CAPE BRETON REGIONAL MUNICIPALITY

ACTIVE TRANSPORTATION PLAN

CBRM IN MOTION

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“THE GROUNDWORK FOR ALL HAPPINESS IS GOOD HEALTH.”

– Leigh Hunt

fathom

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CHAPTER 0

EXECUTIVE SUMMARY

CBRM's first Active Transportation (AT) Plan was adopted by council in 2008. Since then, the municipality, province, and federal governments have 3-way cost shared almost $14m - or about $1m per year - in AT projects from 2008 to 2022. This new CBRM AT Plan will guide the municipality's investment over the next 20 years, expanding the network and providing more affordable mobility options for residents, sustainable forms of transportation, and additional options for healthy living within the municipality. AT Spending is proposed to increase from $1m/year to $1.5m/year.

ACTIVE TRANSPORTATION

Early definitions of Active Transportation (AT) focused on human-powered forms of transportation, like walking/running, cycling, and other self-propelled mobility variations such as wheelchairs, skateboards, scooters, in-line skates, cross-country skiing, and even kayaking. With a recent rise in personal electric mobility, AT has grown to include the use electric bikes (e-bikes), Segways, and e-scooters, which have all recently experience an uptake in popularity and availability. Active transportation should be combined with other modes of transportation like public transit to create integrated mobility networks throughout the region.

AT FACILITIES

AT facilities refers to physical infrastructure needed to make active transportation work, such as sidewalks, pathways, bike lanes, multi-use trails and on-street bike lanes or shoulders. The most effective infrastructure creates a connected network between homes and important destinations like schools, work, public transit, downtowns and parks and recreation facilities.

AT VS RECREATION TRAILS

Active transportation focuses on commuting between two destinations - like a home to work or school; oftentimes replacing auto transportation. Conversely, recreational trails are usually used for exercise and enjoyment rather than for commuting.

This difference is an important distinction for CBRM. The plan's proposed AT projects focus on AT **commuting** rather than **recreational** walking, running or cycling type uses. While recreational trails have many benefits, they are not a focus for this plan and ultimately should be planned, built, and maintained through a different municipal budget.

GROWING AT ADOPTION IN CANADA

Since the 2008 plan, there has been rapid growth and adoption of active transportation across the country and around the world.

AT facilities are no longer considered a non-essential amenity; they are quickly becoming essential municipal infrastructure that improve residents' quality of life. In response to this attitude shift, government engineering departments are re-prioritizing their focus away from auto-centric road design to multi-modal forms of transportation including walking, cycling, transit and more 'complete streets' solutions.

THE OPPORTUNITIES FOR AT GROWTH IN CBRM

According to the 2016 Census, 43% of CBRM commuters travel less than 15 minutes to work. This cohort of people with short commute times is ideal for future implementation of active transportation networks, usually translating to less than 10-15km which is an ideal distance for most cyclists and some walkers. Looking at the national averages for modal split, CBRM has more drivers (82.6% compared to 74%), significantly less public transit (2.6% vs 12.4%), less cycling (0.2% vs 1.4%), and less walking (4% vs 5.5%). It is important to note this data focuses only on commuting to work and does not include commuting to school, or commuting to shopping, etc.

CBRM IN MOTION

THE 2022 AT PLAN OVERVIEW

The 2022 AT plan aims to build on the successes of the 2008 AT Plan by focusing directly on improving the **health** and **quality of life** of residents by expanding AT infrastructure in populated areas. Overall, the plan works to link population centres to schools, downtowns, business centres, shopping areas, and other communities.

This plan lays out the next 20 years of AT investment within the municipality, focusing on locations able to:

- Increase AT participation and reduce residents' reliance on cars
- Create greater social equity and improve peoples lives in measurable ways
- Leverage the economic benefits and reduce municipal costs of traditional transportation network expansion and maintenance
- Improve safety for vulnerable populations like youth and seniors.

A key priority for this plan is to shift private vehicle-based commuting to forms of active transportation. Since commuting is measured in the national census every 5 years, progress can be tracked.

AT is most widely used when the trip distances do not exceed 5km for walking (about a 1 hour walk) and 15-20 km for cycling (about a 1 hour bike ride). As a result, this 2022 plan focuses more specifically on projects within CBRM's various urban communities. The specific communities have been carefully selected by the project stakeholders and local residents. The primary focus is reducing vehicle reliance in exchange for safer AT routes connected to key, routine destinations within CBRM's populated communities (including Sydney, Sydney River, Sydney Mines, North Sydney, Glace Bay, New Waterford, and Louisbourg).

In the more rural areas of CBRM, this plan is supported by the continued expansion of the provincial Blue Routes, implemented by the Province of Nova Scotia.

CBRM AT VISION

The consultants worked closely with local residents, businesses, academic institutions, and CBRM's staff and council to develop a vision statement and goals for the next important phase of CBRM's Active Transportation plan.

CBRM's Active Transportation Plan update will improve the lives of vulnerable and every day municipality's residents with the provision of more equitable transportation options, safer routes for students, healthier commuting options, and improved connective infrastructure within CBRM's densest, growing areas.

WORK COMMUTING TARGETS FOR THE AT PLAN

The commuting targets of this 20-year plan aim to change the modal split in CBRM by:

- Doubling the walking commuting from 4.1% in CBRM to 8%
- Increasing cycling or assisted mobility commuting from 0.2% to 6%
- Increasing transit commuting from 2.7% to 7%
- Increasing the % ride share from 8.4% to 12% of all private vehicle trips.
- Decreasing private vehicle trips from 82% to no more than 70%

STUDENT COMMUTING AT TARGETS

The Cape Breton-Victoria Regional Centre for Education (CBVRCE) oversees the education of 12,000 students, with 60% of those students take the bus. The remaining 40% are a combination of walkers/cyclists, parent drivers, and student drivers for high schools. CBVRCE estimates that driving traffic for students is large, but the figure remains untracked.

This AT Plan sets the following student commuting targets:

- To reduce bus use from 60% to 55% by increasing the radius for middle and high school students from 2km to the provincial standard of 2.5km. Elementary student radius will remain at 1km (vs the 1.5km provincial standard).
- To ensure walking/cycling students are no less than 30% of the population. This target will require a way to track how students get to school (driving vs walk/cycling).

2042 ACTIVE TRANSPORTATION AND INTEGRATED MOBILITY TARGETS

	MINIMUM TARGETS				MAX. TARGETS
	WALKING/ RUNNING	CYCLING OR ASSISTED AT	TRANSIT	RIDESHARE AS PASSENGER	PRIVATE VEHICLE
2016	4.1%	0.3%	2.7%	8.4%	82%
2022	4.5%	0.5%	3%	9%	<82%
2032	6%	4%	5%	10%	<75%
2042	8%	6%	7%	12%	<70%

Each 1% change represents 340 people in CBRM shifting their behaviour from one mode of transportation to another

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AT SUITABILITY CRITERIA

The new 2022 Plan recognizes the significant potential for CBRM's residents to adopt AT commuting in the forthcoming years due to the increased availability of micromobility options. Micromobility includes electric-assisted personal mobility, improved integrated mobility with buses, support from higher levels of government with new funding programs, and greater use as the network grows throughout CBRM.

AT infrastructure can be costly to build and maintain. As such, it is important to focus spending in the areas that will see the greatest use. Additionally, the success of the network is tied closely to its overall connectivity; having numerous small, unconnected facilities is counter-productive to increasing AT adoption. The more interconnected the network, the much greater the chance it will be used. When embarking on building out the AT network, it requires significant investment before adoption reaches a tipping point.

CBRM's current rate for AT adoption for commuting is less than 5%. However, the Law of Innovation of Diffusion sets out that mass adoption doesn't usually happen until about 16% adoption (Innovators are the first group at 2.5%, followed by early adopters in the next 13.5%). Considering this, AT use among CBRM's residents is in its infancy, and will require further implementation and outreach to reach its full potential.

In a large regional municipality, we understand there will be pressures to make changes to the priorities or to the locations of the proposed facilities; however, it is vital to remain as consistent as possible to the proposed plan to ensure the contiguity of the network. The plan has been designed to address the local needs of the community and to increase AT adoption as rapidly as possible.

Costs for AT facilities can be substantially reduced when they are built as part of planned street capital improvements. Since these programs fluctuate from year to year based on funding availability from higher levels of government, it is hard to predict when they might happen in CBRM. Consequently, there will be inherent changes in the AT priorities based on future street upgrades. On the same token, a high AT priority project might increase the priority of a future capital improvement project.

The municipal AT components of this plan are geared towards municipal owned roads and lands. The Province will address their contribution to the plan through the Blue Routes. Any additional AT projects on provincial roads must be developed as a formal partnership between the Province and CBRM .

Based on the feedback the team received throughout this process, the following ranking of criteria are listed below:

1. Projects should be able to assure a high degree of use by the local community (e.g. hundreds of user per day vs dozens of users per day) by linking dense population centres to high desirable destinations (work, school, parks, etc.).
2. Each project should be able to measurably reduce people's reliance on motor vehicle transportation in CBRM. The intent is to reduce vehicle commuting and increasing AT use or transit use for commuting to work, school, or to complete day-to-day activities that might otherwise require travel by car. Projects should decrease traffic congestion and promote a modal shift to transit and active transportation in CBRM.
3. Projects should promote social equity amongst CBRM's vulnerable populations (youth, seniors, those in poverty, those with disabilities) reducing the requirement for car ownership to participate in society, education, or the local economy.
4. Projects that extend or improve upon the existing AT network to increase the connectivity of the network should be a priority.
5. Projects should ensure travel by active transportation is easier, safer, more convenient and more enjoyable than travelling by car.
6. Projects that can be coordinated with future public works capital investments to create new complete streets should be prioritized.
7. Projects should focus on the needs of local residents first - but if the goals complement tourism, it would be considered an added bonus.
8. Projects should improve the design of complete communities in CBRM

These criteria are listed in relative importance for prioritizing future AT investment and were part of the criteria for assessing new projects proposed in this AT Plan. A scoring matrix **(Table 1-1)** was developed to assess future projects that might veer from the recommended plan. In the matrix, each project should be evaluated and scored by multiplying each **criteria score** by its **sub-criteria score**. Where multiple sub-criteria apply, each should be scored as well. The total of all the sub-total scores gives the overall project score. Projects that score:

- > 50 points have a high priority
- 30-50 points have an intermediate priority
- 20-30 points have a a low priority
- < 20 should not be built without a logical rationale.

TABLE 1-1 AT Project Scoring Criteria Matrix. Sample Scoring Sheet

Proposed AT Project Name :

Criteria	Criteria Score	Sub-Criteria Score	Sub-Total
Projects should be able to assure a high degree of use by the local community (e.g. hundreds of user per day vs dozens of users per day) by linking dense population centres to high desire destinations (work, school, parks, etc.).	**10**		
> 1000 people/km2		1	10
500-1000 people/km2		0.9	
25-500 people/km2		0.8	
<25 people/km		0.5	
Projects that can be coordinated with future public works capital investments to create new complete streets should be prioritized.	**9**		
Combine with other Capital Works project		1	9
Land owned by CBRM		1	9
Funding Stream availability		0.5	4.5
Each project should be able to measurably reduce people's reliance on motor vehicle transportation in CBRM. The intent is to reduce vehicle commuting and increasing AT use or transit use for commuting to work, school, or to complete day-to-day activities that might otherwise require travel by car. Projects should decrease traffic congestion and promote a modal shift to transit and active transportation in CBRM.	**8**		
Directly Connects to or within a downtown		1	
Within 2km of a downtown		0.5	4
Within 1km of an elementary school		0.7	5.6
Within 2km of an junior or high school		0.4	
Within 0.5km of a park that has courts or sportsfields serving 20 or more sports participants		0.4	
Projects should promote social equity amongst CBRM's vulnerable populations (youth, seniors, those in poverty, those with disabilities) reducing the requirement for car ownership to participate in society, education or the local economy.	**7**		
Avg Residential Property Assessment within 1km of the project < $150,000		1	7
Project is within 1km of a school		0.5	3.5
Project is within 0.5km of a seniors home with more than 20 seniors		0.5	
Project is within 2km of a CBU or NSCC		0.5	3.5
Project directly connects to a bus routes		0.25	1.75
Projects that extend or improve upon the existing AT network to increase the connectivity of the network should be a priority.	**6**		
Project Connects to an existing AT Network		1	6
Project is within 0.5km of an existing AT Network		0.5	
Projects should ensure travel by active transportation is easier, safer, more convenient and more enjoyable than travelling by car.	**5**		
Project is on an inactive rail line		1	5
Project is on a road that has less than 4 driveways per 100m avg.		0.5	
Project has scenic views of the ocean		0.3	1.5
Projects should focus on the needs of local residents first, but if the goals compliment tourism, that would be considered an added bonus.	**3**		
Project serves the local residents but would also help drive touristm		0.5	1.5
Projects should improve the design of complete communities in CBRM	**2**		
Projects are integrated into new subdivisions or urban developments with over 100 units		1	2
Projects within 0.5km of a new development (<5 years old) with over 100 units		0.5	
Total			73.85

Steps.

1. Multiply the Criteria score by the Sub-criteria Score
2. If multiple sub-criteria apply, perform step 1 for each sub-criteria
3. Add up the Sub-total Scores

AT PRIORITIES BASED ON SCORE:

HIGH PRIORITY: > 75 POINTS

MED PRIORITY: 50-75 POINTS

LOW PRIORITY: 20-50 POINTS

< 20 SHOULD NOT BE BUILT WITHOUT A LOGICAL RATIONALE.

FUNDING ALLOCATION AND PRIORITIES WITHIN THE COMMUNITIES

As a regional municipality, funding should be allocated generally proportionally to the urban communities in the municipality**.** It would be difficult to appropriate exact amounts to each of these communities every year, but the funding targets should be projects that are generally consistent with the population proportions in the urban communities.

The AT Master Plan in this chapter generally follows the discussed funding proportions and the scoring matrix on the previous page. Future public works allocations are difficult to predict since the engineering department projects five years into the future, and are based on funding programs available to the municipality through provincial and federal governments.

CBRM's rural communities will be serviced primarily by the Provincial Blue Route instead of by CBRM since these roads are mostly owned and managed by the Province. The Province is implementing the Blue Route over time as part of their capital improvements as repairs and expansions are needed. The Province has no definitive time line for the implementation of the Blue Route in CBRM; since most roads are upgraded and repaired on a 30-40 year cycle, we would expect much of these improvements to be made over the life of this AT plan or the next update.

THE AT MASTER LIST

The 2022 AT Plan picks up where the last 2008 Plan left off, carrying forward a few of the projects which were not implemented (like the Sydney River Multi-use Trail). The 2022 Plan includes a wide range of AT improvements in various communities which follow the AT Suitability Criteria outlined in the previous section. The new projects also help to extend the network from the 2008 Plan and assumes funding for AT will increase from $1m per year to $1.5m per year over 20 years, resulting in $30m of built AT projects by 2042. The master plan outlines the proposed projects and priorities for implementation in each of the focus communities for this plan.

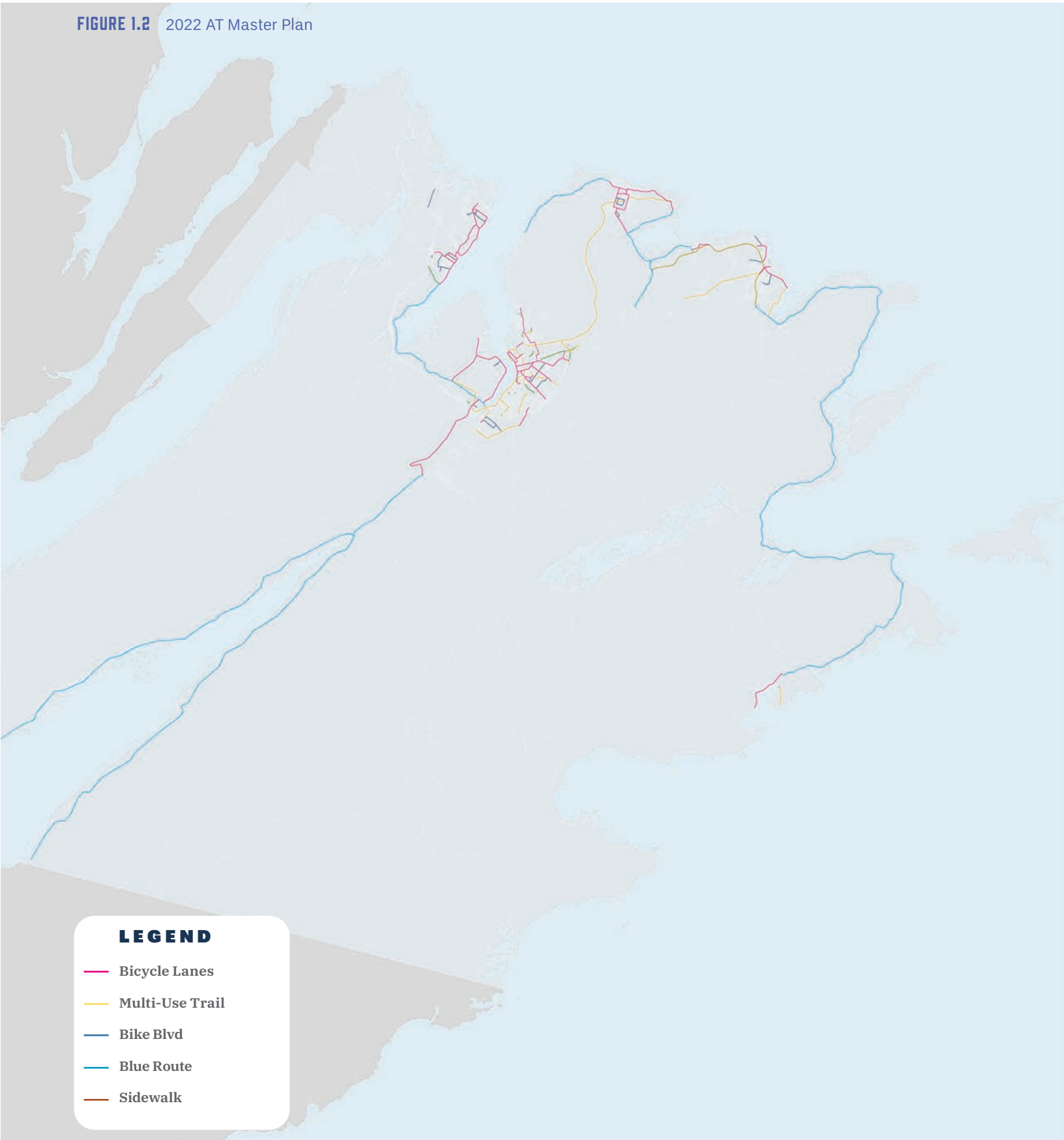
Blow-ups of the plan for each community are shown in the Master Plan Chapter.

AT FACILITIES

There are five AT facility types recommended for the AT master plan including:

1. **Bicycle lanes** (also known as separated bicycle lanes, paved shoulders, buffered bike lanes, or cycle tracks) which share the street right-of-way with vehicles. Some bike lanes are protected or buffered using a combination of horizontal separation (a painted buffer of a certain width) and vertical separation (bollards, curbs, flex posts, parked cars, etc.) to achieve "All Ages and Abilities (AAA)" status - a requirement to fulfil some funding programs in Nova Scotia.
2. **Multi-use trails** are often separated from the street and shared with walkers, joggers, wheelchairs, bikes and other personal mobility devices. These facility types are some of the safest and most used, but they can be more expensive to build and maintain. Rails to trail conversions like the Coal Town trail fall into this category.
3. **Sidewalks** are dedicated to walkers, joggers and wheelchairs and part of the connective AT fabric.
4. **Bike boulevards** are designated streets where cars and bikes share the road. Oftentimes, bike boulevards are located on streets with low speeds and traffic volumes. The streets are sometimes modified to include bicycle friendly geometry, vehicle speed bumps, lower speed limits, painted 'sharrows' or other shared indicators and signage.
5. **Blue routes** are provincially designated bicycle infrastructure that includes painted 1m road shoulders or dedicated multi-use trails on provincial road right-of-ways.

FIGURE 1.2 2022 AT Master Plan



PHASES TOTALS

The High priority projects were assumed to be completed in the first 10 years of the AT Plan. The Medium priority in years 10-15, and the low priority in years 15-20. Generally this works out to about $1.15m per year but this does not include capital improvements needed on streets to make some of these projects work (e.g. road widening and moving curbs and gutters, moving storm sewers, new crosswalks, etc).

- Phase 1 Total (no tax) - $14.1m
- Phase 2 Total (no tax) - $5.2m
- Phase 3 Total (no tax) - $3.7m

ANNUAL BUDGET CHANGE

The cost of additional capital works improvements needed to make the AT infrastructure work could be as high as an additional 25% of the overall cost, plus annual inflation and possibly some land acquisition costs, so we recommend increasing the $1m per year budget to $1.5m. That would increase CBRM's portion from $330k per year to $500k per year.

TOP 10 AT PRIORITY PROJECTS

While Chapter 3 sets out the proposed AT projects in each community and the priorities of each project (high, medium and low), there are a number of potentially high profile projects that could kick start this 2022 AT Plan. These projects are based on the scoring criteria results **Table 1-1**, what we heard from the community and stakeholders, and the project's potential to raise the profile of AT in CBRM.

1. **Sydney River Multi-use trail** - This trail was one of the highest requested items in the public engagement and extends Sydney's waterfront for locals and tourists alike. Its implementation would likely be one of the most signature AT projects in CBRM raising the profile of active transportation.
2. **The Prince and Upper Price Bike Lanes** - This connection will connect downtown Sydney and the waterfront to the MaryAnn Corbett Trail and the Mayflower Mall through a densely populated part of Sydney.
3. **The King Street Bike Lanes** - These lanes would connect a densely populated area of North Sydney with the North Sydney Mall, and the North Sydney waterfront.
4. **The Grand Lake Road sidewalk** - This very busy commercial area needs sidewalks on the north side of the street as soon as possible.
5. **Lingan / Hankard / Victoria Bike Lane in Whitney Pier** - This bike lane will link up to the existing Blue Route already constructed north of Whitney Pier.
6. **The Kings Road Multi-use trail** - Connecting Sydney River under the 125 highway and connecting to Sydney.
7. **The Maryann Corbett Trail** - extension to downtown Glace Bay. This 6km extension is the next phase of this important multi-use trail and has provincial and municipal jurisdiction.
8. **The Ellsworth / Heelan / Emerald / Union Bike Lanes -** connects the future Blue Route in New Waterford through downtown.
9. **Esplanade / Kings / George Bike Lanes -** This proposal will extend the George Street bike lanes and will link much of downtown Sydney and the waterfront with new AT infrastructure.
10. **The Washbrook Creek Greenway -** This important greenway will link several schools through some dense neighbourhoods in Sydney


CIGAR SHOP

CBRM IN MOTION

CHAPTER 1

INTRODUCTION

CBRM's first Active Transportation (AT) Plan was adopted by council in 2008. Since then, the municipality has invested in a wide range of high-profile community AT projects in various locations throughout the municipality, providing more affordable mobility options for residents, sustainable forms of transportation, and alternative options for healthy living within the municipality.

ACTIVE TRANSPORTATION

Early definitions of Active Transportation (AT) focused on human-powered forms of transportation, like walking/running, cycling, and other self-propelled mobility variations such as wheelchairs, skateboards, scooters, in-line skates, cross-country skiing, and even kayaking. More recently with the growth in personal electric mobility, it also includes the use of personal mobility aids like electric bikes (e-bikes), Segways, and e-scooters which are growing in popularity and availability. Active transportation should also be combined with other modes of transportation like public transit to create integrated mobility throughout the region.

AT FACILITIES

AT facilities refers to physical infrastructures needed to make active transportation work, such as sidewalks, pathways, bike lanes, multi-use trails and on-street bike lanes or shoulders. The most effective infrastructure creates a connected network between homes and important destinations like schools, work, public transit, downtowns and parks and recreation facilities.

The municipality - in partnership with the provincial and federal governments - has leveraged matching funding for AT implementation every year since the 2008 AT Plan's adoption, securing about $1m for various AT projects per year (1/3 funding from each of the 3 levels of government). This investment has resulted in some highly visible and much loved community AT projects like the Whitney Pier Community Heritage Trail, the Greenlink Trail system, and the Maryann Corbett Trail - as well as local sidewalk projects. Almost $14m has been spent on these projects and their subsequent upkeep since 2008 (about $5m comes from CBRM funding).

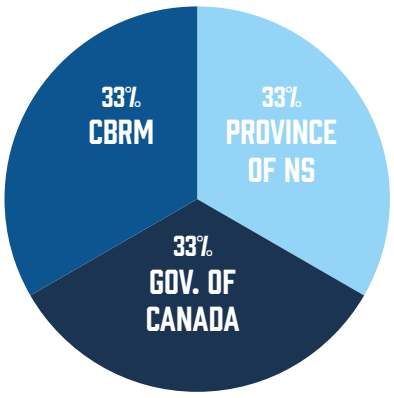
In 2021, with the nearing completion of many of the AT projects identified in the 2008 plan, CBRM commissioned the next phase of its AT plan for adoption and roll-out in 2022 to guide the next 20 years of investment in AT infrastructure. Like traditional road and infrastructure building projects, AT infrastructure is expensive to install, and, in some cases maintain, so it is important to provide a clear rational for prioritizing projects.

AT VS RECREATION TRAILS

Active transportation focuses on commuting between two destinations like a home and work or school - oftentimes replacing transportation by automobiles. Conversely, recreational trails are usually used for exercise and enjoyment rather than for commuting. This is an important distinction for CBRM. AT projects proposed in this plan focus on AT commuting rather than recreational walking, running or cycling type uses.

AT INVESTMENT IN CBRM FROM 2008-2022

$1M/YR



$14M

2008 - 2022

1.1 WHAT'S CHANGED SINCE THE 2008 AT PLAN?

A lot has changed in active transportation since the plan was initially launched in 2008. Notably, AT has become more mainstream, more visible/desirable, and more accessible to people travelling in cities throughout Canada. These trends will continue to shift travel behaviours for Canadians, encouraging increased walking, greater personal mobility and increased transit over the plan's 20-year lifespan. For CBRM, it is crucial to expand the AT network while building on the visible successes of the 2008 AT Plan.

These new trends growing AT adoption include the following:

1. THE NATIONAL ACTIVE TRANSPORTATION PLAN FOR CANADA (2021-2026)

In 2021, the government of Canada launched the $400m National AT Strategy with funding for capital projects and planning projects.

1. The planning projects have a funding limit of up to $50k for individual planning projects. This program is designed to "help vulnerable communities and address structural inequities, given the demographics and/or current state of active transportation" helping to create 'shovel-ready' projects within 24 months.
2. The capital project funding will provide up to 60% of the value of municipal projects with up to 100% funding for projects in indigenous communities like Membertou.

2. COMPLETE STREETS AND THE RE-PRIORITIZATION OF TRANSPORTATION

Transportation engineers and urban planners long viewed streets through the lens of moving vehicle traffic. The more recent 'complete streets' movement looks more broadly at the role of streets in our communities encouraging multi-modal travel including more biking, walking, and transit trips. Multi-modal transportation is more inclusive because it provides affordable options for larger segments of the population: Seniors who don't want to or cannot drive, youth too young to drive, people with disabilities, millennial and others who want to avoid the cost of owning a vehicle, low-income residents, and those who simply choose to include cycling and walking along with other options.

3. BATTERY TECHNOLOGY AND ELECTRIC MOBILITY

In the last decade, new advances in lightweight battery technology have increased e-mobility's accessibility and public prominence. What used to be the exclusively relegated to the domain of electric wheelchairs is now available in the form of e-bikes, e-scooters, e-skateboards. As of 2020, the global electric bicycle market alone is estimated at $24.3 billion, and is expected to nearly triple to $65.8 billion by 2030. Nova Scotia's Electric Vehicle Rebate Program offers a $500 rebate for e-bikes with a minimum retail value of $1,200. The continued growth in electric transportation will significantly increase the demand for active transportation in Canada.

WHAT DOES THIS MEAN FOR A NEW PLAN FOR CBRM?

Moving forward, there will be greater funding opportunities available to municipalities, increased participation in AT mobility by residents, acceptance of AT as a viable transportation option, newer electric options to overcome the accessibility barriers hindering entry into personal mobility, and an increased recognition for more inclusive, multi-modal forms of transportation.

CBRM is in the unique position of being able to access national and provincial programs to grow its AT network and identify areas for greater density near its downtowns and population centres - ultimately increasing the desirability for active transportation. Lastly, the comparatively low cost for land in CBRM provides a unique opportunity to expand AT facilities, thereby growing and improving the region's network.

4. THE COVID-19 PANDEMIC

In 2019 pandemic has drastically changed behaviours and well-entrenched norms relating to transportation, offering city planners and engineers the opportunity to pilot projects that would have been considered unnecessary before the pandemic. Many municipalities introduced the 'slow-street' movements - closing down some local streets to local-only traffic and creating new bicycle boulevards. Additionally, rolling lock-downs and remote working afforded people the opportunity to start walking or cycling regularly; these increases are expected to last long after the pandemic.

5. THE HOUSING CRISIS AND INFLATION

Canada's housing crisis began long before the pandemic, but the cost and availability of housing has been rapidly accelerating due to supply chain issues, material costs, and larger migration trends of people moving from big cities to smaller urban centres like CBRM. At the same time, the recent Ukraine-Russia conflict has caused considerable inflation while substantially increasing gas prices. The additional strain on the cost of driving has forced people to rethink their relationship with their car - and in some cases, their homes. Additionally, more people are turning to apartment living rather than home ownership - often causing increased density in parts of cities where transit and cycling would be considered appealing and cost effective options. Combining increased density with AT and transit is a good practice for cities.

6. AT MOMENTUM

When new AT programs were introduced in the early 2000's, there was significant backlash from drivers and business owners who did not want to share the public roads (or loose parking spaces) with AT infrastructure. As networks start to build-out, more people are using them reducing the 'special interest' stigma that plagued some early AT projects. The cyclist vs. driver mentality is starting to wane in cities that have invested and are seeing higher use of the At infrastructure.

1.2 THE RISE OF MICROMOBILITY

Micromobility refers to a range of small, lightweight vehicles operating at speeds typically below 25 km/h, driven by individual using human power or assisted electric power. Micromobility devices include traditional bicycles, skateboards, scooters, roller skates, and wheelchairs, as well as their new electric counterparts: e-bikes, electric scooters, electric skateboards, gyroboards, electric unicycles, and electric pedal assisted (pedelec) bicycles. They can be privately-owned or available through a shared fleet (often referred to as 'shared mobility').

In 2020, the global micromobility market was valued at $44.12 billion and has a projected value of $214.57 billion by 2030, with a compound growth of 17.4% from 2021 to 2030 (The Global Micromobility Market, 2020). Many of the shared mobility platforms also include a phone app to show dock stations, charging stations, and vehicle locations so they are easy to find, easy to return, easy to 'rent', and easy to charge. In 2021, the City of Montreal paused its e-scooter pilot project due to problems with non-compliance amongst users (no helmets, users not returning scooters to designated areas, and use outside of designated areas). Prior to the pause, e-scooter use was 61% of the micromobility trips, with JUMP e-bikes making up the remainder of trips. The city's analysis in 2021 found that while e-bikes were less used overall, more people respected the regulations and were able to take longer trips then on e-scooters. Due to the large size of CBRM, an e-bike pilot (perhaps expanding on the CBU rideshare program) may precede shared e-scooters.

For micromobility solutions to grow and prosper in CBRM, the municipality will have to accelerate their network implementation and increase the density of residential units in their downtowns. Linking the CBU to downtowns in the CBRM will remain a high priority . The availability of these new micromobility solutions could double or triple the number of AT trips taken in CBRM in the next 10 years if the new micromobility trends reach CBRM.

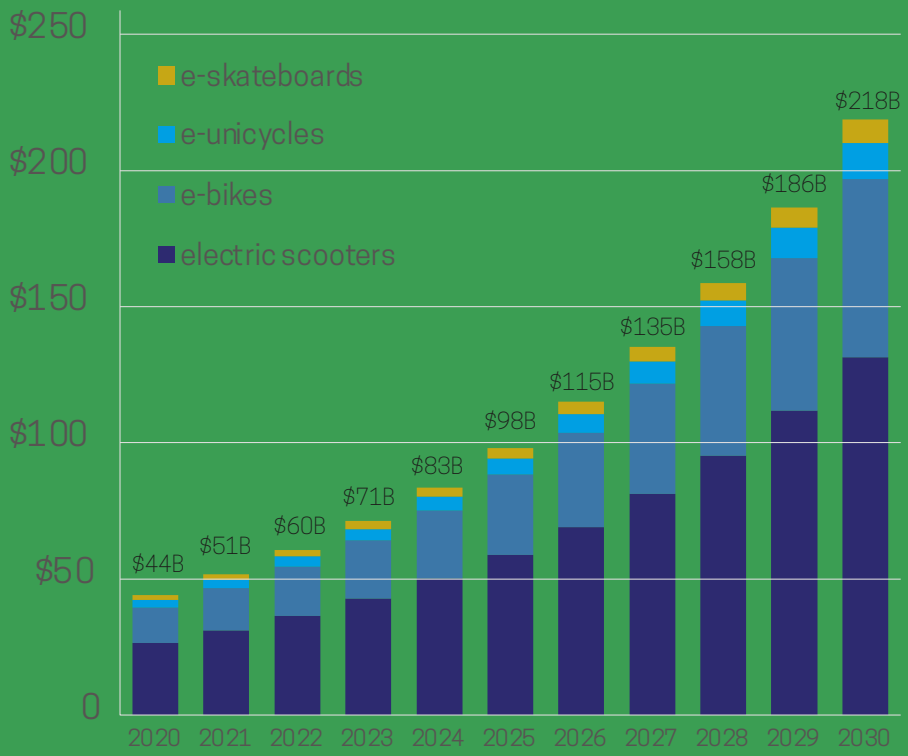


FIGURE 1.3 The projected rise in Micromobility worldwide

CBRM IN MOTION

MICROMOBILITY IN CBRM

UNICYCLES

SKATEBOARD

SCOOTER

VROBOARD

ELECTRIC CAR

ECO ENERGY

ENVIRONMENTALLY PURE TRANSPORT

PERSONAL MOBILITY

BICYCLE

INDIVIDUAL TRANSPORT

R SCOOTER

MODERN PERSONAL TRANSPORTATION

LONGBOARD

PHYSICAL ACTIVITY

ROLLER SKATES

SAFE MOVEMENT

ING CARE OF NATURE

CLEAN AIR

URBAN TRANSPORT

1.3 THE CHANGING NATURE OF CBRM

CBRM is Nova Scotia's second largest municipality. However, the region has experienced a slow decline in its population since 1961, when it peaked at 131,507 people. In 2001, the municipality had a population of 105,965; by 2017, the population was 93,878, representing an average loss of approximately -760 people per year (0.8%). In 1995, eight smaller municipalities were amalgamated by the province to form the CBRM.

Currently, the municipality sprawls over 2,471 km^2 (the seventh largest in Canada behind Ottawa and Chatham-Kent). The majority of the population resides along the municipality's northern coast in the communities of Sydney Mines, North Sydney, Sydney River, Sydney, Whitney Pier, Glace Bay, New Waterford, and Louisbourg (see **Figure 1.4**). These areas have been selected as the focus for AT projects, as the most people live, work and go to school here. As such, these proposed projects will experience the impact the most people, thereby increasing the potential for AT use.

POST SECONDARY GROWTH

One bright spot in CBRM's economy comes from Cape Breton University and NSCC. In 2019, CBRM's population grew for the first time since the 1960's, partially due to increased enrolment from international students at Cape Breton University. There was an additional increase of 2,249 non-permanent residents in CBRM in 2019 when CBU's international student population grew by about 3,500. Non-permanent residents generally include temporary foreign workers and international students.

Cape Breton Island's total population increased by 1,491 people in 2019 to 134,850 - mostly as a result of new growth in CBRM. Further, CBU saw its undergraduate enrolment increase by 44% between 2017 and 2018. Today, international students make up almost half of the student population at CBU and these students pay twice as much for tuition as domestic students, helping to offset the declining domestic enrolment and dwindling government funding. CBU currently has a 40-bike bikeshare program on the campus that is extremely well used.

At the time this report is being written, Nova Scotia Community College (NSCC) is constructing the new NSCC campus on Sydney's downtown waterfront. The $170m campus will open in September 2024 and will accommodate up to 1600 students and 220

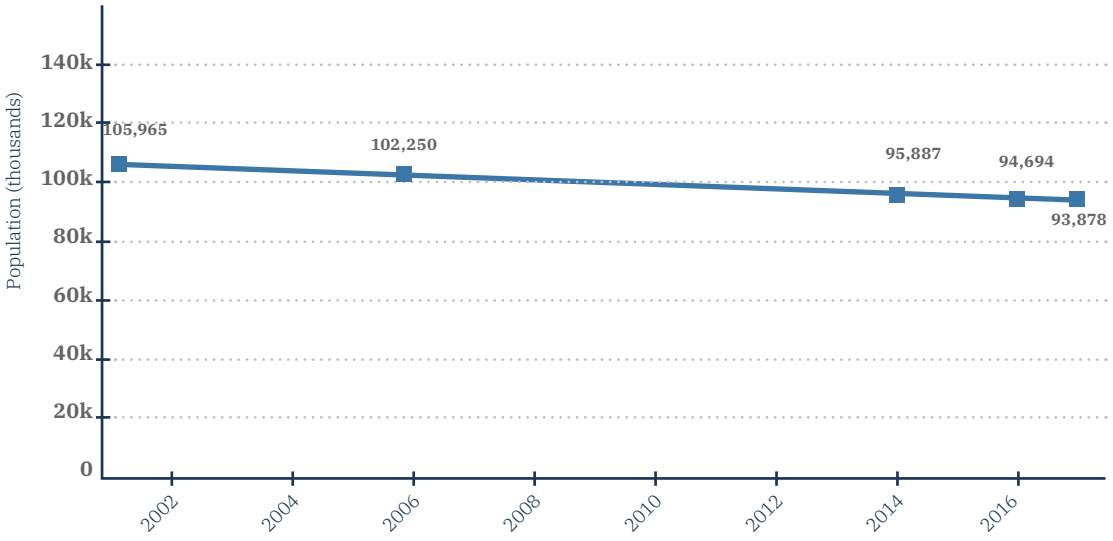
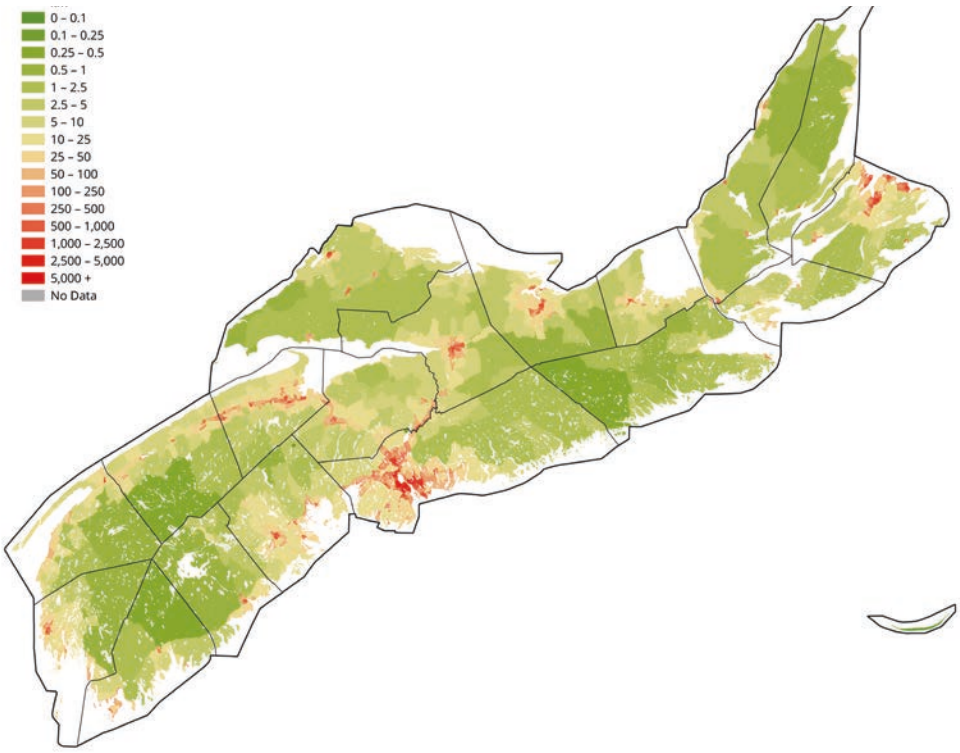


FIGURE 1.4 Population decline in CBRM 2001-2017. The new 2021 census data will not be available until after the summer of 2022.

FIGURE 1.5 Population Density in Nova Scotia 2016.



CBRM POPULATION IN 2016

98,722

% OF POPULATION OVER 65+

23%

% OF POPULATION WITH POST SECONDARY EDUCATION

50%

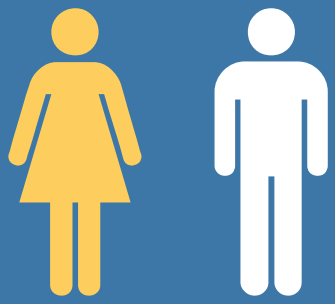
UNEMPLOYMENT RATE

17.6%

staff. The new campus will be one of the flagship schools out of the 14 NSCC campuses across the province. The NSCC is important to the province's and CBRM's economies. 82% of graduates are employed within their field of study within a year, and 94% of those employed stay working in Nova Scotia. The Sydney campus graduates about 500 students per year. As part of this plan's engagement sessions with CBU and NSCC, there were discussions of a shared bikeshare program between the two facilities which should be explored further.

Active transportation and transit are vital to both CBU and NSCC students and staff. In the case of the new NSCC campus, the parking lot is being scaled down from 500 cars at the current campus to 250 cars (most reserved for staff) at the new downtown campus to promote students living in the downtown and/or commuting using transit or AT. Extending the waterfront AT network and continuing to expand the network around CBU will be critical to the success of the campus.

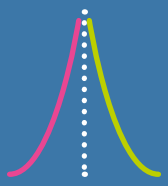
FIGURE 1.6 NSCC Waterfront Campus opening in 2024.



49,625 44,655

DEMOGRAPHICS

An 'age structure graph' (or population pyramid), provides a good social narrative of the population distribution in CBRM. Generally speaking, there are three types of population pyramids including:



Expansive: Pyramidal in shape, the expansive population pyramids show a larger percentage of the population in the younger age cohorts, usually with each age cohort smaller in size than the one below it. This type usually indicates a young and growing population.

Constrictive: Constrictive population pyramids are used to describe populations that are elderly and shrinking. Constrictive pyramids can often look like beehives and typically have an inverted shape with the graph tapering in at the bottom.

Stationary: Stationary, or near stationary, population pyramids are used to describe populations that are not growing. They are characterized by their rectangular shape, displaying somewhat equal percentages across age cohorts that taper off toward the top.

CBRM's population is the stationary pyramid, but it does have a bulge around 60 years old (Baby Boomers) and 19-24 years old (millennials) age groups. The latter curve is expected to move up the pyramid, meaning the bulge in the 15-25 year olds will produce a bulge in the 0-4 age groups in 10-years time, due to 15-25 year olds having having children. Similarly, if life expectancy continues to increase, we will see the Baby Boomer bulge (50-70 year olds in 2016) be around 70-90 years old in two decades (2026-2036). There should be another bulge in young families, newborns and seniors in CBRM over the next decade.

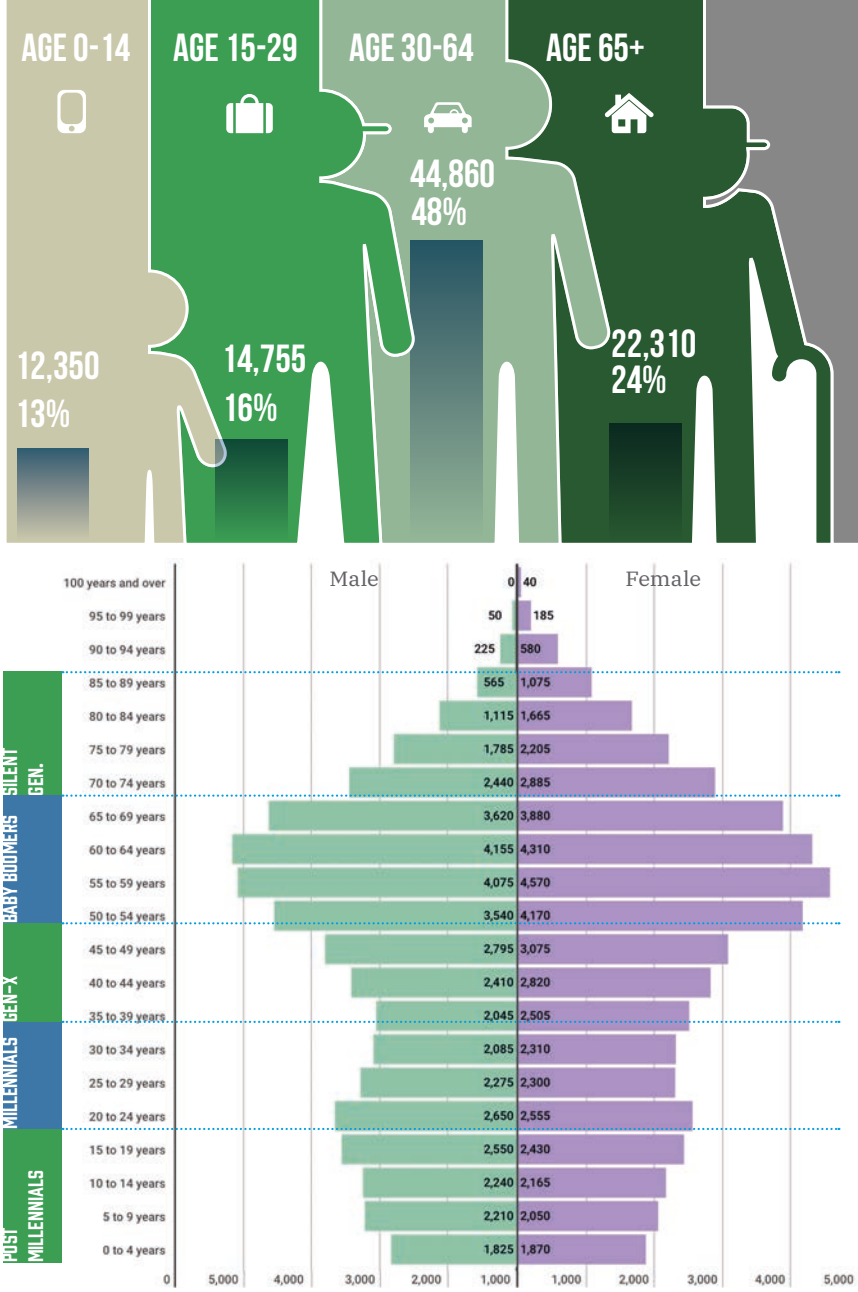
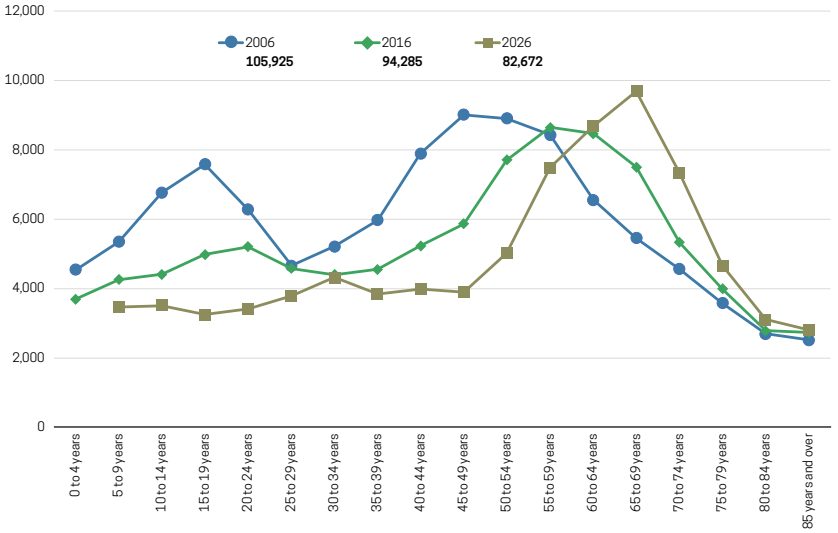


FIGURE 1.7 Population Pyramid For CBRM (2016)

FIGURE 1.8 CBRM average age distribution projection to 2026



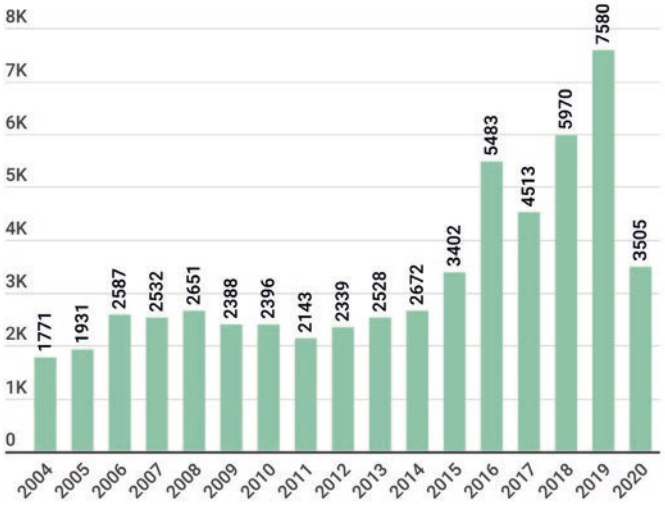


FIGURE 1.9 Immigrants to NS

Like many communities in Atlantic Canada, CBRM has a large proportion of seniors with a bulge in the 55-75 year range extrapolating from the 2016 population pyramid (Fig 4) up to 2021. In 2021, the largest 5-year age category is now in the 65-70 year category. About 24% of the CBRM population in 2016 was over 65 years of age, representing a high seniors population. A second, smaller bulge is found in the 20-30 year old cohort representing about 15% of the total population. As it relates to the most vulnerable age populations for AT, the 5-14 year old age group (8% of the population) and over 65 (24% of the population) would be considered vulnerable and primary targets for new AT infrastructure.

In contrast to CBRM's population changes, Membertou's population has increased from 912 people in 2011 to 1015 people (11.3% growth or 2.25% per year).

POPULATION PROJECTIONS

In 2019, Statistics Canada released its growth projections for Nova Scotia up to 2043 illustrating a range of potential growth scenarios. The most ambitious scenario called for 1.078m people by 2043 and 1m people by 2025. Just a few months after the release of this report, the worldwide pandemic hit, surpassing all high growth targets and reaching 1m by December of 2021. Most of this new growth is coming from young people moving out of larger cities and provinces. In the first quarter of 2021, 5,696 people moved to Nova Scotia from other countries and other parts of Canada. By July of 2021, Halifax saw a year over year increase of 9,000 new residents due to Nova Scotia's safety record through the pandemic and the province's relatively low housing prices.

In 2019, NS welcomed 7,580 new permanent immigrants (a 27% increase) before pausing the program as a result of COVID in 2020 (See **Figure 1.9**). The 2021 immigration figures are expected to exceed 2019. The government of Nova Scotia is targeting to double its population to two million by 2060 by attracting 25,000 newcomers per year through a combination of migration from other parts of Canada and strategic immigration efforts. While Halifax is seeing much of the growth since the pandemic, there is every reason to believe that CBRM could capture some of these new immigrants to surpass the current average loss of about 1,200 people per year. CBU is already capitalizing on its international student growth, helping to increase CBRM's population for the first time in five decades. Many of the immigrants coming to Nova Scotia come (in order of highest to lowest) from India, China, the Philippians, Nigeria, Pakistan and Syria. All of these countries have a strong cycling and walking culture and many will be looking to do what is culturally familiar once they get to Nova Scotia.

Tourism in Cape Breton is also starting to accelerate with recent international recognition as a safe and exciting destination:

1. Travel + Leisure Magazine named Cape Breton Canada's #1 Island Destination 4th year in a row.
2. Voted #1 Island in North America by Conde Nast Traveler magazine.
3. Cape Breton acknowledged by CNN Travel as one of the Worlds best destinations to visit in 2022.

These tourists will benefit from new AT infrastructure enhancing their visit to CBRM and may eve entice some to live in one of Nova Scotia's most scenic communities.

While there is optimism for slow growth in CBRM for the first time in a half century, there are still challenges to overcome. Without a full snapshot of the more recent immigration trends as a result of COVID, the consultants used an average age distribution model. This model projects the population trend of CBRM from 2016-2026 by using historical data from the last decade (2006-2016) as shown in **Figure 1.8**. However, this analysis does not account for new trends in discussed in the immigration section. Assuming past trends, we might expect CBRM's population to decrease from 94,285 people (in 2017) down to 82,672 people in 2026 (see **Figure 1.4**).

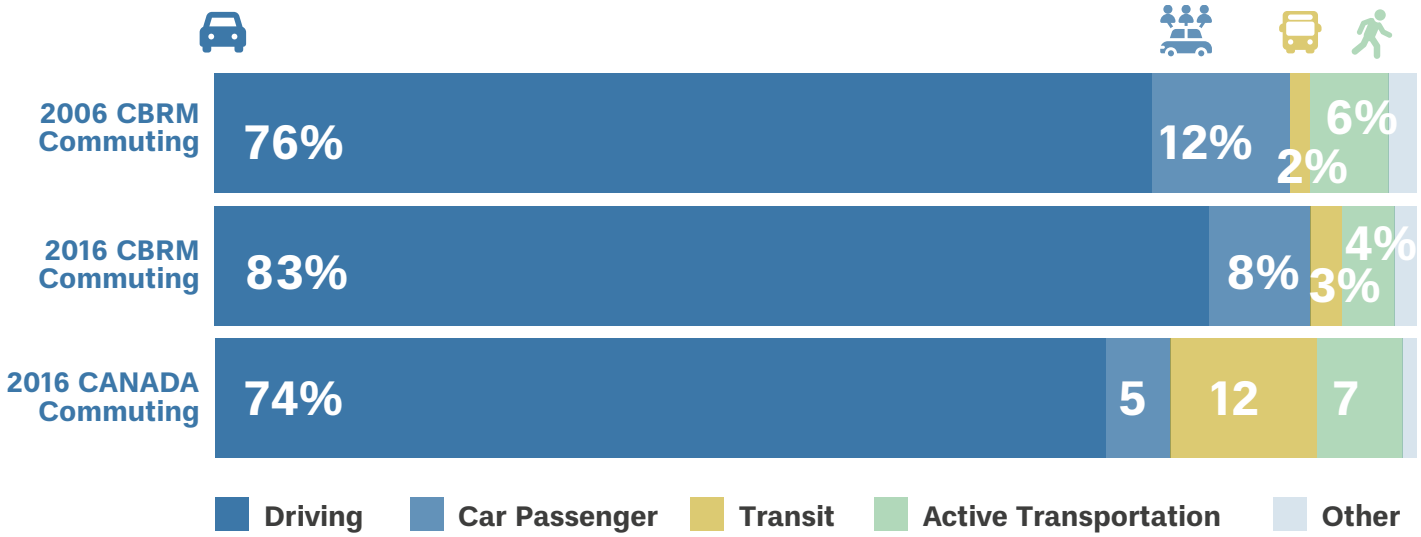


FIGURE 1.10 2006 & 2016 CBRM Commuting destination for the employed labour force aged 15 years and over vs Canada commuting destinations in 2016.

MODAL SPLIT

The National Census provides information on commuting methods in Canadian municipalities. As the 7th largest municipality in Canada, it is unsurpising commuting to work is highly skewed towards vehicles in CBRM. In the 2006 census, walking and cycling are a combined category (6.4%), whereas in the 2016 census, the two are broken out separately (walking - 4.05%, cycling - 0.2%). Between these two census periods it would appear that walking and cycling has decreased in CBRM; however, only 25% of those surveyed were asked the question about commuting, so there is a margin of error accompanying this question. From 2006 to 2016, there appears to be a slight increase in public transit (from 1.9% to 2.7%), but also an increase in driving from 77.6% to 82.6%.

Looking at the national averages for modal split (see **Figure 1.10**), CBRM has more drivers (82.6% compared to 74%), significantly less public transit (2.6% vs 12.4%), less cycling (0.2% vs 1.4%), and less walking (4% vs 5.5%). It is important to note this data focuses only on commuting to work and does not include commuting to school, or shopping, etc. However, data offers a useful comparison for the community survey's findings highlighted in this chapter. The data seems to indicate little change between the time the last AT plan was adopted in 2008 and the 2016 census; however, it will take several years to change commuting patterns once the infrastructure is fully implemented. It will be interesting to see what the upcoming 2021 census data will show.

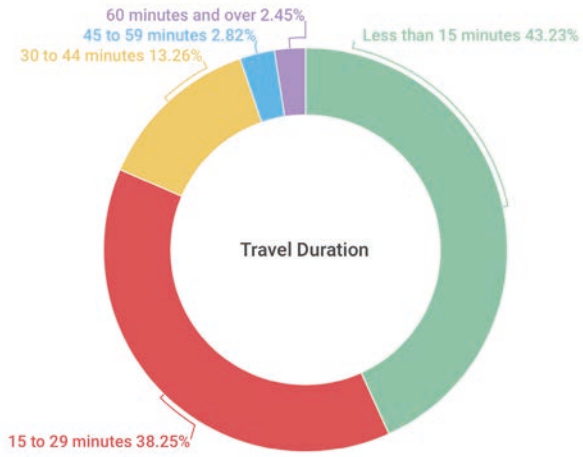


FIGURE 1.11 2016 CBRM average travel duration commuting to work

TRAVEL TIME TO WORK

According to the 2016 Census, 43% of CBRM commuters travel less than 15 minutes to work (see **Figure 1.11**). The short commute times are ideal for potential active transportation usersbecause it often translates to less than 10-15km in distance in urban areas, or 30-45 minutes of cycling and less than an hour of walking.

The long form census asked more detailed questions. The average travel time by car in CBRM to 17.6 minutes, the average travel time by bus at 31 minutes, and by cycling/walking at 12.8 minutes.

As the municipality moves to increase density near its downtowns and employment centres, there could be a substantial reduction in commuting time which will bode well for future AT development. Denser the urban centres correlates with increased use of AT infrastructure. If the municipality continues to sprawl, the more likely people will resort to travelling by motor vehicles. Policies which encourage denser forms of development in the urban cores will be much more sustainable and much less costly for the municipality.

COMMUTING DURATION IN CBRM

Mode of Commuting	< 15 mins	15 - 29 mins	30 - 44 mins	45 - 59 mins	> 60 mins	Avg mins
Car, truck or van	43%	39%	13%	3%	2%	17.6
Driver, alone	43%	40%	13%	2%	2%	17.5
Ride-share to work	47%	34%	13%	3%	3%	18.2
Sustainable transportation	45%	26%	18%	6%	5%	20.1
Public transit	14%	26%	37%	12%	11%	31.6
Active transport	64%	26%	7%	1%	2%	12.8
Other method	36%	24%	18%	6%	15%	34.7

Average Speed

5 KM/HR

1.5 KM

25-30 KM/HR

7 KM

50-70 KM/HR

15 KM

Average Distance in 15 mins

SOCIOECONOMIC STATUS

According to the 2016 census, CBRM resident's median total income in 2015 was $53,833, compared to the national median income of $70,336. After tax, these incomes translate into $48,237 for CBRM and $61,348 for all of Canada. The average income for CBRM households in 2015 was $68,465 compared to $76,797 for Canada households.

CBRM's economy was historically resource based on coal mining, steel, and fisheries. These industries essentially collapsed during the '90s, compounding the population decline and economic challenges. Despite COVID, the municipality is poised to realize successes due to tourism, the developing technology sector, post-secondary growth, cruise ship growth related to the new berth, a new port, immigration, and the anticipated rapid growth of the province.

Comparing the latest labour force data between July of 2020 and 2021, employment in Cape Breton increased by 1,500 (+3.1%) while labour force was down 1,000 (-1.7%). Between 2021 and 2020, the number of unemployed people decreased by 2,500 and the unemployment rate decreased by 4.1 percentage points to 12.6% in July 2021 (16.7% in 2020, 16.7% in 2019, and 14.7% in 2018). The number of persons not included in the labour force increased by 300 when compared to the same period one year ago. These are all optimistic signs for the future of CBRM but reinforce the importance of more affordable forms of transportation for residents in order to participate in the work force.

EDUCATION

Education levels in CBRM are slightly increasing over time. 25% of the population does not have a minimum high school education, 25% has a high school diploma, and the remaining 50% has pursued post secondary education (see **Figure 1.13**). These education levels are just slightly lower than the Canadian average, but this can be accounted for due to the higher average age of the population in CBRM compared to Canada.

CBRM is home to the Cape Breton University, housing approximately 5,500 students, the Canadian Coast Guard College which houses about 200 students and 100 staff, and the new NSCC Waterfront Campus which will be home to 1,600 students and 220 staff. The Cape Breton-Victoria Regional School Board oversees 12,545 students, 1,004 teachers, and 867 non-teaching staff in more than 41 schools in CBRM and Victoria County.

For CBRM's AT network, it will be important to link population centres with educational facilities. With the closest downtowns in the region. NSCC's recent move to downtown Sydney should bring life and vitality to downtown businesses while expanding housing for students in the downtown. It will be critical to link these important education centres within the overall AT network.

Education is also linked to economic prosperity; when the regional economy languishes, the availability of transit service and AT infrastructure is that much more appealing for impoverished residents.

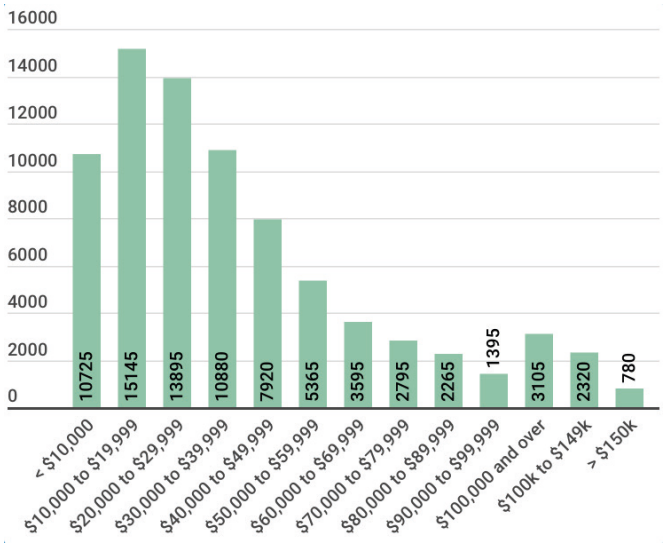


FIGURE 1.12 CBRM Employment income groups in 2015 for the population aged 15 years and over in private households.

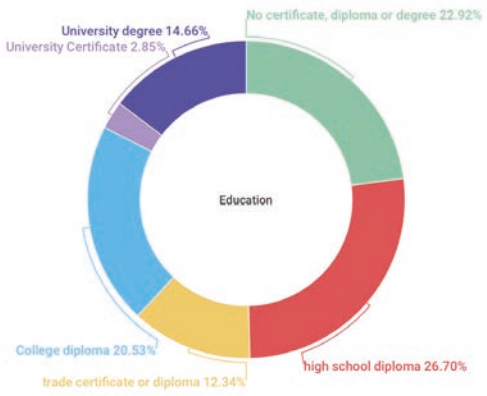


FIGURE 1.13 CBRM Highest certificate, diploma or degree for the population aged 15 years and over in private households.

1.4 THE BENEFITS OF ACTIVE TRANSPORTATION

A comprehensive active transportation plan has the potential to help residents move safely and efficiently throughout the CBRM - from home to school, work, shops, parks, and other important, routine destinations. Communities invested in active transportation recognize significant health and safety benefits, improved sustainability outcomes, and even economic and financial benefits. The following objectives have been identified by CBRM stakeholders as important to this plan:

COMMUNITY HEALTH

By providing better AT infrastructure to link homes to various destinations in the municipality, people become more physically active - reducing obesity and increasing longevity and quality of life for residents.

In 2018, 63.1% of the Canadians aged 18 or over were classified as overweight (27% were classified as **obese** and 36% classified as **overweight**). The current obesity rates are twice as high as they were in the 1970s. Obesity is a serious health problem, often linked with many chronic diseases, including: type 2 diabetes, cardiovascular disease, hypertension, osteoarthritis and certain types of cancer. In 2021, the correlated increase in chronic disease costs the Canadian health care system upwards of $7 billion; this cost is projected to increase to $9 billion in 2021.

Many studies note the direct correlation of obesity rates and the percentage of walking or biking trips in countries around the world (see **Figure 1.14**). Specifically, as walking and cycling participation increase, obesity rates go down. In contrast, inactivity results in obesity and disease prevalence; physical activity is associated with improved physical, mental, and social health outcomes, and a reduction in disease prevalence and associated costs.

FIGURE 1.14 Obesity (BMI ≥ 30 kg · m–2) prevalence and rates of active transportation (defined as the combined percentage of trips taken by walking, bicycling, and public transit). "*Walking, Cycling, and Obesity Rates in Europe, North America, and Australia*" (Journal of Physical Activity and Health, 2008, 5, 795-814)

ENVIRONMENT & SUSTAINABILITY

Active transportation has the lowest pollution rates in terms of transportation, reducing reliance on fossil fuel consuming cars (which in turn removes tons of CO^2 emissions from the air), reduces air pollution and energy consumption, and creates more equitable communities. This also improves people's health as well as the health of the local environment.

In 2019, 25% (185.8 megatonnes of CO^2) of Canada's total greenhouse gas emissions (730 megatonnes total) came from the transportation sector, with a further 26% (191 megatonnes) from the oil and gas sector. Between 1990 and 2019, emissions increased by 21.4%, or 129 Mt CO2 eq. Active Transportation could help meet Canada's ambitious 2030 climate change targets of 511 megatonnes. Almost half the noxious air pollutants in urban areas are emitted by automobiles and almost 20% of toxins in freshwater rivers, lakes, and wetlands come from the transportation sector.

In CBRM, the greatest opportunity for reducing environmental impacts related to driving is to convert the <15 minute driving commuter cohort to AT users. In CBRM, 43% of all driving commutes are less than 15 minutes (15km) and these short distant driving commutes are ideally suited for new AT commuters. These short distance commuters travel about 98 million kilometres per year in CBRM, consuming 11.5 million lites of fuel and creating 33,600 tons of CO^2 every year. For every 1% increase in AT commuting (352 people) in CBRM, there is a 1.2 million kilometre reduction in driving, a 139,000 litre reduction in fuel use (926 barrels of oil), a 410 ton reduction in CO^2 emissions, $195k savings from fuel spending ($550 per person).

COMPLETE COMMUNITIES

To develop a user base and ensure AT plans are feasible, planners and urban designers must ensure the shortest possible routes to key destinations. Studies demonstrate individuals who choose active transportation for every day purposes prefer routes that are efficient, safe, and aesthetically pleasing; developing AT routes that meet these standards yields denser, better-connected communities than those without. A reduction in urban sprawl results in a non-auto dependent commuting cohort, reducing the overall amount of money a municipality spends on infrastructure implementation, and maintenance. Consequently, the reduced municipal costs and higher tax rates allow for more funding to pay for recreation and transportation infrastructure. The combination of compact streets, improved parks, and transportation networks creates communities that are easy to navigate, safer, cleaner - and ultimately - offer a higher quality of living.

Compact grids and accessible distances create equitable communities. Communities that are auto-dependent and require a car restrict opportunities for lower income individuals who cannot afford to own a car. However, offering alternative transportation methods gives individuals access to jobs, health services, and community-based amenities that are otherwise inaccessible.

Complete communities are also healthier communities. Within CBRM, 40.59% of survey respondents live within 10km of their workplace - suggesting it is reasonable many people would be able to walk or bike to work. Increasing physical activity reduces the chances of chronic diseases leading to premature illness and death. Creating dense, walkable communities and implementing AT networks offers individuals the ability to walk or bike to work, thereby increasing their physical activity level while reducing their risk of developing an illness later in life. The ultimate result of incorporating active transportation is estimated to be $3 dollars in health savings for every dollar spent.

The combined efforts of policymakers, local employers, city builders, and many other individuals are required to build complete communities. However, the cost-savings in health and infrastructure and the increased quality of life are instrumental in developing CBRM's future.

ECONOMIC IMPACT

In coastal communities like Cape Breton, active transportation networks provide access to scenic resources - increasing tourism attraction and spending in local communities. Cycling tourism is rapidly growing around the world; in 2016 Ontario's Cycling Tourism Plan resulted in cycling visitors spending $428 million in the province (1.8% of all visitor spending) . Throughout Cape Breton, there are several bicycle groups specializing in multi-day tours. Further, the nearby Cabot Trail is a popular destination for cyclists throughout the country. Connecting the AT Plan to the proposed Blue Routes and nearby trails will ensure that CBRM is primed for developing its own cycle-based tourism, thereby potentially garnering the municipality similar economic gains.

Copenhagen's bi-annual cycling estimates that for every kilometre travelled by bicycle, the city gains approximately $0.14. While this seems like an insignificant amount of money, when combined total cost savings equal almost $41 million.

In 2012, Copenhagen saved $357 million a year in health costs due to bike-related health savings. While it is critical to note that Copenhagen is the pinnacle of a bicycle-oriented city (80% of the population bikes every day), this study demonstrates the immense benefits investing in active transportation could yield for CBRM.

THE HEALTH BENEFITS OF ACTIVE TRANSPORTATION

PHYSICAL

cycling burns between
400–1000
calories an hour

cycling to work can
cut a rider's risk of
developing heart disease or cancer in half

regularly cycling and walking
burns fat, tones muscle, and improves flexibility

MENTAL

a physically active lifestyle had a wellbeing score
32% higher
than inactive individuals

exercise is linked
to brain health,
reducing the chances of developing cognitive changes related to dementia
as we age

frequent physical
activity reduces anxiety and
age-related weight gain,
leading to improved sleep quality

THE ENVIRONMENTAL BENEFITS OF ACTIVE TRANSPORTATION

CBRM'S 15 MINUTE DRIVING COMMUTER POPULATION (42% OF ALL COMMUTES) RESULTS IN:

98 MILLION KM DRIVEN EVERY YEAR

11.5 MILLION LITRES OF FUEL CONSUMED

CREATES 33,600 TONS CO^2

EVERY 1% INCREASE IN AT COMMUTING IN CBRM (352 PEOPLE) RESULTS IN :

1.18 MILLION KM REDUCTION IN DRIVING

139K LITRE REDUCTION OF FUEL

410 TON REDUCTION IN CO^2

$195,000 TOTAL SAVINGS FROM FUEL OR $550 SAVINGS PER PERSON PER YR

REDUCTION IN 926 BARRELS OF OIL

EQUIVALENT OF 274 HOMES ELECTRICITY USE FOR 1 YR

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1.5 COMMUNITY ENGAGEMENT FINDINGS

In the summer and fall of 2021 (through the height of the COVID-19 pandemic) the consultants and the CBRM project managers began a community outreach process to inform the directions and recommendations of this plan. The engagement process included a social media outreach strategy through Facebook and Instagram, over 20 stakeholder interviews, the creation of a dedicated project website to share information and progress with the public and provide feedback to the consultants (www.CBRM-atplan.ca), an online survey, a full week of workshops, meetings and site visits in CBRM. The report also included draft presentations at key stages of the plan. The outcomes from those sessions are presented below:

AT STRATEGY BRAND

A brand was developed and adopted early in this project to unify the messaging, graphics, and communication methods for the project from start to finish. The "CBRM In Motion" tagline was developed to communicate the objective of this project to residents and stakeholders. The early intent of the brand was to use it on future signage, future communications, the website, and future AT development projects after this plan was completed.

SOCIAL MEDIA OUTREACH

A comprehensive social media campaign was launched about four weeks before AT Week to ensure maximum participation during the week-long community engagement sessions. CBRM pushed the campaign through its Facebook and Instagram (@cbrmgov) recreation portals which have over 2,500 followers.

DEDICATED WEBSITE

A dedicated project website was created and launched in August of 2021 holding all of the links for consultant and community feedback, including links to the online survey, the Instagram posts (which was part of the social media outreach), and key timeline milestones of the project. The website included sign up links for the community workshops as well as regular updates for the public to provide additional feedback.

STAKEHOLDER INTERVIEWS

Over 20 stakeholder interviews were conducted with community leaders that represent diverse community interests. The consultants spoke to people whose work is dedicated to economic development, climate change mitigation, tourism generation, environmental sustainability, education, transportation and more. The stakeholders recognize that these are early days for AT in CBRM and that the high visibility of some of the signature projects should bode well for future plans and projects.

Stakeholders praised the overall improved transit system, including improved bus service, signature projects, and improved active transportation connections between select communities across CBRM. In addition, the local connections to the Nova Scotia Blue Route have been well received in the community and should result in both local use and tourist use.

FIGURE 1.15 CBRM>>IN>>MOTION Social Media posting examples

CONCEPT DIRECTION 2

CBRM IN MOTION

TYPEFACE:
POPPINS

HELP US PLAN FOR THE FUTURE

PARAGRAPH HEADER

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COLOUR PALETTE

RGB 26 31 86
HEX 1A1F57

RGB 106 184 121
HEX 2E9592

RGB 252 204 92
HEX FCCC5C

ICONS

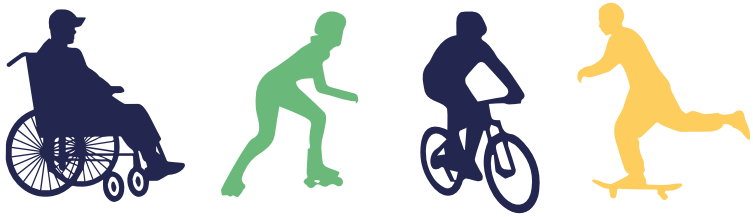


FIGURE 1.16 CBRM IN MOTION brand templates, colour schemes, typefaces, icons and graphic standards

However, several gaps in the transit system were also flagged by stakeholders. Areas that require attention included lack of infrastructure, negative perceptions around active and public transit users, outreach and education, and maintenance of existing infrastructure. In particular, safety was flagged as a huge concern for people who may want to use active transportation more, but feel uncomfortable doing so. Signage was also raised several times, praising CBRM for their trails and existing assets, but commenting this knowledge is informal and could be better disseminated.

Stakeholders felt there were connections to be made between improved active transportation options and the various portfolios they represented, like climate change, tourism, and economic development. In particular, stakeholders wanted to see redevelopment options for the major transit routes leaving and entering Sydney, including Prince Street, George Street, and Kings Road/Esplanade. In terms of approaching this work, stakeholders wanted to ensure we were taking an all ages and abilities approach to planning, as well as looking at how active transportation options could contribute to improved equity, planning for growth, and community cohesion. All agree that AT is fundamental part of city-building and improved quality of life in CBRM and it has the potential to create greater equity for all populations and age groups in the municipality.

The issue of ATV use came up at several meetings, however despite some strong sentiments to the contrary, most people recognize that the ATV groups have been instrumental in helping to implement the AT network in the municipality and will continue to be important partners moving forward.

Most groups recognize the amazing potential of the yet-to-be-realized Sydney River Multi-use Pathway and many groups lamented the wide swath of waterfront land that is underutilized due to the old railway ownership. Most agree that the stretch of rail-line from Open Hearth Park to the Sydport connector rail line will likely never be used again and would be ideal as a multi-use trail between Sydney River and downtown Sydney. Most agree this project would be a signature AT project that would be widely used by the local community and tourists alike. At the same time, most groups recognize the need for a better AT connector between Sydney and North Sydney in the absence of a public ferry connection.

Interviews with the school board, CBU and NSCC underscored the importance of better AT networks around local schools and the surrounding neighbourhoods, and the need for full AT connectivity between CBU and downtown Sydney and the new NSCC Waterfront Campus.

CBRM IN MOTION

CBRM ACTIVE TRANSPORTATION PLAN

ENGAGEMENT WEEK ACTIVITIES

Cape Breton Regional Municipality (CBRM) is creating a new **Active Transportation Plan**. The Plan will outline infrastructure upgrades and new routes required to improve the walkable and wheelable network across the Municipality.

