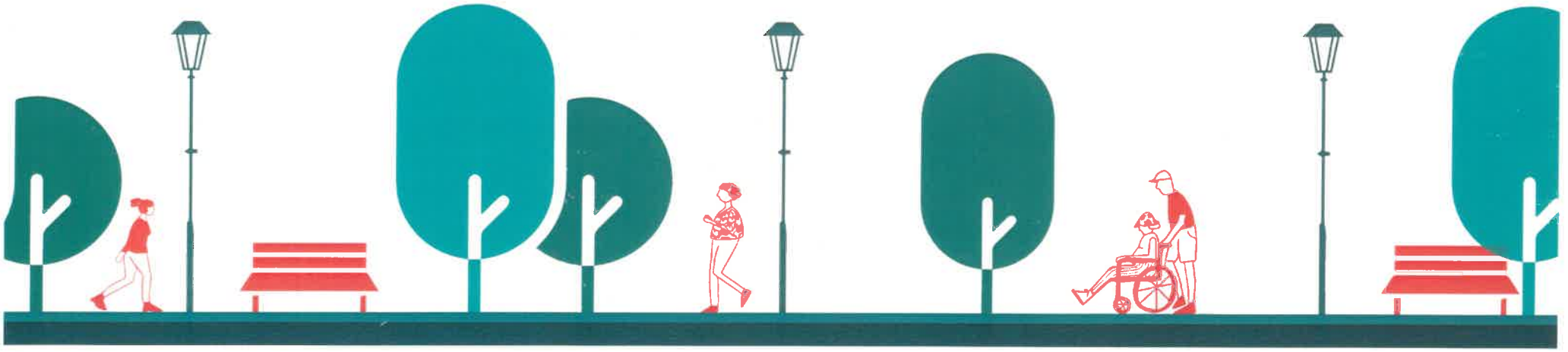
Walk and Wheel

Pedestrian Infrastructure Analysis Report for Town of Stewiacke



STEWIACKE
RIVERS OF OPPORTUNITY

Created for
Town of Stewiacke

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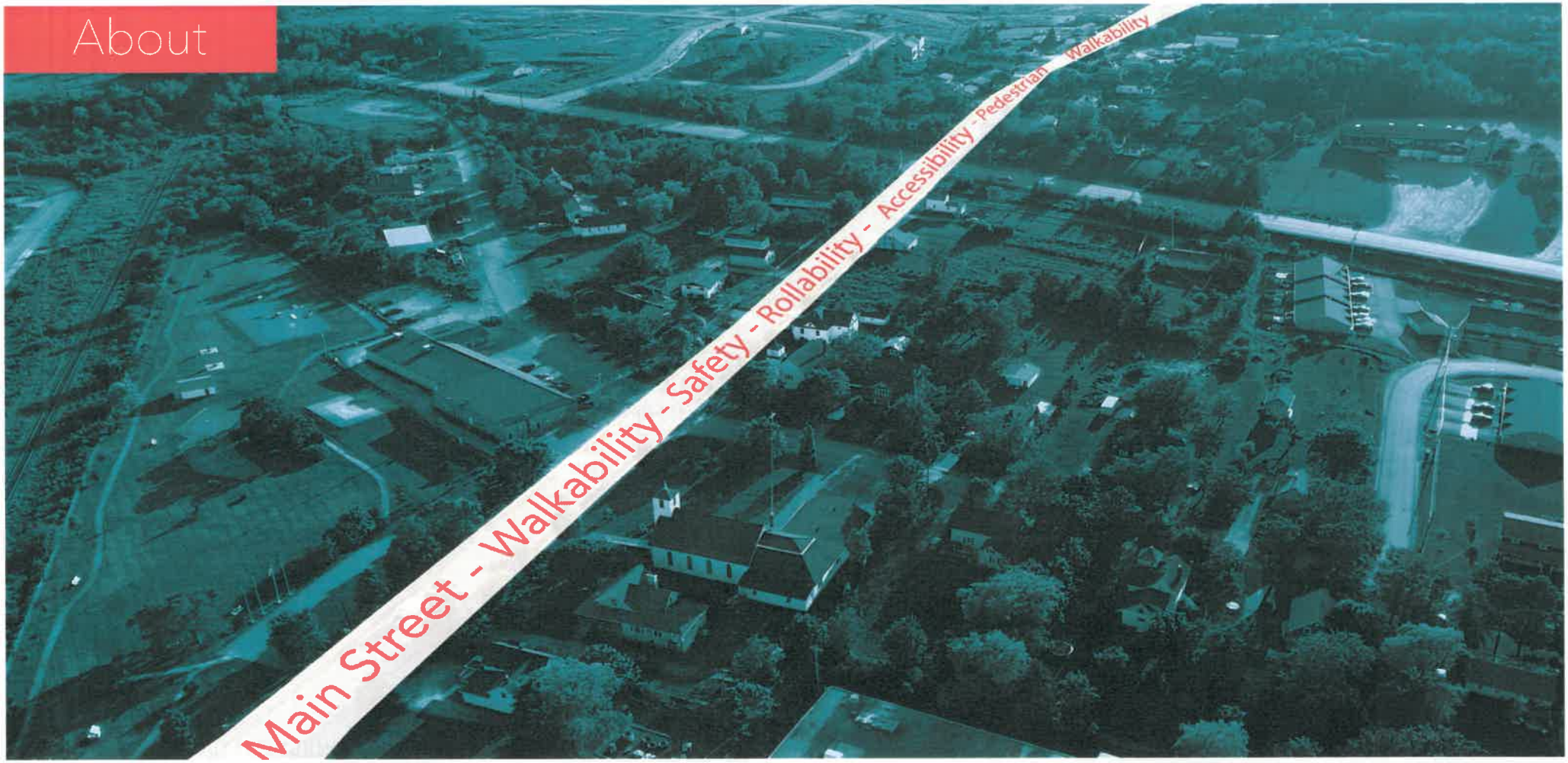


Town of Stewiacke wants to encourage active transportation and walkability in its community. To begin with, the focus is on redeveloping the sidewalks along the Main Street and Kitchener Street. The two streets are central to town's commuting needs and stretch from the West end of Stewiacke to the East.

After performing a walkability audit of the town's Main Street in November 2021, the initiators of this report determined strategies to improve Stewaicke's pedestrian infrastructure were needed. The main concerns were regarding the accessibility and walkability of the sidewalks, and safety of pedestrians. A Walk and Wheel Steering Committee was formed to give the project a head start, and the first task on their list was to create a walkability and accessibility vision for the town through the Main Street revamping project. The "Walk and Wheel: Pedestrian Infrastructure Analysis for Town of Stewiacke" report provides sidewalk analysis and recommendations for needed interventions to achieve the committee's vision of an active community.

Objectives

W

Walkability

To enhance the walking experience of pedestrians through well laid out sidewalks that connect important destinations across the town

Defining Walkability

"Neighbourhood walkability is a measure of how well a neighbourhood promotes active forms of transportation, such as walking. A highly walkable neighbourhood has a variety of destinations within walking distance, well-connected streets, and a mix of land uses. Walkability can increase physical activity levels across a broad population and reduce the risk of many chronic diseases."

(Public Health Ontario, 2022).

A

Accessibility

To encourage inclusive design and remove sidewalk barriers for pedestrians with disabilities and physical limitations

Defining Accessibility

"Accessibility in Canada is about creating communities, workplaces and services that enable everyone to participate fully in society without barriers."

(Employment and Social Development Canada, 2022).

S

Safe System

To provide safer walking experience to all residents, with special attention to the needs of the children and seniors of the community

Defining Safe System

"The goal of a Safe System approach is to design and operate our vehicles and infrastructure in a manner that anticipates human error and accommodates human injury tolerances with a goal of reducing fatal and serious injuries."

(Institute of Transportation Engineers, n.d.)

Scope

Map 1. Aerial view of Town of Stewiacke showing project scope and few landmarks

The project stretch starts from the Scotia Drive intersection on the Main Street near the Mastadon Ridge and extends till the access road to school on Kitchener Street. The stretch covers the central part of the town and endpoints mark entry to the town as well.

As the objectives of the project are to achieve walkability, accessibility, and pedestrian safety along the project stretch, the focus is on quality of sidewalks, connectivity to landmarks, safe crossings, accessible movement from sidewalk to sidewalk, comfortable walking experience. Thus, analysing the existing sidewalks constitutes an important aspect of this study, along with study of the supporting infrastructure like crosswalks, lighting, curb ramps, etc. The analysis informs recommendations, which were discussed with the Walk and Wheel Steering Committee before finalising.

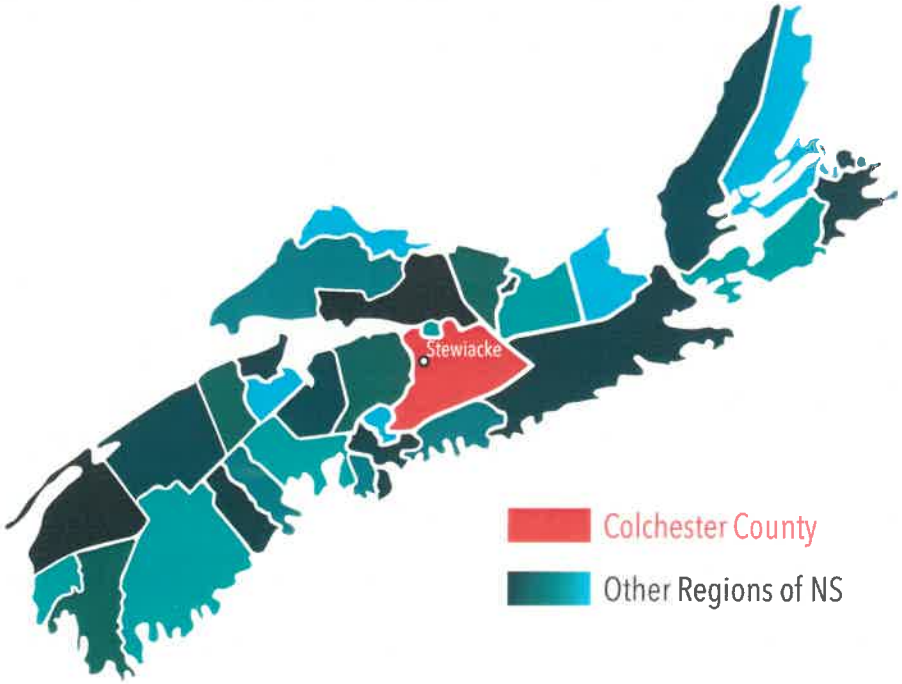
For understanding the feasibility of recommended interventions, cost estimates are part of the project scope. Additionally, the funding options are prescribed to cut down town's overall expenditure. Initially it was intended that phasing of expenses would be part of the project, but it was later agreed upon that the town would be a better judge of the phasing.

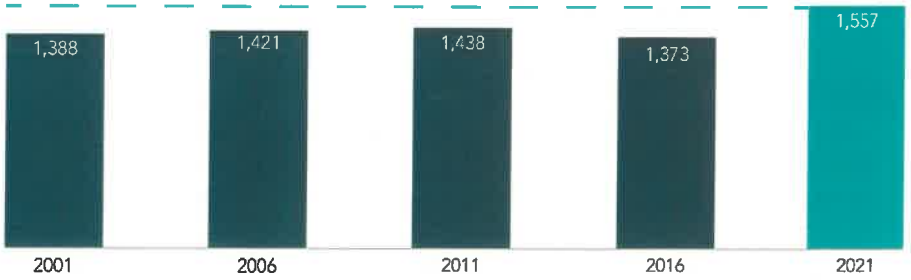
However, to guide phasing discussions, priority phasing of interventions is provided, based on their level of importance for achieving project objectives.

Geographic Context

Town of Stewiacke is situated within the boundaries of Colchester County, in the Stewiacke Valley where the Shubenacadie and Stewiacke Rivers meet. It is well connected to the North and South of the province through Highway 102, and one takes the Exit-11 to enter the town. At a distance of 70 km from Halifax, and 30 km from Truro, Stewiacke has easy access to big city amenities.

In terms of natural features the town has a gentle sloped terrain. The climate reflects the Atlantic temperatures, with mild summers and freezing winters. The town experiences 63.6 snowfall days, with 819 mm of accumulated snow.





Population of Town of Stewiacke over the span of 20 years (Statistics Canada, 2022)

Demographic Context

The years from 2016 to 2021 have seen a significant growth in population of Stewiacke, a 13.4% rise (Statistics Canada, 2022). The population number is record high in last 20 years, which means that a lot of new people are moving to Stewiacke. There is therefore a need to re-evaluate the infrastructure of the town to facilitate the incoming population and provide more reasons for positive influx. Sidewalks are an important part of a community's day to day experience, thus their evaluation and maintenance is much valuable to the growing town.

While more detailed data for Census 2021 is yet to be released, it can however be inferred from the Census 2016 data that there is a balance in population distribution for age cohorts. The median age is 47.5 (Statistics Canada, 2017), and percentage distribution for age cohorts is shown below.

14.9%
0 - 14
Age Cohort

62.9%
15 - 65
Age Cohort

22.2%
65 +
Age Cohort

Policies and Regulations

Planning Strategy for Town of Stewiacke

Town has a Strategic Plan for 2023, and in its vision it commits to create downtown as a pedestrian oriented commercial destination, and to encourage active transportation (Town of Stewiacke, 2013). In the 2009 Municipal Planning Strategy (MPS), the town stated several goals for the community, and under the Cultural and Social Goals, the town strived to "Provide services to promote a safe, healthy, and vibrant community".

The town had declared its intentions for the sidewalk maintenance and improvement in the Section 2.5.5.1 of the 2009 MPS. It stated that "The subject of sidewalks also relates to the environmental and economic pillars of sustainability. Council has been constructing sidewalks in a number areas of the Town. A sidewalk leading to the new school has recently been completed. Council believes that providing sidewalks is an important municipal service and will continue with a sidewalk construction program." (Town of Stewiacke, 2009)

Within the 2009 MPS there was an Integrated Community Sustainability Plan, wherein the Policy ICSP – 30 stated that "It shall be a policy of Council to continue with a program of sidewalk construction as funding becomes available." (Town of Stewiacke, 2009)

From the above mentioned policies and goals, it is clear that the town has been prioritising sidewalks since long and considers those to be an important infrastructure. The sustainability lens is also put to use to enhance the functioning of walkways for encouraging active transportation.

Planning Commitments

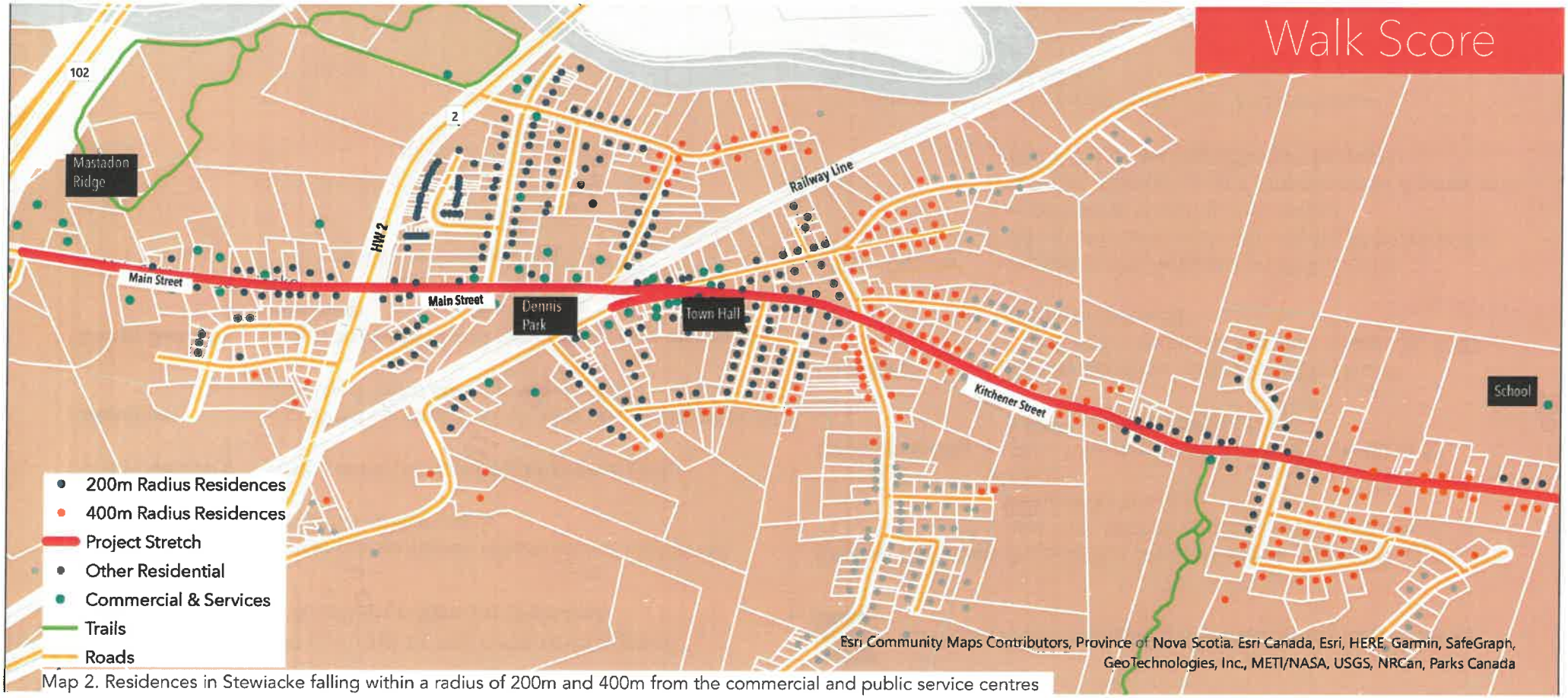
Physical Activity and Recreation Strategic Plan 2019 - 2024

One of the goals outlined in the planning strategy for encouraging physical activity among the town's residents is to make sure that "Stewiacke has a sustainable and connected network of trails, parks, active transportation routes and recreation facilities". The town aims to achieve this by "Explor[ing] development and implementation of an Active Transportation plan" (Town of Stewiacke, 2019). The details of the AT plan are not elaborated, but certain action items do signal towards how the town wishes to move forward. The action items being,

- Identify gaps in connectivity for active transportation and explore strategies to address gaps (Prioritize route for children and youth to travel actively to school)
- Identify opportunities to expand sidewalks for walking through paving projects including bringing opportunities to Council to incorporate within the paving plan

Truro - Colchester Region Accessibility Plan

Town of Stewiacke is part of the ongoing engagement process for the development of a regional accessibility plan. The plan is part of the Moving Accessibility Forward project, which is in turn part of the overall accessibility movement in the province. Stewiacke and You is a citizen survey which is currently live, and there is scope for an open discussion and mapping activities as well. It can be inferred that the town is adapting to the accessibility standards, and the current project on sidewalks is part of the bigger picture (Reachability, 2021).



Map 2. Residences in Stewiacke falling within a radius of 200m and 400m from the commercial and public service centres

27/100

According to the Walk Score website, Town of Stewiacke is a car dependent community (Walkscore, 2022). However, the 5-minute distance check done for the town shows that Stewiacke has the potential to become a walkable community.

As walkability is affected by land use and proximity to facilities, it is essential to measure what parts of the street have better opportunities to engage community in a walking experience.

