



BICYCLE ACTION COMMITTEE

Cobourg Cycling Infrastructure COMPLETION PROPOSAL



Cycle Track, Highway 7, Markham, Ontario

(June, 2021)

The Big Picture

Role of Active Transportation in the Town of Cobourg

Given current climatic and environmental conditions, and that the Town of Cobourg has declared a climate emergency, there must be modal shift – from driving private cars to walking, cycling and using public transportation.

Rationale for improved walking and cycling infrastructure:

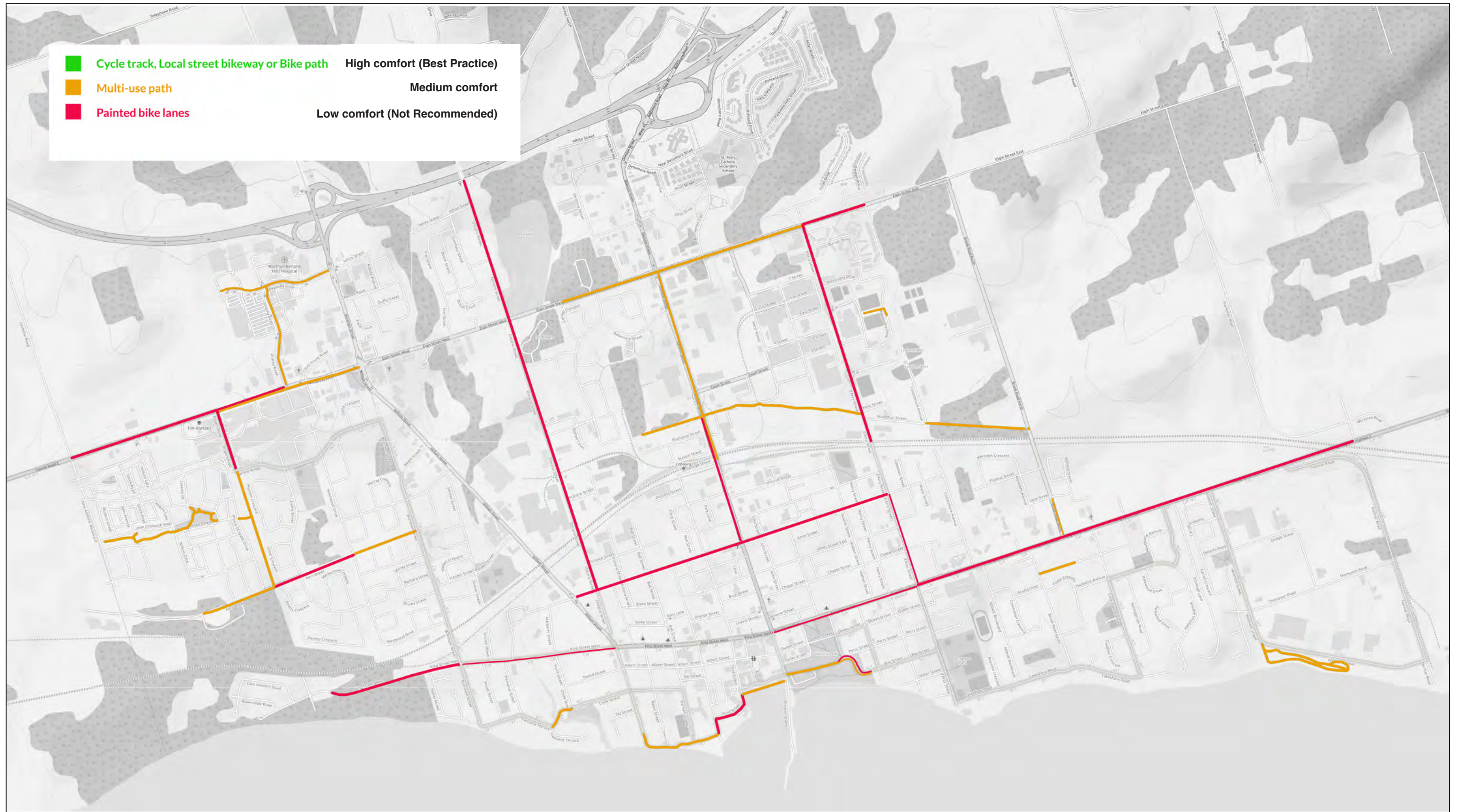
1. Reduces greenhouse gases and pollution—mitigates climate change
2. Promotes physical fitness and mental health and well-being—reducing the financial burden on the health care system
3. Along with public transportation, provides an efficient use of space and resources

Cobourg is of ideal geographic size and location for cycling:

- It is possible to cycle anywhere in the Town relatively quickly
- Terrain is flat with attractive physical surroundings
- Climate is mild. An increasing number of people cycle year-round
- Town government and staff are positive about developing Active Transportation. Over the last ten years some improvements have been made to infrastructure, cycling facilities and education. As a result, the number of cyclists has increased – most noticeably during the pandemic
- The Town advertises itself and has officially been recognized by **Share The Road Coalition** as a *Bicycle Friendly Community*

“Higher comfort” cycling and pedestrian routes will encourage cycling and walking within the Town.

EXISTING Cycling Network in the Town of Cobourg



Classification of Current Infrastructure in the Town of Cobourg

We used **The Canadian Bikeway Comfort and Safety (CAN-BICS) Classification System**¹ to assess Cobourg's Active Transportation routes. The CAN-BICS team researched and evaluated the safety performance and user comfort of different types of infrastructure. There are 3 levels to the classification system:

- **High-comfort- HC:** low-stress, seen as safe routes by most people. These bikeways include cycle tracks on major streets, local street bikeways and cycle-only off-street paths;
- **Medium-comfort- MC:** low-to-medium stress. When shared with pedestrians these routes are seen as safe by some people. These bikeways include multi-use paths sited next to a roadway or along independent corridors.
- **Low-comfort - LC:** high-stress routes, seen as safe by only a few people. These bikeways include painted bike lanes along busy roadways.

