COMPLETE STREET DESIGN GUIDE

CITY OF NANAIMO
THE HARBOUR CITY

ACKNOWLEDGMENTS

The **Complete Street Design Guide (CSDG)** was developed through a collaboration between City of Nanaimo staff, ISL Engineering and Land Services, and Drdul Community Transportation Planning, with support from those who volunteered their comments on drafts of the guide or components included within.

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TAC Sustainable Urban Transportation Award Winner	2020
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UBCM Award for Excellence in Sustainability	2021

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Metral Drive, Nanaimo

Reconstruction of Metral Drive as a Complete Street features protected uni-directional cycle tracks and pedestrian infrastructure for all ages and abilities. These protected facilities link into the E&N Trail, extending network connectivity.

PREFACE

As Nanaimo continues to grow, the way we move around the City will need to evolve. A mobility system that predominantly focuses on individual travel by car needs to shift to one that prioritizes a broader array of options – transitioning to an active and sustainable mobility network. This **Complete Street Design Guide (CSDG)** will help us achieve our vision of safe city streets for everyone, no matter how they choose to travel. Included are several major shifts to street design in the City of Nanaimo that will help people choose healthier and greener ways of traveling, provide people with lower cost transportation options, and make mobility more equitable and inclusive.

Highlights of the Complete Street Design Guide:

Updated street classifications to include a place function in addition to the traditional link function. Streets with place functions are those in which people linger, enjoying inviting spaces to walk, shop, visit, and more. On these streets, you will find less space dedicated to motor vehicles and more to people, with wider sidewalks, spaces for patios where adjacent activities spill into the street, clear separation of pedestrian and cycling uses, street trees, furnishings, and more.

Safe facilities for everybody traveling in the City, no matter how they choose to move. This means that whether a person chooses to walk, cycle, roll, take transit, or drive, there is a safe space for them, regardless of age or ability. On higher speed streets, this could take the form of clear separation between motor vehicle traffic and non-motorized modes, while on low speed streets this could include slow shared spaces.

Continuous sidewalks and cycle tracks provided across Local Streets to manage conflicts and increase accessibility. This means adopting a pedestrian- and cyclist-first approach at **Local Street** intersections, prioritizing vulnerable modes over motor vehicle speed in these higher conflict areas.

USING THIS GUIDE

The **Complete Street Design Guide (CSDG)** is intended to be a useful reference that summarizes and illustrates the City's approach to planning and designing future streets. It is not a standard and does not replace engineering analysis. The **City's Manual of Engineering Standards and Specification (MoESS)**, a schedule of the **City of Nanaimo Subdivision Control Bylaw 1989 No. 3260**, is the guiding document for detailed geometric design of streets in Nanaimo, alongside the most recent and applicable industry and government policies, guidelines, and documents. This document, the CSDG, provides context, rationale, and information to assist with implementing Complete Streets within the varied circumstances of an existing city.

ABOUT THE CSDG

The CSDG provides an approach to street design that will improve safety and increase equity and accessibility for all users, regardless of how they choose to travel. It speaks specifically to those aspects of street design that will help Nanaimo achieve its goals for a green, connected, healthy, empowered, and prosperous future.

The CSDG draws on provincial, national, and international best practices, while identifying design principles that specifically support Nanaimo's aspirations and context. It is not a replacement for existing guidance such as the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads, but rather it emphasizes certain design elements within existing guidance that will help Nanaimo create Complete Streets. In some cases, the CSDG provides guidance that innovates beyond current Canadian practices as we continue to learn and adapt for our future.

WHO IS THE CSDG FOR?

The CSDG is intended to be used by many members of the community.

- For **planners**, it outlines network classifications and requirements for road rights-of-way and it provides guiding principles to be considered in future planning processes.
- For **engineers** and **members of the development industry**, it provides information about road dedication requirements from adjacent properties under development, direction on configuring street cross-sections, and guidance on how possible design departures could be managed in retrofit scenarios.
- For **members of the public** or **user group advocates**, it provides an illustration of the City's vision for new and updated streets.
- For **Mayor and Council**, it provides information about current best practices in street design, empowering them to ask meaningful questions of development applications and it provides rationale for including Complete Streets within transportation project budgets.

NAVIGATING THE CSDG

The CSDG can be read from start to finish, but is also intended to be a reference guide. Each section is described briefly below. Use the tabs on the right to navigate to sections of interest.

CHAPTER 1: Setting the Stage

An overview of what Complete Streets are and why they are important for Nanaimo's future.