The map above shows the project street stretch (highlighted in red), and commercial or public service centres (CPS) plotted as green dots.

As per research, 5-minute walking distance is considered comfortable, for which amenities should fall within a radius of 400m in a neighbourhood (Morphocode, 2021).

To understand where Stewiacke stands as per the 5-minute concept, the residences that fall within 200 m from any CPS are the blue dots, and the ones that are covered in the 400 m radius are marked in orange. Rest of the residences that are farther than 400 m are shown in grey.

From observing the findings, it can be inferred that Stewiacke has the right land use mix to encourage walking, more so on Main Street than Kitchener Street, and the walking culture can be stimulated by removing barriers to the overall walking experience.

Funding Resources

The town would like to secure Federal or Provincial funding for the project, and to facilitate the matching of different fundings available to the nature of this project, a handy list of fundings was prepared.

Most of the funding options respond to the active transportation aspect of the project, and few were found to cater the aspects of accessibility, place making, and community mobilisation. Some of the fundings are recurring, while some are one time opportunities. Application to any of the funding programs would require highlighting that very aspect of the project which would fulfil the eligibility criteria for that program.

Funding 1 (Investing in Canada Infrastructure Program) was used by other jurisdictions to develop sidewalks:

- District of Sooke, BC applied for $1.8 million for sidewalk funding for busy traffic corridor - Read more

- Town of Comox has received $919,000 in funding to develop a new sidewalk and bike lanes on Comox Avenue - Read More

F1 Investing in Canada Infrastructure Program: COVID 19 Resilience Stream (Federal)

Eligible Projects: Active transportation infrastructure/ COVID-19 response infrastructure

Grant Amount: Max. contribution of 80% of project cost

Deadline: Construction must start no later than September 30, 2023 and completed by end of 2023

Other Details: Apply to province and then province prioritises to nominate

For more details visit (Infrastructure Canada, 2021)

F2 Canada Community Revitalization Fund (Federal)

Eligible Projects: Projects that aim to revitalise downtown cores and main streets; or increase the accessibility of community spaces

Grant Amount: Max. coverage cost of 75%; ($750,000 or $1 million - location dependent)

Deadline: Priority deadline - July 23, 2021; Overall Deadline for continuous intake - March 31, 2023 (Remaining funds)

Other Details: Project priority is based on (1) Revitalise downtown cores and main streets (4) Increase the accessibility of community spaces;
Contact Atlantic Canada Opportunities Agency to find if the project qualifies for the grant

For more details visit (Innovation, Science and Economic Development Canada 2021)

F3 Active Transportation Fund (Federal)

Eligible Projects: Capital projects that improve community connectivity and accessibility through active transit

Grant Amount: Max fund coverage of 75% (up to $50 million)

Deadline: Receiving applications for 2022 (Jan 27th - March 31st)

Other Details: By Infrastructure Canada; Based on Canada's National Active Transportation Strategy

For more details visit (Infrastructure Canada, 2022)

F4 Active Communities Fund (Provincial)

Eligible Projects: Projects that plan, create, improve, or evaluate physical environments (community-wide initiatives with less-structured physical activity and movement)

Grant Amount: Max. coverage of 75% (up to $5,000 for programs with more structure); otherwise up to $25,000

Deadline: Yearly

Other Details: Region of Queens Municipality received $3,275 for installing walking route signage in 2021

For more details visit (Nova Scotia, 2021a)

F5 Community ACCESS – Ability Program (Provincial)

Eligible Projects: Improvements to public amenities that will provide universal access; New construction is not eligible

Grant Amount: Max. coverage of 66% (up to $50,000)

Deadline: Every fiscal year (Deadline in February)

Other Details: Priority will be given to applications which demonstrate that the improvements proposed is part of an overall plan and commitment to the inclusiveness of persons with disabilities.

For more details visit (Government of Nova Scotia, 2022)

F6 Connect2 Program (Provincial)

Eligible Projects: Active Transportation Infrastructure and design

Grant Amount: Max. coverage of 75% (up to $100,000 per project)

Deadline: Closed for 2021-22 fiscal year (Possibility of revival)

Other Details: Department of Transportation and Active Transit manages the funding program

For more details visit (Nova Scotia, 2021b)

F7 Pilot project: Transportation networks and commuting options

Eligible Projects: Pilot projects that reduce pollution and encourage people to switch to less polluting transit options

Grant Amount: Max. coverage of 80% for municipalities with population less than 20,000 (up to $500,000)

Deadline: Year round (till funding lasts)

Other Details: Program is part of Green Municipal Funds by Federation of Canadian Municipalities; Projects examples - Active transit infrastructure; Walking networks promoting accessibility and safety;

For more details visit (Federation of Canadian Municipalities, 2022)

F8 Rail Safety Improvement Program-Infrastructure, Technology and Research (RSIP-ITR) funding (Federal)

Eligible Projects: Aiming to address rail line safety issues, or reduce the number of injuries and deaths from accidents along rail lines and on rail property

Grant Amount: Up to 80% of total project cost; Grade crossing closure - Max. $25,000 for a public crossing, Other categories - Max. $500,000 per project

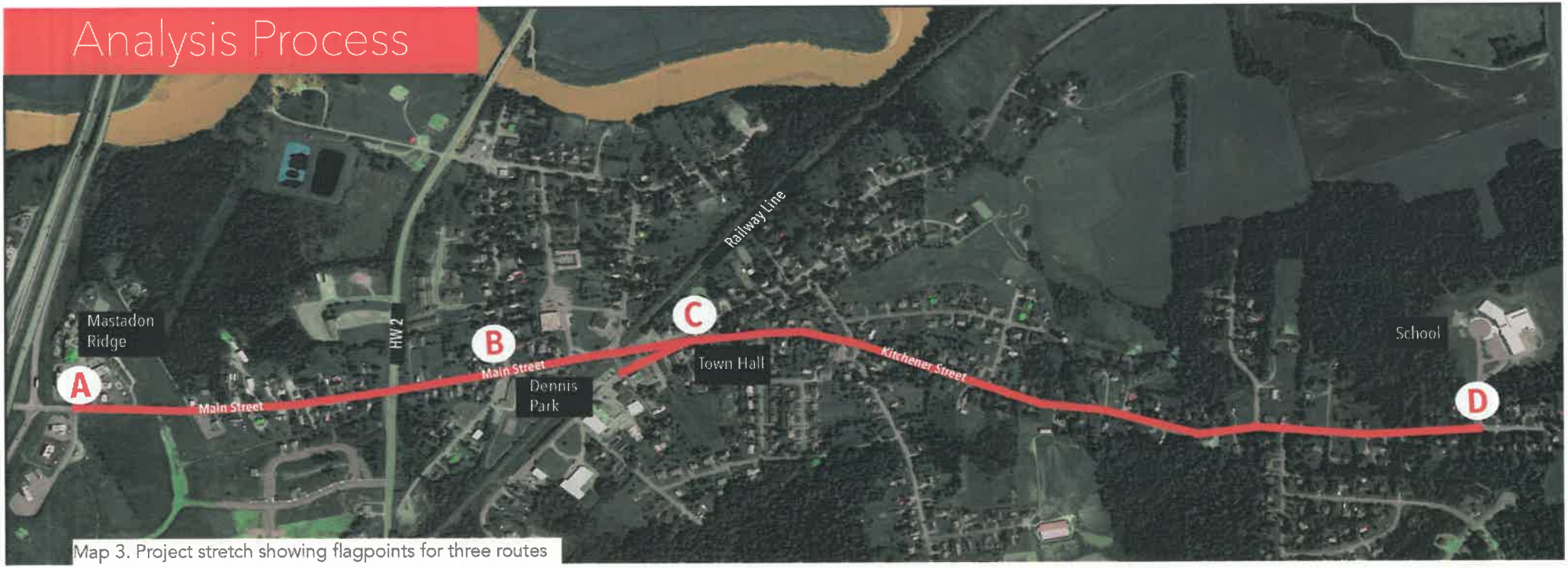
Deadline: August 1, 2022 for projects starting in 2023 - 2024.

Other Details: Grants and contributions are available on an annual or multi-year basis

For more details visit (Transport Canada, 2022)

Project Stretch Analysis

Analysis Process



Map 3. Project stretch showing flagpoints for three routes

To analyse the whole project stretch, both qualitative and quantitative methods were used. For quantitative analysis, a scoring index was developed and each segment was scored based on observations. For qualitative analysis, special features of each segment were brought into consideration. To facilitate the analysis, the project stretch was divided in three routes, considering different abutting land use and a specific kind of pedestrian traffic.

Route A-B: Mainly serves highway commercial

Route B-C: Downtown street section serving community's everyday needs

Route C-D: Residential corridor with main pedestrian traffic to and from school

For detailed observation of the project stretch, the three identified routes were further divided into **12 segments**, resulting in a manageable scale for analysis and interventions. The number of segments was governed by the breakdown of the street layer in the provincial GIS data, making it feasible to map observations for this study and to match with future studies.

The project uses **Scoring Index** to assess quality of sidewalk, which is a tried and tested method. In the two case studies (Asari-Shekadi et al., 2014; Ferreira & Sanches, 2007) referred, the scoring method used to evaluate sidewalks was based on professional standards for transportation and accessibility. They used a scale of 0 to 5, but considering the limited variation in observations for Stewiacke's project stretch, a **scale of 0 to 2** has been used.

Canadian accessibility standards were referred for developing criteria of the Scoring Index. The **25 criteria** are listed under four main sections - **Sidewalk, Curbs, Crosswalks, and Essentials**. The Scoring Index for each section is discussed in the following pages, supported by the standards used for formulation of each criteria.

The analysis concludes with an observation table and a map that shows the score range for each of the 12 street segments.

Developing of Criteria

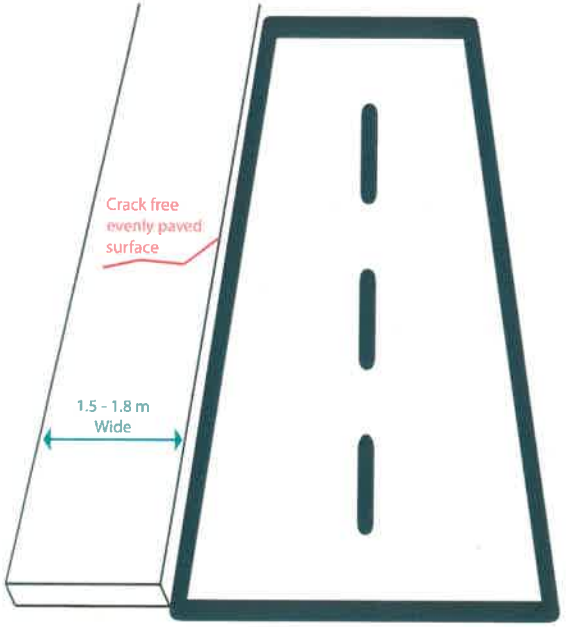
Universal Design is an intrinsic part of designing safe and accessible sidewalks that encourage walkability and rollability. Standards used for developing Scoring Index criteria have been taken from the CSA National Standards for Accessible Design for Built Environment (CSA, 2020), Interim Accessibility Guidelines for Indoor Outdoor Spaces Nova Scotia (NSAD, 2020), CNIB Foundation: Clearing Our Path Guidelines (2019), and Universal Design Checklist by Calgary (2010). The most stringent of the standards outlined in the four documents have been given a score of 2, a more widely used standard is given a score of 1, and aspects of a criteria that fail to address any of the standards are given a score of 0.

Users of this report should also consult the technical recommendations made in Phase 2 of the Built Environment Standard Development Committee of Nova Scotia's recommendations on Accessibility Standards in the Built Environment upon its release.

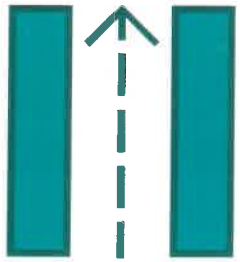
Pathway Standards

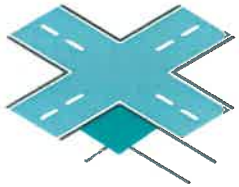
An accessible walking experience is identified by the presence of sidewalk, the surface material and condition of sidewalk, the width of the sidewalk, and whether there is a corner landing at intersections to allow for waiting before the street is crossed.

The diagram on the right explains what an ideal sidewalk would feature. The design aspects are taken from the standards referred for the project.



Sidewalks should be on both sides of the collector roads, and on one side of local roads





At least 1.5m x 1.5m corner landing should be provided at the intersections for waiting of pedestrians. This should exclude the curb ramp area.

Scoring Index

Criteria List: Sidewalk

C1. Sidewalk Presence	
Not Present	0
Present on one side	1
Present on both sides	2
C2. Sidewalk Material	
Gravel / Crushed stones	0
Asphalt	1
Concrete	2
C3. Sidewalk Width	
less than 1.5 m	0
1.5 m	1
more than 1.5 m	2
C4. Sidewalk Surface	
Not paved	0
Paved with cracks	1
Paved in good condition	2
C5. Sidewalk Corner Landing	
Less than 1.5 x 1.5 m	0
1.5 x 1.5 m	1
More than 1.5 x 1.5 m	2

Concrete > Asphalt > Gravel/ Unpaved

For comfortable wheeling and walking, the surface should be as even as possible. Concrete gives long lasting even surface with good friction, but asphalt has high chances of wear and tear. Concrete interlocking blocks are not recommended as they have wider gaps between blocks.

Criteria List: Curbs

6. Curb Presence	
Not Present	0
Present on one side	1
Present on both sides	2
7. Curb Ramp (Civic)	
Not Present	0
Present	2
8. Curb Ramp (Intersection)	
Not Present	0
Present	2
9. Curb Ramp Width	
less than 1.5 m	0
1.5 m	1
more than 1.5 m	2
10. Curb Ramp Surface	
Uneven	0
Finished without tactile	1
FInished with tactile	2
11. Curb Ramp Slope	
Less than 1:8	0
More than 1:8	2

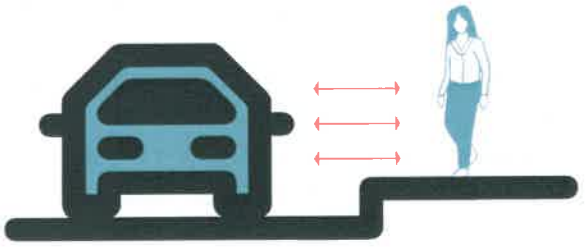
Curb Standards

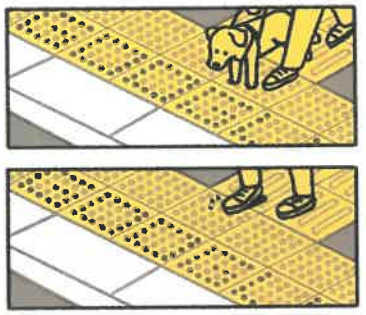
Curbs help raise sidewalks and define a dedicated pathway for pedestrians. The raised sidewalks are better protected from vehicular traffic. The standards recommend having curbs for sidewalks, along with curb ramps wherever leveled access is needed to the abutting land use or at an intersection.

Universally designed curb ramps are encouraged to have tactile plates installed for people with disabilities. The slope of the ramp is also prescribed to be minimum 1:8 based on comfortability in wheeling.

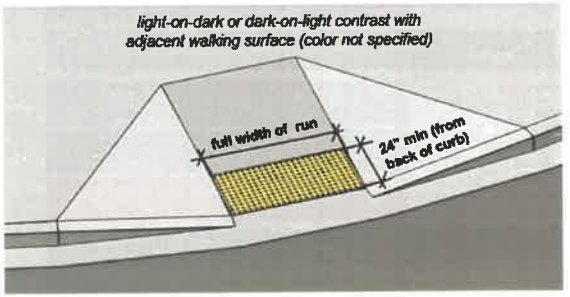
The curb ramp design for intersections is different from the design for mid-block level changes, like for access to mid-block crosswalk or property access. A leveled landing of 1.5m x 1.5m is desirable at the top of the ramp with clear turning space in case of corner positioned curb ramp.

Curbs help keep the traffic seperate from the walkway





Tactile warning surface indicators are used to alert people with low or no vision of potential hazards, such as moving vehicular traffic.



Curb ramp slopes should not be kept lower than 1:10, and wherever possible should be at least 1:15

Slope > 1:10

Criteria List: Crosswalks

12. Mid-Block Crosswalk	
Not Present	0
Present	2
13. Intersection Crosswalk	
Not Present	0
Present in one direction	1
Present in both directions	2
14. Crosswalk Markings	
Not Present	0
Faded/ Inadequate	1
Easy to spot	2
15. Crosswalk Width	
less than 1.8 m	0
1.8 m	1
more than 1.8 m	2
16. Crosswalk Signal	
None	0
Flag / Push Button	1
Push Button + Audible	2
17. Crosswalk Signage	
Not Present	0
Present on one side	1
Present on both sides	2

Crosswalk Standards

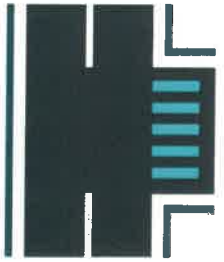
Crosswalks are important for the pedestrians to know where it is safe to cross the road. It also acts as a caution for the drivers to slow down in case a pedestrian is waiting to cross over. Therefore the design of crosswalks should be able to raise attention and highlight the event of crossing.

Crosswalk markings are the essential way of defining the path for the pedestrians. The width of the crosswalk should be at minimum 1.8 m. The type of crosswalk marking should be clear and not faded.

For accessibility, the crosswalks can be accompanied by crossing signals, which can include automatic traffic lights, push button lights, and an audible signal. The chosen signal type can be a combination of the three designs. Additionally, having signage on both sides of the crosswalk ensures that the driver is aware of the crossing from afar.

Minimum width of crosswalk should be 1.8 m

Mid-block crosswalks should be carefully designed as there is no other reason for the traffic to stop. These should always have some kind of signalling device. The crosswalks must be placed at multiple locations across a long stretch of a civic road, but not closer than 90m. Wherever possible, the access to push button and other signalling device should be kept in such a way that it is in easy reach of wheelchair users and children.