Infrastructure type: (ordered according to Safety/Comfort level):

(CT) Cycle Track: A roadway lane exclusively for cyclists and physically separated from both motor vehicles and the sidewalk. Separation from motor vehicle traffic must include a vertical barrier (e.g. a raised median, bollards, box planters or trees and landscaping). Separation from the sidewalk may include street furniture, a curb or landscaped buffer. Facility may be at the level of the roadway or the sidewalk or between the two. **Cobourg has no Cycle Tracks**

(LSB) Local Street Bikeway: A local street (no centre line or lanes) where cyclists share the roadway with motor vehicles. Traffic-calming elements limit motor vehicle speeds and volumes and inhibit their through travel. Bicycle priority measures facilitate cyclists' safe crossing of streets and limit stops and delays. The facility includes measures to improve cyclist comfort: smooth surfaces; street lighting; way-finding signage and pavement markings; consistent paving material and colour. **Cobourg has no Local Street Bikeways.**

¹ See Appendix 2: "The Canadian Bikeway Comfort and Safety (CAN-BICS) Classification System: a common naming convention for cycling infrastructure." Public Health Agency of Canada, September 2020.

(BP) Bike Path: An off-road paved path exclusively for cyclists located along independent corridors away from a road. May be one-way or two-way with a centre line. Often adjacent to a walking path and separated by a painted line, curb or landscaped buffer. **Cobourg has no Bike Paths.**

(MUP) Multi-use path: A two-way paved path shared by cyclists, pedestrians and other users (e.g. skateboarders and rollerbladers). May be located along independent corridors away from a road or next to a roadway and physically segregated from motor vehicles (replacing a sidewalk).

(BL) Painted Bike Lane: A painted lane along a busy roadway that is designated by bicycle and diamond pavement markings and signs as exclusively for cyclists. The lane is positioned between a vehicle travel lane and the curb. It may be buffered with diagonal or chevron hatching. It includes:

- advisory bike lanes (marked by broken lane lines) on the edge of roadways too narrow to provide exclusive cycling and driving space
- sharrows
- bicycle accessible paved shoulders (indicated by an edge line and bike route signs or stencil markings) on roads without a curb

(STR) Share the Road: Sign on a pole, occasional sharrows.

Observations and Analysis of Current Network

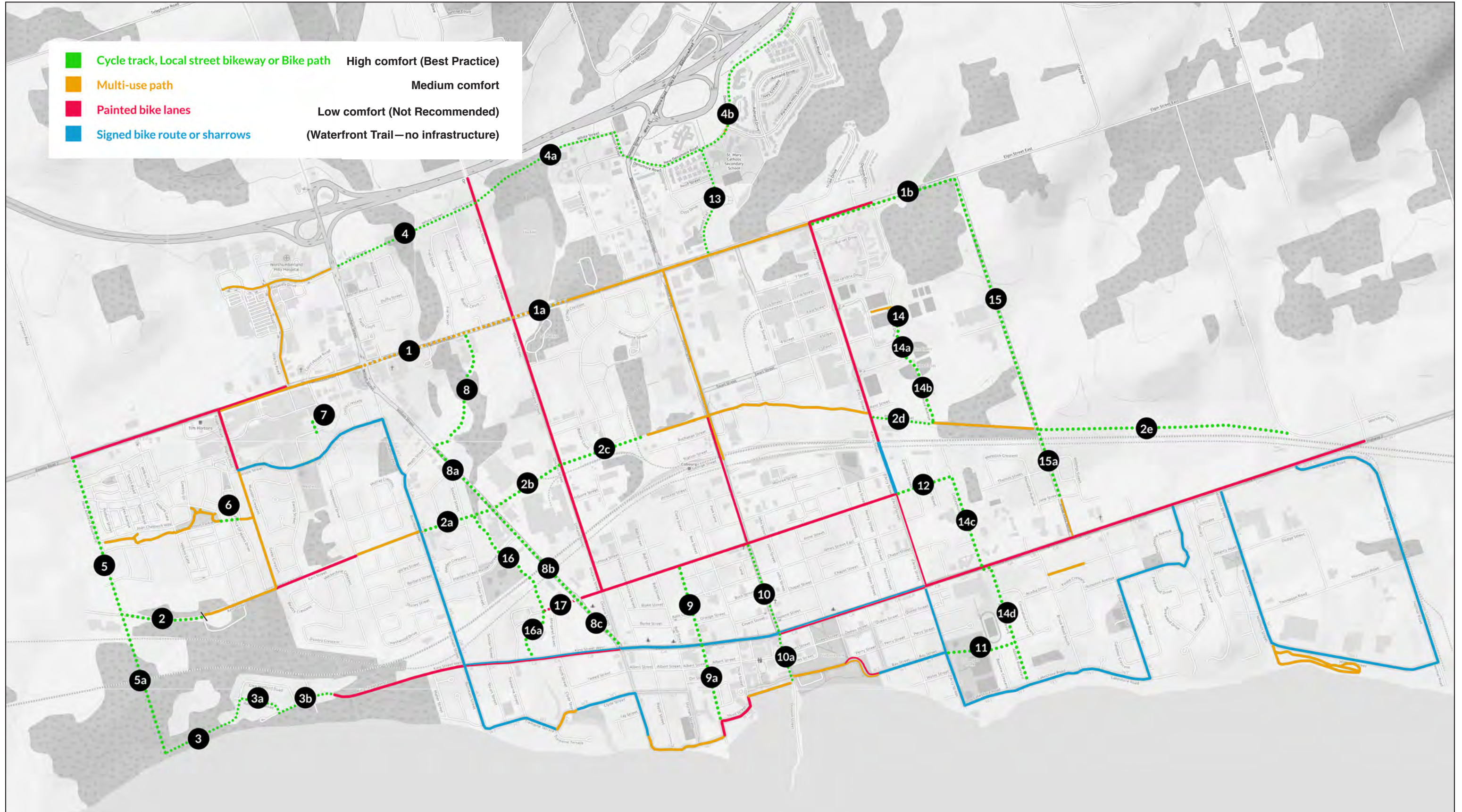
1. There are no complete east-west cycling routes in Cobourg that conform to the CANBICS standards for safety performance at **Medium Comfort/High Comfort (MC/HC)** levels. While several routes have sections with **Multi Use Paths (MUPs) (MC)**, cyclists are required to complete journeys on infrastructure that is either **Low Comfort (LC)** or non-existent.
2. There are no complete north-south cycling routes in Cobourg that conform to CANBICS standards for safety performance at **MC/HC** levels. Only two routes have sections with MUPs. Cyclists are required to complete journeys on infrastructure that is **Low Comfort** or non-existent.
3. Most of Cobourg's infrastructure can be classified as **Low Comfort**. It is generally perceived as unsafe.
4. There are many gaps in the network. Way-finding signage and road markings are absent, as are lanes or paths for transitions between gaps.
5. It is generally assumed that cycling infrastructure should be designed to accommodate accessibility travel/use. Most of the current network does not meet meet this criterion.
6. A checkered history of **safe** infrastructure construction:
 - The section of Elgin Street between Division and St. Peter's Cemetery, built over 20 years ago, separates pedestrians from cyclists and from motorized traffic – a medium-high safety/comfort design. However, Elgin street west of William and east of Division and the latest MUP on Kerr from D'Arcy to the storm water pond – all built within the past five years – do not separate pedestrians and cyclists. On Elgin east of Division the MUP extends to the curb there is no buffer to protect cyclists westbound.
 - D'Arcy Street unprotected bicycle lane on the east side only from King Street to the railway tracks dead ends in a depression in the road at Spencer Street. Vehicles regularly drive in the cycling lane. (Such behaviour occurs throughout the network.) The lane resumes north of the railways to two roundabouts where cyclists are required to dismount and walk their bicycles on the sidewalk. This fiasco reflects a missed opportunity to properly design a safe, high comfort piece of infrastructure.

