Niagara Region

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Appendix 2

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Niagara Region Complete Streets Design Manual (CSDM)

Discussion Paper #2

Best Practices Review

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1.0 Introduction

In June 2020, Niagara Region retained WSP to assist in developing a Complete Streets Design Manual (CSDM). The purpose of this exercise is to move forward with one of the key recommendations outlined in the Region's Transportation Master Plan and to provide Regional staff with a transformative document that will assist practitioners in all aspects of Complete Streets projects, including design, implementation, and maintenance. The concept of Complete Streets has been adopted by municipalities across Canada and the United States. Niagara Region has recognized the potential for achieving Complete Streets on its Regional Road network for nearly a decade and is taking steps to support the delivery of Complete Streets projects to improve its communities. While definitions vary by jurisdiction, Complete Streets are typically defined as roadways that are designed to reflect the needs of surrounding land-use and provide appropriate facilities for all road users.

The Niagara CSDM project is comprised of six technical phases. Each phase includes the submission of a key project deliverable, like this discussion paper, and a consultation event that engages key regional stakeholders with an interest in the design or operations of Regional Roadways. The following phases represent the technical phases of the Niagara CSDM Project (note Phase 1: Project Initiation and Management and Phase 4: Communication Plan are not listed because they are not technical phases).

- **Phase 2.0 Background Review** (completed) | Review and summary of existing policies and practices related to Complete Streets at the Regional, Provincial, and National levels.
- **Phase 3.0 Best Practices Review** (completed) | Review and summary of best practices adopted in other jurisdictions.
- **Phase 5.0 Typologies & Sub-typologies** | Confirmation and refinement of the Complete Streets typologies identified in the 2017 Niagara Transportation Master Plan (TMP) and the development of sub-typologies, as needed, to address context-sensitive needs. The Regional road network will be mapped to include a typology for each road, however, sub-typologies will need to be confirmed by the Region during future implementation because they are context-specific.
- **Phase 6.0 Suite of Standard Products** | Identification of the recommended Complete Streets elements (products) and product suppliers for the typologies and sub-typologies approved in Phase 5.0.
- **Phase 7.0 Demonstration Cross-sections** | Development of example cross-sectional renderings for the typologies confirmed in Phase 5.0.
- **Phase 8.0 Final Documentation** | Iterative drafting and finalization of the Niagara CSDM.

To date, Phases 2.0 and 3.0 of the technical work plan have been completed. This document reflects culmination of research and consultation conducted as part of Phase 3.0 Best Practices Review. It is the second of three discussion papers submitted as part of this project, which are intended to provide the foundation and rationale for the development of the Niagara CSDM.

The discussion paper explores the Complete Streets programs of comparable upper-tier municipalities and highlights notable elements of CSDMs that have been successfully adopted by other municipalities throughout North America – including both Canada and the United States. Key lessons learned, emerging trends, and context-sensitive approaches from other jurisdictions are the central focus of the review. The tasks included in Phase 3 of the proposal that have led to the development of the discussion paper include the following:

- **Task 3.1 Identify Best Practices** | Identify best practices in road design across North America. Review standards related to recommended treatments, fixtures, and materials – identifying opportunities to incorporate the strategies and products applied by other municipalities in Niagara.
- **Task 3.2 Prepare and Distribute Complete Streets Survey** | Prepare and distribute a Complete Streets survey to collect feedback, suggestions, and recommendations on Complete Streets design, implementation, and maintenance from comparable upper-tier municipalities.
- **Task 3.3 Complete Literature Review** | Perform a key terms search and review of select Complete Streets Design Manuals and other notable literature that have been adopted by other municipalities or agencies in North America.
- **Task 3.4 Prepare and Facilitate Best Practices Workshop** | Prepare and host a workshop with specific stakeholders and key Regional staff to gather input on best practices and lessons learned.

The purpose of the best practices review was to understand practices in other jurisdictions that may be appropriate to apply in the Niagara Region. While not all the information researched in the review is applicable, that which is noteworthy has been presented in the discussion paper for consideration by the Region. The discussion paper includes the following sections:

- **2.0 Best Practices Approach Overview** | An outline of the approach taken to develop the Best Practices Discussion Paper.
- **3.0 Survey 1: Jurisdictional Scan** | A review and summary of responses received to an online survey distributed to comparable upper-tier regional municipalities on their approach toward Complete Streets Design
- **4.0 Survey 2: Literature Review** | A review and summary of responses received to an online survey distributed to municipalities across North America who have adopted CSDMs (or comparable documents) to understand lessons learned in developing and applying these documents in their respective jurisdictions.
- **5.0 Jurisdictional Scan |** An analysis of Complete Streets programming in other upper-tier municipalities in Ontario.
- **6.0 Literature Review** | An exploration of Complete Streets typologies (classifications), elements, graphics, and guidance adopted in design manuals, guidelines, and standards from other municipalities and agencies.
- **7.0 Workshop Summary |** A summary of discussions and takeaways from key Regional stakeholders who attended the Best Practices Workshop.
- **8.0 Key Takeaways and Next Steps |** A list of major considerations from best practices that should be considered in the future and a high-level description of the next technical phases of the project.

2.0 Best Practices Approach Overview

Best practices reviews are conducted to identify and assess the applicability of topic specific strategies implemented in other jurisdictions that are typically considered comparable. A comparable jurisdiction can be very subjective and does not always relate to the same topics. For the Niagara Region CSDM project, relevant strategies that were considered in the best practices review needed to consider jurisdictions that have comparable decision making / operational practices and geographies as well as those jurisdictions that have the experience developing and implementing complete streets design manuals. Furthermore, the topics that are assessed typically address a range of influences and areas of practice. For Niagara Region, best practices were reviewed in the context of adopted policy, design guidance, programming, processes, or recent projects that support the development of multimodal roadways.

The intent of the best practices review was to identify strategies that have been successfully implemented or demonstrate parallels to the context of Niagara. As noted above, this could apply to the design and application of street typologies and sub-typologies – as will be addressed in Phase 5 and 6 of the project; and / or inform the layout, format, content and approach to the development of the manual itself in Phases 7 and 8.

While some information is made publicly available on municipal websites, some jurisdictions do not regularly apply these documents or rely heavily on internal documentation and processes making it challenging to understand the full breadth of strategies and a nuanced understanding on how they were developed and how applicable they've been after adoption. As such the approach used for the Niagara CSDM best practices review combined the traditional literature and desktop review research with surveys to municipal contacts to provide more detailed, experience-based input.

The following is an overview of the specific components that informed the development of the best practices review with the purpose of understanding how and why CSDMs are or are not adopted by other upper-tier municipalities within Ontario as well as municipalities who have developed and adopted complete streets design manuals as well as innovative strategies for consideration by Niagara Region.

Task	Description	Purpose
Part 1. Jurisdictional Scan	High-level scan of Complete Streets policy and guidelines adopted by comparable upper-tier municipalities in Ontario through a review of municipal webpages and publicly available information.	Identify regional strategies that may be worth considering in the development of the Niagara CSDM or in future Complete Streets programming that have been successful for those municipalities that also need to consider the influence and impact on lower-tier municipalities within the roadway network.
Part 2. Literature Review	Detailed analysis of CSDMs, Guidelines, and Standards that have been published by other municipalities or agencies from municipalities within Canada and the United States.	Assess design guidance, process, tools, and strategies that could be adapted into the Niagara CSDM based on the content, style, presentation, tone and application of the manual to support the future design and implementation of complete streets.
Part 3. Surveys	Two surveys distributed to jurisdictions that have adopted CSDMs and comparable upper-tier regional municipalities using the online survey tool Survey Monkey.	Gather more detailed information and background context from the comparable jurisdictions to better understand successes and challenges associated with Complete Streets programing and the applicability of CSDMs to the implementation of new projects.
Part 4. Workshop	A two-hour interactive workshop was held with regional and local municipal staff as well as interest groups and stakeholders which included a background presentation as well as real-time outreach and engagement to gather input from attendees.	To provide key stakeholders with background and update on the status of the project including an overview of the process and outcomes for Phase 2 and 3 and to gather input on Complete Streets best practices and local, context specific considerations and applications.

2.1 Part 1. Jurisdictional Scan

The jurisdictional scan consisted of reviewing publicly available information from other comparable municipalities to understand if there are strategies related to Complete Streets that could be adopted in Niagara Region – particularly those related to design, implementation, and maintenance. Key documents for consideration during the review included CSDMs (or comparable documents), transportation master plans (TMPs), Official Plans (OPs), and other documents related to planning and implementing Complete Streets. A key terms search for Complete Streets was completed in these documents to reveal any strategies that have been applied or planned by these municipalities. Recent Complete Streets implementation projects were also identified if promoted on the Regional website. It is noted where roadway typologies / classifications were developed using a Complete Streets approach and if strategies have been developed to assist local lower-tier municipalities in Complete Streets programming.

Jurisdictional Scan Documents:

- York Region
- Durham Region
- Peel Region
- Halton Region
- Waterloo Region
- Essex County
- Simcoe County
- Bruce County
- District of Muskoka

2.2 Part 2. Literature Review

For the context of the Niagara CSDM, the literature review consisted of research into contents of CSDMs, Guidelines, and Standards adopted by select municipalities and agencies in North America. Special note was taken on content relevant to the Niagara CSDM project, such as demonstration cross-sections, typologies / classifications, renderings, implementation and design tools, and Complete Streets products. Consideration was also made for the look, feel, and ease-of-use for these different documents. Materials relevant to the context of Niagara and the objectives identified by Regional staff and stakeholders from past consultation events were summarized into key themes.

Literature Review Documents:

- Toronto Complete Streets Guidelines
- London Complete Streets Design Manual
- Edmonton Complete Streets Design and Construction Standards
- Calgary Complete Streets Guide
- Boston Complete Streets Guidelines
- National Association of Transportation Officials (NACTO) Urban Street Design Guide
- Federal Highway Administration's (FHWA) Small Town and Rural Multimodal Networks

2.3 Part 3. Survey Approach

Online surveys and questionnaires are tools that are used to collect anecdotal / experiential information on processes and lessons learned that are not always captured by public documents. Survey feedback can reveal insight on development and decision-making related to Complete Streets policies and programs from those who are directly involved with the day to day practice and implementation. Survey feedback may also identify challenges that practitioners have faced following the adoption of new municipal standards or guidelines. Without this understanding a best practices review has the potential to only reflect the subjective interpretation of information based on publicly available information.

Considering the purpose of the Niagara Region best practices review aimed to learn about process and practice (comparable upper-tier jurisdictions) as well as design manual development and application (municipalities which have developed and implemented manuals); two unique surveys were created to collect feedback. Both surveys were distributed on November 5th, 2020 and those invited had until November 16th, 2020 to complete the questionnaire before it closed. The survey closing date was extended to November 25th and then again to November 30th to reach a higher response rate from the municipalities invited to participate.

Survey 1: Comparable Jurisdictions

Niagara's upper-tier regional structure, mix of urban-rural land-uses, snowy winter, and seasonal tourism industries and natural features make it unique for Complete Streets design. Located in close proximity to the GTHA, there are a number of comparable upper-tier municipalities which could be considered; however, the unique context also means that other jurisdictions beyond the GTHA may be more appropriate. Nine upper-tier municipalities in Ontario were selected to better understand their Complete Streets programming as well as the unique experiences of implementing or programming completed streets in a structure that needs to consider two levels of government.

Survey 2: Design Manual Review

Complete Streets Design Manuals, Guidelines, and Standards have been adopted by municipalities across North America. While many of them share common elements, they are all designed to meet the local context where they apply. In some cases, these documents are used daily and others have become less an application guide and more resource following their adoption. Ten municipalities were selected that have adopted or are adopting Complete Streets design guidance. The survey questionnaire was developed to collect feedback on the successes, challenges, and applicability of these documents in the municipalities that developed them.

2.4 Part 4. Workshop

A virtual workshop to discuss preliminary takeaways from background and best practices research in the Niagara CSDM was held on November 20th, 2020 for Regional Stakeholders. The workshop included a presentation of research-to-date in the jurisdictional scan and literature review. During the workshop, attendees were given opportunities to provide their feedback on the research materials presented and the applicability of the municipalities reviewed in the jurisdictional scan to the context of Niagara.

3.0 Part 1. Jurisdictional Scan

As part of the Best Practices phase of the Niagara CSDM project, a jurisdictional scan of Complete Streets strategies adopted by other comparable jurisdictions was completed. The purpose of the jurisdictional scan was to understand policies, processes, programs, and design guidelines that support the delivery of Complete Streets in other regional municipalities. Noteworthy strategies that have demonstrated success in comparable jurisdictions may be valuable to consider in Niagara Region either as part of the development of the manual's content or in updating policies and process associated with Completes Streets programming.

It is important to note that while implementation lessons learned and best practices were identified, the Niagara CSDM is not meant to include direction on when Complete Street projects are scheduled to occur or how the projects will be funded. To ensure that the jurisdictional scan included municipalities comparable to Niagara Region, the municipalities reviewed are all upper-tier regional municipalities in Southern Ontario with similar geographies. The preliminary list of municipalities reflected a mix of urban and rural land-uses (York, Durham, Peel, Halton, and Waterloo). The list was expanded to include low density municipalities that receive weekend and seasonal tourist activity (Essex, Simcoe, Bruce, and Muskoka) following a request received at the project's Technical Advisory Committee (TAC) Meeting on October 15th, 2020. The expanded list reflects the mix of land-uses, transportation activities, and roadway contexts found in Niagara Region. In summary, the municipalities reviewed during the jurisdictional scan feature a mix of the following the attributes:

- Mix of rural and urban land-uses
- Tourism attractions that draw seasonal or year-round visitors from other municipalities
- Winter climate that produces snowfall for long stretches of the year
- Those that are experiencing shifts in projected or anticipated growth
- Major culture and natural features which impact transportation modes
- Proximity to the Canada-US border that may draw increased traffic from goods movement

The following pages provide an overview of some of the key considerations and outcomes of the investigation of the various jurisdictions and how it could be considered as part of the Niagara CSDM process and product. Additional context specific details are provided by municipal staff who completed the online survey (see section 3.0).

3.1 York Region

York Region is an upper-tier regional municipality comprised of nine lower-tier municipalities, which include a mix of urban, rural, and suburban land-uses (see **Figure 1**). York Region borders Toronto to the south and it is a key economic and residential area for the Greater Toronto and Hamilton Area (GTHA). Similar to Toronto, York Region includes many built-up urban areas where high density developments propagate around Regional GO Train and TTC Subway Stations that support commuter traffic in to and out of downtown Toronto. Unlike Toronto, much of York Region's surface area is comprised of rural agricultural land-use. Due to its rapidly growing population, greenfield developments are common and result in the reconstruction of former concession roads into arterials capable of supporting increased transportation demand.

The regional road network in York Region is used by a range of modes. While motor vehicles predominate the modal split among commuters, many regional roads feature dedicated facilities for active transportation and local transit. Many larger arterial roads, including Yonge St and Highway 7, have dedicated rights-of-way in the centre of the road for an extensive bus rapid transit system that connects key high-density residential and business areas within York Region. Construction is currently underway to expand and improve the support for bus rapid transit on regional roadways. Bike lanes, cycle tracks, multi-use paths, and sidewalks with pedestrian-level lighting and vibrant streetscaping have been implemented in many of these same corridors to support active transportation. On Highway 7, and more recently Yonge Street, efforts to increase separation for active transportation have been undertaken by York Region when opportunities to reconstruct the boulevard and/or widen the roadway as part of transit infrastructure projects present themselves.

The desire to design Complete Streets along regional roadways is recognized York Region's Transportation Master Plan (2016). The document notes that "new approaches to using public rights-of-way, such as Complete Streets, will help the Region take a balanced approach to encouraging alternative modes and managing congestion." While York Region does not have a Complete Street Design Manual or Guidelines, they have initiated a 'Designing Great Streets Strategy' that establishes six street typologies in a roadway classification system that try to balance the needs of different modes. While the Strategy does not include prescriptive standards, sample cross-sections and some supporting text are provided for each road classification – similar to Niagara's TMP Complete Streets Guidelines Background Paper. Below are York Region's road classifications for their Designing Great Streets Strategy:

- **Urban Centre** | Transit priority, active transportation infrastructure, and vehicular movement to support high-density residential, institutional and mixed uses
- **Urban Avenue** | Transit priority, active transportation infrastructure, and vehicular movement to support residential, commercial, institutional, industrial and mixed uses
- **Main Street** | Local transit connections, active transportation infrastructure and regional vehicular movement to support residential, commercial, institutional, open space, historical and mixed uses
- **Connector** | Regional vehicular movement, goods movement, transit priority and active transportation infrastructure to support residential, commercial and industrial (suburban) uses
- **Rural Road** | Regional and inter-regional vehicular movement, goods movement and active transportation infrastructure to support agricultural, institutional, industrial and open space uses
- **Rural Hamlet** | Regional and inter-regional vehicular movement, goods movement and active transportation infrastructure to support commercial, residential, open space and historic uses

Regional Profile

Municipalities	Population		Regional Road	Annual Capital
9	1,109,909	1,762 km^2	1,214 km	$ 867,000,000

Modal Split

Walking	Cycling	Transit	Motor Vehicle	Other
2.34%	0.28%	12.75%	84.20%	8.03%

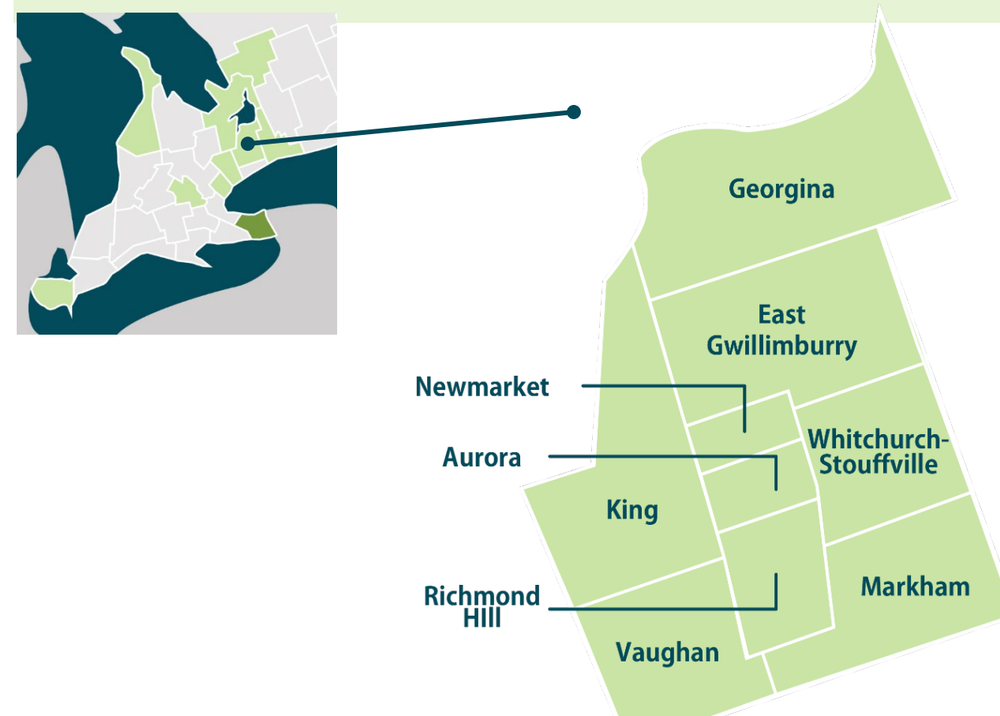


Figure 1 | York Region's location in Southern Ontario and the composition of its lower-tier municipalities.