We welcome everyone to participate in AT week activities throughout **September 13-17**, at **th**e locations, dates, and times below. The design consultants for this project, Fathom Studio, will lead the sessions to gather feedback from the community.

fathom

MONDAY SEP 13	TUESDAY SEP 14	WEDNESDAY SEP 15	THURSDAY SEP 16	FRIDAY SEP 17
				
1-3PM MEETINGS WITH CBRM STAFF AT CITY HALL 3:30-6PM CONSULTANTS TOUR OF COMMUNITY 6-8:30PM PUBLIC WORKSHOP IN LOUISBOURG	9-12AM GROUND TRUTHING IN LOUISBOURG 1:30-3PM CBU/NSCC WORKSHOP 6-8:30PM PUBLIC WORKSHOP IN SYDNEY	9-12AM GROUND TRUTHING IN SYDNEY & SURROUNDING AREA 1:30-3PM CBVRCE SCHOOL BOARD MEETINGS 6-8:30PM PUBLIC WORKSHOP IN GLACE BAY	9-12AM GROUND TRUTHING IN GLACE BAY, DOMINION & NEW WATERFORD 1:30-3PM CBRM COUNCIL WORKSHOP 6-8:30PM PUBLIC WORKSHOP IN NORTH SYDNEY	8-11AM GROUND TRUTHING IN NORTH SYDNEY & SYDNEY MINES 11-12:30 PM WRAP UP WITH STAFF
LOUISBOURG SEPTEMBER 13, 6 PM LOUISBOURG FIRE HALL 7485 MAIN ST, LOUISBOURG	**SYDNEY & SURROUNDING AREA** SEPTEMBER 14, 6 PM ROYAL CAPE BRETON ROOM, JOAN HARRISS CRUISE PAVILION 74 ESPLANADE, SYDNEY	**GLACE BAY, DOMINION & NEW WATERFORD** SEPTEMBER 15, 6 PM GLACE BAY MINERS FORUM 151 LOWER N ST, GLACE BAY	**NORTH SYDNEY & SYDNEY MINES** SEPTEMBER 16, 6 PM JOHN J. NUGENT FIREMEN'S CLUB 1 ELLIOT STREET, SYDNEY MINES	

ALL PARTICIPANTS ARE ENCOURAGED TO BRING A MASK TO THE EVENTS TO WEAR AT YOUR DISCRETION.

FIGURE 1.17 CBRM IN MOTION AT Engagement Week events summary

COMMUNITY WORKSHOP

The consultants hosted 6 workshops over the course of AT Week which was scheduled from Sept 13-17 in 2021. Over 50 attendants attended the various sessions during engagement week. The following is a summary of the findings and suggestions.

Louisbourg Workshop, Sept 13, 2021

Residents that participated in the Monday evening workshop highlighted the need to connect AT routes to the Parks Canada assets at both ends of the Town (Fortress Louisbourg and the Louisbourg Lighthouse). The group noted the new Develop NS Visitor Experience Project near the waterfront and work completed to create new sidewalk connections to recent downtown streetscape improvements. While lamenting the loss of the school in the community, there was general agreement that a waterfront connection was needed to connect between the community and the end of the Parks Canada multi-use trail on the Kennington Cove Road. The group discussed the possibility of a multi-use trail through the old fishery property meeting up at the Commercial Street Extension. Sidewalks from Main Street to this location was also seen as important. The next high priority for the community was to link the Lighthouse to downtown on an AT route. The group noted the new sidewalks on the Havenside Road could connect up with the old rail corridor which is grown over but still used today. The old rail line could function as a multi-use trail to the lighthouse and to a coastal trail all along the waterfront to the east of the lighthouse over to the West Shore Road. There was much discussion about the need for better wayfinding signage and the important work of the ATV community in trail building and maintenance around the town.

CBU / NSCC Workshop, Sept 14

Staff participants from CBU and NSCC both noted the high use and importance of the Maryann Corbett trail for students and other members of the community. The group was anxious to continued extensions of this trail into downtown Sydney and Glace Bay. With NSCC's impending move to the waterfront, they are anxious to see a similar level of connectivity with their new campus and would appreciate the Sydney River Multi-use trail connection to move students off of Kings Road and onto the waterfront. CBU already has a well used bikeshare program (40 bikes) and NSCC commented that they might want to explore a shared service between CBU and NSCC. Both NSCC and CBU mentioned that they would benefit from adequate density alloted to new zones around the campuses to allow for some multi-res housing for students. NSCC commented that they are cutting their parking down from 500 spaces at the current campus to 200 spaces on the new campus so there will need to be provisions to deal with student parking in the downtown and access from a more remote parking lot (possibly near Open hearth park) using AT or a student shuttle service like at the Dartmouth Campus. There was some discussion about the need for bollards on the trail to keep ATV's off it.

Sydney Workshop, Sept 14, 2021

The Sydney workshop on Tuesday Sept 14 was well attended with about 25 participants working at 5 tables. Participants attended from many of the surrounding communities including Westmount, Sydney River, Sydney and Whitney Pier. Many of the groups were highly supportive of new sidewalks near schools, new on street bike lanes, and specifically of the need to implement the Sydney River Multi-use Trail. There was also consensus that new projects like the Washbrook connector have been well received but need to be extended into the surrounding communities and connected to other future AT infrastructure. There was some discussion about transit service routes and timing limitations and the need to connect future AT routes to transit services and making transit bike friendly. There was also discussion about the need for a safe bike route from the Mayflower Mall to downtown Sydney and the overall pedestrian danger of Welton Street and the crosswalks and sidewalks on this street specifically. The groups agreed that bike lanes and bike paths are currently a sporadic patchwork and there's not enough safe routes yet to effectively move the dial on commuting in CBRM. There was some comments about parking in downtowns being mostly free and readily available so car use is high.

CBVRCE School Board Workshop, Sept 15, 2021

Members of the school board participated in an afternoon

FIGURE 1.18 Louisbourg Workshop

FIGURE 1.19 Sydney Workshop

workshop where several issues were identified including:

- Sidewalks - lack of sidewalks, condition of sidewalks, or narrow width of sidewalks makes walking to school in some areas dangerous. Need to do a condition assessment on sidewalks around the municipality. Sidewalks around schools are not generally provincial responsibility. The Board only gets capital funding from the province. No other pots of money.
- Crosswalks and lack of crossing guards in some locations is an issue for safety for some schools.
- Of the roughly 12,000 students in 38 schools, 60% are bused on 86 full-time buses and 40%. There are many students unnecessarily riding buses and many parents drive their kids to school. The walking distance standards for elementary students is 1.6km for the province and 1.0km for CBRM. For middle school and high school, it is 2.4km for the province and 2km in CBRM.
- There are not many kids biking to school
- The school board has been trying to create incentive programs to get kids walking or biking. Food has been a great motivator. There needs to be a culture shift from protecting kids to protecting them from obesity and mental health issues.
- CBVRCE Would be happy to partner with CBRM on programs to get kids walking and biking and that may mean a program for parents to make them feel more confident about the safety of the network.

Glace Bay, Dominion, New Waterford Workshop, Sept 15, 2021

Several participants in the workshop are committed cyclists and are highly supportive of new AT infrastructure. The Coal Town Trail has been a huge blessing for the communities it goes through but it also attracts other CBRM residents and tourists for recreational walking and cycling. There has been a good working relationship between many of the other trail user groups like the ATV users and other groups and this could be a model for future rail conversions in CBRM. For the Coal Town trail to be a true AT connector, it must connect better into downtown Glace Bay and to the Maryann Corbett trail (at both ends). There are many other off-road trails in the community that are well used by walkers and cyclists. The community has been following the Glace Bay and Area Revitalization Plan for downtown improvements, trails, and new parks. The coastal trail is well used by locals and has the potential to be a real tourist destination but it needs to be formalized more and better safety measures need to be put in place for the eroding shoreline. Many of the sidewalks in the community are very old and are in very poor shape. There is a real need for some safe, on-street bike lanes in the communities.

North Sydney & Sydney Mines Workshop, Sept 16, 2021

Participants at the workshop highlighted a number of critical issues with AT infrastructure in the communities including:

- The need for an AT connection between North Sydney (both sides of Sydney Harbour still need to be connected).
- The main streets in North Sydney and Sydney Mines desperately need AT infrastructure like bikes lanes or bike trails.
- The future of the rail line through the community is less certain than other parts of CBRM and will likely be preserved for future rail for the foreseeable future. There is less opportunity for a Coal Town Trail on this side, so it's all the more important to develop the other infrastructure in the community.
- The waterfront streets through both communities should have both bike lanes and sidewalks for locals and tourists.
- Some of the parks and sports fields are not well connected by trails in the communities.
- Plans for a new high school in the industrial park should include sidewalks and bike lanes.
- An AT connection between North Sydney and Sydney mines is a priority.
- Passengers waiting at Marine Atlantic might enjoy a bike rental at the terminal through the communities if the AT connections were installed.

1.6 ONLINE SURVEY RESULTS

An online survey was launched the week prior to AT Week (Sept 13-17, 2021) and remained active for 2 months until November 2021. 649 participants filled out the survey and the results are summarized in this section below. The first series of questions were categorizers, designed to tease out differences between genders, age groups, employment status, and community. These categories may be useful for CBRM in the future to better understand the needs of the various communities in CBRM.

Q1) What is your gender?

Almost two-thirds of the survey respondents were female (67.23%). This may indicate a preference for AT topics by women, women were more active in finding the link to the survey than men, or more comfortable filling out the survey than men. Other online surveys in CBRM have a more equitable breakdown of men and women so this degree of participation seems to indicate a greater interest in the topic and potentially higher participation in AT projects going forward. On-the-ground surveys of use should confirm or disprove this theory.

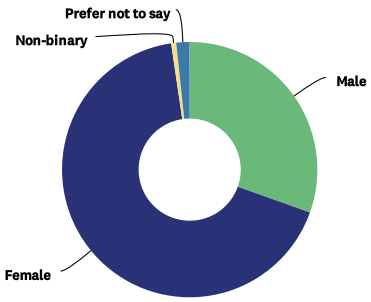
Q2) How old are you?

The largest age demographic represented by survey respondents were individuals aged 50-64 years old (31.89%) which is generally the most populous age group in CBRM. The remaining respondents consist of individuals aged 21-34 (17.03%), 35-49 (27.07%), and 65+ (19.20%).

Individuals under 21 had the lowest survey response rate (4.80%). Consequently, the results of this survey may not incorporate the desires of CBRM's youth population, a key group interested in AT. The lack of youth response could indicate outreach-related issues rather than a lack of interest in AT. Secondly, research suggests survey responses from youth participants are declining at national and international levels. Due to the project's implementation and long-term regional effects, the AT plan has a significant effect on the region's younger generation. As such, future consultation and outreach should make a specific effort to engage the younger audiences on the platforms that they frequent.

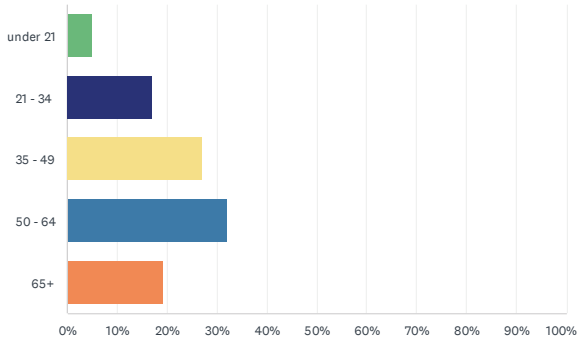
Q1) What is your gender?

Answered: 647 Skipped: 2



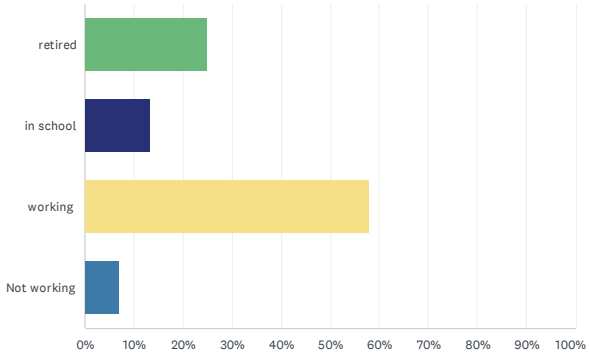
Q2) How old are you?

Answered: 646 Skipped: 3



Q2) Are you currently...

Answered: 647 Skipped: 2



Q3) Are you currently...

Over half (57.96%) of the survey population are currently working. The remaining respondents are retired (24.88%), in school (13.45%), or not working (7.11%). Given most respondents are currently employed, this reflects a need for AT routes to connect people from their homes to places of work. Secondary consideration should be given for AT routes connecting individuals from their residences to primary, secondary, and post-secondary educational institutions.

Q4) What CBRM community do you live in?

Over a quarter of respondents (29.48%) live in Sydney. Glace Bay/Dominion/Reserve Mines (15.59%) and Sydney Mines/ North Sydney (14.66%) are the communities with the second and third largest representation. Generally, these responses follow the population in these communities. To maximize AT use, placing new AT routes in densely populated areas will be essential. The Blue Routes will address the more rural areas of CBRM.

16.05% of survey respondents did not have their community listed. This may reflect participants outside of CBRM or residents in CBRM that do not consider themselves as 'rural' residents.

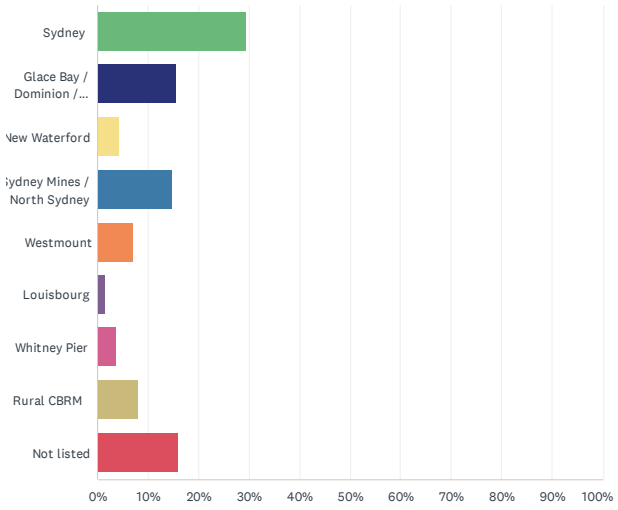
Q5) Do you own...

Car ownership represents the largest demographic in the survey population. Respondents own one (56.63%) or two or more (29.80%) cars (86% car ownership). The majority of the population (93.13%) do not own a motorcycle. Over half (55.4%) of respondents own one or more bikes (36.79% own one bike and 18.57% own two or more bikes). 2.4% of the respondents own an e-bike and we will expect this number to climb rapidly over the next 10-20 years. 2% of respondents own a wheelchair and 15.50% own one or more ATV's. 13.7% own a scooter or a skateboard.

Given the high bicycle ownership in CBRM, we would expect relatively high uptake of multi-use trails. In all the age categories above 35, about 1/3 of the respondents owned bikes. In the 21-34 category, less than 20% owned bikes and below 21 years of age, less than 10% owned bikes. Looking more specifically at bike ownership in the survey, a pivot-

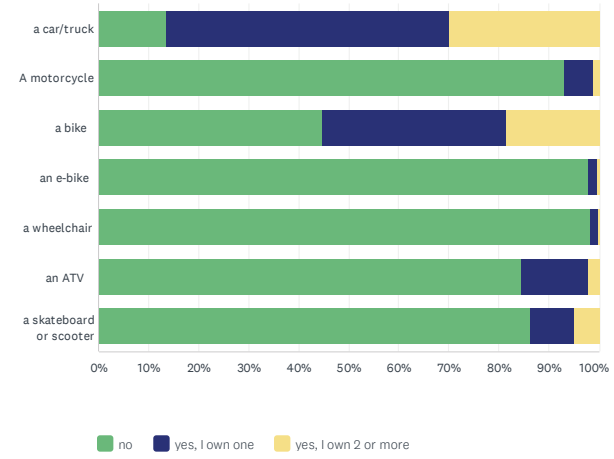
Q4) What CBRM community do you live in?

Answered: 648 Skipped: 1

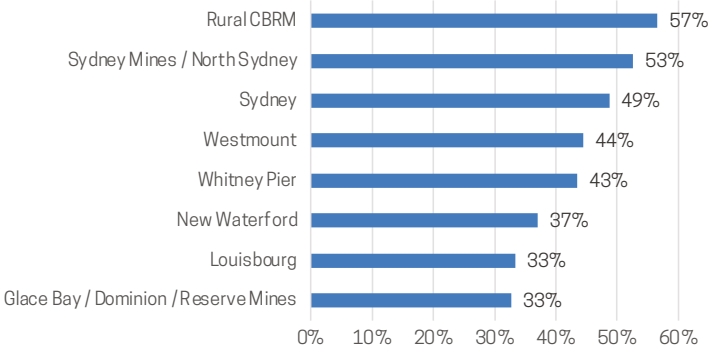


Q5) Do you own...?

Answered: 647 Skipped: 1

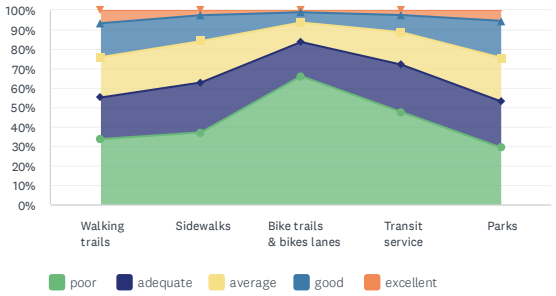


Q5a) % Bike Ownership in CBRM Communities



Q6) **How would you rate the following in your local community?**

Answered: 646 Skipped: 3



Q7) **How would you rate the following in CBRM?**

Answered: 640 Skipped: 9

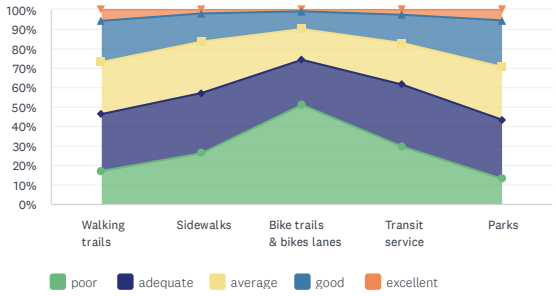


table from the raw data suggests the following ownership in these CBRM communities (see Q5a).

Q6) How would you rate the following AT amenities in your local community?

The highest rated amenities in CBRM were, in order of highest to lowest, parks, walking trails, sidewalks, transit, and lastly, bike trails/lanes. At least 1/3 of all responses rated all amenities as poor showing that many people are not happy with the level of service. Over 60% of the respondents rates bike trails/lanes as poor showing the area that CBRM needs the most attention. Almost half the respondents rated transit as poor as well. A range of 10% to 26% of respondents felt current AT amenities were either “Adequate” or “Average”.

Few residents rated the current AT amenities as excellent (1.12% for bike lanes; 2.56% for current transit; 2.56% for transit service). Overall, walking trails (6.76%) and parks (5.54%) received the highest response in the excellence category but these were still fairly low.

Q7) How would you rate the following in CBRM?

Respondents seemed to be more forgiving of AT infrastructure when looking at CBRM as a whole. Perhaps because they don’t know these areas as well as their local community. Still, the ‘poor’ rating is lower for CBRM than it is for their local community. The trend of what people like and dislike in CBRM follows the trends in their local community. This suggest residents are somewhat satisfied with the current infrastructure for the municipality when compared to response rates for specific communities. Response rates in the excellent ranking remain low however. Again, these responses suggest a need for targeted AT improvements in the region, with a specific focus on improving bike trails, transit service, and sidewalks.

Q8) On average, how much time do you spend daily on the following activities?

The most popular forms of physical activity is walking, with biking and running a distant second. Almost 50% of respondents said they walked for 30mins to an hour per day. Most cyclists (22.39%) spend less than 30 minutes biking, or 30 minutes to an hour (12.12%). Runners (17.84%) spend less than 30 minutes or 30 minutes to an hour running, (9.61%). Walking for 30 minutes to an hour was the most popular form of physical activity (52.17% said 30 minutes). Additionally, respondents spent less than 30 minutes (16.59%) or 1-2 hours (20.45%) walking a day. Skateboarding and ATV'ing were the least popular activities. Skateboarding's low popularity on the survey could be attributed to the lack of the youth response rate. This activity is specifically popular for teenagers and young adults; additional outreach may be required for a more accurate response.

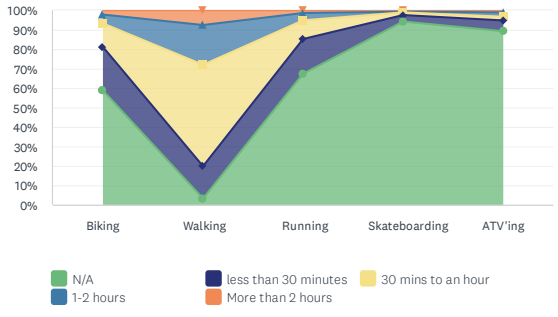
Future AT routes should focus on systems encourage walking, cycling and running due to their popularity among residents.

Q9) How do you get around CBRM?

Unsurprisingly, most respondents use the car regularly (83.28%) to get around CBRM. The second most popular transportation method was walking sometimes (37.88%) to regularly (29.18%). The fewest respondents use a wheelchair (0.73%) or skateboard regularly (0.92%). The majority of individuals using public transit relied on it rarely (18.51%). About 5% of the respondents cycle regularly or sometimes (16%). Carpoolers rarely used the service (16.85%), or sometimes (12.64%), but rarely used the service regularly (3.30%). Overall, inline skating/ skateboarding and wheelchair/motorized scooters were the least regularly used method of transportation. As previously stated, most respondents get around CBRM in their cars followed closely but less frequently by walking, then biking, then transit.

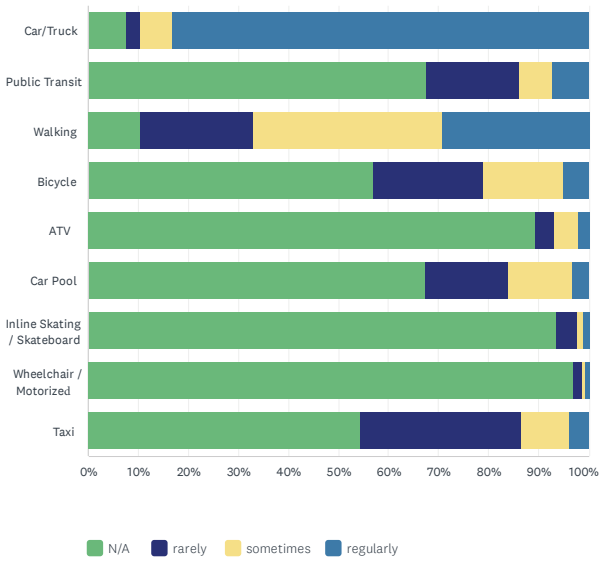
Q8) **On average, how much time per day do you spend on the following activities?**

Answered: 627 Skipped: 22



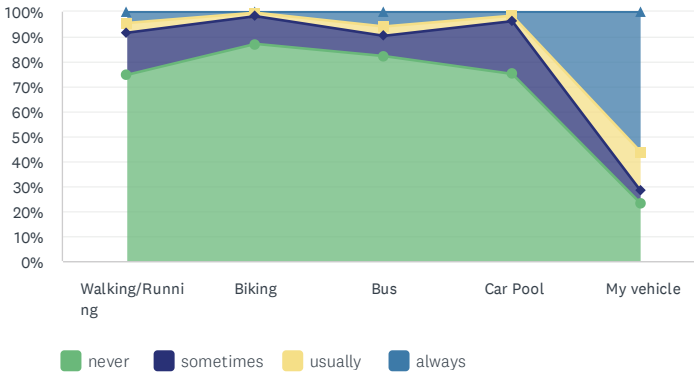
Q9) **How do you get around the CBRM? Check all that apply**

Answered: 627 Skipped: 22



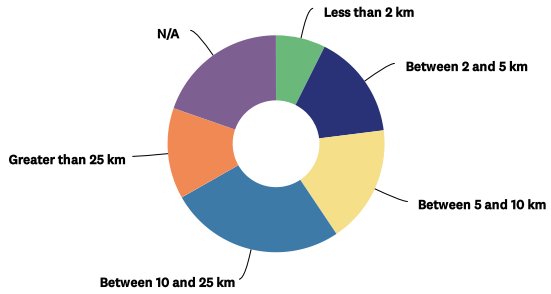
Q10) **How often do you travel to work/school using the following modes?**

Answered: 550 Skipped: 99



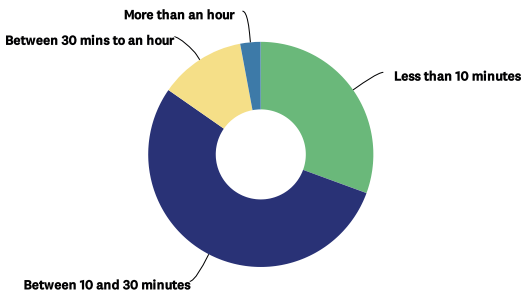
Q11) **What is the approximate distance from your home to your work/school?**

Answered: 569 Skipped: 80



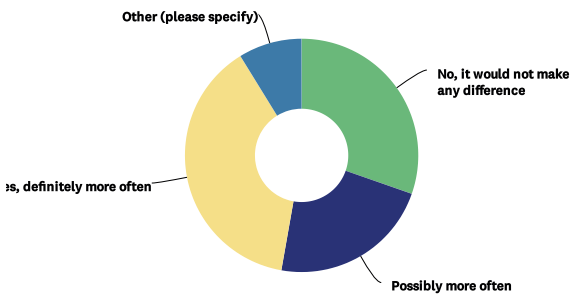
Q12) **On average how long is your typical commute (one way) to your work/school?**

Answered: 510 Skipped: 139



Q14) **If the walking/biking/transit infrastructure was improved in your community, would you use it more frequently to get to work/school?**

Answered: 557 Skipped: 97



Q10) How often do you travel to work using the following modes?

When comparing these results to the 2016 Commuter Census results, there are some general similarities but the census question asks binary questions, while this survey adds the frequency consideration which provides slightly different results. For instance, in the 2016 census, 86% of commuters used their car in CBRM. In this survey, when asked how frequently, respondents 'always' use their car 56% of the time and with less frequency only up to 77% of the time. Walking and running and carpooling to work happens occasionally up to 25% of the time.

Biking was the least popular method for commuting to work regularly (0.40%), followed by carpooling (1.60%), walking/running (4.51%), and bus (5.93%). According to a 2016 StatsCan survey, 12.4% of Canadians use public transit, 12.1% carpooled, and 6.9% used active transportation (walking or cycling) on average. Ultimately, CBRM's reliance on AT and alternative transportation methods are below the national average, suggesting a need for improvements across the region.

Q11) What is the approximate distance from your home to your work/school

What is considered as walkable can vary according to distance and physical ability. However, a walkable distance is generally considered to be a 45-60 minute walk (approximately 5 km). **24% of respondents live less than 5km from their work suggesting it may be possible to increase walking commuting in CBRM**. A 10km bike ride takes around 25-30 minutes at an average speed of 16-20km/hr. **Almost 42% of all respondents live within 10km of their work or school so with good bike infrastructure, it should be relatively easy to increase bike ridership for commuting.**

These findings paint a real picture of the opportunity for AT expansion in CBRM.

Q12) On average, how long is your typical commute (one way) to your work/school?

Over half (54.12%) of survey respondents spent 10 to 30 minutes getting to work or school. 30.59% spent less than 10 minutes, and 12.35% spent 30 minutes to an hour. Based on previous responses to survey questions, we can assume the majority of respondents rely on cars as a method of transportation. However, with **30% of the respondents taking less than 10 mins to get to work (even if by car), this category could be converted to bike use or running relatively easy with the right infrastructure**.

Q13) If the walking/biking/transit infrastructure was improved in your community, would you frequently use it more frequently to get to work/school?

"Yes, definitely more often" (38.42%) was the most responded to category, reflecting a solid desire for a AT improvements to change behaviours. If we also consider the 'possibly more often' (22.44%), **that's over 61% of all CBRM commuters could be enticed into other forms of transportation if improvements were made in the AT network.**

Q14) Are you interested in using alternative (active transportation) strategies to get around CBRM?

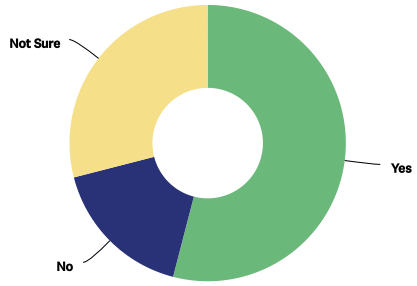
More than half (54.03%) of respondents said they would be interested in using active transportation methods to get around CBRM. Over a quarter (28.99%) selected "Not Sure." "No" received the lowest response rate with 16.98%. Coupled with responses in the previous categories, this suggests while participants rely on their cars, the implementation of improved AT networks could be widely adopted by the community.

Q15) If no, Why not? (please check all that apply)

Weather and snow-clearance (37.09%), destinations are too far (35.62%), safety concerns (35.16%), and destinations are not connected by trails/sidewalks (34.25%) were the most responded to categories. Over one quarter (26.94%) relied on the habitual use of a vehicle, 15.07% felt active transportation was too physically demanding (this might

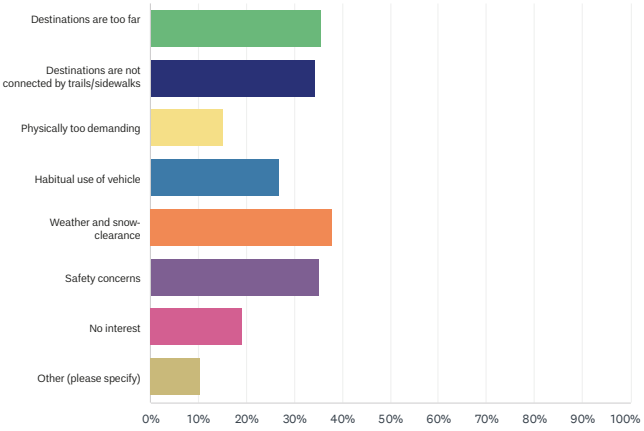
Q14) **Are you interested in using alternative (active transportation) strategies to get about CBRM?**

Answered: 583 Skipped: 66



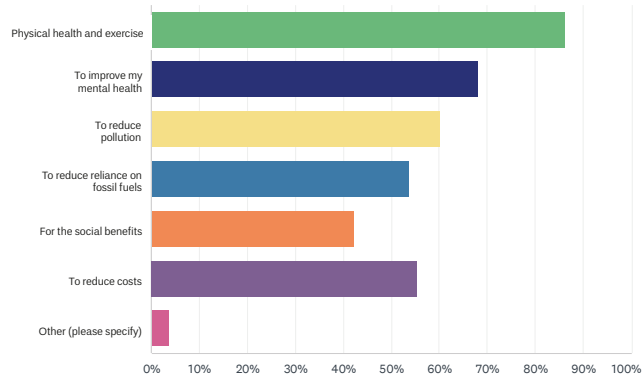
Q15) **If no, why not (Please check all that apply)?**

Answered: 219 Skipped: 430



Q16) **If yes, why? (Please check all that apply)**

Answered: 407 Skipped: 242



be overcome by new electric micromobility), and 19.18% said they were uninterested.

Connectivity and distance are two of the biggest issues regarding the implementation of active transportation in the region. Future strategies should consider intra- and interconnectivity throughout the region, and methods of transport that are not physically strenuous like around coastal shorelines that are flat. **Supporting new e-bike and e-scooter infrastructure could also eliminate the strenuous fears. Addressing safety, connectivity, and strenuousness in the strategy could win over some potential naysayers.**

Q16) If yes, why? (please check all that apply).

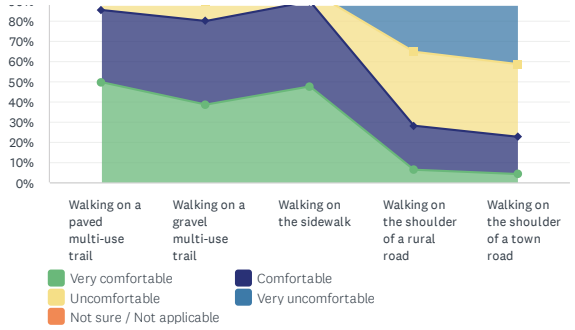
Over three-quarters (86.24%) of the survey respondents were interested in physical health and exercise, 68.04% wanted to improve their mental health, 60.20% were interested in the reduction in pollution. Similarly, 53.81% were interested in reducing their reliance on fossil fuels. 42.26% were interested in AT for the social benefits, and 55.53% were interested in cost reduction. 3.69% said they were interested in AT for other reasons. Overall, this suggests that CBRM's population interest revolves around the use of AT for managing a healthy lifestyle. Future networks should focus on enabling physical activity. Secondary focus should be on strategies that reduce pollution and fossil fuel emissions.

Q17 Please indicate your comfort level with regards to walking for each of the following statements:

When asked about their comfort level regarding different walking environments, 47.49% of respondents felt very comfortable walking on the sidewalk (42.11% said comfortable, 5.56 said uncomfortable, 3.05% said very uncomfortable), walking on gravel multi-use trail (38.49% said very comfortable, 41.37% said comfortable, 9.53% said uncomfortable, and 5.94% said very comfortable), or on a paved multi-use trail (49.55% said very comfortable, 37.73% said comfortable, 7.00% said uncomfortable, and 2.51% said very uncomfortable) as the most enjoyable walking experiences. Comparatively, respondents rated walking on the shoulder of a rural road (31.07%

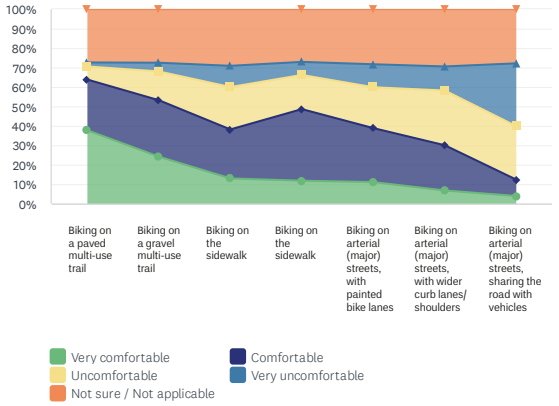
Q17) **Please indicate your comfort level with regard to walking for each of the following statements?**

Answered: 564 Skipped: 85



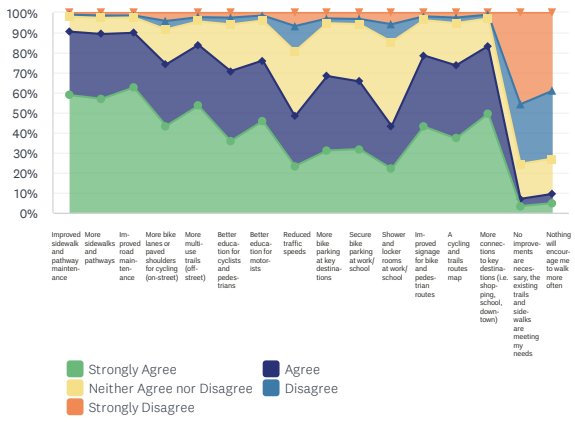
Q18) **Please indicate your comfort level with regard to biking for each of the following statements?**

Answered: 537 Skipped: 112



Q19) **Please indicate your level of agreement with the following statements, regarding initiatives that might encourage you to walk or bike more often:**

Answered: 491 Skipped: 158



said very comfortable, 36.61% said uncomfortable, 21.79% said comfortable, and 6.25% said very comfortable), and walking on the shoulder of a town road (38.28% said very uncomfortable, 35.96% said uncomfortable, 18.42% said comfortable, and 4.11% said comfortable) as the most uncomfortable walking experiences.

This suggests CBRM's future AT plan should consider paving and broadening sidewalks to encourage use and improve the user's overall experience. Gravel can be considered for multi-use trails, but shoulder paths should be avoided.

Q18) Please indicate your comfort level with regards to biking for each of the following statements:

When asked about their biking preferences, the majority of respondents preferred biking on a paved multi-use trail (37.71% said very comfortable, and 26.08% said comfortable), biking on a gravel multi-use trail (24.1 6% said very comfortable, 29.03% said comfortable), and on minor residential streets (11.78% said very comfortable, 38.82% said comfortable) as their preferred place to bike. Major arterial streets with wider curb lanes/ shoulders (12.38% said very uncomfortable and 28.14% said uncomfortable) and sharing the road on major arterials (32.34% said very uncomfortable and 27.48% said uncomfortable) were disfavoured by the survey population. **Future cycling plans should avoid implementing cycling lanes on major arterials and opt for multi-use trails or bike lanes on minor arterials.** These implementations will enable rider comfort for future AT users.

Q19) Please indicate your level of agreement with the following statements, regarding initiatives that might encourage you to walk or bike more often:

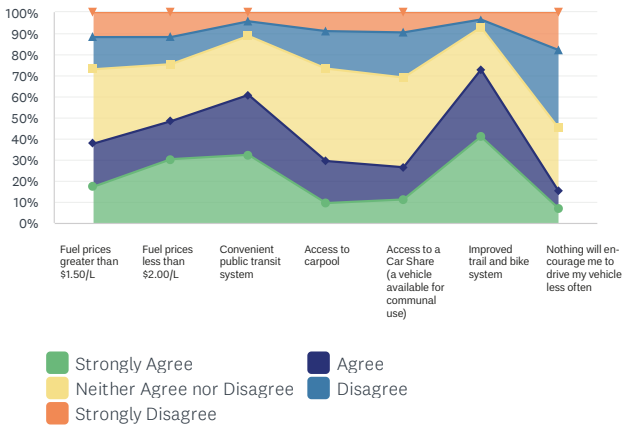
When offered different areas of potential improvement, respondents selected improved sidewalk and pathway maintenance (58.80%), more sidewalks and pathways (56.93%), improved road maintenance (62.60%), and more multi-use trails (off street) (53.46%) as the areas requiring the most attention. The initiatives that were the least responded to were shower and locker rooms at work/school (21.98%), reduced traffic speeds (23.37%), and more bike parking at key destinations (31.08%). Despite the fact that the three latter categories had the fewest respondents, at least 20% of the survey population flagged these areas as requiring attention and improvement. This suggests residents feel there are many areas requiring improvement to facilitate the implementation of CBRM's AT network.

Q20) Please indicate your level of agreement with the following statements, regarding issues that may make you use your vehicle less

Most respondents felt an improved trail and bike system would increase the likelihood of them using a vehicle less. Access to carpool was the least popular improvement method (9.43%). 6.93% of respondents said nothing would encourage them to drive their car less often. The need for connectivity and improved transportation networks has been strongly echoed throughout the survey document. As a result, connectivity and trail improvements should be the AT plan's primary focus going forward.

Q20) **Please indicate your level of agreement with the following statements, regarding issues that may make you drive less:**

Answered: 478 Skipped: 171



CBRM AT SURVEY SUMMARY

To understand how CBRM's residents access the community and the current interest in active transportation, a survey was distributed amongst the municipality's residents. Currently, the majority of residents own and drive vehicles for their primary transportation method. However, most respondents live within the community and have shown an interest in using active transportation if they were given the opportunity and infrastructure to do so.

Of the 649 survey respondents, the survey found that:

84.71% of respondents commute for less than 30 minutes a day

40.59% of respondents live within 10km of their school/ place of work

More than half of respondents would be interested in using AT methods

Of the survey respondents:

86% own one or more cars

18.57% own one or more bicycles

To get to work:

56.20% always use their own vehicle

0.40% always cycle

4.51% always walk/run

Respondents regularly use the following methods to get around CBRM:

- **83.28%** drive
- **7.08%** use transit
- **29.18%** walk
- **5.17%** cycle
- **2.06%** ATV
- **3.30%** carpool
- **0.92%** skateboard/ inline skate
- **0.73%** use a wheelchair
- **3.80%** taxi

Overarching Goals

Focus on **improving and adding to the existing infrastructure** (improved sidewalk, road and pathway maintenance, and more road and cycling pathways) to increase ridership in throughout the CBRM.

Respondents were interested in AT to **improve their overall health, increased exercise**, and **reducing reliance on fossil fuels and resultant pollution**

Reducing shared bike lanes an supporting e-bike and e-scooter infrastructure would **address fear-related issues** surrounding AT use, potentially increasing the number of users in the municipality.

CHAPTER 2

INVENTORY & ANALYSIS

To understand the next 20 years of AT projects for CBRM, it is imperative to fully understand the existing conditions potentially influencing future AT projects, lessons learned from past project's implementation, new priorities underlying future routing decisions for different AT types, and the potential health impacts of those decisions. Ultimately, this section focuses on developing a suitability analysis for prioritizing future AT infrastructure to formulate the AT master plan in the following chapters.

LIFE EXPECTANCY IN CBRM

2 YRS LESS THAN NOVA SCOTIANS

4 YRS LESS THAN CANADIANS

OBESITY RATE IN CBRM

42%

SYDNEY-VICTORIA CHILD POVERTY RATE

36.5% (2020)

2.1 ADDRESSING THE HEALTH PRIORITIES OF CBRM

Municipal governments serve to address the needs and priorities of local communities as they relate to land use, local infrastructure maintenance, planning and upkeep (transportation, water/sewer/stormwater, recreation, parks, etc.), and local services (fire, police, recycling and waste disposal, transit, finance, planning, etc.). Though healthcare is a provincial jurisdiction, **municipal operating expenditures often contribute to the social determinants of health**. Municipal services like social housing can be direct contributors while other services like recreation or transportation are indirect contributors.

Planning is a major, indirect contributor to public health as this department often establishes where people can live, the density and dispersion of the municipality's population, access to water, sewers, parks and recreation, and - to some extent - the economic prosperity of the region. Generally speaking, the more a community sprawls, the more dependant its residents become on automobiles, thereby negatively affecting a neighbourhood's overall walkability.

Oftentimes, the municipality must work with its provincial and federal partners to address the unique health-related needs of its population. In the case of CBRM, there are age-related illnesses (obesity, atherosclerosis, Alzheimer's, stroke, etc.) associated with its older population, environmental illnesses from past industrial land uses (cancers, respiratory illnesses, etc.), and poverty related illnesses (addictions, malnutrition, mental health, etc.). Life expectancy in the municipal is about **two years shorter than the provincial average and three years less the national average due to the factors above**. CBRM residents have a life expectancy of 78.2 years, as compared to 80.4 for NS, and 82.1 for Canada. In CBRM, one in three residents is considered obese, while smoking rates continue to exceed both the provincial and national averages. In 2020,

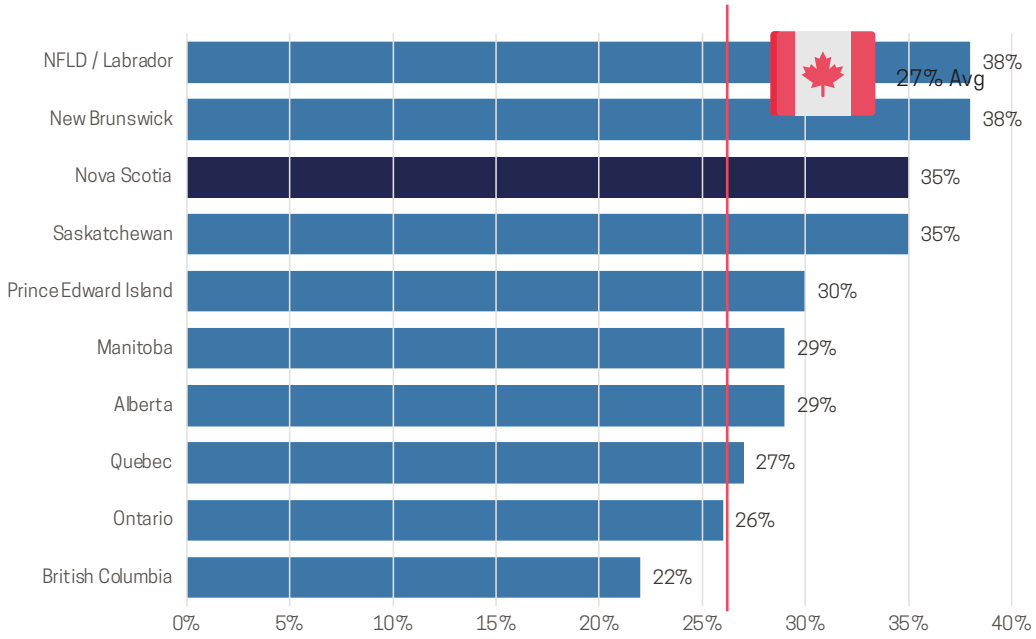


FIGURE 2.1 Obesity prevalence by province compared to Canadian average (27%), 2017

the Sydney-Victoria riding had a child poverty rate of 36.5%, the highest in Nova Scotia (27.8% in Nova Scotia) and Nova Scotia had the third-highest provincial child poverty rate in Canada (18% in Canada) ("The Child Poverty Report Card", 2020). For seniors 65 and over in CBRM, the poverty rate is 20% compared to 18% for NS and 14% cent nationally.

EXERCISE IS THE BEST MEDICINE

While there is no magic bullet to address the many health needs of CBRM residents, physical activity and exercise is the leading cure to many physical and mental health challenges in CBRM. Regular physical activity is one of the easiest ways to reduce the risk for chronic disease and to improve quality of life. Some of the benefits of physical activity include:

- Improve memory and brain function (all age groups).
- Protecting against many chronic diseases (stroke, colon cancer, osteoporosis, hypertension, breast cancer, type 2 diabetes, coronary heart disease)
- Aid weight loss.
- Lower blood pressure and improve heart health.
- Improve sleep quality.
- Reduce feelings of anxiety and depression.
- Combat cancer-related fatigue.
- Improve joint pain and stiffness.
- Maintain muscle strength and balance.
- Increase life span.

Physical inactivity costs our health-care system over $6.8 billion a year in Canada in 2021. Less than half of Canadian adults take at least 7,500 steps per day, which falls within the 'physically active lifestyle' category. This rate has earned Canadian adults an "F" for sedentary behaviours. Kids in 2021 earned an "F" as well since only 21% of 5- to 11-year-olds engaged in active play and non-organized/unstructured leisure activities for more than 1.5 hours per day on average. In the same study, adults received an "F" in active transportation and children received a "D-" because data show that only 21% of 5-19 year olds typically use active modes of transportation.

While the pandemic may have accelerated the downward trends, our physical activity rates have been on the decline for decades.

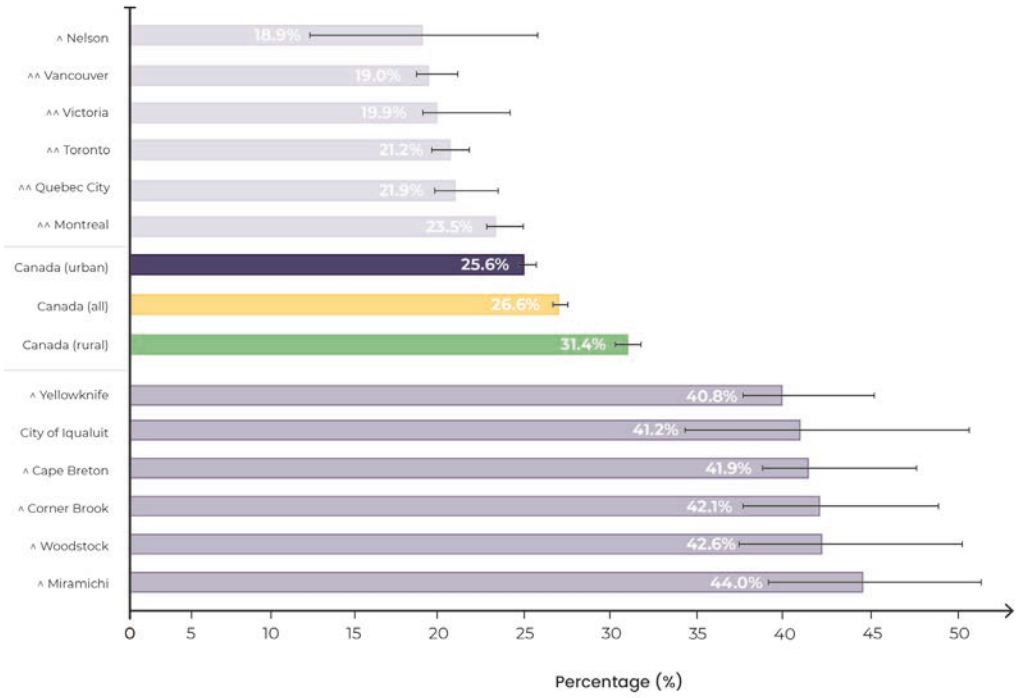


FIGURE 2.2 Municipalities with the lowest and highest adult (18+) rates of obesity in Canada. Community health Survey 2015-2018

THE OBESITY LITMUS TEST

Obesity is a leading indicator of physical activity and CBRM experiences one of the highest rates of obesity than other municipalities in Canada. **Figure 2.2** reveals that Cape Breton has an obesity rate of 41.9% - one of the highest in Canada and significantly higher than the Canadian average of 26.6% and the Nova Scotian average of 35%.

Active transport exists as one of the most promising and sustainable options for combating obesity. While other methods of physical activity can be more dependent on circumstances and less of a long-term commitment, the same types of issues don't apply to active transportation. While it may be difficult to motivate oneself to go to the gym, the same cannot be said about motivating oneself to go to work, (for obvious reasons).

Figure 2.3 shows that the reasons for higher obesity are complex, but include greater unemployment, less education, and lower socioeconomic status. These are all factors faced by CBRM, and so having a strategy to overcome obesity and get citizens moving is all the more important.

SO HOW EXACTLY DOES ACTIVE TRANSPORT HELP LIMIT OBESITY?

A study published in the journal "The Lancet Diabetes and Endocrinology" found that "Walking, cycling or taking public transport to work helps middle-aged adults lose body fat and weight," (The Canadian Press). The study looked at over 150,000 people in the UK between the ages of 40-69, and how they get to work each day along with their physical health. The study found that a "53-year-old man who cycles to work weighed 11 pounds less," and "Cycling to work also resulted in a 1.7 drop in body mass index (BMI-an estimate of body fat based on weight and height) compared to someone who drove to work" (The Canadian Press). As these statistics display, we can see a direct impact on body weight and thus, the risk of obesity, simply from biking to work instead of driving. This is an easy, and practical way we can actively work to limit obesity in the CBRM. With each person who decides to bike to work instead of driving, we expect see a direct impact on the overall risk of obesity.

This study also commented on the benefits of both walking and taking public transport to work. While the benefits weren't as high as when cycling, the study still found lower reported Body mass index's for those who walked or took public transport.

Obesity decreases with higher household education

LESS THAN HIGH SCHOOL EDUCATION

40%

HIGH SCHOOL EDUCATION

34%

POST SECONDARY EDUCATION

24%

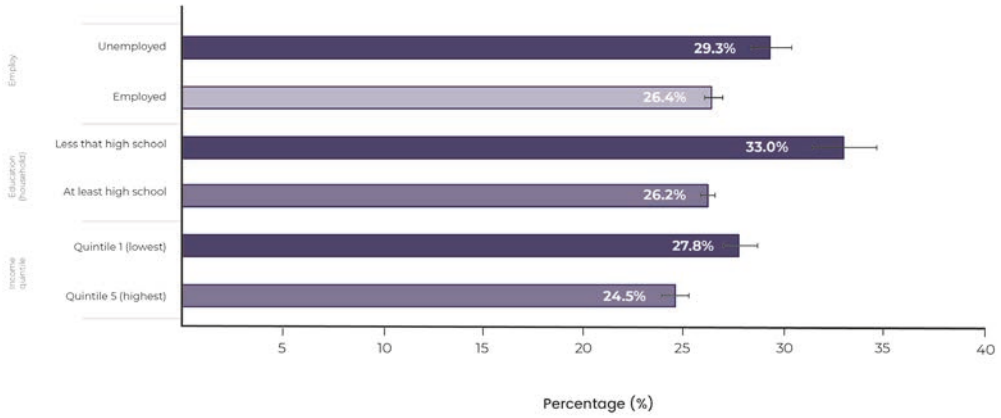


FIGURE 2.3 Obesity prevalence in Canadian adults by socioeconomic status, 2017

It isn't hard to understand how walking twice a day is good for you, but some may question how taking public transport does this? It turns out, simply walking to and from the bus stop both before and after work can make a noticeable difference in Body Mass Index. This research shows the small-scale impact of active transport, and the difference it has on an individual level.

WHERE HAVE SYSTEMS OF ACTIVE TRANSPORT WORKED BEFORE?

One country that has been more progressive than Canada when it comes to active transport is Australia. There has been significant overall recognition of active transport and its benefits throughout the entirety of Australia. In fact, "All Australian states and territories have endorsed some form of AT policy or position statement, demonstrating awareness at the state government level of the value of encouraging more walking and cycling" (Brown, Vicki et al.).

Now, research from Australia suggests that active transport could have a financial benefit due to decreased healthcare costs. This study assumed that around 2-3% of the Australian population between the ages of 18-49 walk to work, and around 1% of the population bikes to work, fairly low totals. Modelling data found that if even these modest totals could be doubled, the total healthcare cost savings could be around $20.6 million.

These savings come as a result of less people needing to be treated for obesity related diseases. It is here where we can begin to discuss the financial impacts of health in relation to active transport. It is no secret that obesity related diseases such as heart disease or diabetes end up incurring high financial costs that are inevitably eaten up by taxpayers. But if there really is this much of a benefit on the healthcare system stemming from active transport, this program will end up paying for itself in the end. This makes active transport even more of a no brainer. This data shows that even an extremely small increase in those utilizing active transport could result in huge impacts financially. That means more tax-payer money available to invest in education, recreation, and other methods of improving the Cape Breton community, rather than being needed for often preventable diseases.

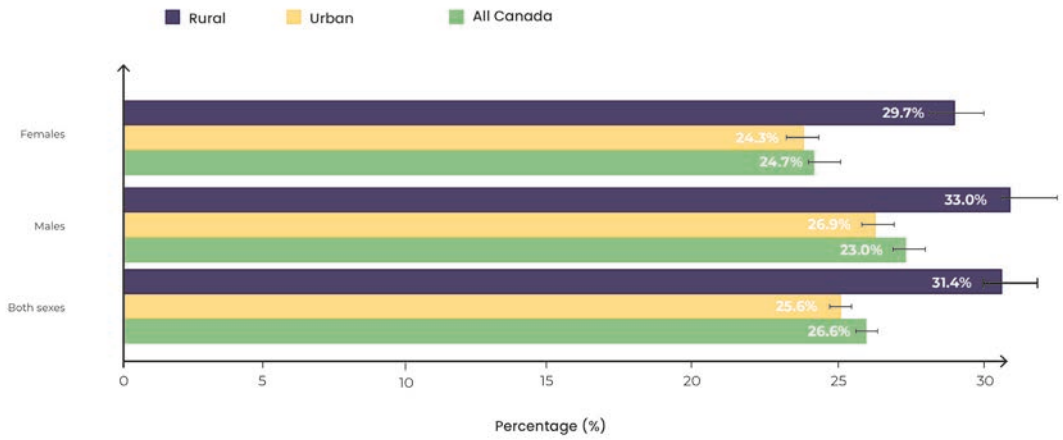


FIGURE 2.4 Obesity prevalence (%) in Canadian adults by rural-urban place of residence and by sex

A LITTLE WALKING COULD GO A LONG WAY

Researchers at Memorial University in NFLD found that just doubling the amount of walking in St. John's could have big impacts financially. One of the researchers was quoted as saying, "We found that over a 10-year period if we doubled the amount of walking in St. John's we would see 18 premature deaths prevented and we would see an economic benefit of more than $117 million dollars,"

Here, we can see the in numbers the direct impact active transportation can make over a prolonged period of time. Further, just like the previous studies, this study is also only requiring a modest uptake in walking. As Holloway explained, "The research we did talks about doubling the amount of walking for people in St. John's. That equals three more minutes of walking a day for every person. So if you can walk to a grocery store instead of driving, that's more than a three-minute walk for most people, it'll make a huge difference". Based on the research, if everyone in St. John's walked for three minutes a day for 10 years, it would save 18 people from dying prematurely and would save taxpayers $117 million in healthcare costs.

IMPROVING MENTAL HEALTH THROUGH ACTIVE TRANSPORT

So far, we have covered the benefits that active transport can have on our physical health, such as lowering body weight and body mass index, and how it can prevent premature deaths. Further, we have also seen how preventing obesity related diseases, and improved overall physical health in general can save tax-payers millions of dollars in prevented healthcare costs.

However, another important benefit of active transport that can sometimes be forgotten is the impact on a person's mental health. As we have begun to focus more closely as a society on mental health in general, we have looked for ways we can improve our mental health. Time and again, it has been proven by doctors and researchers that being physically active has a positive impact on our mental health. It follows that increasing active transportation (and thus physical activity) in the community will have a positive impact on the mental health of those using active transportation.

LOWERING THE RISK OF DEPRESSION

When talking about mental health, one important aspect is depression. A study from the American Journal of Psychiatry, and authored by University of New South Wales senior research fellow Simon Rosenbaum, looked at data from 49 studies around the world, with a sample of over 266,000 participants. It found that those who exercise on a regular basis were less likely to develop depression, "Those who followed weekly guidelines to get 150 minutes of moderate aerobic activity, such as cycling or brisk walking, were less likely to develop depression over nearly eight years of follow up compared with those who didn't meet the guideline" (Zafar). This study shows that physical activity can statistically reduce the risk of developing depression. The minimum required amount of physical activity is

150 minutes a week in order to reduce one's risk of developing depression in this study. This equates to just 30 minutes a day. So, if a person was able to bike 15 minutes to and from work, 5 times a week, they would be reducing their risk of developing depression. Just a small change to how a person commutes is truly all one needs to make a positive impact on their mental health.

IN WHAT WAYS DOES PHYSICAL ACTIVITY IMPROVE YOUR MENTAL HEALTH?

In order to better understand how our brains and mental health are improved through physical activity, consider an article from award winning neuroscientist Dr. Wendy Suzuki. Suzuki is a professor of Neuroscience and Psychology at New York University and recently published an article for CNBC in the United States about 4 brain changing effects of exercise.

1. The first effect exercise has on our brain is that it decreases feelings of anxiety. Suzuki explains this happens as a result of several chemicals being released into our brain when we exercise, "Studies have shown that every time you move your body, a number of beneficial neurotransmitters, including dopamine, norepinephrine, serotonin and acetylcholine, gets released into your brain. These substances can decrease feelings of anxiety and depression" (Suzuki).

2. The second effect exercise has is improving one's focus and concentration. Suzuki references one of her studies that found improved focus after a workout, "In one of my lab experiments, I found that a single workout can help improve your ability to shift and focus attention. This is an immediate benefit that can last for at least two hours after 30 minutes of exercise" (Suzuki).

3. The third effect exercising has on our brains is the promotion of growth of new brain cells. "One of the most significant benefits of exercise, scientists have found, is that it promotes neurogenesis, or the birth of new brain cells. This is essential to improving cognitive function" (Suzuki). Neurogenesis is an important process that takes place over the course of our entire lives. Utilizing active transport to maintain regular exercise can help promote neurogenesis throughout one's life.

4. The fourth and final way exercise improves our brain's health according to Suzuki, is protection from brain aging and neurodegenerative diseases. "Longitudinal studies in humans suggest that regular exercise can increase the size of the hippocampus and prefrontal cortex, both of which are susceptible to neurodegenerative diseases such as dementia and Alzheimer's. So while exercising won't completely prevent or cure normal cognitive decline in aging, doing it consistently can help reduce or delay the onset of it" (Suzuki).

LINKING THE BENEFITS OF PHYSICAL ACTIVITY WITH ACTIVE TRANSPORT

As discussed, there are many benefits to physical activity on both our physical and mental health. However, the barrier that prevents many people from reaching higher levels of physical activity is the lack of time. Many people who look for ways to improve their physical health through exercise find that traditional ways of staying fit can be far too time consuming to be practical when combined with other responsibilities.

Active transportation creates that desperately needed opportunity for busy adults to achieve these levels of physical activity without any significant time commitments. Where an activity such as pickup soccer can take up someone's whole night, active transportation provides the same physical benefits from a commute without taking up excessive amounts of time. While it may take slightly longer to get to work, other methods actually end up taking far more time when considering time spent getting ready and transportation to and from the activity.

2.2 THE 2008 CBRM AT PLAN IMPLEMENTATION

The 2008 AT Plan outlined almost $5m in funding for short term projects which encompassed about 77km of various improvements including new trails, sidewalk upgrades, multi-use trails, paved shoulders and on-street bike lanes. The report also outlined another $15m in longer term projects which encompassed about 314 km in various AT improvements.

The 2008 AT Plan was successful at improving awareness about the benefits of active transportation and identifying large signature projects to improve connections between communities across the municipality. As a large 'Community of Communities', multi-use paths like the Maryann Corbett Trail from Sydney to Glace Bay help to improve connectivity of communities not just physically but also in spirit.

In the intervening years between this plan and the 2008 plan, CBRM has completed the following projects:

1. Whitney Pier Community Heritage Trail, Sydney
    - 3 metre hard packed gravel path suitable for walkers, cyclists, and wheelchair users
    - Features: illuminated at night, benches, informational panels
2. Open Hearth Park, Sydney
3. Greenlink Rotary Park Trail system, Sydney
    - 3 metre wide gravel paths suitable for walkers and cyclists
    - Features: benches
4. Maryann Corbett Trail, Sydney to Glace Bay
    - 3 metre paved path suitable for walkers, cyclists, and wheelchair users
    - 10 km in length
5. Coal Town Trail, Glace Bay (Ongoing)
6. Westmount Walking Loop, Westmount
7. New Waterford Walking Loop, New Waterford
8. Bike Lanes on George Street

The 2008 Plan helped bring walking and cycling to the forefront of the conversation, but much has changed and there remains a lot of unfinished work. Further, the plan did not achieve all of the identified projects, implement local active transportation infrastructure, advance the creation of new policy, or create opportunities for partnerships and programs for outreach and education. These gaps were identified through consultation with stakeholders and the community, and will remain the focus of this new active transportation plan.

A deeper description of these projects and the lessons learned from them is located in **Appendix A** of this report.

2.3 THEMATIC MAPPING

The maps on the following pages have been compiled to convey important information relevant to selecting the appropriate AT routes through the targeted communities of this plan. These include population density maps, existing sidewalks, trails, and parks , key community destinations, road hierarchies and pedestrian/cyclist vehicle collisions. Overlaying these maps provides a clearer picture of the proposed AT network, its planned connectivity, and how roads can be re-prioritized for active transportation instead of solely for automobiles.

Chapter 3 of this report uses these inventory maps to establish the AT Master Plan.

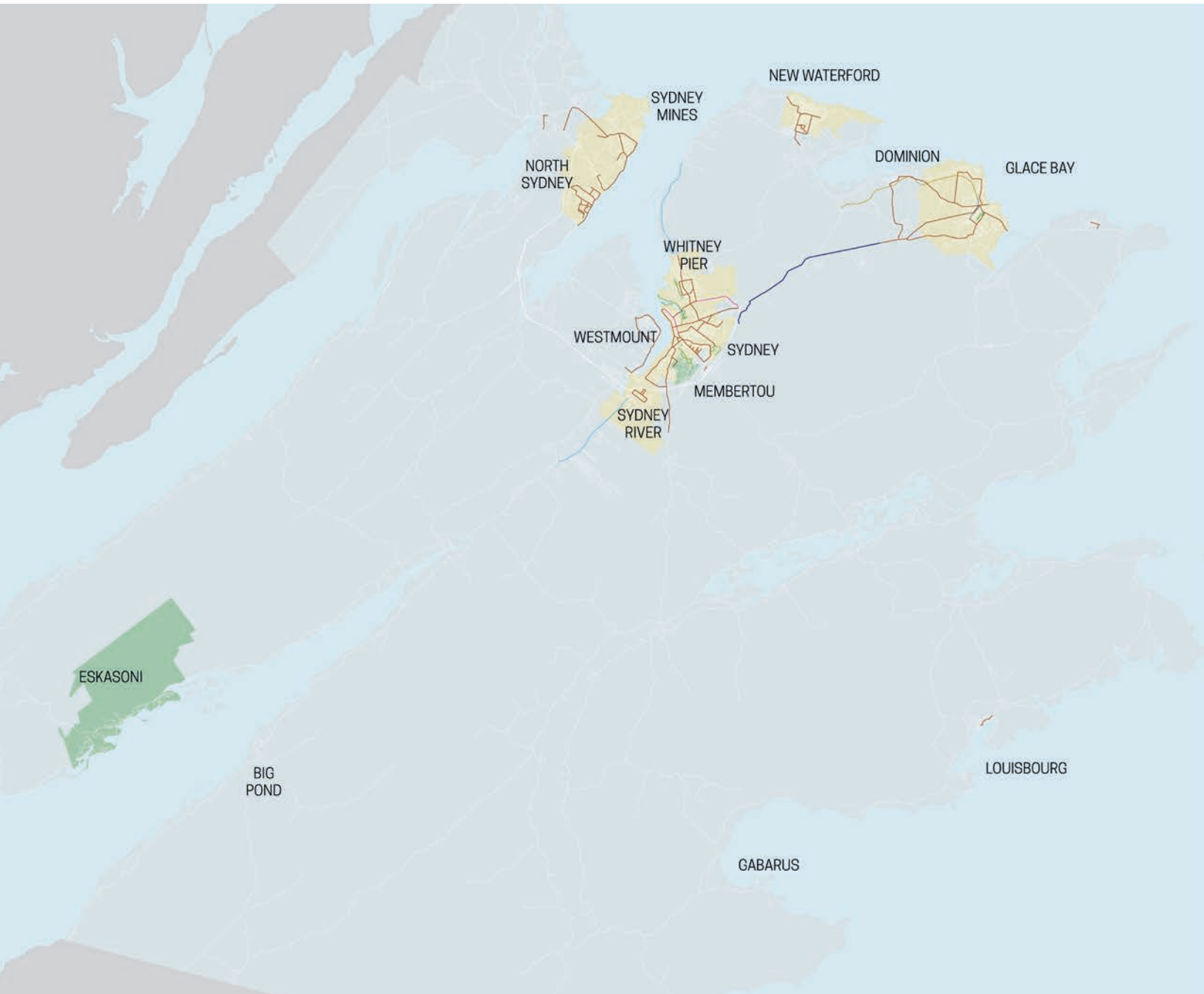


FIGURE 2.5 Built 2008 AT Plan

This plan shows what AT elements have been built since the adoption of the 2008 AT Plan. Though there have been many kilometres of new sidewalks, the major recognized AT projects have included the Whitney Pier Community Heritage Trail, the Greenlink Trail system, the Westmount Walking Loop, the George Street bike lanes, the SPAR Rd paved shoulders, the Maryann Corbett Trail, and several kilometres of Blue Route along with many kilometres of new sidewalk radiating from neighbourhoods to the region's downtowns.

FIGURE 2.6 CBRM Population Density

Only about 1.2% of CBRM's area is urbanized with over 25 people per km². AT infrastructure will be most utilized where population densities warrant their regular use so higher density areas should be prioritized. Other areas (shown in light green) are simply too sparsely populated and sprawling to achieve a high level of AT use. The exception to this is the provincial Blue Route which is mostly located in scenic coastal areas of rural CBRM and will be developed by the province.

In the map above, the Blue areas should be targeted as high priorities, followed by the orange areas and then the yellow areas. The exceptions are inter-community connections like between Sydney River and downtown Sydney, and other important commuter connections

LEGEND

- 0-25 people/km²
- 25-500 people/km²
- 500-1k people/km²
- 1k-2.5k people/km²

Community	2016 Pop	% Pop
Sydney	29,904	32%
Glace Bay	19076	20%
Sydney Mines	14135	15%
New Waterford	7344	8%
North Sydney	5699	6%
Whitney Pier	4612	5%
Dominion	3570	4%
Westmount	2731	3%
Sydney River	2514	3%
Coxsheath	2333	2%
Louisbourg	877	1%

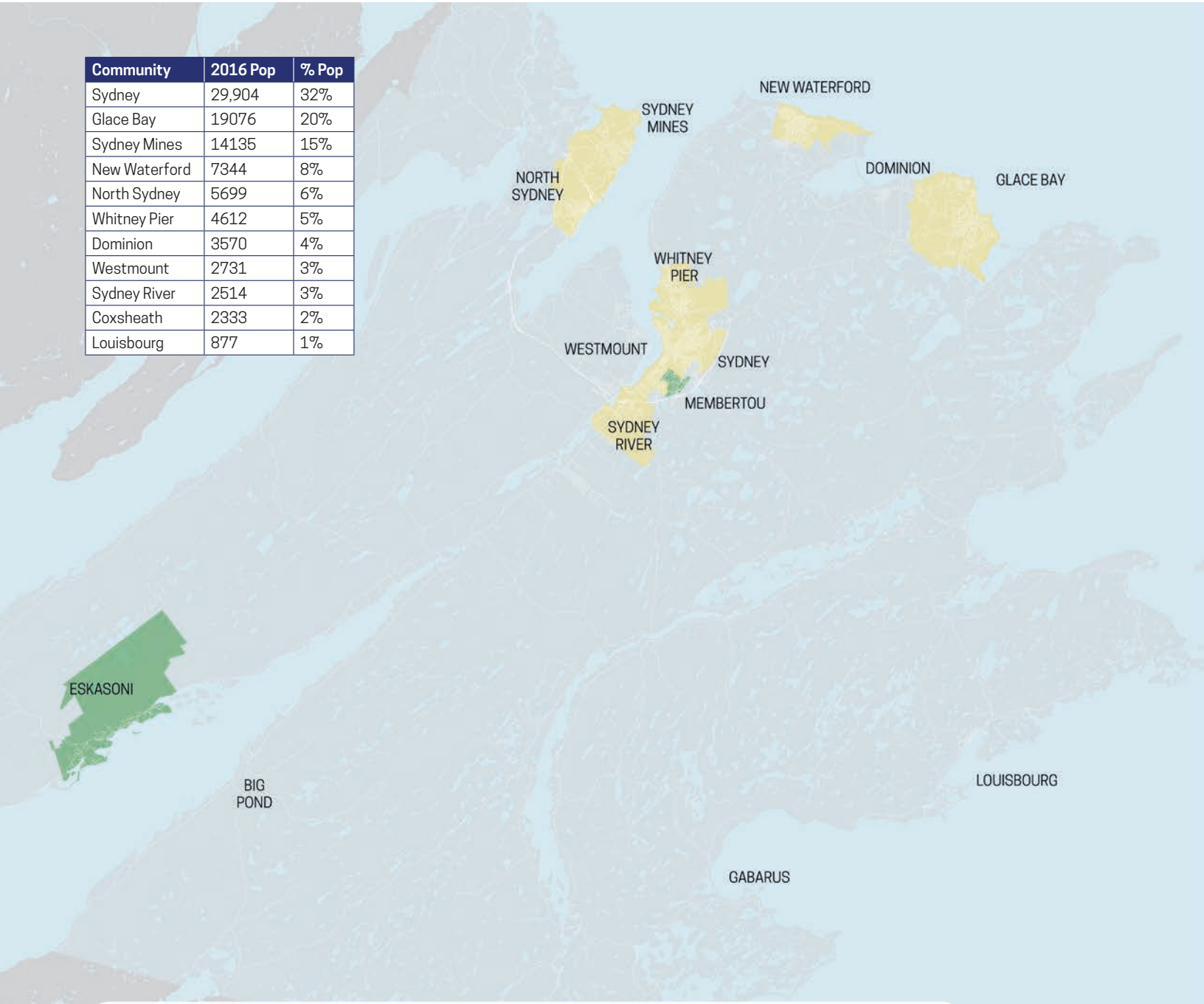


FIGURE 2.7 CBRM Context and Communities

As the 7th largest municipality in Canada, CBRM encompasses 2,430.06 km² and has a population density of 38.8 people/km². The municipality has over 1,600 km of roads or roughly 59 people per km of road. This low density makes it challenging and expensive to maintain the existing road network and emphasizes the need for an expanded active transportation network in the denser areas of the municipality. The areas shown in yellow are some of the higher density neighbourhoods in CBRM spanning about 29.43 km² and increasing the urban population density to 1,016.0/km². The areas shown in green are the two First Nations Reserves in the municipality

AT will have the most impact in the population centres of CBRM. AT funding should generally be based on the population density of specific communities

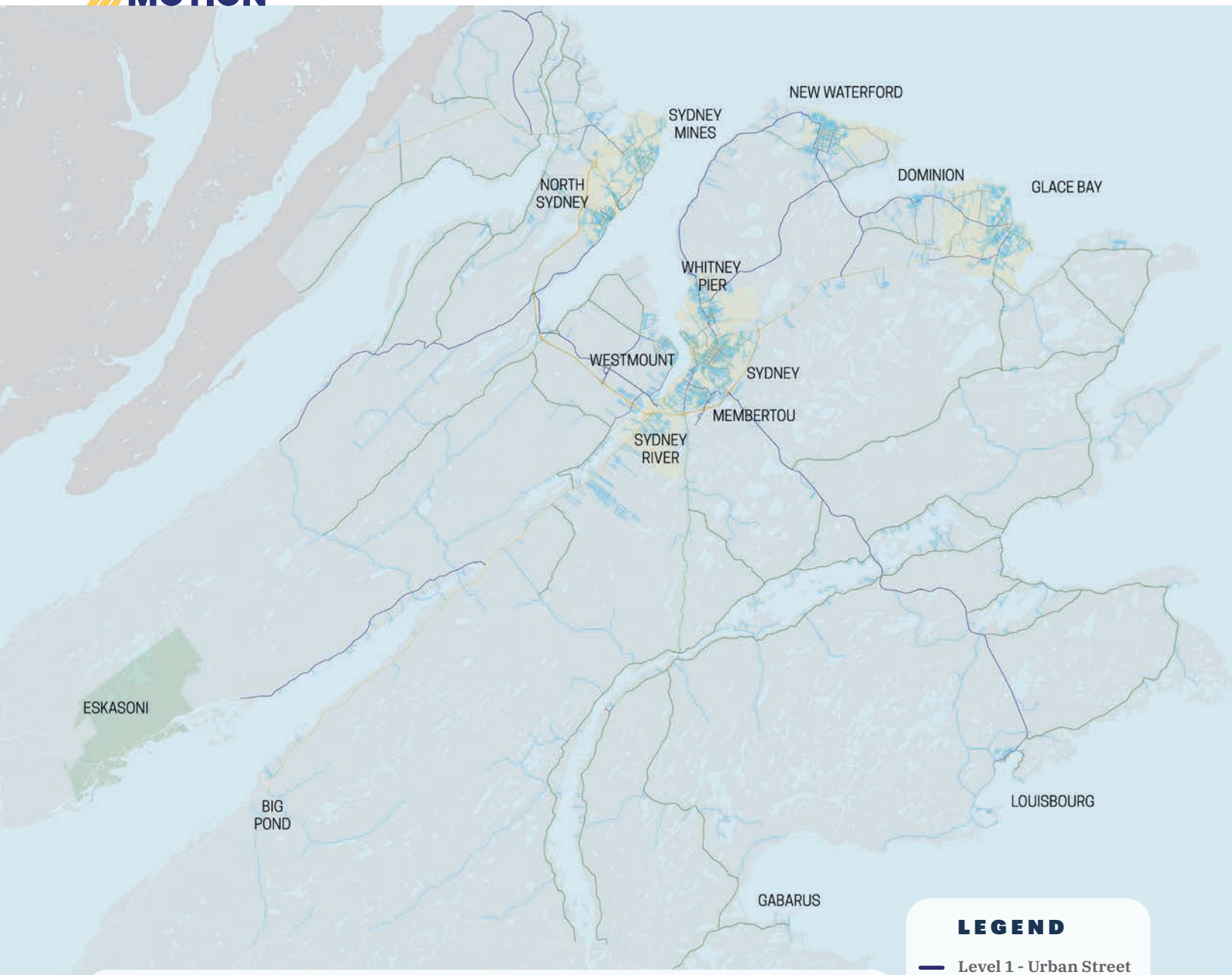


FIGURE 2.8 Road Hierarchy

CBRM prioritizes their roads according to traffic volumes with Level 1 as a primary urban arterial for main streets in CBD's. Level 2 are the major urban collectors for streets emanating from the cores. Level 3 are the minor urban collectors channelling neighbourhood traffic to urban and suburban collectors. Level 4 are the neighbourhood through streets used for local traffic. While the level 1 and 2 streets are prioritized for vehicle traffic, they may or may not be suitable for AT depending if there is room for additional facilities or depending on the number of driveway crossings (which reduces safety). Generally AT should focus on Urban/Suburban streets with the exception of Blue Routes. The road hierarchy though is not a predictor of AT suitability since its emphasis is on moving vehicles. But, these road hierarchies do demonstrate the hierarchy of traffic volumes which is a good indicator of AT priorities and connections that may be needed.