Other missed opportunities include:

- **Spring Street (2013):** Was supposed to have cycling infrastructure, and has none.
- **Densmore Road (2019):** Designated as a cycling route in the Official Plan of the Town in 2010, serves St. Mary's High School and a recreation area. A section was being reconstructed to install sewers – no cycling infrastructure was included in the plan for consideration.
- **Abbott Boulevard (2021):** Newly constructed sidewalk on east side which has two intersections (the west side has none). A short unsigned MUP runs between the west side of Abbott and the east end of Donegan Park. Abbott serves CCI and Gummow school on Cottesmore Avenue. No provision for cycling.

PROPOSED completion of the Cycling Network in the Town of Cobourg

COMPLETION DATE: 2031



Prioritization for Completion of Cycling Routes

- Highest Priority
- Medium Priority
- Lower Priority

SP
 L
 CG
 R
 RS
 CP
 LD

Spine Routes
 Ribs - Link Public Spaces to Spines
 Close Gaps
 Reallocate Space
 Recreational Space as a Destination
 Link to Capital Projects
 New Routes and Land Development

| Map # | Segment | SP | L | CG | R | RS | CP | LD | Comments |
|-------|--|----|---|----|---|----|----|----|---|
| 1 | Elgin St: William St. to Ontario St. | • | • | • | | | | | Upgrade to sidewalk + multi use path |
| 1a | Elgin St: Ontario St. to start of Multi-use path near Cornell Cr. | • | • | • | | | | | Upgrade to sidewalk + multi use path |
| 1b | Elgin St: D'Arcy to Brook Rd. N | • | • | | | | | • | Cycle Tracks (Complete street) |
| 2 | Kerr St. extension to New Amherst Blvd | • | • | • | | • | | • | Cycle Tracks |
| 2a | Kerr St. East extension from Burnham Blvd. to William St. | • | • | • | | • | | | Cycle Tracks RS |
| 2b | Kerr St. East extension from William St. to Ontario St. | • | • | • | | • | | | Cycle Tracks RS |
| 2c | Kerr St. East extension from Ontario St. to Stormwater pond | • | • | • | | • | • | | Cycle Tracks RS |
| 2d | McArthur St: D'Arcy to Cottesmore, aka Kerr extension | • | • | • | • | | | | Cycle Tracks – on-road (pilot) + spur to Cobourg Community Centre (CCC) |
| 2e | Kerr St. extension Brook Rd N to Workman Rd. | • | | | | | • | • | |
| 3 | Glen Watford – end to New Amherst Blvd | • | • | • | | | • | • | Multi use path |
| 3a | Pebble Beach Drive to Ravensdale | • | • | • | • | | | | Cycle Tracks (on road) or LSB + 30 KmPH |
| 3b | King St.W. to Pebble Beach Dr. | • | • | • | • | | | | Cycle Tracks (on-road) |
| 4/4a | Densmore/White from Division to De Palma | • | | | | | | | |
| 4b | Densmore Rd. Parkview Hills Dr. to Birchwood Trail to Division | • | • | • | • | | • | | Cycle Tracks (on-road/Blvd) |
| 5 | New Amherst Blvd:Hwy 2 to Joan Chalovich Way to Kerr | • | • | • | | | | • | Cycle Tracks |
| 5a | New Amherst Blvd: Kerr St. to Lakeshore | | • | • | | • | | • | Cycle Tracks/Multi use path |
| 6 | Connector Rogers Rd. multi use path from the trail to Charles Wilson Parkway | | | | • | | | | LSB + 30 KmPH or Cycle tracks |
| 7 | Path behind Staples Westwood Drive connector | | | | • | | | | Signage to shopping / services |
| 8 | Path Through the park starting from the Y to William St. | | • | • | | • | | | Multi use path |