3.2 Durham Region

Durham Region is an upper-tier regional municipality comprised of eight lower-tier municipalities, which include a mix of urban, rural, and suburban land-uses (see **Figure 2**). Durham Region borders Toronto to the west and it is a key residential area for the GTHA. Durham Region features a few mixed-use and mid-density urban centres but its communities are predominantly suburban and rural. The eastern extent of the GTHA's regional GO Train and Bus network includes stops in four of Durham Region's municipalities, which support commuter traffic in and out of Toronto. Durham Region Transit connects at GO Stations and offers local transit service in Durham's denser communities. While motor vehicles still dominate the modal split within Durham, efforts have been made to improve active transportation along regional and local roads to support walking and cycling. Several key north-south and east-west spine routes have been implemented on select regional roads and include bike lanes and sidewalks or in-boulevard multi-use paths with wide buffers to the roadway. Durham Region is currently in the process of updating its Regional Cycling Plan that outlines priority cycling projects and network phasing for the short- and long-term.

While Durham Region has demonstrated effort to establish multimodal regional roadways, it has no explicit policies or guidelines that address Complete Streets. The Regional Official Plan (2020) emphasizes a need to create 'complete communities' but does not define a design or implementation approach for Complete Streets. The Regional Transportation Master Plan (TMP) recommends establishing a Complete Streets framework that "can improve the safety and comfort of all road users in consideration of different road functions and contexts." The TMP recommends that the planning, design, operations, and maintenance of regional road incorporate a Complete Streets approach. It's also noted that the Region's Arterial Corridor Guidelines should be updated to reflect Complete Streets principles by supporting transit, active transportation, and motor vehicle traffic. While Complete Streets is not formally addressed by Durham Region's existing policy, some roadway design practices and guidelines reflect elements of a Complete Streets approach.

Key recommendations to support the accelerated implementation of Complete Streets in Durham Region, as noted by the Regional TMP, include:

- Establishing a vision for Complete Streets in Durham
- Allow a Complete Streets approach to influence the planning and design process for regional roads
- Evolve existing road operation and maintenance practices
- Set performance measures for Complete Streets and monitor the outcomes following implementation

Regional Profile

Municipalities	Population (2016)	Land Area	Regional Road Network	Annual Capital Budget (2019)
8	645,862	2,524 km^2	839 km	$ 108,600,000

Modal Split

Walking	Cycling	Transit	Motor Vehicle	Other
2.99%	0.32%	11.27%	78.29%	7.13%

Figure 2 | Durham Region's location in Southern Ontario and the composition of its lower-tier municipalities.

3.3 Peel Region

Peel Region is an upper-tier regional municipality comprised of three lower-tier municipalities, which include a mix of urban, rural, and suburban land-uses (see **Figure 3**). Peel Region borders Toronto to the east and it is a key economic and residential area for the GTHA. Peel Region, similar to York Region, has a mix of high- and low-density residential area where it borders the City of Toronto – most notably in the City of Mississauga. Several GO Train and Bus stations and routes run through Peel Region, supporting commuter flows in and out of the downtown Toronto. Two local transit agencies, MiWay and Zum, offer local transit service within the Cities of Mississauga and Brampton that operate routes along local and regional roads. Some transit-oriented development has sprouted around transit hubs. In Caledon, Peel Region's northernmost municipality, the land-use is predominantly rural with several urban communities. Greenfield developments are common throughout the Region.

Peel Region does not have Complete Streets policies or guidelines. The Region's Official Plan does not mention Complete Streets but encourages multimodal accommodation along major transportation corridors. The Region's Transportation Master Plan recommends collaboration with local area municipalities to create Complete Streets and Community supportive designs on regional roadways. It also emphasizes the integration of land-use with road design. In 2013, Peel Region completed a Road Characterization Study (RCS) to begin planning and exploring a vision for multimodal regional roads. The study engaged community stakeholders to establish context-sensitive solutions in regional road design. As part of the RCS process, a set of road cross-sections were produced to serve as a starting point for developers designing new roadways in Peel Region, particularly in greenfield developments. Roadway projects that result in reconstructing significant portions of the roadway may also be required to uphold the cross-section outlined in the RCS. The RCS cross-sections consider facilities and right-of-way (ROW) space for active modes, goods movement, transit, motor vehicles, and parking in a range of roadway land-use contexts in rural, urban, and suburban environments. While the recommended ROW widths are not prescriptive, they typically include multiple, generously wide lanes for motor vehicles. The cross-section examples provided in the RCS include:

- **Rural Road** (30m ROW) | Rural farmlands, natural areas, or scenic landscapes with limited development.
- **Rural Main Street** (20m-26m ROW) | Roadways serving the commercial or residential centres of small towns, villages, and hamlets.
- **Urban Main Street** (45m ROW) | Roadways through high-density, mixed-use, walkable urban areas.
- **Suburban Connectors** (45m ROW) | Links between low-density residential and commercial areas with auto-oriented development.
- **Commercial Connector** (45m ROW) | Similar to Suburban Connectors but with some commercial activity along the roadway.
- **Industrial Connector** (45m ROW) | Roadways servicing warehousing and industrial development areas.

It should be noted that the design recommendations in the RCS predate the 2017 update to the TAC Geometric Design Guidelines for Canadian Roadways so the cross-sectional design recommendations and roadway design elements do not reflect current best practices. It is also worth noting the City of Mississauga has recently begun the development of a local Complete Streets Design Manual that will guide the planning and design of new local roads in the City.

Regional Profile

Municipalities	Population (2016)	Land Area	Regional Road Network	Annual Capital Budget (2019)
3	1,381,739	1,247 km^2	564 km	$ 1,300,000,000

Modal Split

Walking	Cycling	Transit	Motor Vehicle	Other
2.19%	0.29%	15.50%	74.33%	7.69%

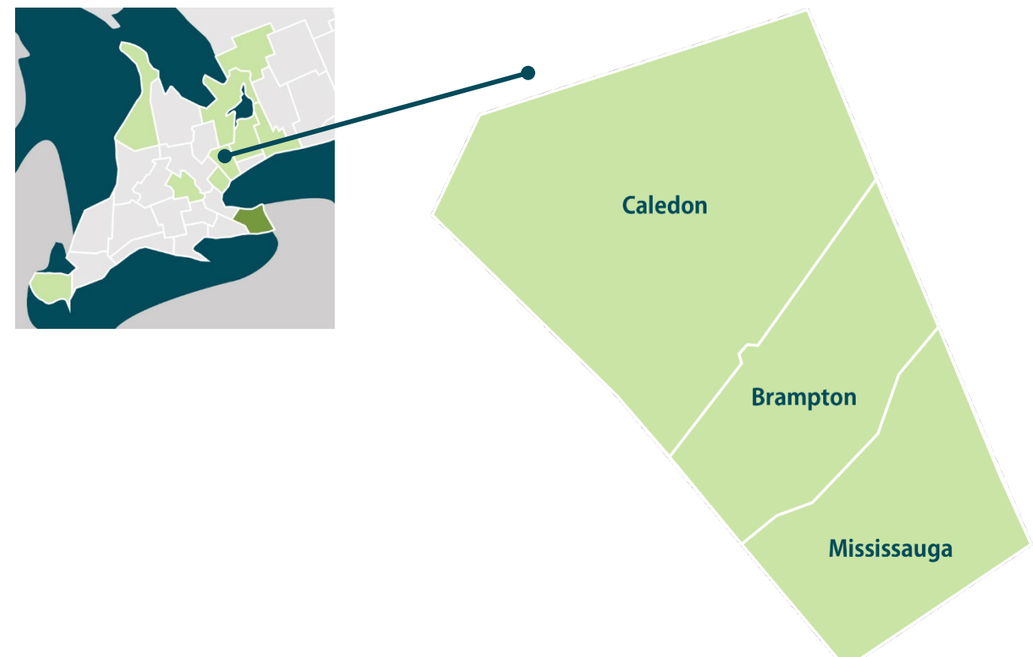


Figure 3 | Peel Region's location in Southern Ontario and the composition of its lower-tier municipalities.

3.4 Halton Region

Halton Region is an upper-tier regional municipality comprised of four lower-tier municipalities, which include a mix of urban, rural, and suburban land-uses (see **Figure 4**). Halton Region borders the City of Hamilton to the southwest and Peel Region to the east. Several urban centres across the Region, including Oakville, Burlington, Milton, and Georgetown (Halton Hills) are supported by Regional GO Bus and Train service that support the flow of commuters in and out of Toronto. Four local transit agencies accommodate local transit service in Halton's four lower-tier municipalities. While the southern areas of Halton Region that border Lake Ontario are urban and suburban, the majority of the Region's surface area is rural. New greenfield developments are common in Halton Region, however, significant portions of Milton and Halton Hills are protected conservation areas or farmland.

Complete Streets are not mentioned within Halton Region's Official Plan or Transportation Master Plan. The Official Plan does encourage multimodal accommodation along major transportation corridors and 'multi-purpose arterials' are defined as a major transportation facility within the document. This street type serves both major and minor arterial functions on Regional roadways and has a central focus on accommodating active transportation. This street type is loosely defined in the Official Plan but it's noted that the degree of land-use access is 'intermediate', transit should be supported, and the adjacent land-uses are typically high-density, mixed-use development. The type of facilities as well as their widths are not specified while a ROW requirement up to 50 m is indicated. Other Major Transportation Facilities referenced in the Region's Official Plan that are applicable to Regional Roads include Major Arterials, Minor Arterials, and Higher Order Transit Corridors. A summary of the Official Plan's Major Transportation Facilities is included below:

- **Major Arterials** | Accommodate all truck traffic, active transportation (pedestrian facilities and on- or off-road cycling facilities where possible), higher order transit, and high volumes of motor vehicle traffic. High degree of access control with transit-supportive, high-density, mixed-use development encouraged. (ROW requirements upwards of 50m)
- **Multi-Purpose Arterials** | Mix of roadway functions between Major and Minor arterials with a focus on accommodate active transportation (pedestrian facilities and on- or off-road cycling facilities where possible). High degree of access control with transit-supportive, high-density, mixed-use development encouraged. Intermediate degree of access control. (ROW requirements upwards of 50m)
- **Minor Arterial** | Accommodate local truck traffic, active transportation (pedestrian facilities and on- or off-road cycling facilities where possible), local transit, and moderate to high volumes of motor vehicle traffic. (ROW requirements upwards of 35m)
- **Higher Order Transit Corridors** | Connects inter-municipal and inter-regional transit via exclusive right-of-way for transit vehicles where possible. Connections to other modes, such as cycling facilities, should be accommodated near stations. Transit-supportive, high density, mixed-use development encouraged near stations. (ROW requirements unspecified)

Halton Region has not adopted formal Complete Streets policies or associated planning and design guidelines. The Region has adopted an Active Transportation Master Plan in 2015 and is in the process of updating its Official Plan. It is possible that future Complete Streets programming may be included as part of updates to Regional policy and design standards.

Regional Profile

Municipalities	Population (2016)	Land Area	Regional Road Network	Annual Capital Budget (2020)
4	548,435	964 km^2	343 km	$ 350,117,000

Modal Split

Walking	Cycling	Transit	Motor Vehicle	Other
3.11%	0.61%	10.84%	78.79%	6.65%

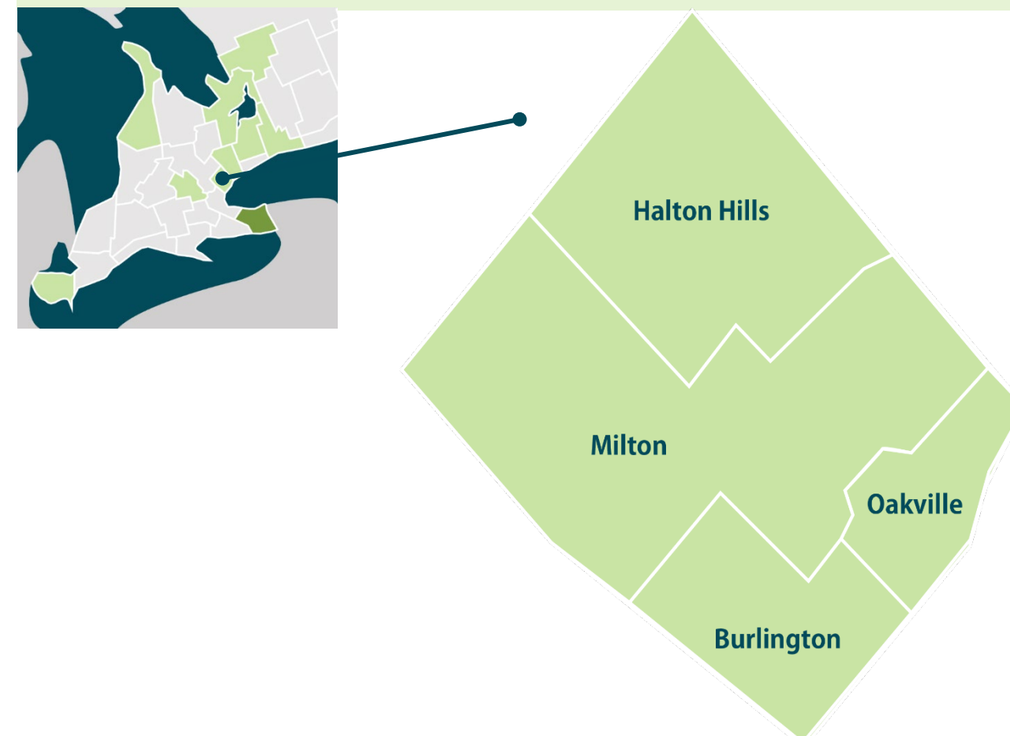


Figure 4 | Halton Region's location in Southern Ontario and the composition of its lower-tier municipalities.

3.5 Waterloo Region

Waterloo Region is an upper-tier regional municipality comprised of seven lower-tier municipalities, which include a mix of urban, rural, and suburban land-uses (see **Figure 5**). Waterloo Region is connected to the GTHA by Regional GO Train and Bus service, the latter of which runs during commuter hours to support commuter traffic in and out of Downtown Toronto. The three urban municipalities within Waterloo Region include the Cities of Waterloo, Kitchener, and Cambridge, which support a growing tech community and a myriad of post-secondary institutions that attract large volumes of young professionals to the Region. The growth in these areas, particularly in Waterloo and Kitchener, have resulted in rapid expansion of mid- to high-density, mixed-use developments in the local centre areas. Grand River Transit (GRT), the Region's local transit agency, offers local bus service in Waterloo, Kitchener, and Cambridge.

The Region and GRT recently completed the first phase of a Light Rail Transit (LRT) system in 2019 that connects several key employment, education, and high-density residential areas in Kitchener and Waterloo. There are currently plans to extend the LRT to key areas of south Kitchener and Cambridge. In addition to public transit, Waterloo Region has also made recent investments in expanding its active transportation network, which is demonstrated by its current separated cycling network pilot project that included 5 km of separated cycling facilities along regional roadways in urban areas. Waterloo Region also recently completed a streetscaping project that involved reconstructing a main street located in Uptown Waterloo (King St). This project was a joint iniative between the Region and the City and included lane width reductions, introduction of raised cycle tracks, and urban design improvements such as pedstrian level lighting and street furniture.

While not called a Complete Streets Design Guidelines, the Region has adopted Context Sensitive Regional Corridor Design Guidelines that provide guidance on the design of regional roadways to provide safe, convenient, and comfortable movement of goods and peeople with consideration for access management. This document was first developed in 2013 but has been identified as a resource for roadway planning and design projects in the 2018 Regional TMP. The Guidelines include general best practices on roadway design and establish a roadway classification system that incorporates principles of Complete Streets and urban design. The roadway classification system applies to arterial roadways that make part of the regional road network. Six roadway classifications are described in the Guidelines, three of which are applicable in rural areas. They include the following:

- Rural Connector (Rural)
- Rural Village – Main Street (Rural)
- Neighbourhood Connector – Main Street (Urban and Rural)
- Community Connector (Urban)
- Neighbourhood Connector – Avenue (Urban)
- Residential Connector (Urban)

The Guidelines go so far as to map the Regional Road Network and assign each classification to existing regional roadways in draft. Descriptions for each classification include quick references on the roadway's transportation function, level of land-use access, adjacent land-use context, ROW width, posted speed, intersection spacing, and high-level guidance on design recommendations for each mode. While sample cross-sections with dimensions are provided for each classification, general ROW recommendations are limited and the guidelines do not prescribe specific facilities or products for each class – noting that these are context-sensitive or discussed in other documents, such as the Region's Active Transportation Master Plan.

In 2019, the City of Kitchener adopted its own Complete Streets Guidelines that apply to roadways under the City's jurisdiction. It includes a Complete Streets classification system that is based on a traditional roadway hierarchy.