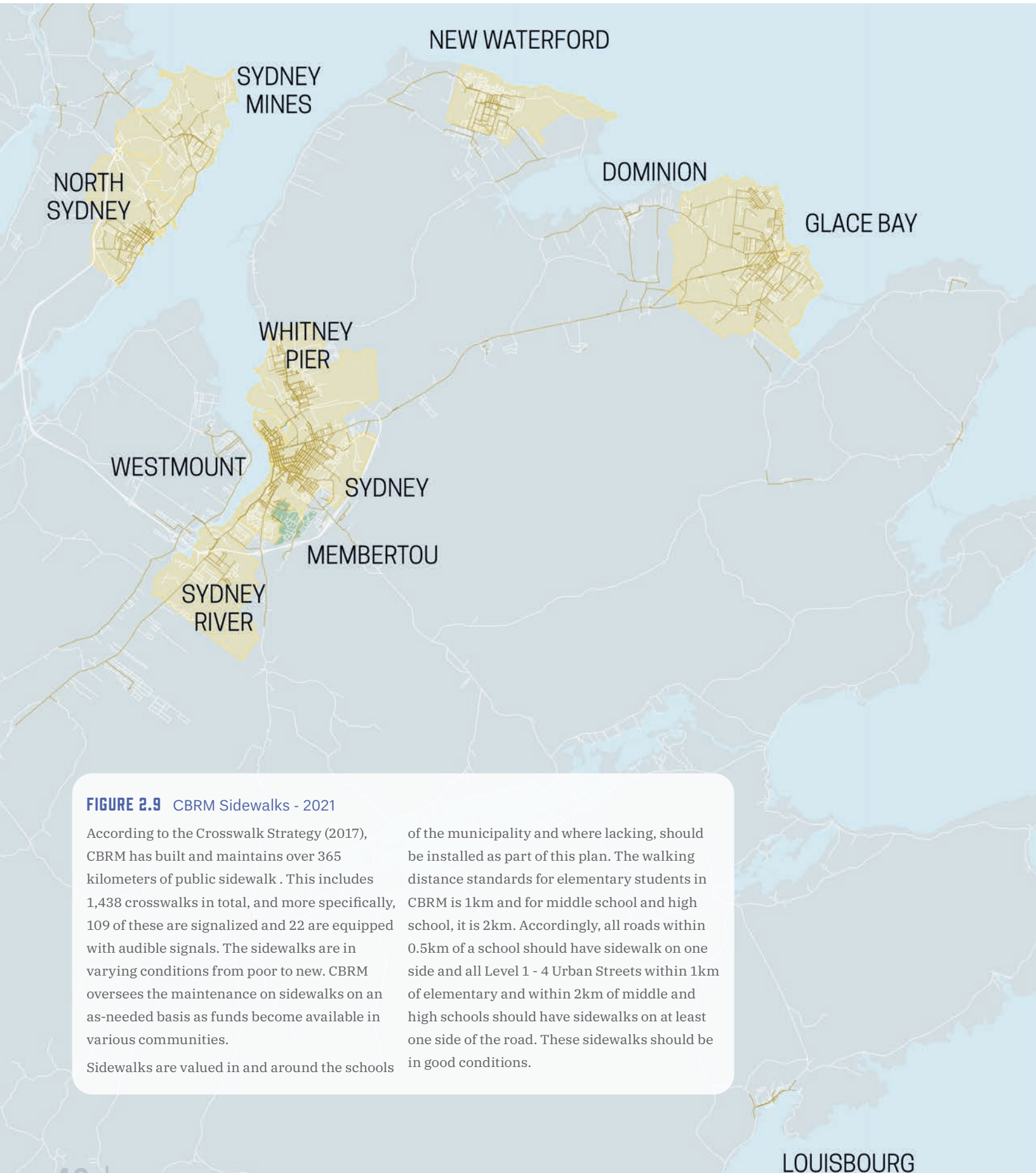


FIGURE 2.9 CBRM Sidewalks - 2021

According to the Crosswalk Strategy (2017), CBRM has built and maintains over 365 kilometers of public sidewalk . This includes 1,438 crosswalks in total, and more specifically, 109 of these are signalized and 22 are equipped with audible signals. The sidewalks are in varying conditions from poor to new. CBRM oversees the maintenance on sidewalks on an as-needed basis as funds become available in various communities.

Sidewalks are valued in and around the schools of the municipality and where lacking, should be installed as part of this plan. The walking distance standards for elementary students in CBRM is 1km and for middle school and high school, it is 2km. Accordingly, all roads within 0.5km of a school should have sidewalk on one side and all Level 1 - 4 Urban Streets within 1km of elementary and within 2km of middle and high schools should have sidewalks on at least one side of the road. These sidewalks should be in good conditions.

FIGURE 2.10 Municipal Parks

The CBRM offers a range of recreational facilities, open spaces, and beaches throughout the region. Offering AT users destination points improves the overall use of the network for both daily commuters and recreational activity. The future AT network should focus on the existing location of parks, schools, and beaches to determine a route and wayfinding strategy allowing future users to navigate and connect to these amenities. Larger sports field facilities could be important destinations for commuting while smaller recreational parks serve local communities and are likely not commute destinations which would be targeted for AT infrastructure beyond sidewalks.

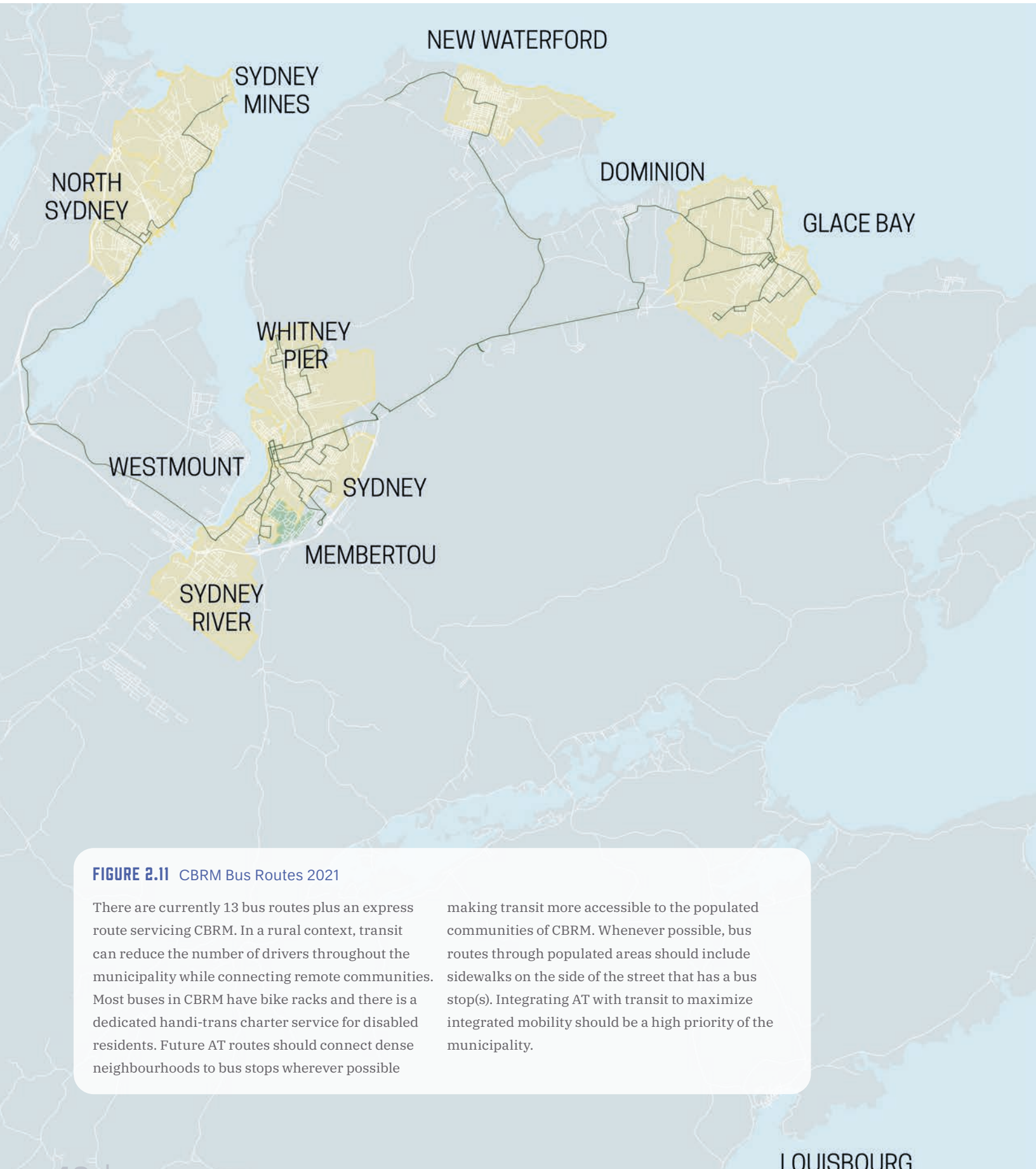


FIGURE 2.11 CBRM Bus Routes 2021

There are currently 13 bus routes plus an express route servicing CBRM. In a rural context, transit can reduce the number of drivers throughout the municipality while connecting remote communities. Most buses in CBRM have bike racks and there is a dedicated handi-trans charter service for disabled residents. Future AT routes should connect dense neighbourhoods to bus stops wherever possible making transit more accessible to the populated communities of CBRM. Whenever possible, bus routes through populated areas should include sidewalks on the side of the street that has a bus stop(s). Integrating AT with transit to maximize integrated mobility should be a high priority of the municipality.

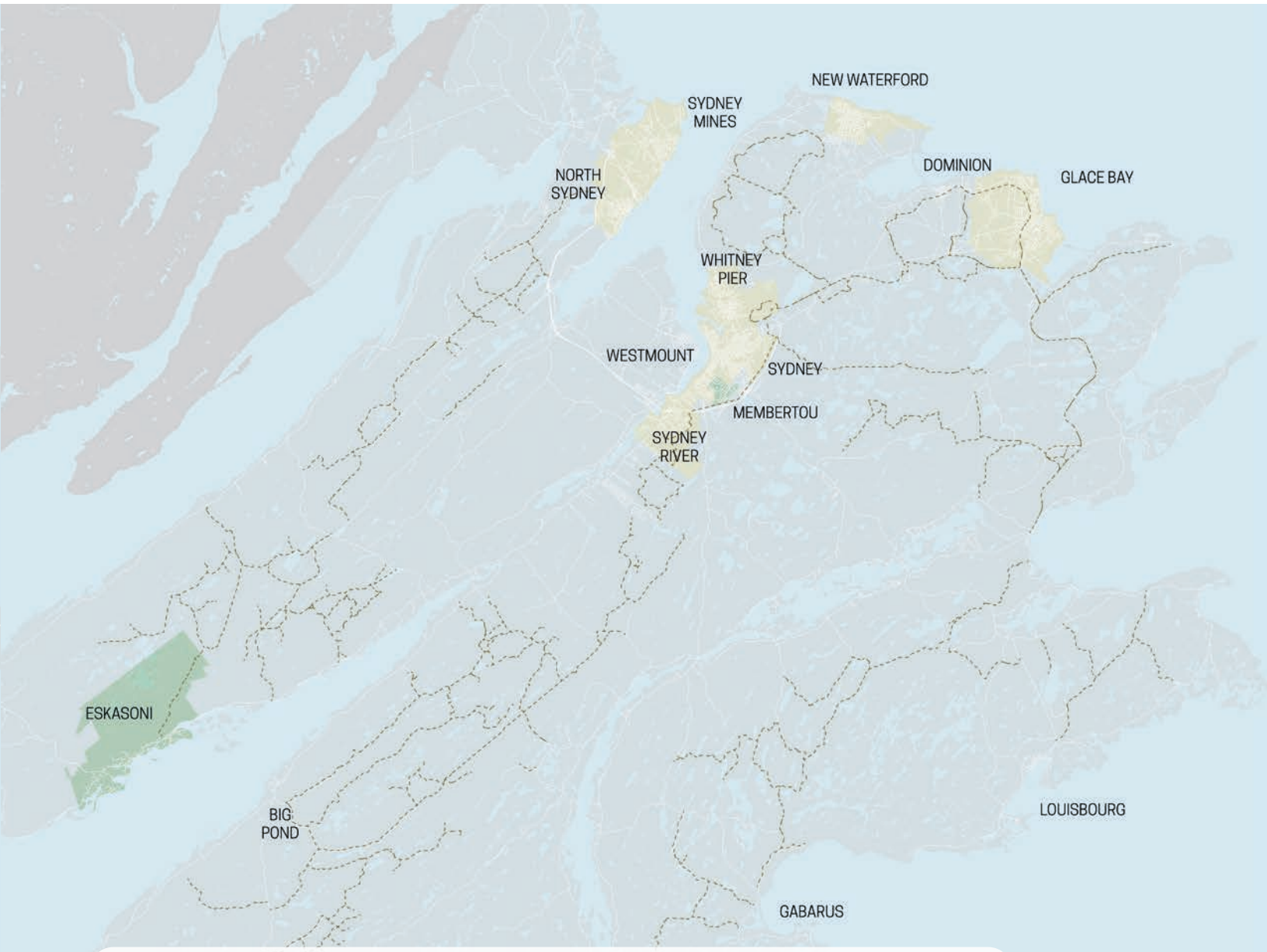


FIGURE 2.12 CBRM ATV Trails

There are hundreds of km's of ATV trails in CBRM managed by the Isle Royal ATV Club and the Marconi Trail Blazers ATV Club. Generally speaking, AT trails and ATV trails are separated to minimize risks to pedestrians, however, in a rural municipality like CBRM, the ATV groups can sometimes be an important ally in getting shared use trails built and maintained like on the Coal Town Trail where the ATV groups and Velo Cape Breton came together to co-develop the old DEVCO rail line into a multi-use trail. There are about 50-60k ATV's in the province and their annual registration fees ($52) pay for trail improvements around the province through the Off-Highway Vehicle Fund ($40 of the $52 charge goes to the fund). Except for Glace Bay, many designated ATV routes avoid populated urban centres and so are generally unsuitable for the AT network except Glace Bay (Coal Town Trail) and the Peacekeepers Way Highway ATV route on the east boundary of Sydney. Future rail to trail conversions though could be shared-use AT trails through rural areas like the potential future Lingan rail corridor.

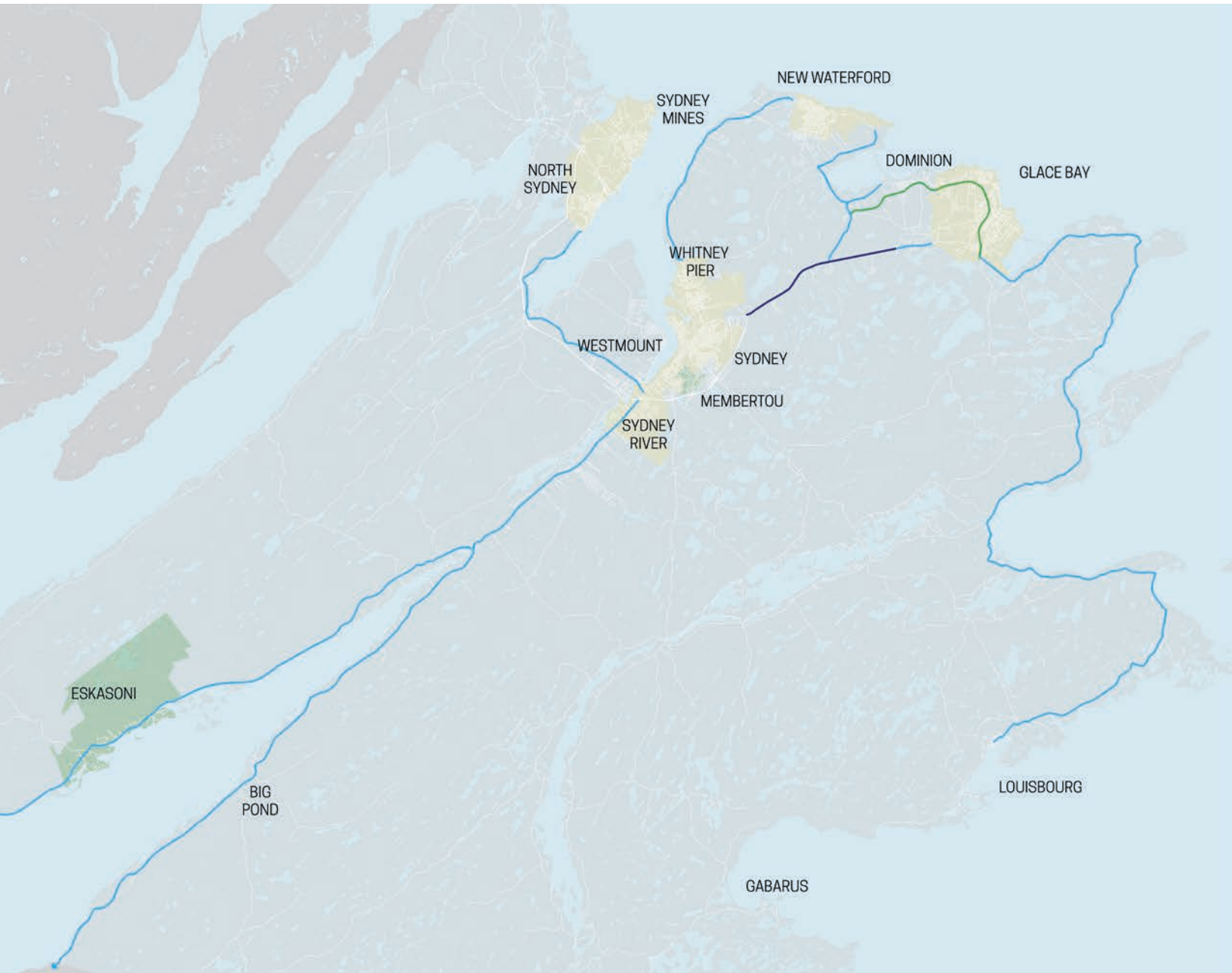


FIGURE 2.13 Provincial Blue Routes

The cycling blue routes will be funded and maintained by the province. Once built, the blue route will connect cycling networks throughout Nova Scotia. CBRM's 2022 AT Plan should the province's blue route for potential funding partnerships. Additionally, future infrastructure should connect to the proposed and existing routes to ensure connectivity throughout Cape Breton and the rest of the province. The CBRM - MUP lines have been highlighted by Cycle Nova Scotia as having preliminary studies and implementation completed, but require further funding, design development, and property secured to be fully realized. In considering priority routes, CBRM should focus on developing missing connections within the existing communities.

LEGEND

- Proposed Road Route
- Proposed Trail Route
- Proposed Multi-use Path
- CBRM - Multi-Use Path

FIGURE 2.14 CBRM Walking Trails

The CBRM has 29 designated walking trails situated in high-density and rural areas. Recreational trails allow CBRM's residents to partake in physical activity, such as running and jogging. Where these trails connect neighbourhoods with other commuting destinations (schools, downtowns, libraries, sports fields, etc.) they may be suitable as part of the AT network. In contrast, stand alone recreation-only trails which are not used specifically as part of a commute are not suitable for the AT network. It is important to distinguish between the purpose of commute-based AT routes and recreation trails.

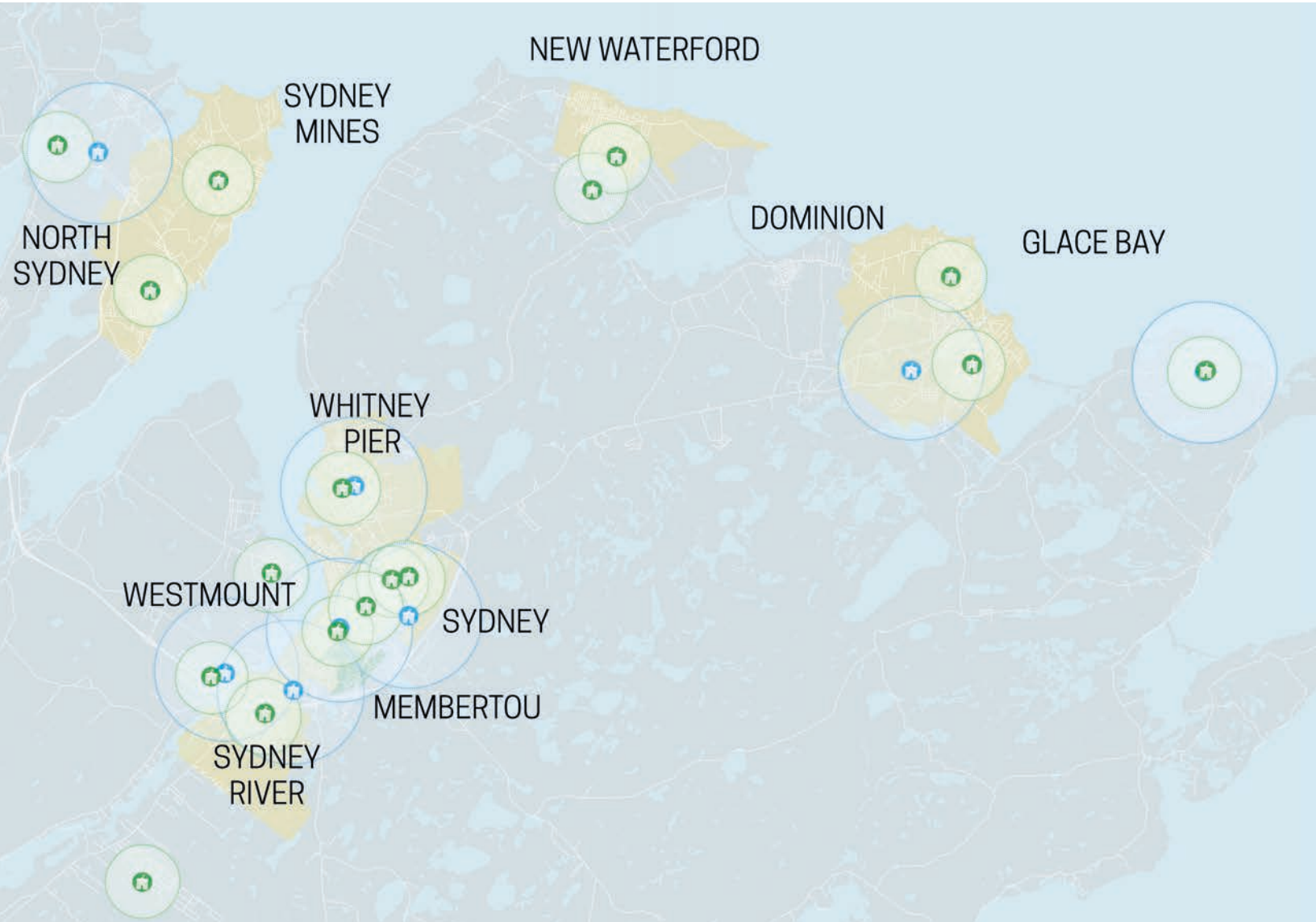


FIGURE 2.15 Schools

There are seventeen elementary schools and seven junior high schools servicing the AT plan's area of interest. Tne standard walking distance for elementary school students is 1km, and 2km for junior and high school students.To promote active transportation among CBRM's younger generation and their caretakers, future networks should prioritize connections from residential areas to schools. Since these routes will primarily serve younger populations, they should focus on safety while maximizing effiency. Lastly, future AT priorities should prioritize the route's proximity to exisiting schools.

FIGURE 2.16 Services and Institutions

Within each of CBRM's communities, there are several public institutions serving the communities. To ensure the AT network will be well-used and responsive to community needs, future plans should consider the locations of these services within the inter- and intra-community context. Specific attention should be paid towards connecting AT networks to colleges/university, libraries and hospitals.

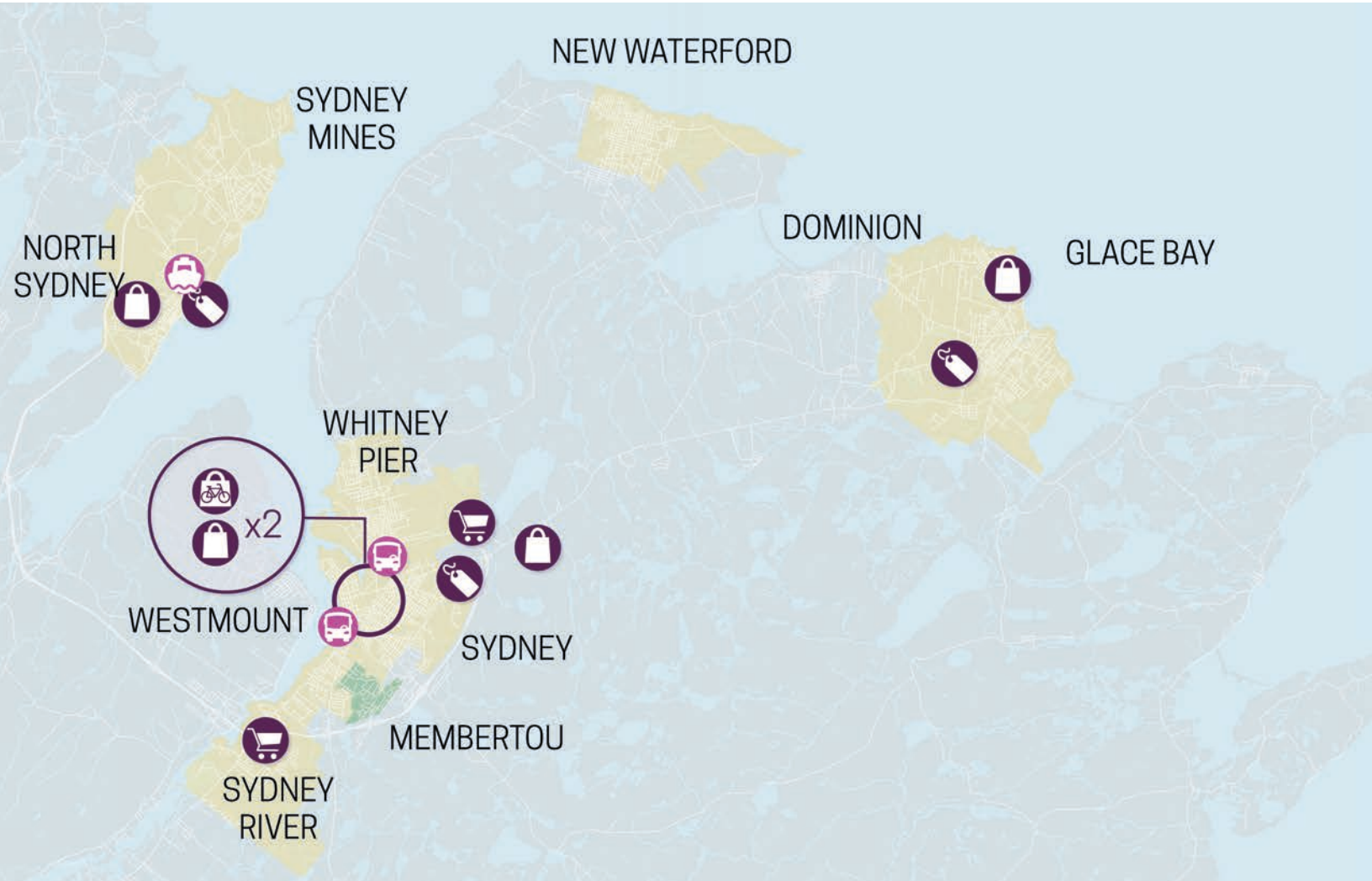


FIGURE 2.17 Retail and Transit

To ensure regular use, the AT network should connect users to shopping centres and stores where they can complete routine tasks. Throughout the CBRM, the majority of these centres are found in high-density areas. Ultimately, the AT network should focus on connecting to retail to promote commuting to retail in addition to commuting to work and school. Doing so encourages a regular, robust use of the AT network by CBRM's residents. Secondly, the AT network should connect to transit terminals so users can cycle or walk to transit stations within their community, consequently expanding the AT network and promoting transit use.

LOUISBOURG

FIGURE 2.18 Visitor Services, Community, and Culture

The location of visitor, community, and cultural centres are important in deciding how the AT network will be used for recreational and tourist uses. The municipality offers several community destinations with regular events that could be considered a commute destination for residents. These include theatres, gyms, museums or other community facilities. Recreation and tourist based destinations would have a lower priority for AT.

FIGURE 2.22 Collisions Data 2007-2018

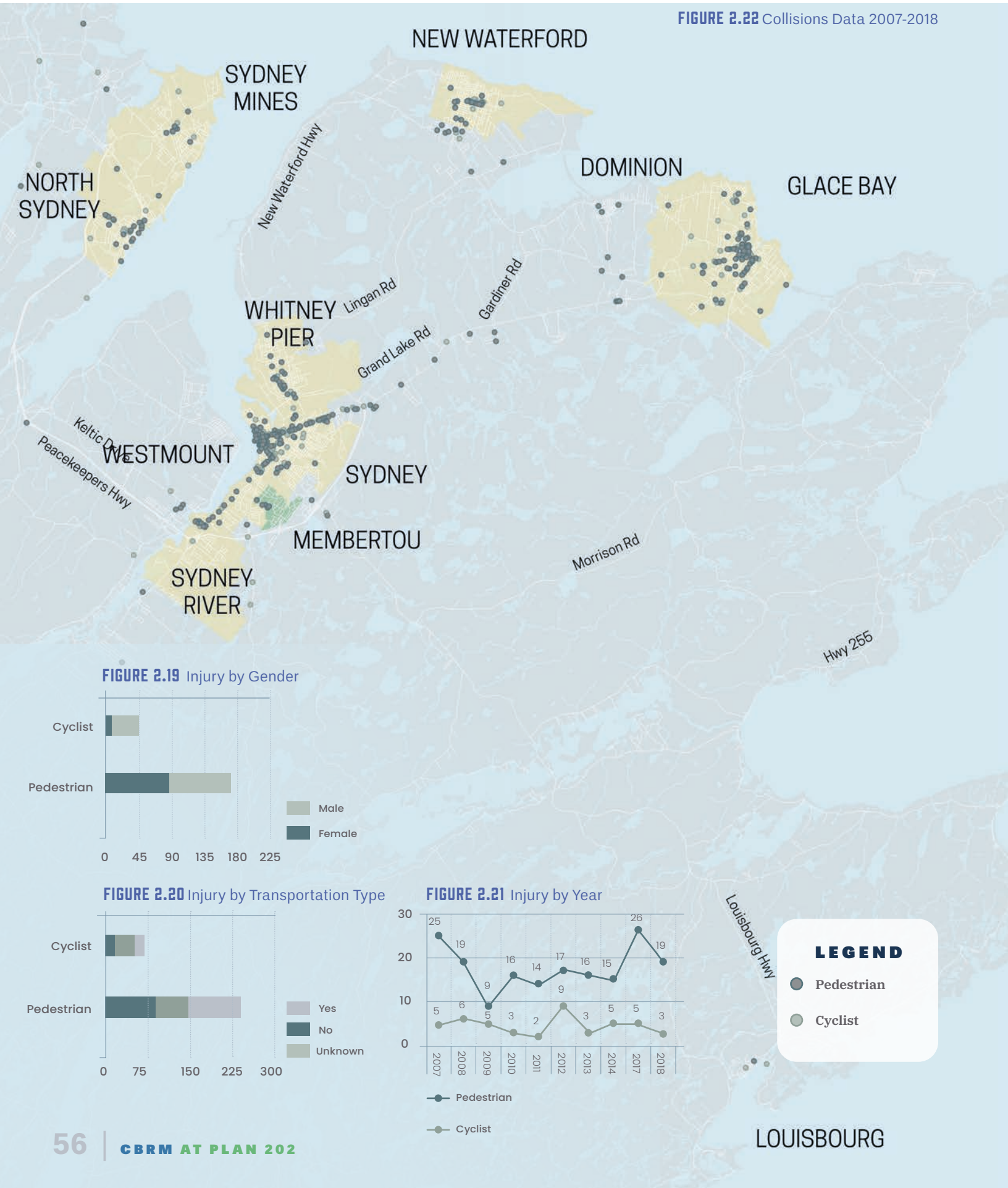


FIGURE 2.19 Injury by Gender

FIGURE 2.20 Injury by Transportation Type

FIGURE 2.21 Injury by Year

2.4 COLLISIONS IN CBRM

The data provided by CBRM offers the location and number of collisions from 2007 to 2018 (with the exception of 2015 and 2016). In total, there were 231 collisions between vehicles and pedestrians and cyclists.

Over three-quarters (76%) of collisions were pedestrian related, with over half (64.7%) of these collisions resulted in an injury. Though cyclists had fewer accidents comparatively, the collisions within this group resulted in more injuries (75%) than vehicular collisions with pedestrians. These statistics further reinforce a need for effective cyclist pavement markings combined with separated or protected cycle tracks along routes experiencing heavy vehicular traffic. Secondly, given the high rates of pedestrian collisions occurring at crosswalks, future AT plans and implementation should focus on upgrading the existing pedestrian infrastructure. Further, there should be an emphasis on pedestrian-vehicle conflict zones.

Looking at **Figure 2.22**, it becomes evident that the majority of collisions occurred within CBRM's higher density communities. Specifically, most collisions took place along major arterials, suggesting that pedestrians and cyclists find themselves at the highest risk of collisions along routes that are shared or often intersect with vehicular traffic. In further considering survey and workshop results, it becomes evident CBRM's residents feel unsafe sharing the roadway with vehicular traffic and would be more likely to use AT routes if they were separated. Looking forward, CBRM should explore protected and separated bike paths to reduce the rate of collisions and promote the use of bike paths throughout the municipality.

Secondly, the greatest rate of collisions occurred amongst CBRM's male population. However, the majority of survey respondents were female. These findings suggest CBRM's female population show the most interest in the AT plan's future, but the current system has either a higher usage by males, or males are more prone to injury and collisions than females. Moving ahead, CBRM and future consultation efforts should make an effort to target and gain insight from the municipality's male population. Doing so would enable an egalitarian view of how the current and future AT network is currently used, challenges faced, and necessary improvements.

To reduce overall collisions, the plan and resultant designs should focus on implementing measures to ensure any roads over 50 km/hr have adequate road markings and barriers to ensure cyclist safety. These measures and appropriate methods of implementation are discussing in the AT standards section. Attention to additional traffic calming measures - e.g. speed calming measures, tree-lined streets, etc. - should be included in resultant AT infrastructure projects. Lastly, future infrastructure should consider whether it is feasible to prioritize cycling and sidewalk infrastructure above new road networks in new roadway development.

FIGURE 2.24 Deaths 2007-2018

INVOLVEMENT	DEATHS
Cyclist	1
Pedestrian	2
Pedestrian (x2)	0
Grand Total	3

FIGURE 2.25 Collisions at Crosswalks 2007-2018

CROSSWALK	INJURY			GRAND TOTAL
Involvement	No	Unknown	Yes	
Cyclist	17	17	12	46
Pedestrian	63	40	77	180
Pedestrian (x2)			2	2
Grand Total	80	57	91	228

FIGURE 2.26 Injury Counts 2007-2018

SEX	F	M	GRAND TOTAL
Involvement	Injury		
Cyclist	9	37	46
Pedestrian	87	88	176
Grand Total	96	125	222

FIGURE 2.23 Collisions Per Year 2007-2018

YEAR	2007	2008	2009	2010	2011	2012	2013	2014	2017	2018	GRAND TOTAL
Involvement	Injury										
Cyclist	7	6	9	5	5	16	4	7	9	3	71
Pedestrian	33	24	16	22	17	23	23	18	36	27	239
Pedestrian (x2)										2	2
Grand Total	40	30	25	27	22	39	27	25	45	32	312

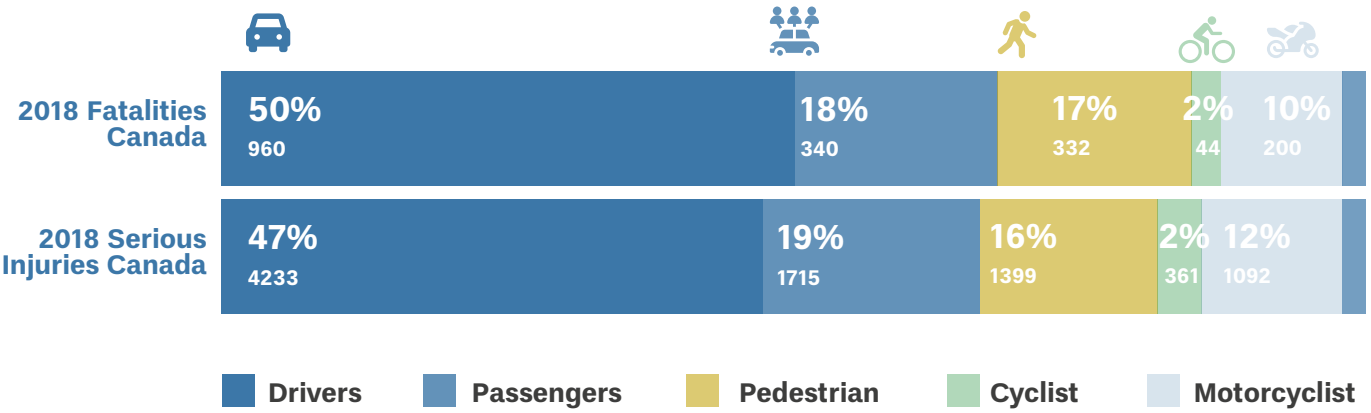


FIGURE 2.27 2018 Fatalities and Serious Injuries by category. https://tc.canada.ca/en/road-transportation/statistics-data/canadian-motor-vehicle-traffic-collision-statistics-2018

	Per 100,000 Population		*Per Billion Vehicle-Kilometres*		*Per 100,000 Licensed Drivers*	
	Fatalities	Injuries	Fatalities	Injuries	Fatalities	Injuries
Canada	5.2	412.4	4.9	391.1	7.2	575
NL	7.4	517	7.2	498.9	6.6	460.8
PE	9.8	424.2	9.6	415.6	13.2	573.8
NS	7.8	747.8	6.3	603.5	10.2	978.9
NB	6.5	348.3	5.6	301.1	9	484.3

FIGURE 2.28 2018 Fatalities and Serious Injuries in Canada and Atlantic Canada. https://tc.canada.ca/en/road-transportation/statistics-data/canadian-motor-vehicle-traffic-collision-statistics-2018

2.5 COLLISIONS IN CANADA

Transport Canada hosts a National Collision Database (NCDB) which contains data on all reportable transportation related collisions in Canada each year. The last analysis was done in 2018 and provides a good snapshot of the pre-pandemic collision data across the country. In 2018, the number of motor vehicle related fatalities was 1,922; down 64% from 2,904 in the year 2000. Over 68% of those fatalities (1,300 people) were car related, 17% were pedestrian relates (332 people), 2.3% were bicycle related (44 people), 10% was motorcycle related (200 people) and 2.4% was non-stated (46 people).

The number of serious injuries decreased to 9,494 in 2018; down 6.1% from 2017 (10,107) and down substantially by 64% from 2000 (15,581). These changes come as the population increases and are likely the result of vehicle and road safety improvements. The fatality rate fell from 1.62 per 10k registered motor-vehicles, down to 0.77 per 10k.

The number of fatalities per 100,000 population increased slightly to 5.2 in 2018 (from 5.0 in 2017), yet is still the second lowest on record. The number of fatalities per billion vehicle kilometres travelled slightly increased to 4.9 in 2018 (from 4.8 in 2017); also the second lowest recorded

The rural nature of Atlantic Canada increases the fatality rate from 5.2 in Canada per 100k of population to 7.8 in Nova Scotia. As well, the fatality rate increased from 4.9 people per billion vehicle kilometres travelled for Canada to 6.3 people per billion kilometres travelled in Nova Scotia.

Figure 2.27 shows that **cycling is one of the safest forms of transportation with only 2.3% of all fatalities and serious injuries in 2018 when compared to 68% resulting from vehicle related fatalities. Walking or jogging pedestrians are still relatively high at 17% of fatalities and 16 of serious injuries.**

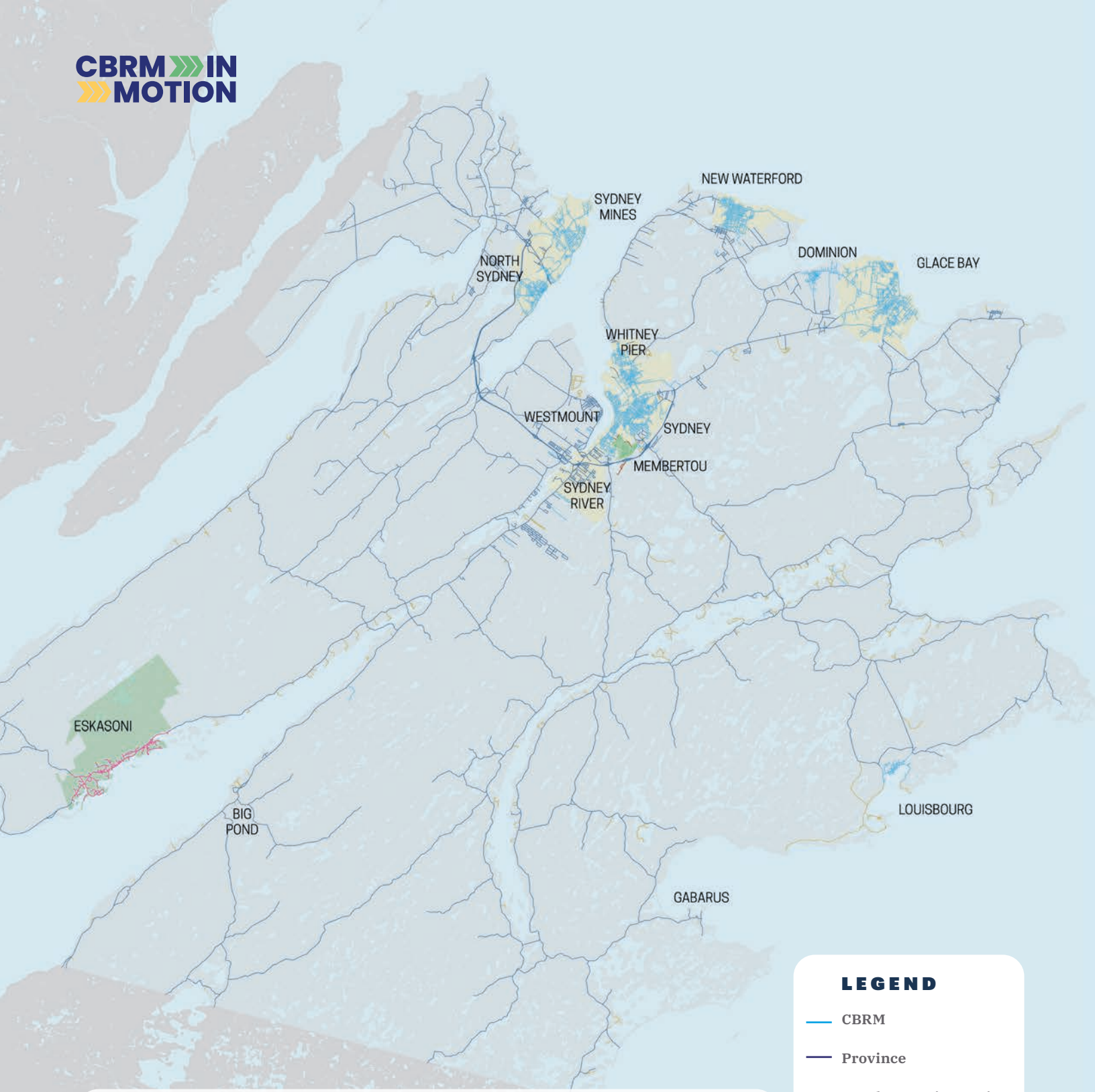


FIGURE 2.29 Road Ownership

Many of the AT projects for this plan are proposed in road corridors except some of the multi-use trail projects. Since CBRM is partially funding the implementation of this plan, most of the AT projects proposed will be on municipally owned land with the exception of the the provincial Blue Routes and off-road multi-use trails. For AT facilities on provincial roads outside the Blue Route, CBRM would have to establish a partnership with the province or First Nations groups to develop AT facilities on non-CBRM owned lands.

SOURCE: TYLER GOUTHRO

CHAPTER 3

AT MASTER PLAN

The previous chapter outlined the thematic maps and inventory which will shape the priorities of the future AT network for CBRM. This chapter outlines the proposed AT network to be built out over the next 20 years, the integrated mobility targets and the supportive policies needed to implement the plan. The AT Master Plan is the culmination of months of public engagement, and coordination with staff and council on the specific projects which will grow the AT network in CBRM into the future.

3.1 ESTABLISHING PRIORITIES FOR THE NEW AT PLAN

The previous 2008 AT Plan set out to prioritize linkages between the various urban communities of CBRM and - with a few exceptions - has been implemented with many notable projects like the Maryann Corbett Trail, the Greenlink Trail, and the SPAR Road shoulder widening, etc.

Guided by the 2008 Plan, the municipality has spent about $330k per year since 2008 on various AT projects. Additionally, CBRM has also leveraged over $1 million per year from other levels of government, proving AT as a good investment for CBRM.

Moving forward, the new AT plan will focus more on local AT projects to connect populated neighbourhoods to key commuting destinations. There are community connector projects that need to be realized from the 2008 plan, including:

1. **The Sydney River Multi-use Trail**
2. **The Prince and Upper Prince Bike Lanes**
3. **The King Street Bike Lanes**
4. **The Grand Lake Road Sidewalk**
5. **Lingan/Hankard/Victoria Bike Lane in Whitney Pier**
6. **The Kings Road Multi-use Trail**
7. **The Maryann Corbett Trail**
8. **The Ellsworth/Heelan/Emerald/ Union Bike Lanes**
9. **Esplanade/Kings/George Bike Lanes**
10. **The Washbrook Creek Greenway**

The reasons some of these projects have not been built mostly have to do with external factors outside the control of the municipality. For instance, the Sydney River Multi-use trail and parts of the North Sydney-Sydney connector trail were proposed on parts of the Cape Breton Central Nova Scotia Railway (owned by Genesee & Wyoming). However, consensus has yet to be reached on the future of this specific rail line by all three levels of government. Despite the Sydney River Trail's failure to be implemented, the consultants heard unanimously that this was an important priority project for CBRM.

The new local community priorities are expanded in this chapter.

3.2 THE 2022 AT PLAN OVERVIEW

Building on the many successes of the 2008 AT Plan, one of the key objectives of this plan is to improve the **health** and **quality of life** of residents by expanding the AT Infrastructure in populated areas, linking neighbourhoods to schools, downtowns, business centres, shopping areas, and other communities.

This plan lays out the next 20 years of AT investment within the municipality in locations that can:

- Increase AT participation and reduce resident's reliance on cars,
- Create greater social equity and improve peoples lives in measurable ways
- Leverage the economic benefits and reduce municipal costs of traditional transportation network expansion and maintenance
- Improve safety for vulnerable populations like youth and seniors.

A key priority for this plan is to shift commuting from private vehicles to other forms of active transportation. Since 'commuting' is measured in the national census every 5 years, progress can be tracked. Similarly, the number of students using school buses in CBRM are also tracked, so it is possible to set targets for increasing student AT use. Non-work related commuting is difficult to track except using local surveys.

To be clear, AT networks and recreational trails are distinct. AT commuting is designed to connect people from where they live to major destinations, ultimately reducing their reliance on automobiles. Comparatively, the primary objectives of recreational trails are focused on the user's enjoyment and health, but the trail itself is usually the destination and not the conduit. While both trails are important, AT is usually commuter-driven, focusing on connecting where people live to a specific destination like a school, shopping area, or downtown. Therefore, commuting AT networks are the focus of the 2022 AT plan.

AT is most widely used when the trip distances do not exceed 5km for walking (about a 1 hour walk) and 15-20 km for cycling (about a 1 hour bike ride). As a result, this 2022 plan focuses more specifically on projects within CBRM's various urban communities. The specific communities have been carefully selected by the project stakeholders and local residents. The primary focus is reducing vehicle reliance in exchange for safer AT routes that connect to key, routine destinations within the CBRM's populated communities (including Sydney, Sydney River, Sydney Mines, North Sydney, Glace Bay, New Waterford, and Louisbourg).

In the more rural areas of CBRM, this plan is supported by the continued expansion of the provincial Blue Routes, implemented by the Province of Nova Scotia.

CBRM AT VISION

The consultants worked closely with local residents, businesses, academic institutions, and CBRM's staff and council to develop a vision statement and goals for the next important phase of CBRM's Active Transportation plan.

CBRM's Active Transportation Plan update will improve the lives of vulnerable and everyday residents of the municipality by providing more equitable transportation options for residents, safer routes for students, more healthy options for commuting and better connective infrastructure within the denser growing areas of the municipality.

WORK COMMUTING TARGETS FOR THE AT PLAN

The commuting targets of this 20-year plan are to change the modal split in CBRM by:

- Doubling the walking commuting from 4.1% in CBRM to 8%
- Increasing cycling or assisted mobility commuting from 0.2% to 6%
- Increasing transit commuting from 2.7% to 7%
- Increasing the % rideshare from 8.4% to 12% of all private vehicle trips.
- Decreasing private vehicle trips from 82% to no more than 70%

STUDENT COMMUTING AT TARGETS

The Cape Breton-Victoria Regional Centre for Education (CBVRCE) oversees the education of 12,000 students, with 60% of those students take the bus. The remaining 40% are a combination of walkers/cyclists, parent drivers, and student drivers for high schools. The Board estimates that driving traffic for students is large, but the figure is not tracked.

This AT Plan sets the following student commuting targets:

- To reduce bus use from 60% to 55% by increasing the radius for middle and high school students from 2km to the provincial standard of 2.5km. Elementary student radius will remain at 1km (vs the 1.5km provincial standard).
- To ensure walking/cycling students are no less than 30% of the population. This target will require a way to track how students get to school (driving vs walk/cycling).

2042 ACTIVE TRANSPORTATION AND INTEGRATED MOBILITY TARGETS

	MINIMUM TARGETS				MAX. TARGETS
	WALKING/ RUNNING	CYCLING OR ASSISTED AT	TRANSIT	RIDESHARE AS PASSENGER	PRIVATE VEHICLE
2016	4.1%	0.3%	2.7%	8.4%	82%
2022	4.5%	0.5%	3%	9%	<82%
2032	6%	4%	5%	10%	<75%
2042	8%	6%	7%	12%	<70%

Each 1% change represents 340 people in CBRM shifting their behaviour from one mode of transportation to another

3.3 AT SUITABILITY CRITERIA

The new 2022 Plan recognizes that there is significant potential for CBRM's residents to adopt AT commuting in the forthcoming years due to the widening availability of micromobility options. Micromobility includes electric-assisted personal mobility, improved integrated mobility with buses, support from higher levels of government with new funding programs, and greater use as the network grows and builds out in CBRM.

AT infrastructure can be costly to build and maintain. As such, it is important to focus spending in the areas that will see the greatest use. In addition, the success of the network is tied closely to its overall connectivity; having numerous small, unconnected facilities is counter-productive to increasing AT adoption. The more connected the network is, the much greater the chance it will be used. When embarking on building out the AT network, it often takes a lot of investment before adoption reaches a tipping point. AT Adoption for commuting in CBRM is still less than 5%. The Law of Innovation of Diffusion sets out that mass adoption doesn't usually happen until about 16% adoption (Innovators are the first group at 2.5%, followed by early adopters in the next 13.5%). Considering this, AT use among CBRM's residents is in its infancy, and will require further implementation and outreach to reach its full potential.

In a large regional municipality we understand there will be pressures to make changes to the priorities or to the locations of the proposed facilities. But it is important to stick, as much as possible, to the plan to ensure the contiguity of the network. The plan has been designed to address the local needs of the community and to speed adoption as rapidly as possible. Costs for AT facilities can be substantially reduced when they are built as part of planned street capital improvements. Since these programs fluctuate from year to year based on funding availability from higher levels of government, it is hard to predict when they might happen in CBRM. So there will be inherent changes in the AT priorities based on future street upgrades. On the same token, a high AT priority project might increase the priority of a future capital improvement project.

The municipal AT components of this plan are geared towards municipal owned roads and lands. The Province will address their contribution to the plan through the Blue Routes. **Any additional AT projects on provincial roads must be developed as a formal partnership between the Province and CBRM .**

Based on the feedback the team received throughout this process, the following ranking of criteria includes:

1. Projects should be able to assure a high degree of use by the local community (e.g. hundreds of user per day vs dozens of users per day) by linking dense population centres to high desire destinations (work, school, parks, etc.).
2. Each project should be able to measurably reduce people's reliance on motor vehicle transportation in CBRM. The intent is to reduce vehicle commuting and increasing AT use or transit use for commuting to work, school, or to complete day-to-day activities that might otherwise require travel by car. Projects should decrease traffic congestion and promote a modal shift to transit and active transportation in CBRM.
3. Projects should promote social equity amongst CBRM's vulnerable populations (youth, seniors, those in poverty, those with disabilities) reducing the requirement for car ownership to participate in society, education or the local economy.
4. Projects that extend or improve upon the existing AT network to increase the connectivity of the network should be a priority.
5. Projects should ensure travel by active transportation is easier, safer, more convenient and more enjoyable than travelling by car.
6. Projects that can be coordinated with future public works capital investments to create new complete streets should be prioritized.
7. Projects should focus on the needs of local residents first, but if the goals compliment tourism, that would be considered an added bonus.
8. Projects should improve the design of complete communities in CBRM

These criteria are listed in relative importance for prioritizing future AT investment and were part of the criteria for assessing new projects proposed in this AT Plan. A scoring matrix (**Table 1-1**) was developed to assess future projects that might veer from the recommended plan. In the matrix, each project should be evaluated and scored by multiplying each **criteria score** by its **sub-criteria score**. Where multiple sub-criteria apply, each should be scored as well. The total of all the sub-total scores gives the overall project score. Projects that score:

- > 50 points have a high priority
- 30-50 points have an intermediate priority
- 20-30 points have a a low priority
- < 20 should not be built without a logical rationale.

TABLE 3-1 AT Project Scoring Criteria Matrix

Proposed AT Project Name :

Criteria	Criteria Score	Sub-Criteria Score	Sub-Total
Projects should be able to assure a high degree of use by the local community (e.g. hundreds of user per day vs dozens of users per day) by linking dense population centres to high desire destinations (work, school, parks, etc.).	**10**		
> 1000 people/km2		1	10
500-1000 people/km2		0.9	
25-500 people/km2		0.8	
<25 people/km		0.5	
Projects that can be coordinated with future public works capital investments to create new complete streets should be prioritized.	**9**		
Combine with other Capital Works project		1	9
Land owned by CBRM		1	9
Funding Stream availability		0.5	4.5
Each project should be able to measurably reduce people's reliance on motor vehicle transportation in CBRM. The intent is to reduce vehicle commuting and increasing AT use or transit use for commuting to work, school, or to complete day-to-day activities that might otherwise require travel by car. Projects should decrease traffic congestion and promote a modal shift to transit and active transportation in CBRM.	**8**		
Directly Connects to or within a downtown		1	
Within 2km of a downtown		0.5	4
Within 1km of an elementary school		0.7	5.6
Within 2km of an junior or high school		0.4	
Within 0.5km of a park that has courts or sportsfields serving 20 or more sports participants		0.4	
Projects should promote social equity amongst CBRM's vulnerable populations (youth, seniors, those in poverty, those with disabilities) reducing the requirement for car ownership to participate in society, education or the local economy.	**7**		
Avg Residential Property Assessment within 1km of the project < $150,000		1	7
Project is within 1km of a school		0.5	3.5
Project is within 0.5km of a seniors home with more than 20 seniors		0.5	
Project is within 2km of a CBU or NSCC		0.5	3.5
Project directly connects to a bus routes		0.25	1.75
Projects that extend or improve upon the existing AT network to increase the connectivity of the network should be a priority.	**6**		
Project Connects to an existing AT Network		1	6
Project is within 0.5km of an existing AT Network		0.5	
Projects should ensure travel by active transportation is easier, safer, more convenient and more enjoyable than travelling by car.	**5**		
Project is on an inactive rail line		1	5
Project is on a road that has less than 4 driveways per 100m avg.		0.5	
Project has scenic views of the ocean		0.3	1.5
Projects should focus on the needs of local residents first, but if the goals compliment tourism, that would be considered an added bonus.	**3**		
Project serves the local residents but would also help drive touristm		0.5	1.5
Projects should improve the design of complete communities in CBRM	**2**		
Projects are integrated into new subdivisions or urban developments with over 100 units		1	2
Projects within 0.5km of a new development (<5 years old) with over 100 units		0.5	
Total			73.85

AT PRIORITIES BASED ON SCORE:

HIGH PRIORITY: > 75 POINTS

MED PRIORITY: 50-75 POINTS

LOW PRIORITY: 20-50 POINTS

< 20 SHOULD NOT BE BUILT WITHOUT A LOGICAL RATIONALE.

Steps.

1. Multiply the Criteria score by the Sub-criteria Score
2. If multiple sub-criteria apply, perform step 1 for each sub-criteria
3. Add up the Sub-total Scores

FUNDING ALLOCATION AND PRIORITIES WITHIN THE COMMUNITIES

As a regional municipality, funding should be allocated generally proportionally to the urban communities in the municipality**.** It would be difficult to appropriate exact amounts to each of these communities every year, but the funding targets should be projects that are generally consistent with the population proportions in the urban communities.

The AT Master Plan in this chapter are general proportional to the size of the urban community and the scoring matrix on the previous page. Future public works allocations are difficult to predict since the engineering department projects 5 years into the future, and are based on what funding programs become available to the municipality through provincial and federal governments.

CBRM's rural communities will be serviced primarily by the Provincial Blue Route instead of by CBRM since these roads are mostly owned and managed by the Province. The Province is implementing the Blue Route over time as part of their capital improvements as repairs and expansions are needed. The Province has no definitive timeline for the implementation of the Blue Route in CBRM but since most roads are upgraded and repaired on a 30-40 year cycle, we would expect much of these improvements to be made over the life of this AT plan or the next update.

3.4 COMMUNITY AT PLANS

The 2022 AT Plan picks up where the last 2008 Plan left off, carrying forward a few of the projects which were not built (like the Sydney River Multi-use Trail). The 2022 Plan includes a wide range of AT improvements in various communities which follow the AT Suitability Criteria outlined in the previous section. The new projects also help to extend the network from the 2008 Plan. The plan assumes that funding for AT will be increased from $1m per year to $1.5m per year over 20 years resulting in $30m of built AT projects by 2042. The master plan outlines the proposed projects and priorities for implementation in each of the focus communities for this plan.

Blow-ups of the plan for each community is shown on the following pages.

AT FACILITIES

The next chapter outlines the detailed design standards for the different AT topologies proposed for CBRM, but for the purpose of this chapter, there are 5 AT facilities for the master plan including:

1. **Bicycle Lanes** (also known as separated bicycle lanes, paved shoulders, buffered bike lanes, or cycle tracks) which share the street right-of-way with vehicles. Some bike lanes are protected or buffered using a combination of horizontal separation (a painted buffer of a certain width) and vertical separation (bollards, curbs, flex posts, parked cars, etc.) to achieve "All Ages and Abilities (AAA) status which is required to fulfil some funding programs in Nova Scotia.

2. **Multi-use Trails** are often separated from the street and shared with walkers, joggers, wheelchairs, bikes and other personal mobility devices. These facility types are some of the safest and most used but they can be more expensive to build and maintain. Rails to trail conversions like the Coal Town trail fall into this category.

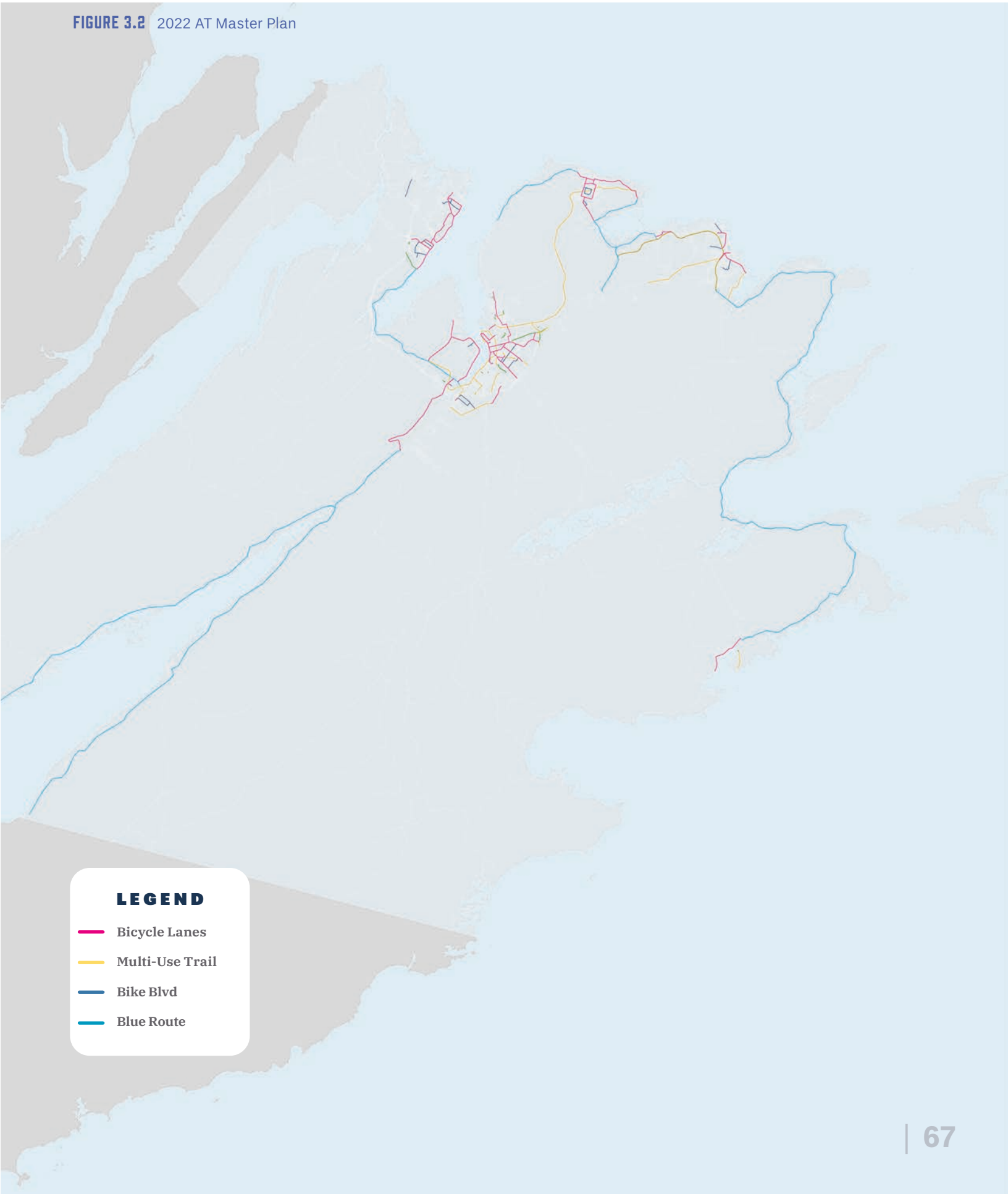
3. **Sidewalks** are dedicated to walkers, joggers and wheelchairs and part of the connective AT fabric. Sidewalk facilities are highlighted in the next section (3.6) separate from the other facilities.

4. **Bike boulevards** are designated streets where cars and bikes share the road when the street is low speed and has low traffic volumes. The streets are sometimes modified to include bicycle friendly geometry, vehicle speed bumps, lower speed limits, painted 'sharrows' or other shared indicators and signage.

5. **Blue Routes** are provincially designated bicycle infrastructure that includes painted 1m road shoulders or dedicated multi-use trails on provincial road right-of-ways.

There are many variations on these 5 facilities which are covered more in the next AT Standards chapter.

FIGURE 3.2 2022 AT Master Plan



SYDNEY MINES AND NORTH SYDNEY

The linkage between Sydney and North Sydney remains unbuilt in 2022 but is planned as part of the provincial Blue Route upgrades in the future. The rail line through the community could eventually be an ideal AT backbone but its future is still uncertain, and of all the lines in Cape Breton, this one is likely the most important to retain for rail economic development linking the new NovaPorte to the mainland. All Bike Blvd proposals in this neighbourhood should include sidewalk on at least one side of the street.

NORTH SYDNEY

	PRIORITY	LENGTH	LOCATION	TYPE	DESCRIPTION
1	High	1.8 km	King St	Bike Lanes	The King Street bike lanes should extend from the waterfront to the Sobeys plaza. The existing road width is about 10.5m and should mostly be easy to retrofit. From Pierce to Commercial Street road widening will be needed or a dedicated 3.2m multi-use cycleway could be considered through this stretch on the south side. The average grade is 2.6% with a few select lengths of 6% max.
2	High	2.5 km	Queen St / Commercial St	Bike Lanes	This bike lane should link the eventual Blue Route termination at Musgrave Lane to Pleasant Street near the Marine Atlantic Terminal. This will be a high cost improvement that should be coordinated with future streetscape improvements. The average slope is 2.6% with a few short runs of 8% slopes.
3	Med	1.9 km	Regent St / High St	Bike Blvd	This Bike Boulevard will link the waterfront to the North Sydney Mall.
4	Med	0.8 km	Archibald St	Bike Blvd	This Bike Boulevard links the Ferrisview Elementary School
5	Low	0.9 km	Blowers / Station	Bike Lanes	This bike lane links Pleasant Street to Kings Street. The average road grade is 2.7% and there is a 60m stretch of steep 8% grade.
6	Med	0.4km	Wilkie St	Bike Blvd	This route will provide direct access to Ferrisview Elementary School for students who live in the catchment area for the former Seton Elementary School. It also provides a direct rout to North Sydney Mall via High Street.
7	High	0.4 km	305 Highway	Bike Lane	Connects Sydney Mines to North Sydney
8	NA	15.1 km	Keltic Dr / Seaview Dr	Bike Lane	The provincial Blue Route Connector linking Sydney to North Sydney. This will be the province's responsibility.

SYDNEY MINES

	PRIORITY	LENGTH	LOCATION	TYPE	DESCRIPTION
9	High	2.5 km	Memorial Dr	Bike Lanes	The Memorial Drive bike lanes will link Memorial High and the future middle school site (near Hillier). The road is mostly 10m wide so some slight widening is needed to accommodate. The maximum slopes are 8% on this road for a very short stretch but the average grade is 2.5%
10	High	1.5 km	Fraser Ave.	Bike Lane	Most of the road width is about 10m so some slight widening will be needed. The maximum slope is 7% for a very short stretch but the average slope is 1.3%. This cycle lanes will link many communities to downtown Sydney Mines, Munroe Academy and Jubilee Elementary.
11	High	5.1 km	Shore Rd & Main St	Bike Lane	Most of the slopes along this stretch are gradual with an average slope of 3.3% and a few peak slopes of up to 10% for very short distances. Most of the road is 10m wide so some slight widening will be needed. This road links many of the uphill communities in Sydney Mines with the waterfront, Northside Hospital, Harbourview Elementary, Sydney Mines Middle School, Downtown Sydney Mines, the Northside Education Centre and Jubilee Elementary.

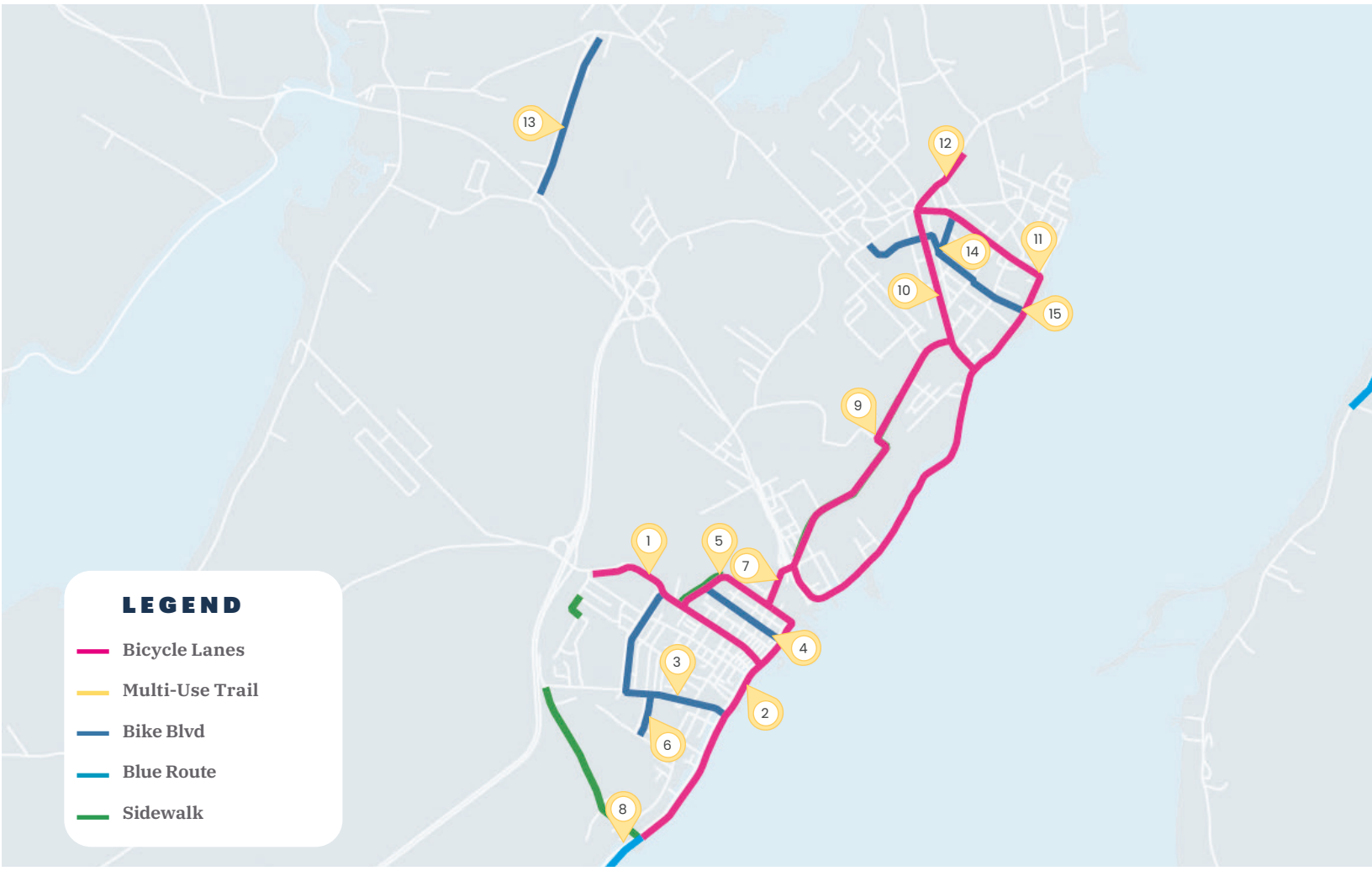


FIGURE 3.3 2022 AT Master Plan: Sydney Mines & North Sydney

SYDNEY MINES					
	PRIORITY	LENGTH	LOCATION	TYPE	DESCRIPTION
12	Low	0.7km	Pitt St	Bike Lane	This stretch is mostly flat with an average road grade of 2.4% and a few localized max grades of 6%. This road will link the Sydney Mines fields with downtown Sydney Mines and many of the communities to the south.
13	Low	1.5 km	Park Rd	Bike Blvd	This bike boulevard links the Dr. T.L. Sullivan School to the local community. The road is very flat with an average grade of 1%. Some of the asphalt walkways should be replaced with concrete in the future. Further, this bike boulevard will connect former students from Florence Elementary School (now closed) to Dr. T.L. Sullivan School. Additionally, this route will accommodate travel to the community of Florence.
14	Low	0.8 km	Staffold Ave / Clyde	Bike Blvd	This bike boulevard links the Munroe academy with the bike boulevards and neighbourhoods to the east. The average slope is 1.1% but there is about 200m of 6% street grade.
15	Low	1.3 km	King, Huron, Richard St	Bike Blvd	The street connects the surrounding neighbourhoods with the Jubillee Elementary and Harbourview Hospital and downtown Sydney Mines. The average slope is 1.9% with about 200m of Richard Street at 6%.

WESTMOUNT, COXHEATH, SYDNEY RIVER, SYDNEY & WHITNEY PIER

Assuming the G&W rail line is maintained to NovaPorte, and that the remaining rail line east of the Sydport Access Road can be leased, the following AT network is imagined for the life of this plan

WESTMOUNT / COXHEATH

	PRIORITY	LENGTH	LOCATION	TYPE	DESCRIPTION
1	Med	8.9 km	Westmount Rd /Sydport Access Rd /	Bike Lane	The Westmount bike lanes will complement the recently built sidewalks on the Westmount Road providing linkages to the Coast Guard College, NovaPorte, Mackenzie College, the Sydport Industrial Park, and the community of Westmount by linking to downtown Sydney. The average slope of this route is very flat at 2.2% with a few hundred metres of 6-8% road extending from the waterfront to the Sobeys plaza. The existing road width is about 10.5m and will be easy to retrofit.
2	Low	1.3 km	Sydport Access	Bike Lane	This short stretch of bike lane will connect the Westmount bike loop to the Sydport Industrial Park. Should the NovaPorte come online, this would increase the priority to medium priority.
3	Med	4.5 km	G&W Rail -Sydport Rd. to Lewis Dr.	Multi-Use Trail	If the G&W rail line east of the Sydport Access Road to Lewis Dr. can be leased, this multi-use trail should be developed as a 3.2m wide crusher dust pathway on the existing rail line.
4	Low	7.7 km	Coxheath Rd.	Bike Lane	The Coxheath Road bike lane would create a loop from Keltic Drive, through Coxheath to the Blacketts Lake Road and on to the King Street Blue Route providing a 13km loop. The populations in Coxheath along this road are generally low, making this a low priority project.
5	High	0.3 km	Mt. Florence St	Bike Blvd	The Mt. Florence Street Bike Boulevard connects Westmount to the Coxheath Elementary School
6	High	0.7km	Sunnydale Drive.	Bike Blvd	The Sunnydale Drive Bike Boulevard connects Westmount to Robin Foote Elementary School

SYDNEY RIVER

	PRIORITY	LENGTH	LOCATION	TYPE	DESCRIPTION
7	High	1.2 km	G&W Rail Lease along Kings Rd	Multi-use trail	The Sydney River cycleway is an important multi-use trail linkage between the Fatima Dr. and the rail crossing at Keltic Dr. This is a much needed trail connection and will require some elevated cycleway connections under the bridge abutment for the Highway. This cycleway will require work around the new roundabout and a crossing on an exit lane of Highway 125 into Sydney. This work will need to be coordinated or performed by the NSTIR.
8	High	3.1 km	Fatima / Carmichael / Riverview	Bike Blvd	This looped bike boulevard around Fatima, Carmichael, and Riverview Drive will connect much of Sydney River to the new Cycleway and the Sydney River Elementary School.
9	High	0.3 km	Highway 4	Bike Lane	There is a short stretch of the Blue Route that needs to be extended on CBRM roads to link up to the new Sydney River Cycleway.
10	Low	3.2 km	Powerline ROW	Multi-use trail	This crusher dust multi-use trail will link the Sydney River with the 327 and the 7th Exchange. The trail already exists but it should be cleaned up, regraded and surfaced with 2.5m wide crusher dust for cyclists and walkers (working with Nova Scotia Power).