| Map # | Segment | SP | L | CG | R | RS | CP | LD | Comments |
|--------|--|----|---|----|---|----|----|----|---|
| 8a | William St: fr path Heath St. to Kerr St. East | | • | • | • | | | | Multi-use path |
| 8b | William St. fr Kerr St. extension to University | | • | • | • | | | | Cycle Tracks (on-road + blvd.) |
| 8c | William St. from University to King | | • | • | • | | | | Cycle Tracks (on-road + blvd.) |
| 9 | Spring St: from University to King | | • | • | | | | | Share the Road signage |
| 9a | From King St. W to Marisa Lane | | • | • | | | | | Share the Road / speed reduction signage |
| 10 | Division St.: University to King | | • | • | • | | | | Cycle Tracks (on-road) + Road Diet |
| 10a | Division St.: King to start of path at the waterfront | | • | | • | | | | Cycle Tracks (on-road) + Road Diet |
| 11 | Donegan Park connector: D'Arcy St. to Abbott Blvd. | | • | • | | | | | Multi use path—Permeable surface |
| 12 | University St: D'Arcy to Cottesmore | | • | • | • | | | | Cycle Tracks (on-road) |
| 13 | Birchwood Trail from Densmore to Elgin | | • | • | • | | | | Cycle Tracks (on-road/blvd) |
| 14 | Legion Fields & CCC: from CCC to part way down Alexander Dr. | | • | • | | • | | | Multi use path: CCC/ Rebound destinations via spur from McArthur St. |
| 14a | Legion Fields & CCC: from Alexander Dr. | | • | • | | • | | | Multi use path CCC/ Rebound destinations |
| 14b | Legion Fields/Cottesmore to McArthur St. | | • | • | | • | | | Cycle Tracks (on-road) CCC/ Rebound destinations (see McArthur—pilot) |
| 14c | Cottesmore: from University to King St. East | | • | • | • | • | | | Cycle Tracks (on-road) |
| 14d | Abbott Blvd. King street east to Lakeshore | | • | • | • | | | | Cycle Tracks (on-road) |
| 15 | Brook Rd. N.: Elgin to Kerr | • | • | • | | | | • | Cycle Tracks (Complete street) |
| 15a | Brook Road/King to Kerr trail | | • | • | • | | | • | Multi use path – east side |
| 16/16a | Cobourg Creek Trail: William St. to Peace Park | | • | | | • | | • | Multi use path |
| 17 | University Ave. West end to Cobourg Creek Trail | | • | | • | • | | | |

Prioritization of Cycling Infrastructure

SPINE Routes (SP)

Complete - within the next three years - at least one east-west spine route throughout the Town, including east - west connections to adjacent municipalities. The Spines are:

- Elgin Street from Brook Road to New Amherst Blvd.
- Kerr Street (ROW) from Workman to New Amherst Blvd.
- King/Queen/Albert from the town line to New Amherst Blvd
- Densmore/White/DePalma from Greer to Strathy (OP 2010 proposed)

The BAC proposes that Kerr Street be given priority. It is a higher comfort route and is the least expensive in time and money to complete.

RIBS -Link Public Spaces to Spines (L)

- Create connections from the spine(s) to all major public service spaces: schools, hospitals, parks, recreation centres, library, shopping areas etc.
- Create connections to significant trails including The Waterfront Trail and trails within conservation areas.

Brook Road North is a key connection between King, the Kerr spine, the planned Villages of Central Park, and the Nagle overpass connecting Baltimore residents to work, schools, recreation and shopping in Cobourg, but it is highly unsafe.

Close Gaps (CG)

- Close short gaps in the existing network with a focus on those gaps that, when completed, will result in continuous routes and important links.

While this criterion has been accorded lower priority, the BAC assumes if gaps fall within Capital Projects, they must be filled at the same time.

Reallocate Space (R)

- Cycle tracks (protected lanes) must be developed through lane reallocation and repainting of pavement markings.

Recreational Space as a Destination (RS)

- The cycling infrastructure – cycle track/Bike path/multi-use path - is a destination itself, where riders enjoy their surroundings and the riding experience. <https://themedadoway.ca/#video>

Link to Capital Projects (CP)

- Maximize cost savings by incorporating cycling/pedestrian infrastructure into already planned **new** capital roads and infrastructure projects.
- Implement trail and cycling facilities within other capital infrastructure projects such as road repair and reconstruction, linear utilities: electric transmission corridors, gas and water supply lines and sewers.
- Implement trail and cycling infrastructure within park development and reconstruction projects.

New Routes and Land Development (LD)

- Active transportation infrastructure must be an integral component of all new land development.
- Planning & Public Works staff must ensure high comfort cycling infrastructure as part of new land development.

BAC Request

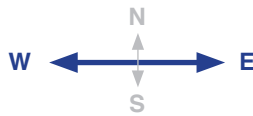
Given that Cobourg has declared a Climate Emergency; given that Cycling and Walking not only mitigate greenhouse gas emissions, but also significantly contribute to improved physical and mental health; and given that Health Canada has recently endorsed the Can-BICS classification system as a means of keeping Canadians safe and healthy, the Bicycle Action Committee requests:

1. That Council and Administrative Staff of the Town of Cobourg adopt **BAC's Cobourg Cycling Infrastructure Completion Proposal** as guidance to complete the town's cycling network, especially, that the spines and ribs described by the BAC's Proposed Network Map be incorporated into the **Transportation Master Plan**.
2. That the cycling infrastructure described and delineated on the map be incorporated into all future applicable infrastructure projects, including:
 - Road repair and reconstruction; linear utilities: electric transmission corridors, gas and water supply lines and sewers;
 - All park development and reconstruction projects;
 - All new land development projects.
3. That the quality of any new or repaired/rebuilt cycling infrastructure reflect the CANBICS safety performance standard of Medium Comfort or higher.

