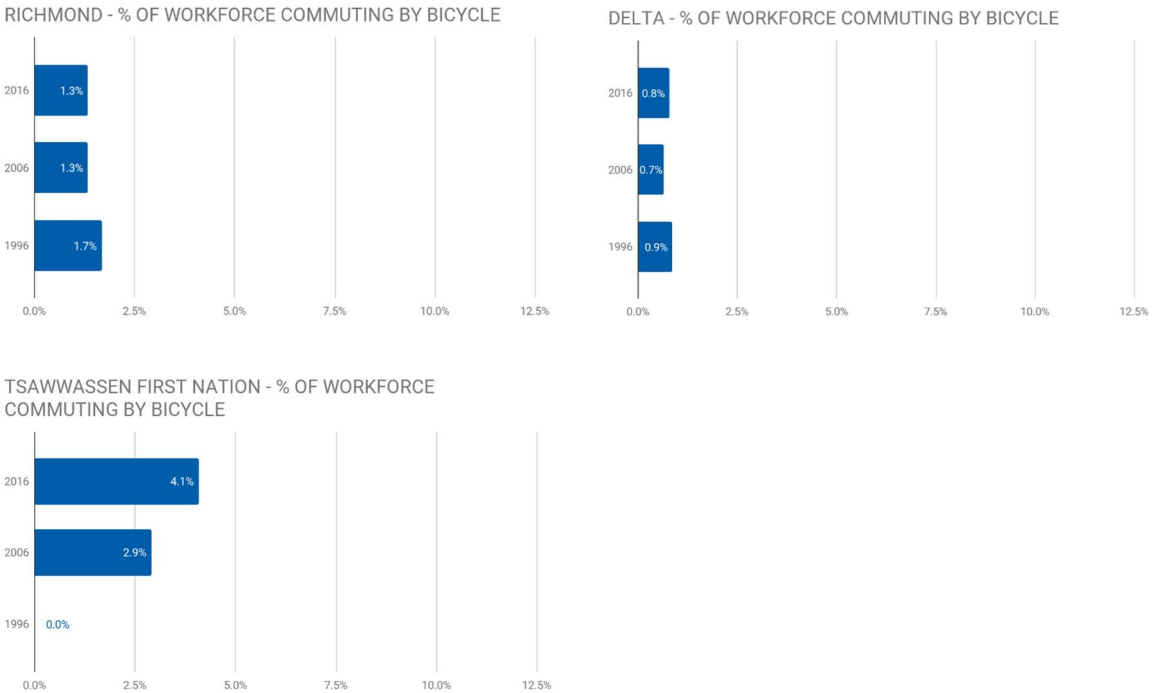


Figure 32- Source: Statistics Canada Journey to Work 1996, 2006, 2016

Share of Trips by Females

In Richmond and Delta in 1996, females made up 24% and 25% of those regularly commuting by bicycle[12]. By 2016 the proportion of commuting trips made by females on bicycles had increased slightly to 27% in Richmond and to 42% in Delta. Delta's high percentage may be a statistical anomaly, given Delta's low cycling rates and the share of bikeways that are considered comfortable for Some, Few and Very Few.

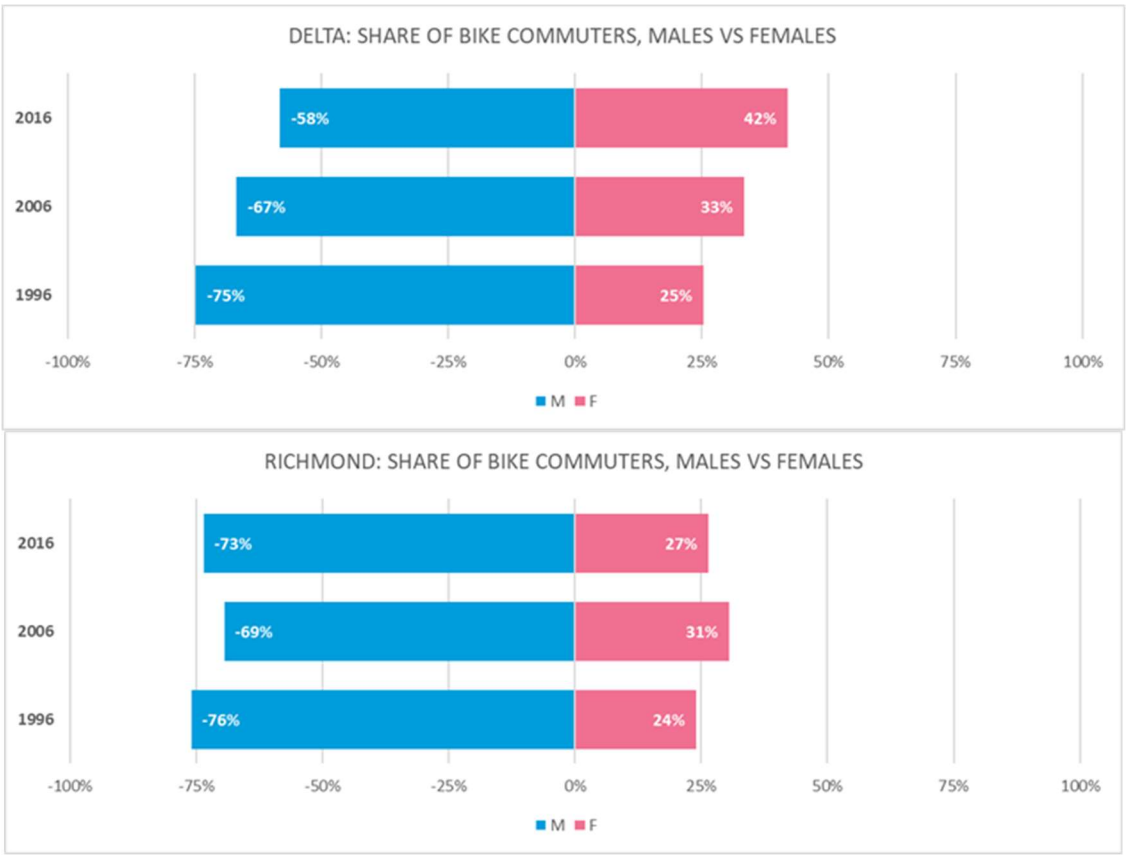


Figure 33 - Source: Statistics Canada Journey to Work 1996, 2006, 2016

Safety

For the Southwest subarea, the rate of collisions involving people cycling was 28 per million bike trips in 2017, somewhat higher than Metro Vancouver's rate of 23 per million bike trips. To reduce the collision rate for people riding bicycles, Delta and Richmond must focus investment in cycling infrastructure proven to support improved safety, and improved cycling connections between key origins and destinations.