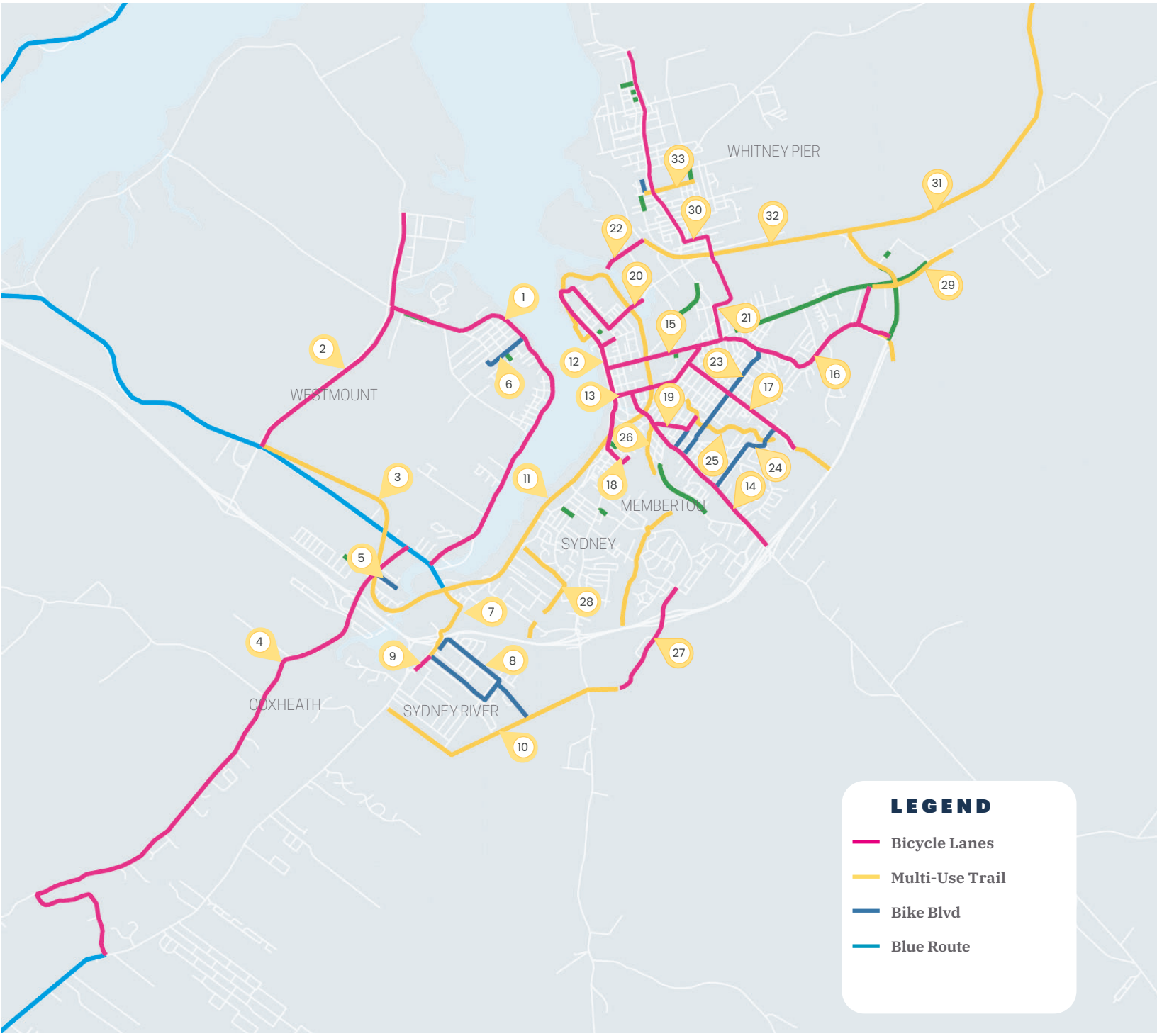


FIGURE 3.4 2022 AT Master Plan: Sydney, Sydney River, Whitney Pier, Westmount, Coxheath

SYDNEY					
	PRIORITY	LENGTH	LOCATION	TYPE	DESCRIPTION
11	High	6.5 km	Sydney River to downtown Sydney	Multi-use trail	The Sydney River multi-use trail is one of the community's highest priority trails linking Keltic Dr along the G&W rail line to Open Hearth Park and on to Esplanade. Two alignments have been presented in this report but the on-rail alignment (land lease from G&W) is by far the most desirable and cost effective. The trail is within a few hundred metres of the most dense population in CBRM and would link Wentworth Park, NSCC, the Sydney Shopping Centre, Downtown Sydney and Open Hearth Park. The trail would require a range of crosswalks and special road crossings. If the rail lease can be secured for more than twenty years it should be asphalt. If less than twenty years, crusher dust should be used.
12	High	3.0 km	Kings/ Esplanade / Ortana/ George	Bike Lane	The onstreet bike lanes extend from the rail line at King Rd, north up Esplanade to Ortana Dr extending to George Street all the way to Ferry Street. This important Bike lane links NSCC, City Hall, the Port of Sydney and a wide range of waterfront uses including the boardwalk. The cross section of Esplanade, like George Street, is extremely wide and could be accommodated with careful design.
13	High	1.4 km	Townsend / Sheriff	Bike Lane	The Townsend Street bike lanes will terminate at the new NSCC Campus and will link NSCC and the waterfront to the backside of the Sydney Shopping Centre and eventually Prince Street. Most of this route is 2-way except 3 blocks (Esplanade to George) is 1-way eastbound. The bike lanes will match either the 1-way or 2-way traffic.
14	Med	2.8 km	George St	Bike Lane	The George Street bike extension is phase 2 of the George Street bike lanes installed as part of the 2008 Plan. It will connect from Townsend St all the way to the highway interchange.
15	High	1.6 km	Prince St	Bike Lane	The Prince Street Bike Lanes link the waterfront, Charlotte Street, downtown Sydney and Open Hearth park up to a fork at Victoria Rd. This road is very dangerous and has seen many accidents so it will be built as part of a future road widening and streetscape improvement project. This project will depend on major street changes to Prince in and around the Sydney Shopping Centre so it has a medium priority.
16	High	3.1 km	Upper Prince / Green Rd	Bike Lane	The Upper Prince/Green Rd. bike lanes are crucial in connecting the Prince Street lanes from downtown to the future Tartan Downs site, the Mayflower Mall and the Maryann Corbett Trail. The average slope is about 2.5% with a steep section around 7% in the first 200m from Prince Street. Consideration will need to be given as to the manner in which access to Upper Prince Street at Ashby Corner for the proposed bike lane will be provided as there is no direct street access at this point.
17	Low	1.9 km	Terrace Street	Bike Lanes	The Terrace Street Lanes will connect the Sydney Academy in the north to the Sherwood Park Education Centre in the south. This route has some steep sections in around 10% grade but has an average grade of 3.1%.
18	Med	0.7 km	Mt Kemmel, Alexandra, King	Bike Lane	This bike lane connects the end of the Greenlink trail near Membertou with the new Sydney River Multi-use trail. This is an important cycling connection needed to connect Membertou to downtown Sydney.
19	Low	0.7 km	Cottage Rd / Royal Ave	Bike Lane	The Cottage Road bike lane connects the George Street bike lane with Brookland Elementary and the new Washbrook Trail greenway. This project has a "Low" priority rating which could change if the "High" priority Washbrook Greenway Trail is constructed sooner than later.
20	High	0.9 km	Ferry / Dorchester	Bike Lane	The Ferry bike lane connects the existing George Street bike lane with Open Hearth Park and its trail networks. Similarly, the Dorchester connector connects waterfront park with the existing bike lane at George Street.

SYDNEY					
	PRIORITY	LENGTH	LOCATION	TYPE	DESCRIPTION
21	Med	1.4 km	Victoria / Inverness	Bike Lane	This is a much needed bike lane connecting Sydney to Whitney Pier, and Whitney Pier to Highway 4 commercial business.
22	Low	0.6	S Road	Bike Lane	If and when the Sydney River multi-use trail is constructed, this trail connection will connect Sydney River to Whitney Pier and the Whitney Pier Community Heritage Trail. This road has not been built yet but should include this AT infrastructure when it is constructed.
23	Med	1.8 km	Cabot St / Oxford	Bike Blvd	This bike boulevard links the proposed George Street bike lanes with Brookland Elementary, the new Washrook Trail Greenway, and the Tartan Downs site.
24	Low	1.3 km	Common / Cottage / Bernard Lind	Bike Blvd	This bike boulevard connects the George Street bike lanes with the Washbrook Greenway and the Sherwood Park Education Centre.
25	High	1.6 km	Washbrook Creek	Multi-use Trail	The Washrook Trail greenway is a complement to the Greenlink Trail connecting the Sherwood Park School with Brookland Elementary. The trail will follow the river corridor as a 3.2m asphalt multi-use trail along its length connecting various park assets along the route.
26	High	0.8 km	Greenlink Trail Extension	Multi-use Trail	The Greenlink extension will link the east side of Wentworth Park through a series of trails and floating boardwalks from Argyle Street to the end of Shandwick Street which is the start/end of the Greenlink Trail. This important connection links the Greenlink Trail to Wentworth Park.
27	Low	1.4 km	Churchill	Bike Lane	These bike lanes are needed to complete the terminus of the Churchill Dr bike lanes connecting to the future Membertou 7th Exchange development.
28	Med	1.3 km	Malcom Munroe School	Multi-use Trail	The Munroe School greenway will link various surrounding neighbourhoods to the Munroe Middle School. There may be issues with securing land due to most of the land being developed on private and public property.
29	High	1.1 km	Hwy 125	Multi-use Trail	The Maryann Corbett Trail is routed around the Emergency Service Centre to the Mayflower Mall but a branch should continue along the Grand Lake Road to Green Road.

WHITNEY PIER					
	PRIORITY	LENGTH	LOCATION	TYPE	DESCRIPTION
30	High	3.4 km	Lingan / Hankard / Victoria	Bike Lane	Beginning at the intersection of Spar Road and Lingan Road, the bike lane turns on Hankard Street and right on to Victoria Road to the South Bar Entry. The average grade of this route is 2.2% and there is about 100m of 8% roads but most of the roads are fairly gentle. As a route through the downtown, this work should be coordinated with streetscape improvements in downtown Whitney Pier
31	Low	20.3 km	NS Power Lingan Rail Line	Multi-use trail	When the Lingan Power Plant is eventually closed (sometime in the next 20 years), CBRM should consider purchasing or leasing this rail line for a future connector between Whitney Pier and New Waterford.
32	Low	1.0 km	Spar Rd	Multi-use Trail	If the NS Power rail line is ever developed as an AT trail, a multi-use trail connection just north of the existing Walmart Superstore should connect the new trail with Highway 4 and the Maryann Corbett Trail. This may eventually warrant removing the bike lanes recently installed along the Spar Road near the end of this plan's life.
33	High	0.8 km	Jarnieson / Cameron	Bike Blvd	This bike boulevard will connect the Whitney Pier Memorial Middle School to Harbourside Elementary School through the new Victoria Road cycle lanes.

NEW WATERFORD

New Waterford is lacking in bike infrastructure, but blessed with sidewalks. However, some are in very poor condition and are in need of replacement. The future of the Town's AT infrastructure, in part, hinges on the future of the Lingan Generating Station and the NS Power rail line. If the rail line ever becomes available for trails, one of the AT projects below (Ellsworth Hinchey bike lanes) may not be needed, though this route is one of the most scenic in CBRM.

NEW WATERFORD					
	PRIORITY	LENGTH	LOCATION	TYPE	DESCRIPTION
1	High	5.8 km	Ellsworth / Heelan / Emerald / Union	Bike Lane	This bike lane connects the north and south blue routes through New Waterford starting at Webbs Lane near the Joe Burns Field and ending at the Lingan Road. This route should also include sidewalks on at least one side where missing. This route will connect many of the major destinations in New Waterford including a range of community sports fields, several commercial areas, the Breton Education Centre, Greenfield School. The average slope of this route is 3% but there are is a 400m stretch near the Greenfield School that has some steep slopes between 8-10%.
2	Med	2.8 km	Plummer / King / Emerald	Bike Lane	This loop connects the Ellsworth backbone to New Waterfords downtown, additional sports fields, the New Waterford Hospital, the Breton Education Centre and the Sobeys. The average road slope is 2% but there is a half kilometre stretch of between 6-8% roads.
3	Low	4.8 km	Ellsworth / Hinchey	Bike Lane	This route will connect the Collier Lands Park to the Lingan Generating Station meeting up with the provincial blue route. The route links the community of New Waterford to the Generating station lands but it will also be one of the more scenic coastal routes through New Waterford. Should the rail line become available before this route is built, this route may not be needed except a small connector from the end of the Blue Route to the rail line.
4	Low	0.3 km	8 St	Bike Lane	This short stretch of bike lane will connect the Hinchey Ave. bike lane to downtown New Waterford *if* the Hinchey Bike Lane is built.
5	Med	1.7 km	Warren / 8 St / Macleod / Mahon	Bike Blvd	This bike boulevard loop connects to the Ellsworth bike lane and the Breton Education Centre and related sports fields. There are a few areas that need sidewalk along this route.
6	Med	0.6 km	James / Ratchford	Bike Blvd	This short stretch of bike boulevard connects the Greenfield School from the main Union Highway bike lanes.

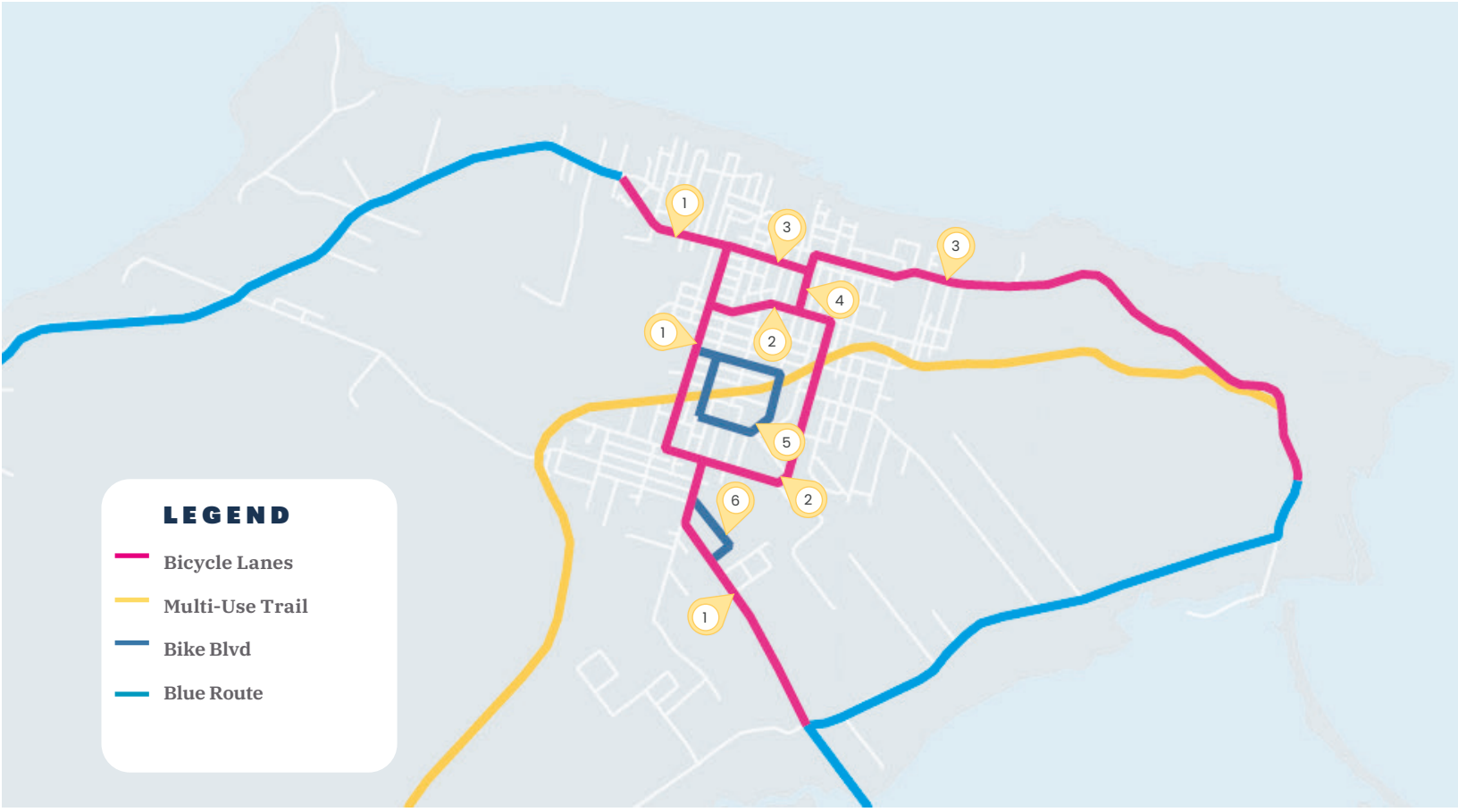


FIGURE 3.5 2022 AT Master Plan: New Waterford

GLACE BAY

Glace Bay benefits from the Coal Town Trail but there is a serious gap in the At infrastructure elsewhere in the Town. The Maryann Corbett trail needs to be linked into downtown Glace Bay and downtown Dominion needs to be linked to the Coal Town Trail. The eventual Blue Route lanes will connect the dead end of the current Coal Town Trail.

GLACE BAY – DOMINION					
	PRIORITY	LENGTH	LOCATION	TYPE	DESCRIPTION
1	High	1.6 km	Highway 4 to Wilson Rd	Multi-use Trail	This is the next phase of the Maryann Corbett Trail extending from where it ends west of Sunnyside Drive to the Wilson Road intersection. Most of this route is part of the Blue Route so it will be coordinated by the province. This last remaining stretch will connect the Tompkins Memorial High.
2	High	4.4 km	Highway 4	Multi-use Trail	This portion of the Maryann Corbett Trail is on CBRM roads and will be CBRM's responsibility. This phase will complete the link between Sydney and Glace Bay ending at the Coal Town Trail. This stretch links the Glace Bay High, the Superstore and Canadian Tire commercial area, and the YMCA and we expect this trail will see a lot of use. The average grade along this route is 1.6% and there are very few sections over 6%.
3	High	3.0 km	Route 4 / Route 28	Bike Lane	This bike lane will connect the end of the Mary Anne Corbett Trail to downtown Glace Bay, the Bayplex, the Miners Memorial Park, and the Miners Museum and ends at the Glace Bay Hospital and Glace Bay Bird Sanctuary.
4	Med	0.6 km	Main St	Bike Lane	This short stretch connects the Coal Town Trail at Mckeen to the Glace Bay waterfront and the Bayplex
5	Med	1.6 km	Stirling / West	Bike Lane	This segment ends at the John Bernard Croak School and connects the Table Head Municipal Park grounds, and several commercial businesses around Tablehead ending at the John Bernard Croak School.
6	Med	0.1 km	2nd St	Multi-use Trail	This short multi-use trail connects the end of the bike lane at the John Bernard Croak School to the Coal Town Trail
7	Med	0.9	Centre	Bike Blvd	The Centre Ave. bike boulevard connects some of the coastal trails and Black Diamond Park to the West Ave. cycle lanes and John Bernard Croak School.
8	Med	1.0 km	Currie	Bike Blvd	The Currie bike boulevard connects the downtown commercial area to the Oceanview Education Centre on an average 2.4% slope road.
9	Med	1.5 km	King / Commercial	Bike Lane	This stretch of bike lanes through Dominion connects the Blue Route to the Dominion Community Centre up to park Street where it ends at the Coal Town Trail. It also connects many of the local neighbourhoods in Dominion to the Dominion Beach Provincial Park. In the next update to the AT plan this end could connect to downtown Glace Bay down the Hwy 28.
10	Med	1.3 km	Seaview / Rebecca / School / Dragatic	Bike Blvd	This route connects the Hwy 28 cycle lanes to the Glace Bay Elementary School and back to the Park Street Mira River Greenway

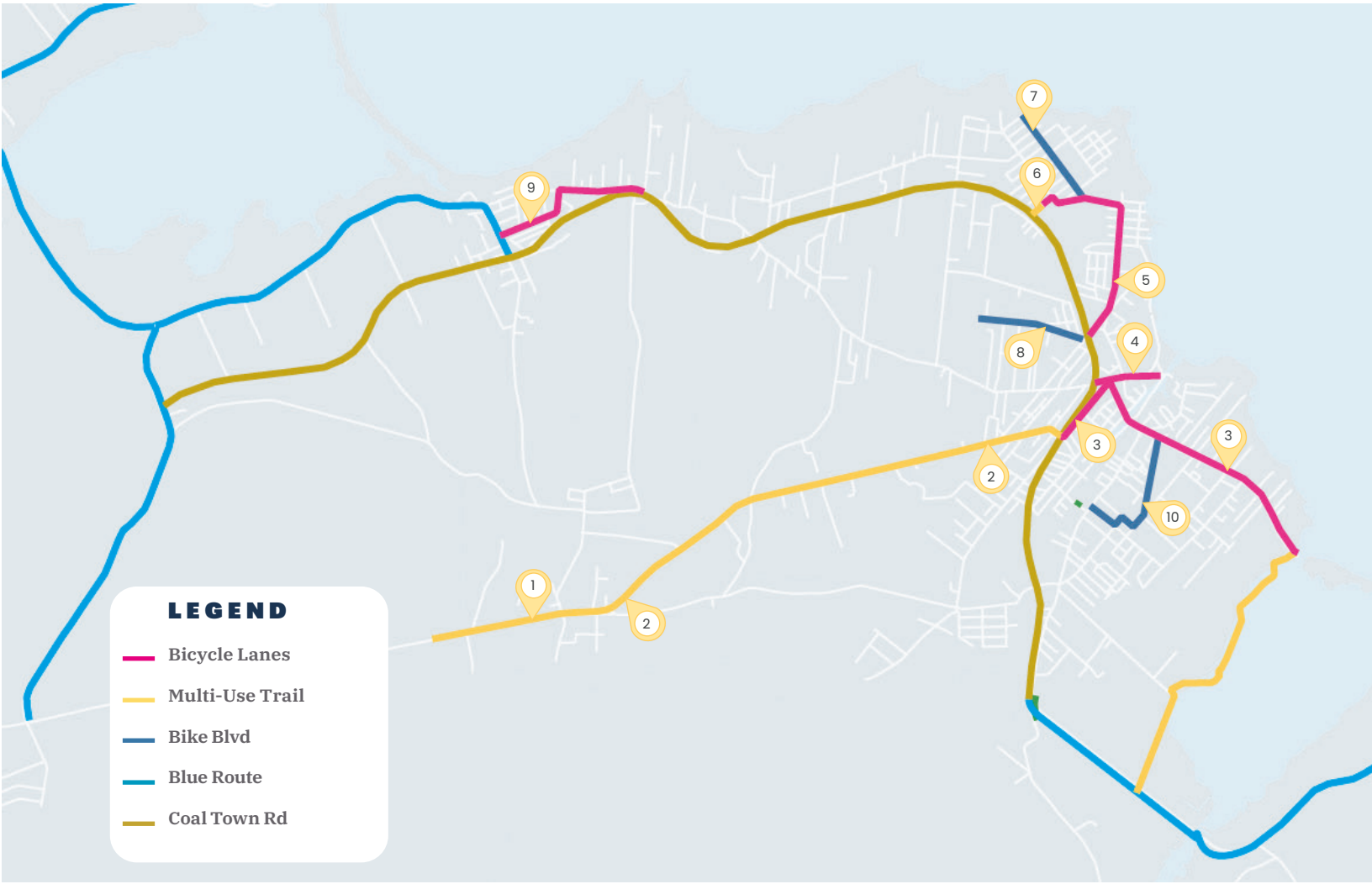


FIGURE 3.6 2022 AT Master Plan: Glace Bay and Dominion

LOUISBOURG

The Town needs to connect the end of the Provincial Blue Route to the Old Town Trail in the National Park, as well as the downtown to the lighthouse site.

LOUISBOURG					
	PRIORITY	LENGTH	LOCATION	TYPE	DESCRIPTION
1	High	2.3 km	Route 22	Bike Lane	This bike lane will connect the end of the Provincial Blue Route through downtown Louisbourg to the Parks Canada Visitor Centre Entrance and on to the Old Town Trail.
2	Med	1.4 km	Rail ROW	Multi-use Trail	This multi-use trail follows the old rail corridor. The proposed multi-use trail bridges the gap from the lighthouse to downtown Louisbourg.
3	Low	7.0 km	Coastal Trail	Bike Blvd	The Centre Ave Bike Blvd connects some of the coastal trails and Black Diamond Park to the West Ave Cycle Lanes and John Bernard Croak School.

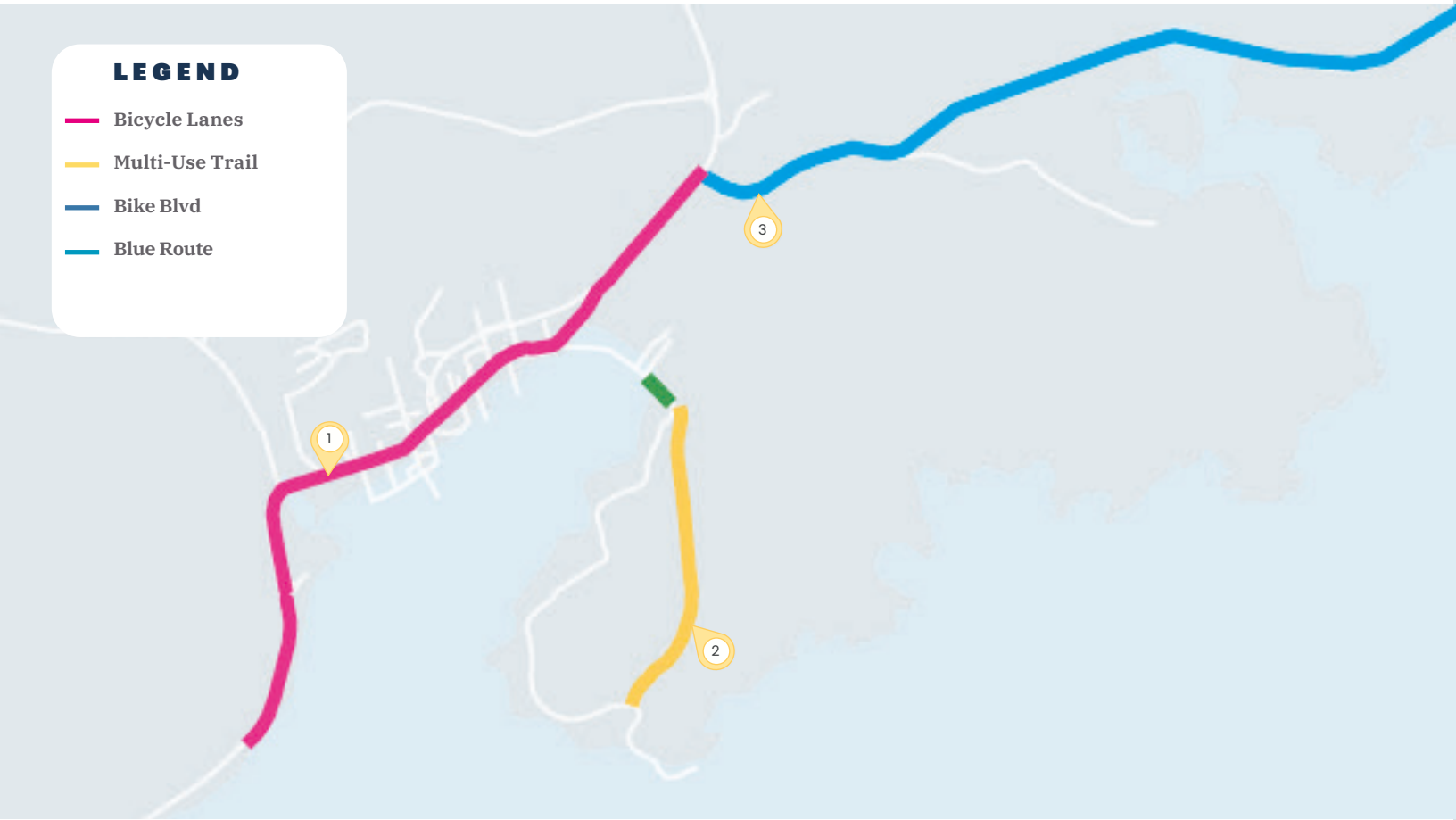


FIGURE 3.7 2022 AT Master Plan: Louisbourg

FIGURE 3.8 Sidewalk AT Facilities

There are some important segments of sidewalk needed to complete some of the AT network as show in the plan above. This map does not consider the existing sidewalk conditions and there may need to be existing sidewalks repaired to make them usable for the network.

3.5 SIDEWALK AT FACILITIES

Sidewalks are a critical part of the AT network and are particularly important near bus stops, in and around schools, near downtowns, and as part of the connective tissue for other AT infrastructure. Identifying suitable areas for sidewalk infrastructure is relatively straight forward and generally follows the same AT Suitability Criteria outlined in Chapter 3.4.

CBRM does not currently have a sidewalk condition assessment so it is much more difficult to identify areas where the sidewalk needs to be replaced. A sidewalk condition assessment was not part of the scope of work for this plan, but going forward, CBRM Public Works should ensure that sidewalk conditions are safe if they are part of the AT network.

TABLE 3-9 Sidewalk AT proposal

POTENTIAL SIDEWALK CONNECTIONS – CENTRAL	
LOCATION	**LENGTH [M]**
Kevin Quinlan-Walmart bus shelter to island	0.90
Rotary Drive – S. Bentinck to Civic #297	0.51
Rotary Drive – S. Bentinck to Civic #297	0.45
Towerview Place – Civic 50 to Alexandra	0.14
Centennial Dr-Upper Prince to Ranna	0.72
Cape Breton St-Inglis to Victoria Rd	0.53
Lingan Rd – Jamieson to Church	0.30
Skye Waye Dr – Sunnydale to Applecross	0.14
School St-Kings rd to Richardson	0.12
Young St – Borden to Victoria	0.06
Hospital St – Cabot to Centennial Rink	0.25
Upper Prince – Reeves to Cowbay Rd Overpass	1.02
Argosy St – Borden to Victoria	0.06
Brookdale St – Manse to Victoria	0.17
Westmount Rd-College to Fairhaven	0.30
Daley Dr-Anderson to MacNamara	0.20
Mason St-Kings to Argyle	0.13
Nepean St – Civic 37 to Charlotte	0.50
Prince Street Sidewalks - Northern Edge	2.80
Inglis St - Existing an Prince	0.06
Keltic Dr - Bridge to existing	0.11
Spar Rd-Kevin Quinlan to 125 intersection	1.00
POTENTIAL SIDEWALK CONNECTIONS – EAST	
Renwick Park to Queen Elizabeth Pedestrian Tunnel	0.04
POTENTIAL SIDEWALK CONNECTIONS – EAST	
Memorial Drive - High School to Eveleigh	0.40
Memorial Drive – Eveleigh to Tobin Avenue	1.38
Baird Street – Continue loop to Holic	0.23
Station Street – Blowers to King	0.48
Musgrave Lane – Queen to Regent	1.56

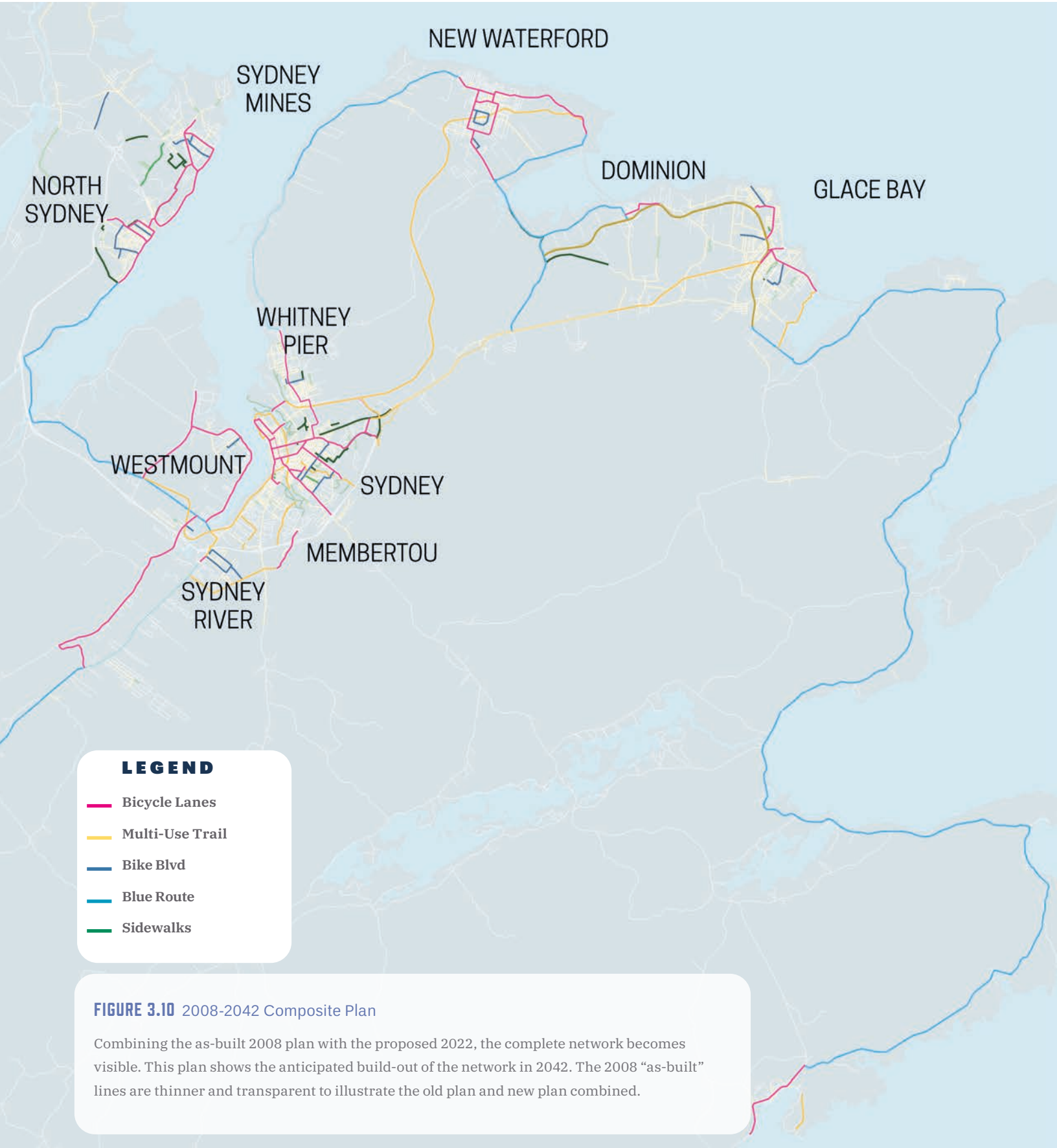


FIGURE 3.10 2008-2042 Composite Plan

Combining the as-built 2008 plan with the proposed 2022, the complete network becomes visible. This plan shows the anticipated build-out of the network in 2042. The 2008 "as-built" lines are thinner and transparent to illustrate the old plan and new plan combined.

3.6 RAILS TO TRAILS

The rail lines through CBRM are a legacy to the region's industrial past, representative of the fabric of coal and steel that grew CBRM's economy. Sadly, the days of coal and steel are gone but the network of rail lines remain as an economic and recreational opportunity for the municipality. The Cape Breton & Central Nova Scotia Railway (CBNS) is owned by Genesee & Wyoming and extends from Truro to downtown Sydney. This rail line could become an important part of the future NovaPorte near Westmount. In 2021, the Province of Nova Scotia extended its $30k per month subsidy to the middle of 2022 (as it has done on numerous occasions) while studying the feasibility of making the line active again to support the NovaPorte container terminal. Clearly, the economic impact of restoring rail for the new container port cannot be understated; the rail line from Truro to Westmount must be reserved for potential reinstatement in the future. However, the Westmount to downtown Sydney line has no immediate purpose and could serve as a backbone of an urban AT connector.

The process of rail abandonment is complex and time consuming. Generally, decision-making favours maintaining the corridors for future rail reinstatement whether it is feasible or not. The only maintenance cost for rail owners for an unused rail line is to ensure the lines in safe condition for the public (e.g. bridges for public safety and navigation, road crossing in safe working order, etc). On the other hand, if a company decides to go through the abandonment process, they must go through environmental cleanup, advertise the rail line for any other potential rail operating for 12 months, and go through a complex government process. Clearly, the Rail Act favours maintaining the status quo. Consequently, many communities like CBRM are left with the industrial blight of a discontinued and unusable rail line.

RAIL LEASE FOR ACTIVE TRANSPORTATION

There is another option to rail abandonment. The Windsor Hantsport Railway had not operated a train on the line since 2010, and like the CBNR line, the line is considered 'discontinued' but not 'abandoned'. Both HRM and some Kings County municipalities have signed a lease agreement to build trails on top of (or beside) rails and to acquire the rail line if it ever is abandoned. As part of the lease agreement, there is an acknowledgement that if the rail line were ever reopened, AT uses would have to be removed. In the case of the W&HR line, Kings County, New Minas, Wolfville, Kentville and the Town of Windsor currently have lease agreements in place which includes a leasing charge of $2,500 per year per kilometre. The capital cost of removing the rail ties and building the trail bed is left to the municipality, as is maintenance costs and insurance for bridges and other unused infrastructure.

While this may sound like an expensive and risky proposition for CBRM, consider that every time road work is completed near a rail line, the municipality must hire the rail owners consultants to ensure that rail crossing safety measures and standards are followed. This cost can be substantial. A rail lease would likely eliminate the need for these costs while the lease was in place. Not to mention the cost difference of building infrastructure in CBRM's public roadways compared to the cost of using the rail line instead. A cost comparison below is presented for the Sydney River Multi Use trail comparing building on the rail line vs off the rail line. Comparatively speaking, the cost of building AT infrastructure on the rail line could be significantly cheaper than the cost of building trails in public street corridors.

Comparatively speaking, the cost of building AT infrastructure on the rail line could be significantly cheaper than the cost of building trails in public street corridors.

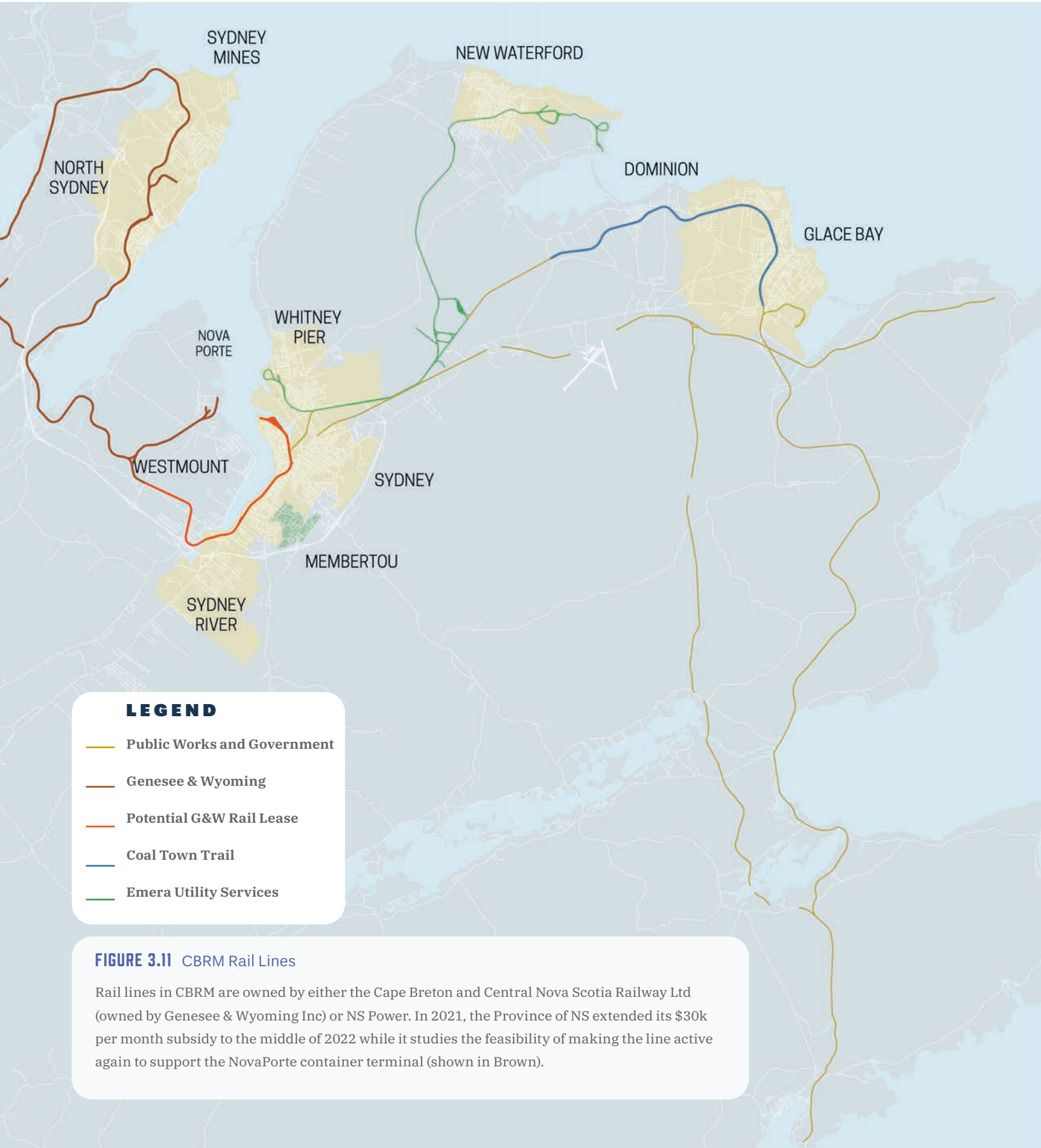


FIGURE 3.11 CBRM Rail Lines

Rail lines in CBRM are owned by either the Cape Breton and Central Nova Scotia Railway Ltd (owned by Genesee & Wyoming Inc) or NS Power. In 2021, the Province of NS extended its $30k per month subsidy to the middle of 2022 while it studies the feasibility of making the line active again to support the NovaPorte container terminal (shown in Brown).

THE SYDNEY RIVER MULTI-USE TRAIL

The length of the rail line between the Sydport Access Road and downtown Sydney is 10.1 km long and if a rail lease could be sought, it might cost about $25k per year using a similar price for the W&HR lease. Securing a lease arrangement with G&W for this branch would be cost effective for CBRM and a significant amenity for all residents of the municipality.

The Sydney River Multi-Use Trail was one of the most requested trails throughout this process. It has the potential to link Sydney River and parts of Membertou to downtown Sydney, the Sydney Waterfront, Wentworth Park, NSCC and the Cruise Port along some of the municipality's most picturesque oceanfront land. It would likely see very high use - possibly some of the highest in CBRM - if built.

Ideally this linkage would extend from Open Hearth park to Wentworth Park and all the way to the Sydport Road as part of the North Sydney connector which remains unbuilt today. If the lease negotiations with G&W remain prolonged for this leg of trail, CBRM may have to consider the on-road connector along Keltic Drive option proposed in the 2008 plan.

To compare the cost differences between using rails-to-trails vs. public and private lands to route the trail, the consultants prepared 2 possible alignments for the Sydney River Multi-use trail; one using the rail alignment, and the other using public and private lands off of the rail line.

Off-Rail Alignment

The first option explores a 3.6km alignment, from Keltic Drive to Kings Road near the STP, which stays off the rail corridor with the exception of two crossing where existing roads currently cross the line. This alignment crosses 32 private properties which would need to either be acquired in full or an easement secured across them. The cost of acquiring these properties/easements has not been estimated but we would expect at least $2m and significant staff time and investment to secure property. The trail would likely have to be phased over time as properties were secured and built in stages. The price escalation and community cost for having to build over time could also be substantial.

This alignment would require substantial shoreline infilling, retaining walls, bridges, stormwater management and regrading, and cut and fill to bring the minimum trail elevation to a safe height of about 3m above high water mark (enough for safe sea level rise). ***The preliminary class D cost estimates for this off-rail project bring it in around $10.4m*** (**Figure 3.13**). We assume land acquisitions would take upwards of $2m and several years to negotiate. This alignment likely would take 5-10 years to build in phases. Appendix B includes the schematic drawings for this alignment.

While this option may seem far-fetched, please note 2022 Plan's consultant team, Fathom Studio, was involved with the design of a similar 3km Dartmouth Harbourfront Trail developed by the Waterfront Development Corporation (Now Develop NS). The Dartmouth Harbourfront Trail runs adjacent to a rail line, and the majority of the trail was secured and built over approximately two years as part of the new sewage treatment plant construction in 2011. So while this option is possible, it is not optimal.

On-Rail Alignment

The on-rail alignment from Keltic Drive to Kings Road is slightly shorter route. The trail would be 3.2km and would not require land purchases, cut and fill, retaining walls, or shoreline infilling, and would need fewer drainage improvements than the previous option. Essentially, if the rail ties were taken up, the flat railbed is primed for a trail. ***The preliminary class D cost estimates for this On-Rail project bring it in around $2.2m*** (**Figure 3.13**). This is roughly one quarter the cost of the off-rail alignment. Further - if the lease could be secured -it could be built in a single season.

The on-rail alignment, if chosen, should create a series of interesting destination parks along the route which include interpretive nodes, seating areas, signage, public art, view points, beaches, and possibly sheltered areas as part of a public washroom facility.

Rail Line AT VS Public Street AT

This cost estimate demonstrates the tremendous savings attributed to using existing rail infrastructure when compared to in public road easements. The public easement AT normally requires changes to curbs and gutters, travel lanes, stormwater drainage, sidewalks, signage and signalization works, and occasionally, land purchases or expropriations. Dedicated multi-use trails on rail corridors are generally much cheaper even with land leases.

FIGURE 3.12 Sydney River Multi-Use Trail

FIGURE 3.13 Sydney River Multi-Use Trail Options

Off-Rail Line Option

Trail Length 3600 m
Retaining Wall Length 550 m

Item	Quantity	Units	Unit Price	Total
Clearing & Grubbing	2.304	ha	$ 30,000.00	$ 69,120.00
Base Fill Volume (from Civil3D)	51000	cu m	$ 50.00	$ 2,550,000.00
Base Cut Volume (from Civil3D)	4090	cu m	$ 12.00	$ 49,080.00
Type 1 Structural Fill (150mm)	2808	cu m	$ 45.00	$ 126,360.00
Type 2 Structural Fill (250mm)	4680	cu m	$ 45.00	$ 210,600.00
Retaining Wall (550x2m high)	1100	sq m	$ 400.00	$ 440,000.00
Railings	550	m	$ 150.00	$ 82,500.00
Asphalt Path (3.2m)	576	cu m	$ 600.00	$ 345,600.00
Light Standards @ 30m OC	120	ea	$ 7,000.00	$ 840,000.00
Interpretive Rest Stations	4	ea	$ 50,000.00	$ 200,000.00
Storm Drains	20	ea	$ 2,000.00	$ 40,000.00
Gravel Shoulder (1m each side)	1080	cu m	$ 45.00	$ 48,600.00
150mm Topsoil and Hydroseed	5040	sq m	$ 15.00	$ 75,600.00
Sub-Total				$ 5,077,460.00
Estimated Land Costs				$ 2,000,000.00
Contingency (20%)				$ 1,415,492.00
Inflation for building in phases (10%)				$ 707,746.00
Design and Construction Admin (15%)				$ 973,942.80
Legal/Admin for Land Acquisition				$ 200,000.00
Total (no Tax)				**$ 10,374,640.80**

On-Rail Line Option

Trail Length 3250 m

Item	Quantity	Units	Unit Price	Total
Remove/Dispose Rail Ties	3250	m	$ 12.00	$ 39,000.00
Type 1 Structural Fill (150mm)	2535	cu m	$ 45.00	$ 114,075.00
Asphalt Path (3.2m)	520	cu m	$ 600.00	$ 312,000.00
Light Standards @ 30m OC	108	ea	$ 7,000.00	$ 756,000.00
Interpretive Rest Stations	4	ea	$ 50,000.00	$ 200,000.00
Gravel Shoulder (1m each side)	975	cu m	$ 45.00	$ 43,875.00
150mm Topsoil and Hydroseed	4550	sq m	$ 15.00	$ 68,250.00
Sub-Total				$ 1,533,200.00
Contingency (20%)				$ 306,640.00
Design and Construction Admin (15%)				$ 275,976.00
Land Lease over 10 years @2500/yr/km				$ 81,250.00
Total (no Tax)				**$ 2,197,066.00**

WHITNEY PIER TO NEW WATERFORD TRAIL

NS Power operates a 22km long branch of the rail line between New Waterford and Whitney Pier. This line was designed to connect the Lingan Generating Station to the coaling piers on Sydney Harbour. Coal is unloaded from ships and stored at the pier, loaded onto trains, and delivered to the Lingan Generating Station. Since 2012, NS Power has been shutting down two of Lingan's generators during the summer months due to lower residential and industrial demand, increased renewable energy use, and to meet their environmental targets set by the government. NS Power is also considering permanently shutting down those generators within the life of this plan (2022-2042) as part of its renewable energy transition from coal.

Should the line become available within the life of this plan and no other rail use be found, it would be ideally suited for a multi-use trail between Sydney, Whitney Pier and Glace New Waterford.

COAL TOWN TRAIL & ADDITIONAL DEVCO MULTI-USE TRAILS

The Coal Town Trail has been a thundering success. Its multi-use nature (allowing for walkers, joggers, cyclists, ATVs, snowmobiles, horseback riders, skiers, snow-shoers, etc.) has attracted a broad cross-section of the municipality's residents. The trail is managed by a variety of special interest groups including Velo CB, Cape Breton Road Runners, Bay it Forward, off-road vehicle clubs, horseback clubs, and snowshoeing clubs. Each group has access to unique funding opportunities allowing for improvements and maintenance to the trail. ch group brings a variety of in-kind assistance from its members.

There have been some conflicts between land owners and motorized/non-motorized trail users but generally speaking the trails have worked well for a wide variety of users. Future rail conversions will likely follow a similar model of use, ownership and maintenance and it is not the intent of this AT plan to weigh in on the compatibility or legality of motorized users. The trail does work well as an AT corridor today attracting walkers, cyclists and other non-motorized users, making it convenient and safe to get to school, to work and to other local destinations from the different neighbourhoods of Glace Bay and Dominion. By this standard, it is an active transportation success story for CBRM. It also attracts many tourists and residents of CBRM from other communities due to the outstanding scenery and 13km length so it also works well as a recreational trail.

New multi-use trails are in the planning stages for linkages to Louisbourg and Gabbarus, and the trail groups would be anxious to mobilize on the Sydney Rover Trail if a lease can be secured. Extending the end of the Coal Town Trail at the Gardiner Road through to Cape Breton University is also a high priority for the groups.

We expect future rail conversions will follow a similar model as the Coal Town Trail though there may be further motorized restrictions as the trail goes through downtown areas. The trail has strict guidelines for use which is policed by CBRM and its members.

FUTURE G&W TRAIL LEASES THROUGH NORTH SYDNEY/SYDNEY MINES

The North Sydney and Sydney Mines G&W lines have an uncertain future but many in the province recognize the importance of this line for future economic development. As such, investment for trails is a lower priority than for bringing back rail. And until the future of this line is more certain, CBRM should focus on developing other off-rail AT infrastructure in these communities until such time as the rail is ever abandoned.

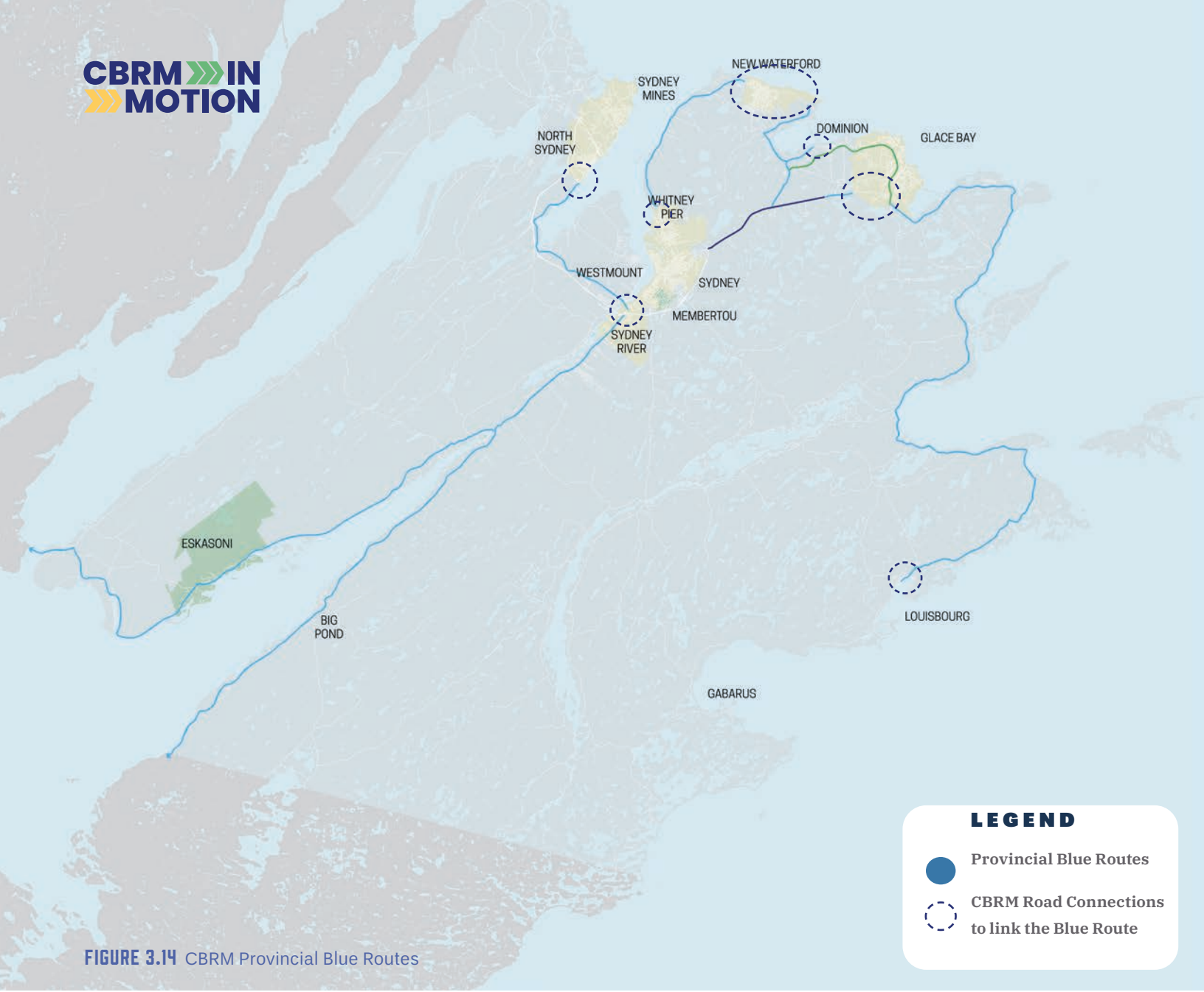


FIGURE 3.14 CBRM Provincial Blue Routes

3.8 PROVINCIAL BLUE ROUTES

The Provincial Blue Routes are located on secondary highways using a combination of paved shoulders, shared lanes, and hard surfaced trails on provincially owned roads. Once completed across Nova Scotia, the Blue Route will include about 3,000km of signed bicycle routes. In CBRM, there are approximately 180km of planned Blue Routes. To date, only about 20% of the network has been completed, with the stretch between Whitney Pier and New Waterford being the most recent.

There is no planned phasing for the route but the network is installed as roads are upgraded over time. Since most roads need upgrades on a 30+ year schedule, it is likely the majority of these routes will be implemented throughout the lifetime of the 2022 Plan. Further, priority consideration should be given for routes that connect to existing projects

Some of the provincial Blue Route roads meet CBRM owned roads. Where this occurs, CBRM should continue the Blue Route to ensure connectivity between communities. These include routes in North Sydney/Sydney Mines, through New Waterford, through Dominion and Glace Bay, and between Sydney River and Sydney. These routes provide the backbone to the rural AT network in CBRM and should be considered as priority projects for future implementation.

CHAPTER 4

IMPLEMENTATION

CBRM has had great success implementing the 2008 plan and the results have provided a strong foundation to build upon going forward. The next 20 years should see much broader adoption of the network and much higher growth in AT usage. This chapter outlines the policy changes that should be adopted to support this plan, the cost estimates and phasing, the funding sources, and administrative and maintenance requirements to put this plan in motion.

4.1 COST ESTIMATES AND PHASING PLAN

Using the recommendations in the previous chapters, class D cost estimates were assembled to show the cost of implementing the AT Plan (in 2022 $$) over the next two decades up till 2042.

The proposed phases for improvements in this plan were prepared based on the AT Suitability Criteria outlined in Chapter 3.4 but was not coordinated with Public Works' capital works program over the next decade. In our discussions with Engineering, we understand that the capital works program changes year to year based on the availability of matching funding. As noted in the AT Plan chapter, the best way to capitalize on spending for AT is to coordinate it with other road alteration projects in the region. So, with that said, the phasing priorities proposed in this plan is subject to change based on the year-to-year priorities and funds available for capital works projects.

The scope of this project did not allow for a sidewalk and infrastructure condition assessment, so there will likely be additional funds needed for sidewalk reinstatements in areas where sidewalk conditions are very poor. Priorities for sidewalk reinstatement should follow the same priorities outlined in this AT plan.

Some of the cycle lane projects in this report may be dependant on road widening as recommended in the AT Standards chapter (Chapter 4). The cost estimates have not considered new curb and gutter installation or stormwater repositioning, as it was assumed these costs would be part of the capital budgets for road upgrades.

Class D estimates are high level and assume a 20% contingency. We have included a 10% fee for design and engineering in the estimates. The costs in these tables exclude HST but include all material and labour.

UNIT COST ASSUMPTIONS

1. For the gravel trail we assumed a width of 3.2 metres for the path with 6" of type 1 base and 2" crusher dust. We also assumed that there would be culverts and ditching improvements along the proposed trails which are factored in that number along with standard landscaping (topsoil/ hydroseed). **Price: $290/m**

2. The paved multi-use trail was assumed to be 3.2 metres wide paved along with subgrade gravels extending on either side. We assumed a medium duty asphalt

(3") over a 6" Type-1 base. We also assumed that there would be culverts and ditching improvements along the proposed trails which are factored in that number along with standard landscaping (topsoil/hydroseed). **Price: $430/m**

3. Sidewalk was priced assuming 1.5 m wide concrete sidewalk with Type 1 gravel sub-grade. **Price: $125/m**

4. Pricing for bike lane extension is based on a 1 metre wide extension of the roadway and includes gravels, asphalt, paint and an allowance for culvert extensions. Bike painting is based on CBRMs input for typical costs for road painting (note that the per metre is for one side of the roadway). **Price: $72/m**

5. Pricing for Bike Blvd includes 'sharow' painting on both sides of the street every 200m and asphalt speed bumps every 500m as well as some Bike Blvd signs every 200m on both sides. **Price: $8/m**

NOTE: These assumptions do not account for curb changes, moving powerpoles, hydrants, catch basins or manholes, or other infrastructure alterations which may be necessary to implement the AT network.

TYPE	COST/M
Gravel Trail	$290.00
Multi-Use Trail	$430.00
Concrete Sidewalk	$125.00
Bike Blvd	$8.00
Bike Lanes	$72.00

North Sydney

Street	Type	Length (km)	Unit Cost/meter	Priority	High Priority	Med Priority	Low Priority
King St	Bike Lane	1.8	$ 120.00	High	$ 216,000.00		
Queen St / Commercial St	Bike Lane	2.5	$ 38.00	High	$ 95,000.00		
Memorial Drive - High School to Eveleigh	Sidewalk	0.4	$ 217.00	High	$ 86,800.00		
Memorial Drive – Eveleigh to Tobin Avenue	Sidewalk	1.4	$ 199.01	High	$ 278,618.00		
Baird Street – Continue loop to Holic	Sidewalk	0.2	$ 305.96	High	$ 61,191.00		
Station Street – Blowers to King	Sidewalk	0.5	$ 280.82	High	$ 140,410.00		
Musgrave Lane – Queen to Regent	Sidewalk	1.6	$ 269.18	High	$ 430,695.00		
305 Highway	Bike Lane	0.4	$ 38.00	High	$ 15,200.00		
Wilkie St	Bike Blvd	0.4	$ 3.00	Med		$ 1,200.00	
Regent St / High St	Bike Blvd	1.9	$ 3.00	Med		$ 5,700.00	
Archibald St	Bike Blvd	0.8	$ 3.00	Med		$ 2,400.00	
Blowers St	Bike Lane	0.9	$ 38.00	Low			$ 34,200.00
Subtotal					$ 1,323,914.00	$ 9,300.00	$ 34,200.00
Contingency (20%)					$ 264,782.80	$ 1,860.00	$ 6,840.00
Design and CA (10%)					$ 132,391.40	$ 930.00	$ 3,420.00
Sub-total					$ 1,721,088.20	$ 12,090.00	$ 44,460.00
Community Total							**$ 1,777,638.20**

Sydney Mines

Street	Type	Length (km)	Unit Cost/meter	Priority	High Priority	Med Priority	Low Priority
Memorial Dr	Bike Lane	2.5	$ 38.00	High	$ 95,000.00		
Fraser St	Bike Lane	1.5	$ 38.00	High	$ 57,000.00		
Shore Rd & Main St	Bike Lane	5.1	$ 38.00	High	$ 193,800.00		
Pitt St	Bike Lane	0.7	$ 38.00	Low			$ 26,600.00
Park Rd	Bike Blvd	1.5	$ 3.00	Low			$ 4,500.00
Saffold Ave / Clyde	Bike Blvd	0.8	$ 3.00	Low			$ 2,400.00
King, Huron, Richard St	Bike Blvd	1.3	$ 3.00	Low			$ 3,900.00
Subtotal					$ 345,800.00	$ -	$ 37,400.00
Contingency (20%)					$ 69,160.00	$ -	$ 7,480.00
Design and CA (10%)					$ 34,580.00	$ -	$ 3,740.00
Sub-total					$ 449,540.00	$ -	$ 48,620.00
Community Total							**$ 498,160.00**

Westmount

Street	Type	Length (km)	Unit Cost/meter	Priority	High Priority	Med Priority	Low Priority
Westmount Rd /Sydport Access Rd /	Bike Lane	8.9	$ 38.00	Med		$ 338,200.00	
Sydport Access	Bike Lane	1.3	$ 38.00	Low			$ 49,400.00
G&W Rail to Trail	Multi-Use Trail	4.5	$ 430.00	Med		$ 1,935,000.00	
Coxheath Rd	Bike Lane	7.7	$ 38.00	Low			$ 292,600.00
Mt Florence St	Bike Blvd	0.3	$ 3.00	High	$ 900.00		
Sunnydale Drive	Bike Blvd	0.7	$ 3.00	High	$ 2,100.00		
Subtotal					$ 3,000.00	$ 2,273,200.00	$ 342,000.00
Contingency (20%)					$ 600.00	$ 454,640.00	$ 68,400.00
Design and CA (10%)					$ 300.00	$ 227,320.00	$ 34,200.00
Sub-total					$ 3,900.00	$ 2,955,160.00	$ 444,600.00
Community Total							**$ 3,403,660.00**

Sydney River

Street	Type	Length (km)	Unit Cost/meter	Priority	High Priority	Med Priority	Low Priority
Kings Rd	Multi-use trail	1.2	$ 430.00	High	$ 516,000.00		
Faitma / Carmicheal / Riverview	Bike Blvd	3.1	$ 3.00	High	$ 9,300.00		
Highway 4	Bike Lane	0.3	$ 38.00	High	$ 11,400.00		
Powerline ROW	Trail	3.2	$ 290.00	Low			$ 928,000.00
Subtotal					$ 536,700.00	$ -	$ 928,000.00
Contingency (20%)					$ 107,340.00	$ -	$ 185,600.00
Design and CA (10%)					$ 53,670.00	$ -	$ 92,800.00
Sub-total					$ 697,710.00	$ -	$ 1,206,400.00
Community Total							**$ 1,904,110.00**

Sydney

Street	Type	Length (km)	Unit Cost/meter	Priority	High Priority	Med Priority	Low Priority
Sydney River to downtown Sydney	Multi-use trail	6.5	$ 430.00	High	$ 2,795,000.00		
Esplenade / Kings / George	Bike Lane	3	$ 38.00	High	$ 114,000.00		
Townsend St	Bike Lane	1.4	$ 38.00	High	$ 53,200.00		
Ferry / Dorchester	Bike Lane	0.9	$ 38.00	High	$ 34,200.00		
Highway 125	Bike Lane	1.1	$ 38.00	High	$ 41,800.00		
Washbrook Creek	Multi-use Trail	1.6	$ 430.00	High	$ 688,000.00		
Greenlink trail Extension	Multi-use Trail	0.8	$ 430.00	High	$ 344,000.00		
Centennial Dr-Upper Prince to Ranna	Sidewalk	0.1	$ 90.00	High	$ 9,000.00		
Cape Breton St-Inglis to Victoria Rd	Sidewalk	0.5	$ 228.00	High	$ 114,000.00		
Hospital St – Cabot to Centennial Rink	Sidewalk	0.3	$ 200.00	High	$ 60,000.0		
Upper Prince – Reeves to Cowbay Rd Overpass	Sidewalk	1	$ 236.00	High	$ 236,000.00		
Prince Street Sidewalks - Northern Edge	Sidewalk	2.8	$ 125.00	High	$ 350,000.00		
Inglis St - Existing an Prince	Sidewalk	0.1	$ 125.00	High	$ 12,500.00		
Keltic Dr - Bridge to existing	Sidewalk	0.1	$ 125.00	High	$ 12,500.00		
Spar Rd-Kevin Quinlan to 125 intersection	Sidewalk	1	$ 230.00	High	$ 230,000.00		
Prince St	Bike Lane	1.6	$ 38.00	High	$ 60,800.00		
Upper Prince	Bike Lane	3.1	$ 38.00	High	$ 230,000.00		
George St	Bike Lane	2.8	$ 38.00	Med		$ 106,400.00	
Mt Kemmel, Alexandra, King	Bike Lane	0.7	$ 38.00	Med		$ 26,600.00	
Munroe School	Multi-use Trail	1.3	$ 430.00	Med		$ 559,000.00	
Victoria / Inverness	Bike Lane	1.4	$ 38.00	Med		$ 53,200.00	
Cabot St / Oxford	Bike Blvd	1.8	$ 3.00	Med		$ 5,400.00	
School St-Kings Rd to Richardson	Sidewalk	0.1	$ 420.00	Med		$ 42,000.00	
Mason St-Kings to Argyle	Sidewalk	0.1	$ 170.00	Med		$ 17,000.00	
Common / Cottage / Bernard Lind	Bike Blvd	1.3	$ 3.00	Low			$ 3,900.00
S Road	Bike Lane	0.6	$ 38.00	Low			$ 22,800.00
Cottage Rd / Royal Ave	Bike Lane	0.7	$ 38.00	Low			$ 26,600.00
Terrace Street	Bike Lane	1.9	$ 38.00	Low			$ 72,200.00
Churchill	Bike Lane	1.4	$ 38.00	Low			$ 53,200.00
Rotary Drive – S. Bentinck to Civic #297	Sidewalk	0.5	$ 520.00				$ 260,000.00
Rotary Drive – Civic #297 to County Line	Sidewalk	0.4	$ 525.00	Low			$ 210,000.00
Towerview Place – Civic 50 to Alexandra	Sidewalk	0.1	$ 450.00	Low			$ 45,000.00
Skye Waye Dr – Sunnydale to Applecross	Sidewalk	0.1	$ 330.00	Low			$ 33,000.00
Kevin Quinlan - Walmart Bus Shelter to Island	Sidewalk	0.1	$ 180.00	Low			$ 18,000.00
Westmount Rd-College to Fairhaven	Sidewalk	0.3	$ 333.33	Low			$ 100,000.00
Daley Dr-Anderson to MacNamara	Sidewalk	0.2	$ 350.00	Low			$ 70,000.00
Nepean St – Civic 37 to Charlotte	Sidewalk	0.05	$ 240.00	Low			$ 12,000.00
Subtotal					$ 5,385,000.00	$ 809,600.00	$ 926,700.00
Contingency (20%)					$ 1,077,000.00	$ 161,920.00	$ 185,340.00
Design and CA (10%)					$ 538,500.00	$ 80,960.00	$ 92,670.00
Sub-total					$ 7,000,500.00	$ 1,052,480.00	$ 1,204,710.00
Community Total							**$ 9,257,690.00**

Whitney Pier

Street	Type	Length (km)	Unit Cost/meter	Priority	High Priority	Med Priority	Low Priority
Lingan / Hankard / Victoria	Bike Lane	3.4	$ 38.00	High	$ 129,200.00		
Spar Rd	Multi-use Trail	1	$ 430.00	Low			$ 430,000.00
Lingan Rd – Jamieson to Church	Sidewalk	0.3	$ 230.00	High	$ 69,000.00		
Young St – Borden to Victoria	Sidewalk	0.1	$ 150.00	Low			$ 15,000.00
Argosy St – Borden to Victoria	Sidewalk	0.1	$ 150.00	Low			$ 15,000.00
Brookdale St – Manse to Victoria	Sidewalk	0.2	$ 205.00	Low			$ 41,000.00
Jameson / Cameron	Bike Lane	0.8	$ 38.00	High	$ 30,400.00		
Subtotal					$ 228,600.00	$ -	$ 501,000.00
Contingency (20%)					$ 45,720.00	$ -	$ 100,200.00
Design and CA (10%)					$ 22,860.00	$ -	$ 50,100.00
Sub-total					$ 297,180.00	$ -	$ 651,300.00
Community Total							**$ 948,480.00**

New Waterford

Street	Type	Length (km)	Unit Cost/meter	Priority	High Priority	Med Priority	Low Priority
Ellsworth / Heelan / Emerald / Union	Bike Lane	5.8	$ 38.00	High	$ 220,400.00		
Plummer / King / Emerald	Bike Lane	2.8	$ 38.00	Med		$ 106,400.00	
Ellsworth / Hinchey	Bike Lane	4.8	$ 38.00	Low			$ 182,400.00
8 St	Bike Lane	0.3	$ 38.00	Low			$ 11,400.00
Warren / 8 St / Macleod / Mahon	Bike Blvd	1.7	$ 3.00	Med		$ 5,100.00	
James / Ratchford	Bike Blvd	0.6	$ 3.00	Med		$ 1,800.00	
Subtotal					$ 220,400.00	$ 113,300.00	$ 193,800.00
Contingency (20%)					$ 44,080.00	$ 22,660.00	$ 38,760.00
Design and CA (10%)					$ 22,040.00	$ 11,330.00	$ 19,380.00
Sub-total					$ 286,520.00	$ 147,290.00	$ 251,940.00
Community Total							**$ 685,750.00**

Glace Bay and Dominion

Street	Type	Length (km)	Unit Cost/meter	Priority	High Priority	Med Priority	Low Priority
Highway 4	Multi-use Trail	1.6	$ 430.00	High	$ 688,000.00		
Highway 4	Multi-use Trail	4.4	$ 430.00	High	$ 1,892,000.00		
Route 4 / Route 28	Bike Lane	3	$ 38.00	High	$ 114,000.00		
Renwick Park to Queen Elizabeth Pedestrian Tunne	Sidewalk	0.4	$ 125.00	High	$ 50,000.00		
Main Street	Bike Lane	0.6	$ 38.00	Med		$ 22,800.00	
Stirling / West	Bike Lane	1.6	$ 38.00	Med		$ 60,800.00	
2nd St	Multi-use Trail	0.1	$ 430.00	Med		$ 43,000.00	
Central	Bike Blvd	0.9	$ 3.00	Med		$ 2,700.00	
Currie	Bike Blvd	1	$ 3.00	Med		$ 3,000.00	
King / Commercial	Bike Lane	1.5	$ 38.00	Med		$ 57,000.00	
Seaview / Rebecca / School / Dragatic	Bike Blvd	1.3	$ 3.00	Med		$ 3,900.00	
Subtotal					$ 2,744,000.00	$ 193,200.00	$ -
Contingency (20%)					$ 548,800.00	$ 38,640.00	$ -
Design and CA (10%)					$ 274,400.00	$ 19,320.00	$ -
Sub-total					$ 3,567,200.00	$ 251,160.00	$ -
Community Total							**$ 3,818,360.00**

Louisbourg

Street	Type	Length (km)	Unit Cost/meter	Priority	High Priority	Med Priority	Low Priority
Route 23	Bike Lane	2.3	$ 38.00	High	$ 87,400.00		
Rail ROW	Multi-use Trail	1.4	$ 430.00	Med		$ 602,000.00	
Havenside Sidewalk	Bike Blvd	0.1	$ 125.00	Low			$ 12,500.00
Subtotal					$ 87,400.00	$ 602,000.00	$ 12,500.00
Contingency (20%)					$ 17,480.00	$ 120,400.00	$ 2,500.00
Design and CA (10%)					$ 8,740.00	$ 60,200.00	$ 1,250.00
Sub-total					$ 113,620.00	$ 782,600.00	$ 16,250.00
Community Total							**$ 912,470.00**

Phase Estimates (no Tax)	**$ 14,137,258.20**	**$ 5,200,780.00**	**$ 3,868,280.00**
Total Estimate (no Tax)			**$ 23,206,318.20**
Cost per Year (20 years)			**$ 1,160,315.91**

PHASES TOTALS

The High priority projects were assumed to be completed in the first 10 years of the AT Plan. The Medium priority in years 10-15, and the low priority in years 15-20. Generally this works out to about $1.15m per year but this does not include capital improvements needed on streets to make some of these projects work (e.g. road widening and moving curbs and gutters, moving storm sewers, new crosswalks, etc).

- Phase 1 Total (no tax) - $14.1m
- Phase 2 Total (no tax) - $5.2m
- Phase 3 Total (no tax) - $3.7m

ANNUAL BUDGET CHANGE

The cost of additional capital works improvements needed to make the AT infrastructure work could be as high as an additional 25% of the overall cost, plus annual inflation and possibly some land acquisition costs, so we recommend increasing the $1m per year budget to $1.5m. That would increase CBRM's portion from $330k per year to $500k per year.

4.2 TOP 10 AT PRIORITY PROJECTS

While Chapter 3 sets out the proposed AT projects in each community and the priorities of each project (high, medium and low), there are a number of potentially high profile projects that could kick start this 2022 AT Plan. These projects are based on the scoring criteria results **Table 1-1**, what we heard from the community and stakeholders, and the project's potential to raise the profile of AT in CBRM.

1. **Sydney River Multi-use trail** - This trail was one of the highest requested items in the public engagement and extends Sydney's waterfront for locals and tourists alike. Its implementation would likely be one of the most signature AT projects in CBRM raising the profile of active transportation.
2. **The Prince and Upper Price Bike Lanes** - This connection will connect downtown Sydney and the waterfront to the MaryAnn Corbett Trail and the Mayflower Mall through a densely populated part of Sydney.
3. **The King Street Bike Lanes** - These lanes would connect a densely populated area of North Sydney with the North Sydney Mall, and the North Sydney waterfront.
4. **The Grand Lake Road sidewalk** - This very busy commercial area needs sidewalks on the north side of the street as soon as possible.
5. **Lingan / Hankard / Victoria Bike Lane in Whitney Pier** - This bike lane will link up to the existing Blue Route already constructed north of Whitney Pier.
6. **The Kings Road Multi-use trail** - Connecting Sydney River under the 125 highway and connecting to Sydney.
7. **The Maryann Corbett Trail** - extension to downtown Glace Bay. This 6km extension is the next phase of this important multi-use trail and has provincial and municipal jurisdiction.
8. **The Ellsworth / Heelan / Emerald / Union Bike Lanes -** connects the future Blue Route in New Waterford through downtown.
9. **Esplanade / Kings / George Bike Lanes -** This proposal will extend the George Street bike lanes and will link much of downtown Sydney and the waterfront with new AT infrastructure.
10. **The Washbrook Creek Greenway -** This important greenway will link several schools through some dense neighbourhoods in Sydney

4.3 POLICY CHANGES

To assist in the timely implementation of this AT Plan, there will need to be some modifications or additions to CBRM's policies in its existing or upcoming documents. The following recommendations should be considered.

MUNICIPAL PLANNING STRATEGY & LAND USE BYLAW

The MPS updates are currently underway and we assume there will be policy statements added relating to climate change adaption, integrated mobility, active transportation, transportation, sustainability, growth nodes and density, downtowns, sprawl, recreation, community safety, health and well-being, and diversity, inclusion, and equity. The timing of the MPS and LUB changes follows this plan and so many of the targets identified in this plan could be added to the MPS targets. The following general policies should be considered in these documents:

Municipal Planning Strategy

1. **Density**: Development patterns in CBRM have often followed industrial development related to resource extraction and processing which has waned since the mid 1900's. This has led to many sprawling low density neighbourhoods and separated land uses which fosters a reliance on the private automobile throughout the municipality. Increasing density in close proximity to where people work, go to school and shop is an important way to reduce reliance on the automobile and change mobility patterns towards transit and active transportation. The use of infill developments for denser forms of housing is a positive way to reduce new sprawl and new streets and services. Ideally 50% of all new housing in CBRM can be created without building new roads in areas where there is water/sewer capacity and near areas where people work or go to school. These are usually located around the region's downtowns or along main transit corridors. Well developed active transportation and transit should be a carrot for developers to develop higher density in these areas (public investment should spur private investment).

2. **Mobility**: There is a growing trend towards travel options that are more healthy, more sustainable, and more enjoyable. Walking, jogging, or biking for all or just part of a commute is an effective way to get healthy while reducing the reliance on private automobiles. Encouraging and enabling more people to use active transportation and/or transit requires rethinking the design of our transportation network and the design of our communities to place a greater emphasis on multimodal transportation. Developers should work with CBRM in developing these more sustainable options. Linking active transportation with an a growing network of green transit routes provides a wider array of mobility options and foster transit supportive lifestyles. The targets of this plan is to shift private auto commuting from 82% to less than 70% in the next 20 years, and to increase AT commuting from 4.5% today to > 20% in 20 years.

3. **Complete Streets**: Transportation solutions that favour or prioritize the automobile are no longer the way to plan our communities. Complete Streets are both a policy and design approach that considers how to achieve safe travel for those walking, cycling, driving automobiles, and riding public transportation. It recognizes that the road corridor must be shared by all modes of transportation, in some cases favouring one form of transportation over another (e.g. transit priority corridors). The old approach of simply adding more lanes to accommodate more traffic is giving way to a more holistic view of how to shift mobility patterns to other forms of transportation by providing more and better transportation options. Complete Streets promote improved safety, better health, improved equity and inclusion, and more sustainable outcomes.

4. **Complete Communities**: is a planning framework that aims to meet the basic needs of all residents in a community, regardless of income, age, or culture through integrated land use planning, transportation planning, and community design. One metric of Complete Community design is to ensure access to services within a 5-15 minute walk, which contrasts the typical segregated land use and sprawl models characteristic of the suburbs. It also focuses on providing a wide mix of housing types and different tiers of affordability in the community. It also provides for a broader range of land uses within the radius of the community including residential, commercial, office, institutional, and recreational instead of sole purpose zones separated by large distances. Lastly, Complete Communities provide a wide range of transportation options within and outside of the community including transit, active transportation, private vehicles, and ridesharing. Sidewalks are a critical component of all streets in this model.

5. **Parks & Open Spaces**: Parks are an integral part of any community and are particularly relevant as density increases and these spaces are important amenities since many urban dwellers don't have yards. CBRM has a Recreation Master Plan but no Parks Master Plan. A Parks Master Plan should be prepared to create a hierarchy of parks and park systems around CBRM as well as parkland dedication guidelines to guide staff and developers in ensuring the right type of park infrastructure is achieved in future neighbourhoods and connections are provided to these parks through AT networks. The Master Plan could also include an Urban Forest Master Plan to guide developers and the municipality on the planting of new tree species around the municipality. In the absence of parkland guidelines or urban forest standards, the MPS and LUB could provide some guidance. The following section outlines some considerations for Parkland Standards for CBRM.