Note: In the event that the above requirements cannot be met, or need to be modified, the Town of Cobourg is required to obtain "BUY-IN" from the cycling community including the BAC before proceeding.

4. **That within the next year, 2022, and for the following years, 2023-24,** the Town budgets for and completes:
 - the Kerr Street Spine between Ontario and William; between William and Burnham
 - the Brook Road North Rib between King St. East and the Kerr Street Spine
 - a bike and pedestrian path from the Kerr Street Spine through the Cobourg Conservation Area to the rear of the YMCA building
5. That, within the next year, the Town establish/hire a **Cycling & Accessibility Coordinator** whose role will be to liaise with the cycling community and collaborate with Planning & Development, Public Works and Parks & Recreation to ensure ongoing implementation of the Proposal.
6. That, as an interim measure regarding item #5, Council and Town Staff keep BAC apprised of all future capital, infrastructure, park development and reconstruction projects and, before any are initiated, be consulted as to what cycling infrastructure should be included. Likewise, Cobourg to ask developers to consult BAC. when they do their site plan for new developments and have them include in their site plan application to the Planning Department how they accommodated BAC input.

Appendix 1: Analysis of Cycling Routes



East West Routes

| East – West Routes | Type | Comfort | Comments | | | | | | | | | | | | | | | | | | | | | | | | |
|--|----------------------|-----------|---|-----------|-------------|-----------|-------------|------------|----------------------|-----------|----------------|-----------|-----------|-----------|--------------|------------|----------------|--|--|-----------|-------------------|--|--|------------|----------------|--|--|
| Waterfront Trail: East town line to Victoria Park via King/ Normar/Wilmott/Maplewood/Hamilton/ Coverdale/Lakeshore/ Bay | BL STR | LC | Speed 50 kph except Coverdale & Donegan Park areas (40) | | | | | | | | | | | | | | | | | | | | | | | | |
| Waterfront Trail: Victoria Park to Ontario St. & Boardwalk | MUP BL BP | MC LC | Contra Lane Bay to MUP through Park & Campsite BP 1m + grass buffer; BL painted lines; wood board walk is rough surface for higher pressure tires | | | | | | | | | | | | | | | | | | | | | | | | |
| Waterfront Trail: Ontario to Rogers Rd & Elgin via Clyde/ Tremaine and Burnham/Carlisle | STR BL MUP | LC MC | MUP less than current default width + narrow bridge crosses Cobourg Creek | | | | | | | | | | | | | | | | | | | | | | | | |
| King Street: East town line to Pebble Beach | BL STR | LC | BL on both sides Town Line to D’arcy – one lane on south side to McGill; resumes at William to Burnham; then, BL both sides to just before Pebble Beach. | | | | | | | | | | | | | | | | | | | | | | | | |
| University Street: Cottesmore to William | BL STR | LC | BL on South Side only D’Arcy to William; Sharrows on North Side | | | | | | | | | | | | | | | | | | | | | | | | |
| Kerr Street & ROW Spine: Brook Rd. N. to New Amherst Blvd | MUP BL | MC LC | Incomplete: gaps between Cottesmore and D’Arcy; between stormwater pond and Ontario; between Ontario and Burnham; not connected to New Amherst Blvd.; Dedicated Active transportation corridor between Brook North and Cottesmore, and between Division and storm water pond west of Division. Painted BL between Westwood and Rogers Rd. bike path ext. | | | | | | | | | | | | | | | | | | | | | | | | |
| Elgin St. Spine | MUP STR BL | MC LC | Incomplete: gaps between William and Ontario; Ontario & St. Peter’s Cemetery. BL on North side between Strathy and Town Line; MUP (Bi-directional) on South side from William to west of Rogers Road. Between Division and William is viewed as a dangerous road to ride. | | | | | | | | | | | | | | | | | | | | | | | | |
| <table> <tr> <td>CT</td> <td>Cycle Track</td> <td>LC</td> <td>Low Comfort</td> </tr> <tr> <td>LSB</td> <td>Local Street Bikeway</td> <td>MC</td> <td>Medium Comfort</td> </tr> <tr> <td>BP</td> <td>Bike Path</td> <td>HC</td> <td>High Comfort</td> </tr> <tr> <td>MUP</td> <td>Multi-Use Path</td> <td></td> <td></td> </tr> <tr> <td>BL</td> <td>Painted Bike Lane</td> <td></td> <td></td> </tr> <tr> <td>STR</td> <td>Share the Road</td> <td></td> <td></td> </tr> </table> | | | | CT | Cycle Track | LC | Low Comfort | LSB | Local Street Bikeway | MC | Medium Comfort | BP | Bike Path | HC | High Comfort | MUP | Multi-Use Path | | | BL | Painted Bike Lane | | | STR | Share the Road | | |
| CT | Cycle Track | LC | Low Comfort | | | | | | | | | | | | | | | | | | | | | | | | |
| LSB | Local Street Bikeway | MC | Medium Comfort | | | | | | | | | | | | | | | | | | | | | | | | |
| BP | Bike Path | HC | High Comfort | | | | | | | | | | | | | | | | | | | | | | | | |
| MUP | Multi-Use Path | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BL | Painted Bike Lane | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STR | Share the Road | | | | | | | | | | | | | | | | | | | | | | | | | | |