Regional Profile

Municipalities	Population (2016)	Land Area	Regional Road Network	Annual Capital Budget (2019)
7	535,154	1,369 km^2	1,180 km	$ 560,000,000

Modal Split

Walking	Cycling	Transit	Motor Vehicle	Other
4.41%	1.12%	5.93%	80.98%	7.56%

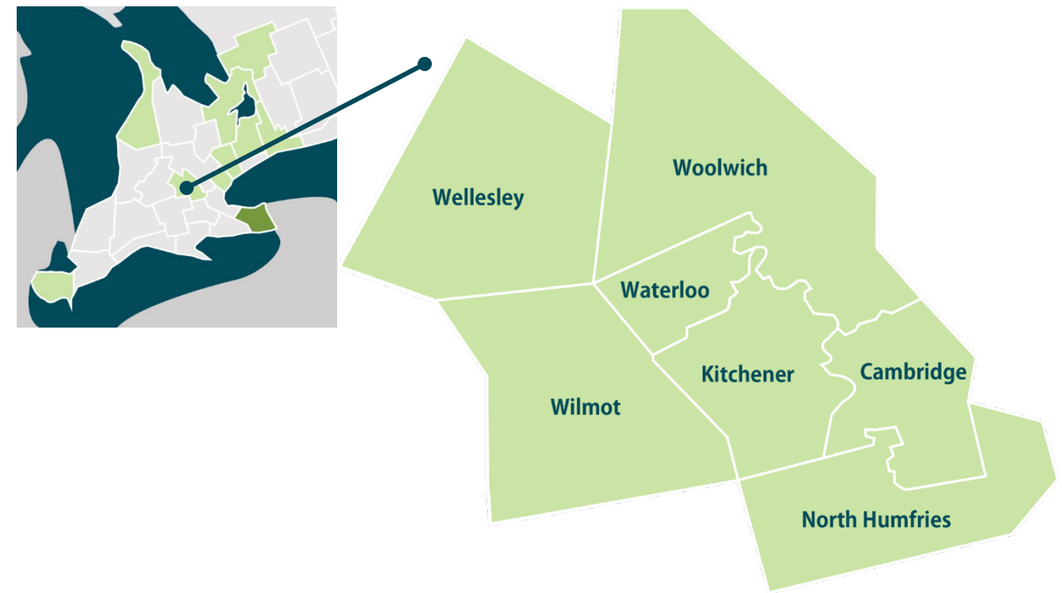


Figure 5 | Waterloo Region's location in Southern Ontario and the composition of its lower-tier municipalities.

3.6 Essex County

Essex County is an upper-tier municipality comprised of seven lower-tier municipalities and is predominantly rural with seven local municipalities, each with an urban centre (see **Figure 6**). Essex County is the southern-most municipality in Ontario and located adjacent to the City of Windsor, which includes two border crossings to the United States. Due to its proximity to the border, Essex County receives considerable truck traffic to support goods movement between the United States and Canada.

Essex County's current Regional Transportation Master Plan (WALTS) is shared with the City of Windsor. It was adopted in 2005 and clearly communicates that goods movement and automobile traffic are primary transportation objectives within the region. It notes that access management and corridor protection on existing roads should be applied ahead of roadway widening and new road construction to manage the efficient movement of goods through the City of Windsor and the County of Essex. While most of the County TMP focuses on optimizing vehicular travel, there is some recognition to the benefits of active transportation but only as it relates to dense urban areas. Discussion within the TMP would suggest that walking, cycling, and transit infrastructure should only be provided near intensive mixed-use developments and higher density land-use areas or otherwise positioned outside of the roadway, such as multi-use trails. Transit recommendations focus on expanding existing local transit service in Windsor to adjacent communities like the Town of LaSalle, which has taken affect. While there is some recognition that the Windsor-Essex Region should promote 'alternative transportation' (cycling, walking, and transit), the Regional TMP does not discuss multi-modal roadway design or Complete Streets.

Since the release of the Regional TMP, Essex County has proactively worked with its lower-tier municipalities to establish a County-Wide Active Transportation Study (CWATS) that identifies a cycling network and implementation plan across the seven municipalities. CWATS was first adopted in 2012 and is currently in the process of being updated in 2021. The project includes a phased implementation program that aligns with major roadway reconstruction and repaving to provide cycling infrastructure on select existing roadways across the County, including rural roadways outside of urban areas. This noteworthy effort exemplifies a change in the transportation paradigm toward multi-modal roadway design and the adoption of a Complete Streets approach. Several local municipalities across Essex County have also made strides to update local roadway guidelines and standards to include Complete Streets principles in part to encourage active modes among residents.

In 2014, the County of Essex adopted a new Official Plan. It notes that a review of the former 2004 Regional TMP is necessary to adjust for variations in previous projections in population growth. The Official Plan notes some transportation considerations that will be included in a future update to the TMP, such as better integration between local, county, and provincial transportation facilities as well as encouraging the implementation of safe, convenient, and visually appealing pedestrian facilities. While the Official Plan does not mention Complete Streets, one of its policy directives is to encourage its local municipalities to develop multimodal transportation systems.

Regional Profile

Municipalities	Population (2016)	Land Area	Regional Road Network	Annual Capital Budget (2019)
7	181,530	1,623 km^2	697 km	$ 10,300,000

Modal Split

Walking	Cycling	Transit	Motor Vehicle	Other
3.40%	0.99%	2.84%	85.65%	7.12%

Figure 6 | Essex County's location in Southern Ontario and the composition of its lower-tier municipalities.

3.7 Simcoe County

Simcoe County is an upper-tier municipality comprised of sixteen lower-tier municipalities and is predominantly rural with a number of urban communities, such as the Town of Collingwood (see **Figure 7**). Simcoe County borders two major urban areas, the Cities of Orillia and Barrie, and accommodates notable north-south commuter traffic between these cities and the GTHA. One GO Train Station and several GO Bus stops are located in Simcoe County to support Regional Commuter traffic between the County, Barrie, and the GTHA. In addition to commuters, Simcoe County's regional road network receives seasonal and weekend visitors who come to visit local ski hills in the winter, Lake Simcoe in the summer, and an assortment of breweries, conservation areas, trails, and other attractions available year-round.

In 2014, Simcoe County updated their TMP and indicated that one of their key goals is to establish a road network that promotes walking, cycling, and transit. To support the achievement of this goal, the County will be adopting a Complete Streets approach as part of regional roadway cross-sectional designs. As part of the TMP update, the County revisited their road classification system, which consisted of three arterial road classes, and identified opportunities and challenges associated with their existing design. While the TMP Update did not include revisions to the road classification system, there is considerable discussion around how they can be improved. Several Complete Streets recommendations are included in the TMP update that may be considered in the future when Simcoe County develops Complete Streets design guidelines. These recommendations include 3D visual comparisons between existing and potential (aspirational) road cross-sections in urban and rural environments.

In lieu of Complete Streets design guidelines, Simcoe County has established a toolbox for designers implementing multi-modal roadways. The toolbox is a high-level overview of general design recommendations for each mode that notes benefits of applying Complete Streets principles, such as the addition of dedicated or separated cycling facilities and the reduction of travel lane widths to achieve traffic calming. As part of the TMP update, the County also established a 5-Step Complete Streets Design Process, which includes:

1. Determine the roadway context by assessing adjacent land-use and reviewing the roadway schedule identified in the County's Official Plan.
2. Identify the needs and objectives of the community as part of the planning and design phase to ensure that the desired modes are reflected in the preliminary design phase.
3. Select a road class that addresses the inputs received in Steps 1 and 2.
4. Identify the appropriate road (curb to curb) and boulevard elements for the selected road class and surrounding context. The process to identify and select these elements should be iterative and may require adjustments before finalization.
5. Develop detailed cross-sections based on the preliminary cross-sectional design created in Step 4.

Regional Profile

Municipalities	Population (2016)	Land Area	Regional Road Network	Annual Capital Budget (2019)
16	307,050	4,860 km^2	848 km	$ 120,000,000

Modal Split

Walking	Cycling	Transit	Motor Vehicle	Other
4.06%	0.56%	2.87%	84.64%	7.87%

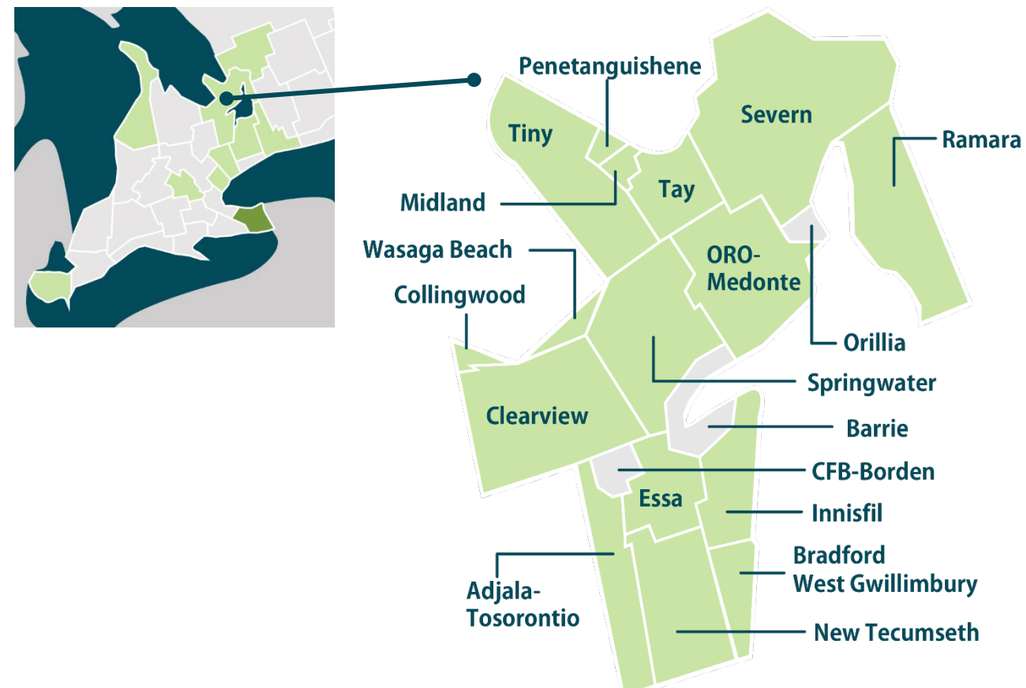


Figure 7 | Simcoe County's location in Southern Ontario and the composition of its lower-tier municipalities.

3.8 Bruce County

Bruce County is an upper-tier municipality comprised of eight lower-tier municipalities and is predominantly rural with some hamlets and small towns (see **Figure 8**). Similar to many other rural municipalities in Ontario, Bruce County is auto-dependent with limited infrastructure to support transit and active transportation on its County Road network. This road network supports County-wide agricultural activity as well as seasonal and weekend visitors drawn to the beaches, cottages, and provincial parks located along the Bruce Peninsula.

The Bruce County Official Plan does not refer to Complete Streets or multi-modal roadway design. Bruce County does not have a TMP but is currently in the early developments stages to create one. Recent public consultation has indicated that the TMP will include consideration for motor vehicles, goods movement, cycling, and walking but does not specify a Complete Streets approach. In 2015, the Centre for Active Transportation (TCAT) and WSP (formerly MMM Group) completed a Complete Streets Policy and Implementation Guide for Bruce County and Grey County. The development of the Guide included a business case for the development of Complete Streets in these counties and policy recommendations to support the delivery of a Complete Streets program. The document was based heavily off of some of the preliminary policy work that had been completed for Niagara Region. Some of the recommendations included in the Guide that may be adopted in future County plans, such as the upcoming TMP, include:

1. County-level policy recommendations on Complete Streets should be shared with local municipalities so that they may better understand the community benefits of Complete Streets and explore the opportunity of developing local Complete Streets policy or guidelines.
2. New Complete Streets policy should build upon existing policy, such as those identified in Official Plans and TMPs.
3. Existing policy deficiencies should be identified and updated based on priority to establish support for Complete Streets and sustainable transportation (e.g. active transportation and transit).
4. New policy should use the 10 elements of comprehensive Complete Streets policy defined by the National Complete Streets Coalition.
5. Consider accelerating the development of policy and infrastructure in communities with a readiness to adopt Complete Streets principles and where there is the greatest likelihood of success.
6. Bruce County, Grey County, and Grey Bruce Health Unit should work together to create a Complete Streets action plan.

Regional Profile

Municipalities	Population (2016)	Land Area	Regional Road Network	Annual Capital Budget (2018)
8	66,491	3,979 km^2	608 km	$ 12,138,994

Modal Split

Walking	Cycling	Transit	Motor Vehicle	Other
5.96%	0.62%	0.67%	86.02%	6.73%

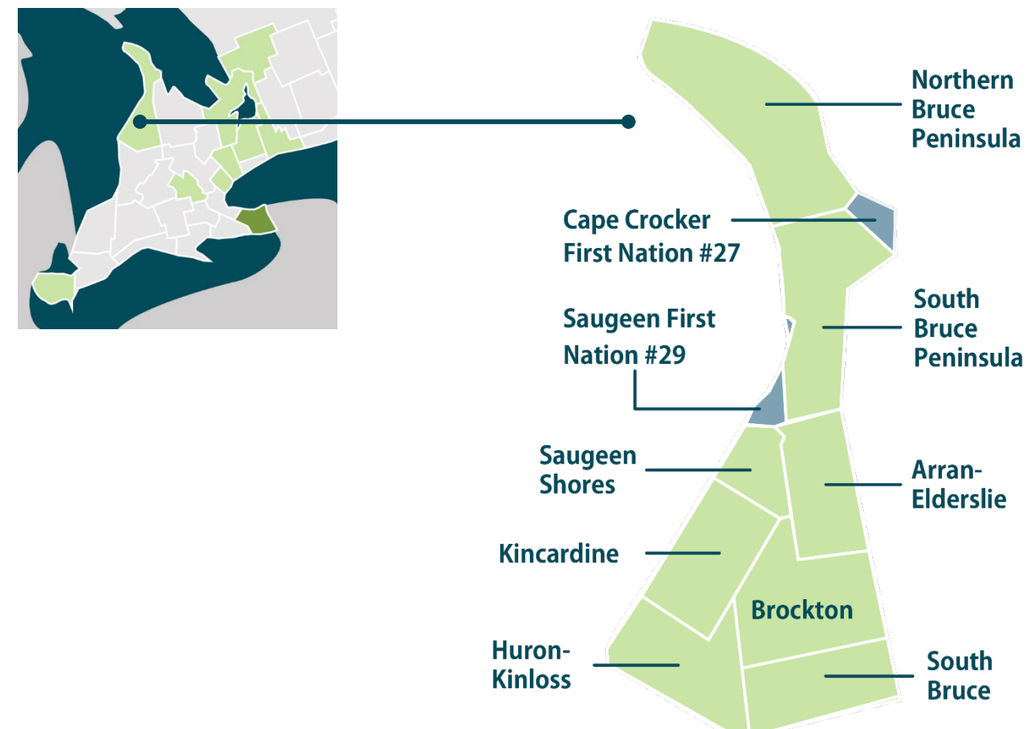


Figure 8 | Bruce County's location in Southern Ontario and the composition of its lower-tier municipalities.

3.9 District Municipality of Muskoka

The District of Muskoka is an upper-tier municipality comprised of six lower-tier municipalities and is predominantly rural with three town, each with an urban centre and three townships (see **Figure 9**). Similar to many other rural municipalities in Ontario, Muskoka is auto-dependent with limited infrastructure to support transit and active transportation on its District Road Network. Muskoka is well-known as a retirement and seasonal vacation community that attracts large volumes of seasonal and weekend visitors in the summer.

The District of Muskoka does not have a TMP or any Complete Streets Guidelines or Policies, though several local municipalities have transportation and or active transportation plans (e.g. Huntsville and Bracebridge). The District's Official Plan (2019) does not mention Complete Streets but notes that one key transportation objective for Muskoka includes establishing an "integrated transportation system that safely and efficiently accommodates various modes of transportation including trains, automobiles, trucks, water, air, public transit, and active transportation." The promotion of public transit and active transportation is an additional objective that is somewhat related to Complete Streets. It should be noted, however, that the Official Plan does not indicate much consideration for non-motorized modes in the description of District's three road classes. In the District's Active Transportation Strategy adopted in 2010, only paved shoulders and shared road signs are recommended as facility types for cycling routes on District Routes. These recommendations may reflect former planning and design practices within the province that predate the adoption of the Ontario Traffic Manual Book 18: Cycling Facilities in 2013.

Regional Profile

Municipalities	Population (2016)	Land Area	Regional Road Network	Annual Capital Budget (2019)
6	60,599	3,938 km^2	630 km	$ 27,000,000

Modal Split

Walking	Cycling	Transit	Motor Vehicle	Other
5.14%	0.35%	0.88%	84.84%	8.79%

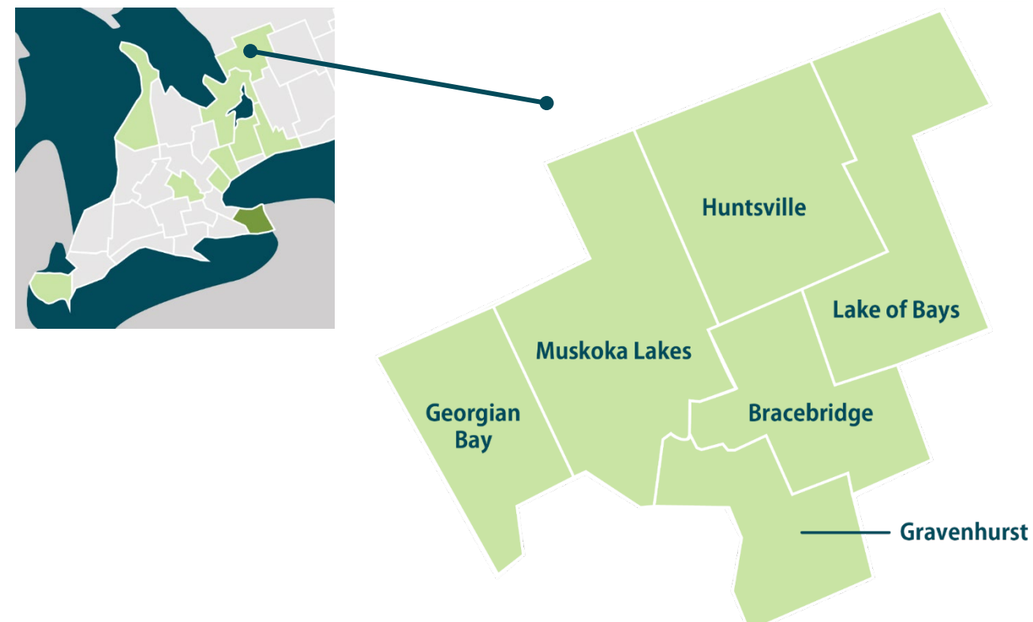


Figure 9 | District Municipality of Muskoka's location in Southern Ontario and the composition of its lower-tier municipalities.