[12] The share of those regularly commuting by bicycle who are female in Tsawwassen First Nation was not available in 2006 or 2016 due to small sample sizes.

Supportive Practices and Policies

Municipality	Bicycle Network	AT/Cycling Strategy	Complete Streets	Vision Zero	Traffic Calming	Construction Zone Traffic Management	Cycling Education[13]
Delta	Yes	No	No	No	Yes	No	Low
Richmond	Yes	Yes	No	No	Yes	Yes	Medium
Tsawwassen FN	No	No	No	No	No	Yes	?

Table 10 - Source: City of Richmond, City of Delta, Tsawwassen First Nation

Richmond, Delta and Tsawwassen First Nation have each established policies and actions supportive of cycling:

- Richmond has published a Cycling Strategy and Bikeway Network plan, both of which will be updated in the coming year. Richmond has an approved traffic calming policy, adopted in 2003 and traffic management policies to accommodate people on bikes during construction.
- Delta has an adopted bicycle network plan as well as a traffic calming policy, adopted in 2003. The City of Delta has plans to conduct a Cycling Master Plan in 2020.
- If people on bikes are potentially affected by construction activities, Tsawwassen First Nation requires those undertaking construction to implement traffic management to accommodate and minimize cycling detours.
- The percentage of students in grades 4-7 that received cycling skills training at least once in the period from 2016-2019 was as follows: 26% in Richmond and 7% in Delta (data for Tsawwassen First Nation is not available). Note that Richmond recently committed to reach all students in Grades 6 and 7 with cycling skills training going forward. Given that there are 38 elementary schools in Richmond, this constitutes a significant investment that has the potential to support increased cycling mode share and improved road safety.

[13] The percentage of students in grades 4-7 receiving cycling skills training at least once between 2016 and 2019 is rated as follows, Low less than 20%, Medium 20%-40%, High over 40%

Key Takeaways

- The share of the population living 400 metres from a bikeway Comfortable for Most is 48%, as compared to the regional average of 65%. Moreover, the network of cycling routes classified as Comfortable for Most is fragmented[14]. Accordingly, the percentage of commute trips people take by bicycle is below the regional average for Delta and Richmond. Tsawwassen First Nation by contrast has a mode share of 4.1%, third highest in the region.
- Amongst the three jurisdictions in this subarea, Richmond achieved the greatest number of policies and practices that are supportive of cycling. In particular, Richmond reached over 25% of students in grades 4-7 with cycling skills training between 2016 and 2019 and narrowly missed a high rating for its supportive policies and practices. Richmond had 5 of 7 supportive policies and practices in place (a minimum of 6 supportive policies are required to achieve a high rating). Richmond is in the process of updating its cycling network plan and has set an ambitious target of a 10% cycling mode share by 2040. With such commitment, there is a strong possibility that Richmond will reverse its decline in the percentage of commute trips made by bike.

[14] Since Delta and Richmond are unique communities with large rural areas, this could explain some of the gaps in the cycling network, since many cycling upgrades that would be considered Comfortable for Most would require extensive civil works.

Subarea - Southeast

(Surrey, White Rock, City of Langley, Township of Langley)
Area: 640 KM2
Population: 681,012
Cycling Network: 1570 KM

A landscape dominated by cars. There's no other way to describe this subarea at present. But future transit plans and design guidelines that require cycling facilities to serve all ages and abilities could combine to increase the share of commute trips made by bicycle in this fast-growing region 'south of the Fraser'. Improving links to transit hubs and major destinations are tactics that could encourage more people to ride bicycles and embrace multimodal travel. Without big commitments to expanding cycling infrastructure however, the car-focused nature of the subarea's road network will continue to negatively impact the rate of cycling in these municipalities.

Subarea Summary Table

	Network (% of Network Comfortable for Most)	**Population Close to Comfortable Network** (% within 400m of a route Comfortable for Most)	**Cycling Rate** (% of commuters who cycle)	**Share of Trips by Females** (% of bicycle commuters who are female)	**Safety** (Collisions per million bike trips)	**Supportive Policies and Practices**[15]
Metro Vancouver	46%	65%	2.3%	35%	23	Low
Langley City	44%	66%	0.5%	23%	36	Low
Langley Township	50%	60%	0.6%	27%		Low
Surrey	28%	52%	0.4%	26%		Low
White Rock	3%	42%	0.7%	36%		Low

Table 11 - Source: ICBC, Statistics Canada Journey to Work 2016, Metro Vancouver Municipalities, TransLink

[15] Rankings within this category are based on the number of approved policies and high to moderate ranked initiatives in the 7 categories listed in the Supportive Policies and Practices Section; High is 6 or 7, Moderate is 4 or 5 and Low is 3 or less.

Bikeway Network

Current cycling conditions are likely to be intimidating to most people, due to an overall lack of separation from the vehicle traffic on major streets and arterials throughout this subarea. However, the Bikeway network in the Southeast has grown over fivefold in the last 10 years increasing to over 1570 lane kilometres of bikeways in 2019. This subarea now has a basic interconnected grid of cycling facilities that can act as a foundation, providing space within road right-of-ways needed to support a network of routes suitable for most people.