North South Routes



| North-South Routes | Type | Comfort | Comments | | | | | | | | | | | | | | | | | | | | | | | | |
|---|----------------------|------------------------|--|-----------|-------------|-----------|-------------|------------|----------------------|-----------|----------------|-----------|-----------|-----------|--------------|------------|----------------|--|--|-----------|-------------------|--|--|------------|----------------|--|--|
| Brook Rd. N | MUP | LC MC | Incomplete: East side only - width 1m becomes a sidewalk between King and East Village entrance. | | | | | | | | | | | | | | | | | | | | | | | | |
| D’Arcy Street | STR BL | LC | Lakeshore to King: sharrows/BL; King to University: BL east side only, University to rail crossing BL + sharrow east side only; north of railways: BL both sides to Elgin, except in roundabouts: Dismount sign. | | | | | | | | | | | | | | | | | | | | | | | | |
| Division Street | BL MUP | LC MC | Incomplete: Lakefront to University no infrastructure; University to underpass BL & road diet; MUP east side to Elgin; MUP west side north of underpass to Kerr; Elgin to 401 no infrastructure. | | | | | | | | | | | | | | | | | | | | | | | | |
| Ontario Street | BL | LC | Incomplete: Clyde St. to University no infrastructure; University to 401 BL. | | | | | | | | | | | | | | | | | | | | | | | | |
| Burnham Street | STR | LC | Signage only for WFT through Carlyle connector to Rogers Rd | | | | | | | | | | | | | | | | | | | | | | | | |
| Rogers Road | MUP BL | MC LC | Shared with pedestrians | | | | | | | | | | | | | | | | | | | | | | | | |
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| MUP | Multi-Use Path | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BL | Painted Bike Lane | | | | | | | | | | | | | | | | | | | | | | | | | | |
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At-a-glance

The Canadian Bikeway Comfort and Safety (Can-BICS) Classification System: a common naming convention for cycling infrastructure

Meghan Winters, PhD (1); Moreno Zanotto, MSc (1); Gregory Butler, MSc (2)

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Abstract

There is no standard naming convention for cycling infrastructure across cities. Our aim was to develop a common nomenclature for cycling infrastructure in Canada, relevant to the context of public health practice. We drew on transportation engineering design guides and public health guidance to develop a bicycle facility classification system: the Canadian Bikeway Comfort and Safety (Can-BICS) classification system, a three-tiered classification scheme that groups five bicycle facilities based on safety performance and user comfort. Adopting consistent nomenclature as per the Can-BICS system will support regional and national surveillance efforts in public health, planning and sustainability.

Keywords: *open data, active transportation, cycling, infrastructure, nomenclature*

Introduction

Getting more people to cycle, more often, is a goal common to public health, sustainability and transportation agendas.¹⁻⁴ Many cities assemble data on their cycling infrastructure and increasingly make these data publicly available through open data initiatives; however, there is no standard naming convention to describe cycling infrastructure. This lack of common nomenclature hinders research and practice efforts to understand the role of cycling infrastructure in supporting active travel across communities.

Our aim was to develop a common nomenclature for cycling infrastructure in Canada, relevant to the context of public health. Such nomenclature is a foundational step toward the operationalization of metrics that may be used for public health research and surveillance of physical activity in Canada.⁵ We considered

cycling infrastructure to be part of roadways or paths intended for cycling (also referred to as “bicycle facilities” or “bikeways”); we did not include end-of-trip facilities such as cycle parking, lockers or showers, which are not consistently tracked.

This study is exempt from Research Ethics Board review as the research uses exclusively publicly available information for which there is no reasonable expectation of privacy.

Methods

Overview

We reviewed transportation engineering design guides and used public health guidance to develop a classification system based on safety performance (injury or crash risk along different infrastructure types) and user comfort (preferences for infrastructure types in terms of comfort

Highlights

- A common nomenclature for cycling infrastructure in Canada is needed to further public health surveillance efforts on active-transportation environments.
- The Can-BICS system is a three-tiered cycling infrastructure classification system that reflects the safety performance and user comfort of five bicycle facility types.
- High-comfort bikeways are low-stress routes. These bikeways include cycle tracks on major streets, local street bikeways and cycle-only off-street paths.
- Medium-comfort bikeways are low-to-medium stress routes. These bikeways include multi-use paths sited next to a roadway or along independent corridors.
- Low-comfort bikeways are high-stress routes. These bikeways include painted bike lanes along busy roadways.

and stress). We also compiled cycling infrastructure names used in open data from Canadian municipalities and mapped them onto the nomenclature classification system.

Engineering design guide review

We reviewed national transportation engineering design guides from Canada and the USA published within the last 5 years

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to identify how cycling infrastructure types are defined and categorized. From these we identified other relevant documents. The documents reviewed were as follows: the Transportation Association of Canada (TAC) *Geometric Design Guide for Canadian Roads*⁶; the City of Vancouver *Transportation Design Guidelines: All Ages and Abilities Cycling Routes*⁷; CROW *Design Manual for Bicycle Traffic*⁸; NACTO's *Urban Bikeway Design Guide*⁹ and *Designing for All Ages & Abilities: Contextual Guidance for High-Comfort Bicycle Facilities*¹⁰; and the Massachusetts Department of Transportation *Separated Bike Lane Planning & Design Guide*¹¹.

Developing classification

We analyzed the classification approaches and justification within each of the engineering guidelines to inform our proposed nomenclature. We also reviewed the public health literature on safety and preference for cycling infrastructure types because safety performance and user comfort were primary organizing principles for the classification scheme (for more information, see the review in *The Canadian Bikeway Comfort and Safety (Can-BICS) Classification System: A Proposal for Developing Common Naming Conventions for Cycling Infrastructure* report¹²). Our preliminary classification scheme was reviewed by one US and three Canadian experts in the fields of public health (n = 2) and transportation planning and design (n = 2). Their feedback resulted in refined infrastructure definitions but no substantial changes to the classification.

Open data analysis

Our aim was to characterize the range of cycling infrastructure names used by Canadian communities to understand the scope of the nomenclature and how this interfaced with the proposed Can-BICS scheme. To select a national sample, we chose the 10% most populated census subdivisions from each province and territory. Taken together, these 45 census subdivisions covered 50.4% of the Canadian population.