6. **Diversity, Inclusion, and Equity**: In a shrinking community like CBRM, there is a wide array of different age groups, socio-economic groups, and a growing mix of immigrants. Providing a wider range of transportation options to vulnerable and affected members of the community, should be an important goal of the municipality. Social equity, as well as diversity and inclusion outcomes, should be addressed through investments in community development, infrastructure, programs, and facilities.

7. **Affordability**: Since the onset of COVID-19, affordability and inflation is impacted all communities in Canada. Housing affordability is being felt widespread across the country as the cost of goods and services are escalating. CBRM has an advantage as its relates to the value of existing housing stock which is escalating at a much slower pace than other parts of the country. The municipality has a role to play in housing affordability as it relates to permitting more dense forms of development (more multifamily housing options, smaller lot requirements, increasing lot coverage or height requirements, and the servicable boundary of the municipality. Planning policies should help improve housing affordability by supporting a diverse range of housing options in communities.

8. **Health and Well-being:** As an aging community, CBRM must be active in the health and well-being of its residents through the introduction of policies and programs that encourage healthier living and infrastructure and programs that provide healthier outcomes. It should include healthy transportation options, healthy recreation choices, and access to clean air, water, and land. Access to affordable housing, healthy foods, green spaces, public places, and accessible facilities that encourage community participation are essential to community health. Communities and networks in the the urban core of CBRM can be designed, developed, and managed to improve the wellness of its residents.

Land Use Bylaw

The Land Use Bylaw is also undergoing a major overhaul along with the MPS so this report precedes the upcoming changes to the LUB. That said, we recommend the following considerations in support of this AT Master Plan.

1. **Parking requirements**. Many municipalities are eliminating or vastly reducing their parking requirements. In HRM and Charlottetown, they have removed parking requirements for downtown areas and density centres following the recent movement in other cities in Canada and across the US. Reducing parking requirements encourages people living in denser communities to use transit or active transportation. The Sydney Urban Core Plan recommended revisiting parking requirements as part of future MPS and LUB changes. We recommend a similar strategy for zones in dense areas of CBRM where transit and active transportation are a viable option. This change will make housing significantly more affordable (an underground parking spot costs $30-40k) and creates much healthier lifestyle alternatives.

2. **Bicycle Parking**. While car parking standards should be reduced or eliminated, bike parking requirements should be increased by requiring Class A (indoor bike parking) and Class B (outdoor bike parking) bicycle parking in new developments at a set ratio and a set rate (see **Table 4-1** from HRM's Centre Plan). Like parking standards for parking lots, the LUB should have standards and geometric design requirements for Class A and Class B bicycle parking set out in the LUB.

3. **Increased density along AT and transit corridors near downtowns**. Generally speaking, we are confident that the new LUB will provide guidance on new higher density developments particularly as infill developments in downtowns or along important transit / AT corridors. This additional density will be needed to provide greater affordability options and to increase the use of AT and transit. Ideally the density range go from 10-30 units per acre along urban corridors to 60-100 units per acre in downtowns and urban cores.

4. **Adequate setbacks along urban corridors**. Urban corridors need enough room to accommodate complete street transformations and depending on the road right-of-way widths, more land may be needed in the future. It will be important to limit parking between the building and the street in these zones to reinforce the urban corridor and to bring residents closer to the street. At the same time, depending on the scale of collector road, an adequate setback should be established to allow the road to expand. This is normally handled through minimum and maximum setback schedules in the zoning bylaw. Generally speaking, a complete street corridor that handles less than 20k vpd can be accommodated in a 20m corridor; 20-30k vpd in a 24m corridor, and greater than 30 vpd requires a 28m corridor. The min and max setback schedules should reflect these widths, usually with a minimum setback of zero in a downtown, 1m or more on a corridor and a max setback of 2-5m depending on the location.

5. **The LUB should limit future urban sprawl outside of the servicable boundary**. By setting growth targets for the urban core, CBRM could limit subdivision expansion in rural areas by setting a limit on the number of lots that can be subdivided (HRM has set a limit of 8 lots) as of right. The only way to go through a rural subdivision is through a conservation subdivision process which is much like a development agreement which reserves a much larger parkland dedication (50% in HRM). This approach would substantially reduce the number of new municipal roads and would focus growth in urban areas where it can utilize active transportation and transit.

Subdivision Bylaw

The subdivision bylaw in CBRM is very old and is need of a modernizing. There are significant missing elements including:

1. Parkland dedication requirements and standards. Most municipalities in Canada use 10% parkland dedication for all subdivided land used for development. For example, a developer subdividing 100 acres must provide 10 acres or cash-in-lieu. The subdivision bylaw needs to set out the parkland dedication requirements and when it applies, how the cash-in-lieu is calculated, and the standards of acceptance for land. The parkland standards should identify the type of land not acceptable for parkland and it usually includes wetlands, streams and rivers, watercourse setbacks of about 20m, environmentally sensitive areas, steeply sloping land over 10% slopes, susceptible lands over mine shafts, etc. As well, the standards should indicate the amount of frontage required to ensure that parks are visible from the street and not located in people's backyards. Usually the larger the park, the more frontage is required. A minimum of 6m for pathways to parks, a minimum of 30m for playgrounds or small parks, 60m for larger urban parks, etc.

2. Since CBRM does not have a municipal engineering standards manual, the subdivision bylaw should set out the requirements for sidewalks in serviced lands. Local roads in serviced areas should have curb and gutters, stormwater systems and sidewalk (1.5m min concrete), and street trees from a predefined list of trees at a rate of 1 caliper sized tree (60mm min) every 15-20m of frontage. Collector roads with anticipated future road volumes of 20k vpd should include sidewalk on both sides of the street and potentially the provision of AT infrastructure depending on its location and proximity to other AT infrastructure outlined in this plan. The plan should also ensure that cul-de-sac heads leave room for 6m trail easements or limit the length of the cul-de-sac if trail easements are not provided.

Parks Master Plan

CBRM is currently lacking a Parks Master Plan to establish what facilities are needed for existing parks, what role each park plays in the network of parks, what facilities and uses are under or over represented given current sport participation rates, the conditions of existing facilities, and how the municipality should plan for future parks. As part of this document, there needs to be policies on bike parking, linear park networks and other issues relating to active transportation.

TABLE 4-1 HRM Centre Plan Bicycle Parking Requirements

Use	General requirement	Required percentage of Class A or Class B bicycle parking	Minimum requirement for Class B bicycle parking	Maximum requirement
Multi-unit dwelling use	1 space for every 2 units	80% Class A 20% Class B	4 spaces	Not Applicable
Large shared housing use	1 space for every 20 bedrooms	80% Class A 20% Class B	2 spaces	Not Applicable
Hotel use	1 space for every 20 guestrooms	80% Class A 20% Class B	2 spaces	Not Applicable
Retail use; Local commercial use; Personal service use; Grocery store use; Restaurant use	1 space for every 300 sq. m of floor area	20% Class A 80% Class B	2 spaces	Not Applicable
Financial institution use; Office use; Hospital use; Medical clinic use; Religious institution use	1 space for every 500 sq. m of floor area	50% Class A 50% Class B	2 spaces	Not Applicable
Cultural use; Minor spectator venue use; Major spectator venue use	1 space for every 20 permanent seats or 1 space for every 250 sq. m of floor area, whichever is less	20% Class A 80% Class B	2 spaces	50 spaces
School use; University or college use	1 space for every 150 sq. m of floor area	20% Class A 80% Class B	2 spaces	Not Applicable
Club recreation use; Community recreation use (indoor facilities)	10 spaces if less than 500 sq. m of floor area; 20 spaces for larger facilities	20% Class A 80% Class B	Not Applicable	Not Applicable
Community recreation use (outdoor facilities)	1 space for every 1,250 sq. m lot area	100% Class B	2 spaces	50 spaces
Parking structure use	1 space for every 20 motor vehicle parking spaces	100% Class B	2 spaces	50 spaces
Any other use not specified in this Table or not exempted from bicycle parking requirements in Sections 446 and 447	1 space for every 500 sq. m of floor area	50% Class A 50% Class B	2 spaces	Not Applicable

4.4 MAINTENANCE STANDARDS

CURRENT MAINTENANCE PRACTICES AND COSTS

Typical maintenance practices in the CBRM for different trail systems are described below:

For gravel surfaced trail systems such as the Green Link Trail and the Whitney Pier Community Heritage Trail, maintenance includes spot applying additional granular materials in areas where surficial degradation is present (usually once the underlying geotextile becomes exposed from wear or erosion). Regrading and compaction of surface gravels is completed annually. In most years, some ditching and repairs to culverts are completed. These trails are not cleared during the winter.

The costs associated with the maintenance of gravel surfaced trails varies from year to year, however, over the past year costs range from $1,000 to $15,800 annually for each trail system.

Maintenance practices associated with paved multi-use trails such as the Maryann Corbett Multi-Use Trail generally include clearing of snow following snowfall events and salting the surface to prevent ice buildup. During the warmer seasons, general landscaping, pruning and trimming vegetation is completed along the trail. Costs associated with typical maintenance of paved multi-use trails was not available at the time of this report.

Bike lanes and widened roadway shoulders are maintained with the roadway itself and includes sweeping of debris from the shoulder/gutter periodically through the warmer seasons, plowing and salting the surface during winter months and reinstatement of line paintings annually. Full maintenance costs were not available at the time of this report, however, reinstatement of line painting was estimated to be approximately $2.95 per metre of painting.

RECOMMENDED MAINTENANCE PROTOCOLS

Sweeping

Bicycle lanes are often filled with debris (gravels, broken glass, etc.) that pose an issue for cyclists. It is recommended that in areas where bike lanes are present that a regular sweeping schedule is put in place to remove debris from the travel way. Shared use paths can also accumulate debris that poses an issue for cyclists. This is especially true for paths located in coastal areas, paths that extend through wooded areas and paths along waterways that are subject to surcharging during storm events.

The following are some recommendations to mitigate the impact of debris in the travel way for cyclists:

- Establishment of a regular sweeping schedule for roadways and pathways that may require routine and special sweeping needs. This typically involves more frequent seasonal sweepings, such as in the spring when snow melt leaves dirt and debris on paths and roadways. It is good practice to periodically inspect roadways and paths, especially after storm events. The sweeping program should also be designed to respond to users requests for sweeping activities.
- In curbed roadways, debris should be removed with maintenance vehicles. In roadways without curb or paths, debris can be swept off the trail/roadway surface.
- To reduce gravels being introduced into the travel ways, it is recommended that paved approaches be installed at gravel trail crossings at roadways.
- Maintaining local ordinances such as requiring trucks be tarped while transporting materials, requiring tow-vehicle operators to remove glass after crashed and requiring contractors to clean up roadways daily during construction operations.

Drainage Improvements

Drainage facilities for trail systems often deteriorate over time due to vegetation growth or build-up of sediments which may impede surficial flow. This is true for infrastructure in roadways such as catch basin structures, which may be plugged or require adjustment of its cover to encourage surficial drainage. The following are some recommendations for maintenance of drainage:

- Periodically review ditching and culverts along trail systems to identify potential areas of concern. Culvert openings may require some cleaning at the inlet as well as flushing to remove any sediment build up in the pipe. Ditching improvements should be carried out as required to ensure positive drainage and mitigation of ponding.
- Replace damaged culverts in a timely fashion.
- Reset catch basin grates flush with asphalt in areas to improve drainage on roadway shoulders.

Snow Clearance

Snow clearing requirements will differ for different trail types. Typically in the CBRM, most trail systems are not cleared of snow during the winter months, however, some multi-use trails and bicycle lanes should be kept free of snow. The following are some recommendations for snow clearance maintenance:

- On streets with bike lanes or shared use shoulders, remove snow from the travel surface (including concrete gutters and shoulders). Snow should not be placed or stored on sidewalks where it will impede pedestrian traffic.
- Remove snow from multi-use paths that are regularly utilized by the public in winter months.

Surface Repairs

Cycling and multi-use trail surfaces can be impacted by cracks, potholes, bumps and other asphalt surface defects. Trail systems will also see surficial degradation over time from wear and erosion that could pose an issue for users. The following are some recommendations for surface treatments:

- Cycling surfaces should be inspected on a routine basis to identify potential surficial defects. Surface defects identified during inspections or after receiving notification from users should be repaired promptly.
- Establishment of processes that enable any responsible agencies to respond to user complaints in a prompt fashion.
- Prevent any edges of asphalt repairs to run longitudinally through a bike lane or shoulder.
- Development of an asphalt preservation program for cycling surfaces to minimize deterioration and damage.
- Review gravel surfaces periodically to assess any areas showing signs of erosion or degradation from use. Repair any areas that may require additional gravels in a timely fashion. It should be noted that installation of erosion control measures may be necessary if degradation persists.
- Perform preventative maintenance periodically. This would include ensuring that any drainage systems remain unplugged and free flowing as well as eliminating intrusive tree roots.

Vegetation

Vegetation growth encroaching onto trail systems can pose issues for user on the trails as well as cause potential structural damage to the trail structure. Overgrowth of vegetation can also affect visibility along trail systems and obscure signage. The following are some recommendations for maintenance of vegetation:

- Periodically review trail systems for encroachment of vegetation and cut back as required to maintain trail sight lines and visibility of trail signage.
- Cut back intrusive root systems. This may require installation of root barrier systems where appropriate.
- Adoption of local ordinance that require adjacent land owners to control vegetation along trail systems. Conversely, ordinances to allow municipal staff to control vegetation encroaching onto trail systems from private properties could be adopted.

Signs and Markings

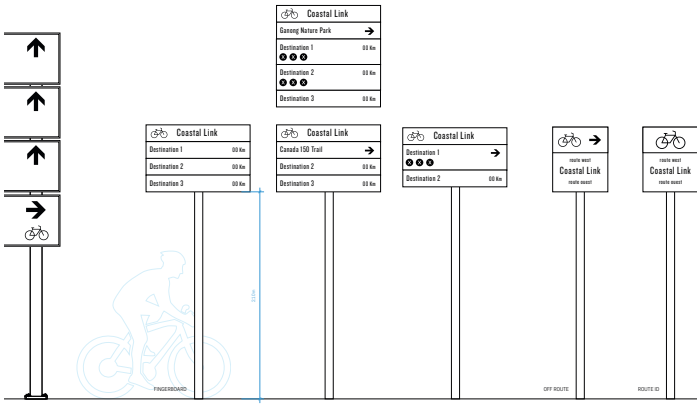
The following are recommendations to help maintain signs and markings:

- Periodically review signage and markings to assess their condition and visibility. This includes reviewing signage at night to assess the retroreflectivity.
- Replace any defective or damaged signage identified promptly.
- Review signal markings on asphalt surfaces periodically and reinstate as required. High traffic areas may require reinstatement more than once per year.

4.5 SIGNAGE IMPLEMENTATION

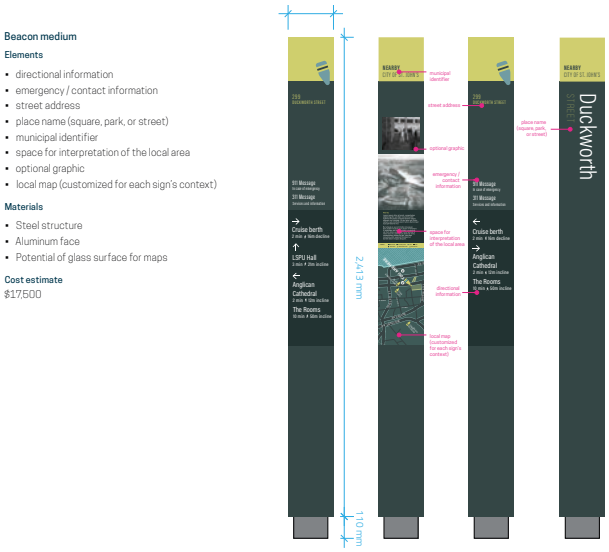
CRITICAL PROCESS

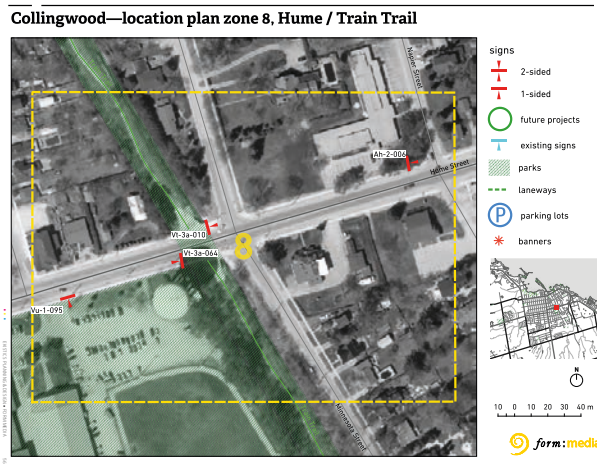
Signage is one of the main elements which your AT users will interact with. While signage seems simple, signs are often in the ground for 20 or 30 years. It is worth doing well, with a thoughtful and durable design. The signs provided here are just a starting point, and we recommend you go through the following minimum steps to get a sign system and program you can implement in CBRM. The AT Signage may want to be coordinated with an overall signage and wayfinding master plan in the coming years. The steps are highlighted below:



SCHEMATIC DESIGN

Establish scale and functional requirements for all sign types.





LOCATION PLAN

Recommend sign locations throughout the study area.

DESIGN DEVELOPMENT

Negotiate messaging requirements for all sign types, along with materials, colour, typeface and other important details.

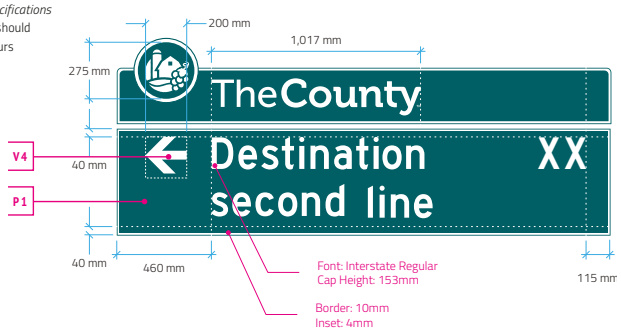
sign	type	intent	front face
Ah-2-006	community ID	confirm direction into downtown	Collingwood Downtown
Vt-3a-010	urban vehicular, pedestrian destination ID & regulatory	direct visitors onto trail	Train Trail → Historic Downtown [recreation icons] [regulatory info]
Vt-3a-064	urban vehicular, pedestrian destination ID & regulatory	direct visitors onto trail	Train Trail ← Historic Downtown [recreation icons] [regulatory info]
Vu-1-095	urban directional	direct visitors to Central Park towards the centre of town	[custom header] ← Historic Downtown ← Harbour ← Library ← Arena

MESSAGE SCHEDULE

Provide messages for every sign in the program. The schedule keys to the information in the location plan.

COLOURS

For vinyl, direct print, and paint colour specifications, refer to *Colour Specifications* starting on page 38. Fabricators should colour match to the Pantone colours specified.



2400 mm panels

DESIGN INTENT—LAYOUTS

Finalize and document layouts for all sign templates.

SIGN TYPES USING THESE SPECIFICATIONS:

UP—pedestrian directional

ASSEMBLY:

Sign panels are bolted to posts using cantilever brackets.

Posts are bolted to ground pin anchor.

MATERIALS:

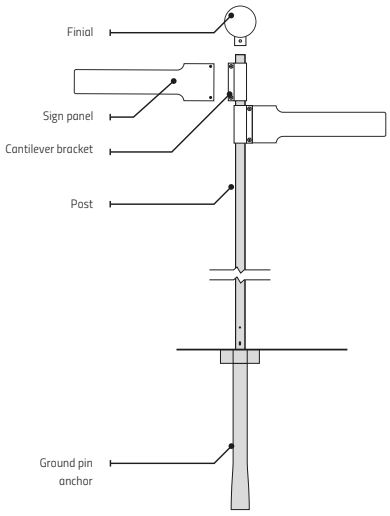
4.8 mm thick aluminum top panel (KAPX-0033). Black powder coated. Engineer grade decal on both sides.

Optional Finial: 3.2 mm thick aluminum 200 x 250 mm (KAPX-0033). Black powder coated. Engineer grade decal on both sides.

19 mm,special 4-sided brackets (2 brackets per storey).

50 mm galvanized fluted steel post (KPAU-0007) 3000 mm long. Black powder coated.

900 mm long ground pin anchor (KFGX-0016), Breakaway Pin (KGXX-0001) with stabilizers (KAPX-0019).



BUDGET AND PHASING

Get a budget estimate for the sign designs, based on quantities established in the location plan. If needed budgets can be phased over multiple rounds of fabrication and installation.

4.6 GRANTS

Funding grants change on a regular basis but grants that address active transportation, transit, micro-transit or micromobility, community walkability, streetscape design, greenhouse gas emissions, sea level rise and coastal changes, and community equity funding may be well suited for application to this plan's implementation. At the time of publication, the deadlines for many of these funding deadlines may have passed. However, many of these grant schedules renew on an annual basis or similar funding will become available on a yearly basis. The goal of this section is to offer an overview of funding programs currently and potentially available for AT programs in CBRM.

The programs that may be available for funding now include:

NATIONAL ACTIVE TRANSPORTATION FUND:

The National AT fund guide lays out the criteria for selection in the $400m fund over the next 5 years to support the expansion and enhancement of active transportation infrastructure and a modal shift away from cars and toward active transportation..

- Contact: ATF-FTA@infc.gc.ca
- Purpose: support projects that improve AT infrastructure. Expand networks of pathways, bike lanes, trails, pedestrian bridges, AT planning and stakeholder engagement activities.
- Goal: promote social equity, make AT accessible, easier, convenient, fun and safe, encourage AT choice over vehicle, reduce GHGs, support goals of the Strengthened Climate Plan, support Canadian economy through reduced congestion, construction job creation, increased access via AT to local business.
- Supporting documents: Canada's National Active Transportation Strategy.
- Supported projects: Planning, design and capital projects.
- Funding Amounts: Planning & design: $50,000.00 (up to 100%), Capital projects: up to 60% of the project cost.
- Timelines: Opened 2022-2027.

CONNECT2:

Provincial grant through the Nova Scotia Department of Energy and Mines. Supports projects that offer low or no carbon transportation projects. Funding for feasibility studies, designs, pilots, plans, engagement activities, and the implementation of a variety of clean energy initiatives in NS. Funding for projects related to walking, biking, rolling, shared mobility, ZEVs, and transit.

Focus: projects that address short trips, connect destinations, increase equity and access in transportation opportunities, and decrease dependency on personal vehicles by improving transportation hubs and integrated mobility

Main objectives: decarbonization of energy sources, learning by doing, electrification of community assets, community lead/readiness approach to clean transportation and energy transformations.

2 streams of funding:

1. AT Infrastructure and Design
    a. Tactile urbanism (bike lanes etc), bike grid infrastructure or design, engineering or feasibility studies
    b. Funding up to $100,000.00 per project
2. Clean Fleets and Shared Mobility
    a. Shared mobility services pilot projects, bicycle fleet pilots, zero-emission fleet pilots (max$15k per vehicle), zero emissions vehicle strategies.
    b. Funding up to $75,000.00 per project.

This grant will cover up to 75% of eligible costs, up to a maximum of $100,000 for the infrastructure and design projects, up to a maximum of $75,000 for clean fleets and shared mobility, and up to a maximum of $50,000 for community building and engagement projects.

Contacts: Salima Medouar at 902-717-7026, Gabrielle Riley Gallagher at 902-424-8090, rconnect2@novascotia.ca

Deadline: September 30th, 2021.

FCM GREEN MUNICIPAL FUND 2 OPTIONS – FEASIBILITY STUDY OR CAPITAL PROJECT

Feasibility Study:

Funds feasibility studies of initiatives that may reduce pollution in Canadian communities by improving transportation systems and networks or encouraging people to switch to less polluting transportation options.

The feasibility study should assess the feasibility (e.g., technical, financial) of an initiative as well as its potential environmental, economic and social impacts.

Examples of what you might study:

- Ridesharing and ride hailing programs
- On-demand transportation solutions
- First- and last-mile solutions
- Bike sharing
- Connecting commuters to park-and-ride facilities
- Active transportation infrastructure (e.g., bike lanes)
- Walking and cycling networks that promote accessibility and safety
- Integrated transportation solutions (e.g., bike share and transit) to reduce fuel consumption and promote transit use.
- Solutions to reduce personal vehicle use, reduce congestion and/or incent Zero Emission Vehicle adoption (e.g., low emission zones, commercial delivery vehicle measures)

FCM Capital Projects:

FCM offers combined loan and grant funding for capital projects that reduce pollution in Canadian communities by improving transportation systems and networks or encouraging people to switch to less polluting transportation options.

Your capital project should do at least one of the following:

- Reduce the number of vehicles on the road, the number of kilometres they travel, or the amount of time they spend transporting people or goods
- Get people to use their vehicles more efficiently or switch to less polluting forms of transportation (i.e., a modal shift to public transit, walking, or cycling).

Examples of what you might implement:

- Ridesharing and ride hailing programs
- On-demand transportation solutions
- First- and last-mile solutions
- Bike sharing
- Connecting commuters to park-and-ride facilities
- Active transportation infrastructure (e.g., bike lanes)
- Walking and cycling networks that promote accessibility and safety
- Integrated transportation solutions (e.g., bike share and transit) to reduce fuel consumption and promote transit use.
- Solutions to reduce personal vehicle use, reduce congestion and/or incent Zero Emission Vehicle adoption (e.g., low emission zones, commercial delivery vehicle measures)

NS ACTIVE COMMUNITIES FUND:

To help your community get active and stay active. In particular, this fund supports community-wide approaches and plans for low barrier, less structured movement. It is part of Let's Get Moving Nova Scotia: An action plan for increasing physical activity in Nova Scotia. You can use this fund to help you:

- Plan, develop or evaluate policy
- Plan, create, improve, or evaluate physical environments (The fund is limited to supporting low-cost physical environment initiatives.) plan, create, improve, or evaluate social environments

Examples of qualifying initiatives:

- Initiatives that encourage low barrier, less-structured movement that people can fit easily into their day.
- Reducing sitting time by, for example, encouraging walking meetings
- Unstructured active play
- Cycling
- Walking, including using a cane, walker, or wheelchair

May consider programs with more structure for up to $5,000 per application period. Such programs should be flexible for participants and encourage daily physical activity over the long term. Initiatives that aim to enhance physical activity among at least one of the following groups:

- Youth ages 12-18
- The aging population, anyone 45 years old or older
- Females in the above age groups
- Community members who may have minimal access to physical activity opportunities
- Less active adult population (in general)

Amount: up to 75% of up to $25,000.00 (Applications above $5000 must be accompanied by and reflect part of a one year (2021–22) multi-faceted community wide physical activity plan).

Contact: Valley Region: (Municipalities of Hants West and Clare, Counties of Digby, Annapolis and Kings): Anna Sherwood, anna.sherwood@novascotia.ca (902) 670-7933

Timeline: Community applications associated with one-year plans can be submitted between April 1st and July 15, 2021. Additional applications from communities who did not exceed the $25,000 limit will be accepted until December 22, 2021

BUILDING VIBRANT COMMUNITIES GRANT

Purpose: This grant is funded by the province of Nova Scotia, aimed specifically towards not-for-profits, local governments, businesses and educational institutions. Overall, the fund focuses

on alleviating poverty by strengthening community organizations and collaboration. In the past, previous themes included transportation.

Timelines: TBA

VEHICLE FLEET GRANTS:

Connect 2

"The Connect2 grant program expands Nova Scotian communities' options for walking, biking, rolling, shared mobility, ZEVs, and transit while reducing GHG emissions. The program supports projects that create or enable clean transportation options and builds infrastructure for short-distance travel and modes of transport using alternative fuel. We're seeking projects that test new ideas or best practices that connect destinations, increase equity and access in transportation opportunities, and decrease dependency on personal vehicles by improving transportation hubs and integrated mobility"

Eligible Projects: Clean Fleets and Shared Mobility Projects under this category may include:

- Shared mobility services pilot projects
- Bicycle fleet pilot projects
- Zero-emission fleet pilot projects (max. $15,000/vehicle within grant request)
- Zero Emission Vehicle strategies

Funding: up to 75% of project cost, up to $75,000 per project in this category.

NRCAN – ZERO EMISSION VEHICLE INFRASTRUCTURE PROGRAM

Purpose: The grant aims to meet the mandate set by the Government of Canada for all new light-duty cars and passenger trucks to transition into electric vehicle fleets, with the ultimate goal of achieving a zero-emissions by 2035. This program will span 5 years, offering a total of $280 million. The fund focuses on increasing the availability of charging and hydrogen refuelling stations throughout Canada. The program aims to implement charging stations within the following infrastructure streams:

- Public Places
- On-Street
- Workplaces
- Multi-Unit Residential Buildings
- Commercial and Public Fleets (on-road and off-road vehicles)

Amount: A maximum of 50% of total project costs up to a maximum of $5 million per project, and a maximum of $2 million per project for delivery-based organizations..

Contact: Proposal is to be delivered via email at infrasubmissions-demandinfr@nrcan-rncan.g

Timeline: The 2021 deadline closed on September 8, 2021. However, the program intends to launch another RFP for all infrastructure streams in the spring of 2022.

FCM GREEN MUNICIPAL FUND

Pilot project: This overarching goal of this fund is to ensure that low-fossil and low-carbon is accessible, efficient, and convenient for governments. Through funding, the organizations offers local governments the opportunity to achieve sustainable transportation methods, and offers the means and resources to transition to a carbon-free future. Essentially, the organization aims to reduce fossil fuel in fleets while offering alternative methods of transportation at the community level.

- Funding to eliminate/reduce GHG from any vehicle that delivers municipal services.
- Can be used to compare models to see what is most effective at reducing GHGs
- Must be able to demonstrate solid business case and the ability to deliver strong environmental, financial and social benefits directly to your community or through replication in other municipalities.
- Includes all types of vehicles used for municipal services including police, waste management and leased vehicles.
- Examples of projects: appropriately sized vehicles for municipal tasks, fast charging stations for EVs, EV fleet replacement (especially for medium and heavy duty trucks),
- Target: should reduce 20% of emissions.

CAPITAL PROJECT: REDUCE FOSSIL FUEL USE IN FLEETS

This project offers a combination of loans and grants to fund capital projects at the municipal level. The project's intent is to reduce and avoid; fossil fuels in any vehicle delivering municipal services. Overall, the project helps municipalities transition into green-energy by helping them undertake any project focusing on the reduction of energy consumption and greenhouse gas emissions.

- All classes of vehicles are eligible.
- Ex. Projects same as above pilot.
- Must reduce emissions 20% when compared to an existing or modeled baseline measurement.
- Stackable with other funding opportunities

Amount: Low-interest loans up to a total amount of $5 million, and a grant worth up to 15% of the loan. The total funding covers up to 80% of eligible project costs. Projects classified for high-ranking loans and grants are qualified for low-interest loans up to $10 million, and a grant worth up to 15% of the loan. In total, the funding is covers 80% of the project's total cost.

Contact: Apply through the website

Timeline: Applicants must submit a Initial Review Form, which is available year-round. Following, applications will be provided to qualified applicants only.

4.7 OUTREACH AND IMPLEMENTATION

The successful implementation of AT infrastructure works in tandem with community outreach projects. Previous national and international AT plans cite the important of combining multiple outreach strategies when launching new AT networks. Successful methods include marketing campaigns, educational outreach, cycle lane pop-ups, and efforts to help individuals transition into the regular use of methods of active transportation. In partnering with local and provincial organizations, municipalities can encourage and spread awareness of AT networks and their usage to their residents.

MARKETING STRATEGIES

Marketing strategies for active transportation must include initiatives to encourage residents to cycle, walk, and use transit regularly. These strategies can incorporate individual projects, but should consider the follow types pre- and post- infrastructure installation.

For residents to consider the role AT networks can play in their lives, they have to see themselves as a AT user. In this specific situation, advertising becomes an important strategy. A study from the University of West England cites the importance of self-image congruency in AT marketing. As a theory, self-image congruency explores how individuals perceive their current self in relation to their ideal self. Within the realm of marketing, this theory caters to the idea that an individual is more likely to purchase items or partake in an activity if they can see their "ideal" self within the advertisement. While this may be easier to accomplish with material goods, studies and applications of the theory demonstrate the success of marketing cycling and walking to potential AT users. Essentially, an individual who can see a version of their ideal self in promotional AT material will be more likely to perform said activity

Research suggests the best application of this method are advertisements wherein the AT user looks relaxed and happy. This not only reassures potential AT users about possible safety concerns, but also encapsulates the idea of a carefree lifestyle many individuals strive to achieve. Secondly, marketing campaigns also encourage advertising cyclists using the "every man" archetype to correct the incorrect notion that every AT user must be an athlete. The use of advertising to demonstrate cyclists and walkers as normal people allows individuals to see themselves as a cyclist or pedestrian. Effective marketing campaigns use a range of ages, demographics, and lifestyles to target as many user groups as possible[1].

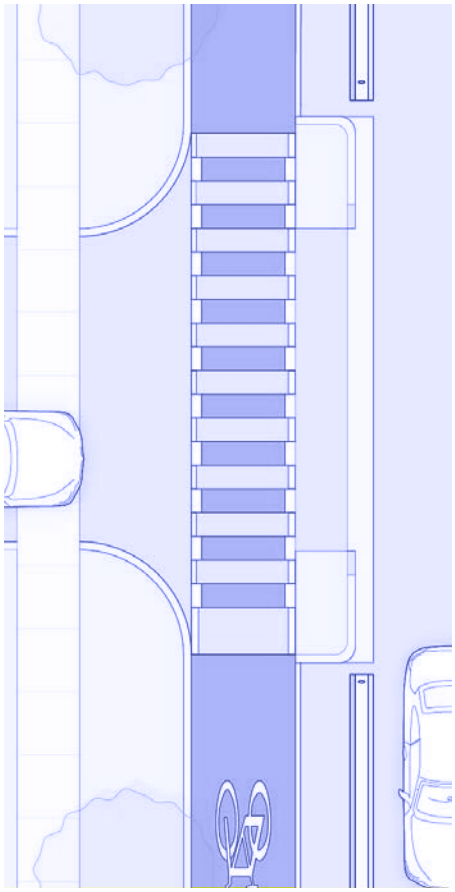
Advertising campaigns should also encourage cyclists and pedestrians to see one another as human individuals. Addressing conflicts between AT users and motorists mitigates safety concerns among potential users and allows both parties to see the other as people. Humanizing the cyclist, pedestrian, and driver allows all parties to consider their role on the road, and their duty to consider the safety of others - regardless of the transportation method they have chosen.

1 Leonard, S., Spotswood, F., & Tapp, A. (2012). Overcoming the self-image incongruency of non-cyclists. Journal of Social Marketing, 2(1), 23–36. https://doi.org/10.1108/20426761211203238

CHAPTER 5

CBRM AT STANDARDS

The previous AT Master Plan chapter outlined the AT infrastructure types and proposed locations for a dedicated AT network in CBRM. Combining AT infrastructure with transit and automobiles must be done carefully and deliberately to ensure that the safety of users and the capacity of the network is not compromised. This chapter lays out how to integrate AT into CBRM's current road and transit network using the latest standards and best-practices.



The way we prioritize roadway space is changing drastically as personal mobility options and transit gain momentum around the world. Rather than weighting the car over all other modes of travel when designing a street, active transportation and integrated mobility planning seeks to 'strategically re-prioritize' the physical allocation of the road corridor to accommodate other forms of transportation like walking, biking and transit. These more "Complete Streets" often eliminate or narrow lanes ("Road Diets"), and create more roadside appeal by adopting "urban forestry" or "enhanced frontage and furniture zones". More equitable street designs diversify how residents can commute throughout CBRM improving their quality of life and reducing their costs. In some cases, road dieting can be less expensive for CBRM to maintain as well as reducing the municipal carbon footprint.

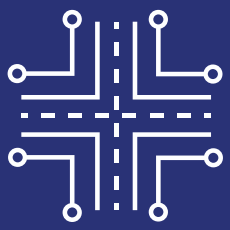
Combining different forms of transportation in a shared road network requires careful design to maximize safety for all users. Road design in Canada is guided by the Transportation Association of Canada's (TAC) *Geometric Design Guide for Canadian Roads* and associated TAC documents, standards produced by the National Association of City Transportation Officials (NACTO), and some select provincial design publications. This chapter lays the standards and best-practices for AT integration in CBRM and the associated references that form the basis for developing, enhancing, and maintaining a robust active transportation network.

CBRM utilizes the Standard Specification for Municipal Services (for Nova Scotia) which contains very little guidance on municipal road design or active transportation. Ideally CBRM will develop its own *municipal design guidelines* manual in the near future, but until that time, this chapter should guide engineers, planners and designers on how to integrate AT considerations into future municipal design/redesign projects along the corridors prioritized for AT.

INCLUSIVE AND ACCESSIBLE

INTUITIVE

CONTEXT SENSITIVE



DESIGN JUDGEMENT, STANDARDS, AND IMPLEMENTATION

5.1 GUIDING PRINCIPLES

The following are some of the critical guiding principles that underly the subsequent AT design standards.

INCLUSIVE AND ACCESSIBLE

AT facilities should be designed to accommodate all or as many users as possible - regardless of demographic, socio-economic, socio-cultural, or physical ability. It is recognized that there may be practical impediments from achieving this in all situations. Some routes may be designed to accommodate specialized uses such as horseback riding, off-road vehicles or winter activities. Others may support complementary travel modes such as ferry or transit service, connections to water based travel (kayaking / canoing, etc.), and more. Ultimately, each of these should be planned, designed, and implemented starting with an inclusive and accessible model, and ensuring the appropriate input and coordination take place between the impacted stakeholders.

INTUITIVE

Facility design should allow users to operate in a safe, stress-free, cohesive, attractive and clear environment. Properly design and implemented, users of each facility intuitively know what to do, where to do it, and when it should be done. This results in existing and new users feeling attracted to their available facilities and is more likely to create long term users of the active transportation networks available to them.

ALL AGES AND ABILITIES (AAA)

All Ages and Abilities (AAA) facilities are designed to ensure every AT user can safely and comfortably travel along the AT network. Users can range from seniors to children, confident cyclists to new riders, people with disabilities or other mobility impairments, bike sharing, recreational, commuter, and commercial users, and powered or non-powered mobility.

AAA Philosophy - Providing AAA facilities promotes the use of constructed AT facilities. Philosophically, all projects should be initiated with the intent to provide AAA compliant facilities by applying AAA best practices guidelines.

AAA Implementation - In the event an AAA facility cannot be accommodated, justification should be provided as to why. Practically, there are reasons why fully compliant AAA facilities may not be feasible including available right-of-way, cost implications, terrain, stakeholder and community input, and more.

The following section includes a more detailed discussion about AAA requirements, opportunities and characteristics that should be considered within this AT plan. Further, each typology discussed in the Standards section includes an “AAA Considerations” discussion to address specific situations relevant to that typology.

CONTEXT SENSITIVE DESIGN

Context sensitive design refers to both roadway and AT designs specifically tailored to work within the area they are designed to serve. Contextual considerations may include topography, adjacent land use, micro-climate, history, community and stakeholder preferences, transportation connectivity and integration, urban / rural application or demographics. One size does not fit all. CBRM includes a large, diverse land area that must be recognized as the foundation for future AT facility design and construction.

DESIGN CONSISTENCY AND FLEXIBILITY

Consistent selection of facility types and application of similar design features in similar situations helps users feel comfortable and confident during their trips. Facilities should therefore be developed in a consistent manner throughout CBRM, but also in the overall Nova Scotia context so facilities feel familiar regardless of where people travel. That said, it is critical to understand that each project is unique and has a unique set of features and demands, therefore consistency can be a balancing act between the standards and specific project needs.

This guide draws from local and nationally recognized design publications. The intent of this section is to provide ranges of applicable guidelines for facilities relevant to this plan, and thereby enabling flexibility in how facilities are designed. Ultimately, completed projects should be site specific while maintaining noticeable consistency across the network for facility users.

DESIGN AND PROFESSIONAL JUDGEMENT

It is important to understand the impacts of AT design choices on the larger transportation environment, including the need to incorporate and understand: safety implications, value engineering, geometric accommodation and transitions, drainage, utilities impact, land use and more. Engaging the necessary internal or external professional support will ensure a successful project. To plan, design, implement and maintain a successful AT project, project teams may include engineers, planners, landscape architects, real estate and various other specialists

SAFETY

Safety “performance” and safety “perception” of transportation systems is a critical factor in the successful implementation of new facilities and in the level of usage on existing facilities.

This is incredibly important for active transportation users who are not afforded the protection of large, stable vehicles that can reduce the severity of collisions should they unfortunately occur.

Active transportation users are significantly more vulnerable within our transportation system, and locations or situations that have poor safety performance records, or have perceived safety issues are often reason enough for may users to avoid using active transportation modes. It is critical that new facilities be design with a focus on the consistent application of best practice safety principles at ALL location along a route, as a single point location can often be enough to discourage use of the route.

For existing facilities, regular safety reviews and solicitation of safety issue from the public should be sought with the intent to mitigate any safety risks that may be negatively impacting the use of the route.

DESIGN DOMAIN

The design domain concept helps designers move away from “standards” or “minimum acceptable” design values (i.e sidewalk or lane width, grades, etc.), by providing a range of appropriate design values. Designers are therefore better able to better understand and define acceptable values that may be applicable to a particular facility. It is important to recognize that the appropriate design values will vary from case-to-case depending on the context, adjacent infrastructure, available right-of-way, and association to various selected design features.

The design domain parameters, were compiled from a variety of sources but are generally presented in terms as outlined in the Transportation Association of Canada‘s (TAC) Geometric Design Guide for Canadian Roads.

SAFETY

TRANSIT INTEGRATION

COMPLETE STREETS

FUTURE USE CONSIDERATIONS

The design process must consider the interaction between selected design values. For example, a minimum width sidewalk should not be installed beside a higher speed roadway with limited separation between the curb and the sidewalk. Options may include narrowing the road lanes to provide more separation, increasing the sidewalk width, or providing improved physical separation between the road and sidewalks. Similarly, if a road has relatively steep grade, a bike lane width closer to the upper recommended limit should be used, or a buffer strip may be considered.

TRANSIT INTEGRATION

Integrating active transportation modes and transit enables people to travel greater distances, in more adverse weather conditions, and for purpose-based trips. The proper design of space, amenities, and the placement of enabling infrastructure is critical in making transit integration a positive, engaging experience.

Various sections through the report includes guidance on two primary facets of transit integration:

1. The treatment of various AT facilities as they pass a typical transit stop location; and
2. The design of the areas surrounding a transit stop in order to effectively integrate with various active transplantation modes.

COMPLETE STREETS

Complete Street are roadways that are envisioned, planned, designed, implemented, and maintained with the intent to serve a wide range of user ages and abilities, using a variety of different modes of transportation. The complete street concept includes the physical operating realm for vehicles, pedestrians, cyclists, transit, as well as the surrounding and supporting environment. The surrounding environment may include features such as lighting, wayfinding, crosswalks, loading zones, trees and greenery, and more.

LOOKING TO THE FUTURE – THE MOBILITY REVOLUTION

The world of transportation is rapidly changing. Electric cars, bikes, and scooters are now commonplace, challenging the concept that active transportation includes only non-motorized travel (i.e. should an electric hoverboard be allowed on a multi-use trail that is traditionally built for non-motorized travel?).

Autonomous vehicles, smart technologies, vertical takeoff and landing vehicles, drone deliveries, and more are reshaping the way we view our transportation network - and the pace of change is accelerating! Existing infrastructure and near- term new construction projects must be designed to accommodate new transportation methods within the lifespan of that infrastructure project. As such, the design guidelines in this chapter will need to be monitored, updated, and refined as many of the above noted technologies become more common daily transportation methods.

5.2 CREATING AN "ALL AGES AND ABILITIES" CULTURE IN CBRM

Experienced cyclists have a higher comfort level cycling with vehicle traffic due to their comfort and abilities to operating their bike at higher travel speeds. In many cases, travels speeds of experienced cyclists can approach vehicle speeds in the adjacent lanes. Recreational and less experienced cyclists, which this AT plan is geared to serve, typically prefer to be separated from vehicles, particularly as vehicles speeds and volumes increase. Bicycle participation is heavily influenced by physical safety and the perceived comfort level.

As noted in the NACTO document "Designing for All Ages and Abilities":

"The All Ages & Abilities criteria is a national and international best practice that should be adopted for all bicycle facility design and network implementation; lesser accommodation should require additional justification. Along with a problem-solving approach to street design, the All Ages & Abilities benchmark should be applied across a city's entire bicycle network to grow bicycling as a safe, equitable mode for the majority of people."

Wherever possible, CBRM should adopt AAA criteria for implementing bicycle facilities. This chapter provides a general summary framework as well as specific facility guidance for implementing AAA facilities.

MOTOR VEHICLE SPEED & VOLUME INCREASES STRESS

Bicycle use is heavily dependent on the stress a person encounters when using a cycling facility. The two most common stresses for cyclists are vehicle SPEED and VOLUME. Both have negative impacts on users and both contribute to a increase in potential number and severity of conflicts on a roadway.

The number of vehicle passing events increase with speed and volume, decreasing rider comfort and safety. When car speeds exceed 35 km/hr, or where traffic volume is higher than 50 vehicle passes per hour, it reduces cycling comfort and increases risk.

Such stresses can be removed or reduced through:

1. Changing the Street Design - changing cross sections, land uses, roadside character, or other features to make the corridor more bike friendly
2. Changing Operations - including speed reductions, signalization, curbside management, etc.
3. Changing the Network - including street closures, turn restrictions, route options, etc.

AAA PRINCIPLES

SAFETY

More people ride when facilities feel safe. Safety takes many forms, but ultimately needs to be viewed from the user's perspective. Standards are great - but you need to "ride a mile on someone else's bike". NACTO research shows that a set of cities that grew their bikeway network by 50% over a span of 7 years, more than **doubled** their ridership. Better bike facilities also directly correlated with increase safety for people walking, cycling and driving.

COMFORT

Providing comfortable. low-stress riding conditions has a significant impact on ridership. Statistics suggest only 5 - 10% of the public feel comfortable riding in mixed traffic or in painted bike lanes, while close to 80% indicate they would ride in protected or off-road bike facilities.

EQUITABLE

Quality infrastructure expands AT opportunities. Deteriorating infrastructure reduces use of available facilities, or worse, discourages a culture of active transportation use. Unfortunately, research suggests that poor network conditions, disproportionately impacts low-income communities, people with disabilities, children and other vulnerable user populations. These challenges cause people to either not ride, or make decisions that are considered riskier in order to ride.

THE ALL AGES & ABILITIES DESIGN TOOLBOX

NACTO sets out five major types of bike facilities to meet AAA criteria guided by **Table 5-1** depending on the street context. The NACTO Urban Bikeway Design Guide provides detailed guidance on bikeway facilities.

1. **Low-Speed Shared Street** allow bicyclists to comfortably operate across the entire roadway when speed limits are no greater than 20 km/h. The volume of people walking and bicycling should be much greater than vehicle volume to maintain comfort. On these low speed streets, safety between pedestrians and cyclists can be more concerning than vehicles. Materials and street edges must be appropriate for bicycling; materials are often varied to delineate road space, but any seams or low mountable curbs must be designed to avoid creating fall hazards for bicyclists. Argyle Street in Halifax is one of the regions first Shared Street and was selected as such due to the street's function to serve local businesses only and its low priority for moving traffic. Future Shared Streets may be appropriate in some of CBRM's downtowns where the street is not important in moving traffic.
2. **Bicycle Boulevards** share low speed local streets with signed bicycle routes. They are characterized by slow motor vehicle speeds (no greater than 30 km/hr) and low volumes (less than 2,000 vehicles per day). Sometimes these are suitable around school zones where the province has recently reduced speeds to 30 km/hr when children are present. Sometimes they are combined with speed bumps to ensure low vehicle speeds and usually are characterized by sharow road paint, and indicator signage. Sometimes the street improvements benefit from traffic calming, filtering most motor vehicle traffic off, and/or prioritizing bicycles at major and minor street intersections. Bicycles share the entire street with vehicles. Directional markings and wayfinding signage provide riders with intuitive, coherent routing.
3. **Buffered & Conventional Bicycle Lanes** provide allocated space for cyclists in the form of bike lanes adjacent to roads. Bicycle lanes improve cycling comfort and safety on streets where the number of passing events is too high for comfortable mixed-traffic bicycling (< 6000 vehicles per day), but where curbside activity, heavy vehicles, and lane invasion are not significant sources of conflict. Buffered bike lanes are physically separated from traffic with extra space, usually painted on the road, providing additional separation from vehicles.
4. **Protected Bicycle Lanes** (also known as Cycle Tracks) use a combination of horizontal separation (buffer distance) and vertical separation (e.g. flex posts, parked cars, planters, or curbs) to protect cyclists from car traffic. The combination of horizontal and vertical buffers can significantly improve safety and increase the use of bicycles. Particular design attention must be paid to areas where vehicles, bikes and pedestrians cross like at intersections, driveways, roundabouts, bus stops, or in areas with onstreet parking.

TABLE 5-1 NACTO AAA Facility Selection Criteria

Contextual Guidance for Selecting All Ages & Abilities Bikeways				
Roadway Context				All Ages & Abilities Bicycle Facility
Target Motor Vehicle Speed *	Target Max. Motor Vehicle Per Day	Motor Vehicle Lanes	Key Operational Considerations	
Any		Any	Any of the following: high curbside activity, frequent buses, motor vehicle congestion, or turning conflicts ‡	**Protected Bicycle Lane**
< 20 km/hr	Less relevant	No centerline, or single lane one-way	Pedestrians share the roadway	**Shared Street**
≤ 35 km/hr	≤ 1,000 – 2,000		< 50 motor vehicles per hour in the peak direction at peak hour	**Bicycle Boulevard**
≤ 40 km/hr	≤ 500 – 1,500			
	≤ 1,500 – 3,000	Single lane each direction, or single lane one-way	Low curbside activity, or low congestion pressure	**Conventional or Buffered Bicycle Lane, or Protected Bicycle Lane**
	≤ 3,000 – 6,000			**Buffered or Protected Bicycle Lane**
	Greater than 6,000			**Protected Bicycle Lane**
	Any	Multiple lanes per direction		
Greater than 40 km/hr †	≤ 6,000	Single lane each direction	Low curbside activity, or low congestion pressure	**Protected Bicycle Lane, or Reduce Speed**
		Multiple lanes per direction		**Protected Bicycle Lane, or Reduce to Single Lane & Reduce Speed**
	Greater than 6,000	Any	Any	Protected Bicycle Lane, or Bicycle Path
High-speed limited access roadways, natural corridors, or geographic edge conditions with limited conflicts		Any	High pedestrian volume	Bike Path with Separate Walkway or Protected Bicycle Lane
			Low pedestrian volume	Shared-Use Path or Protected Bicycle Lane

* While posted or 85th percentile motor vehicle speed are commonly used design speed targets, 95th percentile speed captures high-end speeding, which causes greater stress to bicyclists and more frequent passing events. Setting target speed based on this threshold results in a higher level of bicycling comfort for the full range of riders.

† Setting 25 mph as a motor vehicle speed threshold for providing protected bikeways is consistent with many cities' traffic safety and Vision Zero policies. However, some cities use a 30 mph posted speed as a threshold for protected bikeways, consistent with providing Level of Traffic Stress level 2 (LTS 2) that can effectively reduce stress and accommodate more types of riders. [18]

‡ Operational factors that lead to bikeway conflicts are reasons to provide protected bike lanes regardless of motor vehicle speed and volume.

5. **Shared-Use & Bicycle Paths** are a preferred form of active transportation where there is room for them. Rail to trail conversions are typical in areas like CBRM where rail lines have been decommissioned or unused for long periods. Shared use paths usually combine with other forms of AAA facilities to link homes to key destinations like downtowns or business parks. When shared with pedestrians, the shared use paths must be designed to ensure cyclist and pedestrian safety using signage, or other means to slow cyclists. To become useful for AT, paths work best when connected to an on-street network that meets the same high benchmark of rider comfort, and design provides bicycle-friendly geometry. Ideally, bicycles should be separated from pedestrians where significant volume of either mode is present, but where space limitations exist, multi-use paths are still valuable.

DESIGN DOMAIN

PRACTICAL UPPER LIMIT

Design values above the recommended upper limit and the practical upper limit often still work, but they are likely to create safety or operational risks - usually by giving a confusing message.

Example - if a bike lane is too wide, drivers may mistake it for a parking lane or two lanes of travel.

Use of values in this range require further justification and may require an explicit evaluation of impacts to safety.

RECOMMENDED UPPER LIMIT

Design values between the recommended upper and lower limits generally do not require justification for their selection. They are widely accepted values that typically provide a safe and accessible environment to operate in.

RECOMMENDED LOWER LIMIT

Design values below recommended lower limit should only be used when there are constraints present and no other options can be found to achieve the lower limit. Values in this range generally put the user at an increased risk of collision or operational hazard. Justification is required for selection of a value in this range and documentation of the safety implications is required.

PRACTICAL LOWER LIMIT

Values below the practical lower limit should not be used due to the risk and associated liabilities. In these situations, alternate design options or routes should be considered.

5.3 DEFINITIONS

MULTIMODAL LEVEL OF SERVICE (MMLOS)

The traditional concepts of Level of Service (LOS) has been applied to transportation systems for decades, but generally focuses on a roadway or intersections' ability to accommodate vehicular traffic. Instead, Multi-Modal Level of Service (MMLOS) focuses on the degree of service provided to the ***number of people***, rather than the outdated ***number of vehicles*** on an intersection or roadway. MMLOS considers the number of pedestrians, cyclists, truck traffic, transit, emergency access and private vehicles found at intersections and roadway in the overall quality of operation in the facility. Examples of the MMLOS methodologies can be found in many recent references including the 2019 Multi-Modal Level of Service Framework issued by the HRM.

It is important to note that many MMLOS evaluation guidelines are works in progress and subject to changes, modifications, and refinements. While caution should be exercised in assigning and comparing specific findings from these analyses, the rigours of completing these analyses are valuable and revealing the understand the operations of roadway corridors and intersections.

ROAD DIETING

In general terms, modern streets are becoming are becoming narrower. The reduction of lane widths and the elimination of roadway lanes recognizes the modern need for roadways to serve all transportation methods, rather than focusing solely on the vehicular service to dictate the design of a typical road section. **Table 5-2** and **Table 5-3** demonstrate basic roadway widths for through and parking lanes that should be considered within a road cross section. The supplemented widths provide flexibility when considering the placement and location of sidewalks and bike lanes.

TABLE 5-2 Design Domain for travel Lanes

Roadway Travel Lanes	Practical Lower Limit	RECOMMENDED		Practical Upper Limit
		Lower Limit	Upper Limit	
Width (m)	2.7	3.0	4.0	4.8

TABLE 5-3 Design Domain for parking lanes

Parking Lanes	Practical Lower Limit	RECOMMENDED		Practical Upper Limit
		Lower Limit	Upper Limit	
Width (m)	2.1	2.1	2.7	3.0

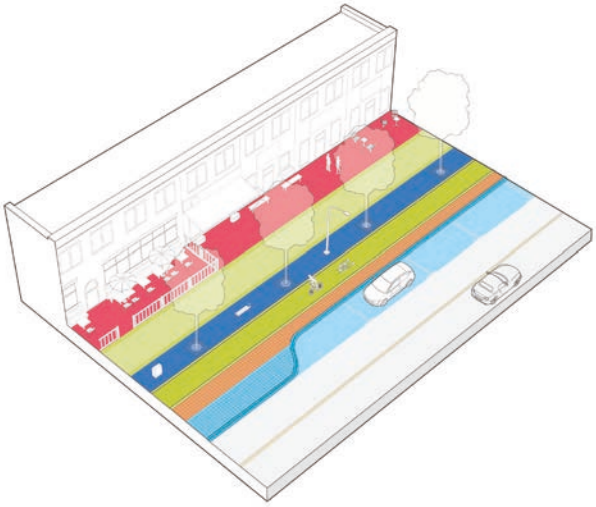


FIGURE 5.4 Components of an Urban Roadway

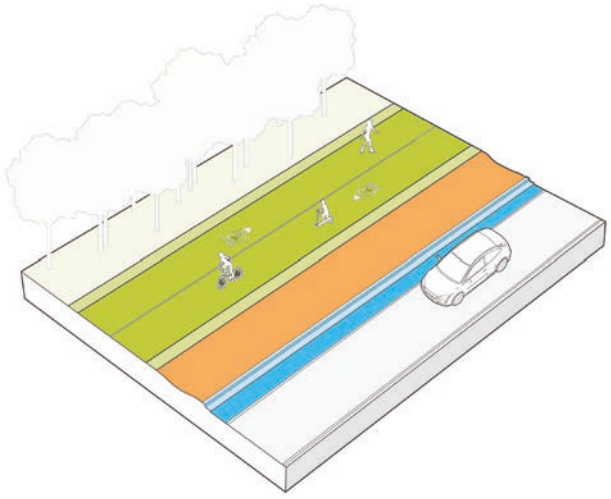


FIGURE 5.5 Components of a Rural Roadway

URBAN CONTEXT

Development in the urban context generally includes medium to high density mixes of residential, commercial, office and institutional land uses. There are numerous potential AT users with the inherent need to travel between various origins and destinations. While available road ROW may be limited due to adjacent land ownership and development, road connectivity is an essential consideration where considering options for route choices. The municipality is often the primary road authority with limited provincial routes.

- **Frontage Zone** - Between the pedestrian zone and the adjacent properties. May range from grassed buffer strip to a full street front cafe and can be private, public or a combination of both.
- **Pedestrian Through Zone** - Clear, accessible and safe space for pedestrians to walk adjacent and generally parallel to a roadway.
- **Furnishing Zone** - May contain street furniture, lighting , trees /planters, bike parking, etc.
- **Bike Through Zone** - This zone may be on the roadway adjacent to the ancillary or traffic zone or may be separated from the roadway by the buffer zone depending on the configuration of the roadway.
- **Buffer Zone** - Can serve a variety of functions within the roadway ROW and is often adjacent to a bike facility.
- **Ancillary Zone** - Flexibly space located within the roadway and supports operations for the roadway and the sidewalk/bicycle through zones. Examples include car or bike parking, loading zones, transit or taxi stops, curb extensions, etc.
- **Traffic Zone** - Includes all traffic travelling along a road corridor.

RURAL CONTEXT

Rural AT routes are characterized by their proximity to low density development areas and may include residential, commercial, institutional and office land uses. Due to the limited amenities, users are typically limited and facilities tend to serve recreational purposes rather than commuter needs. Generally, there is need for flexibility in route locations and networks are often composed of a higher volumes of off-road trails. Consequently, OHVs (off highway vehicles) / ATVs (all terrain vehicles) need to be actively considered in the development of rural AT facilities. Roadways and trails segments can be municipally or provincially owned, therefore increased levels of coordination between the province and municipality will likely be required.

- **Pedestrian / Bicycle / Multi-use Zone** - Clear space used by pedestrians and cyclists.
- **Clear Zone -** The area between the traffic zone and any object considered to be a hazard (including pedestrians and bikes) if there were an errant vehicle. Includes the shoulder zone.
- **Shoulder Zone -** On rural cross sections, the shoulder is the usable portion of the roadway that is outside of the traffic zone and may be used for stopped vehicles, recovery of errant vehicles or emergency services.
- **Traffic Zone** -Includes all traffic travelling along a road corridor.

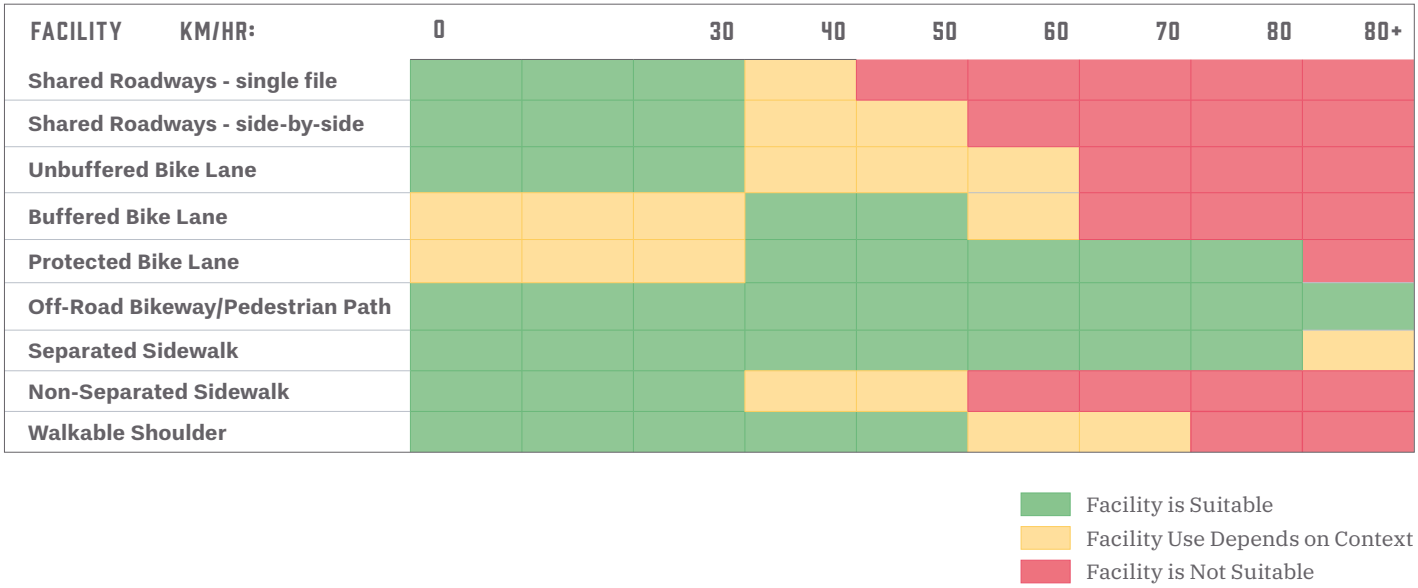
SUBURBAN CONTEXT

The suburban context exists between higher density, urban developed areas, and low density rural areas. Within the suburban context, there is generally less road connectivity, fewer intersections and a wider variety of road and AT treatments. Due to the lack of compact road networks within the suburban context, active transportation infrastructure and development is spread out in comparison to an urban setting. Roadways may vary between urban and rural cross sections. Consequently, there is typically more flexibility in regard to available road right-of-way or finding new active transportation corridors. AT trips are usually oriented towards local usage rather than commuting purposes. However, confident cyclists or e-mode users may undertake longer commuter trips to urban centers. Road authority frequently leans toward municipal units, through provincial responsibilities may exist in some areas.

FACILITY SELECTION GUIDELINES

Table 5-6 provides a general framework identifying what types of facilities are suitable for different speeds on the adjacent roadway. Typically, as the speeds increase the risk of collision frequency and severity increase. To reduce the risk, greater separation is required between the roadway and the AT facility.

TABLE 5-6 Facility Selection Guide



REFERENCES

Transportation Association of Canada (TAC) - Geometric Design Guide for Canadian Roads
TAC Bikeway Traffic Control Guidelines
TAC Pedestrian Crossing Control Guide
Manual of Uniform Traffic Control Devices for Canada (MUTCDC)
British Columbia Active Transportation Design Guide
North American City Transportation Officials (NACTO) - Urban Street Design Guide
NACTO - Global Street Design Guide
NACTO - Designing Streets for Kids
NACTO - Urban Bikeway Design Guide
NACTO - Designing for All Ages and Abilities
NACTO - Don't Give Up at the Intersection

PEDESTRIAN FACILITIES

5.4 PEDESTRIAN FACILITIES

Nearly every trip outside a home begins and ends with access to pedestrian infrastructure - to walk to work, get to the nearby transit stop, walk down the street for lunch or to visit friends, and to take a walk or jog along the waterfront. The goal of the active transportation network work is to be fully accessible, connected, integrated and safe in order to serve the public need and further promote the use of active transportation modes.

When considering pedestrian infrastructure, phrases such as the "walkable environment" and "pedestrian integrated design" are often used to represent the fact that the pedestrian facilities are part of a larger transportation environment. Pedestrian facilities can be segmented into a number of distinct groups

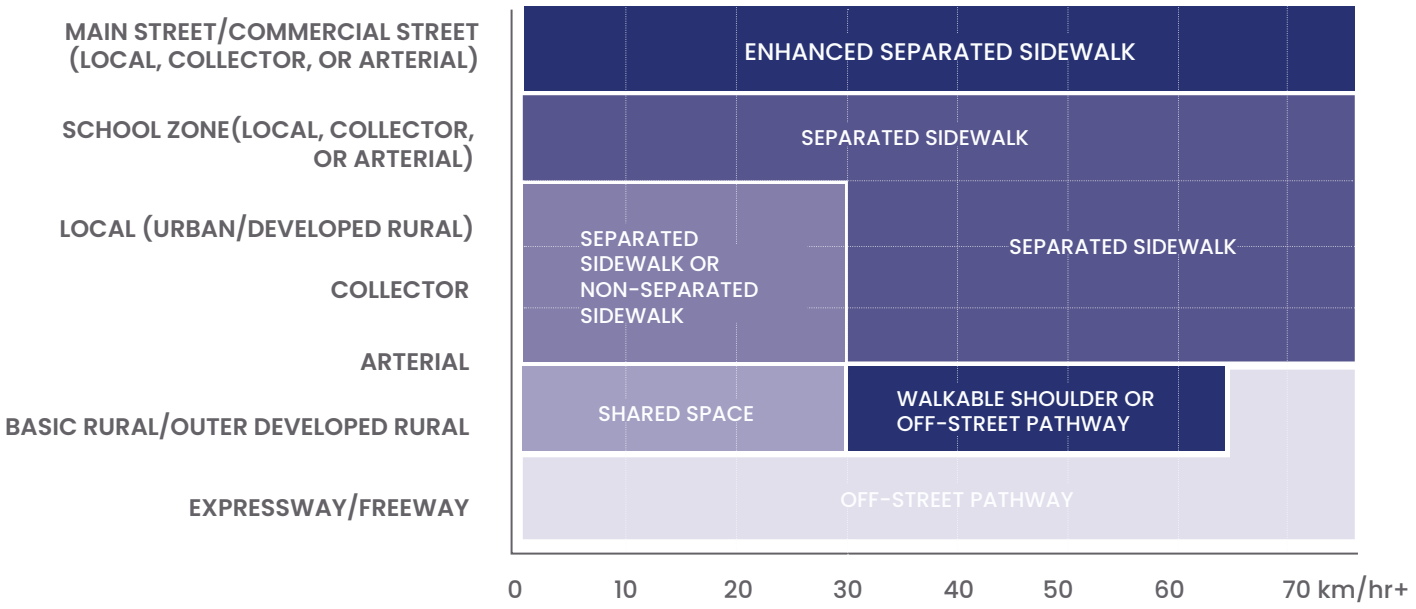
TABLE 5-7 Pedestrian Facility Types

OFF-STREET PATHWAYS	ENHANCED SEPARATED SIDEWALKS	SEPARATED SIDEWALKS	NON-SEPARATED SIDEWALKS	WALKABLE SHOULDERS
Pedestrian/Cycle	Pedestrian Only	Pedestrian Only	Pedestrian Only	Pedestrian Only
Urban/Rural	Urban	Urban	Urban	Urban
ALL AGES AND ABILITIES			NOT AAA SUITABLE	

FACILITY SELECTION

Table 5-8was taken from the British Columbia Active Transportation Design Guides and provides a graphical representation of what types of pedestrian facilities are suitable for various combinations of roadway classification and motor vehicle speeds.

TABLE 5-8 Facility Selection



GENERAL PEDESTRIAN REQUIREMENTS

All pedestrian facilities have two primary components:

1. **Facility -** referred to as the pedestrian through zone and may include any of the sidewalk or pathway types noted above.
2. **Crossings -** locations where the pedestrian facility crosses other transportation facilities including crosswalks (mid-block and intersection), bicycle facilities, or other special circumstances such as transit stops or a high volume building entrance.

PAVEMENT MARKINGS AND SIGNAGE

In most cases, sidewalks do not require pavement markings or signage except at locations where crossings are encountered. Crossing locations may include intersections, mid-block crosswalks, intersections with bikeway facilities, or other special circumstances. Specific requirements at crossing locations are discussed in greater detail later under each facility type throughout this chapter.
Further information is also contained in various TAC publications as well as the Manual of Uniform Traffic Control Devices for Canada (MUTCDC).

GRADES

Flatter grades on pedestrian facilities are preferred in order to accommodate all users and particularly those with mobility impairments. Grading guidelines include:

- Longitudinal grades should not exceed 5% (see **Table 5-9**).
- If terrain dictates, steeper grades up to 8% can be used provided landings are provided at a maximum of 9 meter intervals.
- Most often, separate sidewalks follow the grades of the adjacent roadway. In such cases, opportunities should be pursued to achieve criteria the noted above. If the separate sidewalks do not meet the outlined standard, the facility is not considered accessible.
- Cross slopes on sidewalks should generally be 2% to promote drainage off the sidewalk (and limit risk of ice buildup). In situations were there may be a higher percentage of mobility impairment, lower limits of 1% may be considered (see **Table 5-10**).

TRANSIT CONSIDERATIONS

Transit stops and shelters are generally located in the furnishing zone of a roadway cross section. Adequate space should be provided to minimize the impacts or interference of boarding and alighting movements as well as those waiting for the bus on the adjacent pedestrian sidewalk movements. The clear pedestrian through zone should not be encroached by activities or infrastructure at stop locations. High volumes pedestrian locations, and locations where there is regular cyclist interaction with transit stop traffic will require additional space.

OFF-STREET PATHWAYS

Off-Street pathways are separated from roadways, represented by the both physical separation as well the environment in which the pathway resides. Off-street pathways can be designated as pedestrian-only facilities, but are often associated with multi-use, off-road pathways. For further guidance, see the sections on multi-use paths.

WALKABLE SHOULDERS

Walkable shoulders are a rural application and are addressed in greater detail under the rural roadways section later in this section.

MAINTENANCE

Maintenance budgets need to include all necessary costs for items such as: maintenance reviews and field inspection, line marking updates and corrections, pavement repair or replacement, snow clearing requirements, sweeping and cleaning of facilities, signal and sign repair and maintenance, landscaping, professional consulting costs for profession advice, re-design and audits, and more. These budgets must be shared with the appropriate traffic authorities.

The majority of these costs are associated with existing budgets. However, CBRM council must approve associated identified budgets and departmental responsibilities.

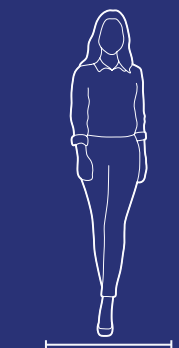
TABLE 5-9 Longitudinal Grade

Longitudinal Grade	Practical Lower Limit	RECOMMENDED		Practical Upper Limit
		Lower Limit	Upper Limit	
% Grade	0%	0.5%	5	8%

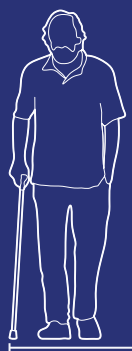
TABLE 5-10 Cross Slope

Cross Slope	Practical Lower Limit	RECOMMENDED		Practical Upper Limit
		Lower Limit	Upper Limit	
% Grade	0.6%	1%	2%	5%

5.5 PEDESTRIAN SPACE

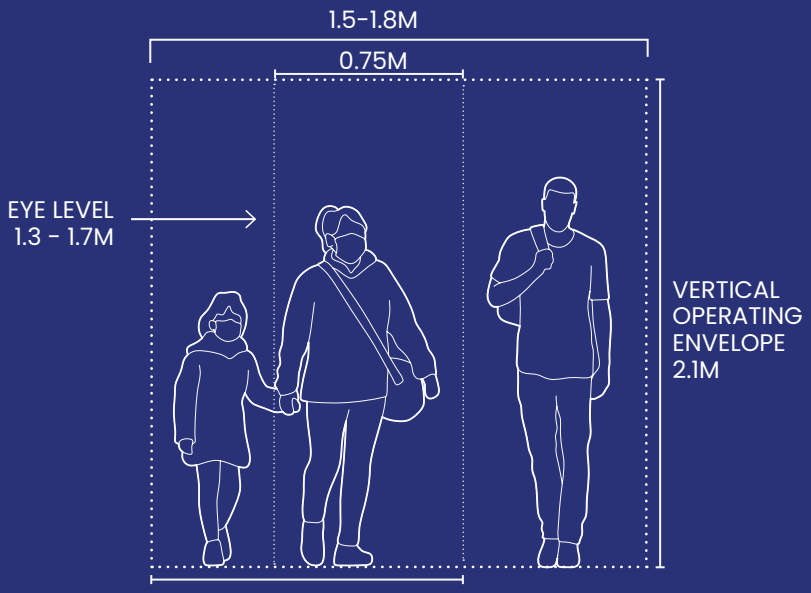


PERSON WITHOUT DISABILITY
0.6M



BLIND PERSON WITH CANE
1 - 1.5M

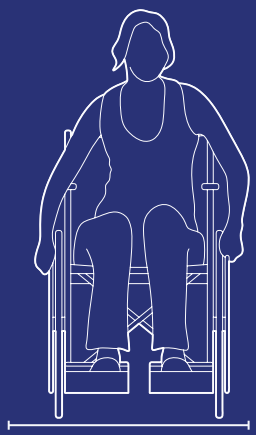
PERSON WITH CANE
0.6-0.75M



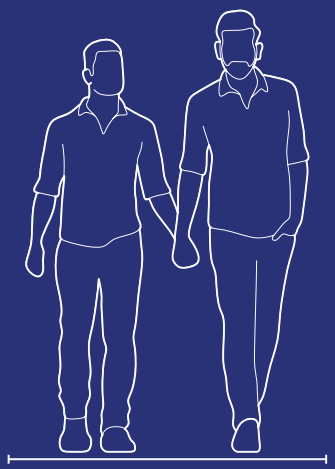
HORIZONTAL OPERATING ENVELOPE WITH CHILD
1.2M

WHEELCHAIR WITH ASSISTANT
2.0-2.5M

PERSON WITH BABY CARRIAGE
1.5-2.0M

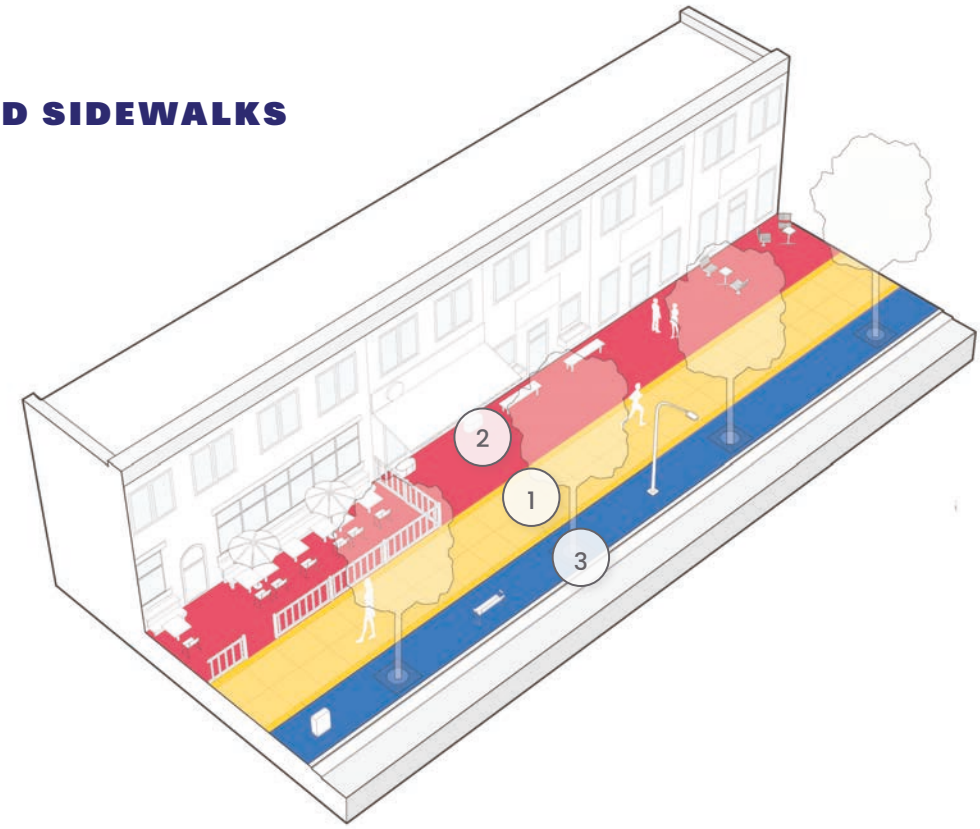


PERSON IN WHEELCHAIR
0.85-1.1M



PERSON WITH ASSISTANT
1.5-2M

5.6 SEPARATED SIDEWALKS



Separated sidewalks represent the vast majority of dedicated pedestrian infrastructure within the urban environment. Separated sidewalks are typically located within, and parallel to the right-of-way of the adjacent roadway. Sidewalks are usually mandated by local roadway design standards and cross-section requirements and are recommended on all urban roadway types from local to arterial roadways. On higher volume roadways, sidewalks are required on both sides of the roadway, unless there is a distinct lack of pedestrian demand. Additionally - in urban areas where vehicle volumes are reduced and speeds are sufficiently slow - sidewalks may be provided on only one side of the roadway.