Crosswalk must always be placed in perpendicular direction to the street as that is the shortest path of travel

Signals at crosswalk provide accessibility and safety

Criteria List: Essentials

18. Accessible Signage

Not Present	0
Present	2

19. Lighting Height

Not Present	0
> 10 m	1
< 10 m	2

20. Lighting Pole Distance

Not Present	0
> 30 m	1
< 30 m	2

21. Sidewalk Buffer

Not Present	0
less than or equal to 1m	1
more than 1 m	2

22. Rest Areas

None	0
One	1
More than one	2

23. Trash Containers

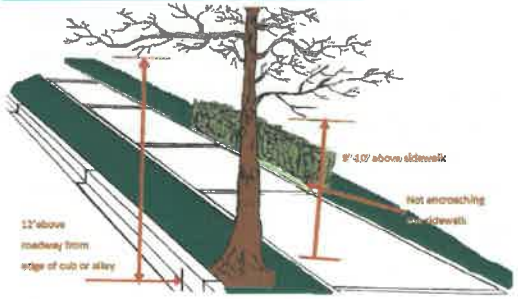
Not Present	0
Present	2

24. Vegetation

Not Present	0
Not maintained	1
Well maintained	2

25. Benches

Not Present	0
≈ Every 400m	1
≈ Every 200m	2



Vegetation should be maintained so that there are no obstructions to the path

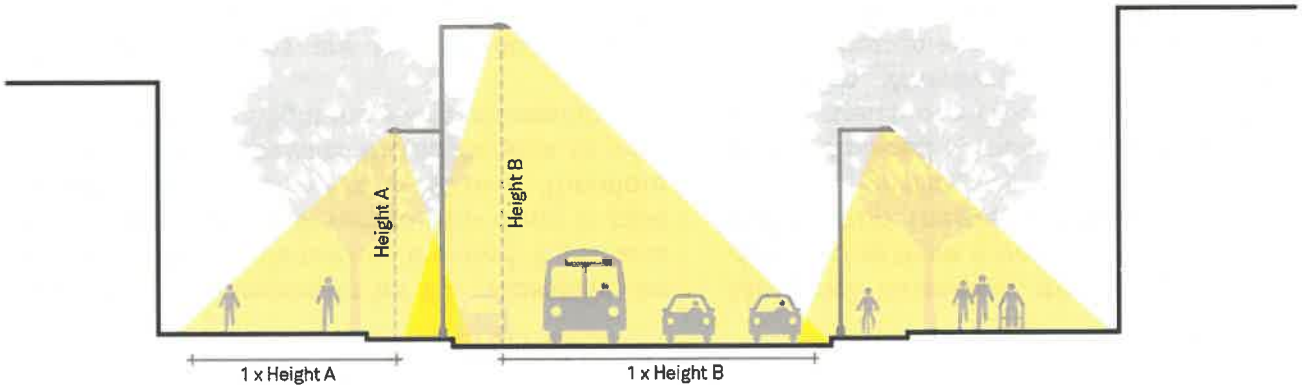
Essential Additions

For a comfortable walking experience, some additional criteria have been added to the project analysis. These are also essential for the safety of pedestrians.

Lighting is an important aspect for walking at night. Adequate lighting can save unwanted trips and falls. It also gives the ability to scan our surroundings, bringing a sense of security. Lighting poles for sidewalks are expected not to obstruct the path. The efficient lighting would be as high as the width it intends to cover and poles spaced apart at 3 times the height of the lighting.

Sidewalk buffer not only gives refuge space from the speeding traffic but is also used to pile snow from the snow clearance. The buffer should at minimum be 1m wide, either paved or vegetated.

The street furniture like benches, trash cans, and planters should be designed and placed to increase accessibility, as per the Universal Design guidelines.



Observations

Scoring Criteria

Street Segment

Segment	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24	C25	Total
S1	1	1	1	1	1	2	2	2	0	1	2	0	0	0	0	0	0	0	1	1	0	0	0	1	0	17
S2	1	1	1	1	1	2	2	2	1	1	2	0	1	1	1	2	2	0	1	1	0	0	0	1	0	25
S3	1	1	2	2	1	1	2	2	1	1	2	0	1	1	1	2	1	0	1	1	2	0	0	2	0	28
S4	2	1	2	2	1	2	2	2	1	1	2	0	1	2	1	2	1	0	2	2	2	0	0	2	0	33
S5	2	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	6
S6	1	1	1	1	0	0	0	0	0	0	0	2	0	0	1	1	0	0	1	1	0	0	0	0	0	10
S7	1	1	0	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0	0	8
S8	1	0	1	1	0	0	0	0	0	0	0	0	1	0	1	1	1	0	1	1	0	0	0	1	0	10
S9	1	0	2	1	0	0	0	0	0	0	0	0	2	0	1	2	1	0	1	1	1	0	0	1	0	14
S10	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	6
S11	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	6
S12	1	1	2	2	1	1	2	2	1	1	2	0	1	1	1	2	1	0	0	0	2	0	0	2	0	26

Segment Legend

S1	Scotia - Gibson
S2	Gibson - HW2
S3	HW2 - Riverside
S4	Riverside - Asquith
S5	Asquith Grade Crossing
S6	Asquith - Y Junction
S7	Y Junction - Geroge
S8	Y Junction - Highland
S9	Highland - Andrews
S10	Andrews - Tower
S11	Tower - Matthews
S12	Matthews - School

Criteria Legend

C1	Sidewalk Presence
C2	Sidewalk Width
C3	Sidewalk Surface
C4	Sidewalk Material
C5	Corner Landing
C6	Curb Presence
C7	Curb Ramp (Civic)
C8	Curb Ramp (Intersection)
C9	Curb Ramp Surface
C10	Curb Ramp Width
C11	Curb Ramp Slope
C12	Crosswalk (Block)
C13	Crosswalk (Intersection)
C14	Crosswalk Width
C15	Crosswalk Marking
C16	Crosswalk Signage
C17	Crosswalk Signals
C18	Accessible Signage
C19	Lighting (Height)
C20	Lighting (Distance)
C21	Sidewalk Buffer
C22	Rest Areas
C23	Trash Containers
C24	Vegetation
C25	Benches

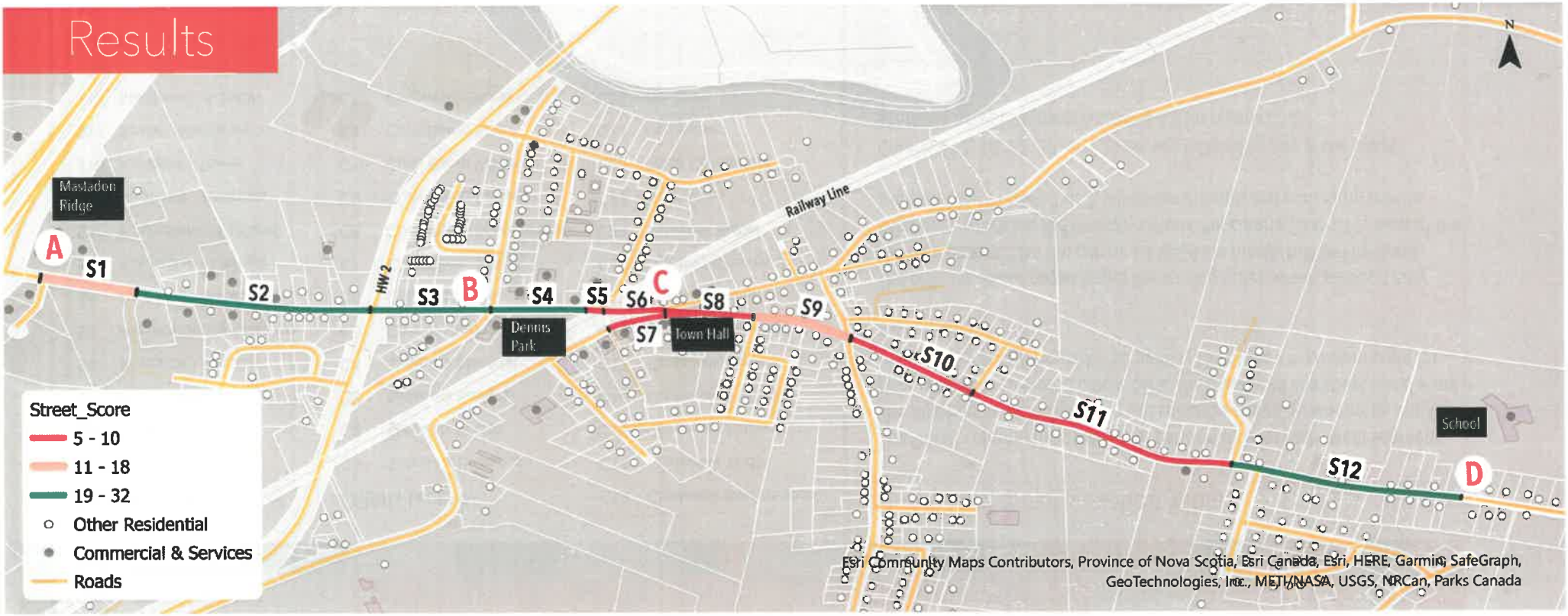
How to read the observation table:

The "Total" column gives the gist of performance for each street segment. The numbers coloured green in this coloumn scored 50% or more, and the ones coloured red scored below 50%. The maximum any street could score in an ideal scenario would be 50 points (25 criteria x maximum score for each criteria i.e. 2).

The cells are colour coded as per the scoring index, which makes it easy to find a pattern. Like the criteria C1 to C4 are mostly fulfilled by street segments, which are the pathway criteria. For criteria C5 to C11, most of the segments fail to score 1 or 2, which are the curb and curb ramp criteria.

Criteria C12, 18, 22, 23, and 25 are not fulfilled by any of the street segment, except segment 6 scoring a 2 for criteria C12.

Results



Map 4. Street segments shown in the scoring range as per the Scoring Index results

The total score from the observation table was mapped for each segment. As shown in the map above, and in reference to the observation table, the score for all 12 segments range between 5 and 32. The segments that did well on the scoring index are shown in green, and the ones that need significant amount of revamping are shown in red. The light pink segments are the average performers.

It can be inferred from the map that the segments near the Town Hall have poor sidewalk infrastructure despite many commercial and public services in the area. There is another continuous segment of poor sidewalk infrastructure, which is on Kitchener street, the segments S10 and S11.

Although S1 and S9 fall in the same category as per the scoring range, the two segments have very different land use and the issues also vary. Segment S9 is sandwiched between two poorly performing stretches, which affects the performance of S9 as well.

The segment near the school scored good on the index as the sidewalk was updated 7 years ago. The long green stretch near HW2 indicates that there is opportunity for having an accessible sidewalk with relatively little addition to the present infrastructure.

Street Segments that did **WELL**

On Main Street

S2 Gibson - HW2

S3 HW2 - Riverside

S4 Riverside - Asquith

On Kitchener Street

S12 Matthews - School

What is good:

- Sidewalk on both or one side
- Almost even surfaces
- Path material is concrete
- S2 has asphalt as path material
- Well maintained curbs
- Curb ramps for civic and intersections
- Sidewalk buffer is good in width
- Vegetation does not obstruct path
- Crosswalk signages are present on both sides
- Flags or push button are available as crosswalk signals

What needs improvement:

- Curb ramp surface needs tactile plates
- Corner landing is not wide enough
- Crosswalks are narrow
- Mid-block crosswalks are needed
- Lighting is there but not sufficient
- Rest areas and benches are needed
- No trash cans are placed
- Flags or push button are bit far off from the sidewalk for access
- Crosswalk markings are not highlighted enough

Needed Actions:

Inserting tactile plates on curb ramps

Introducing corner landings

Installing light poles

Widening and repainting crosswalks

Introducing crosswalks at mid-block

Repositioning crosswalk signals and signages

Installing rest areas with street furniture

On Main Street

S2 Gibson - HW2

Sidewalk on one side of the Main Street

Curb Ramp for civic entries

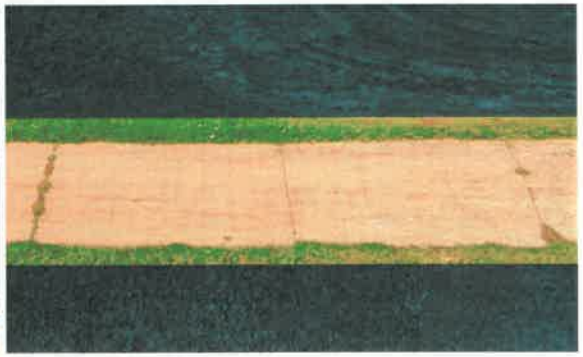
Crossing at HW2 with flags, markings, and push button

On Main Street

S3 HW2 - Riverside

Growing grass in between concrete slabs on civic curb ramp

Curb ramp wider than the curb edge



Cracks between slab edges with growing grass

On Main Street

S4 Riverside - Asquith

Crossing at Riverside with flags and signage

Sidewalk near park with lighting pole and grade crossing signage

Path width of 1.5m being inadequate for passerbys

On Kitchener Street

S12 Matthews - School

Gravel patch in between concrete paving

Signage for speed and school

Concrete paving with even surface

Crosswalk marking with signage on both sides

Street Segments that did Average

On Main Street

S1 Scotia - Gibson

On Kitchener Street

S9 Highland - Andrews

What is good:

- Sidewalk on one side
- Path material is asphalt
- Well maintained curbs on S1
- Curb ramps for civic and intersections on S1
- Sidewalk buffer is there on S9
- Vegetation does not obstruct path
- Crosswalk Signages are present on both sides on S9
- Flags are available as crosswalk signals on S9

What needs improvement:

- Uneven surfaces with grass growing in cracks
- Curb ramp surface needs tactile plates
- Patches of gravel/ unpaved sidewalk
- Corner Landing is needed
- Sidewalk Buffer is not there on S1
- No crosswalks on S1
- Crosswalks are narrow
- Mid-Block Crosswalks are needed
- Lighting is there but not sufficient
- Rest areas and benches are needed
- No trash cans are placed
- Crosswalk markings need revamping

Needed Actions:

Repair of sidewalk surfaces

Inserting tactile plates on curb ramps

Introducing corner landings

Installing light poles

Widening crosswalks

Introducing crosswalks at mid-block

Crosswalk signals and signages

Installing rest areas with street furniture

Repainting crosswalk markings

On Main Street

S1 Scotia - Gibson

Curb ramp with cracks

Gravel patch near Mastadon

Crosswalk and sidewalk missing

Uneven surface and withered curb edges

On Kitchener Street

S9 Highland - Andrews

Crosswalk with markings, flags, and signage

Asphalt sidewalk with signs of wear, no curb, and little buffer from road

Street Segments that did **Poorly**

On Main Street

S5 Asquith Grade Crossing

S6 Asquith - Y Junction

S7 Y Junction - George

On Kitchener Street

S8 Y Junction - Highland

S10 Andrews - Tower

S11 Tower - Matthews

What is good:

- Sidewalk on both or one side
- Path material is asphalt
- Vegetation is maintained at few places
- Intersection crosswalks there on S7 and S8
- Some type of lighting is there on all segments except S5

What needs improvement:

- Uneven surfaces with grass growing in cracks
- Path width is less (1 - 1.2m)
- No curbs therefor no curb ramps
- No sidewalk buffer
- Crosswalks are narrow
- Mid-Block Crosswalks are needed
- Lighting is not sufficient
- Rest areas and benches are needed
- No trash cans are placed
- No crosswalk signals
- Crosswalk markings are missing
- Crosswalk signages are missing
- Vegetation needs maintenance at few spots

Needed Actions:

Repaving
Introducing curbs
Widening sidewalks
Introducing sidewalk buffer or barrier from traffic
Curb ramps as per standards
Maintenance of vegetation
Introducing crosswalks at intersections and mid-block
Crosswalk signals and signages
Installing rest areas with street furniture
Installing light poles

On Main Street

S5 Asquith Grade Crossing

Narrow crosswalk with uneven surface

No crosswalk before or after the at-grade railway crossing

Hazard prone crossing with no curbs on one side of the sidewalk

On Main Street

S6 Asquith - Y Junction

Median crossing with uneven surface

Narrow crosswalk with signage on one side, and no sidewalk on either sides

Unpaved hazard prone path on one side of the road

On Main Street

S7 Y Junction - George

Crosswalk with faded marking and no signage

Unpaved sidewalk near Town Hall and library

Concrete sidewalk with curb in small section of the segment

On Kitchener Street

S8 Y Junction - Highland

Very narrow asphalt sidewalk on one side with some buffer

Uneven surface with sunken paving and large cracks

Narrow crosswalk with no signage on either side

Best Practices

This section compiles best practices for enhancing walkability, accessibility, and safety of pedestrian infrastructure through design, most relevant to the areas for improvement that were identified through the segment analysis. These best practices have been used to inform recommendations made in this report, and can be referred to if and when future sidewalk or streetscaping projects are initiated.

Tactile Surface

For Street Segment

All segments

Criteria Addressed

C9

Relevant Resources

F1 F2 F5

Adaptability Canada (ADC) is the leading national provider of commercial accessibility related equipment and solutions for the public, private and non-profit sector organizations. According to them, Armor-Tile offers the largest selection of fully CSA/ISO compliant detectable warning tactile system products for curb ramps, and pedestrian crossings. The tiles have:

- exceptional wear resistance factor meaning a longer tile life;
- exceeds the most stringent requirements;
- can be Cast in Place - Installs in minutes for new construction;
- can be Surface Applied - Engineered to retrofit;
- can be Modular Paver Systems - dry laid on compacted fill

(ADC, 2022)

Crosswalk Markings

For Street Segment

All segments

Criteria Addressed

C12 C13 C15

Relevant Resources

F1 F2 F4 F5

In a research paper by Pedestrian and Bike Information Centre (Pedbikeinfo), a government unit in US that advocates for best practices related to walking and biking, it is found that the Continental markings are most easily detected from far during day and night, as opposed to Bar Pairs and Transverse. (Pedbikeinfo, 2013)

Transverse Continental Bar Pairs

Safe Routes To School (SRTS) recommends that where the speed limit is over 60 km/h, marked crossings should not be installed alone. Enhancements including raised median islands, traffic and pedestrian signals and/or street lighting may also be needed. The best practice is to design markings so as to minimize crossing distances and should be straight and in line with the curb ramps (SRTS, n.d.).

Median Island Crosswalk designed by Ulster County, US

For Street Segment

S1 S5 S6 S7 S8 S9 S10 S11

Criteria Addressed

C3 C4

Relevant Resources

F1 F2 F4 F5 F6

Sidewalk Repair

Short term and long term sidewalk repairs that are in general practice across US and Canada are listed below. U.S. Department of Transportation (2013), City of Saskatoon (2022), and District of Squamish (2013) also suggest when to use each of the repair techniques.

Short Term Repair

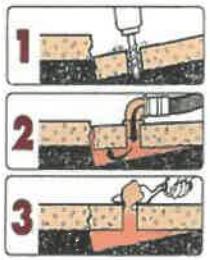
- Wedging
- Crack Filling
- Patching
- Horizontal Cutting/ Trip Ledge Removal/ Grinding
- Mud Jacking/ Slab Lifting
- Asphalt/ Concrete Overlays
- Vegetation Control

Long Term Repair

- Panel Replacement
- Curb Replacement
- Sidewalk Replacement

Grinding

Wedging



Mud Jacking/ Slab Lifting

Concrete overlay/ Resurfacing

Panel Replacement

Sidewalk Replacement

For Street Segment

All segments

Criteria Addressed

C3 C4

Sidewalk Maintenance

In order to maintain sidewalks, a general best practice is to perform regular inspections. Town of Truro (2016) suggests an annual inspection of the sidewalks. It categorises maintenance of sidewalks as per the street type. For Arterial roads, the policy is to maintain two sidewalks, and for collector roads it is to maintain either one or two depending on the necessity.

City of Vancouver (2012) takes a different approach. It considers that a Reactive approach to sidewalk hazards is more effective. In it the public and municipal staff reports the hazard locations that they encountered in their daily lives, upon which action is taken. The approach requires setting of a reliable communication channel.

Coordinated Street Furniture

For Street Segment

S1 S2 S3 S4

Criteria Addressed

C22 C23 C25

In a coordinated street furniture program, private companies provide a supply of street furniture at no cost to the City in exchange for advertising rights. It is a best practice across big cities in North America, but is tried and tested by Ottawa in suburban and rural areas. Furniture type included are benches, waste receptacles, bus stops.