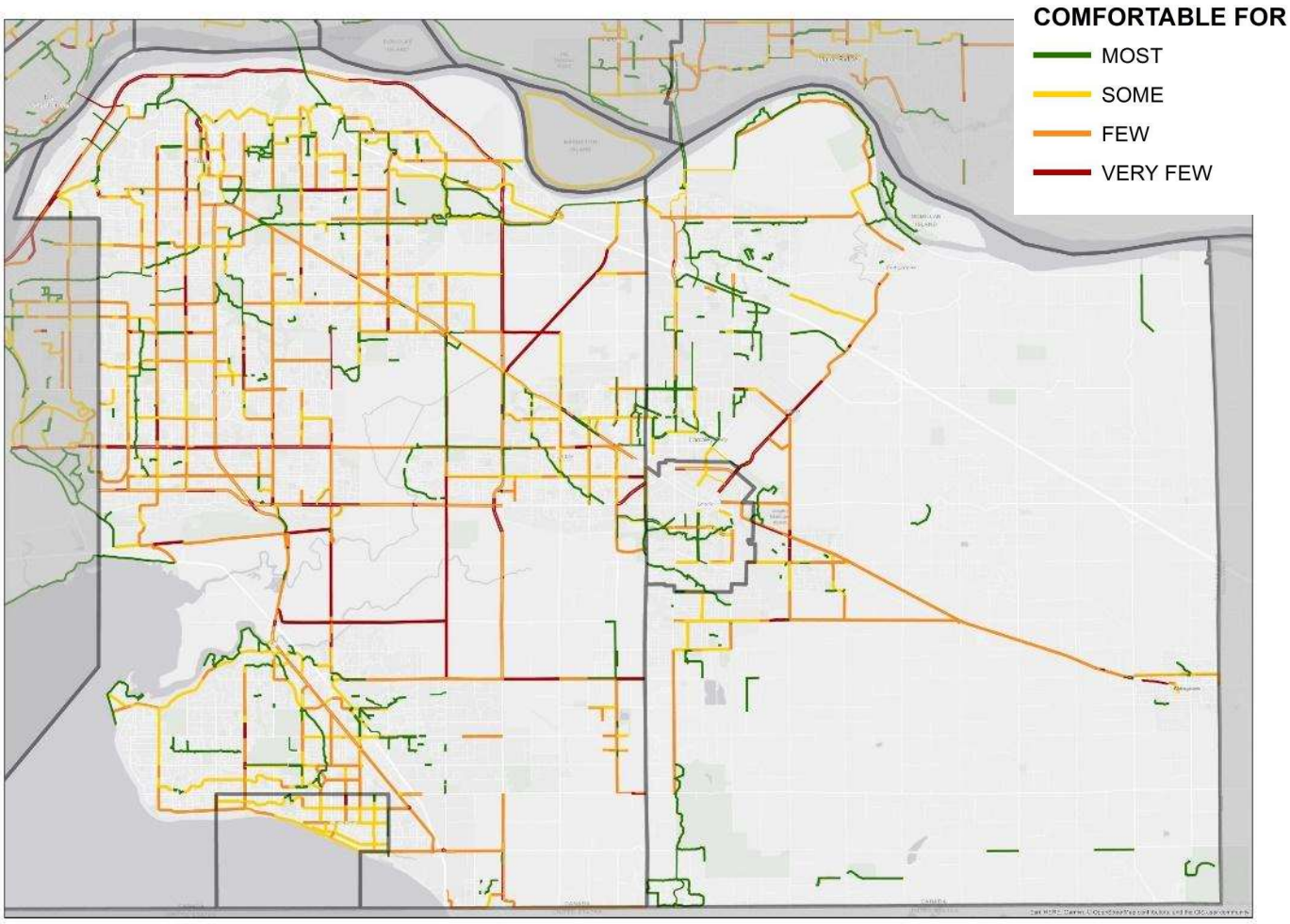
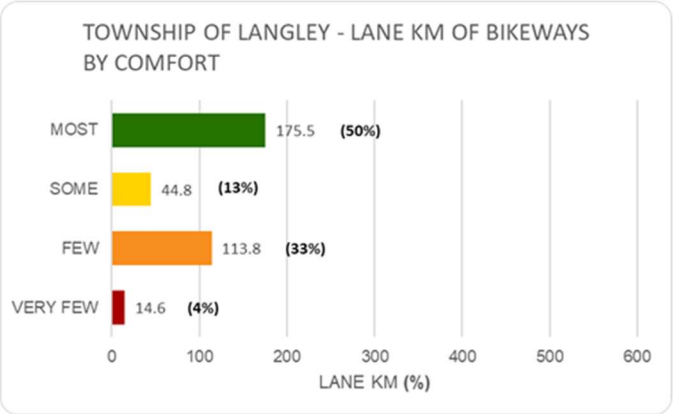
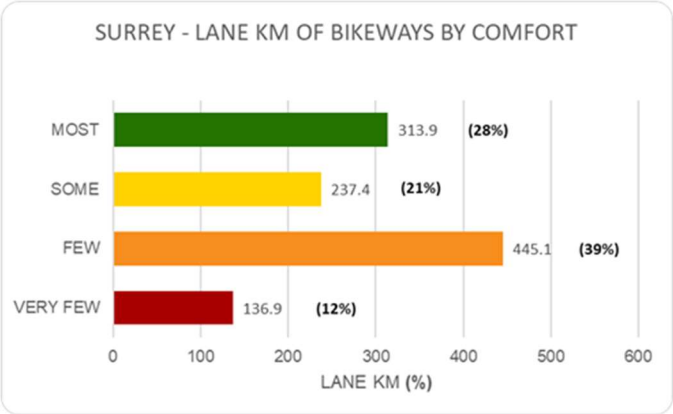


Figure 34- Southeast Designated Bikeways by Level of Comfort
Based on Data received from TransLink, Metro Vancouver Member Municipalities, and Province of BC.

The Comfortable for Most cycling network in the Southeast is characterized by a focus on recreational off-road facilities such as cycling paths in parks like Green Timbers Urban Forest, Derby Reach Regional Park and along various Hydro right of ways. A lack of North-South connectivity and very few routes in the Eastern edge of the subarea can be attributed in part to low density agricultural land uses. Elsewhere in this subarea, the basic network of designated cycling facilities provides room for upgrades that can improve access for a broad range of people interested in completing more of their trips by bicycle.





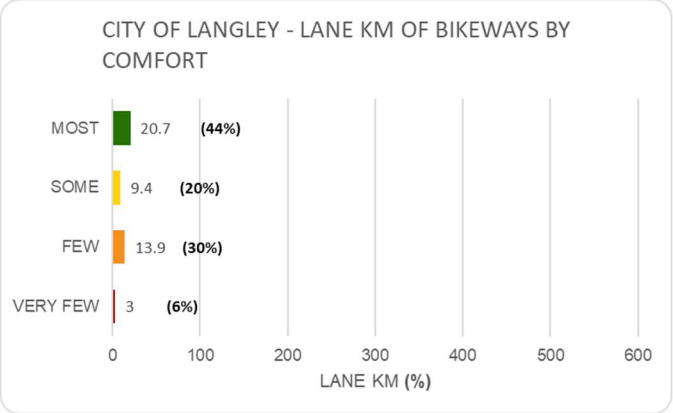


Figure 35 - Based on Data received from TransLink, Metro Vancouver Member Municipalities, and Province of BC.

The following Figure shows the lane kilometres for each type of cycling facility in the Southeast. There are no segregated bike paths and few protected bike lanes in this subarea. Nearly 500 lane kilometres of multi-use paths and shared roads are rated as Comfortable for Most. The rest of the network is a mixture of routes considered comfortable for Some, Few, or Very Few.