(1) PEDESTRIAN ZONE

The pedestrian zone is the space that must be clear for pedestrian use, and therefore cannot include any permanent or temporary obstructions. Zone widths are dictated by the ability of the pedestrian traffic to navigate past other users of the sidewalks. Therefore in lower volume environments with basic roadway cross sections, widths tend to fall within the lower limit ranges of the table presented in the tables below.

In commercial or high volume pedestrian environments, the pedestrian zone can be defined as an Enhanced Pedestrian Zone. In this specific circumstance, widths commonly fall within the upper limits of the range. These higher volume situations may include areas such as busy commercial areas, cruise passenger accommodation and school zones where widths should be determined based on crowd capacity and required room to manoeuvrer.

TABLE 5-11 Pedestrian Zone

1 PEDESTRIAN ZONE	Practical Lower Limit	RECOMMENDED		Practical Upper Limit
		Lower Limit	Upper Limit	
Width (m) <400 ped/15mins	1.5	1.8	2.0	Roadside Width
Width (m) >400 ped/15mins	2.0	2.25	3.0+	Roadside Width

2 FRONTAGE ZONE

The Frontage Zone provides clearance between the pedestrian zone and adjacent land uses. This area can include buildings and associated access, landscaping, utilities, architectural features, commercial activities (such as street front cafes), or outdoor display areas. This space must also account for the location and physical conditions of the property lines adjacent to the sidewalk.

3 FURNISHING ZONE

The furnishing zone is located between the pedestrian zone and the roadway curb (or the bicycle through zone if present) and typically includes signs, light poles, landscaping, trees, transit stops, benches, and a variety of hardware or furniture depending on the available space. As speeds and volumes increase, it is recommended that the furnishing zone width also increase accordingly within the available road ROW. This space should also considered snow storage space.

AT DRIVEWAYS / ALLEYWAYS

Driveways, alleyways, and minor crossings represent conflict areas between pedestrians and vehicles (See **Figure 5.12)**. The higher the vehicle volumes on the driveway, the more care needs to be taken to ensure adequate sight distances, speed control, design clarity and other factors to reduce risk of conflict. Apron style driveways are frequently used at low volume facilities where the sidewalk is continued through the driveway.

At higher volume driveways where curb radii are used and the sidewalk terminates at the curb line, the driveway should be treated as an intersection crossing with appropriate pavement markings used.

Grass should not be considered in the furnishing zone unless the available space is greater than 1.5 meters

TABLE 5-13 Frontage Zone

2 FRONTAGE ZONE	Practical Lower Limit	RECOMMENDED		Practical Upper Limit
		Lower Limit	Upper Limit	
Width (m)	0.2	0.5	3	Roadside Width

TABLE 5-14 Frontage Zone

3 FURNISHING ZONE	Practical Lower Limit	RECOMMENDED		Practical Upper Limit
		Lower Limit	Upper Limit	
Width (m)	0.35	0.5	3	Roadside Width

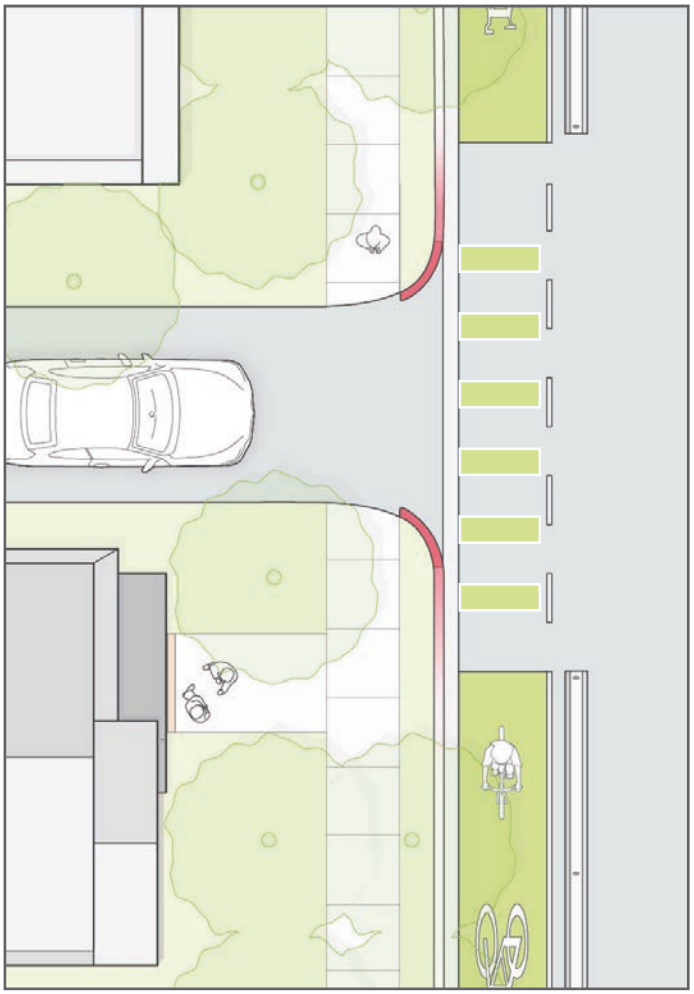


FIGURE 5.12 Driveway Treatment for Separated Bike Lane

AT INTERSECTIONS

There are a wide variety of sidewalk and bikeway treatments at intersections depending on the infrastructure that is present at the intersection (signals, all-way or two-way stop control, right turn channelizations, medians, left turn lanes, etc.). Appropriate design guidelines should be consulted for appropriate treatments at intersections.

LIGHTING

Adequate lighting is a critical part of pedestrian facilities design along the sidewalk and at connecting intersections, crosswalks and other special roadway features. Lighting design should follow the Transportation Association of Canada (TAC) Guide for the design of Roadway Lighting.

OTHER CONSIDERATIONS

Operating Space and Design Dimensions - refer to the TAC Geometric Design Guide, Section 6.2.

SAFETY AND SECURITY

Crime prevention through environmental design (CPTED) is an important feature of pedestrian infrastructure design and includes the physical characteristics of the facility, lighting, public visibility and other factors. The TAC Geometric Design Guide provides some information in this regard and further recommends reference to any available local guidelines or practices as well as the RCMP's overview of the Canadian perspective on Crime Prevention Through Environmental Design (CPTED) strategies.

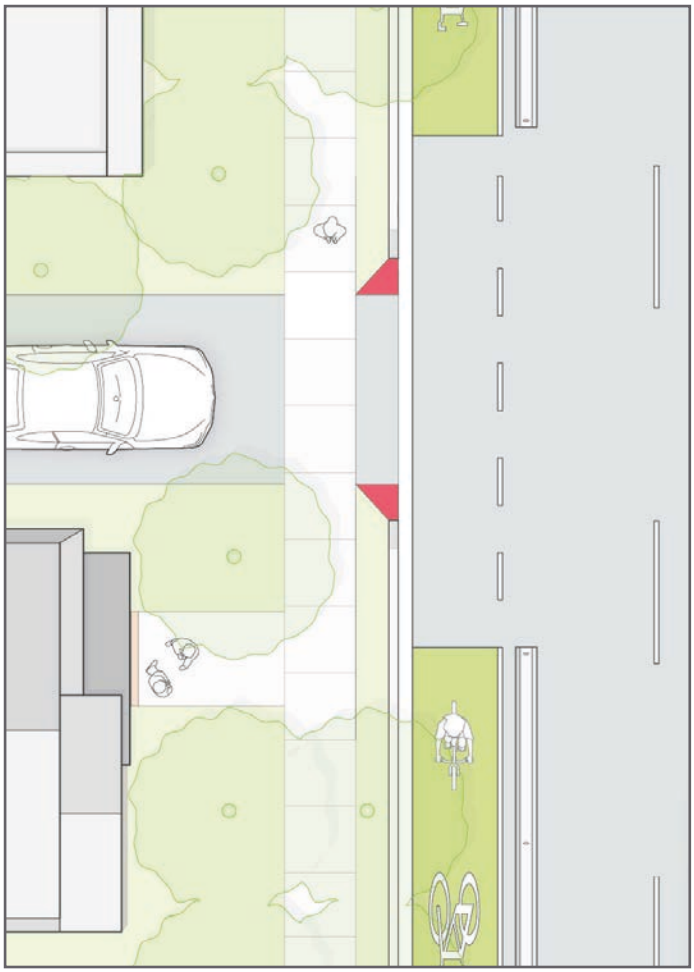
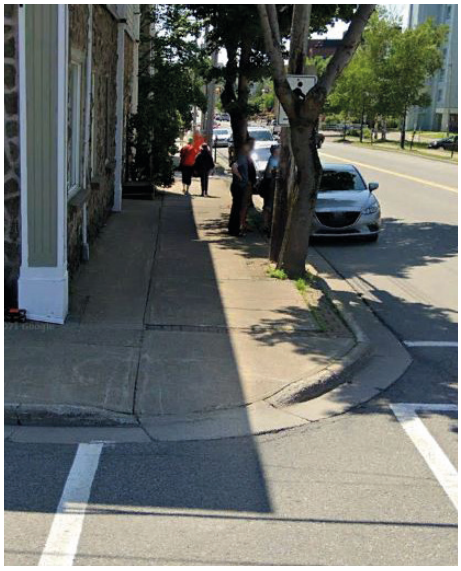
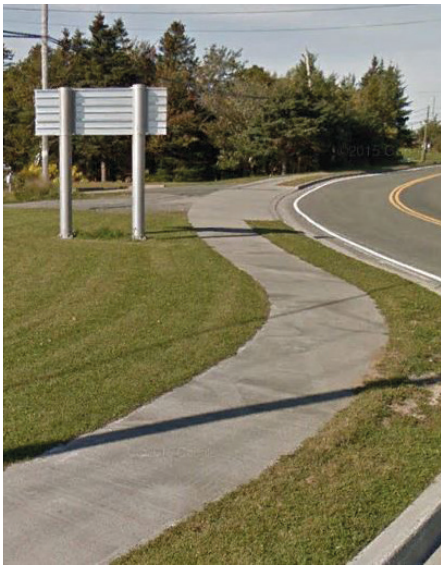


FIGURE 5.15 Apron Driveway Treatment for Separated Bike Lane





5.7 NON-SEPARATED SIDEWALKS

Non-separated sidewalks should only be used where separated sidewalks or off-road pathways are not feasible. Placing a pedestrian sidewalk directly on the back of curb may have the perceived advantage of saving money and reducing ROW requirements. However, non-separated sidewalks can significantly reduce safety performance and the comfort levels for both pedestrians and vehicles on the adjacent roadway. With no direct separation from the roadway, the outer portions of the sidewalk need to be considered non-usable clear space, resulting in the necessary widening of the sidewalk's paved portion.

Non-separated sidewalks require designers to consider alternate arrangements to accommodate roadside furniture and potential utility infrastructure without compromising the unobstructed pedestrian clear zone.

Where the road right-of-way is limited, consideration should be given to reducing other roadway elements in order to provide and adequate pedestrian thoroughfare.

PEDESTRIAN THROUGH ZONE

The majority of design parameters for separated sidewalks also apply to non-separated sidewalks. This includes the clear pedestrian through zone. However, non-separated sidewalks must have a minimum of 0.5 meters of clear space from the face of curb to the edge of the usable pedestrian zone. In the event the side sidewalk extends directly to the back of curb, the recommended lower limit for the sidewalk becomes 1.8 + 0.5 = 2.3 meters (for example).

Alternatively, to improve clarity and sidewalk delineation, a different surface type (i.e. pavers, asphalt, or other alternatives) can be used in the additional 0.5 meters of clear space

AT DRIVEWAYS / ALLEYWAYS

Challenges arise in providing appropriate driveway and sidewalk grades. Specifically, when driveways or alleyways cross, issues in resolving grade changes between the sidewalk and the roadway are likely to occur. There are several ways to solve this issue in the event a non-separated bikeway is used. However, each application has negative implications on safety and comfort in comparison to a fully separated sidewalk.

Pedestrian Zone Non-Separated	Practical Lower Limit	RECOMMENDED		Practical Upper Limit
		Lower Limit	Upper Limit	
Width (m) <400 ped/15mins	1.9	2.2	3.0	Roadside Width
Width (m) >400 ped/15mins	Not Recommended			

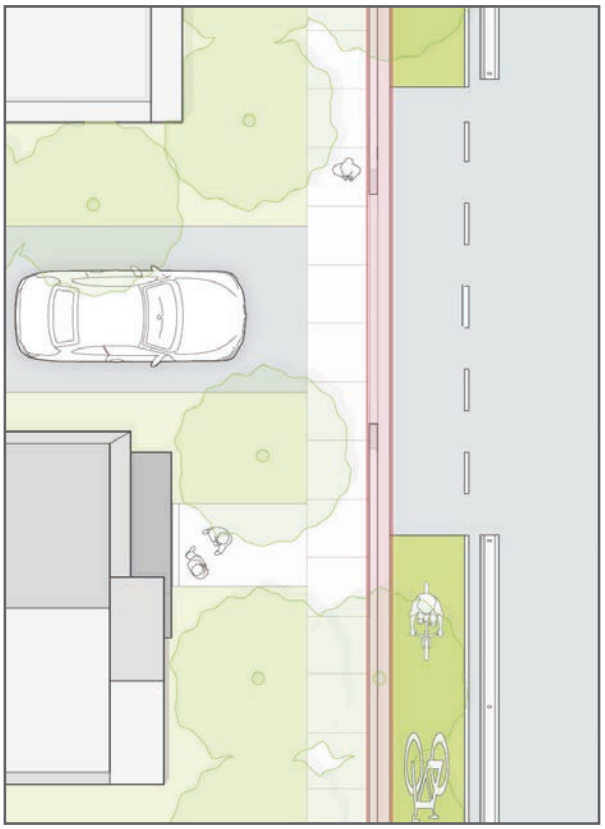
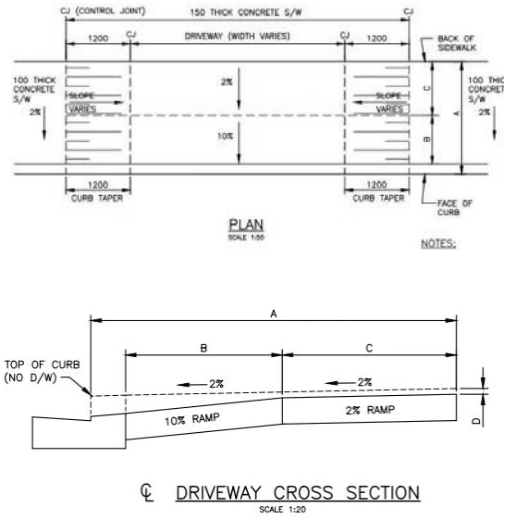


FIGURE 5.16 Non-Separated Sidewalk



5.8 PEDESTRIAN CROSSINGS

Pedestrian crossing locations are critical as they represent an inherent conflict zone between pedestrians and vehicles. To create a safe and comfortable crossing location, safety and operational risk factors must be mitigated to the greatest extent possible. The TAC Pedestrian Crossing Control Guide provides detailed reference material on crossings including guidance on human factors considerations, various pedestrian populations, and safety effects.

It is recommended to adhere to the TAC guidelines for the evaluation and implementation and evaluation of existing or new crossings locations. This helps promote consistency of markings and crossing types across Canada leading to improved safety performance and more predictable operations. Planning activities should not focus on increasing crossing locations, but rather take advantage of existing crossings where applications with the goal to encourage pedestrians towards the safest crossing locations. Where possible, intersection crossing locations should be favoured over mid-block crossings, and mid-block crossings should be professionally evaluated before they are implemented.

PEDESTRIAN CROSSING ENVIRONMENTS

The specific environment in which each crossing is located must be considered. The following environments have specific design requirements and guidelines to minimize risk to vulnerable road users at the crossings:

1. **Intersection Crossings -** The most common crossing location. Most jurisdictions consider all legs of an intersection to be a crosswalk, whether marked or not.
2. **Mid-Block Crossings -** Provides pedestrian route connectivity where intersections are spaced further apart. There are defined desire lines between origins and destinations.
3. **Roundabout Crossings -** Occurs on the approach and departure legs of a roundabout; typically characterized by two stage crossing movements and a limited number of conflict locations.
4. **Channelized Right Turns -** Right turn channelizations are installed when warranted to increase intersection capacity. Sight distances /sight lines and vehicle speed must be carefully managed to minimize safety risk to pedestrians. "Smart Channels" should be considered when designing intersections with required right turn channelizations.
5. **School Areas / Zones -** A higher percentage of children and road users can be expected, therefore extra care must be taken to increase visibility, reduce vehicle speeds, and minimize pedestrian exposure to vehicles.
6. **Smaller Communities and Rural Environments -** Typically applied in environments that may experience higher vehicle speeds, reduced lighting, lower expectation of pedestrian activity, and less pedestrian related infrastructure.

PEDESTRIAN CROSSING CONTROL TREATMENTS

The TAC Pedestrian Crossing Control Guide defines the following 5 types of treatment systems and also provides treatment selection methodology.

1. **Ground Mounted (GM) Systems** - The most basic treatment systems including basic passive signs and pavement markings. This represents most side road crosswalks at a two-way stop controlled intersection. As they are stop controlled, signs are not required.
2. **Enhanced Ground Mounted (GM+) Systems** - Similar to GM systems, but enhanced by zebra pavement markings and require the evaluation of other desirable components to enhance the visibility of the crosswalk.
3. **Rectangular Rapid Flashing Beacons (RRFB) -** Pedestrian activated systems consisting of two rapidly and alternately flashing rectangular flashing beacons mounted above side mounted pedestrian signs.
4. **Overhead Flashing (OF) Beacon System (Special Crosswalk) -** Pedestrian activated systems with internally illuminated overhead mounted signs with round alternate flashing amber beacons and down lighting.
5. **Traffic Signals (TS) (Pedestrian or Full) -** Provides designated crossing locations at signalized intersections or crossing locations.

Detailed crossing guidance can be found in the Transportation Association of Canada's "Pedestrian Control Guide" (latest edition, June 2018)

PAVEMENT MARKINGS

MUTCDC identifies two primary types of crosswalk markings which is consistent with guidance provided by Nova Scotia Public Works (NSPW).

1. **Twin Parallel Line Crosswalk** - Typically used at intersections and in some cases at higher volume driveways and alleyways (see **Figure 5.17**).
2. **Zebra Crosswalks** - Commonly used for mid block crossing locations (see **Figure 5.17**).

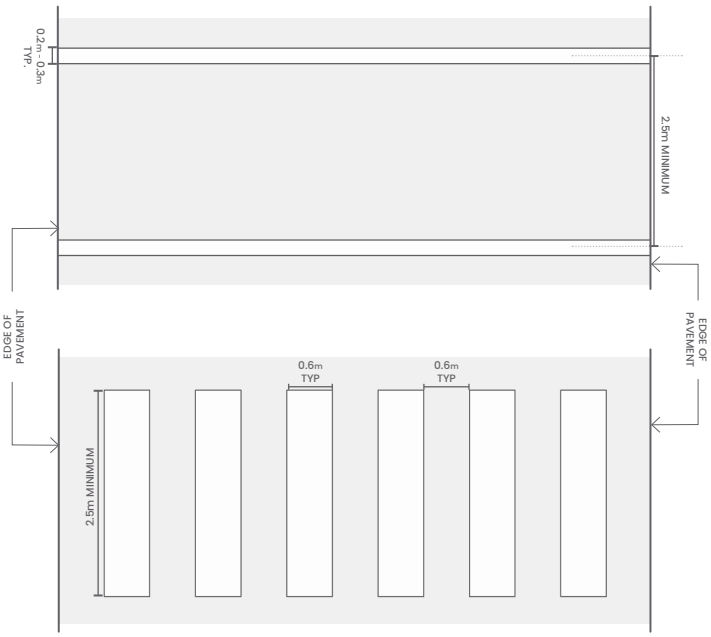


FIGURE 5.17 Pavement Markings

PEDESTRIAN SIGNAGE


RA-4R
600 mm x 750 mm

Pedestrian signage is not required at signalized intersections or intersection approaches controlled by stop signs.

Pedestrian Crosswalk Sign (RA-4R and RA-4L) - indicates location of crosswalks and is installed on both sides of the roadway and mounted back-to-back on two lane roads. Signs should be placed as close as practical to the crossing location.


WC-2R
600 mm x 600 mm

Pedestrian Crosswalk Ahead Sign (WC-2R and WC-2L) provides advanced warning of a crosswalk where there is limited visibility and is installed between 50 and 150 meters in advance of the crosswalk.


RA-5R
600 mm x 750 mm

Special Crosswalk Overhead Sign (RA-5R and RA-5L) indicates the location of a Special (OF) Crosswalk and is installed over both sides of the roadway so that drivers face two signs with each facing the center of the street. The signs must be internally illuminated and equipped with a pedestrian activated flashing amber beacon. The overhead fixtures are to include down-lighting on the crosswalk area.


RA-3R
600 mm x 750 mm

School Crosswalk Sign (RA-3R and RA-3L) are used in locations where school-related crossings take place. They are mounted in the same way as the RA-4 signs. The RA-3 signs can also be used in conjunction with the **School Crosswalk ahead sign (WC-16R and WC-16L)**


WC-16R
600 mm x 600 mm

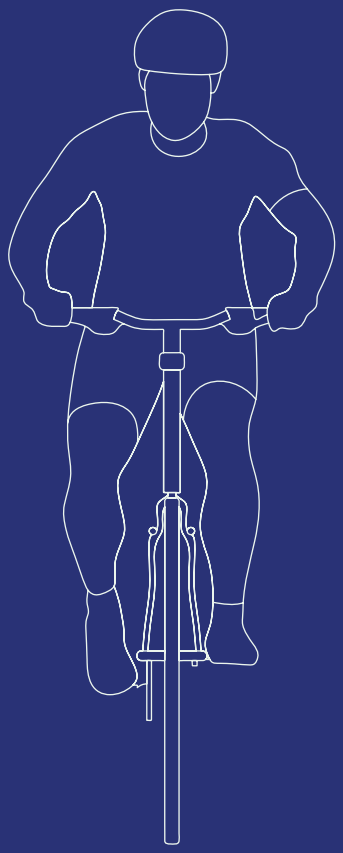
PEDESTRIAN ACTIVATED CROSSWALKS

There are two types of pedestrian activated crosswalk assemblies composed of signage and lighting.

Rectangular Rapid Flashing Beacons (RRFB) - Consist of two rectangular rapid flashing beacons and the appropriate RA-4 (pedestrian) or RA-3 (school) sign. A pedestrian-activated push button and appropriate push button sign ID-21 must be installed with the assemblies on each side of the roadway.

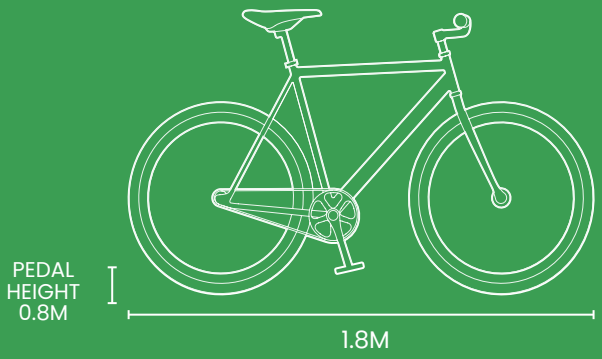
Special Crosswalk (OF) assemblies are installed over both sides of the roadway and include RA-5 signs equipped with one pedestrian activated round flashing beacon (the addition of a second flashing beacon on each sign is optional). The signs must be internally illuminated and must include down-lighting on the crosswalk area from each overhead sign. A pedestrian-activated push button and associated ID-21 sign is to be installed as noted above in the RRFB description.

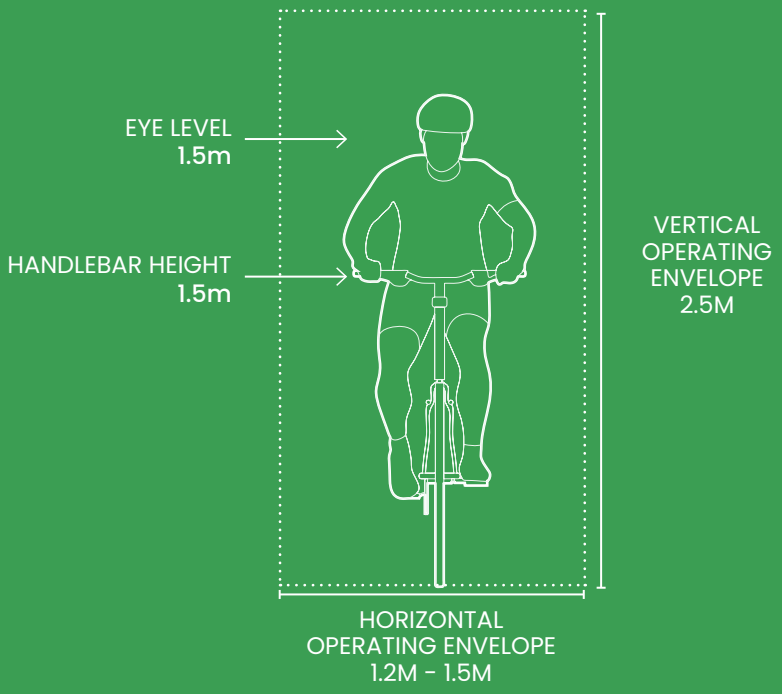

ID-21R
130 mm x 200 mm

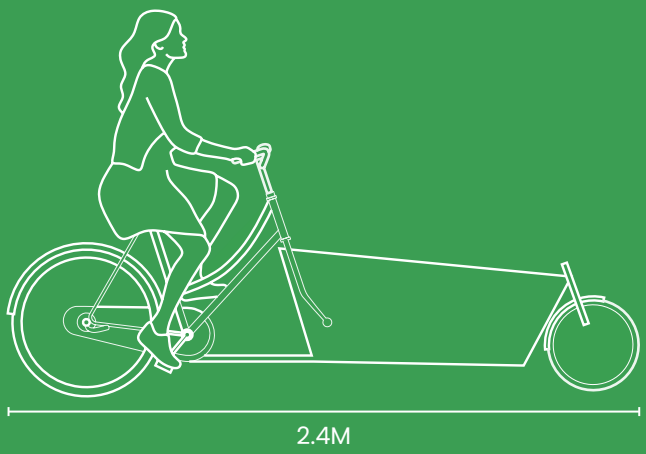


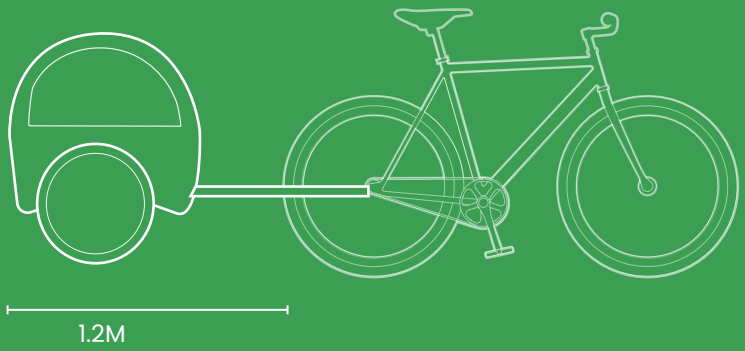
BICYCLE FACILITIES

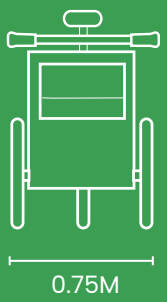
CYCLIST DIMENSIONS











5.9 BICYCLE FACILITIES

GENERAL BICYCLE FACILITY REQUIREMENTS

Cycling facilities differ from pedestrian facilities in many ways. Bicycles are considered vehicles from an operational and legal perspective whereas pedestrians are not. Nonetheless, all cycling facilities have the same two primary components as pedestrian facilities:

1. **Facility** - Referred to as the bicycle through zone and may located on the roadway or immediately beside the roadway.
2. **Crossings** - Locations where the cycling facility crosses other transportation facilities including sidewalks, intersections, or other special circumstances such as transit stops.

PAVEMENT MARKINGS AND SIGNAGE

Most bicycle facilities include required signage and pavement markings to support their operation within the street cross-section. The requirements for each type of facility are discussed in their respective sections.

TRANSIT CONSIDERATIONS

Similar to the pedestrian requirements, adequate space needs to be provided for the integration of bicycle travel at, and past transit stops. This becomes particularly important when transit stops are located adjacent to a bike lane, as the cyclist's increases the risk of pedestrian-cyclist conflicts associated with the transit stop.

Care should be taken to provide space for bicycle parking where a transit generated demand is present. Areas where pedestrian and cyclists activity cross must be marked appropriately using pavement crosswalks and tactile strips where pedestrians cross a bike lane

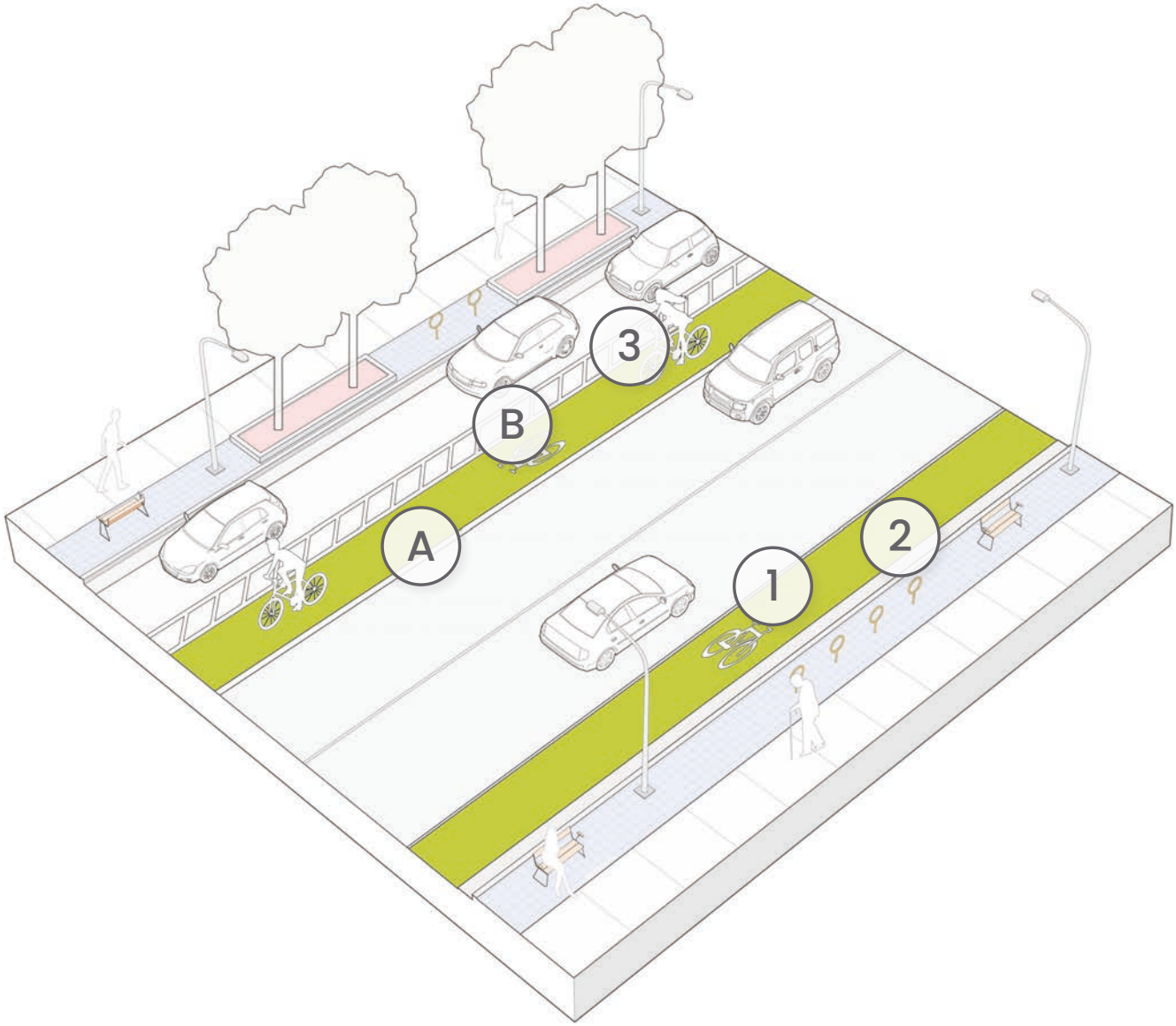
SPECIAL CIRCUMSTANCES

There are a variety of alternate bicycle lane arrangements that may be used within the transportation road network. However, each are considered less desirable than the typologies discussed in the following sections. It is recommended that the following facility types be avoided or minimized to limit user confusion and promote consistency between bicycle facilities. It is further recommended that before any such options be considered, a detailed engineering study is executed to evaluate alternatives, ultimately recommending the appropriate safety and operational features as required. Such facilities include:

Left Side Bike Lanes - Located on the left side of a one-way street. These lanes are primarily used where there are high volumes of left turning cyclists or where restrictions exist on the right side of the road (i.e. transit, loading, etc.).

Contra-flow Bike Lanes - Located on one-way streets where bicycles travel in opposite directions to vehicular traffic and when other same-direction options are not available or feasible. Contra-flow bike lanes are most effective in low volume/low speed vehicle environments and where there are limited intersections or driveways.

Advisory Bike Lane - Bicycle priority areas within a Bike Blvd environment. Bicycles have priority within the dedicated bicycle area, typically delineated by a dashed white line. However, vehicles can legally enter the bicycle space to pass oncoming vehicles.



5.10 SEPARATED BIKEWAYS - BUFFERED / UNBUFFERED BIKE LANES

Painted and buffered bike lanes share the road right-of way, but do not provide **physical separation** between the dedicated bicycle lane and vehicular traffic on the adjacent travel lane. Bicycle lanes are typically oriented in the same direction as the adjacent vehicles. There are two basic types of lanes:

- **Painted / Unbuffered** - includes a single longitudinal white line between the travel lane and bicycle lane.
- **Buffered** - separation space is increased using an additional white line and potentially hatching between the traveled lanes and or the parking lane if one is present. Depending on the available ROW, the buffered space can be used to adjust either the vehicle travel lane, or the bicycle lane as required.

Size and spacing of lanes is generally dictated by the available right of way, and the volume and speed of vehicles. Low volumes and speeds suggest use of widths near the lower limits, while higher speeds warrant the use of values closer to the upper limit. Where upper limit values are being evvaluated, consideration should then be given to upgrading the bicycle lane to a buffered or separated lane as conditions allow.

A	Practical Lower Limit	RECOMMENDED		Practical Upper Limit
		Lower Limit	Upper Limit	
Bike Lane Width (m)	1.5	1.8	2.1	2.1

B	Practical Lower Limit	RECOMMENDED		Practical Upper Limit
		Lower Limit	Upper Limit	
Buffer Width (m)	0.3	0.6	0.9	1.4

PAVEMENT MARKINGS

1. **Longitudinal Lines (white, 100 to 200 mm in width) -** Where space is available, provide a buffered bike lane. This may include reducing the adjacent lane width. Where vehicles are permitted to cross the bike lane, dashed lines are used.
2. **Reserved Lane Diamond Symbol -** Regular intervals and at start of lane (i.e. near intersections). Options include coloured pavements.
3. **Where buffers are 0.6 m wide or more-** Hatching can be provided between longitudinal lines.

SIGNAGE

- **MUTCDC RB-90 / RB-91** - Reserved Bicycle Lane - Continuously along length of bicycle lane spaced no more than 200 meters in urban areas and between 200 and 400 meters in rural environments. Signs should also be placed at intersections and locates where new cyclists may enter the bike lane.
- **MUTCDC RB-92 -** Reserved Bike Lane Ends
- **Optional Supplement** - MUTCD RB-51 - No Parking
- **Optional Supplement** - MUTCD RB-55 - No Stopping

RB-92
60 x 75 cm


RB-90
60 x 75 cm


RB-91
60 x 75 cm


RB-55
30 x 30 cm


RB-51
30 x 30 cm

ADJACENT TO PARKING

An unbuffered bike lane is **not** recommended adjacent to a parking lane. If on-street parking is present, facility choices in order of priority are:

1. If bike lanes are the highest priority, remove on street parking.
2. Use a protected bike lane if parking is essential to maintain.
3. Used a buffered bike lane - where possible, minimize parking lane width
4. If there is inadequate space for protected or buffered bike lanes, relocate the bike facility.

Bike lanes are NOT recommended adjacent to angled parking spaces.

WHERE TO PUT BUFFER WIDTH

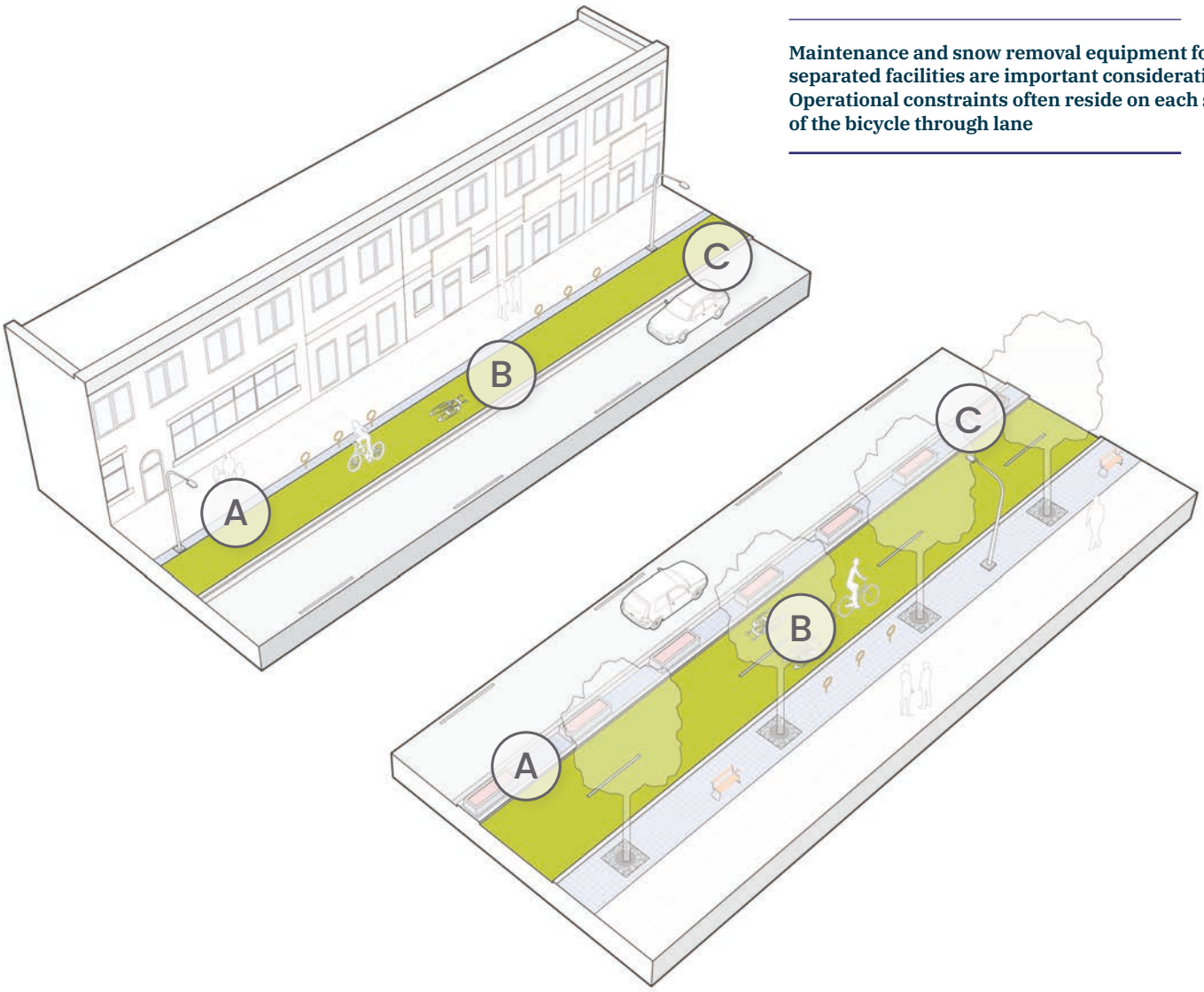
- Can be on one or both sides of a bike lane
- Can be between a parking lane and/or a travel lane
- High turn-over parking suggests increases buffer space between bike lane and parking lane
- Higher volume roadways suggest increasing buffer space between bike lane and travel lanes.

ALL AGES AND ABILITIES CONSIDERATIONS

Conventional and buffered bike lanes on urban streets delineate space for bicyclists but provide no physical separation between people bicycling and driving. With on-street parking, they also place the bicycle between parked vehicles and moving motor vehicles. Since bicyclists must enter the motor vehicle lane to avoid conflict with turning vehicles, parking maneuvers, double parking or curbside loading, or open doors, it is important for passing events to be minimized.

Risk Mitigation - Conventional / Buffered Bike Lanes

- Set target speeds at or below 40 km/hr for unbuffered bike lanes and 50 km/hr for buffered lanes to improve comfort and allow drivers to more easily react when bicyclists need to move into the motor vehicle lane. Use strategies such as lower progression speeds, shorter signal cycle lengths, narrower lanes, or enhanced roadside environment to encourage drivers to reduce speed, and limit top-end speeding incidents.
- Discourage motor vehicle through-movement on priority bike routes where possible to reduce volumes. Lower motor vehicle volumes reduce the number of passing events. Depending upon the presence and intensity of other operational stressors, an All Ages & Abilities condition may be reached below approximately 3,000 – 6,000 vehicles per day, or approximately 300 to 400 vehicles per hour.
- Reduce curbside conflicts, especially freight, loading, and bus pull-outs. Carefully manage loading activity and parking demand. On one-way streets with transit activity, move the bike lane or buffered bike lane to the left side of the street to alleviate intersection and curbside conflicts. On streets with heavy curbside use but low motor vehicle volume, consider moving truck traffic or curbside loading to other streets.
- Address intersection conflicts through motor vehicle turn prohibitions, access management, and signal phasing strategies. Due to the likelihood of both left- and right-turning conflicts from bi-directional motor vehicle traffic, use the same motor vehicle volume threshold on two-way streets as on one-way streets.
- Increase buffer distance where traffic characteristics adjacent to the bike lane decrease comfort, including large vehicles or curbside parking. Where adjacent sources of stress are present, a buffered bike lane can improve comfort by increasing shy distance between bikes and motor vehicles. Where multiple motor vehicle lanes, moderate truck and large vehicle volumes, or frequent transit indicate that most bicyclists will need more separation to be comfortable.



Maintenance and snow removal equipment for separated facilities are important considerations. Operational constraints often reside on each side of the bicycle through lane

5.11 SEPARATED BIKEWAYS - PROTECTED BIKE LANES

Protected bike lanes are facilities dedicated to bicycle traffic - and in some cases - alternative travel modes such as scooters, in line skates, skateboards, etc. Generally, protected bike lanes are located within a road right-of-way. The defining characteristic of this typology is the physical separation of the bicycle zone from the vehicular traffic. These facilities share may similarities to buffered bike lanes and are best suited for roadways with higher vehicle speeds and/or volumes, and roadways with multiple lanes in each direction.

Protected bike lanes are defined by the:

(A) **Furnishing Zone -** provides separation between the pedestrian and bicycle through zones.

(B) **Bicycle Through Zone** - the clear operational space for cyclists

(C) **Street Buffer Zone** - physical separation between the bicycle through zone and roadway operations.

Different design choices can be made for each of these zones and may require decisions on trade offs between each zone. The following general principles should be considered:

- Vertical and horizontal changes should be minimized
- Width selection depends on bicycle volumes and speeds
- Street buffer should provide adequate horizontal separation from vehicles, including loading activities
- Furnishing zone should discourage pedestrians from walking in the bicycle zone.

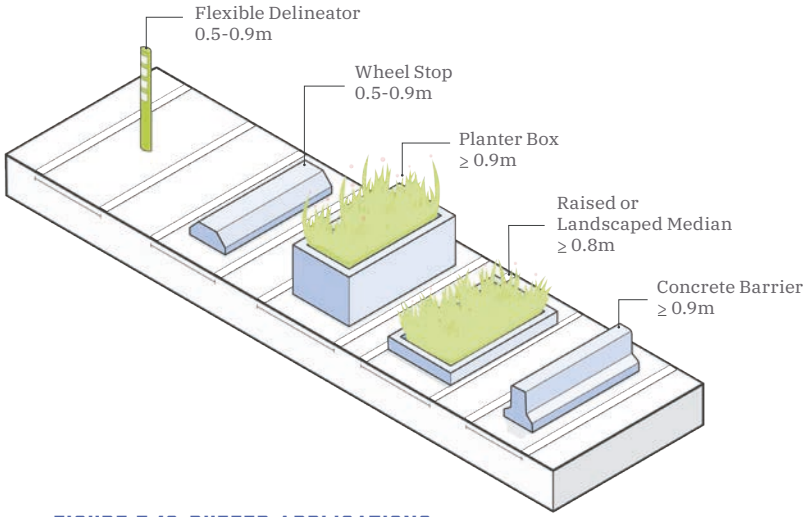
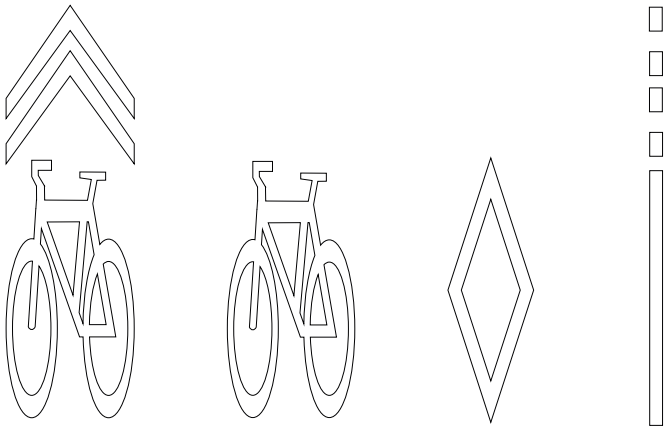


FIGURE 5.19 BUFFER APPLICATIONS

Protected Bike Lanes	Practical Lower Limit	RECOMMENDED		Practical Upper Limit
		Lower Limit	Upper Limit	
Uni Directional Bike Lane	1.5	1.8	2.5	3.0
Bi-Directional Bike Lane	2.4	3.0	3.6	4.0
Delineator Width (m)	0.3	0.6	1.0	2.0

TABLE 5-18 Table D-13 in the British Columbia Active Transportation Design Guide provides a handy comparison chart for the different types of separators in street buffer zones



DELINEATOR/ TYPES OF SEPARATORS

Generally the higher the speeds of adjacent vehicles, more physical protection is recommended. At speeds less than 50 km/h, flexible delineators and wheel stops can be considered. Spacing can be intermittent but the defined usable zone should remain consistent.

At 50 and 60 km/h, more significant visual and physical separation are recommended such as stable planters and raised / landscaped medians. Consideration should be given to providing a continuous barrier

At speeds greater than 60 km/h, continuous separation such as concrete barriers, curb and gutter sections with added buffer or other substantial protection should be used. See **Figure 5.19** for buffer types and their applications.

ELEVATION CONSIDERATIONS

A separated bike lane may reside at different elevations relative to the roadway. Options include:

- **Roadway Level** - Same elevation as the roadway with a separator in between
- **Sidewalk Level -** Same level as the sidewalk, using the curb or curb/gutter as a separator along with an added buffer to separate bicycles and vehicles.
- **Intermediate Level** - A level between the sidewalk and roadway with a separator between the roadway and a transition to the sidewalk elevation.

PAVEMENT MARKINGS

- Protected bike lanes should use the bicycle symbol and the reserved lane diamond symbol at regular intervals and at the start of the cycle lane (i.e. near intersections or route entry points).
- A directional arrow may also be considered if there are concerns about travel in the wrong direction.
- If the lane is bidirectional, it should include a dividing line that are dashed to indicated where passing is permitted and solid.
- In some cases, a longitudinal white line can be painted parallel to the separator in order to provide a clear space between the cyclist and the physical separation.

SIGNAGE

MUTCDC RB-90 / RB-91 - Reserved Bicycle Lane

Continuously placed along length of bicycle lane, spaced no more than 200 meters in urban areas and between 200-400 meters in rural environments. Signs should also be placed at intersections and located where new cyclists may enter the bike lane.

MUTCDC RB-92 - Reserve Bike Lane Ends

Must be installed at the end of a reserved bicycle lane to mark its end point.

RB-22 - Wrong Way / RB-23 - Entry Prohibited

On unidirectional protected bike lanes, the Wrong Way and/or Entry Prohibited signs can be used to deter wrong way travel within the lane. Signs should be facing in the opposite direction to intended travel.

RB-91
60 x 75 cm

RB-92
60 x 75 cm

RB-23
60 x 60 cm

AT

DRIVEWAYS

Protected bikeways frequently intersect driveways and alleyways. As such, driveways represent points of conflict between cyclists and pedestrians, it is recommended that green conflict zone markings be utilized across driveways and alleyways with higher traffic volumes.

TRANSIT STOPS

Where vehicles are permitted to cross the bike lane (i.e. at and intersection right turn lane), a dashed longitudinal line should be used.

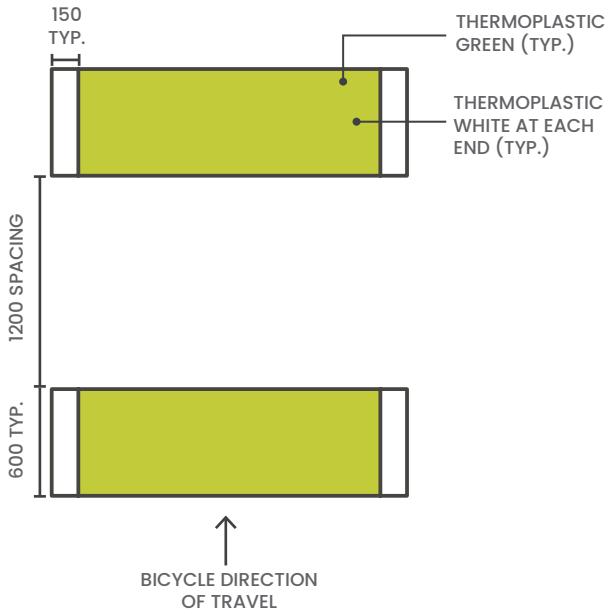


FIGURE 5.20 Buffer Appplications

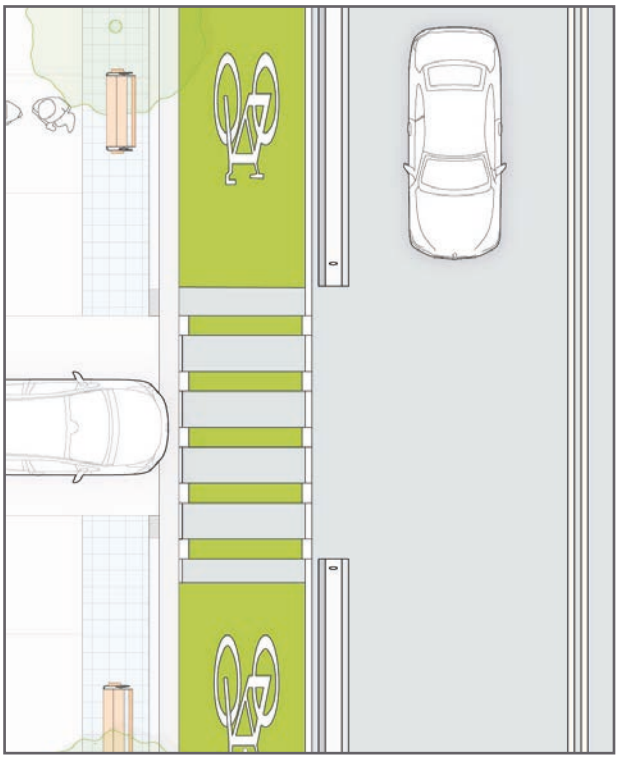


FIGURE 5.21 Driveway application in an urban enviroment

ALL AGES AND ABILITIES CONSIDERATIONS

Protected bike lanes (including raised bikeways) create All Ages & Abilities conditions by using physical separation to create a consistently exclusive, designated bicycling space. The physical protection offered by protected bike lanes means that they can often meet the All Ages & Abilities criteria even in higher speed, high volume, or unpredictable conditions. Protected bike lanes improve the overall organization of the street, and increase safety for people walking, bicycling, and in motor vehicles.

What to do:

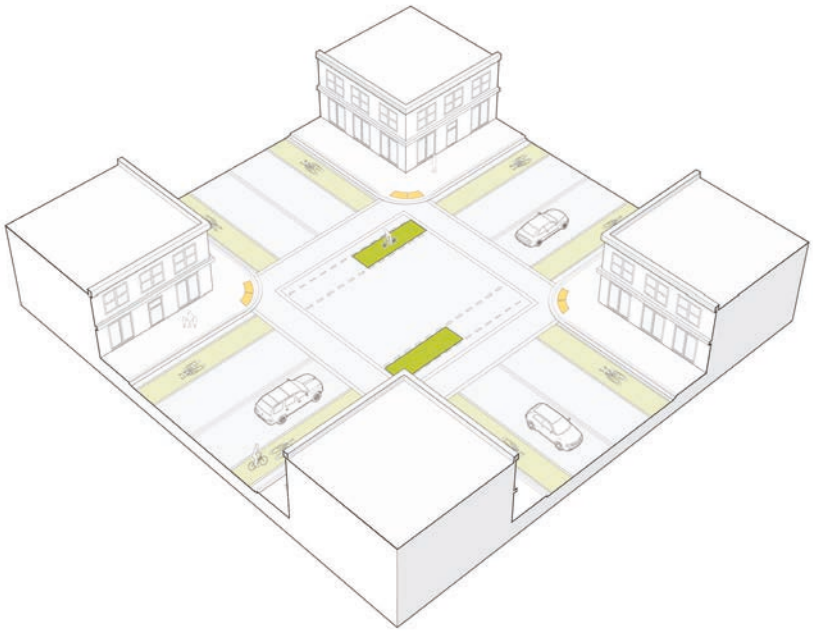
- Build protected bike lanes where motor vehicle speed consistently exceeds 25 mph, where daily motor vehicle volume is higher than approximately 6,000 vehicles per day, where curbside conflicts are expected, or wherever there is more than one motor vehicle lane per direction.
- Manage intersection and curbside conflicts with transit boarding islands, protected (bend-out or offset) intersection designs, signal phasing, and other turn management strategies.
- Reduce speeds through operational strategies, such as signal time, lower signal progression, and shorter signal cycles.
- On streets with parking, reverse the position of the parking and the bike lane to create physical separation between the bike lane and moving motor vehicle traffic.
- On streets without parking, add vertical separation elements (e.g. delineators, barriers, raised curbs) in an existing buffer, or raise existing curbside bike lanes.
- On streets with multiple motor vehicle lanes in each travel direction, convert one travel lane to a protected bike lane, better organizing the street and improving safety for people biking, walking and driving.
- Convert conventional or buffered lanes to protected lanes if motor vehicle speeds and volumes cannot be otherwise reduced and where there is high curbside activity or peaks of intensive demand such as retail-heavy streets, or around schools, large employers, institutions, and entertainment districts.

5.12 BIKEWAY CROSSINGS

AT INTERSECTIONS

Accommodating bike lanes approaching and through intersections can be challenging and care must be taken not to provide conflicting or unclear information to drivers or cyclists. At an intersection, a variety of lane markings can be used for buffered or unbuffered bike lanes through an intersection. However, lines always indicate the continuation of the bike path through the intersection. Lines' marking application can take a few different forms depending on the lane configuration approaching the intersection.

1. **Bike lane beside a shared through and right turn lane (no dedicated right turn lane) -** The bike lane remains continuous and linear through the intersection with dashed lines indicating the locations of potential bicycle / vehicle conflict. Coloured pavements across part or all of the intersection may be used to increase conspicuousness in conflict areas.
2. **Bike Lane beside a dedicated right turn lane -** A dashed line is used to indicate where vehicles can cross the bike lane. This situation could include a full dedicated parallel lane, or a right turn **channelization.**



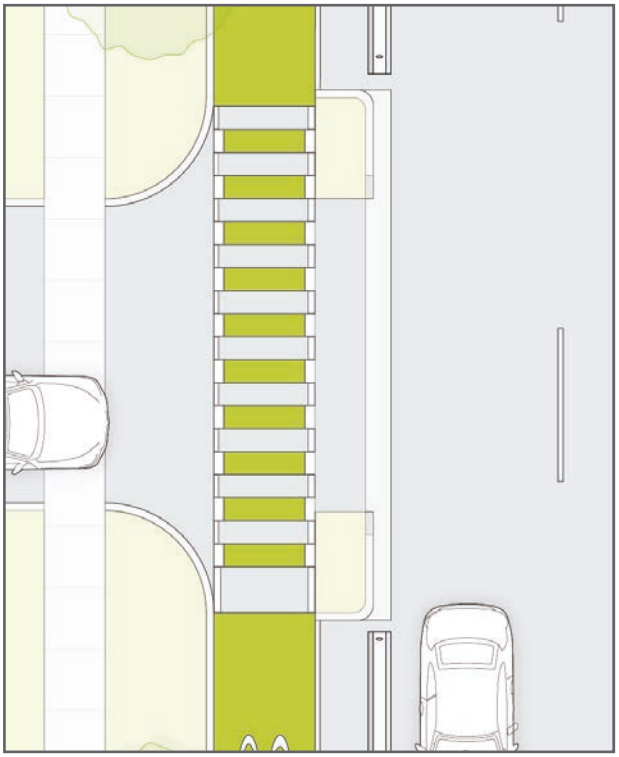


FIGURE 5.22 Bike Lane Crossing at Driveway

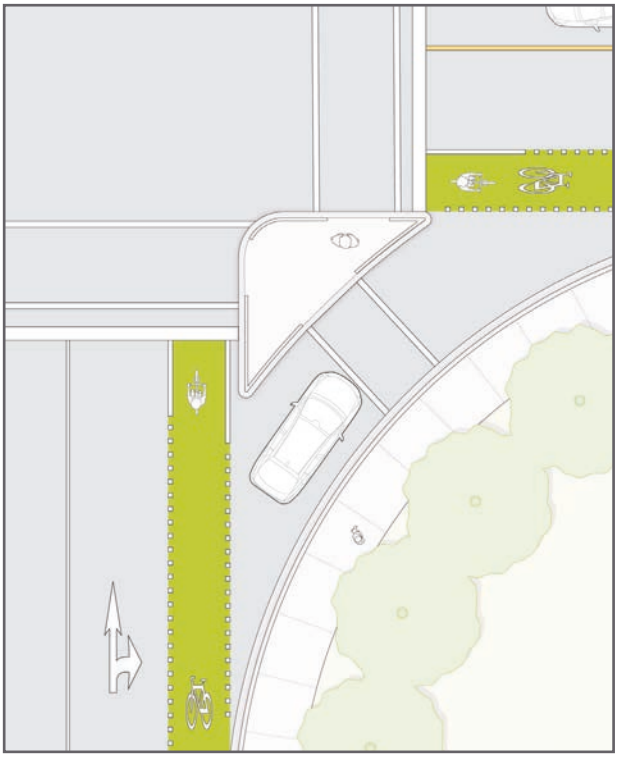


FIGURE 5.23 Bike Lane at Channelized Right Turn

5.13 AT TRANSIT STOPS

Special accommodation is require when bike lanes are located along transit routes and transit stop locations are present. Frequently, bus stop are located near intersection where additional crossing infrastructure may be in place. Wherever possible, transit hold periods should not be implemented at shared locations to minimize potential conflict.

Key considerations at the intersection of transit stops with bike lanes include:

- Dashed lines should be used when a transit stop shares space with a bicycle lane with the dashed length being about 30 meters in length starting upstream of the stop.
- If space allows, the preferred solution is to construct a transit "by-pass" zone which shifts the bike lane from the roadway space to a location behind the bus stop. Additional signage a markings are important in such areas for clear guidance of all users.
- In constrained situations, bicycle lanes can be transitioned to a raised bicycle lane at the bus stop allowing transit users to cross the bike lane on grade.
- Where transit vehicles are equipped with front-loading bicycle racks, adequate space must be provided to allow loading and unloading activities to take place.
- If pedestrians are required to cross a bike path to get to a "floating transit stop" crosswalk markings should be provided across the bike lane.

Floating transit stop, Burrard Road, Vancouver, B.C.

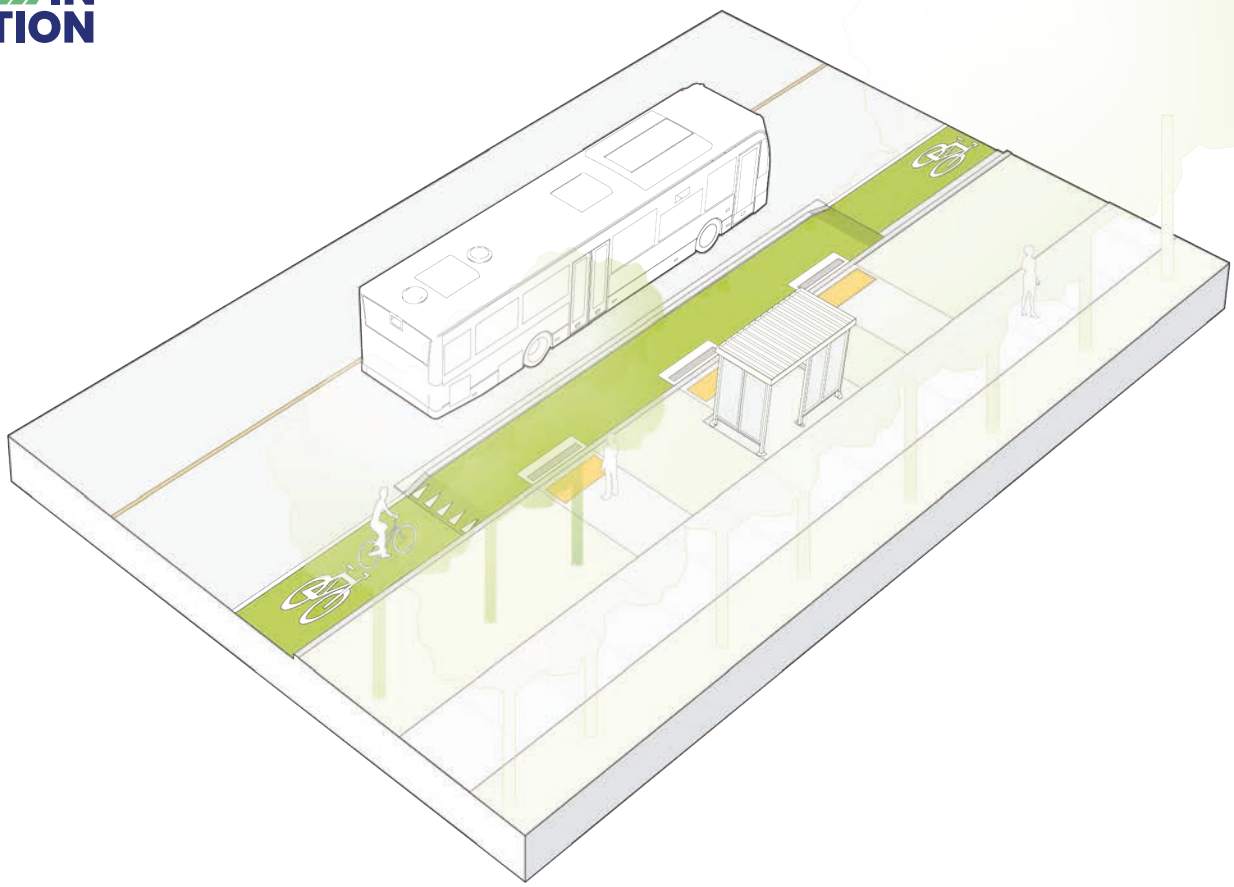


FIGURE 5.24 Raised Bike Lane at Transit Stop

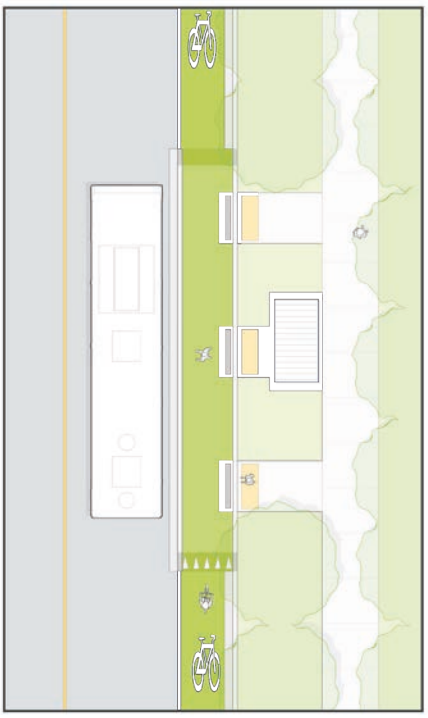


FIGURE 5.25 Raised Bike Lane at Transit Stop

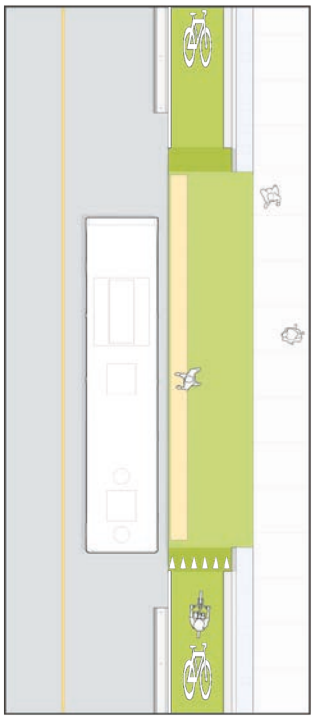
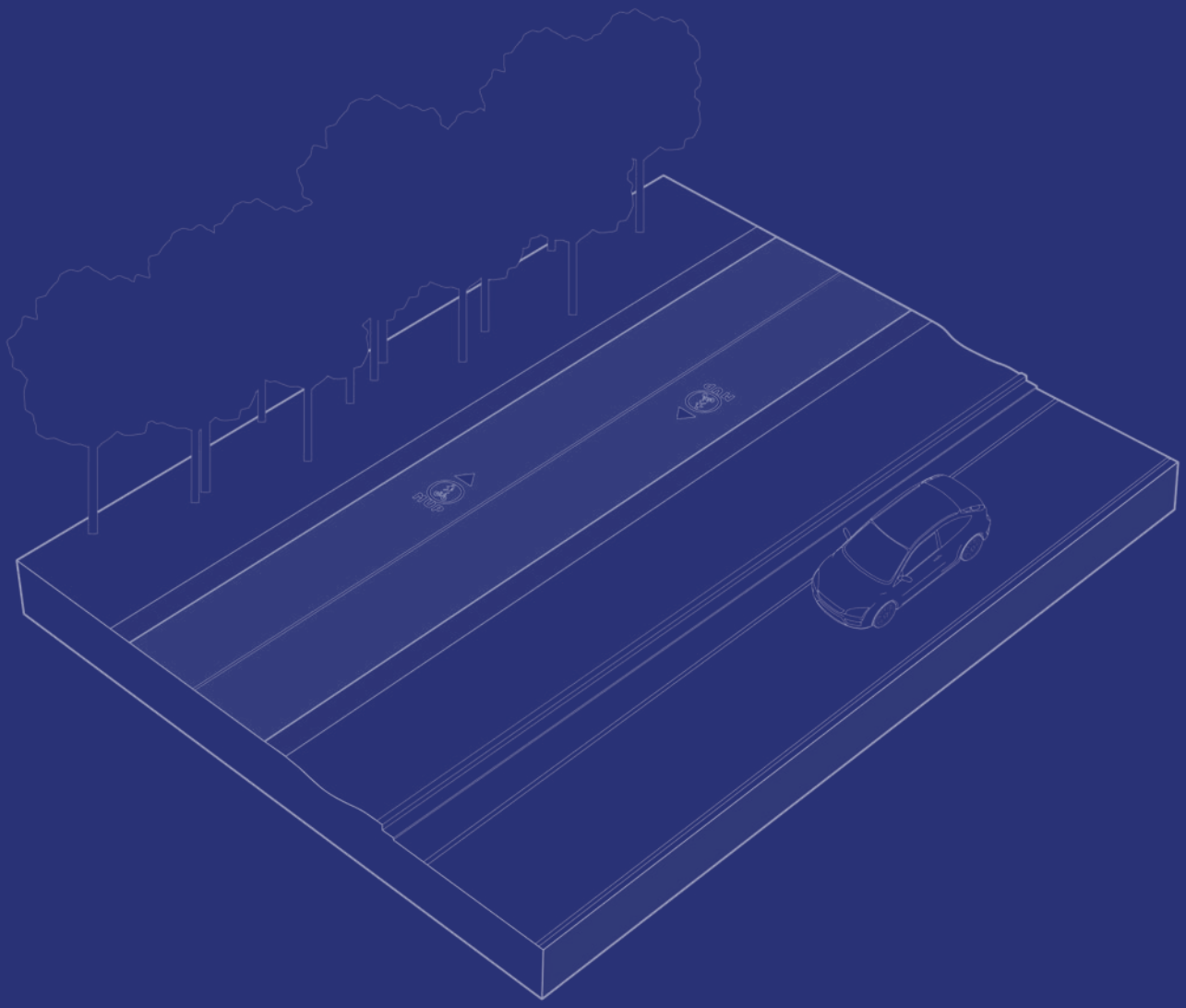


FIGURE 5.26 Raised Bike Lane at Transit Stop



MULTI-USE FACILITIES

5.14 MIXED FACILITIES

Multi-use facilities are designed for use by more than one group of active transportation users. The previous sections discussed facilities that were specifically design for pedestrians, and then for cyclists.

MULTI-USE PATHS

The most common application of mixed use pathways are those located off-street. **Figure 5.27** demonstrates fully separated pathways; **Figure 5.28** demonstrates a multi-use pathway parallel to a roadway corridor.

Multi-use pathways are typically designed to accommodate a wide variety of users,such as pedestrians and bicycles. Additional alternate uses - such as skateboarding, in-line skating, kick scooters, and other similar mode - can be accommodated on multi-use pathways. More recently, multi-use pathways have become increasingly used by electronic modes of travel, such as: electric scooters, hover boards, electric and gas powered bicycles. Looking further, various municipalities permit the use of Off-Highway Vehicles (OHVs) / All-Terrain Vehicles (ATVs) on multi-use trails.

The most common locations for multi-use pathways are along corridors that have limited interaction with vehicles at intersections or driveways and may include:

- Parallel to roads and highways
- Parallel to or within railway corridors, including rails-to-trails initiatives
- Within utility corridors
- Within greenway corridors
- Other situations, such as: through parks, adjacent to water features, or cross country connections to multiple adjacent AT facilities.

Bike Paths	Practical Lower Limit	RECOMMENDED		Practical Upper Limit
		Lower Limit	Upper Limit	
Width (m) Uni-directional	1.5	1.8	2.5	3.0
Width (m) Bi-directional	2.4	3.0	3.6	4.0

Multi-use Path	Practical Lower Limit	RECOMMENDED		Practical Upper Limit
		Lower Limit	Upper Limit	
Width (m)	2.7	3.0	6.0	6.0

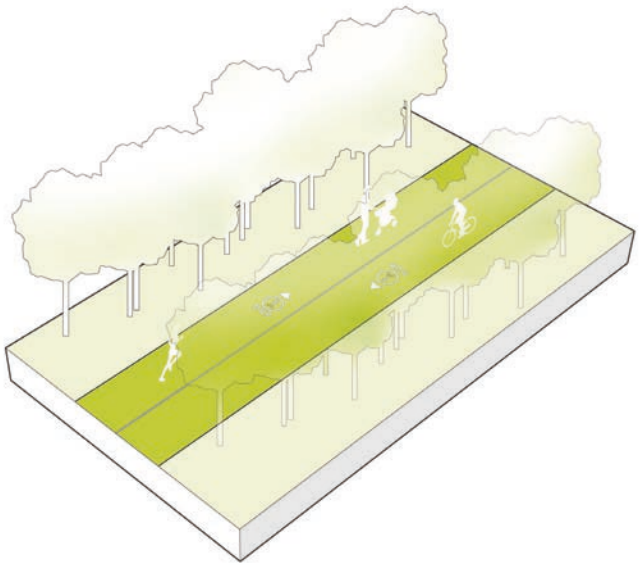


FIGURE 5.27 Rural Multi-Use Pathway

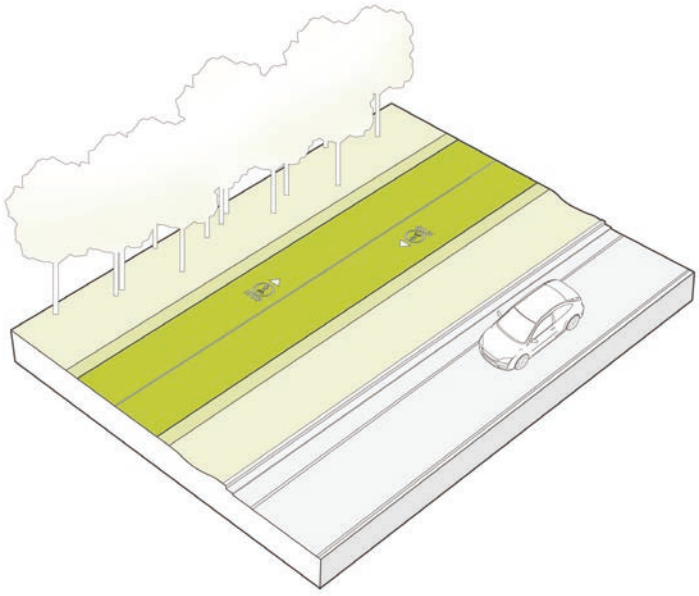


FIGURE 5.28 Multi-Use Pathway Next to Roadway

In built-up land use and higher density development areas, separating pedestrians from cyclists becomes more important. Where development is located on both sides of the road, consideration should be given to uni-directional bikeways (protected bike lanes)

SEPARATING BIKES AND PEDESTRIANS

Multi-use paths can mix pedestrians and cyclists, or separate pedestrians and cyclists. The TAC Geometric Design Guide provides the following guidance for when to separate transportation modes:

- > 20% pedestrians and total user volumes > 33 persons per hour per meter of path width (i.e. 1.8 meter width requires total volume of 60 pph)
- < 20% pedestrians and total user volumes > 50 persons/hr/meter width.

LIGHTING

As with all AT facilities, adequate lighting is critical for the safe and comfortable use of multi-use facilities. Lighting should, at a minimum, be provided at intersections (typically 25 meters in advance) and crossing points or other areas where potential conflicts or user confusion may be likely (hills, corners, high volume driveways, bridge crossings, etc.).

Many multi-use trails can be of significant length and may be well separated from an adjacent roadway. In these situations, street light may help in illuminating the pathway. It may be cost prohibitive to provide lighting along its entire length. Practical lighting level is a critical planning item and depends on the location of the facility, expected time of use, need for AAA conformity, alternate lighting sources, and more.

AT DRIVEWAYS

As previously noted, multi-use pathways are best used when there is limited side road interference from driveways and intersections. Where crossings are required, appropriate signage and pavement marking s are critical for guidance. Wherever possible, the multi-use trail should be given the priority; driveways or low-volume minor roads should be required to stop or yield to bicycle and pedestrian traffic. **Figure 5.33 to 36** demonstrate how guidance can be offered to both pedestrians and cyclists in this situation.