The Integrated Street Furniture Program guideline of Ottawa (2009) informs design and placement decisions and provide helpful guidance on any future furniture programs implemented in the public right-of-way. The guide helps maintain a cohesive look of street furniture donated/ exchanged by the private companies.

Effective Lighting

For Street Segment

All segments

Criteria Addressed

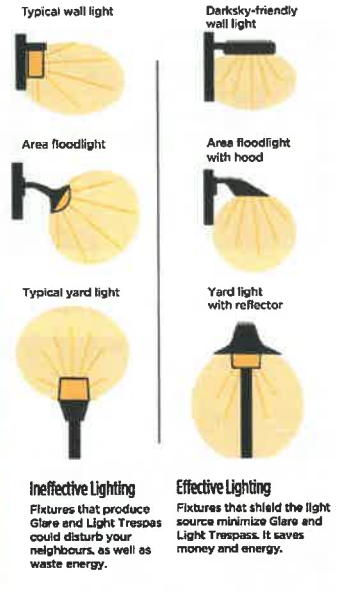
C19 C20

Relevant Resources

F2 F3 F7

Lighting selection should be guided by factors of energy saving and avoiding light spill and trespass. In a Best Practices for Effective Lighting guide by City of Toronto (2017), it is highlighted that only downright lighting with covered tops should be used. It provides good illumination without creating light pollution.

Green Building Canada (2020) recommends using LED technology with solar panels to save on energy usage. With advancement of technology, the cost of installing solar panels proves to be cost effective in longer run. There numerous budget friendly design options available in the market to choose from.



Tactical Urbanism

For Street Segment

All segments

Criteria Addressed

Multiple

Relevant Resources

F3 F4

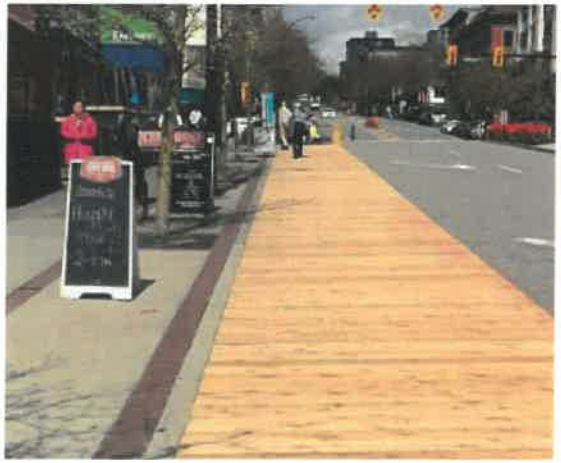
Tactical urbanism is a method of rapid, low cost project implementation using a set of techniques designed to enhance the built environment, with the intent of bringing about long-term positive outcomes for the community.

Tactical Urbanism projects typically arise from an identified community need or issue and present an excellent opportunity to engage with the community members. These projects can be initiated and led by many different organizations, agencies, or groups, including municipalities, health authorities, and school communities. These projects can be on the ground for anywhere from a few hours to days or even weeks, and they can sometimes be transitioned into permanent projects

TransLink (2020) had released a Tactical Urbanism Guide for Metro Vancouver, in which interventions on public infrastructure that can be carried out by the public in a legal manner are outlined. It recommends that the community projects must seek approval from the municipality's engineering department before carrying out any temporary modifications to the road network or to road capacity.

Tactical urbanism projects have been used to reallocate road space in response to the incresing need for active transportation and placemaking. Some interventions that the community can uptake are:

- Adding planter dividers
- Extending sidewalk
- Providing street furniture
- Building curb extension
- Painting safe crosswalks



Snow Clearance

For Street Segment

All segments

Criteria Addressed

C3 C9

Relevant Resources

F4 F5

WalkBoston (2020) had prepared a snow removal guide, and it mentions seven (7) key means to improving sidewalk clearance:

- Create social awareness campaigns
- Identify a municipal point person for snow removal
- Set priorities for sidewalk snow clearance
- Improve monitoring and enforcement
- Design sidewalks for easier snow removal
- Create sensible policies

The manual suggests that the Combination Method for snow clearance responsibility is the best way out. It outlines that municipalities in Massachusets combine private and public snow clearance. These municipalities clear the most heavily traveled sidewalks, but require property owners to clear abutting sidewalks in other parts of the city.

Halton Hills (2020) also initiated a sidewalk clearance program to encourage collective effort.

Traffic Calming

For Street Segment

S8 S9 S10 S11

Criteria Addressed

C12 C13 C21

Relevant Resources

F1 F2 F7

Traffic calming is a system that utilizes design strategy and physical adjustments to reduce traffic speeds for the safety and accessibility of all street users. It helps reduce risk of injury in case of collision of a moving vehicle with a pedestrian or bicyclist. The technique also helps in enhancing the feeling of safety for sidewalk users, where sidewalks are narrow and there is no buffer between the road and sidewalk. Some ways to achieve this is by installing:

- Temporary bollard or planters to narrow street width
- Speed Humps or Raised Crosswalks
- Chicanes that are extensions of sidewalk creating winding effect
- Chokers to narrow down the entry point to a street

(City of Ottawa, 2019)

Jurisdictional Scan

This section re-examines some aspects of the best practices explored in the previous section within the regional context of Nova Scotia. It does so by compiling examples of similar practices already implemented by neighbouring jurisdictions. The contents of this section can be used as reference material to inform the implementation of certain best practices within the context of local and provincial policies.

Snow Removal

Most of the municipalities in NS provide snow plowing services. The research could not find a case where property owners are responsible for clearing snow from sidewalks

HRM: The municipality is responsible for clearing all public sidewalks in the Halifax region. That means crews are responsible for clearing 3,844 lane kilometres of roads, about 1,000 kilometres of sidewalks and walkways and approximately 2,300 bus stops. Residents and businesses are responsible for clearing their own driveways and pathways, including any snow that has been plowed in (HRM, 2020).

East Hants: For winter clearing of roads and sidewalks, the Municipality has service ownership, during the winter season (East Hants, n.d.).

West Hants: The Municipality provides snow removal and salting/ sanding during the winter on both its roads and sidewalks (East Hants, 2022).

Town of Truro: The town is responsible for plowing 73 Km. of sidewalks after snow. Residents are required to clear their own driveways and walkways without depositing snow and ice onto the street or sidewalk area (Town of Truro, n.d.).

Municipality of Colchester: The County plows all sidewalks in Debert, Brookfield, Hilden, Truro Heights, North River, Onslow, Salmon River and Valley. Sidewalks in school zones are made a priority whenever possible. There is a contact number provided to report any issues with sidewalk plowing (Colchester, n.d.).

LED Streetlights

Province of Nova Scotia has a mandate for its municipalities to covert all street lighting to LED by the end of 2022. The mandate is part of the energy efficiency strategy, under the 2011 amendment of the Energy-efficient Appliances Act (DNRR, n.d.).

The regulation under the act says, "Conventional lighting that is not LED and that fails to comply with ANSI/IESNA RP-8, American National Standard Practice for Roadway Lighting must not be used by the following after the dates indicated: by a municipality, after December 31, 2022" (Nova Scotia, 2012).

According to the provincial government, "LED lights are expected to use less than half the energy of traditional lights and when combined with reduced maintenance costs, the estimated annual savings could be $18 million. They'll also reduce greenhouse gas emissions by more than 30,000 tons" (DNRR, n.d.)

Municipalities that have already switched to the LED streetlights include Annapolis, East Hants, and Antigonish (DNRR, n.d.)

Purchasing LED Streetlights

NS Power rents out LED streetlights at a competitive rate along with maintenance services as well, which is a good alternative to purchasing streetlights outright (NS Power, 2022).

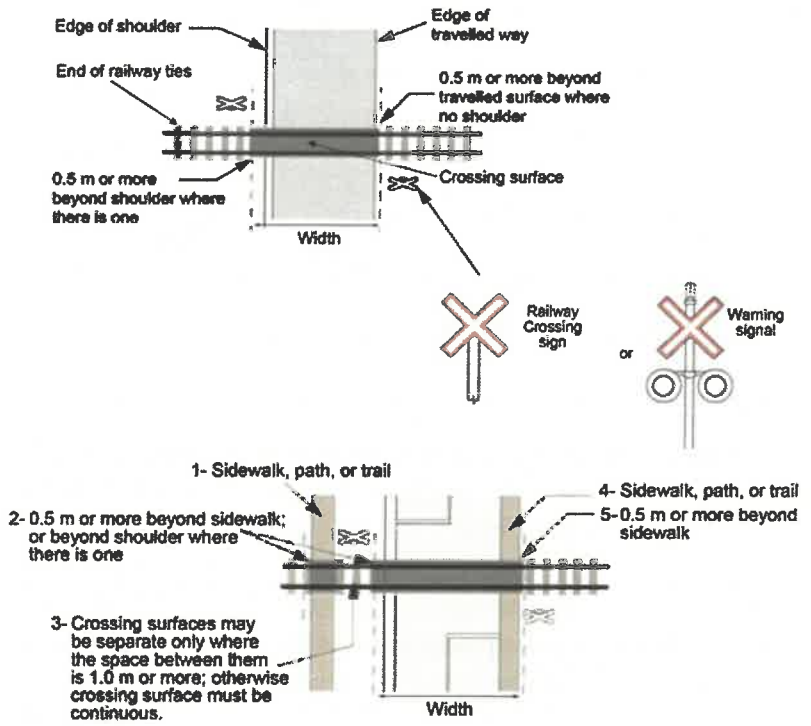
HRM had its 25,000 streetlights in the suburban and rural areas of the municipality leased to the municipality by Nova Scotia Power (CBC News, 2011), which were purchased by the municipality in 2014 to convert these to LED (The Coast, 2017).

Grade Crossing Design

The regulatory framework for railway safety and security is administered by Transport Canada under the Railway Safety Act, whereby the construction or modifications of a grade crossing requires the authorization by the Canadian Transportation Agency. While the need for such a crossing is typically established by the public road authority, the design and protection requirements must meet the Transport Canada standards.

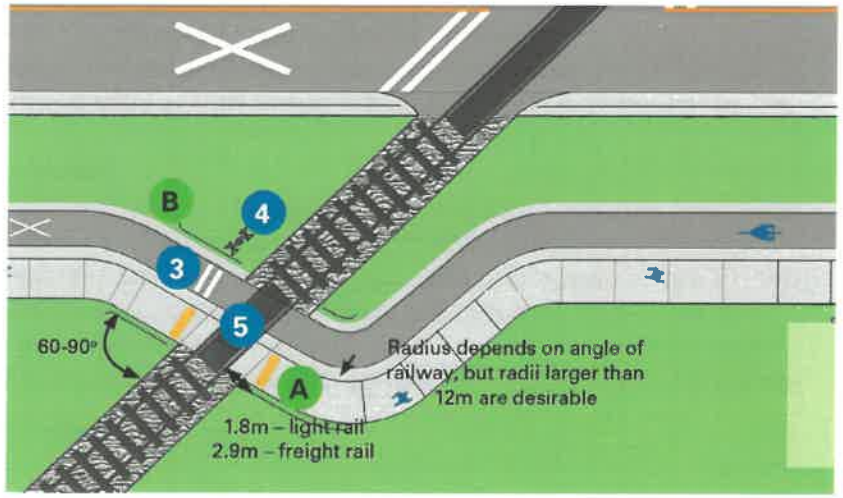
The regulation requires crossing surfaces to "extend 0.5 m or more beyond the sidewalk. Crossing surface of a sidewalk, path or trail along a road may be separate from the road crossing surface if there is 1.0 m or more between the two crossing surfaces. Otherwise, crossing surface must be continuous" (Transport Canada, 2014)

The regulation also restricts the elevation of the top of the rail with respect to the crossing surface, which must be installed as close as possible to the top of the rail within the wear limits of maximum 13 mm (Transport Canada, 2014).



In a sidewalk guideline by York Region, Ontario, there are three important recommendations to be considered for Rail Crossing:

- Rubber (or similar) crossing pad to improve crossing surface extended 0.5 m or more beyond facility
- Railing for channelizing pedestrians to prevent unauthorized crossing, as needed
- Accessibility standard compliant ramps and tactile plates can be placed in advance of the crossings. Best practices in pedestrian safety for at-grade rail crossing suggest that they are an important element for accessibility. It is preferred to include a 1200 mm level area adjacent to the tactile plate (York Region, n.d.).



Raised Crosswalk

Raised crosswalks are marked pedestrian crossings that are raised above the roadway. Raised crosswalks encourage slower speeds of travel by causing discomfort for drivers travelling at higher speeds. Raised crosswalks are like speed tables, with a flat topped elongated section.

The roadway is raised to half the height of the gutter, allowing for a small pedestrian ramp to remain in place and tactile indicators installed to support pedestrians with visual impairments. When designing raised crosswalks, site drainage is reviewed and catch basins are installed or relocated if necessary. To avoid noise created by passing vehicle, the width of the table should be at least 2.5 m to accommodate both wheels of a vehicle (FHWA, 2018).

HRM is to install its first raised crosswalks which are planned for construction in 2022 (HRM, 2021).

Raised Intersection

A raised intersection is similar to that of a raised crosswalk except that it encompasses the entire intersection. The crosswalks on each approach to the intersection are raised as well—enabling pedestrians to cross the road at the same elevation as the sidewalk. This type of countermeasure encourages drivers to reduce their speed entering the intersection and yield to pedestrians crossing the roadway.

There are currently no raised intersections in Nova Scotia, as per research, but are a common practice in Ontario. In a guide by Ottawa, following recommendation are made:

- Should be designed to ensure adequate drainage is maintained on the street.
- Detectable warnings or markings should be installed to clearly define the transition between the sidewalk and roadway.
- Not appropriate for high volume or high speed roads or streets with steep grades.
- Include input from local emergency services representatives during the planning and design stages.
- Should be installed as part of an overall traffic calming plan.

Traffic Calming Strategies

HRM recommends using traffic calming strategies on "streets that are in residential areas and are classified as Local or Minor Collector are most appropriate for abrupt physical traffic calming measures". The strategies should not be adopted for "Major Collector or arterial roadways as they are designed to facilitate vehicle and goods movement" (HRM, 2022). HRM uses following interventions:

Raised Median

A raised median island is an elevated median constructed on the centerline of a two way roadway to reduce the overall width of the travel lanes. The purpose of a raised median island is to reduce vehicle speeds by lane narrowing and to reduce pedestrian–vehicle conflicts when utilized at intersections or marked crosswalks. When considering raised median islands the street use and classification are reviewed to ensure that trucks, snow clearing equipment and emergency service vehicles can safely maneuver through the corridor.

Lane Narrowing

Reducing lane widths using pavement markings or other features leads drivers to perceive the roadway to be less comfortable at higher speeds due to the narrowing of the lanes and ultimately reduce operating speeds. The reclaimed space can be reallocated to pedestrians or other road users.

Curb Extensions

Curb extensions can reduce the crossing distance for pedestrians when located at intersections and marked crosswalks and increase mutual visibility between pedestrians and motorists. These narrow the lane width and are intended to reduce vehicle speeds by making the road feel more constrained. Special care is taken to ensure snow clearing equipment and emergency service vehicles can safely maneuver around the deflections

Recommendations

Segment-Wise Recommendations

Based on the walkability and accessibility analysis done for 12 street segments, each segment was classified under an existing condition type and suggested interventions were highlighted. Now, the suggested interventions for each segment will be outlined as recommendations. For ease of execution, recommendations are phased, and the basis of phasing was to prioritise safe and accessible walking experience through the whole project, and secondarily enhance additional aspects. The recommendations grouped under different phasing, along with suitable funding options are:

I. Upgrading Existing (Phase 1)

In the first phase of interventions, the recommendations that apply to upgrading the existing infrastructure are included. The interventions being, but not limited to, repairing sidewalks, widening sidewalks, repairing curb ramps, adding tactile plates to existing curb ramps, widening and marking existing crosswalks, repositioning of existing signages and signals, etc.

F2 F5 F6

II. Adding Essentials (Phase 2)

In the second phase of interventions, the recommendations that apply to installing new infrastructure that is essential to achieve project objectives are listed. The interventions being, but not limited to, constructing new sidewalks, new curbs, new buffer, new signages, new curb ramps with tactile plates, new crosswalks with signals and signages, new streetlights, etc.

F1 F2 F3 F6 F7 F8

III. Adding Supplementary (Phase 3)

In the third phase of interventions, the recommendations that apply to installing new infrastructure that is supplemental to achieve project objectives are listed. The interventions being, but not limited to, constructing rest areas, placing new benches, new trash receptacles, additional signages, etc.

F2 F6

Note: The above phases are not ranked (1,2,3) in the order in which they are meant to occur, but instead categorize elements by different thresholds of implementation. It is understood that elements of different phases may be applied in a different order when possible and opportune through funding availability or other civil projects.

Broader Recommendations

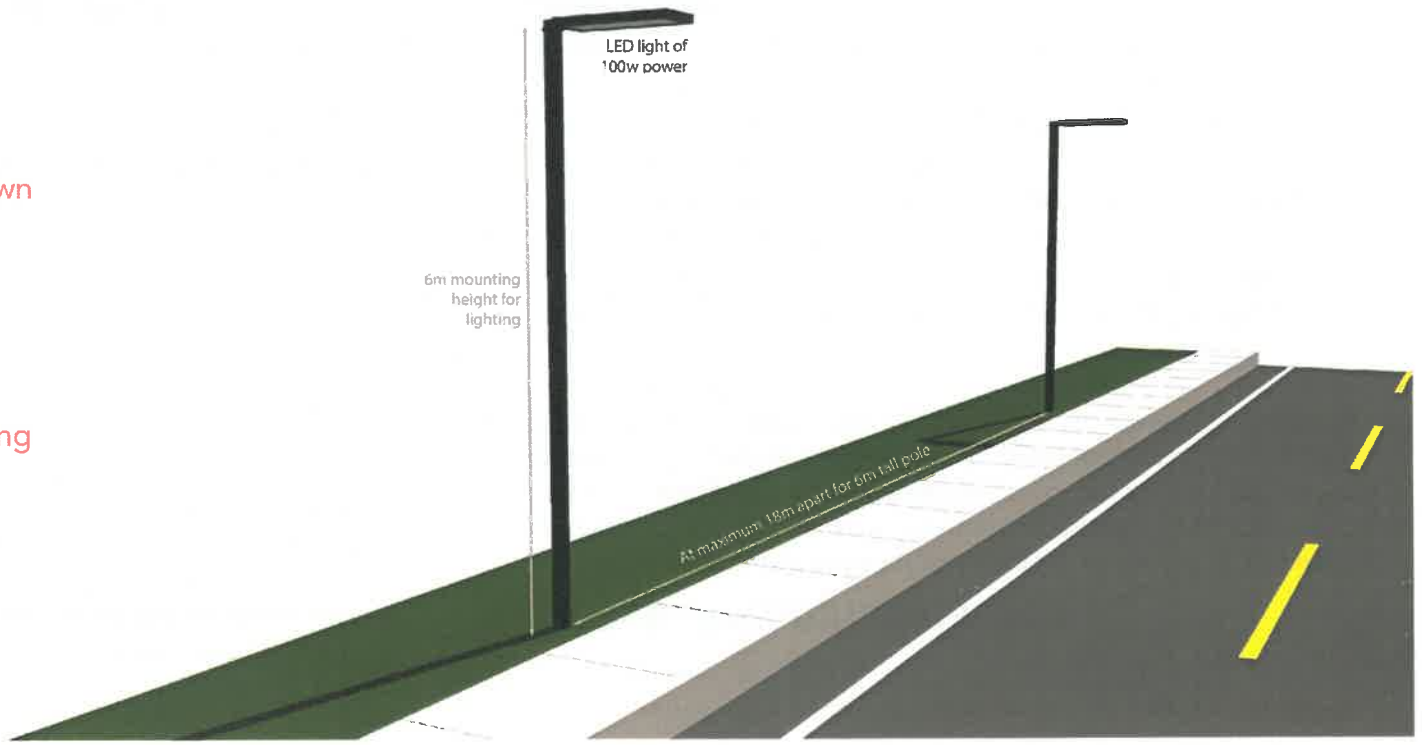
Broader recommendations for the study area are listed separately, following the segment-wise recommendations. These are not part of phasing of recommendations, and can be considered with respect to the project timeline for implementation. Although the best time to consider a recommendation will depend on case-by-case, but in general:

- Recommendations that are made regarding further study of an area should be carried out before any of the physical interventions are executed.
- Policy recommendations can be considered after significant improvements have been done.
- Program or community recommendations can be considered at any stage of the project, as long as it complements the execution.