We searched for a cycling infrastructure dataset and supplemented open data with a municipal cycling map when necessary. We extracted all names used in the municipal data and categorized these to the Can-BICS classification scheme. First, where possible (~60% of names), we categorized

facility names to the five Can-BICS cycling facilities by name alone (e.g. bike lanes categorized as painted bike lane). To ensure rigour, we performed spot checks on 10% of these facility names by using Google Street View (an online street view imagery service) and QGIS (a geographic information system) to locate and identify infrastructure types; all matched. Where the name itself did not facilitate easy categorization (~40%), we relied on Google Street View and QGIS. The open data files and facility name data are available through the SFU RADAR repository (researchdata.sfu.ca).

Results

The six engineering design guidelines identified multiple cycling facilities. We grouped these into five consolidated categories ("painted bike lanes," "local street bikeways," "cycle tracks," "bike paths" and "multi-use paths") related to design, exclusivity for cyclists and proximity of cyclists to other road users.^{6,7} Some guides touched on safety (e.g. separation from motor vehicles), but there was little explicit consideration of user preference or comfort, especially for roadway cycling facilities.

Integrating practice guidelines and public health considerations to categorize infrastructure that would best encourage cycling and make cycling safer, we developed the Canadian Bikeway Comfort and Safety (Can-BICS) classification system. This three-tiered classification scheme groups five cycling facilities based on safety performance and user comfort (Table 1):

- **High-comfort bikeways.** These low-stress cycling facilities are comfortable for most people. Route types include cycle tracks alongside busy roads, local street bikeways and off-road bike paths.
- **Medium-comfort bikeways.** These low-to-medium stress cycling facilities are considered comfortable by some people. The off-road infrastructure multi-use path fits within this category. Multi-use paths are shared with pedestrians and other active modes and can be located along a road or in an independent corridor.
- **Low-comfort bikeways.** These cycling facilities are high stress and comfortable for few people. The infrastructure type within this category is a painted bike lane, where people are cycling in a painted lane along busy roadways.

Comparing open data facility names with Can-BICS

Of the 45 municipalities, 89% (n = 40/45) had an open data catalogue and 80% of these included a cycling infrastructure dataset (n = 32/40). Data sources were published between 2005 and 2019. We extracted 269 cycling infrastructure names from open data (range: 2–14 per census subdivision) after removing obvious pedestrian infrastructure (e.g. stairs and sidewalks), route fragments and decommissioned routes. About 100 unique names were in use, after taking into account related terms (e.g. bike lane and bicycle lane). We categorized 60% of the 269 names to the five Can-BICS cycling facilities by name alone (e.g. bike lanes categorized as painted bike lane). The remaining 40% (n = 108) we assessed via Google Maps Street View (see *The Canadian Bikeway Comfort and Safety (Can-BICS) Classification System: A Proposal for Developing Common Naming Conventions for Cycling Infrastructure*).¹²

We compared municipal open data nomenclature and Can-BICS (Figure 1) to assess overlap. Note that the proportions reported here represent the frequency of use of this facility name across the open data files and not the proportional distance of an infrastructure type within the cycling network. We found that 23% of names in open data were high-comfort bikeways: 8% being cycle tracks, 12% local street bikeways and 3% bike paths. Overall, 24% were medium comfort (multi-use paths) and 28% were low comfort (painted bike lanes).


There were also facility names that arose in open data but did not fit the Can-BICS criteria as they are not considered suitable (i.e. safe or comfortable) for promoting cycling for people of all ages and abilities based on the current state of knowledge. Many were shared lanes, that is, sharrows in a car travel lane. There is no evidence that sharrows provide the benefit of safety, and the majority of people do not want to share a travel lane with motor vehicles. Others were gravel trails, namely multi-use trails surfaced in gravel, dirt or aggregate, including mountain bike trails, walking trails in parks or hiking dirt paths. The Transportation Association of Canada guidelines explicitly exclude gravel trails, with the rationale that these are accessible to a smaller range of bicycles and have unique design requirements.⁶ Finally, "mixed

TABLE 1
The Canadian Bikeway Comfort and Safety (Can-BICS) Classification System


| High-comfort bikeways: Comfortable for most people | | |
|--|--|---|
| Facility | Description | Image |
| Cycle track | A roadway lane exclusively for cyclists and physically separated from both motor vehicles and the sidewalk. Separation from motor vehicle traffic must include a vertical barrier (e.g. a raised median, bollards, box planters or trees and landscaping). Separation from the sidewalk may include street furniture, a curb or landscaped buffer. Facility may be at the level of the roadway or the sidewalk or between the two. |  |
| | |  |
| Local street bikeway | A local street (no centre line or lanes) where cyclists share the roadway with motor vehicles. Traffic-calming elements limit motor vehicle speeds and volumes and inhibit their through travel. Bicycle priority measures facilitate cyclists' safe crossing of streets and limit stops and delays. The facility includes measures to improve cyclist comfort: smooth surfaces; street lighting; wayfinding signage and pavement markings; and consistent paving material and colour. |  |
| | |  |
| Bike path | An off-road paved path exclusively for cyclists located along independent corridors away from a road. May be one-way or two-way with a centre line. Often adjacent to a walking path and separated by a painted line, curb or landscaped buffer. |  |
| | |  |

Continued on the following page

Medium-comfort bikeways: Comfortable for some people

| Facility | Description | Image |
|----------------|---|--|
| Multi-use path | A two-way paved path shared by cyclists, pedestrians and other users (e.g. skateboarders and rollerbladers). May be located along independent corridors away from a road or next to a roadway and physically segregated from motor vehicles (replacing a sidewalk). |  |

Low-comfort bikeways: Comfortable for few people

| Facility | Description | Image |
|-------------------|--|---|
| Painted bike lane | A painted lane along a busy roadway that is designated by bicycle and diamond pavement markings and signs as exclusively for cyclists. The lane is positioned between a vehicle travel lane and the curb. It may be buffered using diagonal or chevron hatching or unbuffered. Includes both advisory bike lanes (marked by broken lane lines) on the edge of roadways too narrow to provide exclusive cycling and driving spaces and bicycle accessible paved shoulders (indicated by an edge line and bike route signs or stencil markings) on roads without a curb. |  |

Source: The Canadian Bikeway Comfort and Safety (Can-BICS) Classification System: A Proposal for Developing Common Naming Conventions for Cycling Infrastructure.¹²

traffic” infrastructure (unimproved local roads) may serve as links to the main cycling network, but without signage or traffic calming, do not constitute cycling infrastructure. Together, these routes comprised 26% of the different facility names in open data.