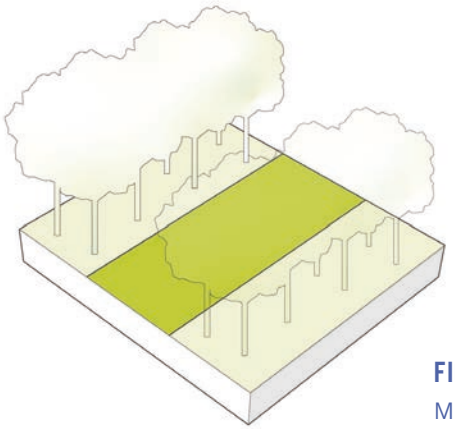


FIGURE 5.29 Basic Shared Multi-Use Pathway

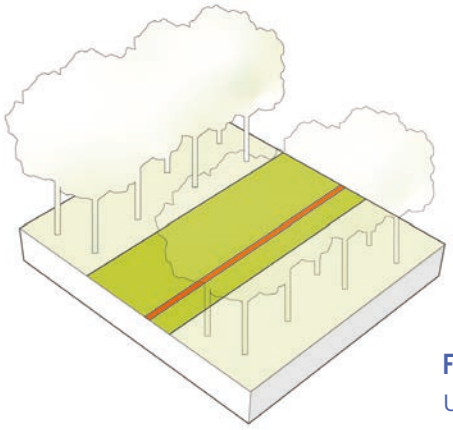


FIGURE 5.30 Separated Multi-Use Pathway - Paint Line or Curb Separation

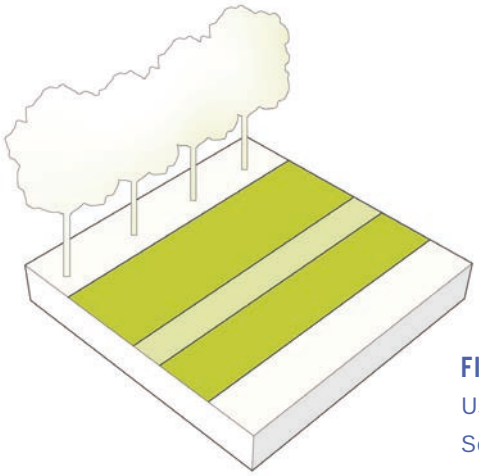


FIGURE 5.31 Separated Multi-Use Pathway - Boulevard Separation

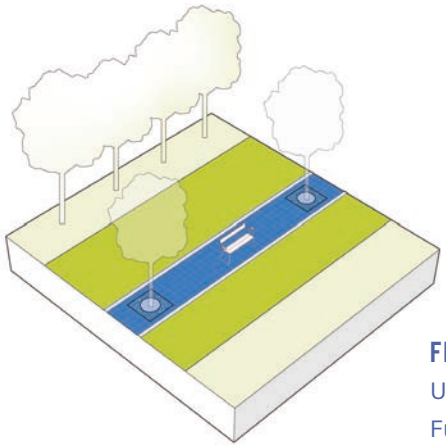


FIGURE 5.32 Separated Multi-Use Pathway - Median and Furniture Separation

FIGURE 5.33 Multi-use Path Crossing - Setback from Pedestrian

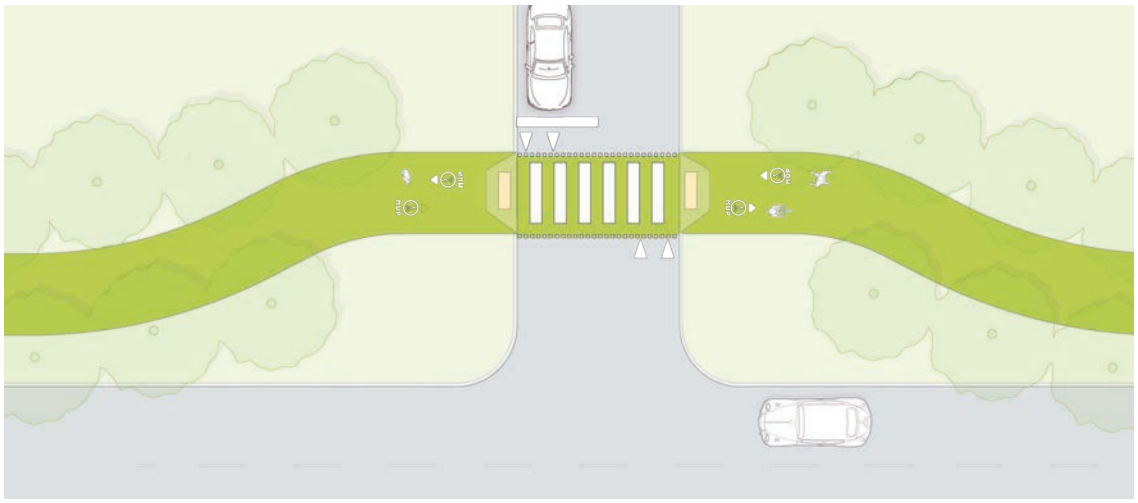


FIGURE 5.34 Separated Multi-Use Path Crossing

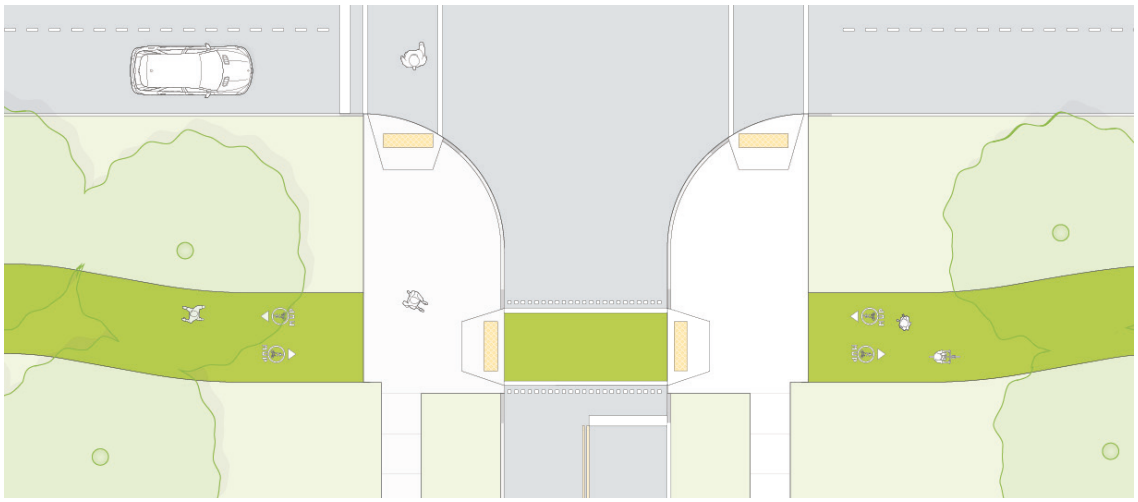
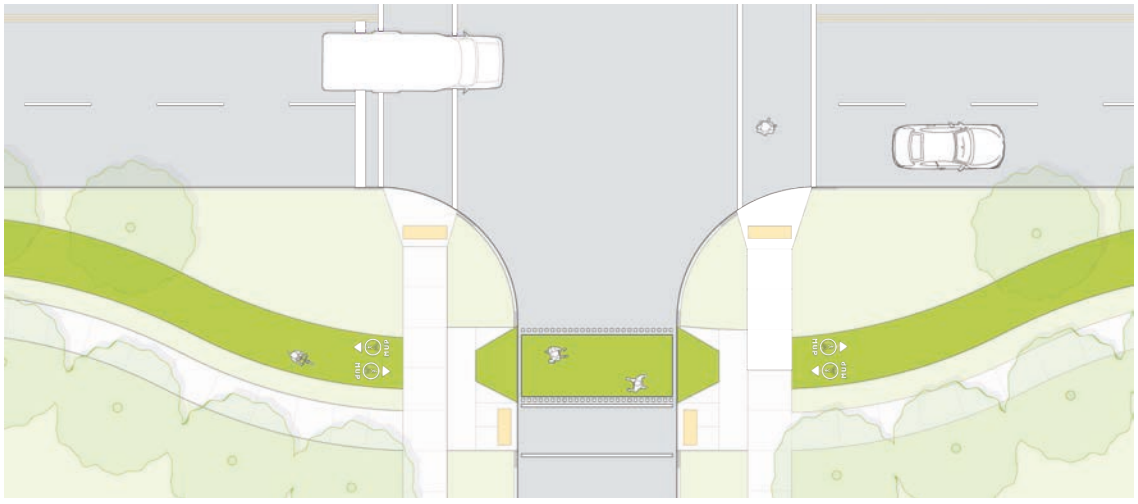


FIGURE 5.35 Multi-use Path Crossing - Shared Space



5.15 SHARED ROADWAYS

Shared roadways are low vehicle volume and low speed facilities located in areas where the living environment is prioritized over vehicular movements. Recommended volumes are typically less than 1000 vehicles per day or up to 2500 vph with careful consideration of operating conditions and intersections between user and vehicular traffic. Recommended speeds are 30 km/h and up to 40 km/hr. Shared roadways are oftentimes found in local residential neighbourhoods, but can also be effective in small-scale commercial corridors with prioritized active transportation movements. Cyclists and vehicles share the same space on the travelled roadway; therefore the nature of the facilities means that parking is often permitted on one or both sides of the roadway.

Though cars are permitted, bikes - and potentially pedestrians - are given priority in the same shared space. Ideally, the road should not serve as a vehicle thoroughfare (i.e. local traffic only), have low volumes, limited width (1 or 2 lanes) and should generally form part of a larger bike network. The roadways can take various forms with the extremes being:

1. **Bike and Pedestrian Oriented -** The space feels like a park or walking space with typical roadway features being replaced with bike and pedestrian features, landscaping and furniture.
2. **Vehicle Oriented -** The space feels like a roadway, but signage, pavements markings and other features clearly designate the space as a fully shared space.

Shared roadways are often used to fill in gaps in bicycle or active transportation networks; in appropriate situations, they can be a cost effective means of doing so. Further, shared roadways may form part of larger Bicycle Boulevard or Neighbourhood Bikeway networks, where series of Bike Blvd sections are married together form a longer Bike Blvd corridor. Critical considerations include:

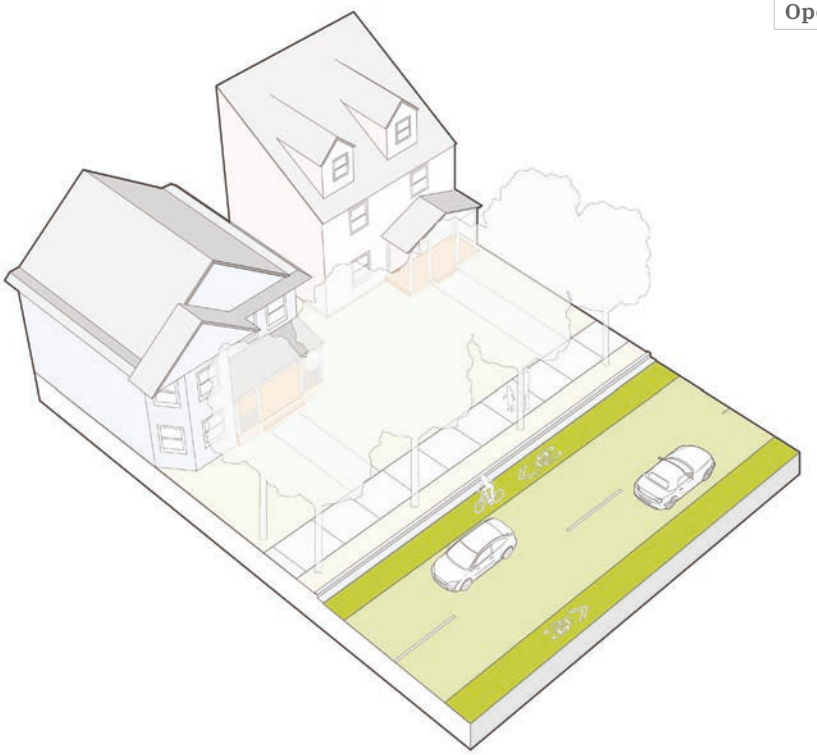
- Design features to must promote slow speeds and awareness of surroundings.
- The road should not generate any significant vehicle demand, particularly during peak hour traffic.
- Distance between cross streets should be in the range of 200 meters. and should not exceed 400 meters.
- Shared roadways should have gateway features that clear identifies they are entering a shared road environment to drivers and cyclists.
- A variety of features can be used to identify entry into a shared environment, including: material changes, roadway narrowing, grade changes, signage, and more.
- Particular attention must be paid to transition areas for those with physical or visual impairments.
- Shared environments may consider using a variety of traffic calming measure to help support operations.

DIMENSIONS

Figure 5.36 offers recommended lanes widths for "side-by-side" and "single file" operations. The choice of the appropriate option is based on the available lane width and whether parking is permitted on the curb side of the lane.

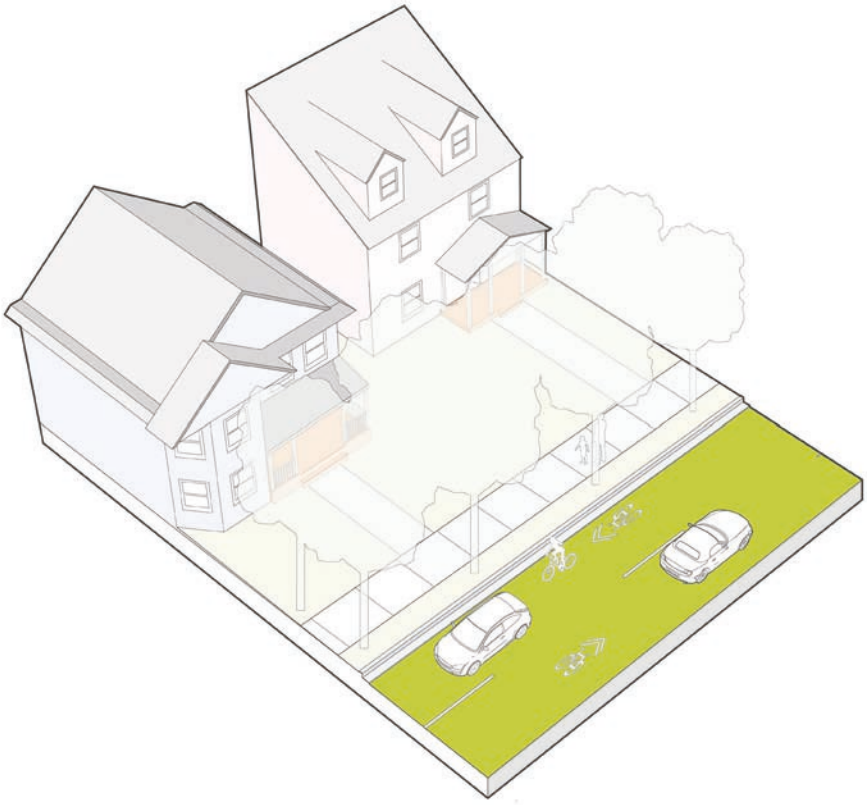
FIGURE 5.36 Recommended Lane Widths

Width of Shared Lanes	Practical Lower Limit	RECOMMENDED		Practical Upper Limit
		Lower Limit	Upper Limit	
For Side-By-Side Operation	4.3	4.3	4.9	4.9
For Single File Operation	Lane Width	Lane Width	4.0	4.3



SIDE-BY SIDE OPERATIONS

Typically implemented on roadways within the range of 4.3 to 4.9 meters wide which allows motorists to pass a cyclist without encroaching into the opposing lane. Painted bicycle symbols are located closer to the curb line to represent the cycling location and provides guidance to drivers to minimize risk of conflict with cyclists. A white edge line is not used in these situations unless a full and adequate dedicated bike lane can be accommodated (unbuffered bike lane).



SINGLE FILE OPERATIONS

Implemented on narrower roadways less than 4.3 m in width. Bicycle symbols are painted near the middle of the laneway to clearly indicated that both vehicles and bicycles can share the roadway space. Vehicles are required to cross into opposing traffic space if they are going to pass a cyclist.

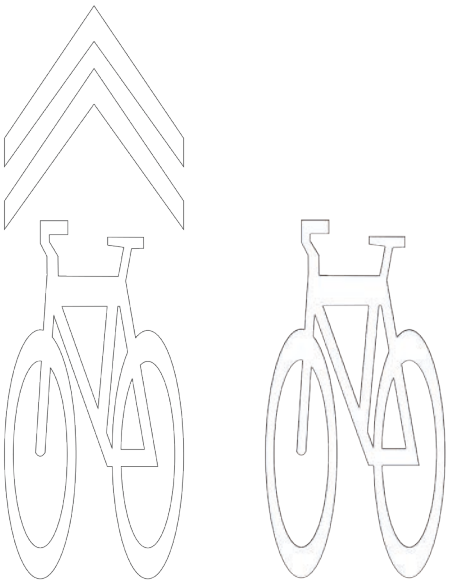


FIGURE 5.37 Sharrow Travel Lane Markings (left and single lane travel marks (right)

PAVEMENT MARKINGS

Both side-by-side and single-file shared use lanes are marked with a shared lane marking ("sharrow"). For side-by-side facilities the sharrow is placed toward the right side of the pavement (see **Figure 5.37)**, while single-file facilities place the sharrow in the middle of the traveled lane (**Figure 5.37**). In both options, the marking's location suggest to the cyclist where to travel.

SIGNAGE

Side-by-side facilities include WC-19 signage in accordance with Section 8.1.2 of the TAC Bikeway Traffic Control Guidelines while single file operations and the WC-20 signage in accordance with Section 8.1.3 of the TAC Bikeway Traffic Control Guidelines.

At locations where a shared environment ends, Shared Space Ends signage should be considered to alert all users of their need to transition to alternate facilities.

The Bicycle Route sign (MUTCDC IB-23) can also be used.

OTHER CONSIDERATIONS

Could be extended as part of a:

- "Neighbourhood Bike way" initiatives can be considered where multiple interconnected streets could serve as shared roadways. This is a signification planning exercise and requires the coordination of shared road section with intersection crossing strategies and facility connectivity.
- "Bike way Corridor" where multiple consecutive shared roadways connect to form a longer linear corridor. This corridor could also include other types of AT connections.

AT INTERSECTIONS

It is important that shared spaces are initiated, terminated, or continued across intersecting roadways. In residential areas with low volume cross-streets, shared spaces can generally continue through the intersection. Specific attention must be paid to the placement of signage and pavement markings on either side of the intersection, thereby ensuring drivers and cyclists are aware of the continued shared space. Additionally, the signage and pavement ensures a vehicle entering the corridor from side roads becomes aware they are entering a shared space. Wherever possible, designers should minimize stops for vehicles and cyclists in the shared use environment.

The connection of a shared roadway at major intersections should allow cyclists and pedestrians to easily merge to and from existing connecting infrastructure on the higher order cross

street. Similar intuitive transitions should be provided on any other minor side roads that have connecting AT infrastructure. If the shared facility is to cross a major intersection, there are a variety of treatments and signage that can provide clear guidance of route continuation on the opposite site of the roadway and how users are intended to cross major roadways.

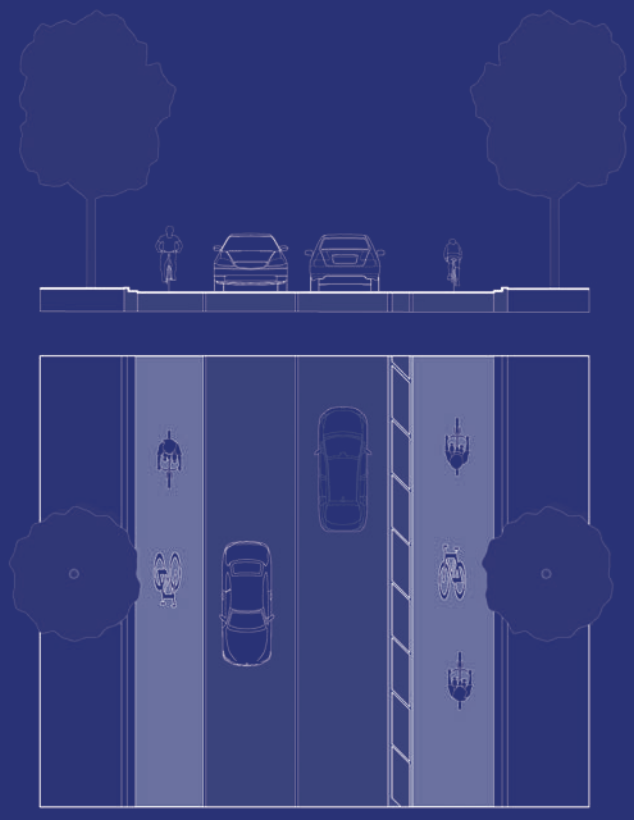
Where the shared use facility transitions to alternate connected facilities, way finding signs should be used to offer pedestrians and cyclists appropriate guidance on successfully navigating between facilities.

DRIVEWAYS

As the shared space environment operate within the roadway, there is no specific accommodated for driveway access. That said, it is important that all locations of potential conflict (i.e. higher volume driveways, underground parking access, alleyways, etc.) be highly visible and clearly delineated. The placement of markings and signage should be coordinated with driveway locations to provide all users with clear guidance.

OTHER CONSIDERATIONS AND FACILITIES

Unmarked Wide Curb Lanes - Facilities where wide lane width are available (typically 4 - 4.8 meters wide) to accommodate cyclists. These facilities provide benefit to cyclists that may be uncomfortable traveling alongside vehicles. Such widths promote higher vehicle speeds and increased variation in driver travel paths. Bicycle route signage, shared space markings, or signs should not be used in these situations. If lane widths are closer to 4.8 meters, then options to construct a properly designated share space or curbside bike lane should be further investigated.



RURAL ROADWAYS

5.16 RURAL ROADWAYS

There are a wide variety of rural and suburban road corridors that are required to accommodate active transportation users. Since AT volumes along rural routes are often lower and distances are significantly longer, facilities are often considered a lower priority in terms of investment for active transportation infrastructure. From a planning perspective, it is critical to define the highest priority areas where the highest number of active transportation users will be accommodated.

An off-road path or trail is the oft-preferred treatment in rural areas. Wherever ROW is available or there are feasible off road routes, (e.g. an abandoned rail corridor or existing off-road trails), the off-road options should be pursued. However, in most situations this is not possible. In the situations off-road trails are unavailable, the space immediately adjacent to the roadway needs to be activated. This may take the form of a dedicated AT space, and could be separated, buffered, or unbuffered similarly to the urban context. The major difference in rural settings is that the dedicated space directly adjacent to the roadway can legally be used by vehicles for operational, maintenance, or safety needs on an as-need basis.

Shoulders are a standard requirement on roadways with rural cross-sections. The Nova Scotia Department of Transportation and Public Works provides standard details for a variety of roadway cross sections from major arterial to local roadways. These details can be found at: *https://novascotia.ca/tran/highways/standarddrawings.asp*. This page also includes specific guidance for Paved Shoulder Widths for Active Transportation.

Table 5-38 summarizes the lane and usable shoulder widths identified in these cross sections, as well as references to the recommended paved shoulder widths for active transportation use. It is important to note the following:

- Many rural cross-section roadways do not meet the current guidelines for shoulder width, due to either their original construction or lack of maintenance. As a result, the available shoulder space to grow in or deteriorated
- There is no differentiation between pedestrian and cycling facilities. That said, in many cases where pedestrians may be present, then cyclists are also likely to use the space.
- Many highways have very narrow asphalt shoulders outside of the white painted edgeline as seen in fig.26. The consequent narrow shoulder space is not accessible to bicycles and often challenging for pedestrians.
- **In many rural situations, coordination is required between CBRM and the province to ensure the consistent application of AT facility design across jurisdictional limits.**

The remainder of this section provides guidance and best practices for **rural active transportation to guide the development of facilities in the future.**

Rural roadways present different challenges for pedestrians and cyclist as compared to urban areas. In urban areas, active transportation traffic is expected, and therefore most typically has dedicated features to indicate the likely presence of AT traffic. Drivers tend to be more aware of potential conflict points, and AT users are usually conscious of the traffic that surrounds them. On the other hand, rural areas typically provide less delineation between roadway and AT traffic and there is more frequently reduced driver expectations that AT traffic may be present. Designed urban environments tend to keep drivers alert and aware of their surrounding while rural environments often includes long stretches where there is little change in the roadside environment and AT users are seldom present. Night time lighting is usually poor or absent; many rural roadways (including shoulders) throughout Nova Scotia are in poor condition.

Many rural areas do not formally separate AT traffic from vehicular traffic and these areas are generally considered as shared use or mixed use facilities. This situation is common on lower volume local roadways, but can also be found on some higher volume, higher speed facilities. For experienced and confident cyclists this may be less of an issue, as bicycles are legally entitled to roadway space. However, such facilities are not considered AAA compliant.

Further, many rural areas include facilities that may be considered pedestrian accessible, but are not accessible for cyclists due to the nature or conditions of the usable shoulder space. As a cost saving measure, many rural shoulders were traditionally constructed of gravel, which can deteriorate quickly in the absence of regular maintenance. Many jurisdictions now suggest - or have written into policy - that all new and upgraded highways include provisions for bicycle traffic and that any exceptions to this require justification. Given the rapidly increasing use of bicycles, both in a general sense and as a response to the COVID-19 pandemic, it appears prudent to adopt a similar approach to the implementation of AT facilities in rural environments.Generally, any roadway that has vehicle speeds over 30 km/hr, and is reasonably expected to have some pedestrian traffic present should be designed or retrofitted to include usable AT shoulders or an off-road pathway. The general hierarchy of preferred rural pedestrian facilities are:

1. Off-Street Pathway (dedicated or mixed use) - See Section on Multi-Use Trails and Paths for Design Guidance
2. Dedicated On-Road Facility with Physical Separation
3. Dedicated On-Road Facility with No Separation
4. No Dedicated Facility or Mixed Use Conditions

Higher volumes and higher speed require that designers move up this hierarchy in order to minimize safety risks to all users.

TABLE 5-38 Usable Lane Widths

MIXED OR SHARED SPACE	SEPARATED AT SPACE	OFF-ROAD FACILITY
30 km / hr	70 km /hr	

FACILITY TYPE	LANE WIDTH	USABLE SHOULDER WIDTH	PAVED SHOULDERS FOR AT
Freeway (Type A)	3.7	2.5	N/A
Major Arterial (Type B)	3.7	2.5	1.5 - 2.0
Arterial (Type C)	3.7	2.2	1.2 - 2.0
Arterial (Type D)	3.5	2.0	1.2 - 2.0
Major Collector (Type E)	3.5	2.0	1.2 - 2.0
Minor Collector (Type F)	3.3	1.5	1.2 - 18
Local (Type G)	3.0	1.2	1.2 - 1.5
Local (Type H)	4.0	N/A	N/A
Local (Type I)	3.3	N/A	N/A
Local (Type J)	3.0	1.6	

FIGURE 5.39 Rural Routes - Shared Bike Lanes

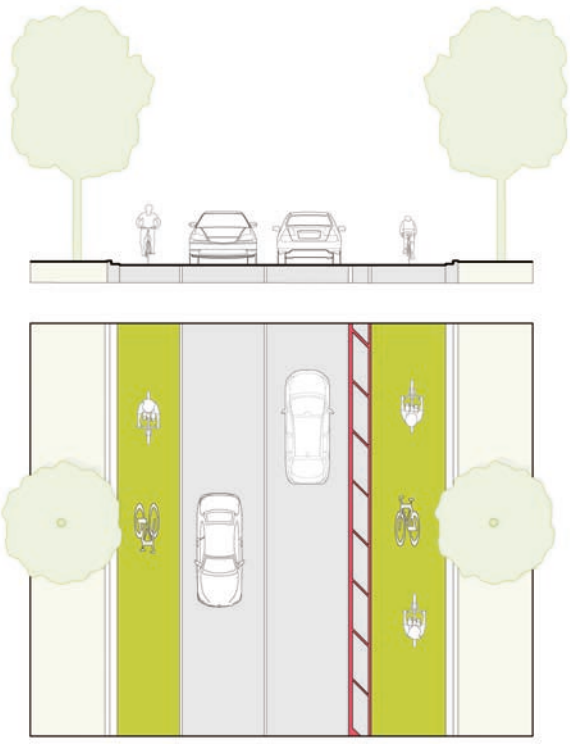


FIGURE 5.40 Rural Routes - Buffered Bike Lanes

5.17 DESIGN CONSIDERATIONS

PEDESTRIAN ACCESSIBLE SHOULDER

- The pedestrian through zone should meet all longitudinal and cross slope grading requirements, as noted under the urban conditions sections.
- Width requirements are similar to urban conditions. Where higher volumes of pedestrians and vehicles exist, movement toward the upper limit ranges is recommended.

BICYCLE ACCESSIBLE SHOULDER

- Defined by a solid white longitudinal line along the edge of the road that separates the bicycle through zone from vehicular traffic
- Shoulder surface needs to be a smooth paved surface that is clear of vegetation (ground or overhanging), gravels or other debris, and snow / ice.
- Bicycle travel should be one-way only in the same direction as the adjacent vehicle lane.
- Bike accessible shoulders may be shared by pedestrian traffic. It is important to consider the volumes of both pedestrians and cyclists and the frequency of potential conflicts. Frequent conflict suggests wider usable space, but more appropriately an off-road or separated facility.

GENERAL CONSIDERATIONS

- On rural roadways where rumble strips are used, the clear pedestrian or bicycle space does not include the rumble strip area. The rumble strip area can be considered a buffer area in the context of a buffered facility.
- Buffered AT shoulders may be used in some locations where volumes and speeds suggest additional separation and where ROW allows. Desirable buffer width is 1.2 meters with a constrained lower limit of 0.9 m.
- In rural applications, and particularly in higher speed environments, the implementation of a separated through zone must be accompanied by an explicit evaluation of safety which addresses the type of physical separation that is being used and its impact on vehicular safety performance.

Bike Accessible Shoulders	Practical Lower Limit	RECOMMENDED		Practical Upper Limit
		Lower Limit	Upper Limit	
Width (m) <50 km/h	1.5	1.8	3.0	3.0
Width (m) <70 km/h	1.5	2.5	3.0	3.0
Width (m) >70 km/h	Not Recommended - If provided, they should be subject to an explicit evaluation of safety			

Pedestrian Accessible Shoulders	Practical Lower Limit	RECOMMENDED		Practical Upper Limit
		Lower Limit	Upper Limit	
Width (m) <70 km/hr	1.2	1.5	2.0	3.0
Width (m) >70 km/hr	Not Recommended - If provided, they should be subject to an explicit evaluation of safety			

SIGNAGE AND WAYFINDING

Regulatory signage is not required for bicycle or pedestrian accessible shoulders. The reserved bike lane signage (RB90 and RB91) should not be used in rural areas as the shoulder spaces is legally accessible by all users including vehicles.

In some areas, opportunities exist to use guide signs or informational signage to raise awareness of the potential for bicycle traffic to be present. Specific version of such signage can be found along many of provinces designated “Blue Route” facilities. Additional guidance can also be found in the Bicycle Nova Scotia, Bicycle Wayfinding Guide (2019).

PAVEMENT MARKINGS

- Longitudinal Lines - white, 100 to 200 mm in width to delineate separation between the accessible shoulder and vehicle lanes.
- Where space is available, providing a buffered bike lane in more urban or suburban areas is an effective way to identify the potential for higher volumes of cyclist traffic. Where buffers are 0.6 m wide or more, hatching can be provided between longitudinal lines. Often these areas also introduce dedicated off road pedestrian facilities or multi-use off road trails.
- Where the roadway is a designated cycling route, the standard TAC bicycle pavement marking can be used and is typically installed in conjunction with appropriate bicycle signage as noted above. The road markings are typically placed within 10 meters upstream of the associated signage. Symbols should also be installed following each major intersection and in rural areas, supplementary symbols can be place d every 15. to 2 kilometers

BRIDGE CROSSINGS

Bridge crossings may present challenges in many areas due to the reduced width of the structure and therefore the inability to maintain full width facilities for bicycle and/or pedestrian facilities. In such cases, it is important to provide appropriate signage and transitional pavement markings to ensure all users are aware of the narrowed cross section and there is a need to share the roadway.

5.18 NOVA SCOTIA BLUE ROUTE

The origins of the Provincial Blue Route date back to 2007 and envisioned a province wide network of bike ways. This includes potential connections transit or shuttle services, ferries and airports. Implementation of the route has been slow but steady with some projects following some but not necessarily all of the recommended guidelines.

Development of the route has typically been incorporated into repaving plans on highway sections, though specific project have been carried out in some cases. It is recommended that CBRM work closely with the province to develop connections between the proposed Blue Routes and AT networks.

The Blue Route homepage (blueroute.ca) identifies 4 basic types of facilities that constitute Blue Route infrastructure:

- **Shared Lanes - for rural roads and local low volume, low speed streets. Does not require any specific provisions other than signage identifying the route as a Blue Route segment.**
- **Paved Shoulders - generally 1 - 1.75 meters wide on busier roads and secondary highways. *[This point should be read in consideration of accessible shoulder guidelines contained in this section]***
- **Bike Lanes and Local Street Bikeways - Bike lanes, typically 1.5 - 1.8m wide, are designated exclusively for bicycles and can be effective on streets with higher traffic volumes and higher travel speeds. Local street bikeways use quiet neighbourhood streets as shared routes and incorporate special design features to make sharing the road safer and more comfortable for all road users.**
- **Trails - Multi-use trails are typically 2 - 4m wide and are ideal places to ride a bicycle away from road traffic. Bicycle-friendly trails have a crushed stone or paved travel way and provide connection points with communities and access to amenities.**


STOP
3 WAY

CHAPTER 6

WAYFINDING STANDARDS

Wayfinding is a set of strategies to help point visitors in the right direction. People who return to the same places day after day, month after month, don't need much help finding their way. But visitors and newcomers who are looking for a destination in an unfamiliar place will need some cues to get to their intended destination. Wayfinding isn't just signs, though signs are often a big part of wayfinding projects. The trail, the location of an exit, the perceived direction of a road, the location of building entrances, the presence of landmarks, and other environmental cues are all very important to wayfinding.

6.1 WHAT IS WAYFINDING

The art of wayfinding is reading the landscape and anticipating the **decision points**: the places where a visitor may be required to make a decision of which way to go. At or near the decision points, we may need to intervene and guide the visitor on the right path. Decision points occur at road intersections, forks in a trail, or at some change of transportation mode, like in a parking lot where people are getting out of their cars to walk.

Wayfinding is also about **destinations**: what name to use, when, and whether to use names or symbols or both. Including every possible destination would be impossible, so wayfinding is about prioritizing what destinations to include, at what point in the process, and when, where, and what elements of the system they may appear on.

The Appalachian Trail has one of the most recognized trail logos in North America.

The periodic appearance of the simple logo above—to remind people they're going the right way—is far more emotionally gratifying than looking at a GPS or smartphone.

SIGN TYPES

We typically divide sign designs into six categories:

1. **Guidance signs** point the way to a destination (or to several). Destinations may be large and nebulous (e.g. a downtown area) and small (e.g. a public washroom). Typically directional signs lead the way with the name of a destination—a name or symbol or both—and an arrow, but may include trailblazing signs and distance markers.

2. **Identification (ID) signs** identify a place, district, destination, building, etc. Identification signs tell you the name of the place, and if it's the place you were looking for, confirm that you've arrived.

3. **Information signs** provide additional information not easily delivered with simple messaging and directional information. Information signs may include maps, and content intended to inform, describe, or draw attention to.

4. **Traffic control signs** are typically governed by provincial legislation or regulation. Using universally understood colour and shape (think of a STOP sign), these signs signal the driver to changes in driving conditions by providing warning and guidance information. We distinguish between these standardized engineered roadway signs and **regulatory** signs below, whose function and design is not defined in engineering standards or legislation. **Regulatory signs** point out things that visitors may, must or may not do in a place. Such signs include site specific information, for example what activities are allowed in a park or on a trail. Some regulatory information is purely **legalistic**—where messages are required by legislation, or recommended by legal counsel, but with no expectation that the messages will be read or acted on by users. Other regulatory information is **behaviour changing**—where a specific behaviour needs to be clearly communicated by the sign owner, and needs to be acted on by the sign reader. Legalistic information should be avoided as message pollution, and a waste of valuable signage "real-estate".

5. **Interpretive signs** provide context for the visitor, and inform on interesting or unique aspect of a place's nature, culture, or history.

6. **Interpretive signs** provide context for the visitor, and inform on interesting or unique aspect of a place's nature, culture, or history.

For ease of comprehension of message, it is best to avoid combining any of the above in a single sign panel, though some kiosk-like signs may do so.

MODALITY

People move through the environment using different means, often using more than one mode in a journey. Taking the bus means walking to the bus stop. Getting out for a trail-ride may mean putting your bike in a rack and driving to the trailhead. Wayfinding signs may be geared to one mode or another, and often wayfinding systems require different sign families to address different modes.

Expectations differ depending on how the user is travelling:

» People in motor vehicles receive information while they are in motion. They need to see, process, and react long before a turn or lane-change is required. Vehicles may be travelling at high speed, and as such, highway wayfinding needs very large type, brief messaging, and very little graphics. Motor vehicle signs are always single-sided and installed with the sign perpendicular to the path of travel.

» People on bicycles may be travelling

FIGURE 6.41 Identification Sign

FIGURE 6.42 Guidance Sign

FIGURE 6.43 Information Sign

between 10–35 km/h depending on fitness level. Cycling wayfinding signs may look similar to road signs, as riders prefer to receive information while in motion. Unlike people in motor vehicles, cyclists *may* stop to read more detailed information if presented infrequently. Like signs for motor vehicles, cycling signs are generally installed perpendicular to the path of travel. Cyclists' viewplanes are oriented downwards, and as such, cycling-specific signs should be mounted as low as practical.

- Pedestrian wayfinding generally assumes that people are able to stop and read, or process information on a map. Speeds of pedestrians are low (generally less than 5 km/h on flat terrain), but vary significantly by age, fitness, and mobility needs. Pedestrian signs are often
- installed parallel to the path of travel, so that people must turn to read the signs as they pass.

Please keep in mind that, when developing an AT wayfinding system for CBRM, not all of the sign types will be geared towards cyclists in motion.

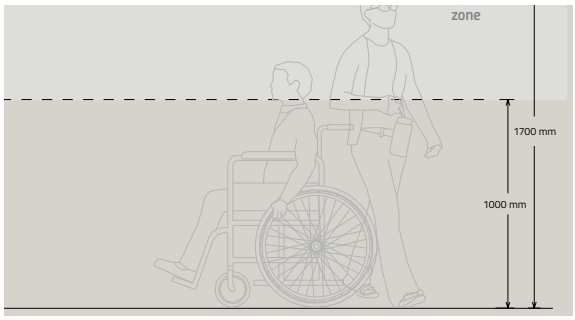
FIGURE 6.44 "Behaviour change" regulatory. The required behaviour is communicated clearly and concisely.

FIGURE 6.45 Interpretive sign

Pedestrian signage can communicate far more information than signs for people in motion.

FIGURE 6.46 Pedestrian Signage

6.2 BEST PRACTICES



FOLLOW ACCESSIBILITY DESIGN STANDARDS

- Signs for the human-scale follow accessible design principles.
- Information must be at the right height, with easy-to-read high-contrast text, and simple messaging. Signs should be functional for everyone.
- We follow several standards appropriate to the jurisdiction and context: Americans with Disabilities Act (ADA), Design of Public Spaces Standard (DPSS in Ontario), Accessibility for Ontarians with Disabilities Act (AODA, Ontario), Parks Canada, and Canadian Standards Association (CSA).

FOLLOW MUTCD-C GUIDELINES

- For highway signs we follow the guidelines in the Manual of Uniform Traffic Devices for Canada (MUTCD-C).
- Road signs always use sans serif typefaces, as they are more legible at a distance.
- Text size is determined by speed-limit to ensure that the messages can be read in the brief time before the driver passes a sign, without distracting the driver from the road.
- We generally specify text size by cap-height in millimetres, standard for road sign specifications in Canada.

TIMELINESS

- Heavily stylized sign shapes, and branded elements can quickly become dated.
- The lifetime of most signs is about 10 years—a typical warranty period—but many signs are in the ground for 20 years or more.
- More generic sign designs are likely to remain timely for much longer.

BREVITY IS ESSENTIAL

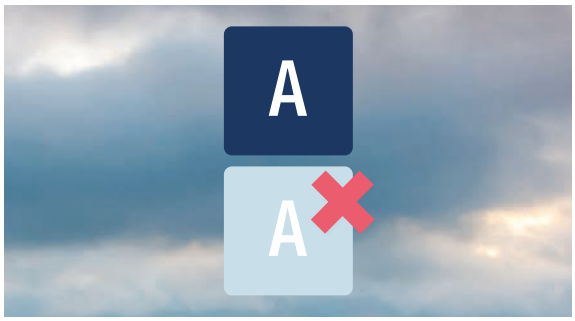
- People spend very little time reading and processing information on signs.
- People moving at speed (in vehicles, on bicycles) have just seconds to read, process and react to sign messages.
- Directional signs ideally carry 1–3 destinations per sign.
- Pedestrian signs (e.g. map kiosks) may carry more information, but keep in mind the audience: how long are people likely to linger and read?

COLOUR IS PART OF THE LANGUAGE

- White text on a blue background is standard for tourism wayfinding signs throughout much of Canada and the USA.
- Non-tourism wayfinding is generally white text on a green background.
- Many other colours have commonly accepted meanings on signs which make them hard to use, e.g. red meaning danger.

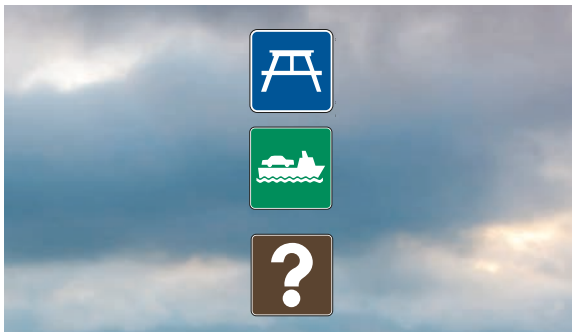
USE COLOUR TO REINFORCE

- Current wayfinding practice discourages colour-coding as a primary strategy— it is difficult to teach users about new colour-codes.
- Colour is useful where it confirms and strengthens a message, or your brand.
- Colour-blind users may not be able to differentiate between certain combinations.
- Colour-codes are used for specific purposes within several common signage domains (e.g. highway cautionary signs are always black text on yellow).road sign specifications in Canada.



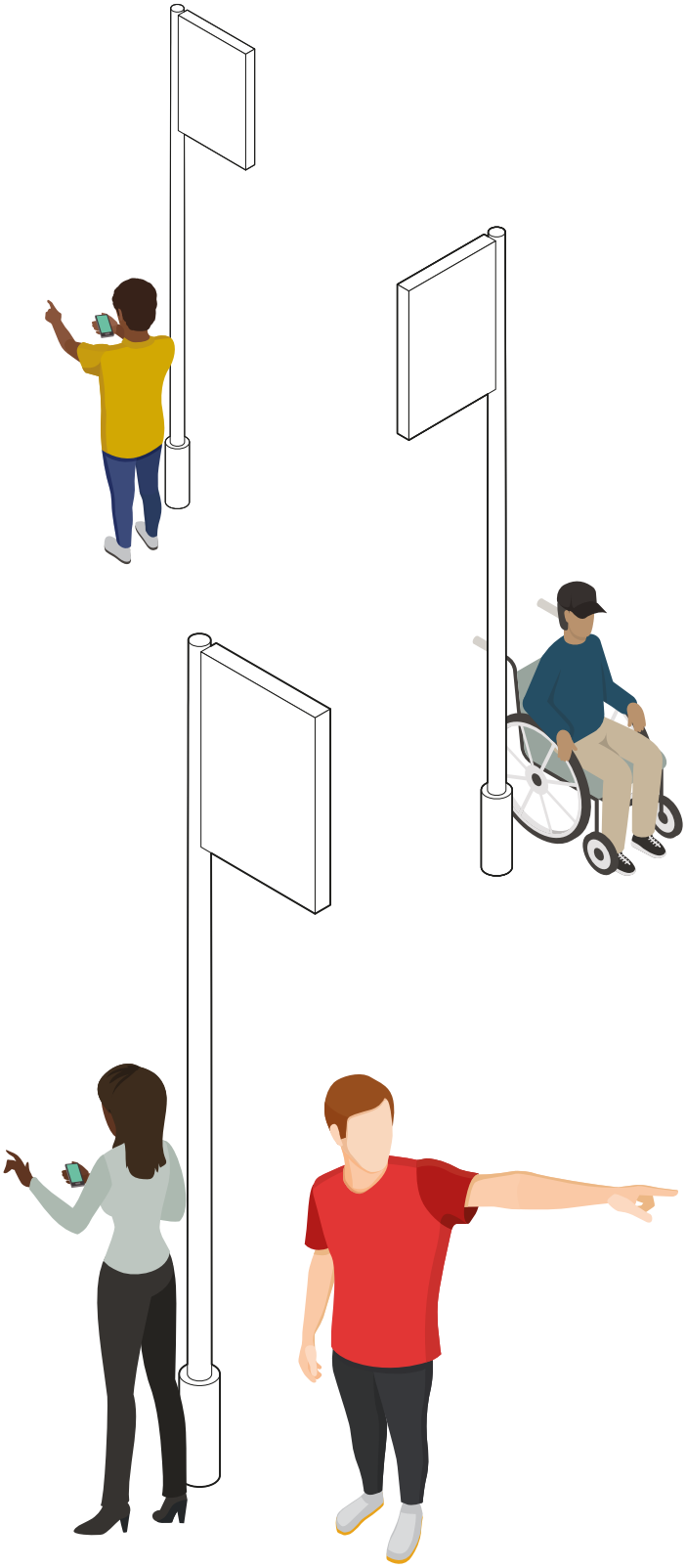
HIGH COLOUR CONTRAST

- Text on signs should have a colour contrast greater than 70% against its background.
- Subtle background and text colour combinations are unacceptable on most signs.



USE SYMBOLS TO REINFORCE ONLY

- Pictograms are useful only where they are universally recognized—consider standard washroom icons, or the use of "?" for an information booth.
- Most symbols are not well-known enough on their own: they must be accompanied by text.
- Each province uses its own set of tourism pictograms, but fortunately, there are several which are consistent across the country and in the USA.
- Use pictograms ONLY where they speed comprehension or clarify the message.



6.3 SIGNS IN A MOBILE AGE

ARE SIGNS STILL NECESSARY?

Digital wayfinding tools are a supplement to conventional media such as signage. Smart-phone adoption continues to grow, and the availability of data connections and databases of points of interest continues to improve. But allowing people to navigate by observing their surroundings, instead of relying on devices, fosters appreciation and knowledge of the environment in a way that digital wayfinding does not.

Despite the availability of GPS to travellers, there's nothing like wayfinding signage to assure you of your destination, or that you're headed in the right direction. It provides a sense of place and a welcoming environment—enabling visitors to arrive at their destination safely, find the services they need or want, and leave with a positive perception of the community. And for residents, signage can instill a sense of community pride and even raise awareness of less-known amenities nearby.

Unlike device-based wayfinding, which is dominated by technology giants Google and Amazon, signage can be designed by municipalities for citizens, reflecting values of inclusion and civic orientation rather than the more commercially-driven approach of the tech giants.

We see digital mapping as serving a different role than sign-based wayfinding we present in this project. Mapping apps are generally best at searching, while carefully curated physical maps are better at providing context and heads-up guidance as people move through your place. People moving through a space may have many different goals and destinations. To understand the breadth of wayfinding objectives, we can look at some common scenarios

EFFICIENT NAVIGATION TO KNOWN DESTINATION

The first wayfinding scenario that springs to mind is when someone knows where they want to go—a specific amenity, a community or a street address—but don't know the best route. In this case, their goal is to find a quick and reasonably pleasant route that gets them to their destination. A new resident for example, or a resident unfamiliar with other areas of the region.

LOCATING A TYPE OF SERVICE WHEN YOU DON'T KNOW THE LOCATION

A different case might be when someone knows what they want to do but don't know where it is located. For example, someone might want to visit a library, relax in a park, or find a meal, but they do not know exactly where to go

LOOKING TO EXPLORE

Some journeys are less task-driven, and are more of an exploration. Someone may want to explore a part of the city/town/place they don't know well, take a walk to relax, or just see the sights. In this case they may know they are looking for a varied, stimulating environment that is rewarding to walk through, without seeking out a particular amenity or destination.

EVALUATING DIFFERENT MODES OF TRANSPORT

Another scenario is evaluating what mode of transport to take. Does one walk or drive? Can you park and proceed on foot? Is the path to get there steep or possibly inaccessible? Will multiple car trips be necessary? Which is quicker—walking to a transit terminal serving many routes, or waiting at a bus stop serving a few. Wayfinding is not just choosing a route—it also can guide people to choose one mode or another.

WHAT WAYFINDING DOES

When done well, wayfinding makes moving through a place seem effortless and welcoming. When poorly done or nonexistent, people leave feeling confused and frustrated. By making people more comfortable in public spaces, wayfinding may encourage more people to choose sustainable transportation modes (cycling, wheeling, walking, busing) more frequently.

BUILDING A SENSE OF PLACE

Wayfinding can contribute to a sense of place. Unlike the uniform world of online mapping, wayfinding is part of the urban and regional experience; the distinctive street signs of Paris, the hallmark look of the London Underground are powerful indicators of place. Wayfinding tools like signs and maps are a powerful, long-lasting part of a place's image. Unlike a logo or visual identity which is merely applied to objects in the environment, wayfinding is part of the urban fabric, just like roads, street-fronts and public spaces

WILL PEOPLE USE SIGNS?

Yes, and no. Many people use signs when they are properly designed and sited. Signage is ubiquitous in urban and rural settings, and is universally understood to provide useful information. That said, there is a segment of the population that will not look at signs. Some may not understand the language, others may have poor sight. Some prefer to ask questions, while others choose a heads down approach, using technology instead. Signage will benefit many, but will not serve all.

6.4 RECOMMENDATIONS

1. **Function is paramount**

» Your wayfinding users (your residents, new residents, and visitors) deserve great signage. Branding, legal communication, and marketing are all important sign elements, but good wayfinding requires simple signs. Functionality for your sign users must come first.

2. **Signs shouldn't add clutter**

Your environment is important, and signs shouldn't take away from it. We recommend that the sign locations recommended in this project do not duplicate other signs already in place. When new signs go in the ground, any redundant signage should come out.

STANDARDS

Transportation Association of Canada (TAC) produces a standard for regulatory on-road cycling signs, but TAC does not provide much guidance for wayfinding, nor for cycling off-road. Bicycle Nova Scotia (BNS) has produced a wayfinding signage toolkit for municipalities which is very comprehensive, and provided a useful starting point for the sign concepts provided in this project.

BRAND

3. **Light branding**

We designed a custom brand for this project, and the signs conceptualized here employ a "light" version of that brand, using the project's typography and colour treatment. Heavy branding quickly falls out of fashion as brands and visual identities change over time. With a light touch, the signs match this project's brand and provide a functional, legible design that will still be fresh years in the future.

PLANNING

4. **Work with the provincial road authority**

Many rural roads in Nova Scotia are owned by the province, who will need to be consulted with when planning an on-road cycling signage system.

5. **The AT network should be seamless, signage should be seamless too**

Signs for on-road and off-road routes may not be the same, but they should have consistency of branding to give users the sense of a seamless network of AT routes.

6. **Some sign types may be geared towards pedestrians or people in vehicles.**

When developing an AT wayfinding system for CBRM, not all of the sign types will be geared towards cyclists in motion. Some signs will guide people in vehicles to staging areas / trailheads. Other signs, such as trailhead signs, are designed for people who are not in motion, standing near the sign.

7. **Digital mapping should complement real-world signage**

Digital and sign-based wayfinding work very well together, but their integration requires some work on the part of municipalities. Most importantly CBRM must ensure that the information provided on major digital mapping systems match the information provided on signs, to avoid user confusion. Most important are matching place names and route alignments—what people see on their smart-phone should not conflict with what the sign is communicating.

8. **Naming concerns**

   For simplicity, on-road routes should retain the vehicular name. Off-road routes however, need names or numbers for wayfinding purposes, and must be named with the same care and consideration as vehicular routes. Special routes can be named and branded uniquely within the system if justified—think of the way the Cabot Trail (actually Highway 33) has a special identity within the provincial highway system in Cape Breton.

9. **Design development**

   The designs given in this document are concepts only. They should not be implemented without engaging a sign consultant to do schematic design and design development, location planning and message scheduling, as well as implementation planning including a phased budget.

10. **Sign heights and placement**

    These conceptual signs do not include recommendations for ideal hanging height, clearance or placement in the target environments.

    Most AT signs are hung to be out of reach, but this provides poor eyeline visibility for pedestrians, and very poor visibility for cyclists, whose eyes are often cast downwards. Also, AT signs are often installed in locations too close or too far from the trail or road. The design development should recommend specific height guidelines, and horizontal placement guidelines to ensure signs are visible, but don't create obstructions for users.

11. **Operations and maintenance**

    While signs are durable and generally take care of themselves, they have annual maintenance requirements, and they have a natural lifespan. CBRM should not make significant investments in new signage without also assigning responsibility for its upkeep. Consider the following ongoing responsibilities:

- Sign panels should be checked annually for damage and wear, and cleaned, repaired or replaced as needed.
- Trees and shrubs around signs must be cut so that they doesn't obscure visibility for drivers or pedestrians.
- Wayfinding signs may need adjustment over time—destinations come and go, routes change, destinations are renamed. Ensure those changes are always reflected in your signage.
- Signs are typically guaranteed for 5–10 years. Maintain a schedule to check signs' lifespan.
- Consider a reserve to deal with needed sign maintenance—knowing that signs may need repair or replacement on a regular basis.

If visitors see useful, well kept wayfinding signage, they will feel welcomed. Broken, obscured, or unusable wayfinding signage will reflect poorly on your administration.

Unusable signs present an unwelcoming image.

6.5 CBRM AT BRAND SYSTEM

BRAND

The CBRM In Motion logo represents the forward, bold new motion of the AT plan. This logo could be part of all future AT work in the municipality including

People cycling throughout CBRM may pass hundreds of signs in their travels. It is unnecessary—and more likely counterproductive—to have each and every sign heavily branded.

CBRM IN MOTION

RGB 26 31 86
HEX 1A1F57

RGB 106 184 121
HEX 2E9592

RGB 252 204 92
HEX FCCC5C

TYPOGRAPHY SPECIFICATIONS

Knockout: Due to its clear legibility, this typeface works well as a signage font. Even from a distance, its clear-differentiated letterforms remain legible.

Note

If the sign fabricator does not have the fonts specified, it is their responsibility to purchase them. While font substitutions may be acceptable for some brand applications (e.g. Arial in corporate documents), they are not acceptable on signs.

abcdefghijklm
nopqrstuvwxyz
1234567890

Knockout Junior Wlt Weight

PICTOGRAMS

We recommend using the Society for Experiential Graphic Design (SEGD) Universal Recreation Set to identify generic destinations.

We also recommend the use of gender neutral restroom symbols where such facilities exist.

A sampling of pictograms from the SEGD recreation symbols set

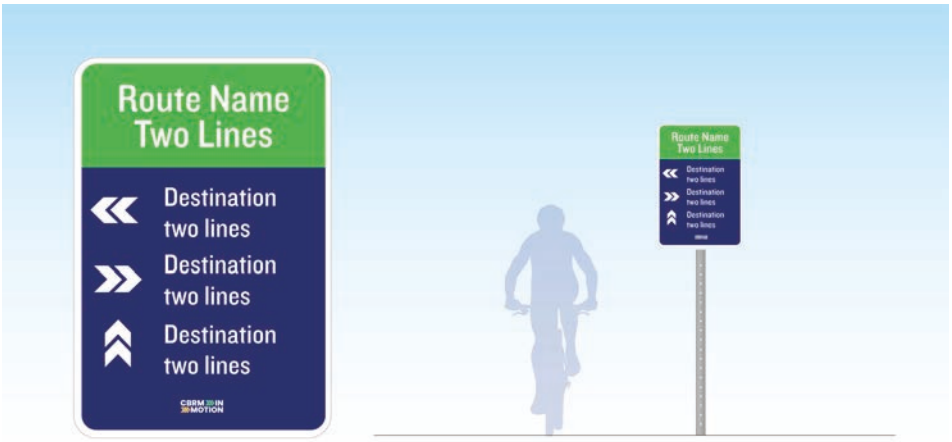
Some recommended washroom pictograms

6.6 CBRM AT SIGN TYPES

The following pages presents concepts for a set of sign designs. These are provided for discussion only, and require a large degree of refinement before implementation: schematic design, design development, location planning and message scheduling, are all required. These should be done by a wayfinding consultant, in a separate project.

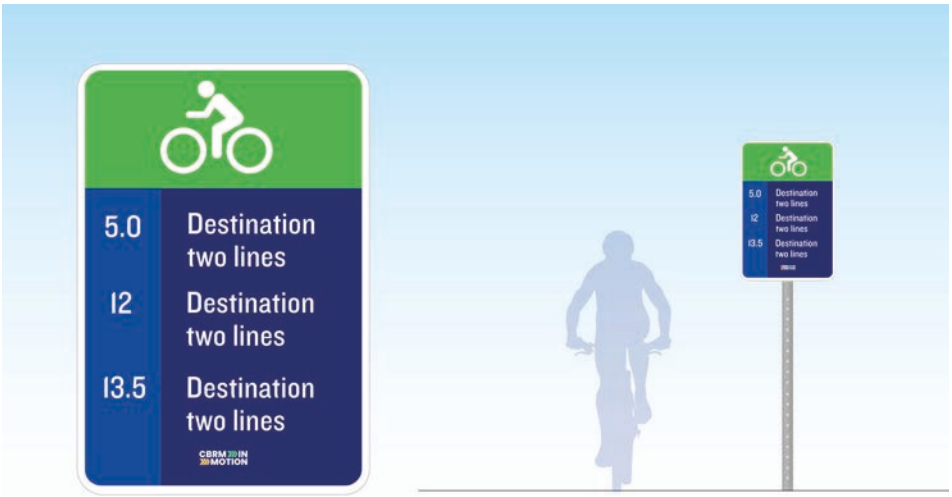
DECISION

Decision signs point the direction to destinations ahead of a turn or decision making point.



CONFIRMATION

Confirmation signs reassure cyclists of their intended direction and communicate distances to upcoming destinations.



WAYMARKERS

Waymarkers are used to guide cyclist to or along a designated bike route.

MULTI-USE TRAIL – SMALL

Although the wayfinding systems typically rely on text messages, there may be situations when symbols can be used to inform AT users of permitted.

MULTI-USE TRAIL – LARGE

Although the wayfinding systems typically rely on text messages, there may be situations when symbols can be used to inform AT users of permitted.

PARK SYSTEM

Park systems help orient users throughout the park and understand access and surrounding context.

TURN FINGERBOARDS

Turn fingerboards can be used to highlight unusual turns or to provide directions to local destinations.

TRAILHEAD

Trail Head signs can be used to combine many of the previous signs and elements into one sign type. The addition of a wayfinding map is common practice for trailhead signs.

RESERVED BICYCLE LANE

Reserved bicycle lane sign—this is a custom-branded version of the MUTCD-C's RB-90 sign. While a custom-branded sign would improve the connection between various types of on- and off-road facilities, further research would be required to determine if a customized sign of this type is allowed on-road in Nova Scotia

APPENDIX A - 2008 AT PLAN BUILT PROJECTS

BIKE TO SCHOOL WEEK

LOCATION AND DATE

Vancouver, BC; 2016 - Current

GOAL

Bike to School Week is an annual organized event involving schools across the Metro Vancouver area. In 2019, 123 schools participated with almost 11,000 riders taking part.

The program aims to educate teachers and students about the mental and physical health and sustainability benefits related to cycling. Additional, the program aims to teach students about cycling from a young age.

In addition to promoting students and staff to cycle to work, the week also asks schools to incorporate cycling education into their lesson plans. These include - but not limited to - school announcements, poster displays, promoting and encouraging all forms of active transportation, providing incenvization for students to cycle to school. The week is organized by HUB, and offers awards and prizes to schools scoring the highest in ridership, trips, and the best first-time school.

Ultimately, the program hopes to develop the school's green initiatives, build a sense of community, and teach students about the importance and benefits related to active transportation[1].

EDUCATION

Educational outreach helps individuals begin using AT networks at an early age. School-based programming can promote the early adoption of AT while teaching children to cycling safety - encouraging them to become a confident AT user later on. When an adult considers their daily routine and incorporating a new transportation method, they are unlikely to do so because of the assumed inconvenience. Studies suggest adults are only likely to adopt AT methods when they are experiencing periods of change - presenting limited opportunities[1]. Therefore, it becomes important for children to adopt healthy behaviours and travel methods related to AT earlier, so they are more likely to continue these patterns throughout their life.

However, due to safety perceptions regarding children walking and cycling to school alone, many parents choose to drive their children or let them take the bus. To promote youth cycling and walking, the municipality should partner with educational boards and outreach programs that assist children cycle and walk for their school commutes. Examples include peer-buddy programs, incentivizing parents use AT methods with their children, and creating leadership programs focusing on youth AT-involvement.

SAFETY LITERATURE

Considering the feedback received from the survey results, safety is one of the major challenges in attracting future AT users. To promote visibility and ensure current and future users of the network feel safe, signage features and community measures can be implemented prior to and post-installation. The use of signage can help drivers and AT users understand new infrastructure, changes from the previously existing infrastructure, and how users are expected to share the road.

Canadian municipalities and cities have also created websites and distributed educational pamphlets prior to the opening of newly constructed infrastructure. Doing so serves the dual purpose of creating awareness about new AT networks in the area and help persuade curious residents to try the AT network by easing potential doubts.

BICYCLE AMBASSADORS

Several cities across Canada have implemented the use of bicycle ambassadors to help raise awareness around recently opened AT facilities. To promote cohesion and awareness, ambassadors wear brightly coloured clothing featuring with the AT Plan's logo, and should be welcoming in nature.

The primary role of ambassadors is to answer questions, provide outreach to businesses, and offer safety advice by educating others and leading by example. Bicycle ambassadors also use the network, offering examples of proper AT usage and safety protocol. Having regular cycling presence on the road promotes the use of the AT network, and allows individuals to have their questions answered directly. This is an effective strategy in allowing people to understand how the AT network can be used, demonstrating safety, and offers individuals the opportunity to talk to someone who is familiar with cycling culture.

1 126 Metro Vancouver Schools Celebrated Bike to School Week. HUB Cycling: Bike Events, Education, Action in Metro Vancouver. (2021, August 23). Retrieved February 18, 2022, from https://bikehub.ca/about-us/news/126-

1 Kraus, S., Koch, N. (2021). Provisional covid-19 infrastructure induces large, rapid increases in cycling. Proceedings of the National Academy of Sciences, 118(15). https://doi.org/10.1073/pnas.2024399118

CBRM IN MOTION

POP-UPS

Former traffic studies have demonstrated that adding additional traffic lanes to existing roads does not reduce traffic levels. Instead, widened roads tend to attract more drivers due to the perceived additional road space[2].

During the COVID-19 pandemic, cities across the world implemented pop-up cycle lanes. Similar to the previously discussed studies, research demonstrated more cycle lanes encouraged more cyclists. A study in conducted across 106 cities in Europe tracked the use of pop-up cycle lanes over four months. Research suggests individuals are more likely to change their habits (such as commuting using AT methods) when they are presented with a major life change. In this situation, COVID-19 significantly disrupted the majority of the world population's daily routine – especially those relying on transit and car-share options. Despite its downfalls, the pandemic allowed policymakers to quickly implement cycle lanes during this period of significant change. To determine whether cycling would become a newly-adopted transportation method, researchers tracked the use to see if there was an increase in cyclists using the pop-up and existing infrastructure.

Ultimately, the study found cycling increased by 11-48% within four months on average, accounting for potentially $1 to $7 billion in health benefits per year if ridership continued at the same rate[2]. While this study was conducted under a very specific set of circumstances, it demonstrates the potential for individuals to form and take-on new habits. Though society hopefully will never experience change on the same scale brought forth by the COVID-19 pandemic, there will always be individuals experiencing small-to-large scale changes in their lives. As the study suggests, each one of these changes offers the potential for an increase in AT ridership.

COMMUNITY EVENTS

Organizing community events around the opening of new AT infrastructure increases awareness and potential ridership within the community. Festivals and open street events generate excitement about the AT network, create awareness, and allow people to try the AT network. Additionally, many towns and cities across Canada have organized community cycling groups. Cycling as a part of a large group can make an individual feel safer while allowing them to explore the AT network. Though the chances of them only cycling within a large group is considerably low, once they have used the AT network and had a positive experience, they are likely to do so again.

Other community events might include peer-ridership programs where adults can pair with an experienced AT-user. Doing so allows people to become comfortable with cycling, meet new people, and foster a sense of community.

CAN-BIKE PROGRAM: INTRODUCTION TO CYCLING SKILLS

LOCATION AND DATE

Sydney, Cape Breton; Current

GOAL

Velo Cape Breton's Can-Bike Program is targeted to members and non-members. The program helps participants develop defensive biking techniques and learn bicycle maintenance skills for short and long distance cycling trips.

Sessions can be offered to small groups of 3-5 five people. During the spring and autumn off-seasons, 3 hour lessons are available for a maximum of six people.

A-1 CBRM'S ACTIVE TRANSPORTATION PLAN IN 2022

In 2008, the CRBM's launched and implemented its first active transportation plan. As discussed earlier in the report, the plan was successful in creating awareness about the benefits and possibility of active transportation in the municipality. However, the majority of the plan was never realized. This section will offer an overview of the successes of the 2008 Plan, but also lessons learnt to ensure the 2022 Plan improves upon the current challenges faced by existing infrastructure.

FIGURE 1. Original tram line corridor

FIGURE 2. CBU Rest Area

FIGURE 3. Trail looking east from Kytes Drive

MARYANN CORBETT TRAIL [GRAND LAKE ROAD MULTI-USE TRAIL]

The Maryann Corbett Trail is generally a 3 metre wide paved path, but is reduced to a 2.5 metre wide paved path in limited sections where it would be too costly to relocate infrastructure. The trail is located on the south side of Highway #4 (Sydney-Glace Bay Highway) which is a very busy four-lane highway. The trail length is approximately 10.4 kms and runs from Cow Bay Road and terminates near civic address 2054 on Highway #4 in Reserve Mines. The trail is a multi-use path suitable for walkers, cyclists and wheelchair users and provides a connection between the Reserve Mines and Sydney communities. The construction of the trail was completed over several years as capital cost and the size of the Project were two factors that resulted in a multi-year phased construction approach.

The first section of the trail was completed in 2014 and consisted of the construction of approximately 750 metres of new trail at its current termination point in Reserve Mines. This section required widening of the shoulder area in some sections to accommodate the construction of the trail. A full 3 metre wide paved path was constructed in this section and also saw the installation of RA-5 Pedestrian Crossing signal lights near Civic #2054 on Highway #4 (Sydney-Glace Bay Highway) and the installation of new roadway signage.

The second section of trail construction performed in 2015 saw the continuation of the trail to the east starting from where the trail construction ended in 2014 and continued past the entrance to the J.A. Douglas McCurdy Sydney Airport and terminated near the entrance to the property where once a drive-in theater existed. Culvert extensions and widening of the roadway shoulder were performed. The construction of a rest area was also performed to give users of the trail a place where they could enjoy a moment of relaxation. This section was approximately 2,050 metres in length and consisted of a 3 metre wide paved path.

The next portions of the Maryann Corbett Trail were constructed in 2016 was performed in three separate sections. One section having an approximate length of 820 metres and ran from the Mayflower Mall, behind the Grand Lake Road fire station, and ended prior to the current CARSTAR building. Construction stopped prior to the CARSTAR building as a new road access off of Highway #4 was anticipated at this location in the near future to access a potential new commercial development. This section consisted of a 3 metre wide paved path, extensions to existing culverts, ditching improvements, reshaping of embankment and plantings along the side of the trail. The second section had an approximate length of 2,700 metres and started at Yolanda Drive, continuing west adjacent to Highway #4 until the old tram line corridor was encountered at which point the trail veered off to follow the tram line and terminated prior to entering the Cape Breton University property. This section required some power pole relocations, property acquisitions, retaining wall construction, culvert extensions and resulted in the construction of a 3 metre wide paved path, with a reduction of the path to 2.5 meters in one area, along this route. The third section had an approximate length of 730 metres and commenced at the entrance to the property where once a drive-in theater existed and terminated at the entrance to Forrest Haven Cemetery. A gabion wall was constructed along a section of this trail, culvert extensions and widening of the shoulder were performed to facilitate the construction of the 3 metre wide paved path.

In 2017 construction of the trail continued to install the remaining sections to complete the full length of the trail. A section having an approximate length of 1,770 metres that extended from the entrance of Forrest Haven Cemetery and continued east to tie into the old tram line corridor (east of Cape Breton University) was constructed having mainly a 3 metre wide paved path but was reduced for a portion of its run to a 2.5 metre wide paved path to avoid existing infrastructure. This section had areas where power pole relocations were required. Culvert extensions, widening of the shoulders and installation of signage was also performed. In 2018 a rest area in a wooded area just off the trail, located west of the Cape Breton University, was constructed in a tranquil area that provides viewing of an adjacent brook.

In 2018 approximately 640 metres of trail was constructed which started at Youlanda Drive and continued east to connect with the trail located just east of the Polaris building. This section saw the construction of a 3 metre wide paved path. The final section of the trail was completed in 2018, having an approximate length of 910 metres, that connected the east side of the Mayflower Mall with Cow Bay Road, was performed. This section required tree clearing and the construction of a wooden bridge to facilitate the construction of the 3 metre pave path along this section.

MARYANN CORBETT TRAIL (GRAND LAKE ROAD MULTI-USE TRAIL)

YEAR CONSTRUCTED

2018

NUMBER OF PEOPLE USING THE INFRASTRUCTURE

Although exact numbers of trail users are not available, this trail sees a fair amount a traffic throughout the week. The majority of the traffic on the trail system is observed to be bicycle users, however, pedestrian traffic utilizes the trail system

MAINTENANCE PRACTICES

During the winter, the trail is cleared of snow following snowfall events and is also salted to prevent ice buildup. Maintenance during the summer months includes general landscaping and pruning and trimming vegetation.

GREENLINK TRAIL

YEAR CONSTRUCTED

2012

NUMBER OF USERS

Exact numbers of trail users are not available; trail is regularly utilized by the community evidenced by vehicles regularly present in the parking lots throughout the day. The trail generally sees more traffic during the spring, summer and fall seasons. However, the trail system remains utilized by the public during winter months for snowshoeing - albeit in smaller numbers.

LESSONS LEARNED

During the construction of the trail section between Rotary Park and Shandwick Drive, bedrock was encountered along the eastern end of the trail extension. This created difficulty in cutting the trail and ditching profiles through this section, leading to increased construction costs.

As previously mentioned, the trail section between Shandwick Drive and Rotary Park was impacted by erosion from the adjacent brook. Consideration for the impacts of watercourses near trail systems should be incorporated during the design phases going forward.

MAINTENANCE PRACTICES

During the winter, the trail is cleared of snow following snowfall events and is also salted to prevent ice buildup. Maintenance during the summer months includes general landscaping and pruning and trimming vegetation.

GREENLINK TRAIL

The Greenlink Trail is a 3 metre wide fine gravelled trail located in Sydney between Membertou and Hardwood Hill. This trail has several different trail heads including at Shipyard Elementary, Shandwick Street, Rotary Drive, Maillard Street, Churchill Drive and the Cape Breton Regional Hospital, and serves as a connector for each of these areas. The total length of the trail system is approximately 3.22 kms and was constructed utilizing crusher fines as the surface finish which is user friendly for the intended users of the trail. The trail is a multi-use path suitable for walkers, cyclists and wheelchair users (except between Rotary Park and Shandwick Drive where the section of trail is not wheelchair accessible due to steep passages at each end of this section).

The Greenlink Trail was constructed in different phases beginning in 2010, with the final work being completed in 2012. Work during the 2012 construction season included the construction of new trail sections running from Maillard Street to the Shipyard ballfield and a section running from Rotary Park to Shandwick Street, installation of new HDPE culvert sections in areas of the trail which were subject to flooding, installation of new ditching, installation of gravels to construct the desired alignment and profile of the trail, installation of a new gabion basket retaining wall at the Shandwick Street entrance, installation of way finding signage, installation of story boards that provides information on local Mi'kmaq heritage, installation of new decorative metal archway entrances at the Maillard Street and Rotary Park entrances, installation of benches to provide rest areas in selected locations and the installation of new parking lots at the Churchill Drive and Rotary Park trailheads. The parking lot at the Churchill Drive trailhead is approximately 700 m2 and has a capacity of 14 parking spaces while the Rotary Park parking lot is approximately 540 m2 and has a capacity of 12 parking spaces. Both parking lots are complete with a gravel surface and have armour stone and architectural masonry walls bordering the parking areas. Work for this phase of the construction also included the installation

FIGURE 4. Greenlink rest area

FIGURE 5. Greenlink rip rap

of a new crosswalk at the Churchill Street intersection of the trail, complete with new RA-5 Pedestrian Crossing signals. Various plantings were also performed along selected sections of the trail.

Since the substantial completion of the trail system, there has been some additional work completed on the trail, including repairs to the embankment along the stretch of trail running from Rotary Park to Shandwick Drive where the adjacent brook was beginning to erode the trail. This work also involved the installation of new erosion control measures along this stretch of trail including reshaping of the embankments, placement of geotextile anchored into the embankment and placement of large armour stone material.

The trail is regularly utilized by the community as seen by the fact that there are normally vehicles present in the parking lots at any time during the day. There is one regular visitor that travels daily from the north side to walk the trail.

FIGURE 6. Whitney Pier Trail at Matilda Street

FIGURE 7. Whitney Pier Trail at Henry Street

FIGURE 8. Bollard and Lighting

WHITNEY PIER COMMUNITY HERITAGE TRAIL

The Whitney Pier Community Heritage Trail is a 3 metre wide fine gravelled trail located in Whitney Pier and runs from Railroad Street to Dominion Street. This trail has several different trail heads including at SPAR Road, Railroad Street, Henry Street, Ferris Street, Bryan Street, Church Street, James Street, Matilda Street and Dominion Street. The trail serves as a connector for each of these areas while also providing areas for rest and interactive heritage signage for the area. The total length of the trail system is approximately 1.5 kms. The trail is a multi-use path suitable for walkers, cyclists and wheelchair users.

The Whitney Pier Community Heritage Trail was constructed in different phases beginning in 2011, with the final work being completed in 2012. Work on this trail included installation of new fine trail gravels, ditching improvements, culvert installations, installation of new overhead lighting along the trail, architectural bollards at all trail entrances, concrete landings at trail intersections at roadways (to mitigate gravels spilling onto adjacent roadways), installation of rest areas, installation of new trail signage and installation of new interactive local heritage signage.

WHITNEY PIER COMMUNITY HERITAGE TRAIL

YEAR CONSTRUCTED

2011

NUMBER OF USERS

Exact numbers of trail users are not available; trail is regularly utilized by the community. The trail generally sees more traffic during the spring, summer and fall seasons. During the winter, the trail system remains utilized by the public during winter months for snowshoeing, albeit in smaller numbers.

LESSONS LEARNED

Initially bollards were installed at all of the trail entrances to prohibit motorized traffic from entering the trail system. However, these bollards were pulled from the ground by ATV and truck users along the trail. Currently, motorized traffic can be encountered on the trail. More creative ways of keeping motorized traffic from entering the trail system is required while maintaining access for maintenance vehicles.

MAINTENANCE PRACTICES

Typical maintenance of the trail includes regrading of the fine gravel surface twice a year. During the winter, the trail is not groomed

COAL TOWN TRAIL

YEAR CONSTRUCTED

2020

NUMBER OF USERS

Although exact numbers of trail users are not available, this trail sees a fair amount a traffic throughout the week. The majority of the active transportation traffic on the trail system is observed to be bicycle users; however, pedestrians also use the trail system. All-terrain vehicles have been noticed using the system as well.

MAINTENANCE PRACTICES

During the winter, the trail is cleared of snow following snowfall events and is also salted to prevent ice buildup. Maintenance during the summer months includes general landscaping, pruning, and trimming vegetation.

COAL TOWN TRAIL

The Coal Town Trail is primarily a 3 metre wide fine gravelled trail with a localized paved section in Glace Bay. The trail runs along the former DEVCO railway corridor from Birch Grove Road to Gardiner Road. Bicycle Nova Scotia had a "Best Practice Review and Recommendation Report" performed in 2019 that looked into the upgrades required to transform this abandoned railway corridor into a multi-use trail. Bicycle Nova Scotia shared this report with the Cape Breton Regional Municipality (CBRM). In subsequent years the CBRM had some of the recommendations performed such as: tree clearing, replacement of ballast material with finer gravels, resurface areas to eliminate water ponding, resurfacing where required, improved drainage in areas, replaced high back curb where trail meet roads with low back curb, sloped area from low back curb to sidewalk or trail and installed concrete or asphalt surface, installed asphalt surface at trail intersections at roadways (to mitigate gravels spilling onto adjacent roadways) and installed bollards at all locations a trails meet roads to prevent access from motorized cars and trucks from accessing the trail.

As noted above there was a section of the trail in Glace Bay that ran from King Edward Street to Main Street which CBRM paved due to nuisance dust issues that was regularly occurring as a result of ATV traffic on the previously gravelled surfaces. This trail has numerous access points along its length and serves as an active transportation connector for the communities of Gardner Mines, Dominion and Glace Bay. The total length of the trail system is approximately 13.4 kms. The trail is a multi-use path suitable for walkers, cyclists and wheelchair users. The trail was used regularly by ATV traffic before the railway corridor was made more user friendly to the general public and continues to be used regularly by ATV traffic.

FIGURE 9. Gardner Road - existing entrance

FIGURE 10. Typical upgraded gravel trail

Work on this trail has been completed from 2020 until the present. As a part of the agreement to purchase this large parcel of land from DEVCO, DEVCO has committed to paying the CBRM an annual maintenance allowance. CBRM also contributes more funding to complete upgrades to the trail. Trail upkeep and maintenance are provided by a society, compromised of Bay it Forward, Marconi Trail Blazers, Velo Cape Breton, and Cape Breton Road Runners. The society receives annual payments from PWGSC as part of their stewardship agreement.