F4 F7

Specifications

This section describes specifications for different elements illustrated in this report's segment-wise design recommendations. Symbols shown here appear on the maps in the following section to represent these elements. Specifications are based on standards (CSA, NSAD, and Clearing Our Path guidelines) and are depicted using 3D diagrams.



Existing Streetlight

Where streetlight exists and meets the criteria for sidewalk streetlighting. Light should be of at least 100w, positioned between 6m to 8m high, and not placed father than 3 times the height of the lighting pole.

New Streetlight

Where new streetlight is recommended as per the criteria for sidewalk streetlighting. New light should be LED of at least 100w, positioned 6m high, with centre to centre distance between two streetlight poles being not more than 18m.

New Streetlight with crossing signal

Where the new streetlight and crossing signal share the same pole. The situation would arise at crosswalks. The signal of type specified in segment-wise recommendations, should be mounted on the same pole as the light. Pedestrian signage should be mounted on the same pole, if possible.

Renovated Sidewalk

Where existing sidewalk needs major renovation and widening. Concrete resurfacing should be used, and where possible widden sidewalks to 1.8m. Different repairing techniques discussed in best practices should be used to level the sidewalk.

Maintain Sidewalk

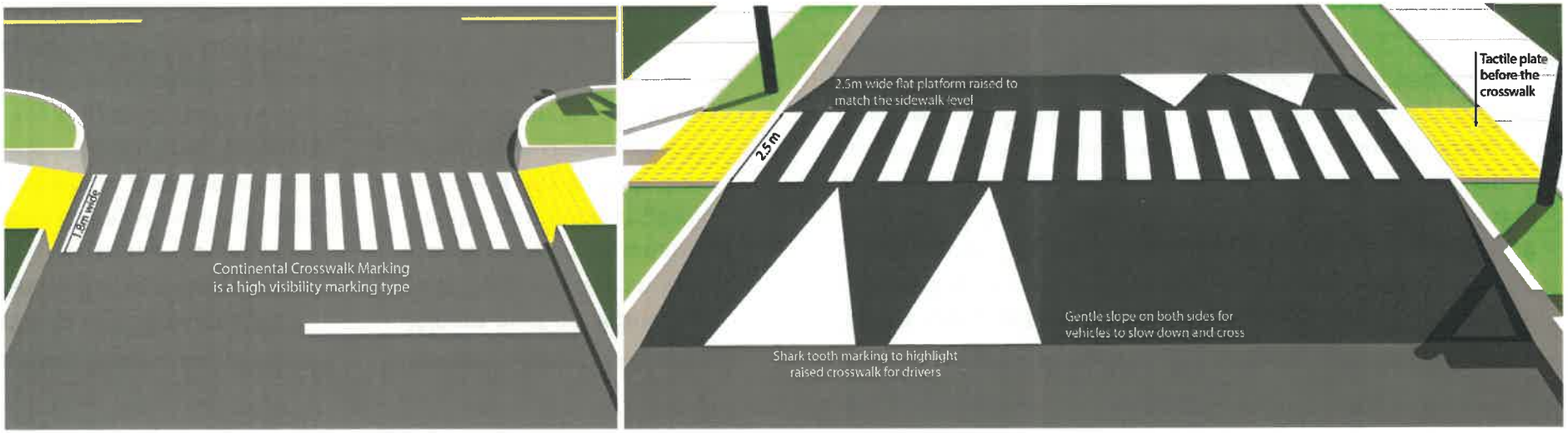
Where existing sidewalk is in fairly good condition and needs minor maintenance. Fill the gap in pavings with concrete mix to stub the vegetation growth and to reduce chances of trip hazard.

New Sidewalk

Where construction of new sidewalk is recommended. Width should be at minimum 1.5m and should be 1.8m wherever enough roadside space is available. Concrete finish should be even and curbs should be installed.

Sidewalk Buffer

Where sidewalk buffer can be provided to the new sidewalk. If space available for buffer is less than 1m then consider extending sidewalk than providing vegetational buffer. Buffer should not exceed 1.5 m in width.



Crosswalk Marking

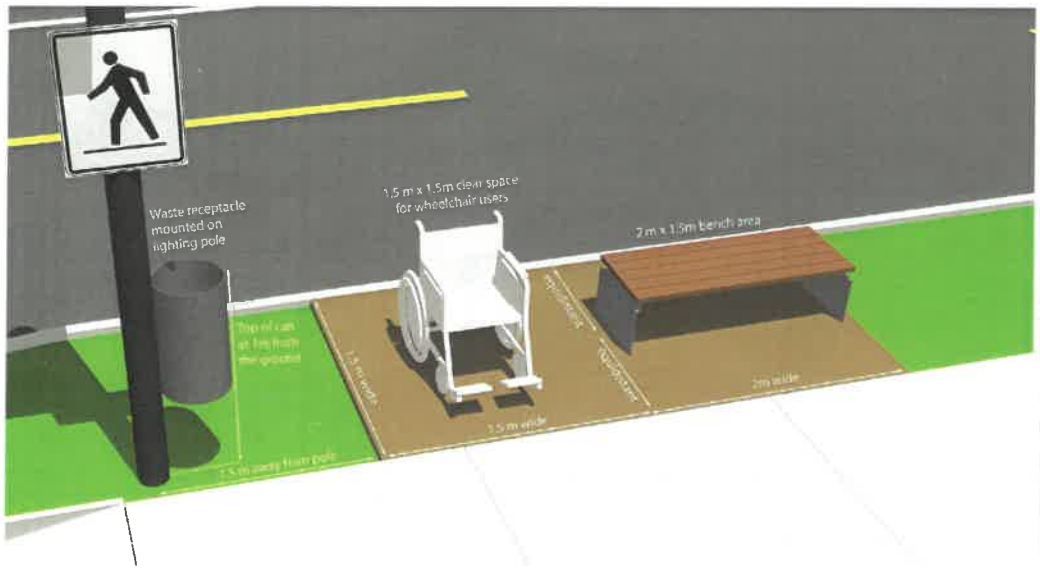
Where crosswalk marking needs to be painted or re-painted. Existing crosswalks need to widened, or repositioned, thus all crosswalks, new and old will have to be marked. Crosswalks should be at minimum 1.8m wide and with oriental markings.

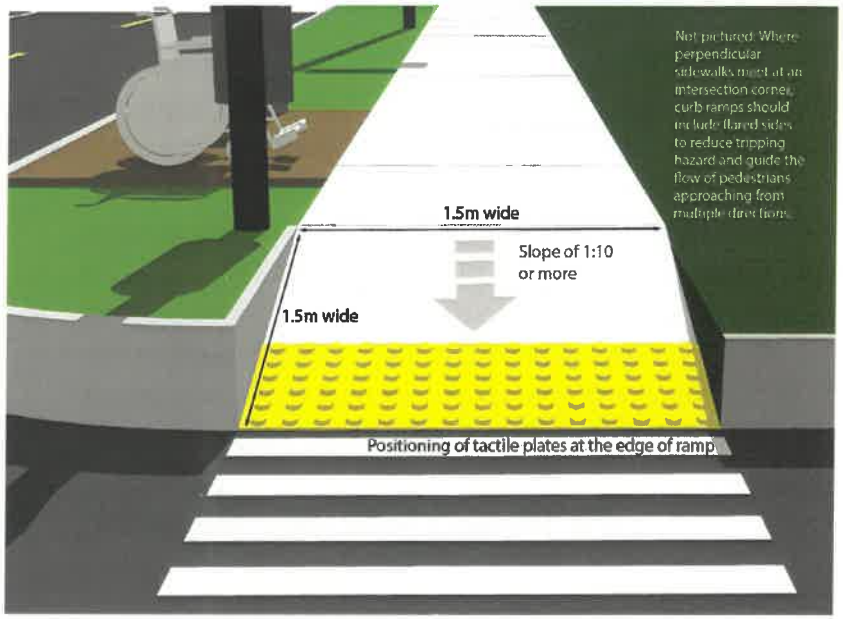
Raised Crosswalk

Where raised crosswalk is advised to be constructed. The height of the raised crosswalk should be not more than 10 cm, with clear 2.5m flat crosswalk area, and sloped area lying outside of it. The crosswalk should be painted in a colour that highlights the raised crosswalk.

Pedestrian Landing

Where levelled platform is recommended near a crosswalk. The landing should be at the same level as the crosswalk, and should be highlighted through differently coloured paint. The landing should be at least 1.5m x 1.5m in size, and where needed longer.





Resting Area

Where a concrete paved area with a bench and trash can is advised to be provided. The resting area should be able to accomodate a wheelchair as well. The size of the platform should be 1.5m x 3.5m.

Resting areas are to be placed near intersections or crosswalks, which makes it easier for pedestrians to remember where the closest resting area is.

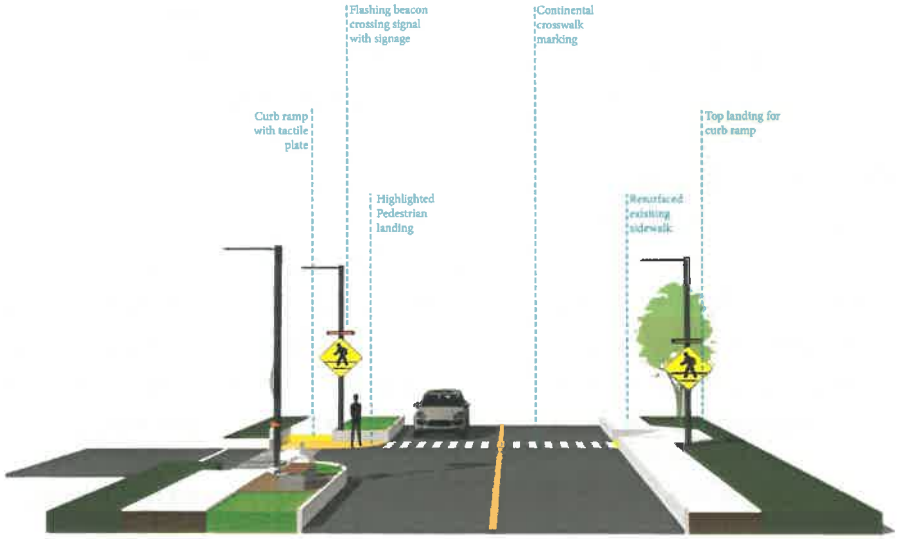
Curb Ramp

Where a curb ramp is advised, whether new or repaired, along with tactile plates. As per analysis it is best to lay out new ramps throughout the project. If choice is made otherwise, then also tactile plates should be installed. Ramp width should be minimum 1.5m and a slope between 1:10 and 1:15. The tactile plates should be placed where the ramp meets the road. It is advised to use Armour-tile brand for tactile plates.

Planter Box

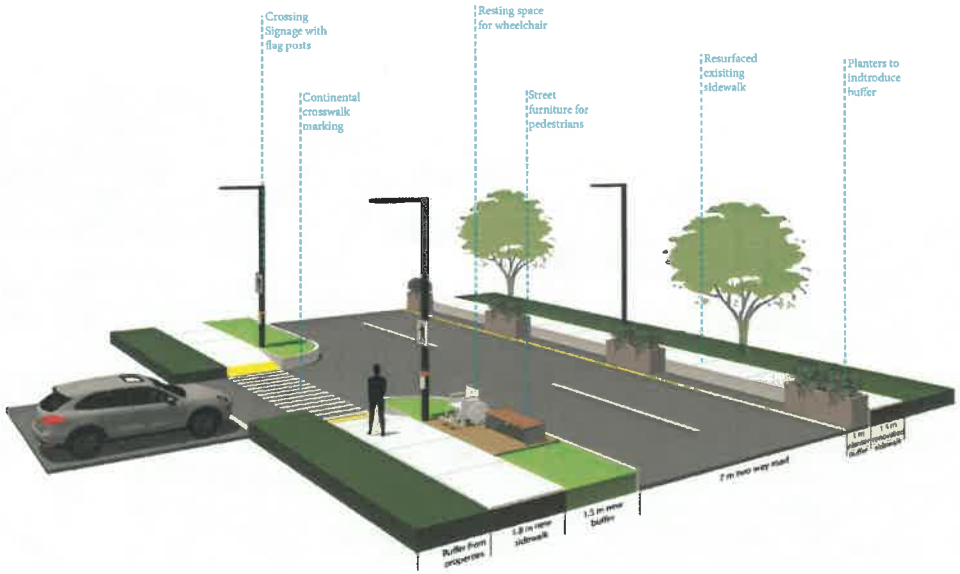
Where planter box is used as a buffer from the street traffic. The option to add planter boxes should be considered only when there is not enough space to widen the sidewalk or add a vegetated buffer. The width for the planter buffer should be 1m or less.

Crosswalk Signal Specification



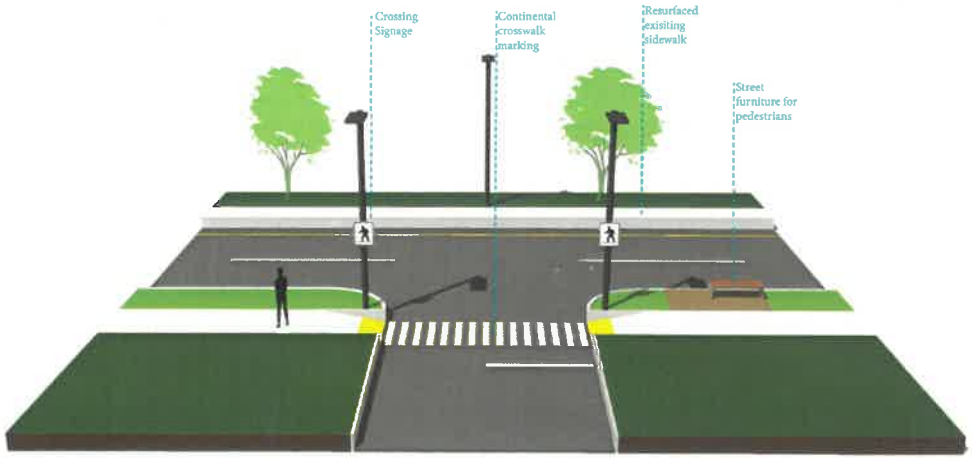
Type A Flashing Beacon

This signal type should be used on a collector street where the chances of speeding are high for the incoming traffic. The signal can be automatic or can be installed with a push-button. The flashing beacon should face the incoming traffic lane and be posted on both sides of the crosswalk. The flashing signal, signage and push button can be mounted on the streetlight pole, which should be strategically placed to remain in clear sight of traffic.



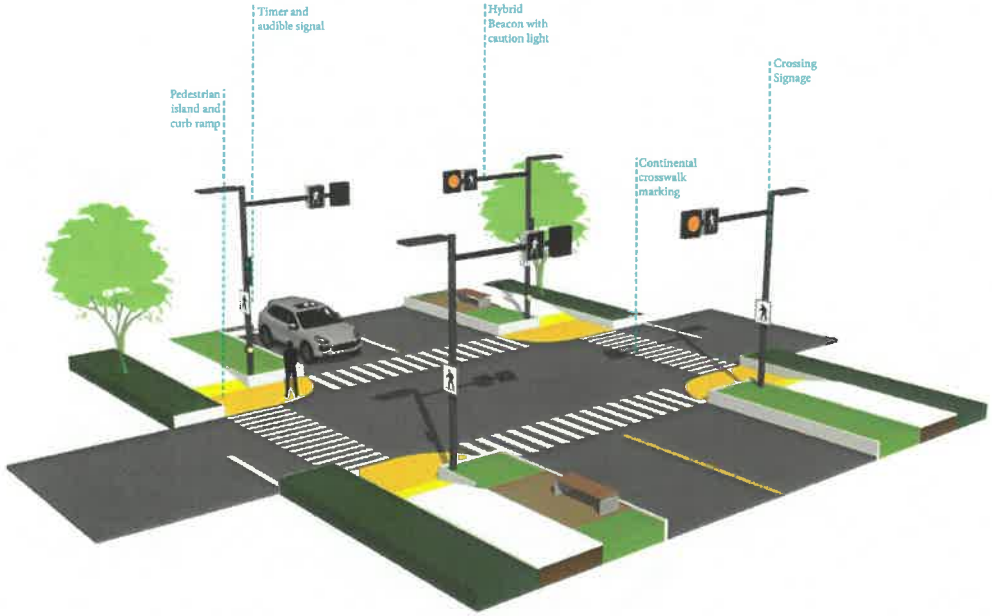
Type B Flagged Signaling

This signal type should be used on a feeder local street where the chances of speeding are low for the incoming traffic. The signal can have four flags posted on either side of the crosswalk with pedestrian signage. The signage should be double facing on both sides of the crosswalk. The signage and flag posts can be mounted on the streetlight pole, which should be strategically placed to remain in clear sight of traffic.



Type C Signage Only

This signal type should be used on a private road intersecting the collector street. The signal can have pedestrian crossing signage on either side of the crosswalk. The signage should be double facing on both sides of the crosswalk. The signage can be mounted on the streetlight pole, which should be strategically placed to remain in clear sight of traffic.



Type D Hybrid Beacon

This signal type should be used on a busy four way intersection. The signal can have hybrid beacon signal lights with pedestrian timer, push button, and audible signal. The double facing pedestrian crossing signage must be placed on either side of the crosswalk. The signal lights, timer, push button, and signages can be mounted on the streetlight pole, which should be strategically placed to remain in clear sight of traffic.