Discussion

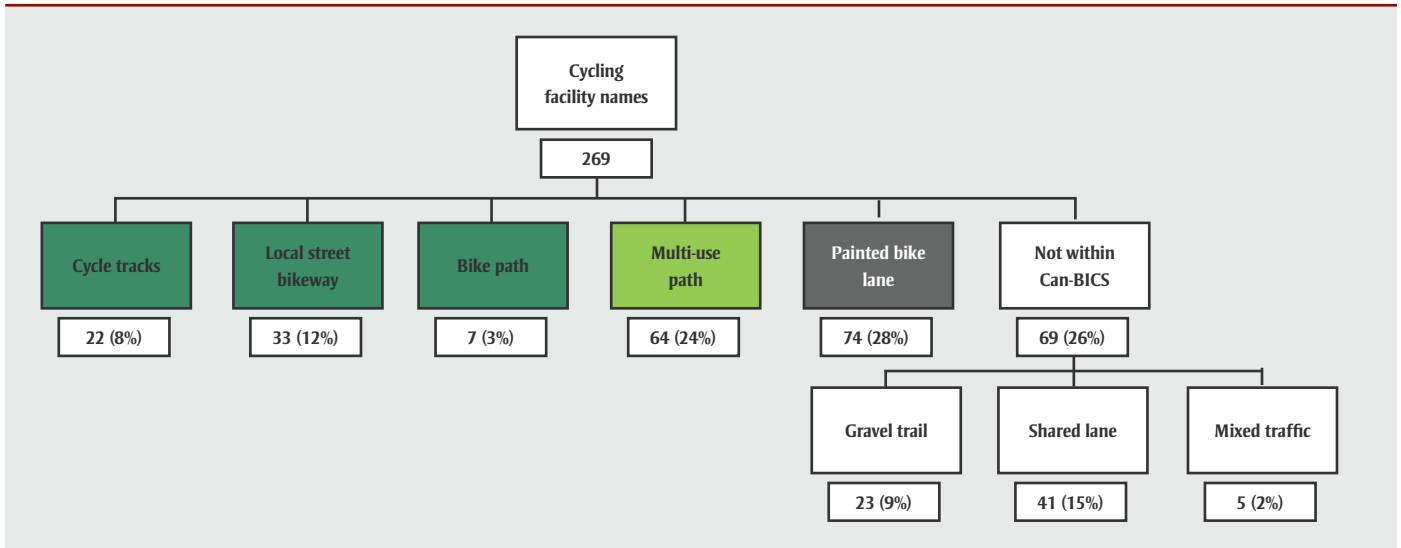
The Canadian Bikeway Comfort and Safety (Can-BICS) classification system defines

five types of cycling facilities ordered into a three-tiered classification scheme based on safety performance and user comfort. The classification was informed by a review of professional practice guidelines for bicycle facility design, public health literature on safety and preferences and a scan of current naming conventions. This approach focuses on safer cycling facility types preferred by people of all ages and abilities, reflecting a public health perspective that aims to get more people

cycling, more often, for both individual and population-level benefits.¹³

A standardized nomenclature approach for cycling infrastructure is essential for public health surveillance as it can enable comparisons of the availability and infrastructure types across settings and over time. We envision that planners can apply the standardized nomenclature in Can-BICS to categorize the routes in their own communities and enable the development

FIGURE 1
Categorization of municipal open data bicycle facility names^a to the Can-BICS classification system



Source: The Canadian Bikeway Comfort and Safety (Can-BICS) Classification System: A Proposal for Developing Common Naming Conventions for Cycling Infrastructure.¹²

Abbreviation: Can-BICS, Canadian Bikeway Comfort and Safety.

^a 269 facility names from across 45 census subdivisions.

of granular spatial data and metrics to support local public health authorities.

For Can-BICS, next steps are to operationalize metrics (e.g. kilometres of high/medium/low-comfort routes per area), identify spatial units (e.g. dissemination area) and boundary issues, and evaluate the quality of open data sources. Emerging work suggests OpenStreetMap (OSM; openstreetmap.org) is a promising data source for Canadian cities.¹⁴ For a national effort, any data source must be evaluated in terms of access, completeness and comparability, but the potential to streamline and standardize efforts is strong.

Strengths and limitations

Design matters. While Can-BICS uses a broad classification of user comfort and safety, there are nuances. A cycle track (high comfort) that is poorly designed may have greater injury risk than a well-designed painted bike lane (low comfort). Intersection treatments and network connectivity also impact route safety and comfort.

Conclusion

There is limited past work in harmonizing the names for cycling infrastructure across cities, although this is important for comparing neighbourhoods within a single city or a set of cities as part of a national approach.^{15,16} A standardized nomenclature

such as Can-BICS is a foundational step toward building capacity in public health surveillance for urban cycling environments.

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Authors' contributions and statement

MW led the project conceptualization, supervised the analysis and contributed to the drafting and revision of the paper. MZ led the literature review, data collection and data analysis and contributed to the drafting and revision of paper. GB contributed to the project conceptualization and the drafting and revision of the paper

The content and views expressed in this article are those of the authors and do not necessarily reflect those of the Government of Canada.

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