3.10 Summary of Key Themes

Niagara Region is unique in that it has adopted Complete Streets policy and preliminary complete street foundations as part of the recently adopted Transportation Master Plan (TMP) (as documented and assessed in Discussion Paper #1). The CSDM is being developed as a means of furthering the Region's toolkit as it relates to the design and implementation of complete streets. Unlike Niagara Region, other upper-tier regional municipalities in Ontario vary in their level of commitment to the Complete Streets approach and the development of multimodal road networks. While some of the more populated, "urban" municipalities have successfully implemented Complete Streets projects, the other municipalities reviewed have not identified a clear approach to Complete Streets programming – with several who have not yet integrated or adopted references to Complete Streets into policy such as a TMP or OP. Niagara Region, in contrast, has demonstrated an early interest in Complete Streets through their TMP, OP, and previously completed studies into the potential benefits of Complete Streets in their communities. Nonetheless, there are trends and lessons in other municipalities that should be considered by Niagara Region as they move forward with Complete Streets programming and the development of the CSDM.

Key Theme #1: Complete Streets Classification System

Establishing a Complete Streets or multi-modal classification system is a strategy that has been adopted by many of the municipalities. The Regions of York, Peel, and Waterloo have adopted road classification systems that include Rural, Hamlet, and Commercial Arterial classes and have established design guidance for these classes that is similar in detail to Niagara Region's TMP. While considerable flexibility in their guidance allows for open interpretation and application of these roadway classes, these regional municipalities have successfully implemented several Complete Streets projects demonstrating a level of success in use and implementation. Waterloo Region, for example, has implemented several Complete Streets in the last few years as part of major reconstruction and pilot (retrofit) projects. One of these projects included significant urban design improvements and the implementation of separated cycling infrastructure on a historic main street in the City of Waterloo that resulted in noticeable improvements to traffic calming. The completion of this project and the proliferation of both reconstruction and retrofit Complete Streets projects demonstrates how a classification system can be implemented in different ways while maintaining consistent modal design objectives. Furthermore, these projects were implemented after a Complete Streets classification system was defined and adopted. It is worth noting, however, that a suite of standard products for each road class has not been adopted by almost all of the municipalities. Instead of a list of products and treatments that can be applied for each class, municipalities have chosen instead to identify modal priorities and principles that should be applied in each road class, allowing practitioners the flexibility to evaluate different design options on a project basis.

Key Theme #2: Regional Transit Integration and Priority

The municipalities reviewed vary in the prioritization of transit in their approach to Complete Streets. The municipalities that border Toronto have demonstrated a clear investment in transit infrastructure compared to others, likely due to cross-municipal commuter traffic as well as the investment in regional systems of transit provision. The Regions of York and Peel have gone so far as to create dedicated transit lanes and transit priority lanes to efficiently move large volumes of buses on regional roads. By creating transit priority on key corridors, these regions have incentivized transit usage as a fast alternative to single occupancy vehicles. Waterloo Region developed cross-sections that include configurations for shared and dedicated lanes for the recently implemented LRT. In contrast, rural municipalities have demonstrated limited investment in transit priority designs which typically occurs to a lack of community need and demand. While these municipalities may not have regional transit systems, some municipalities (ex. Essex County) have local transit agencies operating on select regional roads.

Halton Region, for example, does not have a regional transit commission but has identified transit priority lanes and road classes in their OP, which demonstrates an understanding of how local transit operates on regional roads with local area municipalities looking to invest in community-specific transit systems. While the implementation of transit priority strategies may go beyond the scope of this project, Niagara Region may wish to consider roadway design strategies that support the efficient movement of busses on regional roadways.

Key Theme #3: Separated Cycling Infrastructure

Separated cycling infrastructure is becoming increasingly more common in cross-sectional designs for higher-speed (e.g. >50km/h) and high-volume roadways due to significant updates to provincially and nationally accepted design guidelines and standards (see Discussion Paper #1 for more detail). As noted in the Ontario Traffic Manual Book 18: Cycling Facilities, separated cycling infrastructure (e.g. separated bike lanes, cycle tracks, and in-boulevard multi-use pathways) provide an elevated level of comfort to interested but concerned cyclists on busy roadways. Many transportation agencies and organizations, such as the Transportation Association of Canada (TAC), Institute of Transportation Engineers (ITE), and National Association of City Transportation Official (NACTO), have recognized separated cycling infrastructure as suitable for all ages and abilities – depending on quality, of course. The Region's of York and Waterloo have implemented many separated cycling facilities in recent years to align with these principles. What is most noteworthy in their approach is the commitment to implement cycling infrastructure regardless of their roadway project type. For these municipalities, the implementation of separated cycling infrastructure and Complete Streets design is not limited to major roadway reconstruction. While demonstration cross-sections for their classifications may show a cycle track in the boulevard for urban/suburban arterials, these municipalities have implemented separated bike lanes in resurfacing and pilot projects so that some form of separation is available before scheduled reconstruction in the future. Separated cycling infrastructure is not identified to the same degree in the policies and guidance of rural municipalities, however, consideration has still been made for cycling infrastructure on rural roads. The County of Essex Active Transportation Strategy (CWATS) has included the implementation of paved shoulders on cycling routes that were previously gravel shoulders. Essex County has also implemented a cycle track and a separated bike lane on rural roads near select hamlets. Based on the review of regional municipalities, improvement to on-road cycling infrastructure on roadways in Ontario are continuing to include more and more separation. In Durham Region's update to the regional cycling plan there is a significant increase in the number of separated cycling routes and facilities with the acknowledgement of the form and function of the regional road network. While separation may not be necessary on all roadways, it remains an important consideration to attracting interested but concerned cyclists and can be implemented into reconstruction, new construction, retrofit, and pilot projects.

4.0 Part 2. Literature Review

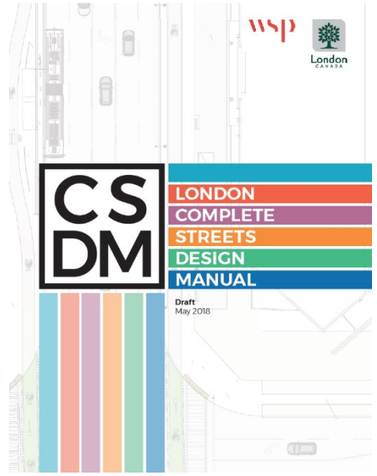
Complete Streets Design Manuals and Guidelines are currently being developed and/or have been adopted by many municipalities and agencies across North America. These documents are typically created by both upper-tier and lower-tier municipalities with medium to large urban centres that desire roadway design guidance that is tailored to the local context of their town or city. Strategies to accommodate alternative modes within existing narrow rights-of-way dominate the content of these documents. For some municipalities, the development of manuals or guidelines is performed in conjunction with updates to roadway standards – making them prescriptive documents. While Complete Streets guidelines and manuals are not common among rural and upper-tier municipalities, some agencies have created generalized Complete Streets guidance that may be applied in wide range suburban, small town, and rural contexts. Regardless of their land-use context, all of these guidelines demonstrate perspectives and recommendations on how roads may be configured to accommodate multiple modes with consideration for accessibility, safety, and comfort.

As part of the Best Practices phase of the Niagara CSDM, a literature review of manuals, guidelines, and standards from select municipalities and agencies was completed to understand lessons learned from other jurisdictions. The documents selected address Complete Streets design and planning in a range of land-uses, including urban, suburban, rural, and small-town environments. Priority was made on selecting documents that were developed by Canadian municipalities with winter climates comparable to Niagara. Additional documents created by American municipalities and agencies were reviewed because they reflect best practices that have been applied in other jurisdictions or they include in-depth discussion on rural roadway design, which is under-represented in other documents. The following elements were considered when reviewing each document:

- **Design Considerations** | The breadth of design priorities and recommendations.
- **Cross-Section Examples** | Description of sample renderings and typical cross-sections, noting the level of flexibility for ROW and lane widths.
- **Tools & Strategies** | Processes, strategies, and supporting tools designed to assist practitioners planning, design, implementing, and maintaining Complete Streets.
- **Applicability** | Relevancy of the document's content to Complete Streets in Niagara Region.
- **Lessons Learned** | Key takeaways from each document.

4.1 City of London

The London Complete Streets Design Manual was adopted in 2018 to guide the way streets are designed in London. The Manual is a resource for practitioners designing and implementing Complete Streets in London, including detailed guidance pertaining to the planning and implementation process, tools to assist in the prioritization of Complete Streets elements, and cross-sections for a robust classification system suitable for urban and rural application. The guidance included in the manual is flexible and may be applied in new construction, retrofit, pilot, or reconstruction projects.

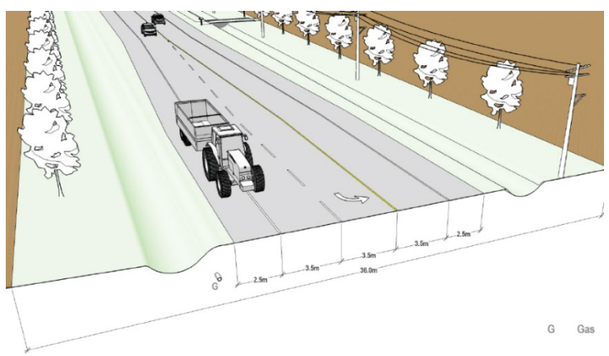


Design Considerations

The Manual includes three chapters dedicated to Complete Streets Design that address the design elements for different transportation modes (e.g. walking, cycling, transit, motor vehicles, parking, goods movement), midblock design treatments for each of the eight (8) Complete Streets Classifications, and intersection design treatments for common arterial/collector intersection scenarios. By describing the elements and design considerations at the forefront of the document, practitioners may use the CSDM as an encyclopedia of sorts to understand typical roadway elements and considerations for different modes before embarking on the process to design a complete street. Significant effort is placed into describing how users interact and identifying strategies to mitigate collision risk. For example, refuge islands and extended signal timing is recommended for pedestrian crossing treatments on wide, high volume roadways. Where cycle tracks are recommended on corridors with high-frequency transit, transit boarding islands with 'cyclists yield to pedestrians' pavement markings and signage on the adjacent cycling facilities are used to provide sufficient curbside queuing space for transit users and alleviating pedestrian-cycling conflicts – all while maintaining a separating cycling facility that is comfortable for a wide range of cyclists. Design guidance also address utility placement (above and below grade), drainage, lighting, and streetscaping recommendations.

Cross-Section Examples

The Complete Streets classifications presented in the manual feature typical cross-section dimensions. Six urban and two rural classifications are included in the City's classification system, which was adopted in 2016 as part of the City's Official Plan review – prior to the development of the Manual. The classification system includes main street, arterial, collector, and local roadway classes that have been updated to the context of Complete Streets. Example renderings highlight a mix of new construction and retrofit applications with supporting text that assists practitioners in the design process.



Tools & Strategies

An entire chapter of the Manual is dedicated to outlining the planning and design process. The chapter includes tools (workflows, checklists, decision trees, and appended Excel files) that assist practitioners through the process of implementing a Complete Street. These tools include:

- **Process for Complete Streets Planning and Design.** A workflow describing goals for each of the phases in the implementation process and corresponding tools in the CSDM that may be used to assist in each phase.
- **Workflow for Developer-Led File Manager Projects.** A workflow describing the goals of the City's four-stage File Manager review process for development applications and the tools in the Manual that may be used to assist developers and City staff in each stage.
- **Complete Streets Auditing Tool.** An Excel file that indicates the relative priority ranking for transportation modes based on each Complete Streets classification.
- **Street Conditions/Priority Guideline Tool.** A table that describes, at a high level, what the relative priority levels mean for each transportation mode in the Complete Streets Auditing Tool.
- **Project Scope Tool.** A decision tree that identifies the appropriate project scale for a specific corridor, which may be helpful during the planning and conceptualization phases
- **Checklist for Designers/Reviewers.** A checklist that outlines steps and considerations that should be made by designers involved in the conceptualization and design phases for a Complete Streets project.
- **Stakeholder Mapping Tool.** Lists of internal and external stakeholders in London that may require consultation as part of a Complete Streets project.
- **Street Element Decisions Making Tool.** A decision tree to assist practitioners in determining whether a conceptual cross-section may be implemented in a given ROW and identifying suitable alternatives where the ROW is not wide enough.

Applicability

The Manual is very applicable to Niagara Region. It's guidance centres around a robust Complete Streets classification system, which include rural and main street classes. Recommended widths, elements, renderings, and design considerations are provided for each of the Complete Streets classes and intersection concepts. The Manual outlines a clear process for the planning and design phases of Complete Streets projects. It does not, however, address winter maintenance or provide a suite of standard products, which are desired components for the Niagara CSDM project. In addition, staff and stakeholders have expressed an interest in utilizing this manual as the basis for development where applicable.

Lessons Learned

- Tools should be created to assist practitioners at every stage of the Complete Streets planning and design phase but should not be so exhaustive that it complicates the process or deters users from using the CSDM.
- Tailoring guidance around pre-established Complete Streets classifications can be done successfully so long as there is cross-departmental buy-in with the proposed classes and associated guidance.
- Intersection and crossing treatments are as important as midblock corridor design and a CSDM should describe key design consideration and recommendations for both topics.

4.2 City of Toronto

The Toronto Complete Street Guidelines were approved in 2017 and is a tool to implement the vision for streets identified in the Official Plan (OP). The guidelines provide city, consultant, developer, and community groups with information on how to design streets that meeting city-wide objectives. The Guidelines apply to all street design projects in the City and are highly visual with photos, renderings and figures throughout the document. Street typologies are for urban cross-sections and are intended to be aspirational. Design guidance is intended to be integrated with the City's other standard design guides and engineering standards relative to Complete Streets.

Design Considerations:

The Toronto Complete Street Guidelines is made up of nine chapters. Each design chapter includes a rendering that demonstrates design principles and is followed by text that describes the principle.

Design considerations are provided in each chapter for Pedestrians, Cycling, Transit, Green Infrastructure, Roadways and Intersections. General design principles, a context-sensitive design section and key design elements are included in each chapter. The context-sensitive design section provides guidance on how to select design elements appropriate to the context. Key design elements are descriptive. No dimensions, tables or targets are prescribed for design elements indicating a high-level of flexibility.

The City of Toronto has developed a wide range of design documents that are used in combination with the Complete Streets Guidelines including but not limited to Green Streets Technical Guidelines, Urban Design Streetscape Manual, On-street Bikeway Design Guidelines (draft) and road classification system.

Cross-Section Examples

Chapter 2 of the guidelines includes directions on how to establish a street type by understanding placemaking and movement roles and applying relevant overlays to a street. 16 aspirational street typologies and 2 sub-typologies are included in the guidelines and are intended to provide a starting point in the complete streets design approach. Cross-sections are examples not intended for direct application. Dimensions and standard design elements are not included with cross-sections.

Street typologies are separated by land-use through downtown and centres, neighbourhood, residential, commercial, mixed-use and parks. Other designations include Main Street, Connector Street, Shared Streets, Access Street, and lanes.

Tools & Strategies

Chapter 3 of the guidelines includes a five-step design process that is complimented with checklists through each step. The guidelines acknowledge that the design process is general and is best suited to large projects such as major reconstruction and environmental assessment studies but adaptable to many different project types.

The five-step design process includes:

1. Identify the context
2. Establish Design Priorities
3. Develop Decision-Making Framework and Metrics
4. Assemble/Evaluate/Refine (repeat if necessary)
5. Finalize Preliminary Design + Document.

A sample decision making framework template and sample criteria and metrics are included to support step 3. Public engagement and stakeholder consultation are not explicitly included in the design process steps but expected throughout the design process. It is expected that key voices are identified early in the process and involved throughout with documentation of key decisions to ensure a transparent and defensible product.

Applicability

Toronto's approach to defining street types through a street's placemaking and mobility role and then applying overlays can be a consideration for Niagara Region. This methodology supports the development of context specific designs that cover dense urban environments, hamlets, and rural areas.

Elements of checklists and decision-making templates that accompany the five-step design process could inform a set of tools for Niagara. Templates are simple and easy to use and support the designer in documenting key decisions throughout the design process.

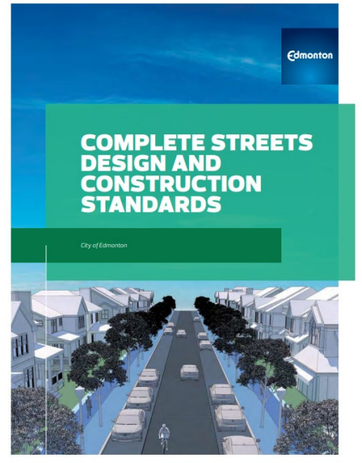
Design principles and the visual communication through street renderings in each chapter assists the reader's understanding. Design principles provide a framework that helps to generate ideas through the street design process and helps the public understand why certain features may be applied.

Lessons Learned

With 16 aspirational street typologies, 2 sub-typologies and no dimensions or standard design elements, it can be difficult to understand how to apply each cross-section. There may be value through the Niagara approach to focus on refining the number of cross-sections and including an example of how to apply the street typology in the street design process. The guidelines may prove to be more challenging as they relate to implementation as they do not provide enough detail on cross-section elements to complete a street design from start to finish. The guidelines do not consolidate the City's design practices into a single resource. As a result, practitioners and the public must reference other documents to understand how to implement the guideline.