Since 2021, Bicycle Nova Scotia and other interested stakeholders have applied for funding through the CBRM and provincial governments to complete trail upgrades and have been successful in funding the installation of trail signage and interpretive signage installation at the Gardiner Road trailhead as well as other trail upgrades.

FIGURE 11. George Street bicycle lane

FIGURE 12. Route 4 towards Blackett Road

GEORGE STREET BIKE LANES

George Street is a main thoroughfare in Sydney that runs from Ortona Drive to approximately 1 km beyond the Highway 125 overpass. The section of George Street running from Ortona Drive to Townsend Street is four-lanes and can accommodate parking on both sides of the roadway. In recent years, CBRM has rebuilt or resurfaced the roadway through this section of George Street and have installed new roadway signage and line paintings for a dedicated bicycle lane. This stretch of dedicated bicycle lanes runs for a total approximate length of 1,700 metres.

NOVA SCOTIA ROUTE 4 WIDENED SHOULDER

Nova Scotia Route 4 is a two-lane roadway that runs west from Glace Bay and goes beyond the Canso causeway where it eventually becomes a four-lane highway terminating in Thomson Station. The section of Route 4 beginning in Sydney River at the off-ramp from Highway #125 and terminates at Blacketts Lake Road had its shoulder of the roadway widened in 2012 to accommodate room for pedestrian traffic and bicyclers. This work also included the installation of a painted line demarking the shoulder. Currently there is no signage or specific line markings to indicate this shoulder is a dedicated bicycle lane. This stretch of widened shoulder runs for a total approximate length of 5.6 kms.

GEORGE STREET BIKE LANES

YEAR CONSTRUCTED

2020

NUMBER OF USERS

Although exact numbers of bike lane users are not available, this bike lane is regularly utilized by the community.

MAINTENANCE PRACTICES

Typical maintenance of the bike lanes includes street sweeping debris and refuse in the spring and snow clearing during the winter. The bicycle lane markings are repainted on a yearly basis.

MAINTENANCE COSTS

TLine paintings - Approx. $7,500.00/ year

NOVA SCOTIA BLUE ROUTE 4 WIDENED SHOULDER

YEAR CONSTRUCTED

2012

NUMBER OF USERS

Although exact numbers of users are not available, this widened shoulder is utilized by the cycling community quite regularly.

MAINTENANCE PRACTICES

Typical maintenance of the widened shoulder includes snow clearing during the winter and repainting of the demarcation lines on a yearly basis.

SOUTH BAR WIDENED SHOULDER

YEAR CONSTRUCTED

2021

NUMBER OF USERS

Although exact numbers of users are not available, this widened shoulder is utilized by the cycling community quite regularly.

MAINTENANCE PRACTICES

Typical maintenance of the widened shoulder includes snow clearing during the winter and repainting of the demarcation lines on a yearly basis.

SPAR ROAD WIDENED SHOULDER AND SHOULDER ADJUSTMENTS

YEAR CONSTRUCTED

2013

NUMBER OF USERS

Although exact numbers of users are not available, this widened shoulder is utilized by the cycling community quite regularly.

LESSONS LEARNED

The impact of railway track crossings on roadways with regards to bicycle traffic and the methods of which this can be overcome when faced with non-right angle crossings.

MAINTENANCE PRACTICES

Typical maintenance of the widened shoulder includes snow clearing during the winter and repainting of the demarcation lines every year.

FIGURE 13. Widened shoulder for bicycle traffic along SPAR Road

SOUTH BAR WIDENED SHOULDER

The New Waterford Highway is a two-lane roadway that runs from Whitney Pier and terminates in New Waterford. In 2021, beginning with the section of the New Waterford Highway running through South Bar from Grant Street in Whitney Pier to Victoria Mines was resurfaced by NSTIR. While this work was being completed, the CBRM paid to have the western shoulder of the roadway widened to accommodate room for pedestrian traffic and bicyclers. This additional work also included the installation of a painted line demarking the shoulder, extension of the existing culverts and ditching improvements. Currently there is no signage or specific line markings to indicate this shoulder is a dedicated bicycle lane. This stretch of widened shoulder runs for a total approximate length of 7.8 kms.

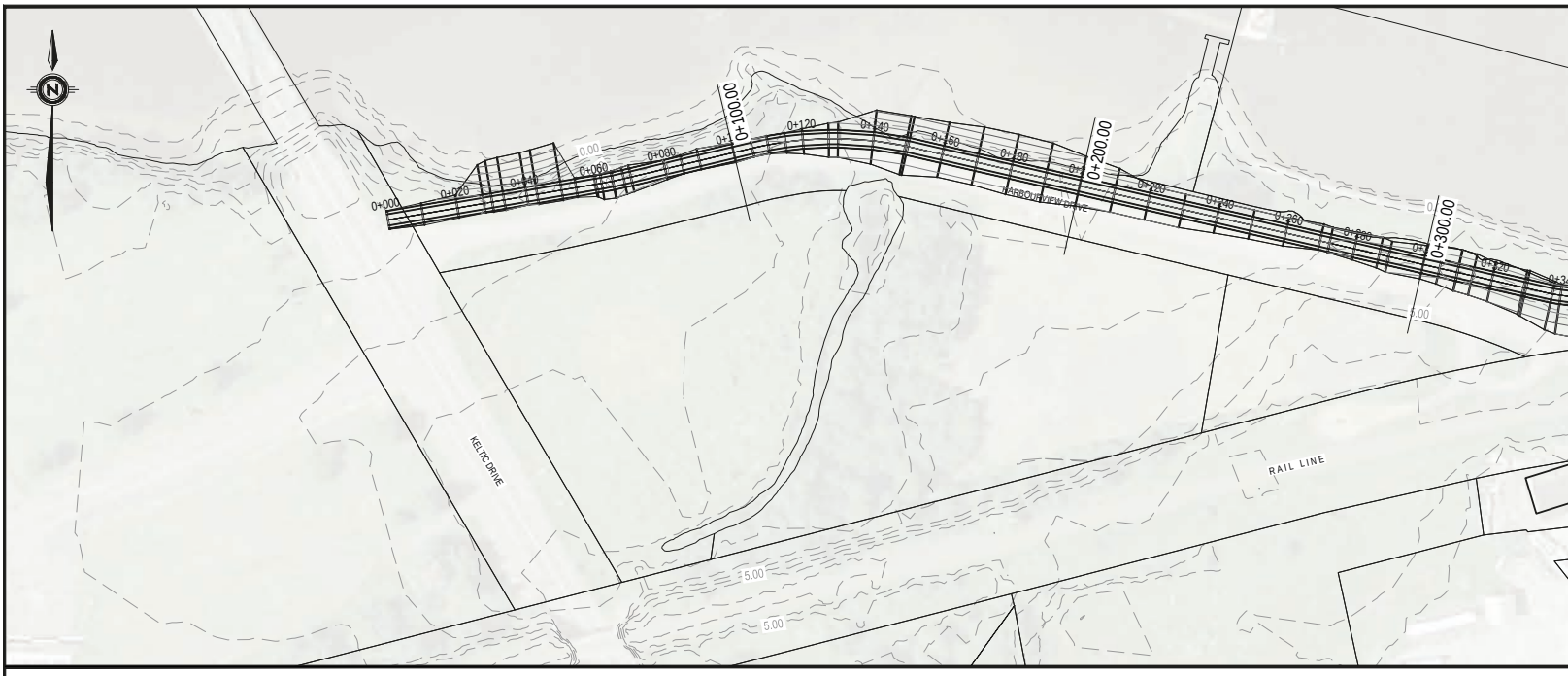
SPAR ROAD WIDENED SHOULDER AND SHOULDER ADJUSTMENTS

SPAR Road is a two-lane roadway that runs from Sydney's north end beginning at the international coal pier and terminates at the intersection of Grand Lake Road and Highway #125. This roadway serves as a collector road for travelers to bypass traffic along Prince Street, Welton Street and Grand Lake Road while commuting to Sydney's north end, Whitney Pier, the Mayflower Mall or beyond to Glace Bay. In 2010, the section of SPAR Road running from the Lingan Road intersection to the intersection of Kevin Quinlan Avenue was widened to accommodate bicycle traffic and included shoulder line painting.

Through this section of SPAR Road, there was a section of rail line that crossed the roadway on an angle and created an issue with bicycle travelers getting caught in the tracks. CBRM engaged EXP to redesign the bicycle path to cross the railway line at a right angle to correct this issue. Work for this alteration was completed in 2013 and included installation of new base gravels, installation of 100 mm of asphalt pavement, installation of rubber rails at crossings, ditching improvements, extension of an existing concrete culverts and line paintings.

Currently there is no signage or specific line markings to indicate this shoulder is a dedicated bicycle lane. This stretch of widened shoulder runs for a total approximate length of 2.5 kms.

APPENDIX B - SYDNEY RIVER MULTI USE TRAIL SCHEMATIC DESIGN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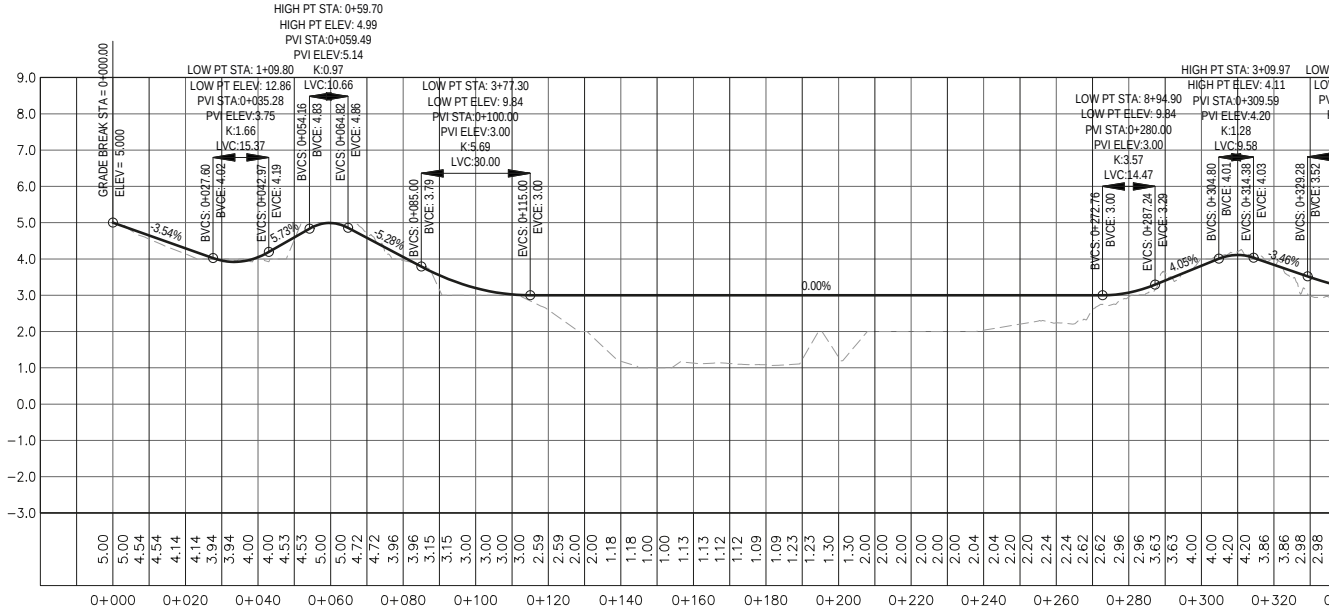
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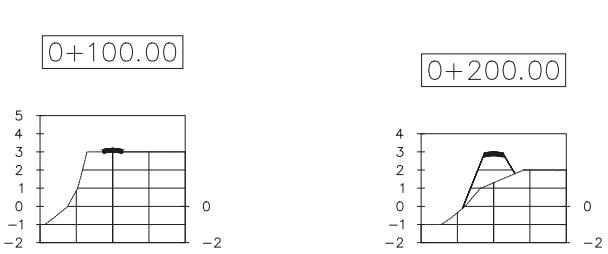
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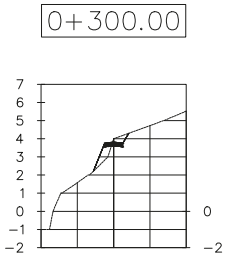
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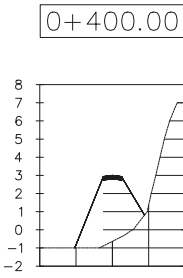
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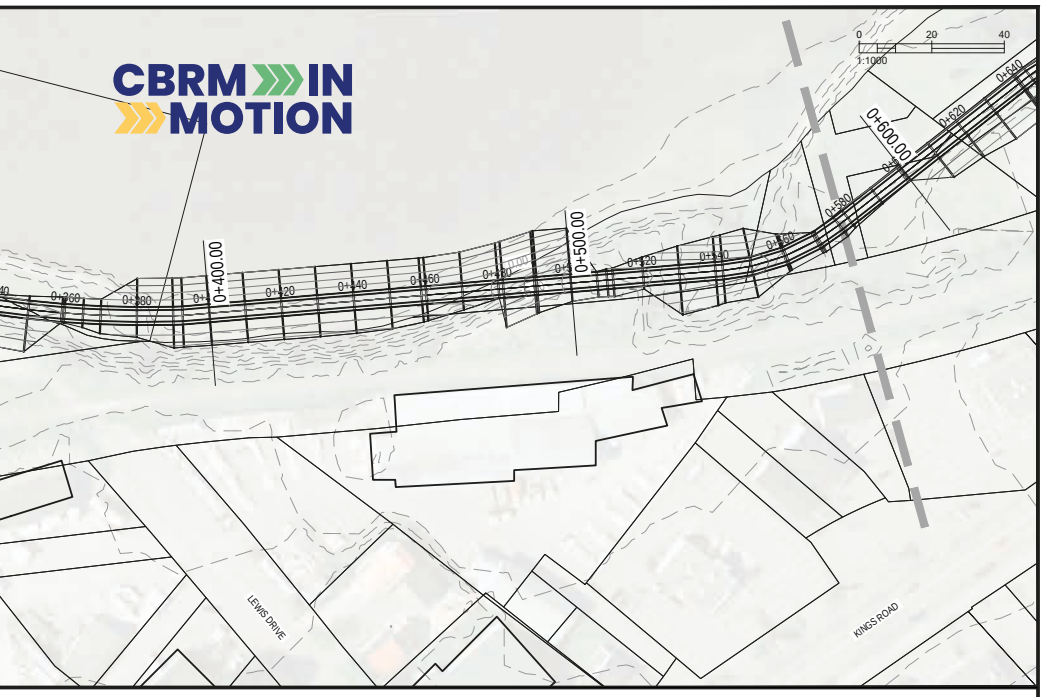

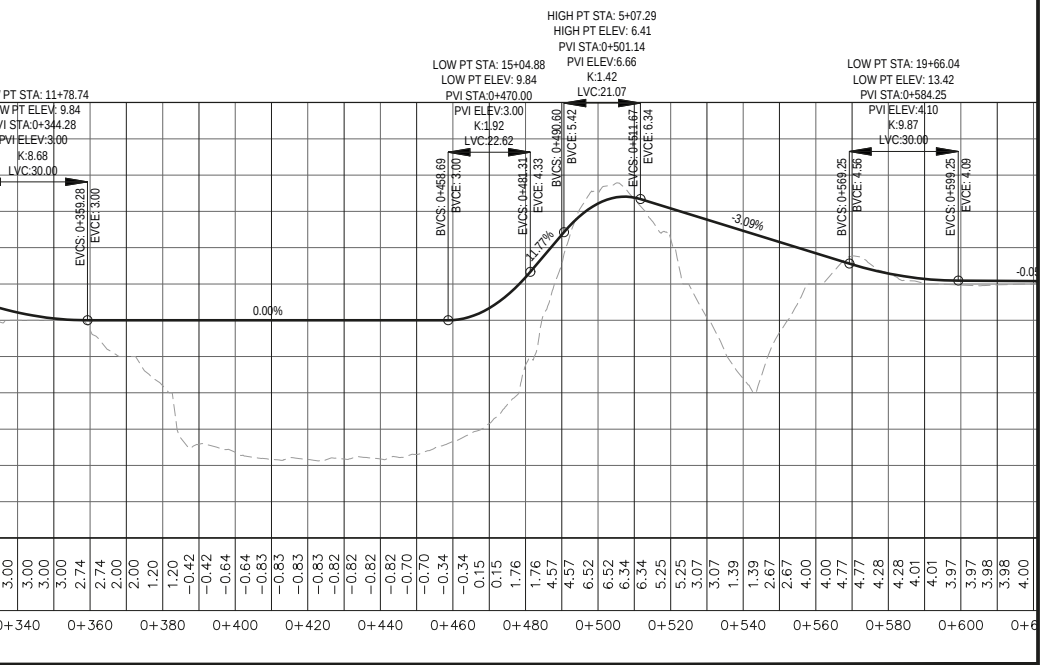

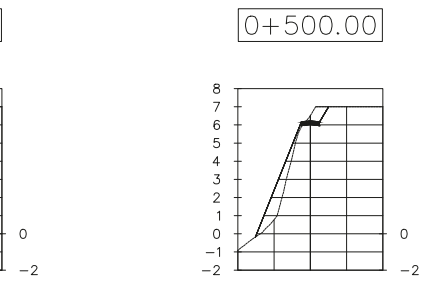

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Key Plan

SCALE: N.T.S.

Seal

Revisions

NO.	DATE

Project

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Plan, Profile & Sections

Scale	Project number
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Drawn By	Checked	Approved
DJH	RTL	RTL

Drawing Number

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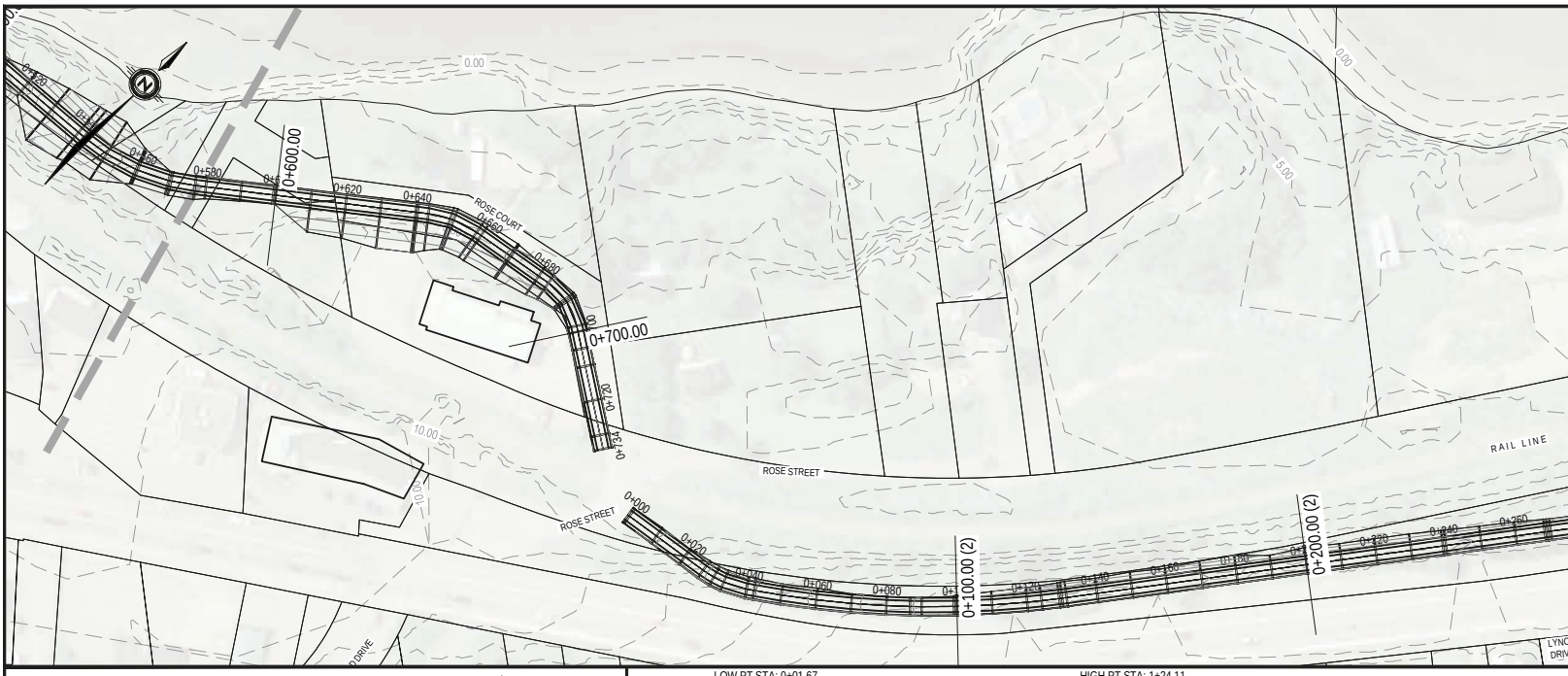
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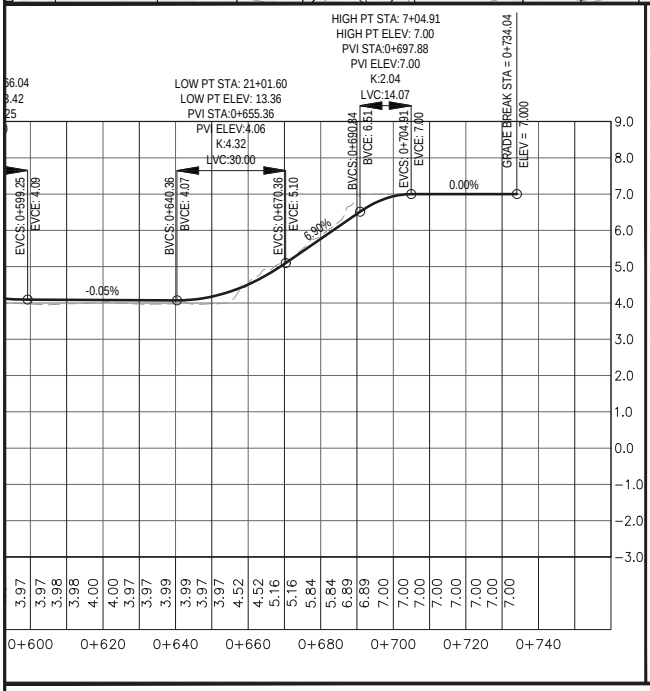
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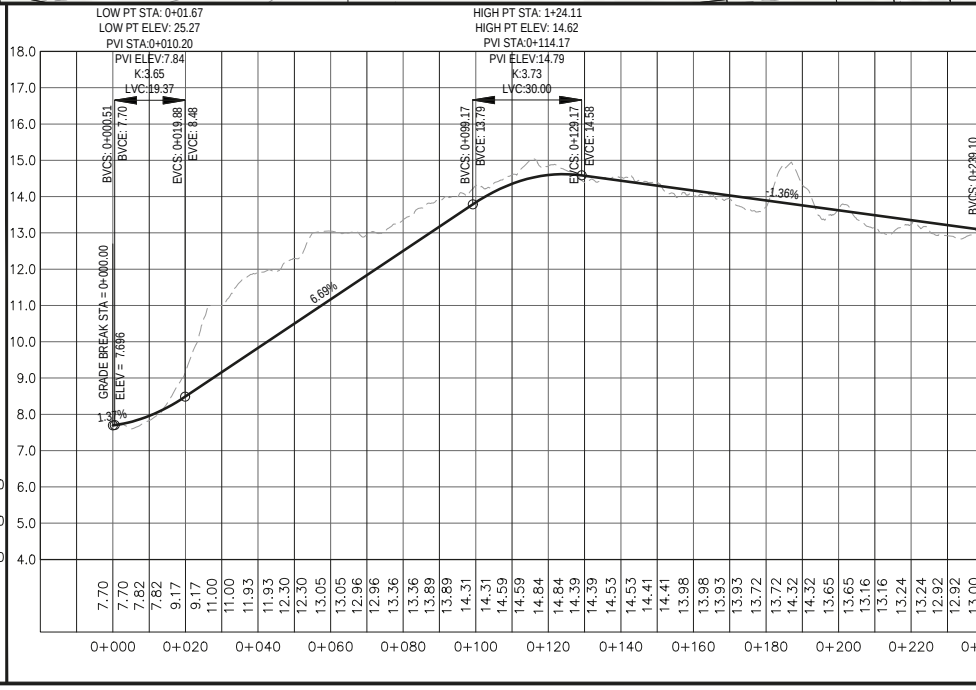
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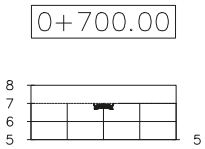
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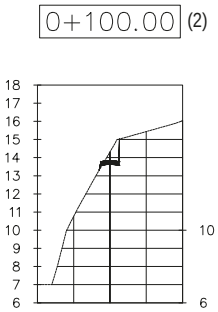
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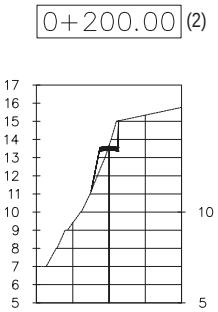
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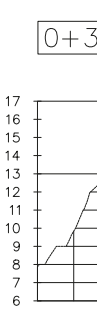
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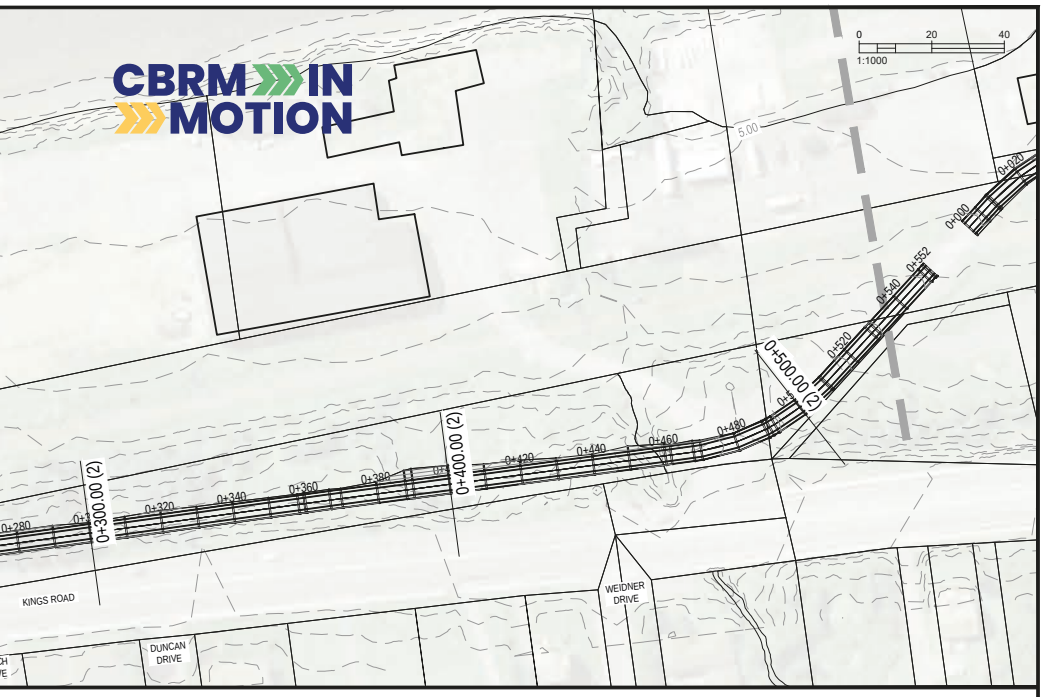

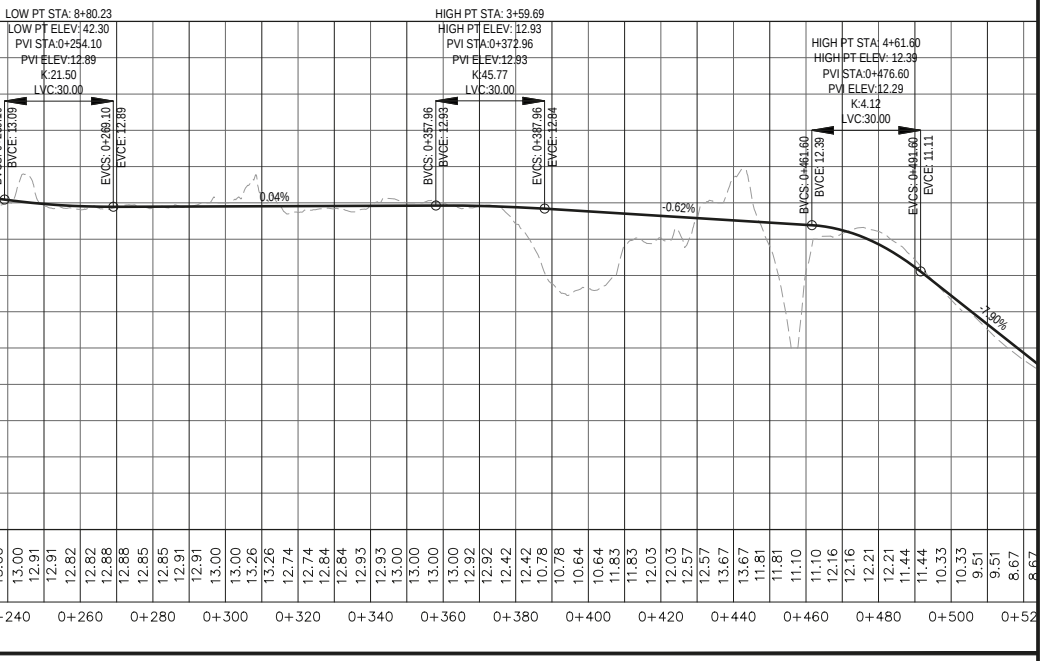

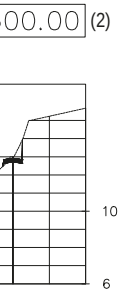

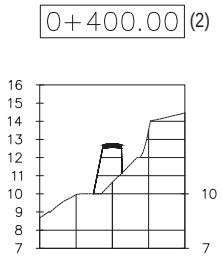

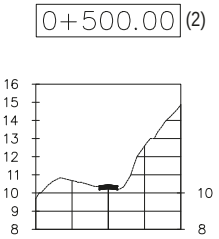

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Revisions

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Area 2
Plan, Profile & Sections

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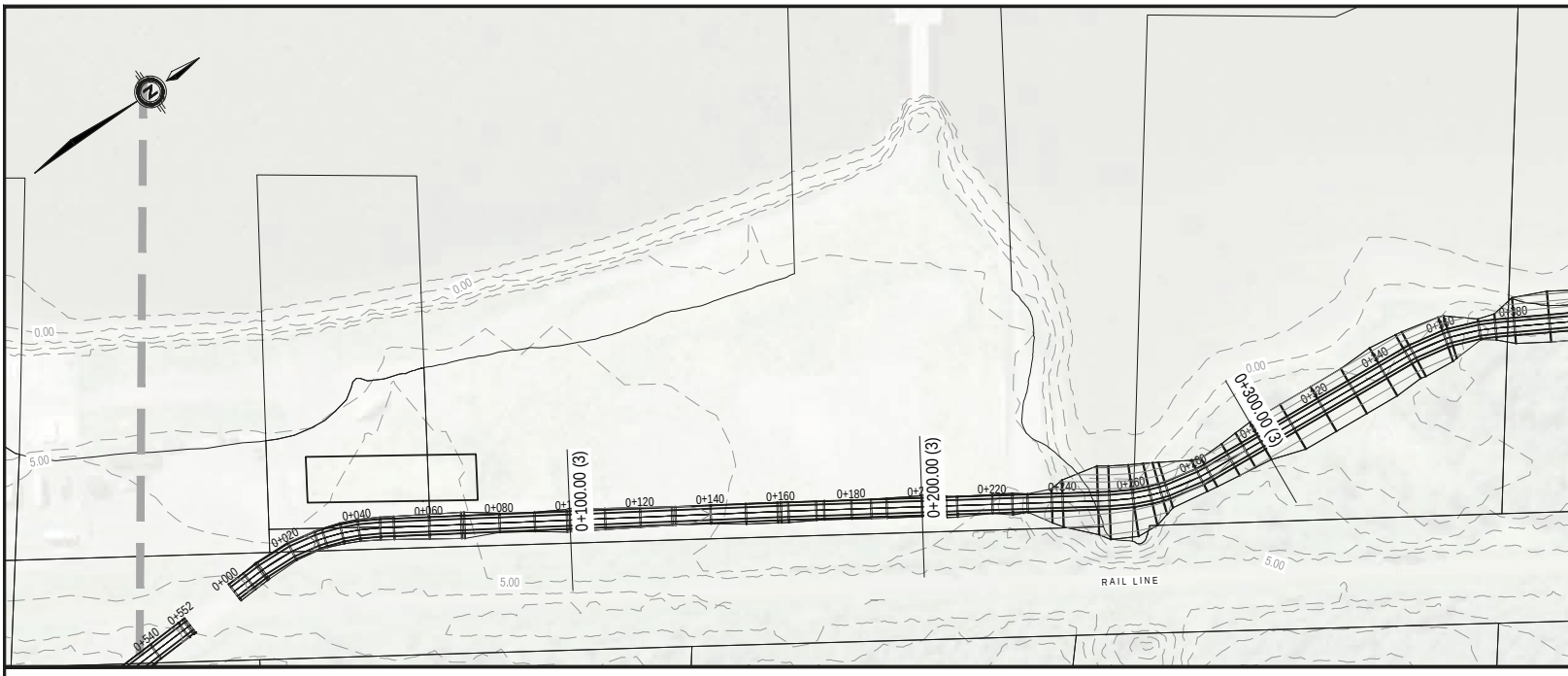
Drawn By	Checked	Approved
DJH	RTL	RTL

Drawing Number

L102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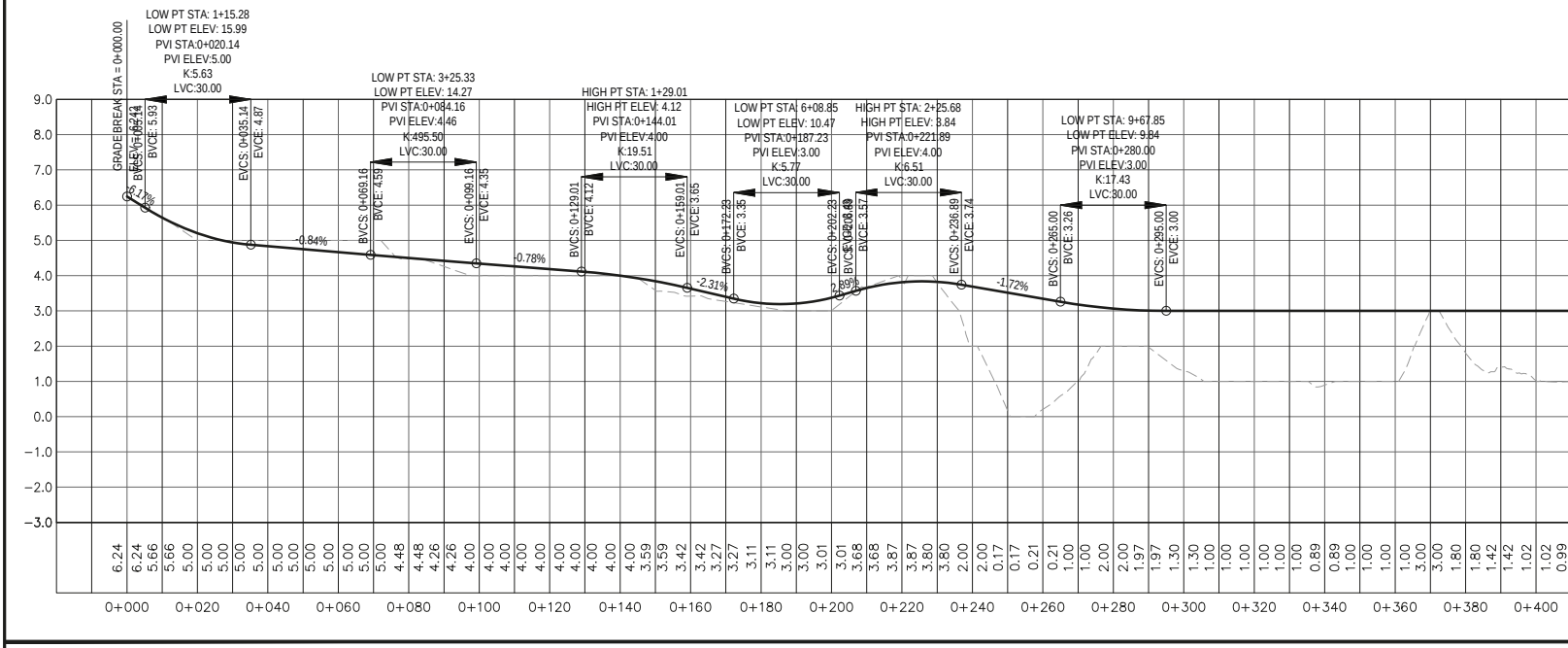
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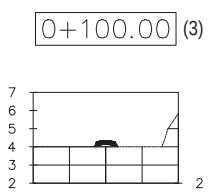
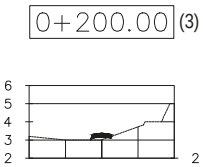
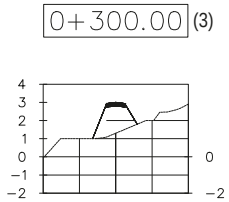
LVC:30.00
BVCS: 0+172.23
BVCE: 3.35
EVCS: 0+202.23
BVCE: 3.57
2.89%
HIGH PT STA: 2+25.68
HIGH PT ELEV: 3.84
PVI STA:0+221.89
PVI ELEV:4.00
K:6.51
LVC:30.00
EVCS: 0+236.89
EVCE: 3.74
-1.72%
LOW PT STA: 9+67.85
LOW PT ELEV: 9.84
PVI STA:0+280.00
PVI ELEV:3.00
K:17.43
LVC:30.00
BVCS: 0+265.00
BVCE: 3.26
EVCS: 0+295.00
EVCE: 3.00
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
−1.0
−2.0
−3.0
0+000
0+020
0+040
0+060
0+080
0+100
0+120
0+140
0+160
0+180
0+200
0+220
0+240
0+260
0+280
0+300
0+320
0+340
0+360
0+380
0+400


0+100.00 (3)
7
6
5
4
3
2
2


0+200.00 (3)
6
5
4
3
2
2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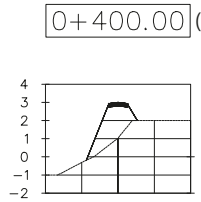
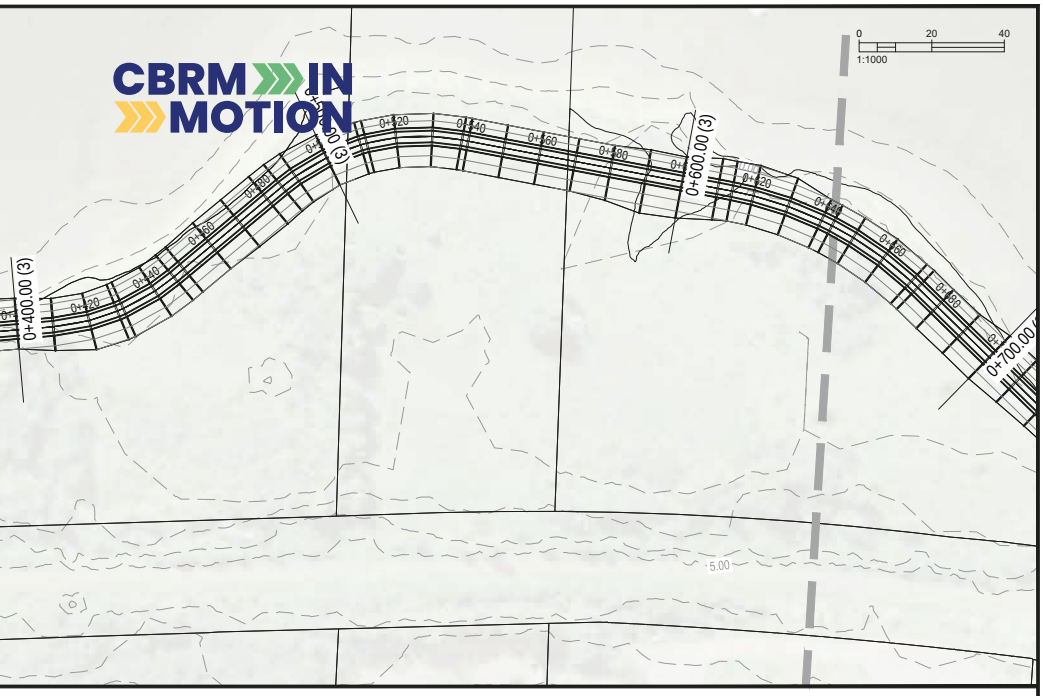
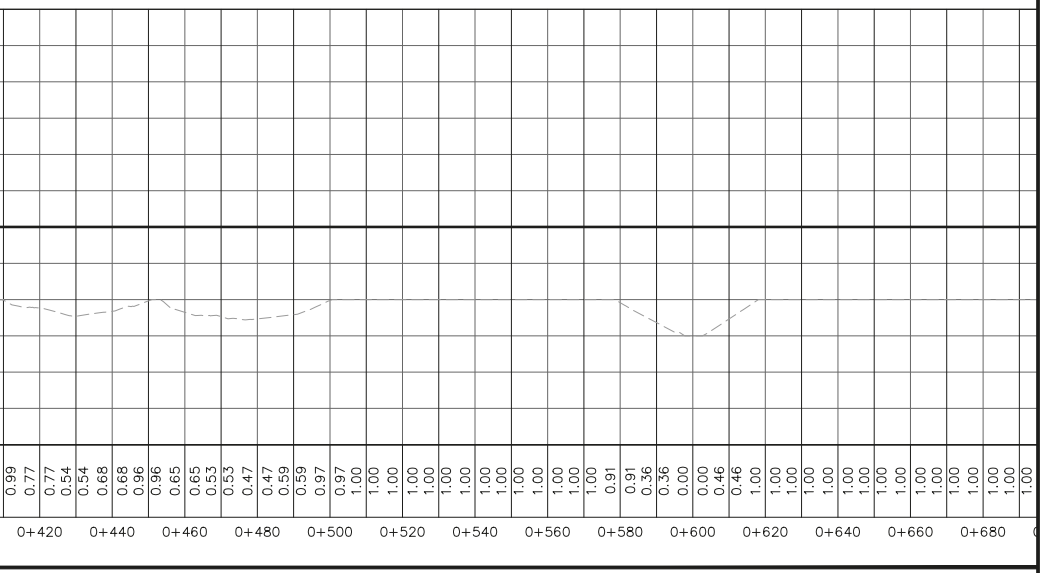
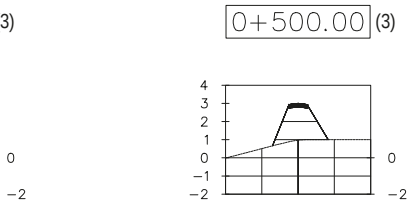
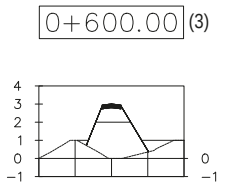
4
3
2
1
0
−1
−2
0
−2


0+400.00
4
3
2
1
0
−1
−2









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Seal

Revisions

NO.	DATE

Project

Drawing Name

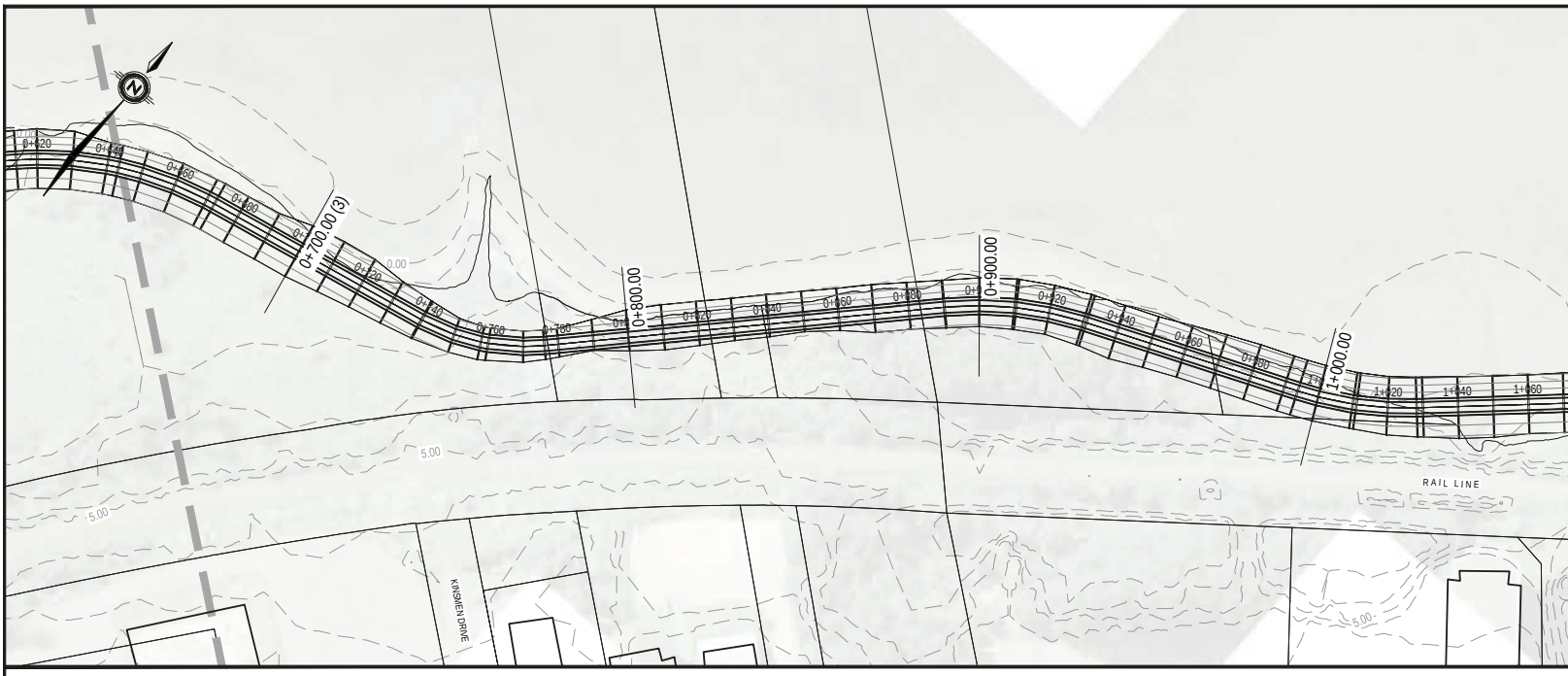
Area 3
Plan, Profile & Sections

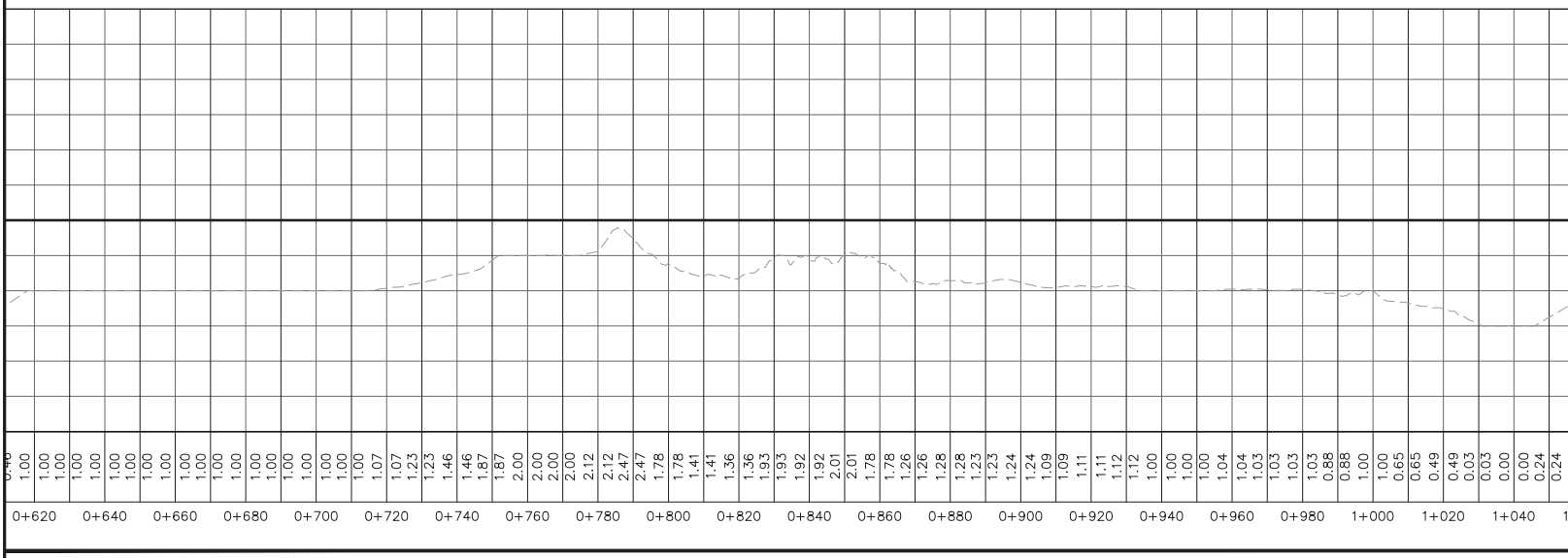
Scale	Project number
1:1000	

Drawn By	Checked	Approved
DJH	RTL	RTL

Drawing Number

L103


0+700.00 (3)
0+800.00
0+900.00
1+000.00
RAIL LINE
KINSMEN DRIVE
5.00


0+620
0+640
0+660
0+680
0+700
0+720
0+740
0+760
0+780
0+800
0+820
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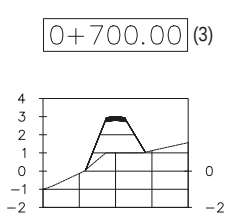
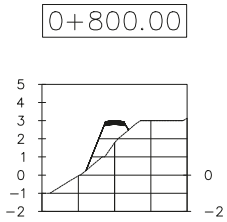
1+000
1+020
1+040


0+700.00 (3)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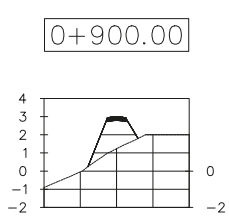
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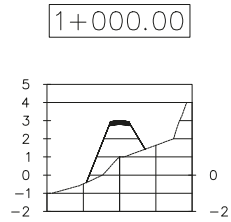
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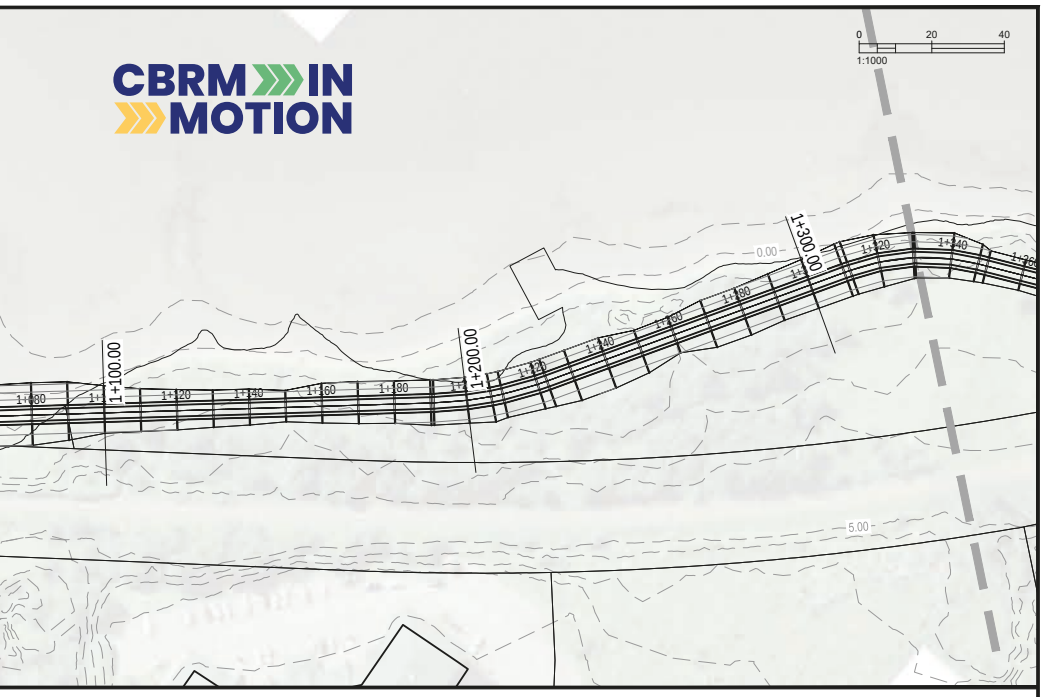

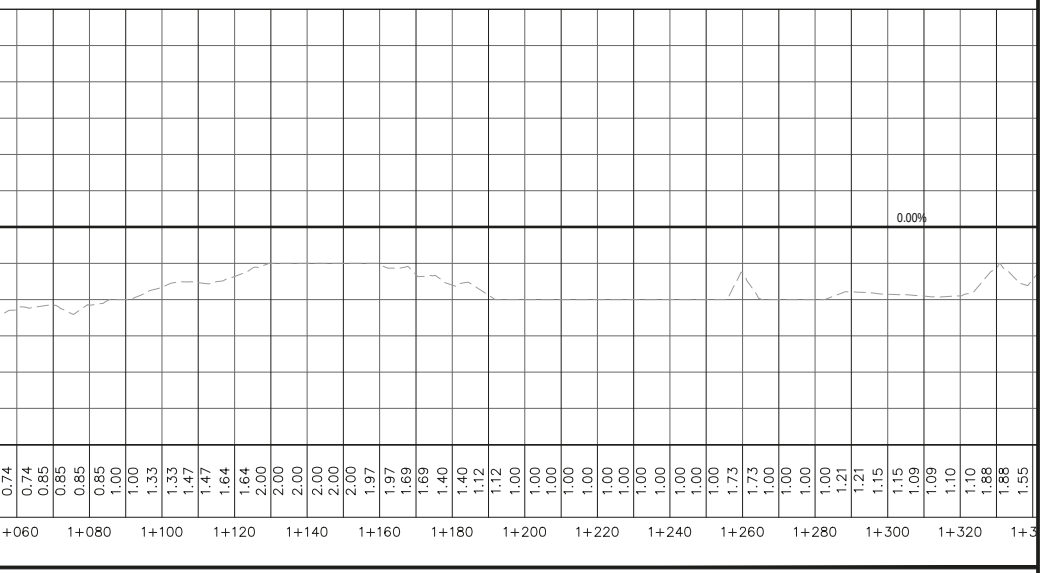

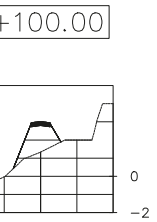

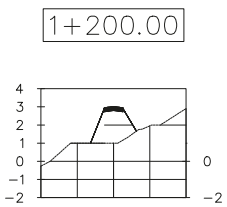

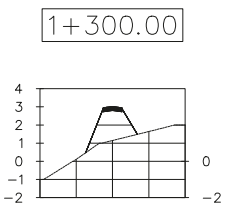

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Revisions

NO.	DATE

Project

Drawing Name

Area 4
Plan, Profile & Sections

Scale
1:1000

Project number

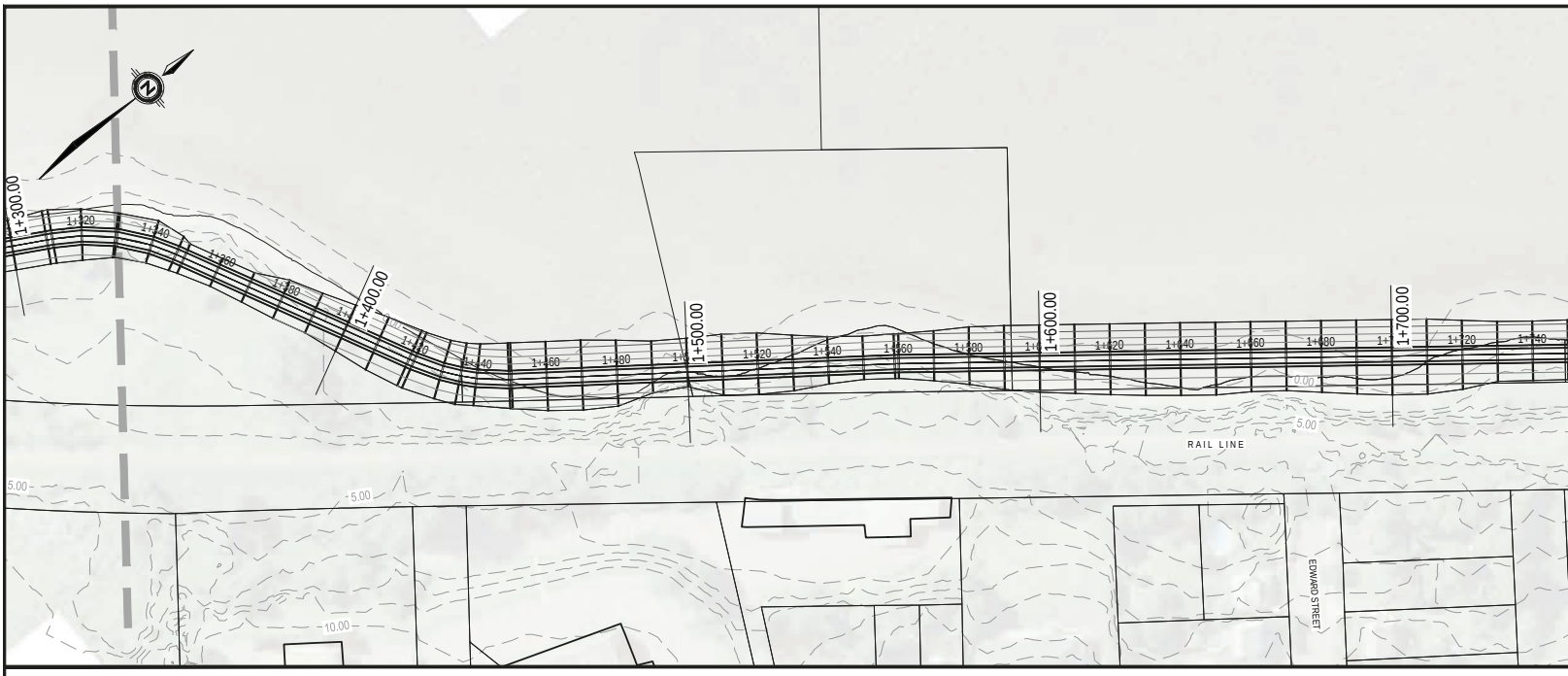
Drawn By
DJH

Checked
RTL

Approved
RTL

Drawing Number

L104


1+300.00
1+400.00
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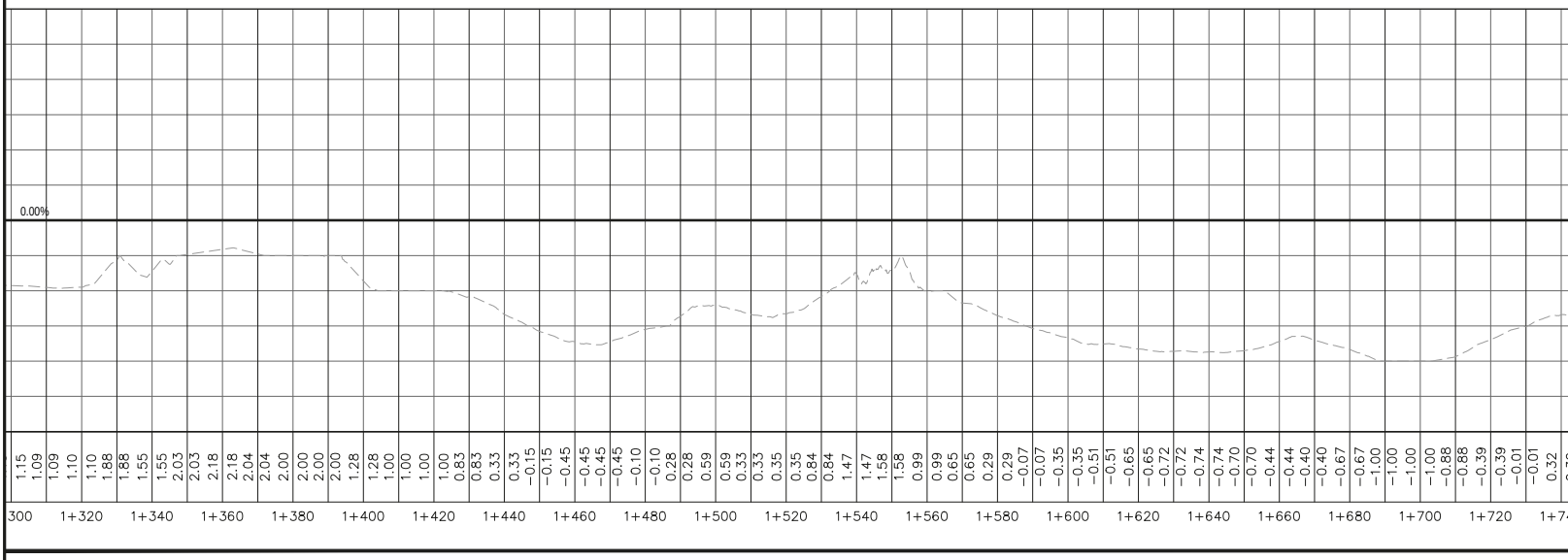
RAIL LINE
EDWARD STREET
5.00
10.00


0.00%
1+300
1+320
1+340
1+360
1+380
1+400
1+420
1+440
1+460
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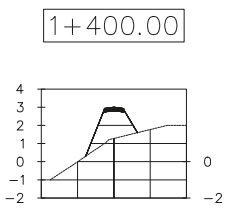
1+680
1+700
1+720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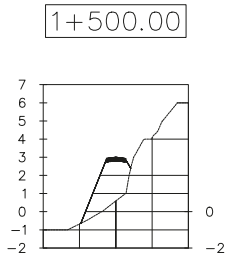
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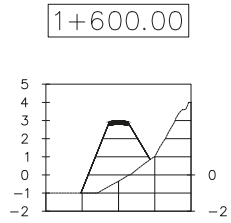
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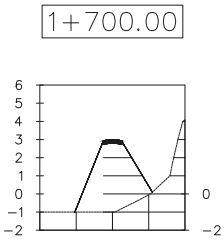
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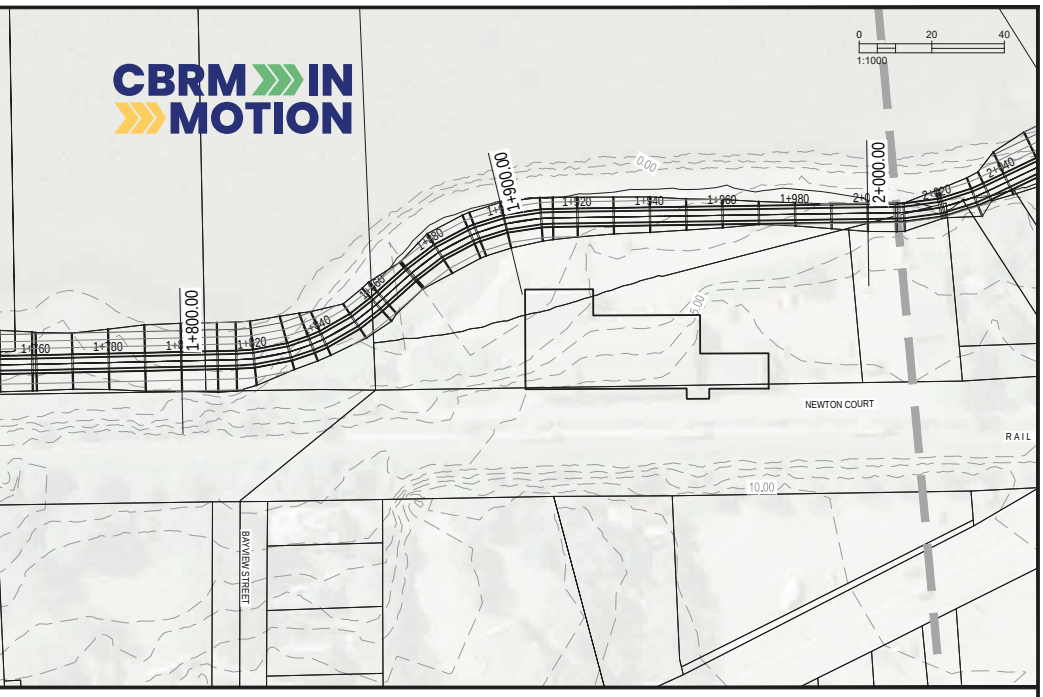

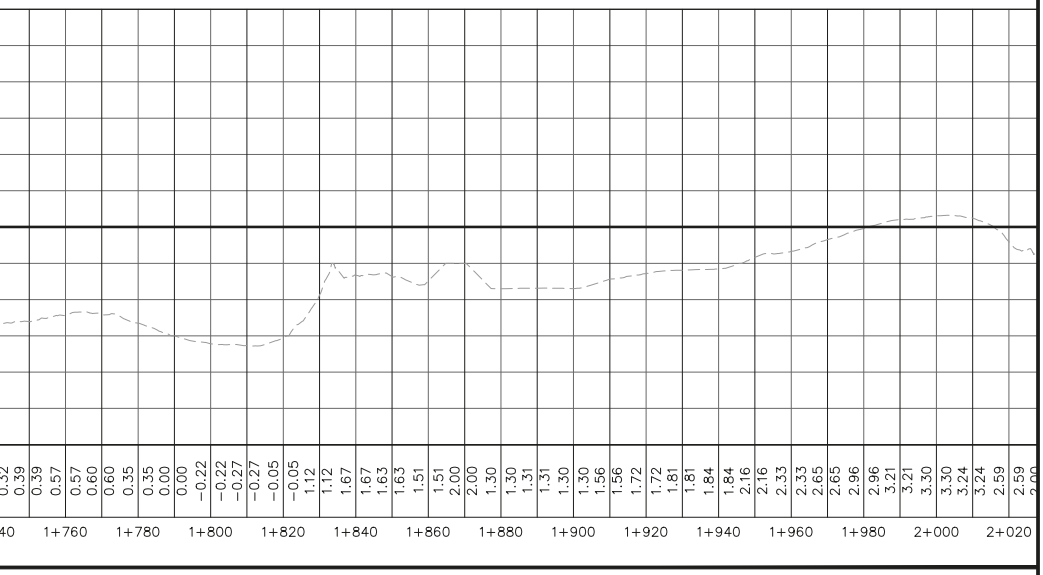

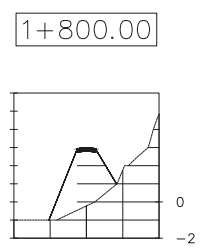

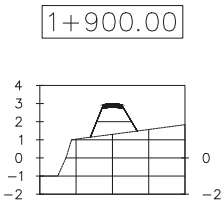

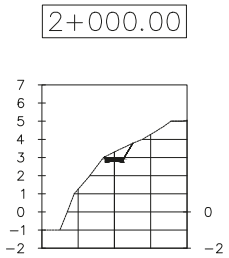

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Revisions

NO.	DATE

Project

Drawing Name

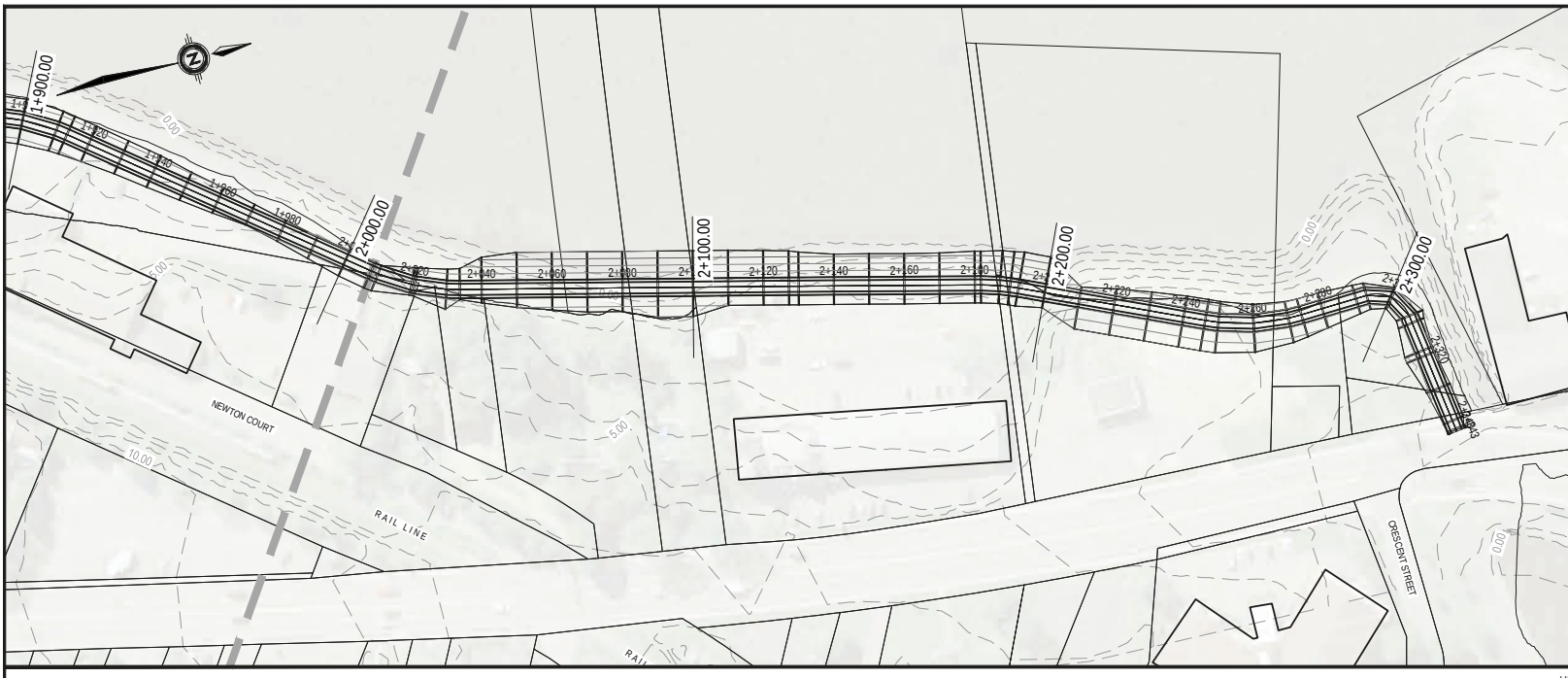
Area 5
Plan, Profile & Sections

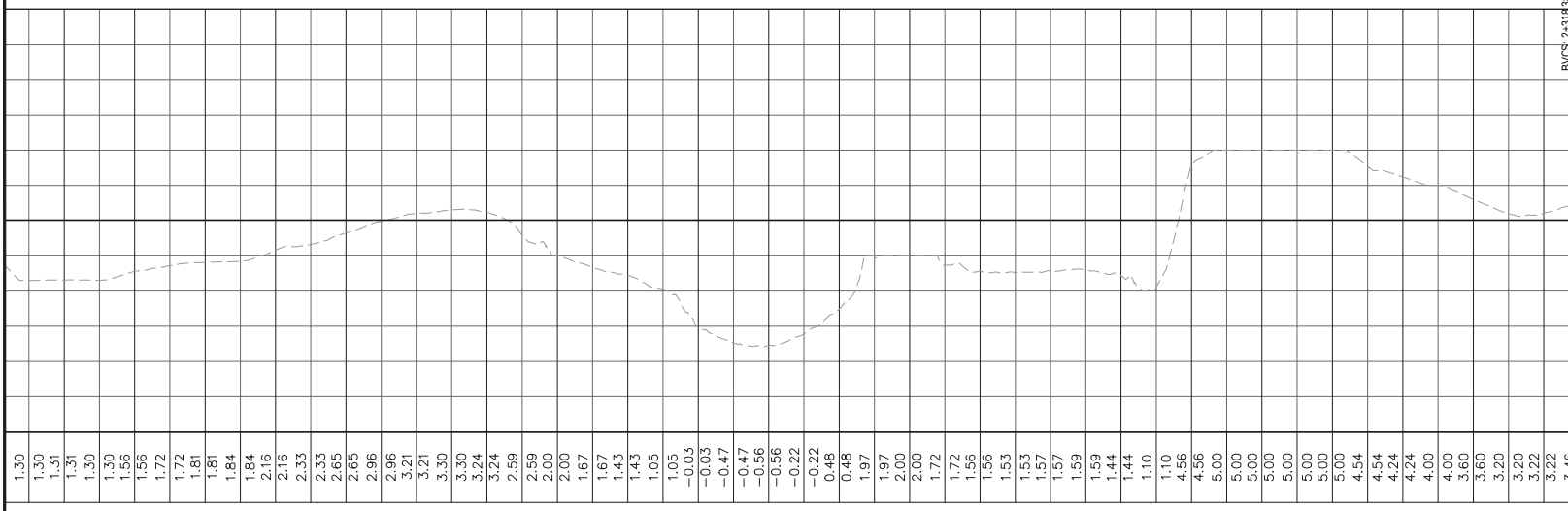
Scale	Project number
1:1000	

Drawn By	Checked	Approved
DJH	RTL	RTL

Drawing Number

L105





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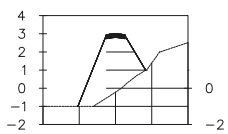
1.30	1.30	1.31	1.31	1.30	1.30	1.56	1.72	1.72	1.81	1.81	1.84	1.84	2.16	2.16	2.33	2.33	2.65	2.65	2.96	2.96	3.21	3.21	3.30	3.30	3.24	3.24	2.59	2.59	2.00	2.00	1.67	1.67	1.43	1.43	1.05	1.05	−0.03	−0.03	−0.47	−0.47	−0.56	−0.56	−0.22	−0.22	0.48	0.48	1.97	1.97	2.00	2.00	1.72	1.72	1.56	1.56	1.53	1.53	1.57	1.57	1.59	1.59	1.44	1.44	1.10	1.10	4.56	4.56	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.54	4.54	4.24	4.24	4.00	4.00	3.60	3.60	3.20	3.20	3.22	3.22

2+100.00



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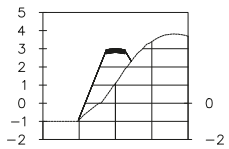

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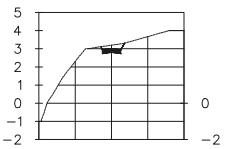

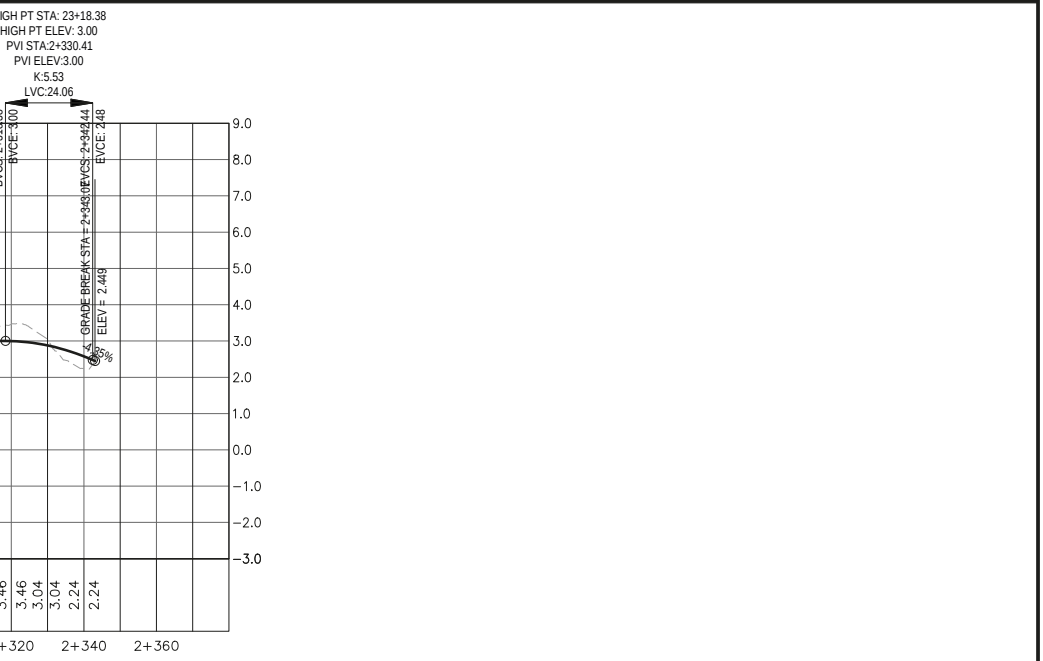

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Key Plan

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Revisions

NO.	DATE

Project

Drawing Name

Area 6
Plan, Profile & Sections

Scale	Project number
1:1000	

Drawn By	Checked	Approved
DJH	RTL	RTL

Drawing Number

L106