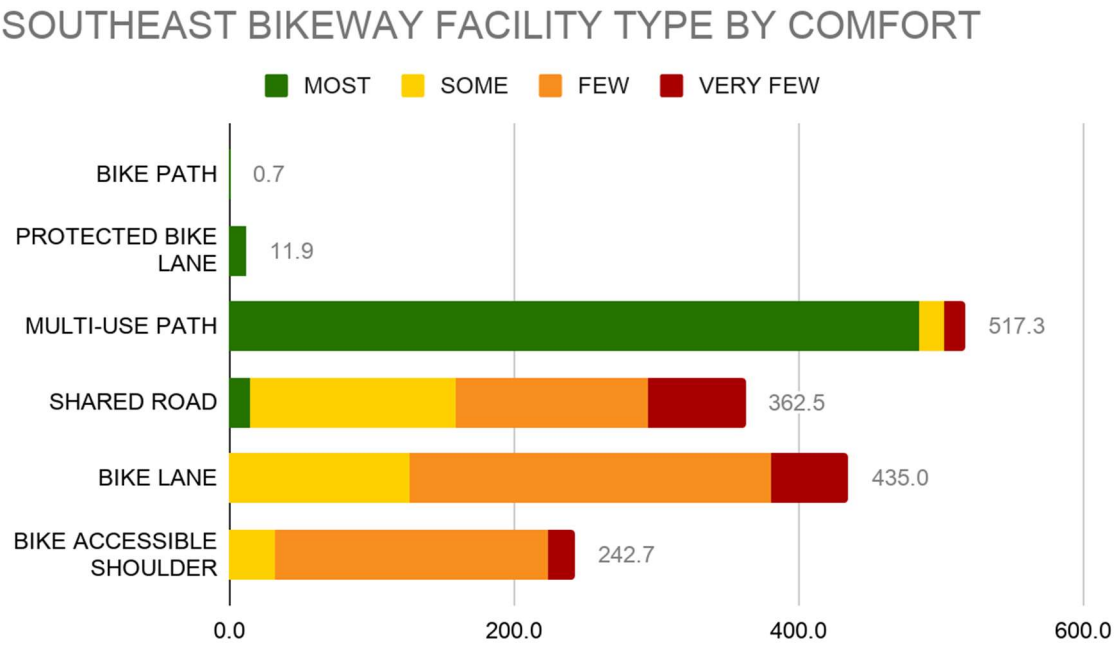


Figure 21 - Based on Data received from TransLink, Metro Vancouver Member Municipalities, and Province of BC.

Given the mix of urban, suburban and rural land uses within this subarea, a variety of strategies will be needed to provide comfortable and safe routes for cycling. In town centres Surrey is leading by establishing design guidelines and standard cross sections for protected bike lanes on collectors and arterial roadways. These designs are being implemented during development and roadway upgrades. In suburban areas, grid networks that serve active transportation users can be overlaid on curvilinear road networks in residential neighbourhoods to provide direct and safe access to people walking and cycling. On rural and suburban collector roads, bike lanes and paved shoulders can be transitioned into protected bike lanes or complemented with multi-use paths setback from the roadway or on separate right of ways. In such settings, multi-use paths can be appropriate since low volumes of bicycle and pedestrian traffic as well as infrequent intersections with driveways and roads allow the opportunity to mitigate some of the factors that tend to increase the incidence of injury to cyclists on multi-use paths within more urbanized settings.

About 53% of residents in the Southwest subarea are within 400 metres of a bikeway that is Comfortable for Most, below the regional average of 65%. The percentage of residents living within 400 metres of a route Comfortable for Most varies throughout this subarea with City of Langley above the regional benchmark and all others below. Because of gaps in and limited access to and from the network of comfortable routes, this subarea tends to appeal to people who are willing to ride in close proximity to higher speed motor vehicle traffic without any physical separation.

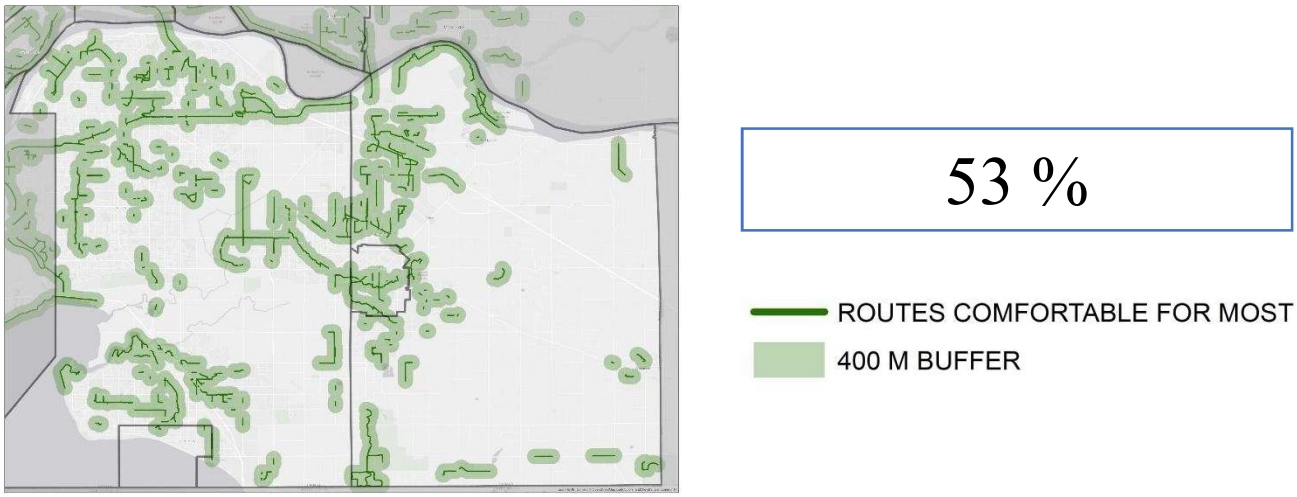


Figure 22 - Percent of Population Within 400 M of a Bikeway Comfortable for Most
Based on Data received from TransLink, Metro Vancouver Member Municipalities, Province of British Columbia, and Statistics

Cycling Rates

All of the municipalities in the subarea have cycling rates that are lower than the regional average. Only White Rock and the Township of Langley have seen the rate of people commuting by bicycle increase over the past decade. This part of Metro Vancouver has seen significant population growth in recent years, but provision of cycling infrastructure Comfortable for Most and serving local destinations including, for example, schools, community centres, shopping, business centres or major transit nodes, is not yet widely available.