4.3 City of Edmonton

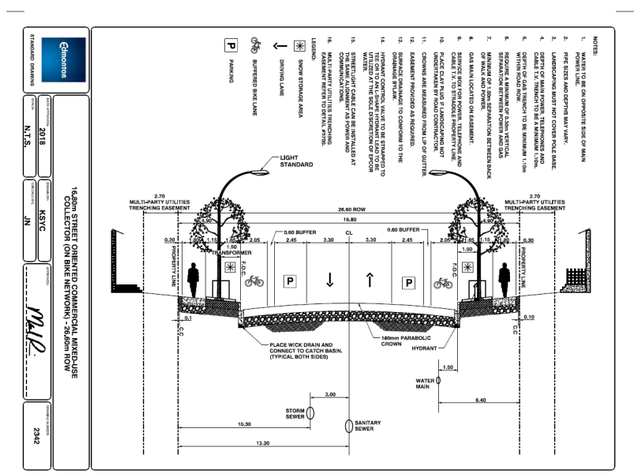
The Edmonton Complete Streets Design and Construction Standards (CSDCS) were released in 2018.The CSDCS provides a single point of reference that supports the planning, design, and construction of Complete Streets in Edmonton. The CSDSC integrates and replaces the Complete Street Guidelines (2013) and Volume 2: Roadways Design and Construction Standards (2015). The primary audience includes engineers, planners, and the development industry. The CSDCS apply to the planning, design, and construction of all streets including both greenfield and renewal/retrofit projects. The standards include a method to establish a street typology and 28 cross-sections intended for greenfield use that range from urban commercial/residential/mixed-use/industrial on and off the bike network and rural industrial.



Design Considerations

The CSDCS is broken up into three broad chapters: Section 1.0 Concepts and Philosophy for Complete Streets Design, Section 2.0 Design Process, Trade-Offs and Evaluation, and Section 3.0 Design Requirements for Complete Streets Design. Section 3.0 includes 15 sub-sections with information on design elements separated by street design zones and information on specific contexts including: general, travelled way, public realm, roadside, off-street paths/trails, intersections, offsets and utility alignment, traffic calming, shared streets, reverse housing lanes, and alleys, temporary roads and turnarounds, vehicular barriers, cul-de-sac, industrial streets, wildlife passages, and standard detail drawings.

Each sub-section is supported with photos, renderings, figures and tables. Tables include lower and upper limits and a target value with supporting text that describes how to select dimensions according to different contexts. The standards are highly technical and moderately flexible. Designers are required to select design elements and dimensions in alignment with the street type and modal priority appropriate for the context.



Cross-Section Examples

Two approaches are included for establishing street typologies and cross-sections. The first includes a methodology to establish or categorize a street into a street type. The street type is described through a three-part definition that includes relationship of buildings to the street (street-oriented or non-street oriented), land-use context (residential, community destinations and open space, commercial/mixed-use and industrial), and functional classification (freeway, arterial, collector, local, alley, shared street and pedestrian-only street).

The second approach includes a set of 28 cross-sections as part of the standard detail drawings and are intended for greenfield development. The cross-sections are separated between urban/rural, residential/commercial/mixed-use, street orientation and bike network. Rural cross sections are limited to industrial contexts. The standard cross-sections include several right-of-way widths and dimensions for specific design elements.

Tools & Strategies

A nine-step street design process is included in Section 2.0 of the standards. Each step includes a general description about how to establish project goals/scope, identify the street typology and modal priority. Considerations when making trade-offs are discussed in Section 2.2 and associated strategies range from modifications to design speed to the removal of lanes. The trade-offs and design exceptions process mirror the Transportation Association of Canada Geometric Design Guidelines for Canadian Roads process. Design exceptions are required for design elements that fall outside of the recommend range included in the standards. A design exception template is included with the standards.

Step 2 Create Engagement Plan outlines the activities that will be used to engage stakeholders and public for each of the subsequent steps in the Design Process. The Engagement plan also identifies the level of engagement for stakeholders and the public based on the City's Public Engagement Policy C593.

Applicability

The CSDCS were created to better support implementation of Complete Streets. Engineers, Planners and the Development Industry are required to apply CSDSC as the standards integrated and replaced the Complete Streets Guidelines and Volume 2 Roadway Design and Construction Standards. The standards provide enough detail to support a conceptual, preliminary and detailed design of a street. The Niagara CSDM could apply a similar strategy to support implementation of Complete Streets.

Design considerations included in the standards are Edmonton specific. Each design element was established based on an understanding of winter operations and maintenance practices. Additional detail is provided on elements such as cycling to reflect Edmonton's experience with cycle infrastructure. Niagara's design elements should consider the impact of winter operations and maintenance practices – as noted through considerable input from staff and stakeholders. Specific elements in the CSDCS may be valuable to reference.

Lessons Learned

The CSDCS are extensive and reflect the evolving experience of implementing Complete Streets in Edmonton. The level of detail and specificity regarding certain design elements may not apply in the Niagara context as a regional body.

Navigation through the CSDCS could be enhanced through an improved table of contents and addition of symbols or colours. A high-level of familiarity with the document is required to easily navigate between tables and sections.

4.4 City of Calgary

The City of Calgary Complete Streets Policy and Guide was approved in 2014. The Guidelines provide the City of Calgary staff and the development industry guidance on how to incorporate Complete Streets concepts into the planning (including engagement), design, and construction of new streets or the reconstruction of existing streets. Greenfield plan submissions must conform to the Complete Streets policy and meet or exceed the design standards contained in the Design Guide for Subdivision Servicing (2014 DGSS); Section II of the DGSS reflects the Complete Streets Guide. Retrofit streets must adhere to the policy expectations and procedures. The guidelines include limited flexibility as specific values are included for design elements and greenfield developments are required to apply the DGSS. Greater flexibility is permitted for retrofit designs.

2014
Complete Streets Guide

DOCUMENT PURPOSE

The Complete Streets Guide has been created to foster a better understanding of the Calgary Transportation Plan (CTP) and Municipal Development Plan (MDP). It provides guidance for the implementation of policies and concepts contained in these plans.

The Guide provides direction to City Administration and to the development industry on how to incorporate Complete Streets concepts (including enhanced public realm) into the planning, design, and reconstruction of existing streets and construction of new streets. Reconstruction (or retrofit) guidance is the primary focus of the Guide.

In conjunction with the development of this Guide, major revisions have been made to The City's current new Street Design Standards to accommodate pedestrians, cyclists, street trees, and low-impact development (e.g., source control practices for storm water) while maintaining existing right-of-way requirements. These new standards replace the 20-year-old existing standards contained in The City of Calgary Design Guide for Subdivision Servicing.

The latest electronic versions of both the Complete Streets Guide and the Design Guide for Subdivision Servicing can be found at the Complete Streets webpage: www.calgary.ca/completestreets.

Calgary Transportation Plan and Complete Streets

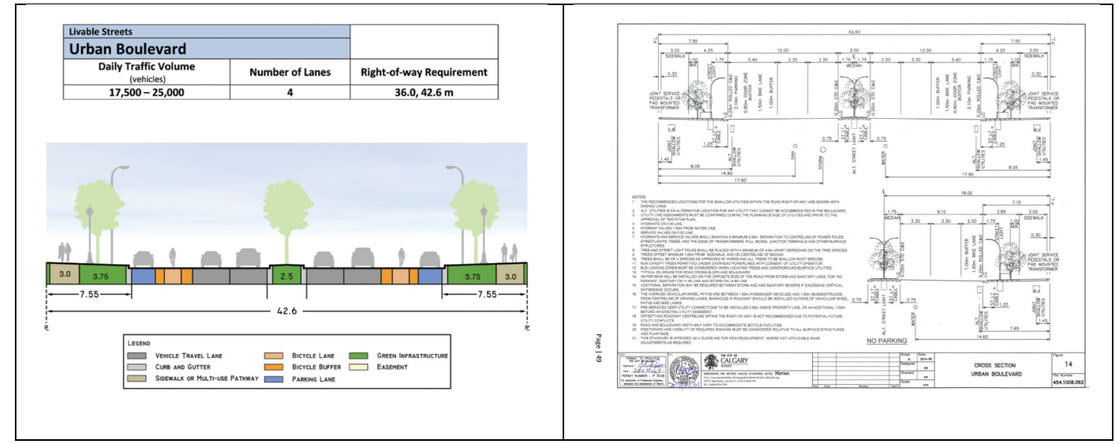
Design Considerations

The guidelines are divided into six chapters and include guidance on street classification, network design guidelines, street design guidelines, retrofit street design guidelines and process, new street design standards, and costs and funding. Chapter 3 includes design considerations for general practice, pedestrian design, bikeway design, transit design, traffic calming design, streetscape design, intersection design and access management. The guidelines are complimented with the 2014 DGSS which include several cross sections, corner radii and corner details, general information, roadway design standards, pedestrian, cycling and transit infrastructure, guard rails, sound attenuation, and emergency access requirements.

The guidelines include several photos and supporting text but have no design tables. A summary section at the end of each design consideration is provided that includes key takeaways and specific dimensions for elements. The guidelines were created in 2014 and as a result may include some outdated practice (i.e. bike facility selection). The 2014 DGSS includes specific design parameters and cross-sections for greenfield application.

Cross-Section Examples

Calgary's cross-sections or typologies are described as classifications and are delineated by context and focus on pedestrian, cyclists, and transit users. 13 specific street classifications were created with defined priorities or level of accommodation for each mode. Classifications include a range of streets that fall into "four families" of streets that vary by function (arterial street) to more context specific classifications (Urban Boulevard) and include descriptive text about the classification's role. Cross-sections included in the guidelines are generalized with detailed information included in the 2014 DGSS.



Tools & Strategies

A specific design process is not included with the guidelines. Network design guidelines are included with tools that are used to evaluate the effectiveness such as a connectivity index. Nine street design principles are included to inform the design of streets. Principles of road ROW variance are also included in the policy trade-offs through the design process. A retrofit street design process is also included in the guideline that includes a context sensitive solutions process design and example case studies. The 2014 DGSS is used as a tool to implement complete streets in greenfield contexts.

Applicability

Network design guidelines may be applied to large site developments or redevelopments and in retrofit situations when evaluating the role of the street. This framework ensures that a broader lens is applied to a street design.

Principles for road ROW variance may be a useful tool to assist discussion on trade-offs as part of the Complete Streets design process.

The details included in the Design Guide for Subdivision Servicing provide clear standards for implementation of Complete Streets in greenfield contexts. This approach may be valuable in growths areas where rapid development is expected.

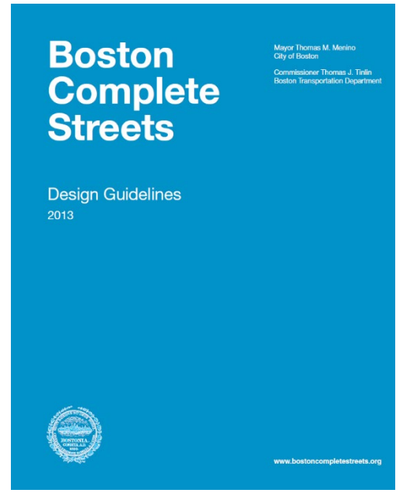
Lessons Learned

Several principles and guides are included to inform the street design process. The connection between each process could be clarified to better understand how to apply it to a street design.

Calgary's street classifications and design guidance are specific. It may be difficult to fit all streets within the specific design parameters or street classification. In order to support more context-sensitive design, there may be value in providing a range of values.

4.5 City of Boston

The Boston Complete Street Design Guidelines were adopted in 2013. The Guidelines were developed to provide policy and design guidance for practitioners, developers, the public, and local stakeholders on the planning, design, and operation of roadways and sidewalks in Boston. The Guidelines place emphasis on design treatments that improve safety and comfort for a wide range of users and modes. The design treatments and rendering style of the document seem to have been adapted into many of the Complete Streets documents developed by other jurisdictions since the Guidelines were released. The Guidelines are prescriptive standards for designing roadways in Boston and are applicable for new construction, retrofit, pilot, and reconstruction projects.



Design Considerations

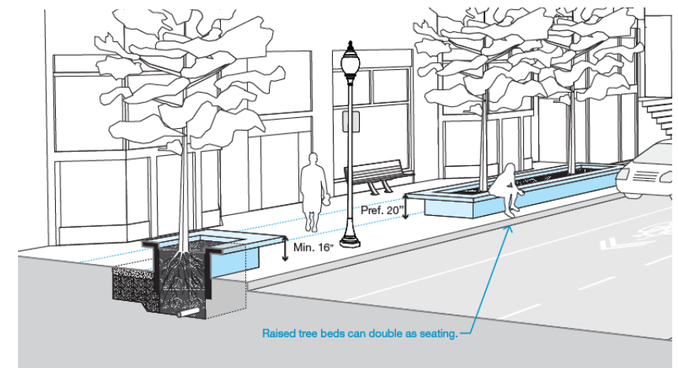
Detailed discussion on recommended and required design elements is imbedded throughout the Guidelines. Design treatments, considerations, and cross-sectional widths are described through text and dynamic visual aids in separate chapters for Sidewalks (boulevard treatments above the curb), Roadways (elements between the curb), Intersections, and Curbside Infrastructure. Where ROWs are limited and roadway elements must be prioritized, the document notes:

> *"…**trade-offs to achieve multimodal streets must be balanced and equitable and should always strive to promote healthy and active transportation.** Depending upon the Street Type, the degree of accommodations for walking and bicycling will vary; a Downtown Mixed-Use Street will typically accommodate wider sidewalks with street furniture, trees and greenscape, and transit stop amenities, while a Neighborhood Residential Street may have narrower sidewalks, on-street parking, and 'neighborway' treatments. **Regardless of trade-offs, all Street Types must consider the needs of pedestrians and bicyclists."***

Design strategies for different modes and streetscaping that can also support traffic calming objectives are identified throughout the Guidelines. Specific design treatments to address speed management are discussed in the Roadway Design section. It is noted that all traffic calming treatments should not impede the operations of emergency services vehicles. Interesting discussion on placemaking to attract visitors to Complete Streets are discussed at the end of the document with unique considerations for creating intersections that draw pedestrian activity.

Cross-Section Examples

The Guidelines serve as the City of Boston's roadway standards and include minimums, maximums, and typical dimensions provided for most roadway elements. A Complete Streets classification system is outlined at the beginning of the document and includes nine urban street classes (Street Types). Sample renderings are provided for each Street Type but typical cross-section widths are not included. The recommended minimum, maximum and typical dimensions for different roadway elements (e.g. boulevard and sidewalk treatments) are described in chapters dedicated to ROW zones, as previously noted. In some sections of the document, the Guidelines provide dynamic matrices, infographics, and renderings with a comparison of recommended treatments for different Street Types. This approach is a bit confusing, especially for practitioners that may be trying to select an appropriate Street Type for a given roadway and trying draft conceptual cross-sections. The document is not structured as a quick reference and requires practitioners to consider the best design treatments based on mode as opposed to by Street Type. Nonetheless, design considerations are very robust – including incredibly detailed discussion for boulevard features such street trees, drainage, lighting, and all of the recommended facilities for different modes.



Tools & Strategies

The Guidelines do not identify many tools. A typical design and implementation process is briefly outlined at the end of the document, as well as a handful of pages discuss maintenance, roadway life-cycle, and snow clearance requirements.

Applicability

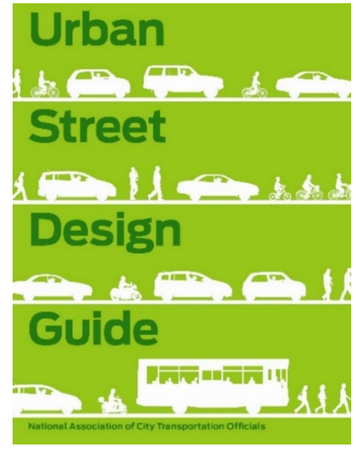
The design guidance in the Guidelines are extremely detailed, which is expected given their role as the City's standards. Compared to Complete Streets documents from other municipalities, Boston's Guidelines have exceptionally robust streetscaping guidance that could be used as a basis for the review and consideration of the suite of products in Phase 6. It should be noted, however, that most of the Guidelines are focused on roadway and boulevard designs in dense urban areas due to the predominantly urban and suburban land-uses in Boston.

Lessons Learned

The document is overwhelming with a wide assortment of detailed information on the design, placement, and function of progressive transportation infrastructure design and streetscaping strategies. The structure of the document does not support ease-of-use, particularly as it relates to connecting design treatments to Street Types, which may be intentional. It is recommended that Niagara Region consider the streetscaping recommendations from Boston's Guidelines and consider the place-making recommendations presented at the end of the document.

4.6 NACTO Urban Street Design Guide

The National Association City Transportation Officials (NACTO) is an association of 87 North American cities and transit agencies that share knowledge, experience, and insight into transportation strategies. The association strives toward helping municipalities conceptualize and implement new sustainable roadway designs that support active transportation and public transit in addition to motor vehicle through movement. NACTO holds an annual conference in a different American or Canadian city every year to showcase progressive roadway design and network projects. NACTO is well known for its series of informative roadway design guides that first began with the publication of the Urban Bikeway Design Guide in 2011. In 2013, NACTO released the Urban Street Design Guide that outlines roadway design principles to make urban streets safer and more inviting to people walking, shopping, cycling, parking, and driving.



Design Considerations

The NACTO Urban Street Design Guide presents strategies that municipalities may adopt or modify to create multi-modal roadways in a variety of urban contexts. Since the document is not a set of standards or guidelines tied to any government agency, it is not prescriptive. The Guide outlines a set of recommended principles that practitioners should consider when designing roadways to reflect a Complete Streets approach:

- **Streets are Public Spaces** | Streets are vital but underutilized publics spaces that should be designed to accommodate placemaking and fun in addition to travel.
- **Great Streets are Great for Business** | Well-designed streets attract activity that supports local businesses and increases revenue over time.
- **Streets Can Be Changed** | Old streets have evolved over time and will continue to evolve over time so practitioners should explore opportunities to redesign or reconfigure elements of ROWs when they can.
- **Design for Safety** | Streets should be designed to allow different users, particularly vulnerable road users, to interact safely.
- **Streets are Ecosystems** | Green infrastructure such as shade trees and bioswales are necessary to the ecological functions of roadways.
- **Act Now** | Municipalities should consider phased implementation processes where low-cost interim design solutions are temporarily installed until funding is available for a total reconstruction to inform public decision-making and test new design treatments

Cross-Section Examples

The Guide presents 13 urban street typologies that are based on best practices from example roadways across North America. Every arterial street type features two conceptual cross-sections (3D renderings): existing design and interim or reconstruction design. Cross-sections in the guide do not feature sample ROW widths but they are supported by text that identifies preferred design elements for different modes and design options for interim treatments. Similar guidance is provided for intersections in a separate chapter dedicated to the topic.