CHAPTER 2: Network & Classifications

An outline, illustrations, and key features for the eight street classifications in Nanaimo's street network.

CHAPTER 3: Complete Street Design

The anatomy of a Complete Street and its typical zones, along with a summary of how Complete Streets can be implemented within an existing street network.

CHAPTER 4: Pedestrian Design

Considerations for designing pedestrian facilities including Universal Design, pedestrian facility types, and information on how the Pedestrian Zone fits in different street classifications.

CHAPTER 5: Cycling Design

Background and rationale for all ages and abilities cycling facilities and information on cycling facility types and common layouts and examples.

CHAPTER 6: Transit Design

Considerations for making transit more attractive including route design, transit priority, and transit stop design guidance for integrating transit stops within Complete Streets.

CHAPTER 7: Motor Vehicle Design

Factors to be considered in design of the Vehicle Zone including design vehicle, lane width, corner radii, and ways to meet Complete Street objectives.

CHAPTER 8: Intersection & Crossing Design

Design considerations to support safety where modes interact in different types of intersections including unsignalized intersections, signalized intersections, and roundabouts.

CHAPTER 9: Streetscape Design

Introduction to elements that support a memorable street experience such as street trees, furniture, stormwater features, lighting, placemaking, materials, maintenance, and more.

CHAPTER 10: Looking Forward

Direction for monitoring and updating the City's approach to Complete Streets to remain responsive and current and an introduction to potential complementary policies that could further support Complete Streets.

CHAPTER: 11 Reference

A consolidated summary of key reference information included in the CSDG.

Burrard Street, Vancouver

Example of a Complete Street providing space for people walking, cycling, rolling, taking transit, and driving.

1 SETTING THE STAGE

1.1 What is a Complete Street?

Streets are a vital part of our community. Every resident relies on the street network to make their way through the City and the experience we have on these streets is central to how we experience our community. Complete Streets create more livable neighbourhoods where people can travel by all modes including by foot, bicycle, micromobility, transit, automobile, and more. They improve safety and accessibility for all users, provide infrastructure for all modes of transportation, and create attractive streetscapes and public spaces that contribute to our City's sense of place.

Complete Streets enable everybody to navigate the street safely.

They provide safe spaces for pedestrians, cyclists, and rollers. These users feel safest when they are protected from motor vehicles, especially on roads where traffic volumes or speeds are higher.

They make transit convenient and comfortable. People are more likely to use transit when services are frequent and reliable and there are accessible and well-placed transit stops with comfortable, weather-protected waiting areas.

They manage vehicle speeds. Former motor vehicle design principles focused on building extra capacity and removing potential barriers from the sides of the roadway, so that traffic could move quickly. An unintended outcome has been streets where drivers feel comfortable at higher speeds than appropriate on urban streets. Complete Streets help to regulate motor vehicle speeds and reduce the frequency and severity of collisions.

By making streets safer for all modes, the community becomes more accessible to more people, and by including everyone, Nanaimo becomes more inclusive. Complete Streets are for people of all incomes, genders, ethnicities, ages, and physical abilities, including those who require mobility devices to assist them, those who must or choose to walk, cycle, or roll, those who use or rely on transit, and people who drive also.

The Nanaimo Complete Street Design Guide (CSDG) provides supporting information to the City of Nanaimo's Manual of Engineering Standards and Specifications (MoESS) and provides guidance and information to City staff, Council, developers, planners, engineers, and residents alike.

1.2 Purpose & Background

Nanaimo was incorporated in 1874, several decades before the advent of the automobile. The original City Centre, now our Downtown, features some of the most attractive, walkable streets in the City. Like many communities that grew significantly over the last century, Nanaimo's city pattern has evolved from a tight walkable urban area with narrow, pedestrian-oriented streets (as seen in the Downtown), to a more vehicular-focused sprawling development pattern where distances are further, streets are wider, and walking is much more difficult.

The issues of a sprawling development pattern are exacerbated by population growth. Population projections completed in 2020 anticipate that Nanaimo will grow from its recorded 2021 Census population of 99,863 to between 117,000 and 128,000 by 2036. If newcomers, like most Nanaimo residents today, also primarily rely on personal vehicles for transportation, congestion will undoubtedly increase. Growth in vehicle use can only continue unabated for so long. If the City is to grow in a more sustainable manner, residents must have more choices in how they move around the City.