Segment-wise Recommendations

I. Upgrading Existing

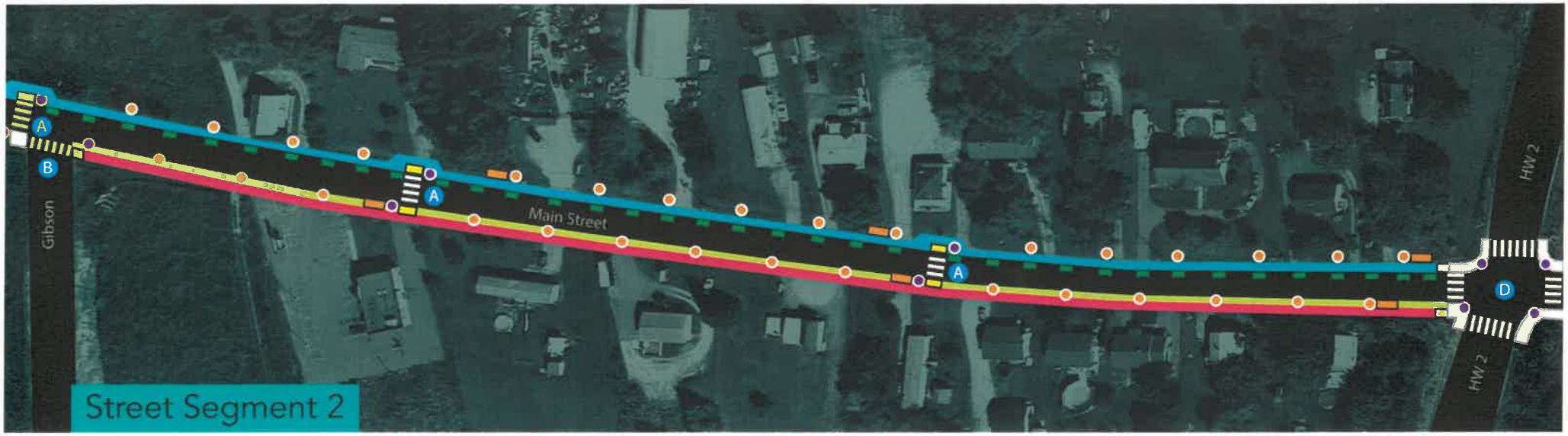
- Existing sidewalk needs concrete re-surfacing, and if possible widening from current 1.5m to prescribed 1.8 m.
- Curbs are present on both sides, and must be replaced wherever signs of wear are showing.

II. Adding Essentials

- There is enough space to add a new sidewalk of 1.8m width and also provide 1.2 m green buffer from the street.
- Curb ramps should be a new construction, following the surface and slope requirements, also adapting to the context.
- The crosswalk markings and pedestrian landings should adapt to the context.
- All crosswalk signals should follow the assigned signal typology.
- All streetlights should be LED, mounted on a 6m tall pole and at maximum 18m apart.

III. Adding Supplementary

- New rest areas should be strategically placed next to intersections or crosswalks, where they can be used as bus stops in future.
- New planter boxes should be made of concrete or metal for longevity and at least 0.8m high and 0.8m wide.
- The buffer should allow for a minimum of 7m wide road for traffic. Therefore not more than 1m in Segment 1.



I. Upgrading Existing

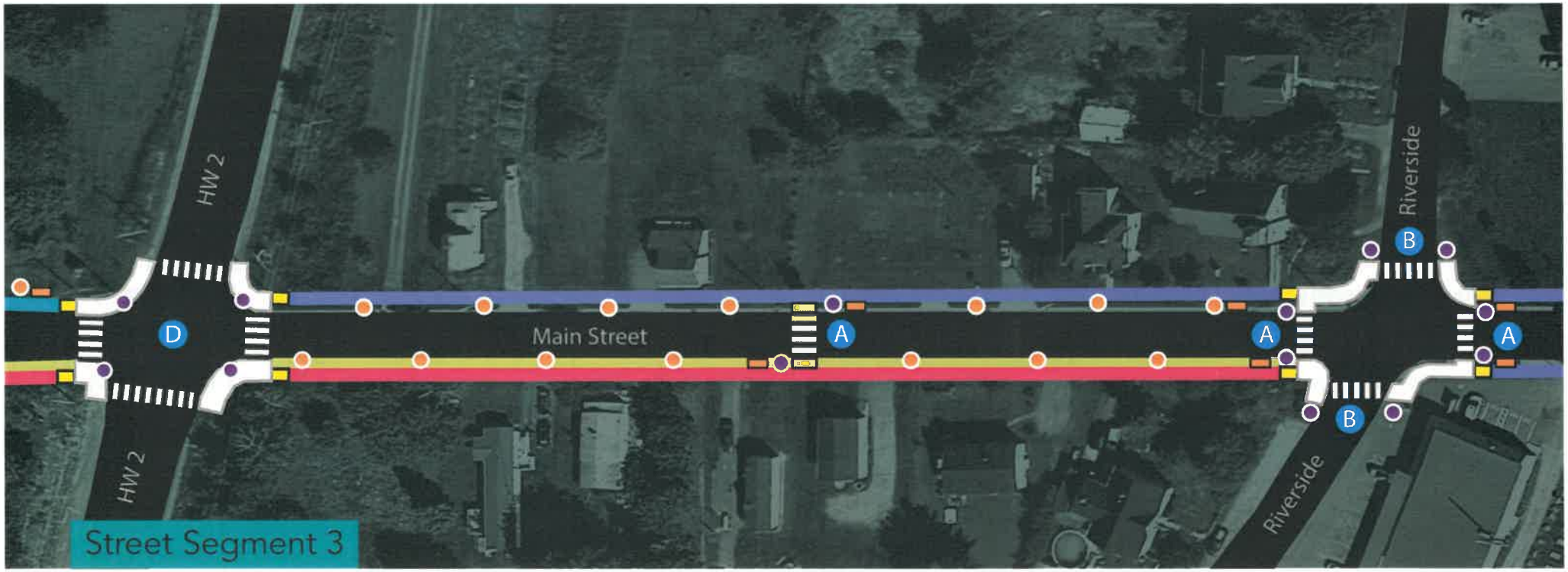
- Existing sidewalk needs concrete re-surfacing, and if possible widening from current 1.5m to prescribed 1.8 m.
- Curbs are present on both sides, and must be replaced wherever signs of wear are showing.
- Existing civic curb ramps can be leveraged for mid-block crossing wherever possible.
- Crossing signal on HW2 is outdated and should be replaced with the recommended signal typology.
- Existing pedestrian signs on HW2 intersection should be relocated to a type B crosswalk, and new signages with higher contrast should be installed.
- Current crosswalk marking on HW2 is not wide enough and should be re-marked as per specifications.

II. Adding Essentials

- There is enough space to add a new sidewalk of 1.8m width and also provide 1.2 m green buffer from the street.
- Curb ramps should be a new construction, following the surface and slope requirements, also adapting to the context.
- Location of mid-block crosswalk indicated in the map is tentative, and can be changed based on the context and need of the community. More than two mid-block crosswalks are not recommended for this segment.
- The crosswalk markings and pedestrian landings should adapt to the context.
- All crosswalk signals should follow the assigned signal typology.
- All streetlights should be LED, mounted on a 6m tall pole and at maximum 18m apart.

III. Adding Supplementary

- New rest areas should be strategically placed next to intersections or crosswalks, where they can be used as bus stops in future.
- New planter boxes should be made of concrete or metal for logevity and at least 0.8m high and 0.8m wide.
- Planter boxes should not block the driveway of civic properties.
- The buffer should allow for a minimum of 7m wide road for traffic. Therefore not more than 1m in Segment 1.



I. Upgrading Existing

- Existing sidewalk needs regular maintenance, and if possible widening from current 1.5m to prescribed 1.8 m.
- Curbs must be replaced wherever signs of wear are showing.
- Existing civic curb ramps can be leveraged for mid-block crossing wherever possible.
- Crossing signal using flags on Riverside intersection is not safe enough and should be replaced with the recommended signal typology.
- Existing pedestrian signs on intersection should be relocated to a type B crosswalk, and new signages with higher contrast and flashing beacon should be installed.
- Current crosswalk markings should be re-marked as per specifications.

II. Adding Essentials

- There is enough space to add a new 1.8 m wide sidewalk, with curbs and 1.2 m green buffer from the street.
- Curb ramps should be a new construction, following the surface and slope requirements, also adapting to the context.
- Location of mid-block crosswalk indicated in the map is tentative, and can be changed based on the context and need of the community. More than one mid-block crosswalk is not recommended for this segment.
- The crosswalk markings and pedestrian landings should adapt to the context.
- All crosswalk signals should follow the assigned signal typology.
- All streetlights should be LED, mounted on a 6m tall pole and at maximum 18m apart.

III. Adding Supplementary

- New rest areas should be strategically placed next to intersections or crosswalks, where they can be used as bus stops in future.

I. Upgrading Existing

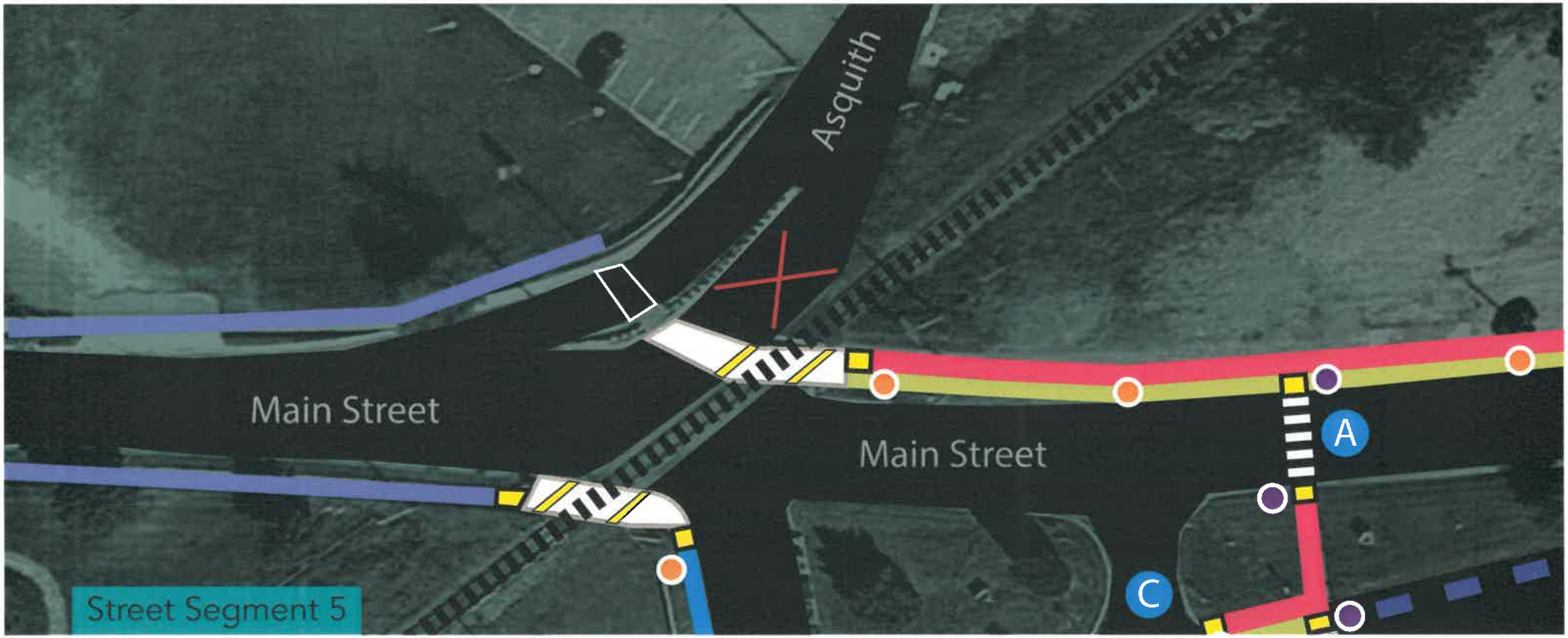
- Existing sidewalk needs regular maintenance, and if possible widening from current 1.5m to prescribed 1.8 m.
- Curbs must be replaced wherever signs of wear are showing.
- Existing street lights follow the height and distance requirements, but will have to be switched to LED.

II. Adding Essentials

- Curb ramps should be a new construction, following the surface and slope requirements, also adapting to the context.
- Location of mid-block crosswalk indicated in the map facilitates the connection of daycare to the park, and is also halfway between Riverside intersection and Dunrovin intersection.
- The crosswalk markings and pedestrian landings should adapt to the context.
- All crosswalk signals should follow the assigned signal typology - A or B.
- All streetlights should be LED, mounted on a 6m tall pole and at maximum 18m apart.

III. Adding Supplementary

- New rest areas in downtown should be abundantly placed for community and also strategically placed next to intersections or crosswalks, where they can be used as bus stops in future.



I. Upgrading Existing

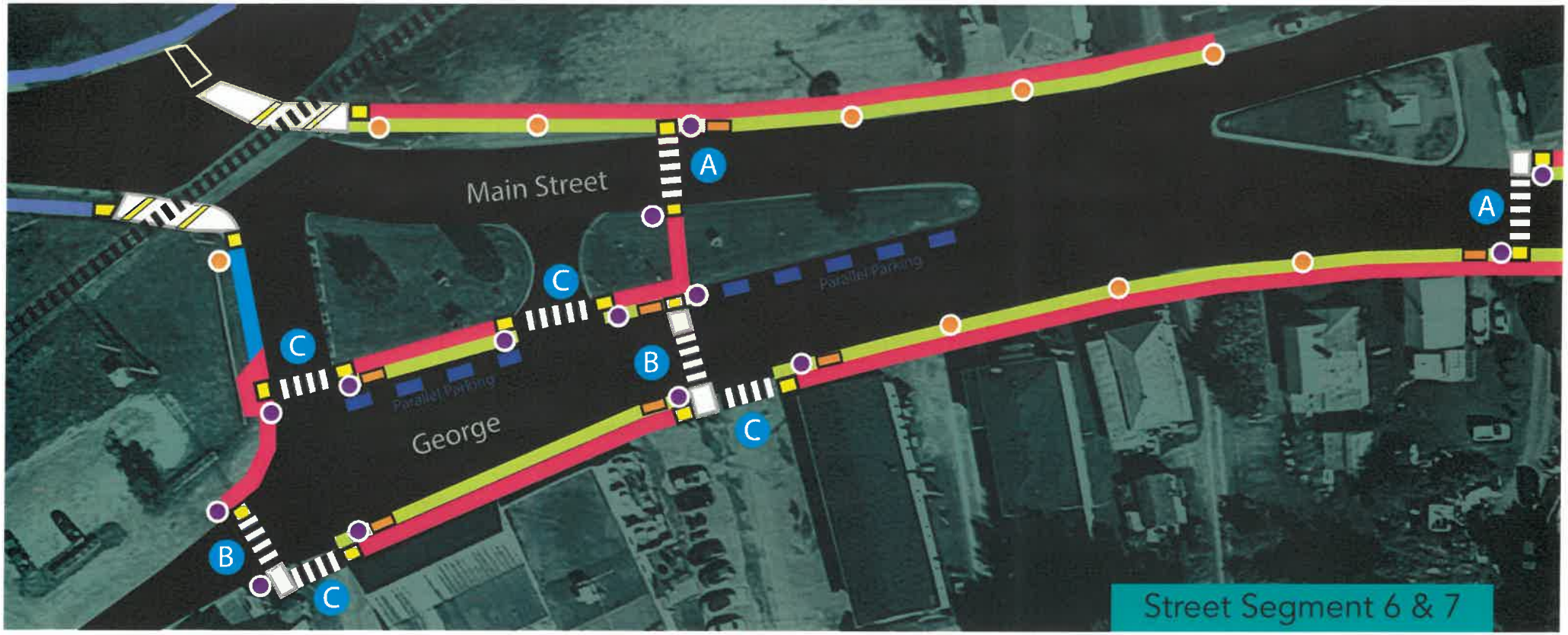
- Existing asphalt surface for grade crossing should be resurfaced with concrete, following the Transport Canada regulations. The crossing can be painted to highlight, and should have tactile plates installed on both sides of the track.
- Direct vehicular access from Asquith road to grade crossing creates an unecessary distraction for pedestrians. Closing of road access should be confirmed through a detailed traffic flow study.

II. Adding Essentials

- Curb ramps should be a new construction, following the surface and slope requirements, also adapting to the context.
- If possible, the ramps should be placed at least 3m away from the tracks, with clear landing before the tactile plates placed close to the track.
- The width of the crossing should be at minimum 0.5 m wider than the sidewalk width.

III. Adding Supplementary

- No street furniture should be placed in direct vicinity of the tracks and crossing, giving as much clear space as possible.
- There should be no other signages near the crossing, other than the required signages by Transport Canada.



I. Upgrading Existing

- Existing sidewalk near tracks needs resurfacing and levelling. If possible widening from current 1.5m to prescribed 1.8 m.
- Curbs must be replaced wherever signs of wear are showing.
- Existing pedestrian crosswalk on Main Street needs to be upgraded to flashing beacon typology.
- Current crosswalk markings are narrow should be re-marked as per specifications.

II. Adding Essentials

- There is enough space to add a new 1.8 m wide sidewalk, with curbs and 1.5 m green buffer from the street.
- Curb ramps should be a new construction, following specifications.
- The crosswalk markings and pedestrian landings are shown as per the existing car-oriented street network. However, it is recommended that the traffic flow and street network of this segment should be studied to allow pedestrian friendly traffic flow before implementing crosswalk design.
- The parklet in the middle of two segments can be used for placemaking, if streets and traffic flow is re-organised. Further study is recommended, refer to Appendix E.
- George street is narrowed for ease of crossing by adding sidewalk, green buffer, and parallel parking space.
- Large pedestrian landings on cross-junction act as comfortable waiting area for pedestrians.

III. Adding Supplementary

- New rest areas should be strategically placed to benefit the local businesses.

I. Upgrading Existing

- Existing sidewalk is uneven, cracked, slanting and narrow. A new sidewalk is recommended.
- Existing pedestrian flag signal near municipal office should be replaced with a flashing beacon signal.
- Current crosswalk marking near municipal office is not wide enough and should be re-marked as per specifications.
- Existing signages can be used but should be mounted on streelight poles.

II. Adding Essentials

- New sidewalk of 1.8m width should be constructed wherever there is enough space. If possible provide 1 m green buffer from the street, if not then widen the sidewalk to cover the remaining shoulder.
- Sidewalks should be separated from the road using curbs and curb ramps should be a new construction, following the surface and slope requirements, and adapting to the context.
- Raised crosswalks are suggested on Kitchener Street to deliberately slow the slopping down and speeding traffic in the residential and school zone.
- The Kitchener Street is a narrow collector road, therefore traffic calming techniques that further narrow the street should not be used.
- The crosswalk markings and pedestrian landings should adapt to the context.
- All streetlights should be LED, mounted on a 6m tall pole and at maximum 18m apart.

III. Adding Supplementary

- New rest areas should be strategically placed next to intersections or crosswalks, where they can be used as bus stops in future.

I. Upgrading Existing

- Existing sidewalk is slanting and narrow. A new sidewalk is recommended.
- Existing pedestrian flag signal on St Andrews should be replaced with a flashing beacon signal.
- Current crosswalk markings are not wide enough and should be re-marked as per specifications.

II. Adding Essentials

- New sidewalk of 1.8m width should be constructed wherever there is enough space. If possible provide 1 m green buffer from the street, if not then widen the sidewalk to cover the remaining shoulder.
- Sidewalks should be separated from the road using curbs and curb ramps should be a new construction, following the surface and slope requirements, and adapting to the context.
- Raised crosswalks are suggested on Kitchener Street to deliberately slow the sloping down and speeding traffic in the residential and school zone.
- The Kitchener Street is a narrow collector road, therefore traffic calming techniques that further narrow the street should not be used.
- The crosswalk markings and pedestrian landings should adapt to the context.
- All streetlights should be LED, mounted on a 6m tall pole and at maximum 18m apart.