Tools & Strategies

The Guide does not include significant guidance on the planning or design process for a given project, nor does it include any associated tools to assist practitioners. It does, however, provide considerable discussion on how roadway designs evolve from existing, interim, and reconstruction design phases. Guidance is imbedded throughout the document on low-cost, high-impact interim design treatments that municipalities can explore before committing funding to full roadway reconstruction. The Guide reinforces the necessity to establish safe and comfortable multi-modal roadways where appropriate and tries to address the misconception that it is only achievable to do so when a road is repaved and/or the curb is moved. Temporary road closures for open markets and active street days, rearranging pavement markings, and implementing temporary separation techniques for cycling facilities are all examples of low-cost strategies to implement temporary multi-modal design treatments.

Applicability

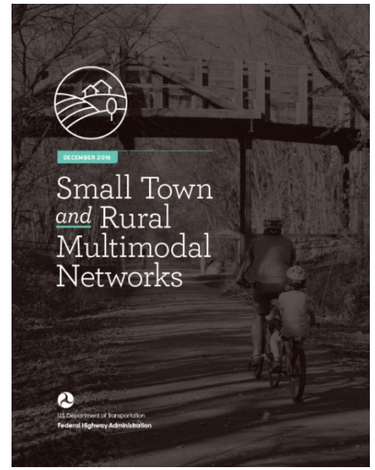
The NACTO Urban Street Design Guide is flexible guideline with aspirational design treatments that may be adapted in a wide range of urban design conditions. The Guide serves as a useful tool for practitioners seeking a visual aid for contemporary roadway design concepts. It establishes a clear vision for redesigning roadways using 3D renderings, case studies, and photos from real-world examples. While the guidance is exclusive to an urban context, many of the strategies explored in the document may be applied in suburban and rural environments. The traffic guidance, placemaking strategies, and intersection design treatments explored in the document should be considered by municipalities seeking strategies to attract residents and visitors to streets for cultural events and shopping.

Lessons Learned

The Guide is highly conceptual. Little to no guidance is provided on desired cross-sectional widths for roadway elements based on street type or adjacent land-use. It does, however, include urban street typologies and lane configurations that are appropriate for a range of land-uses. It is up to the practitioners to determine how these configurations can be adapted to their project corridor. Some of them may be applicable to the main street or urban connector typologies in the context of Niagara Complete Streets. Where the Guide excels is in its discussion of interim and retrofit design treatments. It strives to break the perception that multi-modal corridor designs are only achievable in reconstruction applications. NACTO recognizes an urgent need in many municipalities to implement separated cycling facilities and transit priority lanes, among other roadway functions, and presents strategies to create supportive roadways using interim design treatments. It may be worth considering temporary Complete Streets design treatments and products for interim and pilot applications when designing the Niagara CSDM.

4.7 FHWA Small Town and Rural Multimodal Networks

The Federal Highway Administration (FHWA) is an American federally funded agency that supports state and local governments design and construct roadway infrastructure across the United States. The Small Town and Rural Multimodal Networks guide resource intended to assist practitioners design roadways that support active modes and improve accessibility for a range of users in small town and rural settings. The document includes conceptual guidance and case studies of real-world applications in rural communities.



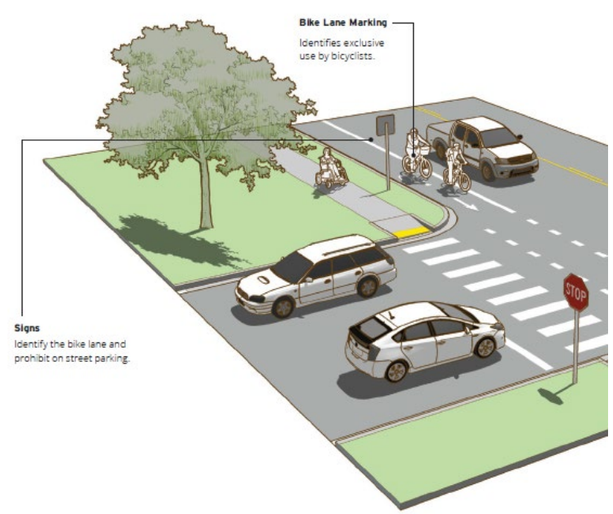
Design Considerations

Traditionally, the expansion of rural roadways and highway systems has prioritized high-speed motor vehicle through movement, making walking and cycling less safe and less comfortable. The Guide discusses recommended active transportation facilities that may be implemented in roadway retrofit or redesign projects. Facilities are recommended for different roadway contexts based on the speed and volume of motor vehicle traffic, the network function (i.e. highway, collector, local), and the adjacent land-use. The Guide is successful in communicating the network benefits of improving active transportation connections in rural communities. The Guide notes:

> *"Developing interconnected networks of bicycling and walking facilities in rural and small-town settings can be challenging due to a lack of alternate through roadways and the concentration of motor vehicle traffic on major roads. Planners and engineers must think creatively to establish connected facilities within communities and consider how all roadway types and independent connections can be used to create access to key locations. A connected network is not developed by a single trail, sidewalk, or bike lane but is comprised of many facilities that support walking and bicycling throughout the community."*

Some general active transportation design recommendations from the Guide include:

- Facilities and connections to schools should include increased separation for younger users
- Commercial Corridors and Main Streets should accommodate walking and cycling – as these streets transition out of rural cores, the facility design should change
- Small facilities may be warranted to bridge gaps between larger corridors in the greater network



Cross-Section Examples

Example cross-sections and other 3D renderings are provided for every facility type discussed in the Guide. It should be noted that these cross-sections showcase active transportation facilities in rural settings and are not specific street types in a formal classification system. While cross-sections do not feature ROW widths, supporting text identifies design elements and both the preferred and minimum dimensions for every facility that is highlighted. It is noted, however, what types of road (speed, volume, hierarchy, land-use) would warrant consideration for different active transportation facilities.

Tools & Strategies

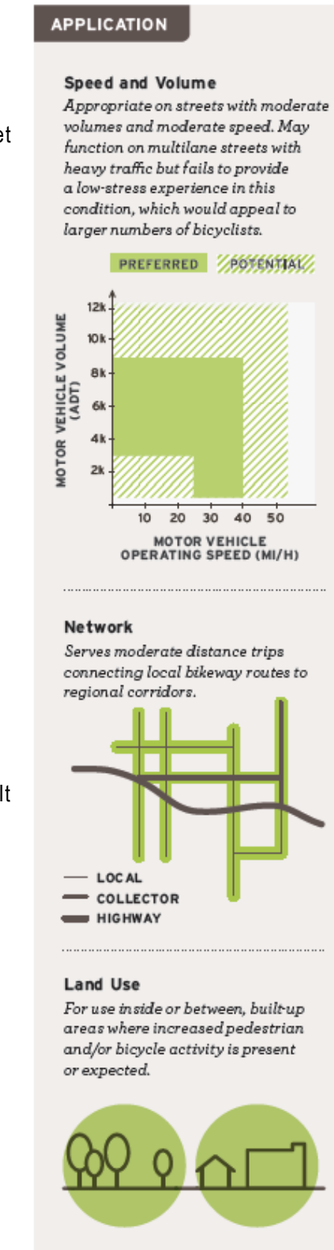
The Guide highlights some general best practices in the transportation planning process, such as engagement and phased network implementation, but does not provide in-depth discussion. It defers to state and local governments on requirements in planning and designing roadways. A noteworthy tool applied throughout the Guide includes the 'Application' bar the describes the roadway contexts appropriate for design treatments. The bar features text, graphs, and visual ques that demonstrate the preferred motor vehicle speed and volume, road hierarchy, and land-use for each facility type presented.

Applicability

The Guide is highly applicable to Niagara Region. The document's focus on safe, comfortable, and accessible multimodal roadway design aligns with the core values and principles of both the Vision Zero and Complete Streets philosophies. It exclusively explores design treatments for rural and small-town land-uses, which makes its recommendations relatable to the context of Niagara's predominantly rural regional road network. Finally, its 'Key Opportunities' section examines strategies that may be applied to address context-sensitive topics that may be of interest to Niagara Region, including: school connections, speed management, multimodal main streets, and access to public lands.

Lessons Learned

Given the rural context of Niagara, the FHWA's Small Town and Rural Multimodal Networks provides discussion on a road type that receives limited attention in other design guidelines. The recommendations included within the document should be considered in the development of cross-sections and design recommendations for all street typologies in the Niagara CSDM, particularly in rural land-uses.



4.8 Summary of Key Themes & Uses

Complete Streets Design Manuals, Guidelines, and Standards serve an important role in showing practitioners how roadways can be designed to address the needs of all road users in a variety of land-uses and geometric conditions. While they may differ in their level of authority and prescription, they each outline Complete Streets design strategies that can be flexibly implemented into a range of contexts. A balance of text, tables, renderings, flow charts, decision trees, and other tools are presented to guide practitioners through the Complete Streets approach in designing roadways within their respective jurisdictions.

Key Theme #1: Demonstration Cross-Sections

Sample cross-sections have been developed for every road classification described in the documents reviewed in the literature review. Cross-sections are an incredibly valuable tool for visualizing design concepts discussed in the body of these documents. While they are a common feature in each document, the design approach and associated written content for cross-sections can vary dramatically between each document. The development of Complete Street cross-sections as part of the Niagara CSDM reflecting the confirmed typologies and sub-typologies will be addressed in Phase 5.

There is a key distinction between cross-sectional renderings that depict aspirational designs and those that depict achievable designs based on the guidance described in text and tables throughout the documents. For example, the inclusion of typical or recommended cross-sectional widths is a strategy to creating renderings that feel applicable to the local context. Lane widths demonstrate how features fit within the ROW whereas cross-sections without dimensions or leading lines may come across as overly conceptual. For example, the Toronto CSG and NACTO Urban Streets Design Guide include cross-sections without any indication of ROW width preferences or requirements, which has made these documents more appropriate for conceptualizing Complete Streets as opposed to designing them. On the other side of the spectrum, the Edmonton CSDCS are prescriptive and include standard cross-sections with highly detailed design guidance. Unfortunately, neither of these strategies are likely applicable to the context of the Niagara CSDM because it is intended as a design document that must allow for some degree of flexibility depending on context. The London CSDM presents a balanced approach that includes typical cross-sections for reconstruction presented with ROW widths and supporting text.

Flexible design treatments are described for each mode, parking, utilities, and streetscaping elements. Adopting elements of London's approach in Niagara could produce a similarly flexible guide that is not overly conceptual.

While NACTO's Urban Streets Design Guide is highly conceptual, it is worth noting that the renderings in this document depict design applications for both retrofit and reconstruction applications. The document excels in how it communicates that Complete Streets are not limited to reconstruction projects. In fact, the beginning of the document includes a series of cross-sections that help users visualize the evolution of a roadway from existing conditions to interim (pilot) design to full reconstruction. Some of the example cross-sections for the road classifications presented in the document include an interim design rendering and a reconstruction design to further emphasize this point. The Toronto CSG and London CSDM also include cross-sectional renderings that feature interim design solutions, such as separated bike lanes with flexible bollards. Adding interim design cross-sections into the Niagara CSDM may be worth considering if the Region is open to exploring pilot and retrofit applications.

Key Theme #2: Design Guidance by Mode

While each of the documents reviewed provided direction on recommended roadway elements and widths by mode for each Complete Streets classification, detailed design guidance is provided in separate sections for each mode. The London CSDM has one chapter that serves as a catalogue of Complete Streets elements (treatments and facilities) sorted by mode with text that describes some general best practices for design and implementation. Practitioners are to utilize this chapter when seeking additional guidance on the roadway elements recommended in the Complete Streets classification. The Toronto and Boston CSGs go one step further by providing independent chapters for roadway elements and recommendations for each mode. The Boston CSG is particularly detailed in its discussion of design standards and recommended roadway elements for each mode. This document includes some interesting discussion regarding the interactions of different modes and how Complete Streets elements should be designed to improve both safety and comfort for vulnerable road users.

By separating modal guidance, practitioners learn how infrastructure should be designed to improve the experience of each user as opposed to exploring creative ways to fit features into a given ROW. Niagara Region should consider adapting this approach by including high-level direction for selecting roadway elements in each Complete Streets classification and then providing additional detailed guidance or best practices in a separate section for each mode, which should also include streetscaping, on-street parking/loading, and utilities.

Key Theme #3: Balancing Trade-Offs

Complete Streets documents must address the topic of trade-offs, especially as it pertains to retrofit, interim, and reconstruction design scenarios where existing land-use places limitations on ROW width. The term 'trade-offs' in a Complete Streets context describes any strategy that balances the design needs of multiple modes while fitting within the special constraints of a given ROW. In some circumstances, all of the design elements recommended for a roadway cannot be implemented because the ROW is too narrow. Complete Streets documents should provide instruction to practitioners on selecting design elements that should be retained in limited ROW conditions and propose alternative design or operational strategies to mitigate any impacts.

The discussion of trade-offs is a key component of the Boston CSG, London CSDM, and Edmonton CSDCS. The Boston CSG leads its discussion of trade-offs noting that while the approach may vary depending on street classification and context, it is paramount that practitioners consider the needs of pedestrian and cycling facilities on every road. For example, while dedicated cycling facilities may not be feasible in every roadway context practitioners should seek design strategies that make cycling more comfortable, such as reducing the speed limit, implementing traffic calming design strategies, and reducing turn radii at side streets in an effort to reduce motor vehicle speeds. The London CSDM and Edmonton CSDCS include supporting tools that assist practitioners in decision-making for trade-offs. The former ranks and prioritizes modes for any given Complete Streets classifications. The latter identifies high and low priority modes for each Complete Streets classification and directs practitioners to consider design elements at the higher range of recommended cross-section widths for high priority modes and then balance remaining space as needed for low priority modes.

Where context requires deviation, practitioners must use engineering judgement and provide sound rationale based on policy or locally adopted guidance. Niagara Region should consider creating a similar priority system for modes to evaluate trade-offs that reflect regional transportation objectives.

Key Theme #4: Process Guidance

Process guidance is key foundational component of Complete Streets design documents. Process sections are typically provided at the onset of a document to outline how practitioners should use the different sections of the document. The City of Toronto CSG includes an excellent infographic that visualizes the planning, design, implementation, and maintenance/monitoring phases of a Complete Streets project with references to sections of the document that should be referenced at each phase. The City of London CSDM includes similar guidance but extrapolates on different phases in greater detail. An entire chapter of this document is dedicated to the implementation process with a suite of tools (flowcharts, decision trees, checklists, and spreadsheets) that assist practitioners as they progress through typical Complete Streets projects.

Key Theme #5: Rural Active Transportation Design Guidance

The addition of active transportation facilities as part of typical roadway cross-sections is becoming increasingly popular among Complete Streets design guidance. Three of the documents reviewed include rural cross-sections and each of them identifies facilities that can accommodate cycling and pedestrian traffic. The London CSDM recommends paved shoulders be implemented on segments of rural roadways that cross populated areas (i.e. hamlets) and segments identified as part of major cycling routes. Where motor vehicle speeds and volumes are high, it is recommended that a painted buffer be provided between the paved shoulder and general traffic. In addition to paved shoulders in populated areas, it is recommended that motor vehicles lanes be narrowed and sidewalk be implemented in the boulevard to provide pedestrian facilities. The Edmonton CSDCS goes one step further and recommends that shared (multi) use pathway be implemented on one side adjacent to rural roadways where cycling and pedestrian volumes may be expected. In these cases, the pathway would be implemented on the other side of the roadway's drainage ditch to provide ample physical separation between the general through lane and the active transportation facility. The FHWA Small Town and Rural Networks guide highlights a broad range of cycling and pedestrian facilities that are appropriate on rural roadways based on motor vehicle speed, volume, and surrounding land-use. This document even identifies conditions where cycle tracks may be appropriate in a rural context.

A considerable portion of Niagara's regional road network is comprised of rural roadways. Given the popularity of the Region for seasonal tourism, its reasonable to expect some interest in cycling or walking along some of its more scenic landscapes. Consideration should be made toward identifying active transportation infrastructure as a component of some rural roadway cross-sections. Paved shoulders are currently identified as a component of the Rural Complete Streets classification identified in the Regional TMP, however, the addition of painted buffer or the implementation of separated facilities (i.e. cycle track or multi-use pathway) may be worth considering on segments designed for cycling tourism, segments popular among tourists, or segments identified as cycle routes that are also high speed / high volume roadways. Separation may also be warranted on goods movements corridors where large vehicles may impact safety or the perception of safety among cyclists.

Key Theme #6: Placemaking in the Boulevard

Complete Streets can serve a placemaking function when the boulevard is animated and wide sidewalks permit a large volume of pedestrian movement. The role of the boulevard in attracting pedestrian activity is particularly important along Main Streets and commercial corridors where residents and visitors are more likely to interact with adjacent land-use. Boulevard design (streetscaping, amenities, and green infrastructure) is a considerable section of each of the Complete Streets documents adopted by municipalities included in this literature review. In fact, the Toronto and Boston CSGs have chapters dedicated to the topic with the latter including robust boulevard design standards. These documents, as well as the London CSDM, approach boulevard design the same way a cross-section would explain the elements of ROW - by breaking the space into zones. Typical zones include the market zone (adjacent to commercial land-use), sidewalk (pedestrian clearway), furniture zone, and edge zone. While not all of these zones apply to every Complete Streets classification, it is important to distinguish their use and the type of treatments that are common in each zone. The Boston CSG is particularly detailed in its discussion on boulevard zones. It clearly defines the types of materials, such as different forms of street lighting or the species of street trees, that are appropriate in different land-uses and Complete Streets classifications. There is also discussion on the topic of drainage and green infrastructure (i.e. low impact developments), which are also referenced in the London CSDM. Although some of these boulevard treatments may only be feasible as part of major reconstruction or new construction projects, these documents recognize that low cost strategies can be implemented to create dynamic streetscapes through tactical urbanism.

Tactical urbanism describes any short-term, low cost, and (optionally) temporary installation that improves the operational or aesthetic function of the public realm. Tactical urbanism strategies may include painting the surface of the road, implementing pre-fabricated removable feature (e.g. flexible bollards, planter boxes), and temporarily reallocating existing ROW space. Many of these strategies are applied in retrofit, interim, or pilot implementations where major construction is part of the project scope. These projects are excellent opportunities to test new roadway or boulevard design treatments and strategies to engage the community.