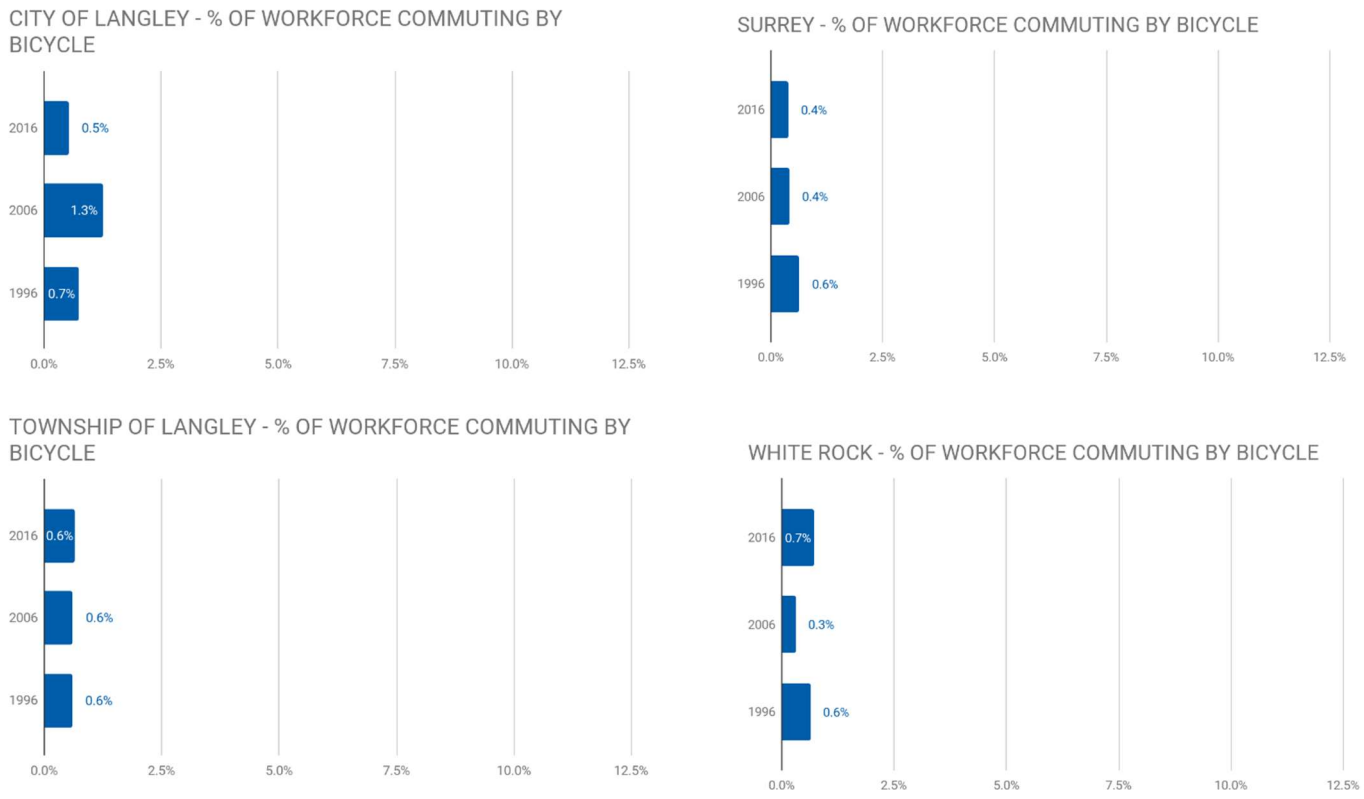
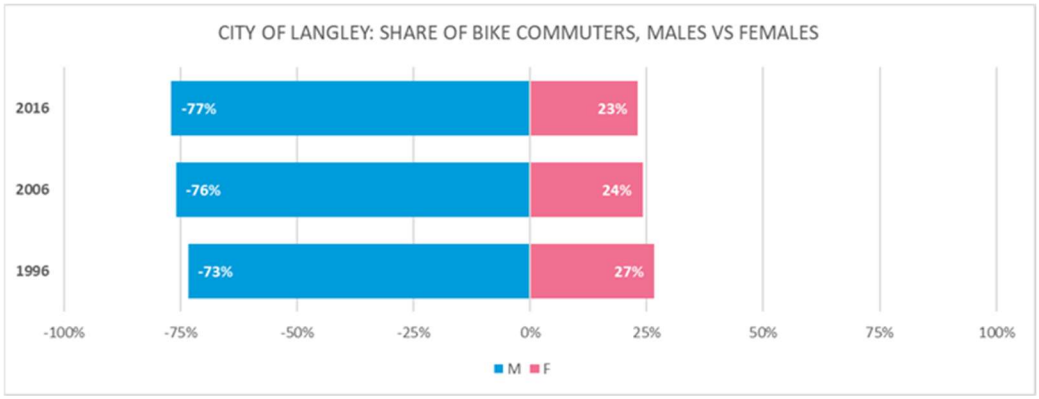
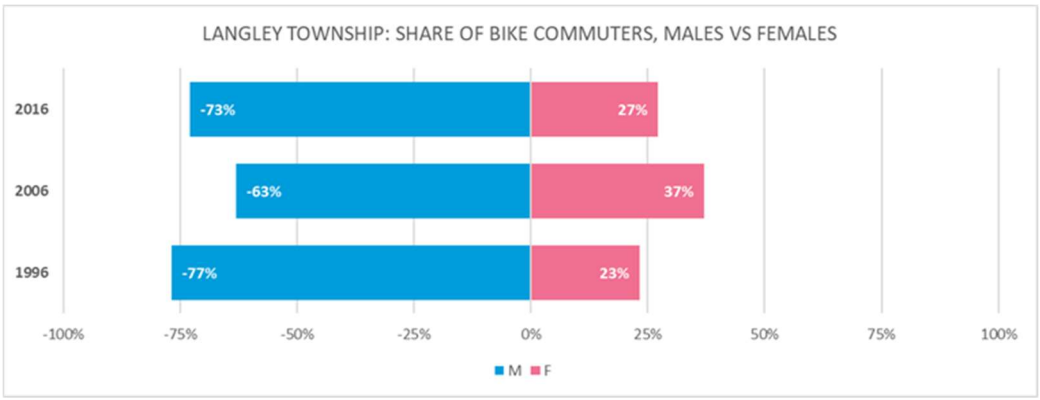