III. Adding Supplementary

- New rest areas should be strategically placed next to intersections or crosswalks, where they can be used as bus stops in future.

Street Segment 10

I. Upgrading Existing

- Existing sidewalk is uneven and narrow. Needs leveling, concrete re-surfacing, and widening from 1 m to 1.8 m.

II. Adding Essentials

- There is enough space to add a new 1.8 m wide sidewalk, with curbs and 1.5 m green buffer from the street.
- Sidewalks should be separated from the road using curbs and curb ramps should be a new construction, following the surface and slope requirements, and adapting to the context.
- Raised crosswalks are suggested on Kitchener Street to deliberately slow the slopping down and speeding traffic in the residential and school zone.
- The Kitchener Street is a narrow collector road, therefore traffic calming techniques that further narrow the street should not be used.
- The crosswalk markings and pedestrian landings should adapt to the context.
- All streetlights should be LED, mounted on a 6m tall pole and at maximum 18m apart.

III. Adding Supplementary

- New rest areas should be strategically placed next to intersections or crosswalks, where they can be used as bus stops in future.

I. Upgrading Existing

- Existing sidewalk is uneven and narrow. Needs leveling, concrete re-surfacing, and widening from 1.2m to 1.8 m.
- Existing crosswalk at Matthews is at an oblique angle to the road, needs to be corrected and re-marked as per specifications.
- Existing flag post signal can be relocated, and a new flashing beacon signal should be installed.

II. Adding Essentials

- There is enough space to add a new 1.8 m wide sidewalk, with curbs and 1.5 m green buffer from the street.
- Sidewalks should be separated from the road using curbs and curb ramps should be a new construction, following specifications.
- Raised crosswalks are suggested on Kitchener Street for traffic calming.
- All streetlights should be LED, mounted on a 6m tall pole and at maximum 18m apart.

III. Adding Supplementary

- New rest areas should be strategically placed next to intersections or crosswalks, where they can be used as bus stops in future.

I. Upgrading Existing

- Existing sidewalk is in good shape, if possible can be widened from current 1.5m to prescribed 1.8m.
- Existing crosswalk at road to school has faded and needs to be repainted.
- Existing street buffer can be used to place streetlight poles.

II. Adding Essentials

- There is enough space to add a new 1.8 m wide sidewalk, with curbs and 1.5 m green buffer from the street.
- Sidewalks should be separated from the road using curbs and curb ramps should be a new construction, following specifications.
- Raised crosswalks are suggested on Kitchener Street for traffic calming.
- All streetlights should be LED, mounted on a 6m tall pole and at maximum 18m apart.
- Two mid-block crosswalks are needed, but further cosultation with the school and community is needed to pick the right locations.

III. Adding Supplementary

- New rest areas should be strategically placed next to intersections or crosswalks, where they can be used as bus stops in future.

Broader Recommendations

Recommendation B1
Town should remain in charge of snow clearance for all public sidewalks. Snow clearance by-law should be established, with details on street priority, tentative time taken for clearance, a reliable mode for public to report issues, introducing tickets for throwing snow from private property to public sidewalks.

Recommendation B2
Town should establish speed limits in all its zones. Wherever possible, speed limit should not be more than 50 km/h, and should not be more than 30 km/h in heavily pedestrianised areas - near town hall, downtown, and school zone.

Recommendation B3
Town should place speed limit signages wherever major intersections are, and where speed limit changes. To ensure speed limit is being followed, special in 30km/h speed limit zones, driver's feedback signal should be installed. Vehicles must be ticketed for not following the speed limit.

Recommendation B4
Town should place slow down signages closer to intersections or mid-block crossings. Signages aimed at provoking concerned response from drivers should be installed wherever deemed fit. For example - "Go Slow We Love Our Students" or "Stewiacke Prioritises Walkability, Go Slow" or "Thank you for slowing down".

Recommendation B5
Town should consult public before finalising any interventions on crosswalks. Placing of crosswalks and comfort of pedestrians with using flags or flashing beacons should be taken into account.

Recommendation B6
Town should encourage community to be part of the project, by actively seeking their opinion, and by helping establish a dedicated community group for walkability and accessibility. Existing community groups (Appendix F) can be consulted for initiation, and fundings to run the group can be discussed with local investors.

Recommendation B7
Town should engage students in the project. Safe Routes to School is a program in the US for safe and walkable sidewalks for children on their way to school. The program can be reffered to for innovative engagement ideas, like scavenger hunt, drawing competitions, story narration on walk to school, etc.

Recommendation B8
Town should establish a sidewalk management system, and encourage residents to report trip hazards in their daily walk experiences. A private service provider can be hired to set up the management system. Safesidewalks Canada is a company that specialises in setting up sidewalk management system.

Recommendation B9
Town should initiate a traffic flow study on two of the identified uncomfortable intersections for pedestrians. First being the Asquith street turning to the grade crossing, second being the cross junction of Main Street, George Street, and Kitchener Street. The study might result in reorienting of street network, which would alter the sidewalk network and other pedestrian infrastructure.

Recommendation B10
Town should conduct a study for future land use, which would affect the pedestrian flow, and some areas would need better infrastructure than what is recommended in this report.

Recommendation B11
Town should secure federal and provincial fundings listed in the report for different parts of the project. Other funding opportunities might roll out in near future, the committee should keep a close lookout.

Recommendation B12
Town should regularly check for weeping trees or branches, as they can obstruct the sidewalks, and more so for physically disabled.

Recommendation B13
Town should not consider using 1.8 m sidewalk as a shared pathway, as the prescribed width is at least 3m. Refer to Appendix C for details on shared pathway usage.

Recommendation B14
Town should consider approaching local groups to sponsor different street furnitures or memorial benches. A list of existing local groups can be found in Appendix F.

Downtown View on George Street

View near Mastadon Ridge on Main Street

Project Costing

$ 2,856,990	Hard Costs
$ 142,850	Soft Costs (5%)
$ 2,999,840	Project Cost

Element-wise costing

Sidewalk Renovation
$66,025 - 1,227m long @ $54/m

New Sidewalks
$1,878,784 - 2,864m long @ $656/m

Curb Ramp New
$56,700 - 63 ramps @ $900/each

Raised Crosswalk
$62,300 - 7 crosswalks @ $8,900/each

Crosswalk Marking
$48,000 - 48 crosswalks @ $1,000/each

Tactile Plates
$2,430 - 81 plates @ $30/each

LED Streetlighting
$24,900 - 249 streetlights @ $1,000/each

Rest Areas Platform
$20,000 - 40 rest areas @ $500/each

Benches
$12,000 - 40 benches @ $300/each

Flashing Beacon
$268,600 - 34 beacons @ $7,900/each

Hybrid Beacon
$85,760 - 4 beacons @ $21,400/each

Receptacles
$15,600 - 40 bins @ $390/each

Flag Posts
$750 - 30 posts @ $25/each (4 flags)

Pedestrian Signage
$41,040 - 152 signages @ $270/each

Pedestrian Landing
$32,400 - 27 landings @ $1,200/each

Planter Boxes
$17,600 - 44 planters @ $400/each

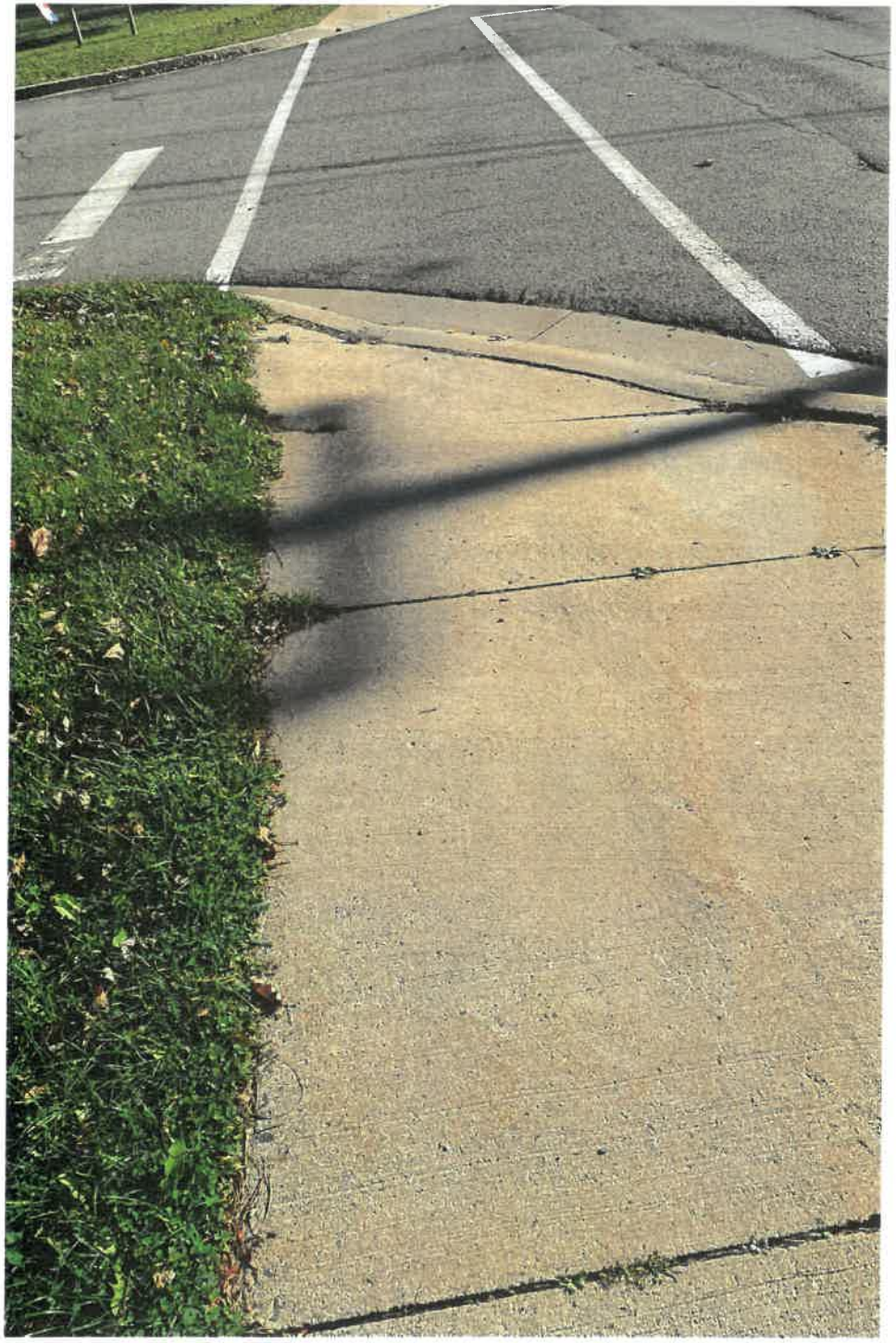
Phase 1
Upgrading Exisiting
$ 114,775

Phase 2
Adding Essential
$ 2,267,094

Phase 3
Adding Supplementary
$ 299,020

Note:

Consider this costing as a rough estimation of project expenditure. Installation charges are not considered, which can significantly increase the project's budget. Some costs are taken from US vendors, and actual costs may vary. Refer to Appendix A for segment-wise breakdown of cost for each element, and refer to Appendix B for cost source table.



Conclusion

The Walk and Wheel project was initiated to inform tangible actions to improve the pedestrian infrastructure of the Town of Stewiacke. The project was premised in the aspirations of the Town to achieve three objectives - Walkability, Accessibility, and Safety. These objectives acted as pillars in selecting criteria for analysis, performing site observations, outlining best practices and funding resources, suggesting interventions and, finally, in giving recommendations.

The recommendations appearing in this report were made in agreement with the Walk and Wheel Steering Committee and offer options to improve the walk-and-wheelability of Stewiacke in the form of design interventions, community initiatives, and policy considerations. The content of this report can assist the Town when applying to funding sources outlined herein, and adds momentum for Stewiacke to be more active, inclusive, and pedestrian-friendly.

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Appendix A: Project Cost Breakdown

Sidewalk Renovation

Segment	Length	Price	Total
S1	57		
S2	400		
S3	0		
S4	0		
S5	0		
S6	0		
S7	20		
S8	0		
S9	0		
S10	260		
S11	490		
S12	0		
	1227	53.81	66,025

Sidewalk New

Segment	Length	Price	Total
S1	254		
S2	400		
S3	180		
S4	0		
S5	0		
S6	100		
S7	250		
S8	200		
S9	320		
S10	250		
S11	480		
S12	430		
	2864	656	1,878,784

Curb Ramp New

Segment	Number	Price	Total
S1	11		
S2	6		
S3	8		
S4	6		
S5	3		
S6	4		
S7	11		
S8	2		
S9	4		
S10	2		
S11	2		
S12	4		
	63	900	56,700

Raised Crosswalk

Segment	Number	Price	Total
S1	0		
S2	0		
S3	0		
S4	0		
S5	0		
S6	0		
S7	0		
S8	1		
S9	1		
S10	1		
S11	3		
S12	1		
	7	8,900.00	62,300

Crosswalk Marking

Segment	Number	Price	Total
S1	8		
S2	6		
S3	5		
S4	3		
S5	0		
S6	3		
S7	9		
S8	2		
S9	3		
S10	2		
S11	4		
S12	3		
	48	1000	48,000

Tactile Plates

Segment	Number	Price	Total
S1	11		
S2	6		
S3	8		
S4	6		
S5	7		
S6	4		
S7	11		
S8	4		
S9	6		
S10	4		
S11	8		
S12	6		
	81	30	2,430

Lighting			
Segment	Number	Price	Total
S1	21		
S2	40		
S3	24		
S4	8		
S5	0		
S6	10		
S7	22		
S8	11		
S9	17		
S10	23		
S11	40		
S12	33		
	249	1000	249,000

Rest Areas Platform			
Segment	Number	Price	Total
S1	4		
S2	6		
S3	6		
S4	6		
S5	0		
S6	2		
S7	6		
S8	2		
S9	2		
S10	1		
S11	3		
S12	2		
	40	500	20,000

Benches			
Segment	Number	Price	Total
S1	4		
S2	6		
S3	6		
S4	6		
S5	0		
S6	2		
S7	6		
S8	2		
S9	2		
S10	1		
S11	3		
S12	2		
	40	300	12,000

Flashing Beacon			
Segment	Number	Price	Total
S1	4		
S2	4		
S3	6		
S4	2		
S5	0		
S6	2		
S7	2		
S8	2		
S9	2		
S10	2		
S11	6		
S12	2		
	34	7,900	268,600

Hybrid Beacon Crossing			
Segment	Number	Price	Total
S1	0		
S2	4		
S3	0		
S4	0		
S5	0		
S6	0		
S7	0		
S8	0		
S9	0		
S10	0		
S11	0		
S12	0		
	4	21,440	85,760

Receptacles			
Segment	Number	Price	Total
S1	4		
S2	6		
S3	6		
S4	6		
S5	0		
S6	2		
S7	6		
S8	2		
S9	2		
S10	1		
S11	3		
S12	2		
	40	390	15,600

Flag Posts			
Segment	Number	Price	Total
S1	4		
S2	0		
S3	4		
S4	4		
S5	0		
S6	0		
S7	4		
S8	2		
S9	4		
S10	2		
S11	2		
S12	4		
	30	25	750

Pedestrian Signage			
Segment	Number	Price	Total
S1	22		
S2	16		
S3	18		
S4	10		
S5	0		
S6	8		
S7	28		
S8	6		
S9	10		
S10	6		
S11	16		
S12	12		
	152	270	41,040

Pedestrian Landing			
Segment	Number	Price	Total
S1	5		
S2	4		
S3	4		
S4	1		
S5	4		
S6	3		
S7	6		
S8	0		
S9	0		
S10	0		
S11	0		
S12	0		
	27	1,200	32,400

Planter Boxes			
Segment	Number	Price	Total
S1	11		
S2	33		
S3	0		
S4	0		
S5	0		
S6	0		
S7	0		
S8	0		
S9	0		
S10	0		
S11	0		
S12	0		
	44	400	17,600

Appendix B: Cost Sources

Item	Price	Source	Weblink
100W LED Motion Sensor Shoebox light	238	LED Light Expert, USA	https://www.ledlightexpert.com/100-Watt-Motion-Sensor-LED-NextGen-III-Parking-Lot-Lights--
100 LED Shoebox Light	298	Arani, Canada	https://www.arani.ca/en_ca/hybrid-led-shoebox-
100W lighting Rental	12.61/ month	NS Power	https://www.nspower.ca/your-home/energy-
Street Light	3,600	PedBikeInfo	https://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf
Armor Tile - Cast in Place	17.95/ sq ft	Recommended by Adaptability Canada	https://adaptabilitycanada.com/lb/files/1425333401-
Armor Tile - Surface in Place	17.95/ sq ft Quantity per box: 8 and 4 depending on size	Recommended by Adaptability Canada	https://adaptabilitycanada.com/lb/files/1425333401-
Stripped Crosswalk	950	SRTS recommended	http://guide.saferoutesinfo.org/engineering/marke
	340	PedBikeInfo	https://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf
High Visibility Crosswalk	3000	SRTS recommended	http://guide.saferoutesinfo.org/engineering/marke
		PedBikeInfo	https://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf

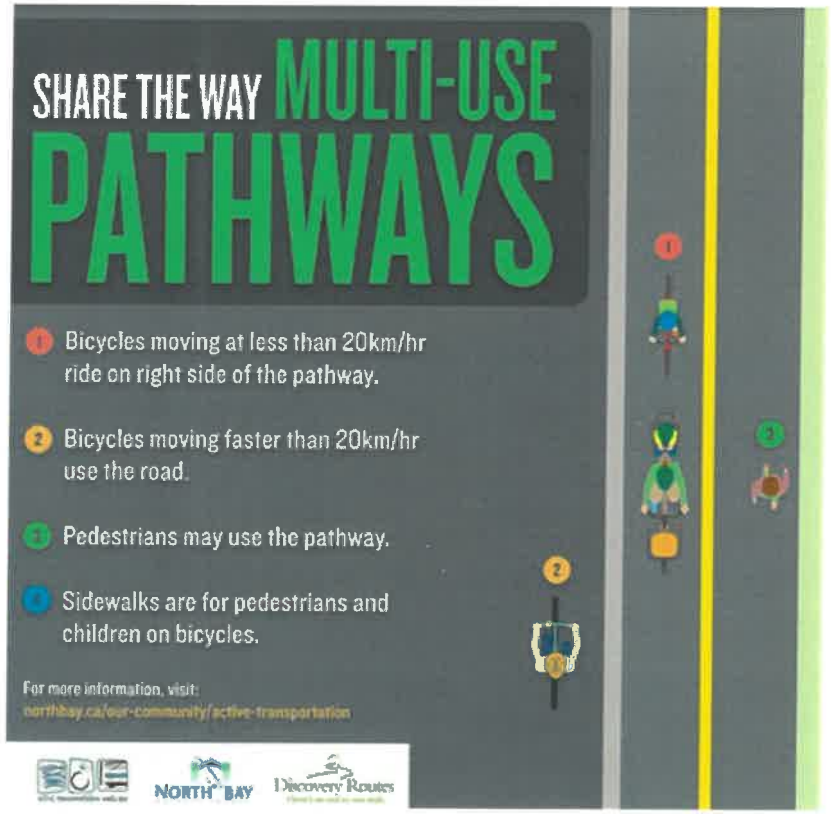
Item	Price	Source	Weblink
Island for crosswalk	13,200/ unit	PedBikeInfo	https://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf
Raised Crosswalk	8,900/ each	PedBikeInfo	https://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf
Raised Intersection	75,000/ each	PedBikeInfo	https://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf
Bollard	800/ each	PedBikeInfo	https://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf
Curb Ramp	900/ each	PedBikeInfo	https://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf
Bench	300/ each	PedBikeInfo The Park catalogue	https://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf https://www.theparkcatalog.com/benches?price=-
Receptacle	390/ each	PedBikeInfo	https://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf
Concrete sidewalk + Curb	200/ linear foot	PedBikeInfo	https://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf
Curb	22/ linear foot	PedBikeInfo	https://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf

Item	Price	Source	Weblink
Asphalt Paved Shoulder	7/ sq ft	PedBikeInfo	https://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf
Concrete paved shoulder	8/ sq ft	PedBikeInfo	https://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf
Resurfacing Concrete	5/ sq ft	Home Advisor	https://www.homeadvisor.com/cost/outdoor-
Solar Powered LED Pedestrian Crossing Sign	2,299	Seton	https://www.seton.ca/solar-powered-led-signs-pedestrian-crossing-sign-23956d.html
Push Button Pedestrian Crossing Sign	7,915	Seton	https://www.seton.ca/push-button-led-pedestrian-crossing-signs-me4573.html?utm_campaign=PC-03-Traffic%26ParkingSigns_CatchAllSmartShopping_Seton_PLA_NB_NC_Google_CA&utm_source=google&utm_medium=cpc&utm_term=&matchtype=&device=c&adgroupid=Catch+All+-+New+Hierarchy&gclid=Cj0KCQjw29CRBhCUARIsAOboZbLI2BentkbejYAxwHeAuqjLIPHCfH2rgG75t8dxqVtNKzT_eX4kQT0aApwvEALw_wcB&gclsrc=aw.ds#22440D
Flashing Beacon	6,500	PedBikeInfo	https://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf
RRFB	17,850	PedBikeInfo	https://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf

Note on Shared Pathways

Paved multi-use or shared pathways often appear in rural areas in place of pedestrian sidewalks due to their potential to serve multiple modes of active transportation, such as cycling, roller-skating, skateboarding, etc., in addition to pedestrian movement, using a similar infrastructure footprint. However, vulnerable users are often disadvantaged by this approach, particularly older adults and persons with mobility limitations (Ottoni, Sims-Gould, & Winters, 2021). Feelings of safety are often lessened by a heighted fear of collisions with cyclists and others travelling at increased speeds, which can be a hazardous encounter for both parties (Kang & Fricker, 2016).