Use of Documents in Complete Streets Project Phases

Each of the documents highlighted in this literature review provide some level of guidance to practitioners implementing Complete Streets projects. Guidance may include high-level process overviews, decision-making frameworks, and best practices regarding each stage in a Complete Streets project: planning, designing, implementing, and maintaining. These documents vary in the flexibility of applying associated guidance, allowing deviation from recommended designs and processes, and they vary in the level of detail. It's important to consider how these documents differ because they may indicate how relevant they are to the upcoming Niagara CSDM and whether their contents can be considered a comparable best practice. **Table 1** outlines the relative level of guidance provided in each document for each stage in a Complete Streets project. When reviewing this table, it is important to recognize that the Niagara CSDM is intended to be a flexible document that it cognisant of trade-offs in the design and implementation of Complete Streets on Niagara regional road network. For this reason, many of the guidelines with overly prescriptive design and implementation are not necessary better examples of best practice than others with flexible guidance.

Table 1 | The level of guidance provided for practitioners at each phase of a Complete Streets project.

	Planning	Design	Implementation	Maintenance / Monitoring
Toronto Complete Streets Guidelines	Moderate	Low	Low	N/A
London Complete Streets Design Manual	High	Moderate	Moderate	Moderate
Edmonton Complete Streets Design and Construction Standards	High	High	High	Moderate
Calgary Complete Streets Policy and Guide	Low	Low	Low	Low
Boston Complete Streets Design Guidelines	Moderate	High	High	Moderate
NACTO Urban Streets Design Guide	Moderate	Low	Moderate	N/A
FHWA Rural and Small Town Multimodal Networks	Moderate	Moderate	Low	Low
Rank	N/A Not incorporated as part of documented guidance	Low Limited / aspirational guidance	Moderate Applicable / flexible guidance	High Prescriptive guidance / standards

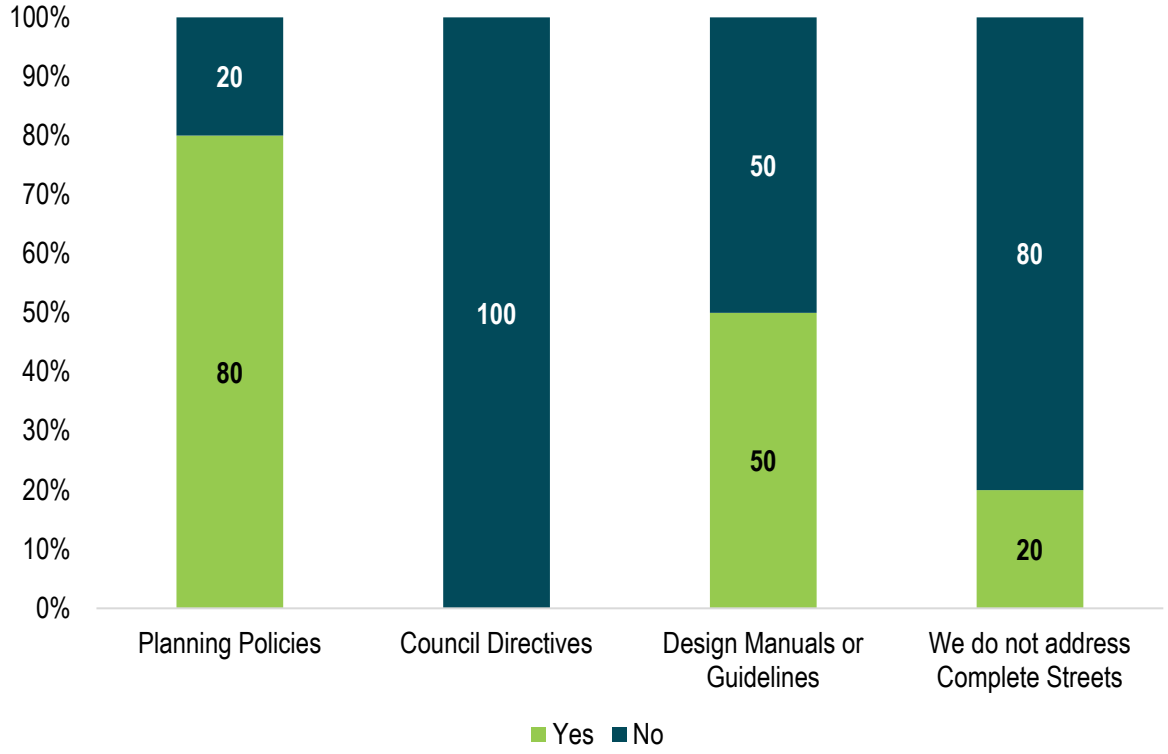
5.0 Part 3. Survey

An overview of the approach to the online surveys was previously provided in section 2.0 of the repot. The detailed outcomes and survey highlights are presented in the following sections.

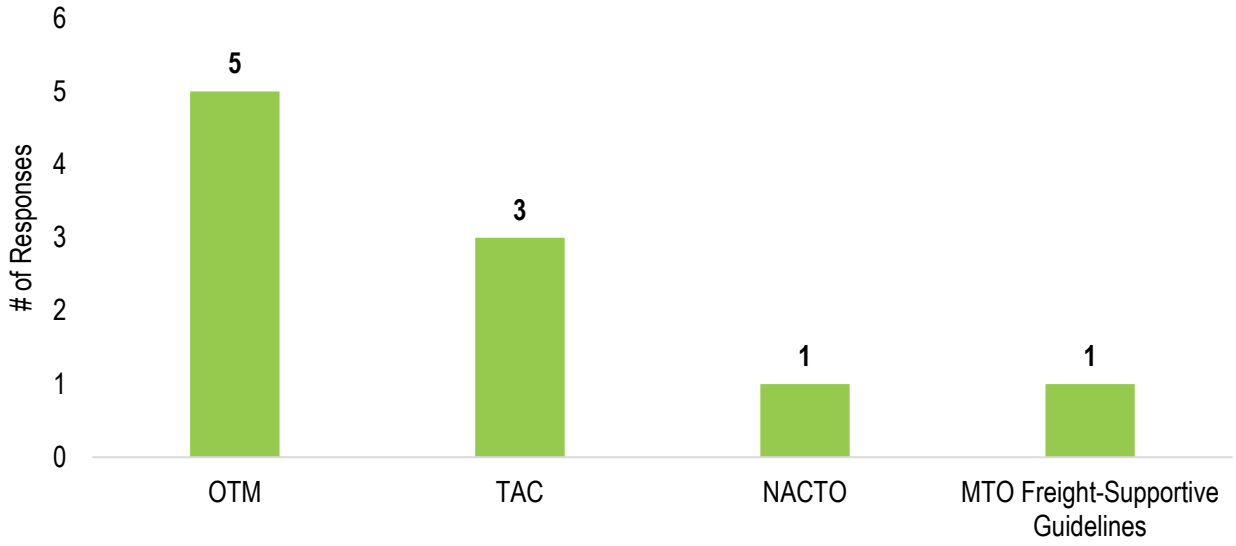
5.1 Survey 1: Comparable Jurisdictions

Survey 1 was created to collect feedback from upper-tier regional municipalities on their approach or lack of approach to Complete Streets. Nine upper-tier municipalities were invited to participate in Survey 1 and six responded (66%) – Peel Region, Durham Region, Waterloo Region, Essex County, Bruce County, and Simcoe County. Municipal representatives invited to participate were asked nine probing questions to collect information on how their municipality addresses (or does not address) Complete Streets on their regional road network. The questions were design to collect insight on the design guidance applied when implementing Complete Streets, the connection between Complete Streets and their respective roadway classification system, and lessons learned from implementing Complete Streets programs. The following section summarizes the answers received.

Question 1: How does your municipality address Complete Streets?

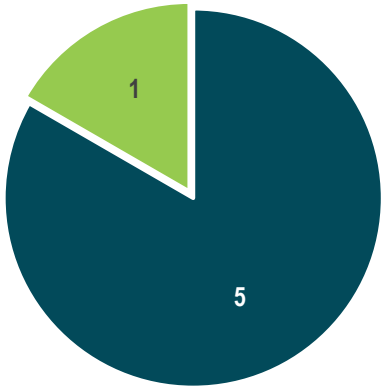


Question 2: What external design guidelines does your municipality apply when designing or implementing multi-modal corridors?



- One respondent noted that while they do not design Complete Streets currently, that they would likely apply TAC and OTM guidance if they decided to plan and implement Complete Streets in the future.
- Two respondents specified OTM Books 15 (Pedestrian Crossings) and 18 (Cycling Facilities) as key documents used within the OTM series.

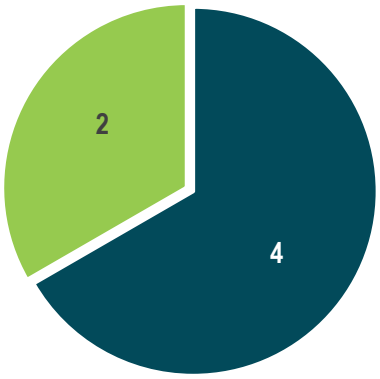
Question 3: Has your municipality developed or adopted any Complete Streets specific manual, guidelines, or standards? Does this document apply to your lower-tier municipalities?



- No, we have not adopted any Complete Streets specific manual, guidelines, or standards
- Yes, our Complete Streets document also applies to all of our lower-tier municipality
- Yes, our Complete Strets document applies to all of our lower-tier municipalities and includes classifications that apply specifically to their local road network.
- Yes, our Complete Streets document applies to any of our lower-tier municipalities without their own local complete Streets Design document
- Other

- One respondent selected 'Other' and noted that they have adopted a context-sensitive roadway design manual that affects regional roadways while some of their local municipalities have adopted local Complete Streets Design Guidelines

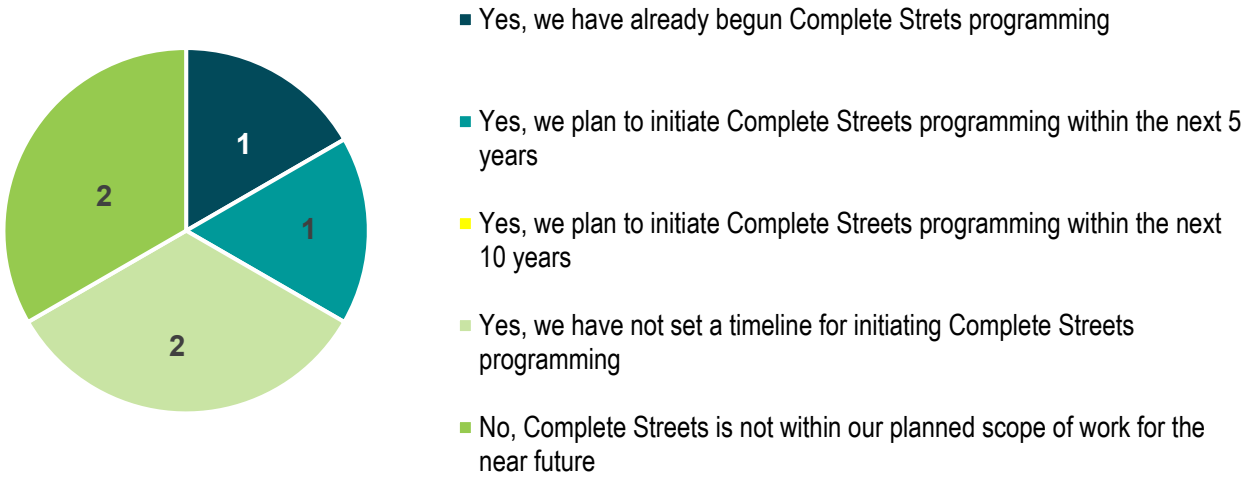
Question 4: Has your municipality adopted a Complete Streets classification system? If yes, how have you assigned these new classifications to your existing road network?



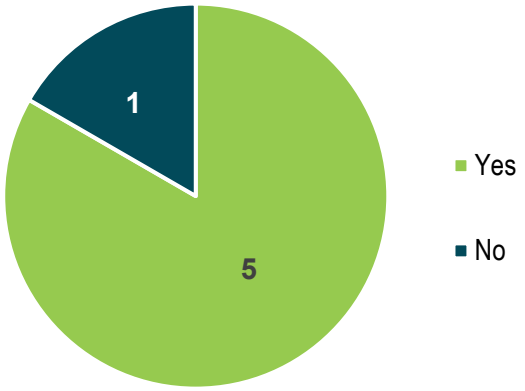
- No, we have not adopted a Complete Streets classification system
- Yes, we updated road allowance widths in our Official Plan based on Complete Streets classification recommendations
- Yes, we design and apply our Complete Streets classifications to meet available roadway widths
- Other

- Two respondents selected 'Other' and noted that they have adopted regional road classifications that incorporate components of Complete Streets design but that these classifications are not adopted in a Complete Streets design manual, guidelines, or standards.

Question 5: Has your municipality considered initiating a Complete Streets program?



Question 6: Has your municipality implemented any Complete Streets design projects, whether they be part of larger scale capital projects, whether they be part of larger scale capital projects, retrofits, or pilot projects?



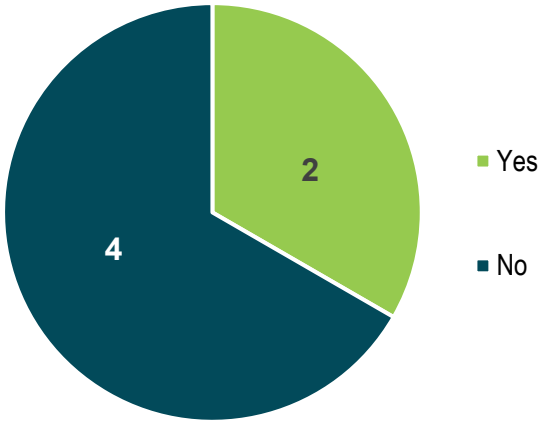
Some examples of implemented Complete Streets design projects provided by respondents include:

- **Peel Region** | Village of Alton
- **Waterloo Region** | Ottawa St, Fischer-Hallman Rd, City of Waterloo Separated Bike Lane Pilot

Figure 11 | Village of Alton Streetscaping Improvement Project, Town of Caledon (2019)

Figure 10 | Waterloo Separated Bike Lane Pilot, Region of Waterloo (2020)

Question 7: Does your municipality have any formal financial supports or incentive programs for its lower-tier municipalities related to Complete Streets projects?



Question 8: Please identify and describe up to five successes that your municipality has experienced related to Complete Streets.

- Five respondents indicated that they have yet to experience any Complete Streets successes at the regional level – two of which previously indicated that Complete Streets are not part of their planned scope of work for the future (see Question 5).
- One respondent indicated that they have seen significant improvements to their cycling network and pedestrian crossings as a result of Complete Streets projects. They specifically noted that an increase the volume and quality of separated cycling infrastructure and the introduction of median refuge islands at pedestrian crossings have created notable improvements on their road network. Furthermore, they have supported lower-tier municipalities in implementing local Complete Streets initiatives.

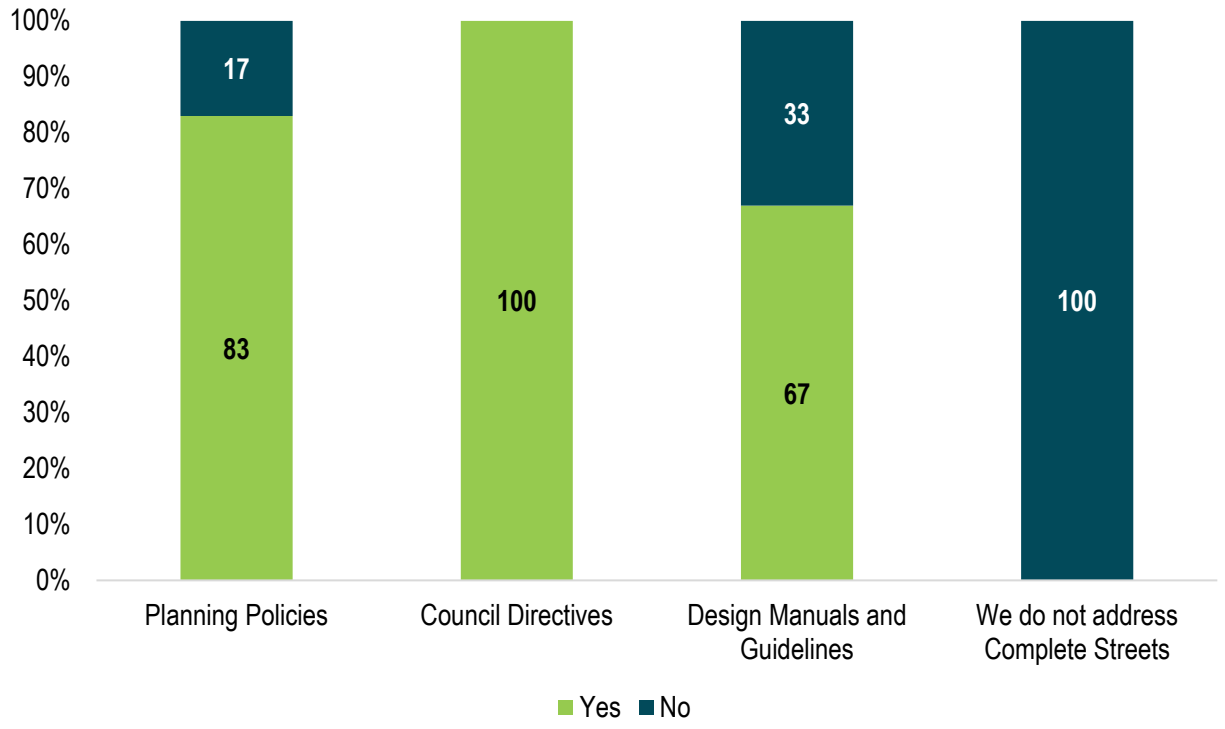
Question 9: Please identify and describe up to five challenges that your municipality has experienced related to Complete Streets.

- Three respondents indicated that they have yet to experience any Complete Streets challenges at the regional level – two of which previously indicated that Complete Streets are not part of their planned scope of work for the future (see Question 5).
- Two respondents indicated that the increased capital and maintenance costs are challenges.
- Two respondents indicated that balancing ROW space for different modes, specifically parking and active transportation, is a challenge in retrofit and reconstruction projects.