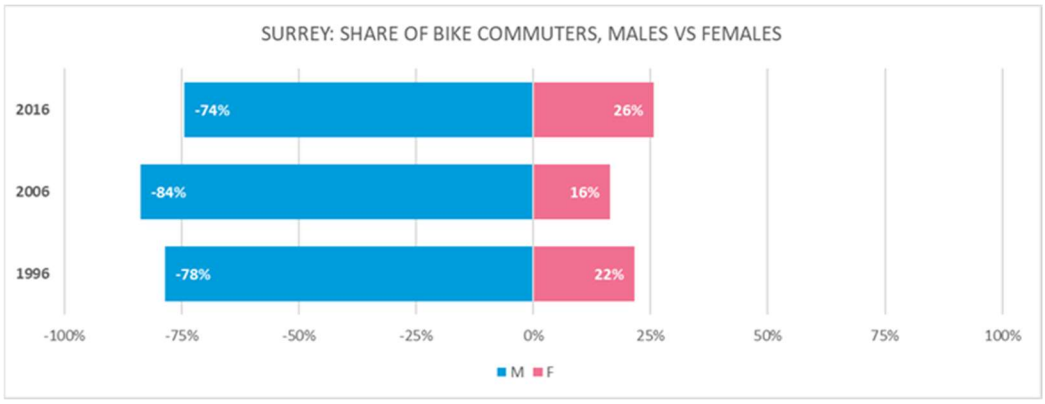
Figure 23 - Source: Statistics Canada Journey to Work 1996, 2006, 2016

Share of Trips by Females

Males dominate ridership in the Southeast, with an average ridership ratio of 3:1 compared to females. This is arguably a result of the unforgiving nature of most of the cycling routes in the subarea. White Rock shows greater cycling rates by females, and high numbers in 2006 (likely a statistical anomaly due to small numbers), though it does seem that cycling may be relatively comfortable on local streets in White Rock.







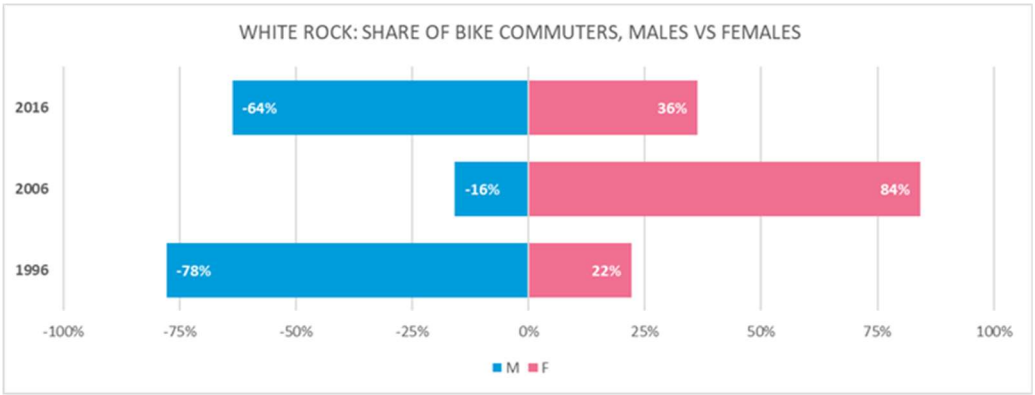


Figure 24 - Sources: Statistics Canada Journey to Work 1996, 2006, 2016

Safety

For the Southeast subarea, the rate of collisions involving people cycling was 36 per million bike trips in 2017, higher than Metro Vancouver's rate of 23 collisions per million bike trips. To reduce the collision rate for people riding bicycles, municipalities in the Southeast must focus investment in cycling infrastructure proven to support improved safety and improved connections between key origins and destinations.

Supportive Practices and Policies

Municipality	Bicycle Network	AT/Cycling Strategy	Complete Streets	Vision Zero	Traffic Calming	Construction Zone Traffic Management	Cycling Education[16]
Langley City	Yes	Yes	No	No	Yes	No	Low
Langley Township	Yes	Yes	No	No	Yes	In Progress	Low
Surrey	No	Yes	No	Yes	No	No	High
White Rock	Yes	Yes	No	No	Yes	No	Low

Table 12 - City of Surrey, Langley Township, Langley City, City of White Rock

- Langley Township and City, and White Rock each have an up-to-date, Council approved municipal bikeway network plan.
- Of this group, all agencies have an approved Cycling Strategy that includes a wider range of policies and programs aimed at supporting increased participation in active transportation.
- None of the municipalities in this subarea have a Council approved Complete Street policy, and only Surrey has an approved a Vision Zero action plan with an aim to achieve a roadway system with no fatalities or serious injuries involving road traffic.
- None have policies in place that require those undertaking construction to implement traffic management accommodating and minimizing detours for people on bikes.
- Surrey has taken the initiative to establish design guidelines for protected bikeways that are guiding the development of roadway upgrades in Town Centres throughout the municipality. These improvements are suitable for all ages and abilities and will offer connections to key destinations, including shops, post-secondary schools and recreational facilities as a key tactic to supply more residents in the subarea with options beyond transit and automobiles and bolster shifts in ridership. However, given that this network is implemented only through new development, full buildout will take many years. In the meantime, interim facilities are required that bridge gaps providing improved cycling connections that are attractive to a broad range of existing and potential cyclists.
- The percentage of students in grades 4-7 receiving cycling skills training at least once in the period from 2016-2019 was as follows:
    - 18% in Langley City and Township;
    - Just over 20% in Surrey; and
    - None in White Rock.

[16] The percentage of students in grades 4-7 receiving cycling skills training at least once between 2016 and 2019 is rated as follows, Low less than 20%, Medium 20%-40%, High over 40%

Key Takeaways

- In the Southeast subarea the share of trips that people make by bicycle, the share of females who regularly ride a bicycle to work and the percent of residents that live within 400 metres of a bikeway are all largely below the regional average. Municipalities in this subarea must focus investment on infrastructure proven to support improved safety and in particular on cycling facilities that are Comfortable for Most and which provide connections to transit hubs and other key destinations.
- Going forward, municipalities in the Southeast subarea can take advantage of increased capital funding through TransLink's Bicycle Infrastructure Capital Cost Sharing and Major Road Network capital funding programs to leverage funds required to upgrade existing cycling routes and make cycling a realistic option for more people.
- The collision rate involving cyclists is 56% higher in the Southeast subarea than the regional average. Given this situation, municipalities should give consideration to enacting Complete Streets policies and enacting or strengthening Vision Zero and traffic calming policies and practices to control speeds and improve safety on the 1040 lane kilometres of bikeways (over 66% of the total bikeway network) that are not physically separated from motor vehicle traffic.

Appendix B: Data Sources

Data for this report was drawn from a variety of sources including:

Statistics Canada: Population data and Journey to Work data (which represents people who commute to and from work) were drawn from the 1996, 2006, and 2016 Canada Census.