Users who experience visual impairment express similar concerns, worsened by the silent approach of many wheeled users (Liu et al., 2018). Some design practices can address the concerns of vulnerable pedestrians and reduce the likelihood of conflicts. These include, but are not limited to, widening the paved surface to enable safe two-way travel – the Transportation Association of Canada recommends a minimum of 3 m in width, and up to 6 m for multi-use paths (TAC, 2017), installing frequent benches, plantings, and other fixed barriers to encourage slower speeds by cyclists (Kang & Fricker, 2016), and tactile surface indicators to guide direction of travel and tactile separators to ensure pedestrians with visual impairment do not cross into the path of oncoming users (City of Toronto, 2015; CNIB, 2019). Overall, dedicated sidewalks prioritise pedestrian safety and walkability, while presenting fewer risks to users than shared infrastructures.



Poster on Multi-Use Pathway by North Bay in Ontario. Sourced from the city's official website.

City of Toronto. (2015). Toronto Multi-Use Trail Design Guidelines. Transportation Services, Parks, Forestry & Recreation.
CNIB. (2019). Clearing Our Path. 4.8.5., Multi-Use Trails. Available at https://www.clearingourpath.ca/4.8.5-multi-use-trails_e.php.
Kang, L., & Fricker, J.D. (2016). Sharing urban sidewalks with bicyclists? An exploratory analysis of pedestrian perceptions and attitudes. Transport Policy, 49, 216-225.
Liu, S., Fitzharris, M., Oxley, J., Edwards, C. (2018, October 15). The impact of electric/hybrid vehicles and bicycles on pedestrians who are blind or have low vision. Vision Australia.
Ottoni, C.A., Sims-Gould, J., & Winters, M. (2021). Safety perceptions of older adults on an urban greenway: Interplay of the social and built environment. Health & Place, 70, 102605.
Transportation Association of Canada (TAC). (2017). Geometric Design Guides for Canadian Roads, Chapter 5 – Bicycle Integrated Design.

Appendix D

Pedestrian Signage Specification (Provincial)

The following signage specifications have been directly retrieved from Section 8, Designations and descriptions of official traffic signs, of Traffic Signs Regulations, NS Reg 165/2012 (Nova Scotia, 2012). Readers are advised to review the latest version of these regulations if and when they are updated.

"School crosswalk" sign (Designation - RA-3L, RA-3R)

- must have a black symbol of a walking schoolboy and schoolgirl on a white background
- must be oriented so that the symbol shows the pedestrians walking toward the centre of the roadway

"Pedestrian crosswalk" sign (Designation - RA-4L, RA-4R)

- must have a black symbol of a pedestrian on a white background
- must be oriented so that the symbol shows the pedestrian walking toward the centre of the roadway

"Overhead pedestrian crosswalk" sign (Designation - RA-5L, RA-5R)

- must have a white symbol of a pedestrian on a black background
- must be mounted above the crosswalk and oriented so that the symbol shows the pedestrian walking toward the centre of the roadway
- must be internally illuminated

RA - 4R
600mm x 750 mm

RA - 3R
600mm x 750 mm

RA - 5R
600mm x 750 mm

Nova Scotia. (2012). "Traffic Signs Regulations made under Section 88 of the Motor Vehicle Act". NS Reg 165/2012. Retrieved from https://canlii.ca/t/55557

Pedestrian Signage Specification (Federal)

The following signage specifications have been directly retrieved from Part A of the Transportation Association of Canada's Manual of Uniform Traffic Control Devices for Canada, Sixth Edition, (TAC, 2020). Readers are advised to review the latest version of these specifications if and when they are updated

WC - 2R
600mm x 600 mm

WC - 16R
600mm x 600 mm

A6.4.1 Pedestrian Crosswalk Sign (RA-4)

The Pedestrian Crosswalk sign is used to indicate the location of a pedestrian crosswalk. The sign is installed on both sides of the road. On two-way roads, two signs are mounted back-to-back on both sides of the road. The right and left version (RA-4R, RA-4L) of the sign is used as appropriate so that the pedestrian symbol on each sign is walking toward the centre of the road.

A6.4.3 Pedestrian Crosswalk Ahead Sign (WC-2)

Where there is limited visibility of the crosswalk area, the Pedestrian Crosswalk Ahead sign (WC-2) must be installed 50 m to 150 m in advance of pedestrian crosswalks.

The Pedestrian Crosswalk Ahead sign may be used in advance of a Special Crosswalk. The pedestrian symbol on the sign must be walking toward the centre of the road. The right version of the sign is installed on the right side of the road. On one-way streets or divided roads, the left version of the sign may also be installed on the left side or in the median, with the pedestrian symbol walking toward the centre of the road.

A6.5.1 School Crosswalk Sign (RA-3)

The School Crosswalk sign is used to indicate the location of a school crosswalk. The sign is installed on both sides of the road. On two-way roads, two signs are mounted back-to-back on both sides of the road. The right and left version (RA-3R, RA-3L) of the sign is used as appropriate so that the pedestrian symbol on each sign is walking toward the centre of the road.

A6.5.2 School Crosswalk Ahead Sign (WC-16)

The School Crosswalk Ahead sign may be used in advance of a school crossing except where the School Area sign (WC-1) is in place. The right or left version (WC-16R, WC-16L) is used as appropriate so that the pedestrian symbol on each sign is walking toward the centre of the road.

TAC. (2020). "Manual of Uniform Traffic Control Devices for Canada". Sixth Edition. Retrieved from https://www.tac-atc.ca/sites/default/files/site/doc/publications/MUTCDC5/ptm-mutcdc14-e-sectiona6-2020updates.pdf

A6.6.1 Special Crosswalk Overhead Sign (RA-5)

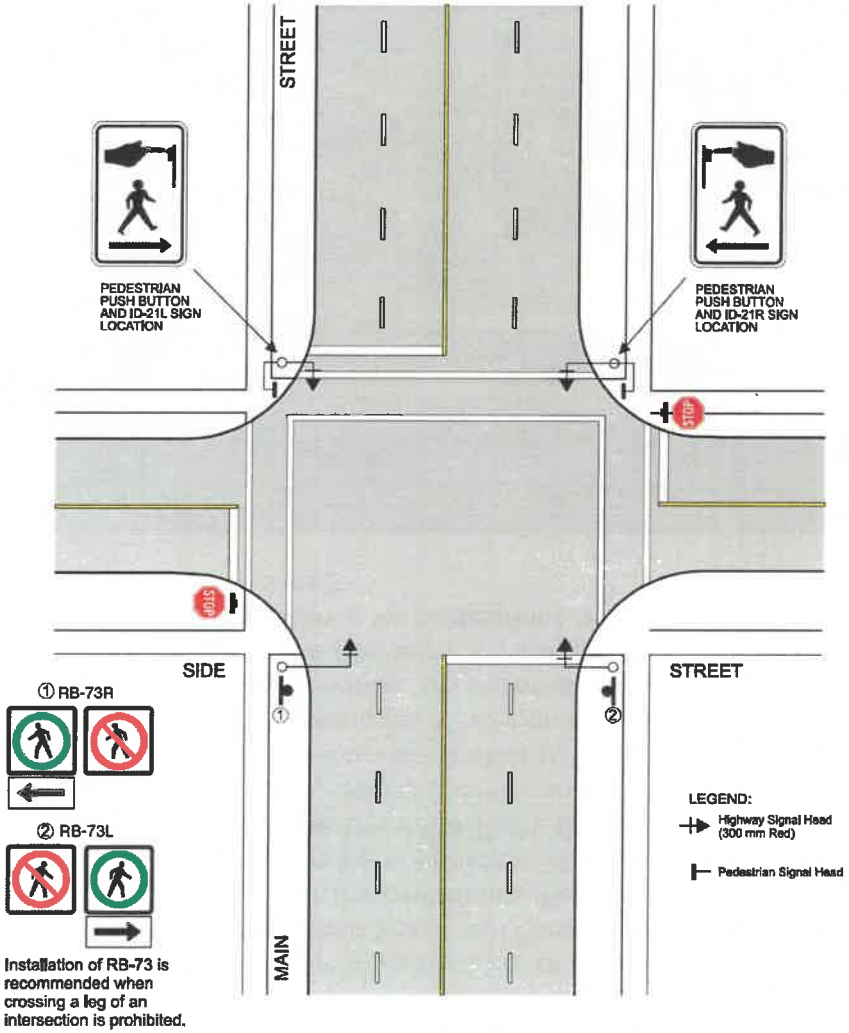
The overhead sign (RA- 5) indicates the location of a Special Crosswalk. The sign must be installed over the road. The Special Crosswalk installation must include the following features:

- The right and left version is used as appropriate so that the pedestrian symbol on each sign is walking toward the centre of the road.
- For each approach, an overhead sign (RA-5) is placed over both sides of the road so that the driver will face two signs.
- The two overhead signs must each be equipped with a pedestrian-activated flashing amber beacon.
- The overhead signs (RA-5) must be internally-illuminated.
- From each overhead sign, there must be downlighting on the crosswalk area. Each overhead sign must be offset from the crosswalk area, so that the pedestrian is fully illuminated for the approaching driver.
- The overhead signs must be suspended at a height of not less than 5.1 m or more than 6.0 m from the pavement to the bottom of the sign.

TAC. (2020). "Manual of Uniform Traffic Control Devices for Canada". Sixth Edition. Retrieved from https://www.tac-atc.ca/sites/default/files/site/doc/publications/MUTCDC5/ptm-mutcdc14-e-sectiona6-2020updates.pdf

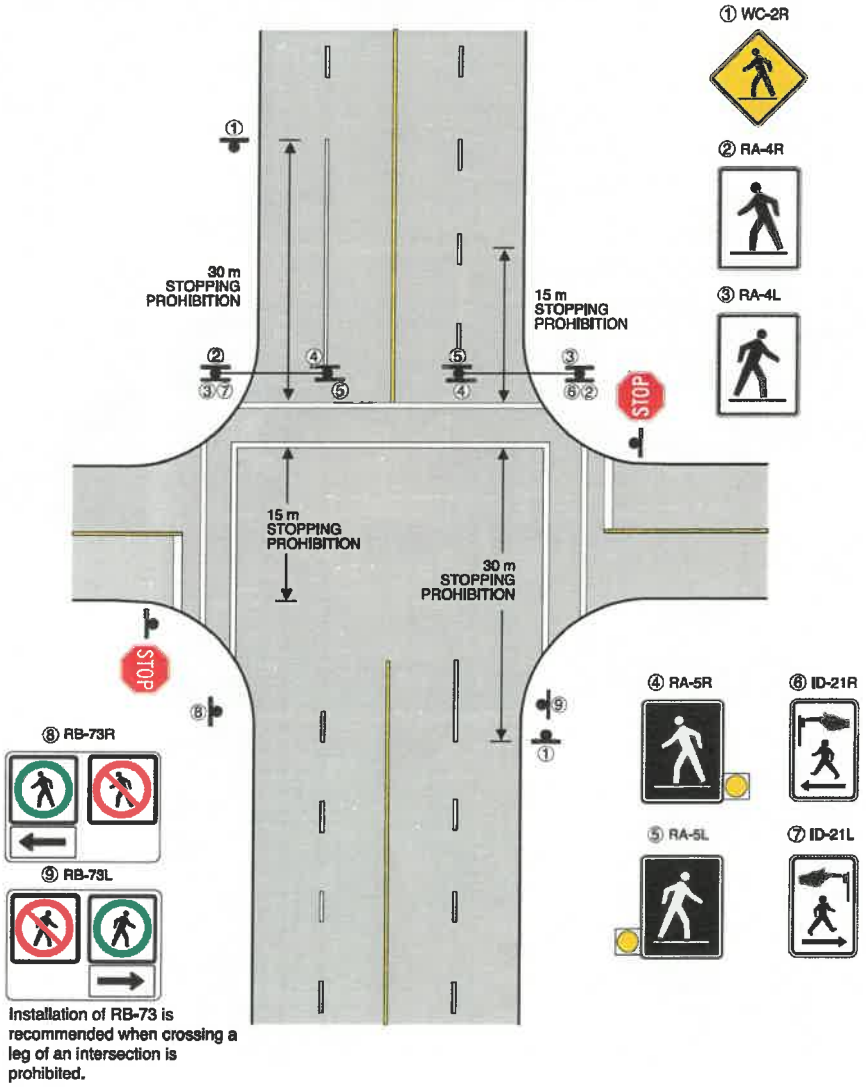
TYPICAL PEDESTRIAN SIGNAL INSTALLATION

FAR SIDE HEADS



If pedestrian crossing demands warrant a crosswalk, a pedestrian signal may be added on the other side of the intersection.

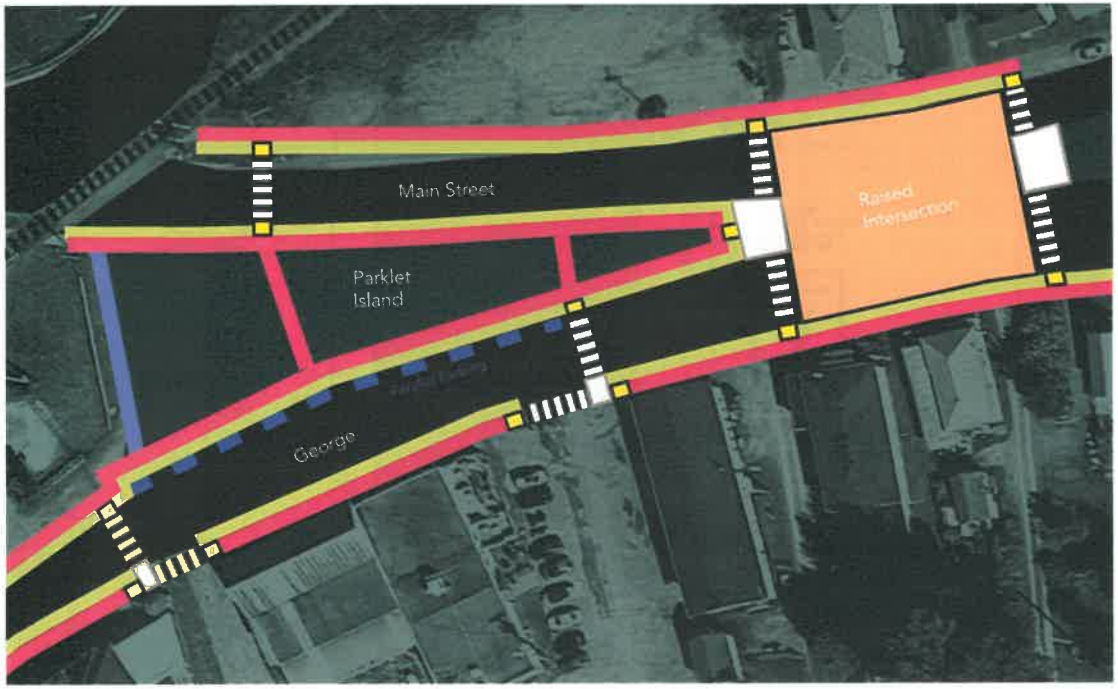
TYPICAL SPECIAL CROSSWALK INSTALLATION



Appendix E

Placemaking Option for Downtown

While analysing the pedestrian infrastructure for downtown, it was observed that green islands between Main Street and George Street have the potential of becoming an active space for the community. Placemaking is an act of creating informal spaces to strengthen the connection between people and the places they share. Being located in the centre of the Town, the unified green island can also host small community events. George Street can also be closed during the events to create a continuous space from the parklet to the commercial stores on the other side of George street. Few examples of how green spaces next to a street can add to the whole walkability experience, are shown on the right. The map below shows how blocking off existing one way turns to create a single unified parklet would lead to safer walking experience for pedestrians as the points of conflict with traffic (crosswalks) would be reduced.



Appendix F

List of established local groups in Stewiacke

Following is a list of community groups and organizations in Stewiacke that are established and can be included in later stages of this project.

- Mastodon Ridge Properties
- Coldstream Clear Distillery
- Stewiacke Fisherman's Association
- Big River Café
- Maggie's Place
- Winding River Early Learning Daycare Centre
- Smiles and Chuckles Daycare Centre
- Colchester-East Hants Library - Stewiacke Branch
- Winding River School Parent Advisory Group
- Winding River Consolidated School
- Fox Hollow Golf Club
- Stewiacke Fire Department
- Stewiacke Garden Club
- Stewiacke Barking Lot Association
- Stewiacke Minor Baseball Association
- Stewiacke Paint Club
- Nelson House Bed and Breakfast

The list is not exhaustive. Other regional organizations in the Colchester- East Hants area, in which the community members are active, including but not limited to sport, recreation and community groups, can also be reached out to.