5.2 Survey 2: Design Manual Review

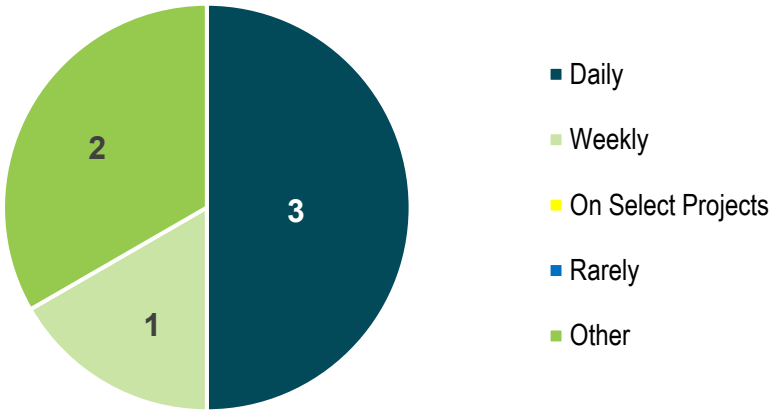
Survey 2 was created to collect feedback from a select group of North American municipalities that have already adopted local Complete Streets Design Manuals, Guidelines, or Standards. Ten winter municipalities in Canada and the US that have adopted Complete Streets Design Guidelines, Manuals, or Standards were invited to participate in Survey 2 and six responded (60%) – Toronto, London, Ottawa, Calgary, Milwaukee, and Madison. Municipal representatives invited to participate were asked eleven probing questions to collect information how they developed and current implement their Complete Streets guidance. The survey questions address related to design, process, implementation, and post-implementation considerations for Complete Streets projects. Survey 2 also includes questions that ask respondents about sections of their CSDMs that are used regularly and any successes or challenges associated with applying their Complete Streets guidance to local projects.

Question 1: In addition to Complete Streets Design Manuals, Guidelines, or Standards, please indicate other ways that your municipality addresses Complete Streets?



- Multiple respondents indicated that Complete Streets has been incorporated into local policy and design documents that include Official Plans, Transportation Master Plans, Active Transportation Strategies and Plans, Technical Design Guidelines (e.g. curb radii, lane widths, green streets) Zoning By-law, and Greenfield Development Application Processes.

Question 2: How often does your team apply or refer to your Complete Streets document?



- One respondent noted that while their team (cycling infrastructure) does not use their Complete Street document frequently, it does not mean that other departments do not.

Question 3: What sections of your Complete Streets document are most frequently used by your department and why?

Respondents identified the following sections in their respective Complete Streets documents:

- **Complete Streets Elements** | Discussions on the design considerations for different modes and typical infrastructure features in Complete Streets design.
- **Street Design** | Complete Streets classifications and examples cross-sections.
- **Tools** | Decision-making tools that support the implementation of Complete Streets projects. One respondent noted that their roadway rehabilitation team frequently uses a decision-making tools (unspecified) within their CSDM on rehabilitation projects.
- **Retrofit** | Design and implementation guidance that relates specifically to implementing Complete Street design on existing roadways without major reconstruction.
- **Vision Zero and Traffic Calming** | Graphics, discussion, and design guidance that support strategies to reduce motor vehicle speeds and improve safety for vulnerable road users (pedestrians, cyclists, and motorcyclists)
- **Multi-Modal Level of Service** | Complete Streets monitoring strategies.

Question 4: When addressing Complete Streets, which departments are involved / utilize the design document and how do you coordinate those discussions?

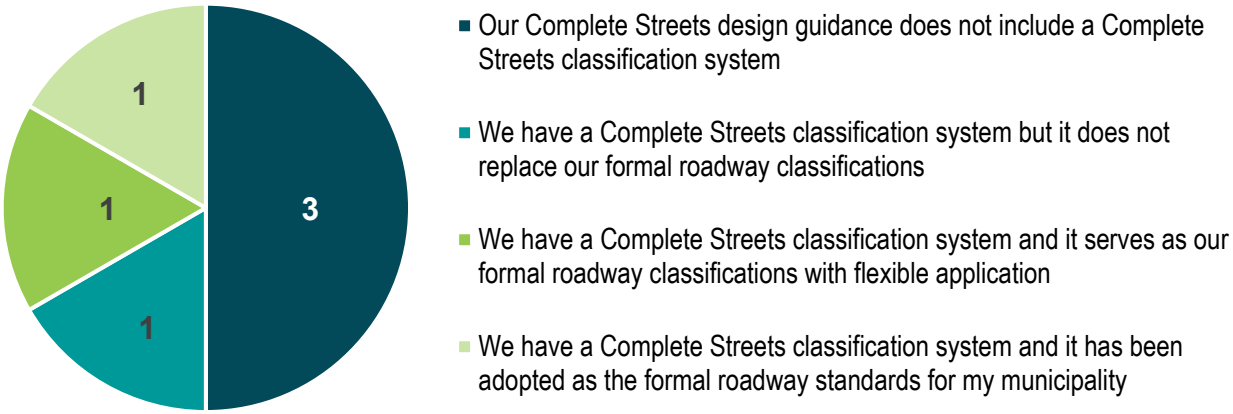
Respondents indicated that the following departments had been consulted in the development of Complete Streets projects:

- Every department affected by roadway infrastructure design, implementation, operation, and maintenance
- Transportation Planning
- Traffic Operations
- Traffic Engineering
- Transit
- Road Maintenance
- Public Works
- Infrastructure Services
- Deep and Shallow Utilities
- Emergency Response Services
- Parks and Urban Forestry
- City Development
- Health Department

Respondents noted that they apply the following coordination efforts in Complete Streets projects:

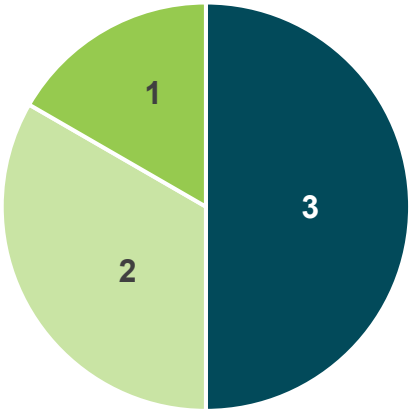
- Workshops to identify challenges and requirements for new projects
- Circulation of functional, preliminary, and detailed design plans for review and feedback before finalization
- Complete Streets Committee that include various departments, elected officials, and community leaders
- One respondent noted that there is no noteworthy coordination that has been applied since adopting their Complete Streets document

Question 5: How does your Complete Streets document currently relate to your existing roadway classification system?



- One respondent noted that their Complete Streets classification system was developed and adopted in their Official Plan prior to developing a Complete Streets Design Manual.
- One respondent noted that they updated their roadway standards and created their Complete Streets classification system at the same time to ensure that they align with one another.

Question 6: How does your Complete Streets document currently relate to your existing roadway network?



- One respondent noted that they updated ROW widths for Complete Streets classes in their Official Plan and then established more detail on design within their Complete Streets Design Manual.
- One respondent noted that their Complete Streets classes have not been mapped to their existing road network because it would be a great endeavor and relatively low on their priority list. Instead, practitioners are advised to apply the classes and Complete Streets guidelines on design projects.

Question 7: Is your Complete Streets document applied in most road design projects?

Respondents noted the following regarding applicability of their Complete Streets guidance in road design projects:

- Three respondents indicated that their Complete Streets guidance applies to all roadway projects, including both retrofit and new construction projects. One respondent added that rationale must be provided where practitioners deviate from the municipality's local Complete Streets guidance.
- One respondent indicated that their municipality does not have a clear Complete Streets framework and that it is difficult to ensure that a Complete Streets approach is applied in every road project when considering the volume of projects that occur in their municipality annually.
- One respondent noted that while they try to make a clear connection between their Complete Streets policy and proposed designs for new roadways, the majority of their projects are in constrained corridors and they are often required to make trade-offs that deviate from their policy.

Question 8: Who are the major stakeholders/contributors — externally and internally — to Complete Streets related initiatives?

Respondents identified the following stakeholder groups:

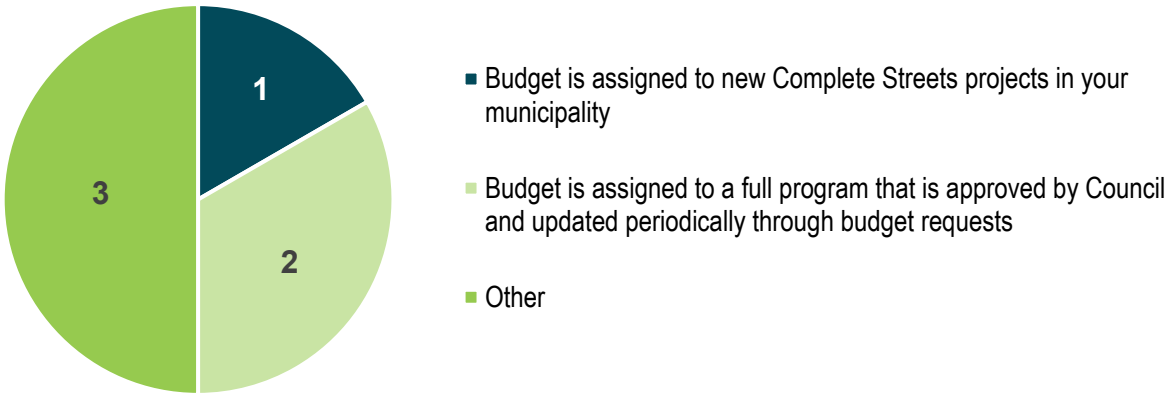
Internal

- Transportation Development Services
- Transportation Planning and Engineering
- Traffic Operations
- Water Resources
- City / Regional Planning
- Park/Urban Forestry
- Public Health
- Elected Officials and Mayor's Office
- Emergency Response Services

External

- Utilities Agencies
- Transit Commission
- Community Stakeholder Groups
- Development Industry
- Cycling Advocacy Groups
- Traffic Safety Advocacy Groups
- Neighbourhood Improvement Associations
- Business Improvement Associations

Question 9: How is budget assigned to new Complete Streets projects in your municipality?



Three respondents selected 'Other'

Respondent 1 noted that budget is assigned to a full program approved by Council and new Complete Streets projects.

Respondent 2 noted that all new roadway projects may be considered Complete Streets but that funding is currently allocated to 'multi-modal safety improvements.'

Respondent 3 noted that Complete Streets projects are implemented as part of major roadway construction (e.g. watermain and sewer replacements, roadway reconstruction, new construction) and roadway retrofit projects. While new construction projects can be budget as part of site plan applications, other roadway projects are budgeted as part of the annual capital budget process.

Question 10: Please identify five successes within your Complete Streets document (i.e. tools, content, application, etc.) that have been achieved by your municipality.

Respondents identified the following successes:

- One respondent has observed a consistent application of the Complete Streets approach to roadway design projects completed in-house following the adoption of their Complete Streets Design Manual.
- One respondent noted that their municipality benefitted considerably from updating roadway design standards and developing Complete Streets Guidelines at the same time.
- Two respondents indicated that the adoption of Complete Streets guidance has allowed them to allocate roadway space in a better a way and that Complete Streets projects have supported their Vision Zero / Traffic Safety programming.
- Two respondents noted that the adoption of Complete Streets guidance has led to considerably faster design turnaround by 'reducing the design ambiguity for design proponents.' In other words, local Complete Streets design guidance have resulted in saved time because they provide clear instruction to designers.

- One respondent indicated that adopting Complete Streets policy and guidance has made Complete Streets the 'default' roadway design in their municipality, which suggests considerable stakeholder buy-in.

Question 11: Please identify five challenges associated with your Complete Streets document (i.e. tools, content, application, etc.) that your municipality has experienced.

Respondents identified the following challenges:

- One respondent noted that while they have adopted a Complete Streets Design Manual, documents created prior to this adoption may include conflicting direction.
- One respondent noted that competing internal and external interests have created challenges in Complete Streets projects. In some cases, there is concern as to whether new designs are implementable or successful. Another respondent noted that there is considerable misunderstanding across different departments about the Complete Streets concept and that there is no ownership outside of their own department on Complete Streets projects. These comments suggest that stakeholder buy-in (both internal and external) has not been achieved and that there may be unclear performance metrics for completed projects.
- One respondents indicated that there is an increased operational cost associated with Complete Streets, particularly as it pertains to snow removal from on-street cycling infrastructure.
- One respondent noted that they have received push back from stakeholders regarding traffic calming features, such as curb extensions and midblock pedestrian crossings.
- One respondent noted that it took over a year to develop street types alone and that they have hardly been used. In their opinion, it would be beneficial to skip this step and widen the existing road classification system to be multi-modal.
- One respondent suggested addressing key multi-modal and/or traffic safety instead of assuming a Complete Streets Design Manual can solve everything. For examples, they noted that changing their curb radii standard would impact every road project as opposed to their Complete Streets guidelines that are applied occasionally.
- One respondent noted that competing priorities among different departments is a huge challenge on Complete Streets projects.

6.0 Part 4. Stakeholder Workshop

On November 20th, 2020, a virtual workshop was held for regional stakeholders, which included representatives from Local Area Municipalities (LAMs), conservation authorities, rail authorities, Business Improvement Areas (BIAs), and more. The purpose of the workshop – as noted above – was to increase awareness of the complete street design manual project process, to involve key stakeholders in the preliminary process of development and to gather preliminary input on Complete Streets preferences and best practices.

At the start of the workshop, a presentation was given by the consultant team presenting critical background information and context. Throughout the presentation a series of questions were posed to the group using an anonymous interactive online engagement tool called Menti. The purpose of the tool was to collect feedback from stakeholders on their preliminary preferences related to complete street best practices relative to the Niagara context. Below is a summary of key items identified by stakeholders in the online engagement tools during the workshop. For greater detail on the stakeholder workshop and other engagement events, please consult the project's Engagement Summary Report.

Stakeholders invited:

- Local Area Municipalities (LAMs)
- Conservation Authorities
- Rail Authorities
- Business Improvements Areas
- School Boards and Post-Secondary Institutions
- Utilities Agencies
- Regional Advisory Committees
- Niagara Student Transportation Services

As part of the November 2020 stakeholder workshop, attendees were asked two sets of questions regarding the applicability of municipalities reviewed in the jurisdictional scan to the context of Niagara Region and preliminary impressions of the documents reviewed in the literature review. The results of these questions directed the project team as they continued research into best practices. The following is a summary of key themes that emerged from the input received:

- **Waterloo Region** was considered the most comparable upper-tier regional municipality to Niagara Region among attendees. Due to Waterloo's geography, land-uses, and recent Complete Streets projects, stakeholders identified this regional municipality as a jurisdiction that should receive considerable attention during the research into best practices. **Durham Region** was identified as having a comparable regional structure to Niagara Region and was also identified as a jurisdiction that should be researched in depth.
- The **London Complete Streets Design Manual** was identified by attendees as an existing CSDM adopted by another jurisdiction that should be reviewed in detail. Attendees clearly distinguished

this document among others due to its appealing layout, effective implementation tools and processes, and applicable decision-making perspective.

- Both the **London Complete Streets Design Manual** and **NACTO Urban Street Design Guide** were identified by attendees as documents that are easy to use, which should be noted when reviewing their structure and layout.

A more detailed summary of the questions asked, outcomes and key themes that emerged are documented in the engagement summary for the project.

7.0 Next Steps

This discussion paper summarizes the research conducted during the Best Practices Review phase (Phase 3) of the Niagara CSDM project. It describes lessons learned from other jurisdictions who have comparable decision-making structures to Niagara or those that are implementing Complete Streets programs and adopting local Complete Streets design guidance through both desktop and survey based research. It summarizes the feedback received from regional stakeholders at a project workshop on the applicability of best practices from other jurisdictions to the context of Niagara Region. It highlights elements of Complete Streets programs that are planned or implemented in other upper-tier regional municipalities in Ontario. It summarizes the design recommendations and implementation strategies of Complete Streets design guidance that have been adopted by other jurisdictions and agencies. Most importantly, the paper identifies key elements of Complete Streets programming and design guidance that may be applicable to Niagara Region when developing its CSDM.

7.1 Key Takeaways and Future Considerations

The contents of this discussion paper are intended to be used as the foundation around decision making regarding the foundations and content for the Niagara Region Complete Streets Design Manual including but not limited to:

- **Update and finalize the Niagara Complete Streets classifications** as part of confirming the typologies and sub-typologies in Phase 5 of the project to ensure they address a wide range of urban and rural land-uses while complying with recent national and provincial standards.
- **Consider how local transit interacts with regional roadways** and identify design strategies that could be implemented to improve access to transit or operation of transit on Complete Streets. Consideration for transit design strategies should be revisited in the development of demonstration cross-sections in Phase 7.
- **Explore the feasibility of implementing separated cycling infrastructure** in areas of high motor vehicle speeds and volumes, particularly along commercial or main street corridors when confirming typologies and sub-typologies in Phase 5. On rural roadways separation such as multi-use pathways adjacent to the roadway may be appropriate in scenic landscapes to connect dense communities and locations of interest.
- **Develop a strategy to evaluate trade-offs** on narrow rights-of-way and other constraining conditions where all elements of a typical cross-section cannot fit as part the development of the final CSDM in Phase 8 – following the confirmation of products and typologies / sub-typologies from previous phases. Additional tools and strategies to support the planning, design, and implementation phases of Complete Streets projects should also be explored at this time.

- Consider exploring products and design treatments that could be applied for **interim and pilot projects** when drafting the suite of standard products in Phase 6 and demonstration cross-sections in Phase 7. While new construction and reconstruction projects create long lasting infrastructure, the capital cost can be so high that it becomes a barrier to wide-spread implementation of Complete Streets. Several municipalities, including the Region of Waterloo, have found successes in implementing low-cost, pilot projects to convert existing corridors into Complete Streets without moving the curb.

7.2 Next Steps

The upcoming phases of the Niagara CSDM project will work towards confirming the typologies and sub-typologies for complete street types within Niagara Region building upon the recommended approach outlined in the TMP. More specifically, this includes confirming elements of the Region's Complete Streets classifications that are applicable to the regional road network, developing a list of standard products, and drafting demonstration cross-sections. The key takeaways identified in the Background Review and Best Practices Review Discussion Papers should guide the work completed in these upcoming phases. Consultation with Regional stakeholders will occur simultaneously to ensure that the guidance developed for the CSDM is implementable.