ICBC Crash Data: Collision data was drawn from ICBC's collision database covering collisions up to and including 2017. ICBC data is available for the entire region; however, known limitations of the data set include the fact that ICBC data only includes information on injuries which involve motor vehicles and which are reported to ICBC.

Province of BC: The Province's Digital Road Atlas provided the road network lines, speed limits and roadway classifications. These were used to inform the classification of bikeways by level of comfort.

TransLink Trip Diary: Provided estimates of daily utilitarian cycling trips region-wide and for most local jurisdictions, except for some smaller municipalities, for which estimates were not available. These daily trip estimates, along with ICBC collision data, were used to calculate subarea collision rates for cyclists.

Municipal Self Reporting: Municipal representatives provided information concerning bicycle infrastructure, bicycle infrastructure spending, and supportive policies and practices.

Appendix C: Bikeway Classification System

e.g.	Type *	Class A	Class B	Class C	Class D	Class E	Notes
	Separated from vehicle traffic						
1	**Bike Path:** Off-road facility for the exclusive use of people cycling, may be unidirectional or bidirectional. Separate from both motorists and pedestrians, but designed based on bicycles operating in parallel with pedestrians, especially at intersections.	**Width:** Bidirectional 3.0-4.8m, Unidirectional 2.0-3.0m **Posted Speed:** N/A **Volume:** N/A	**Width**: Bidirectional 2.4-2.9m, Unidirectional 1.5-1.9m **Posted Speed:** N/A **Volume**: N/A	**Width**: Bidirectional 2.1-2.3m, Unidirectional 1.2-1.4m **Posted Speed:** N/A **Volume**: N/A	**Width:** Bidirectional <2.1m Unidirectional <1.2m **Posted Speed**: N/A **Volume**: N/A	Never	**When in a road right of way (ROW)**: A bike path should fall outside of the Clear Zone (≥1.2 m on roadways with posted speeds of ≤60 km/h - see Transportation Association of Canada Geometric Design Guide (TAC GDG), see Table 7.3.1 for higher speed roads). Further, designs of **bike paths** should avoid obstacles in the pathway, include adequate sight lines and lighting, be direct, and avoid the use of rigid bollards. If cyclist volumes exceed 1,500 per day then *recommended* facility widths shall be ≥3.6 m bidirectional, and ≥2.4 m unidirectional. **Bike Path**'s are generally appropriate in association with higher speed roads.
2	**Protected Bike Lane**: Exclusive on-road facility delineated by a vertical barrier element/physical separation from motor vehicles, as well as separation from pedestrians. Can be unidirectional or bidirectional	**Width**: Bidirectional 3.0-4.8m, Unidirectional 2.0-3.0m **Posted Speed:** ≤60 km/h **Volume:** N/A	**Width**: Bidirectional 2.4-2.9m, Unidirectional 1.5-1.9m **Posted Speed**: ≤60 km/h **Volume:** N/A	**Width:** Bidirectional 2.1-2.3m, Unidirectional 1.2-1.4m **Posted Speed**: >60 & <80 km/h **Volume**: N/A	**Width:** Bidirectional <2.1m Unidirectional <1.2m **OR** **Posted Speed:** >80 & ≤90km/h **Volume**: N/A	**Width:** Bidirectional <2.1m Unidirectional <1.2m **Posted speed:** ≥90km/h **Volume**: N/A	Separation from vehicles by delineator (curbs, bollards, concrete barriers, etc.) is required. Type of delineator dependent on speed and volume of traffic (for specific details see TAC GDG Chapter 5, section 5.7.5). At intersections, a protected bike lane should be set back 6m from the parallel travel lane-see Transportation Association of Canada Geometric Design Guide (TAC GDG), Section 5.6.2.3 for guidelines. Parking may provide additional barrier beyond the delineator - at a minimum curbstops over 100 mm high are necessary with periodic gaps for drainage and wheelchair access. Width of delineator is 0.30-1.0 m. If adjacent to parking, min separation is ≥0. 80 m (Class A), ≥0.60 m (Class B). **Volume**: If motor vehicle ADT is greater than 4,000, this facility is more acceptable than others. If cyclist volumes exceed 1,500 per day then *recommended* facility widths shall be ≥3.6 m bidirectional, and ≥2.4 m unidirectional.
3	**Multi-Use Path (MUP)**: Off-road facility that allows for shared use by people cycling and pedestrians.	**Width:** Bidirectional 3.5-6.0m, Unidirectional bikes 3.0-4.0m **Posted Speed**: N/A (ie outside of road ROW) **Volume:** N/A **Paved**	**Width:** Bidirectional 3.0-3.4m, Unidirectional bikes 2.4-2.9m **Posted Speed:** ≤60km/h & ≥1.2m from curb face **Volume:** N/A **Paved**	**Width**: Bidirectional 2.7-2.9m, Unidirectional bikes 2.1-2.3m **Posted Speed**: ≤60km/h & <1.2m from curb face **Paved or Unpaved**	**Width:** Bidirectional <2.7m, Unidirectional bikes <2.1m **OR** **Posted Speed:** >60km/h & with adequate setback or physical protection as per TAC guidance	**Posted Speed:** >60km/h & <1. 2m from curb face	MUP's are not intended to replace a sidewalk where there is sufficient motor vehicle or pedestrian and bicycle traffic that may lead to high rates of conflict. As a guide, **MUPs** are not *recommended* when pedestrian and bicycle traffic volumes exceed a total peak hour volume of 200 users. A **MUP** should fall outside of the Clear Zone (≥1.2 m on roadways with posted speeds of ≤60 km/h - see TAC GDG, Table 7.3.1 for higher speed roads). Further, designs of **MUPs** should avoid obstacles in the pathway, include adequate sight lines and lighting, be direct, and avoid the use of rigid bollards.
	Unseparated from vehicle traffic						
4	**Neighbourhood Street Bikeway or Shared Roadway**: Bikes and motor vehicles share the roadway, which provides a continuous corridor of suitable operating conditions for people cycling, including limiting exposure to motor vehicle traffic. Can include a variety of roadways including local roads, alleys and service roads.	**Width:** Parking one side 5.5-7.5m, parking both sides 8.0-11.0m **Posted Speed**: ≤30km/h **Volume:** ≤1,000 ADT	**Width:** Parking one side 5.5-7.5m, parking both sides 8.0-11.0m **Posted Speed:** ≤30km/h **Volume:** ≤2,000 ADT	**Width**: varies by road type **Posted Speed**: ≤50km/h **Volume**: ≤3,000 ADT **OR** **Posted Speed**: ≤30km/h & Collector	**Width:** varies by road type **Posted Speed:** ≤50km/h **Volume:** <6000 ADT **OR** **Posted Speed:** <30km/h & Arterial	**Width:** varies by road type **Posted Speed**: >50km/h **OR** **Volume:** ≥6000	Traffic diversion can include such treatments as directional and median barriers. Traffic calming can include such treatments as raised crossings, and bicycle permeable humps and chicanes. All such facilities should include shared lane markings to indicate the potential presence and positioning of people cycling. Municipalities are *recommended* to limit posted speeds to 30 km/h on all **Neighbourhood Street Bikeways** and **Shared Roadways**. **Widths**: If curb less than 100 mm, or parking along curb, gutter pan can be included in width. Otherwise, width excludes gutter pan.
5	**Bike Lane**: On-road facility adjacent to a curb or a parking lane and delineated from motor vehicles with paint markings.	Never	**Width:** 1.7-2.4m **Posted Speed**: ≤50km/h **Volume:** ≤4,000 ADT Absence of curbside parking.	**Width**: 1.5-1.6m **Posted Speed**: ≤50km/h **Volume:** N/A Curbside parking permitted.	**Posted Speed**: >50 & ≤70km/h **Volume:** N/A	**Posted Speed**: >70km/h **OR** **Posted Speed**: >50 & ≤70km/h **&** curbside parking **Volume**: N/A	If parking present or speeds/ volumes might exceed limits or over 1,500 people cycling per day, **separated bikeway** *recommended*. **Widths:** If curb less than 100 mm, or parking along curb, gutter pan can be included in width. Otherwise, width excludes gutter pan.
6	**Bike Accessible Shoulder**: Signed and marked, paved area with no curb, located to the right of roadway general purpose travel lanes, and separated from general purpose lanes by white edge line or painted buffer. Usually in rural areas. May be shared with pedestrians.	Never	**Width:** 1.8-2.4m **Posted Speed**: ≤50 km/h **Volume:** ≤4,000 ADT	**Width**: 1.5-1.7m **Posted Speed**: ≤60km/h **Volume:** N/A	**Posted Speed**: >60 & ≤90km/h **OR** **Posted Speed**: ≤60km/h **&** Parking permitted outside shoulder	**Posted Speed**: >60 & ≤90km/h **&** parking permitted outside shoulder **OR** posted speed >90kmh	Parking not permitted in bikeway. If speeds/ volumes exceed limits, or over 1,500 people cycling per day **separated bikeway** *recommended.* Width for buffered facility: 2.4-3.5 m total, bike lane 1.8-2.4 m

* In all cases pavement markings (bicycle stencils) and signage are necessary at regular intervals and should be placed at a distance of 20 to 30 metres in advance of, and following each intersection and other decision points, or every 400 m when intersections are not present.

Notes:

Class A: Designed toward the practical and absolute upper limit of the design domain and intended to comfortably accommodate higher volumes of users, including for example passing movements and side-by-side cycling.

Class B: Includes dimensions that sit between lower practical and practical upper limits for the dimensions of bikeways. These facilities may not be intended to accommodate passing movements or side-by-side cycling. Agencies implementing such facilities should check with TAC guidance if passing movements or side by side cycling is intended.

Class C: These facilities are intended to accommodate lower volumes of cyclists and tend toward the lower practical and absolute lower limits of cycling infrastructure. Such facilities will tend to accommodate single file cycling, but are not intended to accommodate passing movements or side-by-side cycling.

Class D: These facilities are intended to accommodate low volumes of cyclists and are at or below absolute lower limits of the design domain. These facilities provide basic accommodation of cyclists operating in single file and exhibit deficiencies including, but not limited to deficient signage and pavement markings, higher speed and higher volume motor vehicle traffic on adjacent facilities, and/or motor vehicle parking permitted in close proximity to cyclists.

Class E: These facilities do not meet the absolute lower limit of the design domain and even experienced cyclists should use such facilities with caution. Such facilities tend to have a combination of deficiencies including for example, a lack of signage and pavement markings, higher speed and higher volume motor vehicle traffic on adjacent facilities, and/or motor vehicle parking permitted in close proximity to cyclists.

Comfort : Green = Comfortable for "**Most**", Yellow = Comfortable for "**Some**", Orange = Comfortable for "**Few**", Red = Comfortable for "**Very Few**"

Volume Assumptions: Local (or equilivant) = 2000, Collector (or equivilant) = 4000, Arterial (or equivilant) = 6000

Appendix D: Acknowledgements

The State of Cycling project could not have been completed without the generous support, guidance and direction from many individuals and a number of organizations along the way. The impetus to initiate the project came from HUB Cycling Board members who saw the vital need to better understand the current state of cycling in Metro Vancouver. TransLink shared that perspective, and joined HUB Cycling as a project partner, funder, and major stakeholder. HUB Cycling was successful gaining funding from the Real Estate Foundation of BC, the BC Ministry of Social Development and several private sector firms, then recruited project research staff so the project could proceed. Municipal and provincial agencies from throughout Metro Vancouver as well as key representatives from academia, HUB Cycling's Board, volunteers and Local Committees supported the project by gathering and sharing data and through regular input to the project team.

The State of Cycling project team is deeply grateful to the individuals and groups listed below for all their assistance, advice, time, and expertise.

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- Gavin Davidson (State of Cycling Project Lead, HUB Cycling)
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Volunteer research team. **In office** - Joseph Peace **In field** - Colleen MacDonald, Seann Greenwood, Dragana Radulovic, Jackie Chow, Robert Wong, Ken Zuk, Garth Wright, Jeff Leigh, Agnes d'Entremont, Stuart Smith, Tim Yzerman, Simon Watkins, Patrick Mooney, John Burgess, Bruce Kleeberger, Mike Richter, Jim LaBelle, Shane Griffin, Michelle Sweet, John Klippenstein, Claude Theriault, Andrew Hartline, Natalia Pisarek, Shanna Knights, Henrik Clemmensen, Joming Lau, Michael Nelson, Patrick Parkes, Andrew Pickell, Bridget Perry-Gore, Sandra Jones, Amy Smith, Glenn Eriksen, Leonard Foster, Derek Williams, Donna Kwan, Janet Fletcher, Bobo Eyrich, Paul Janzen, Kris George, Collene Harris, Joe Boyd, Roel Schootman, Rachel Moens,Tobias Hendrik A., Louise Allen, Gerald Joe

We owe thanks to Chris Keam who provided copywriting and editing services throughout the report's development, and to various reviewers, in particular Jeff Leigh, Rex Hodgson, Andrew Picard, Richard Campbell and Kay Teschke who provided input and guidance on various drafts.