For many decades, street design in Nanaimo focused on providing space for the automobile, leading to wide, unencumbered streets that are easily navigated by car. However, many of these streets are difficult to walk, and even harder to roll or cycle. The potential risk for conflict with vehicles deters many people from walking, cycling, or rolling to their destinations.

Today, design philosophies prioritize safe system design. This approach recognizes that people will make mistakes and designs streets to reduce the risk as much as possible. Lower vehicle speeds reduce the likelihood of collisions, and if mistakes that lead to a collision do occur, the likelihood of a fatality or serious injury is greatly reduced. Safety for all street users is considered more important than travel time. The CSDG aligns with the safe system design philosophy and guidance from federal and provincial strategies.

Figure 1.1 Federal & Provincial Strategies

2017

Transportation Association of Canada (TAC)

Updated Geometric Design Guide for Canadian Roads

Includes updated design guidance for pedestrian and bicycle infrastructure which focuses on safety and separation where vehicle volumes or speeds are high.

2019

Province of British Columbia

Active Transportation Strategy and
Active Transportation Design Guidelines

These documents recognize the health, environmental, and congestion-reducing benefits of more people traveling by active modes and the importance of Complete Streets. They outline aspirational standards for accommodating active modes.

2021

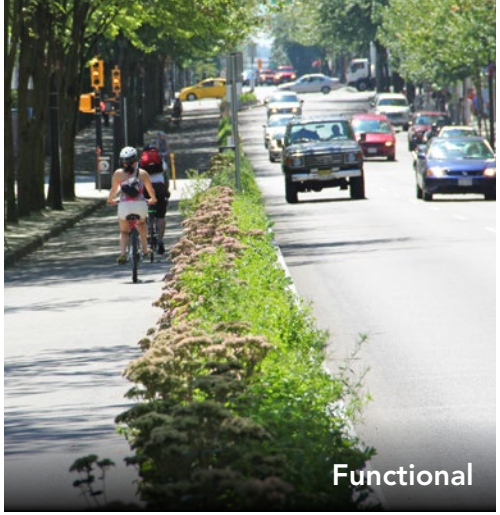
Infrastructure Canada

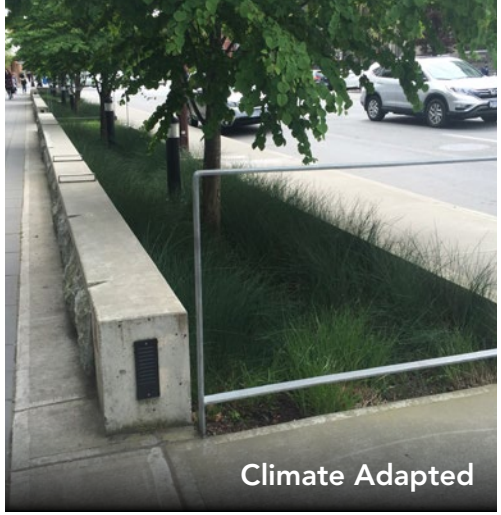
National Active Transportation Strategy

Canada's first strategy to increase opportunities for Canadians to engage in active transportation by promoting the construction and use of pathways, trails, and cycling lanes.

Commercial Street, Nanaimo. Narrow pedestrian-orientated street.

Wakesiah Avenue, Nanaimo. Wide, vehicle-oriented street.


Functional


Climate Adapted


Connected

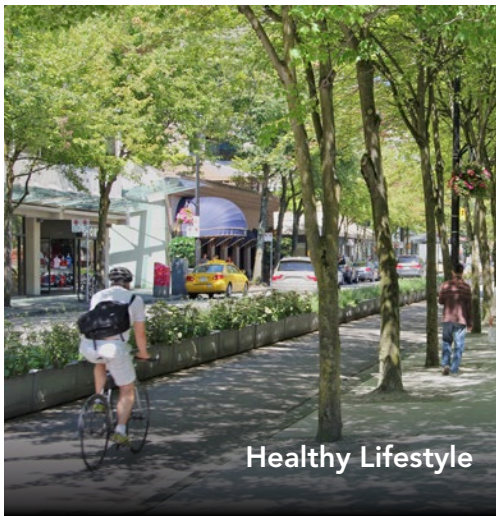

Visionary


Green


Safe


Efficient


4 Equitable


Healthy Lifestyle


Community Focused

1.3 Complete Street Design Philosophy & Principles

VISIONARY

The Official Community Plan, *City Plan – Nanaimo ReImagined*, supports safe and convenient movement around the City for all, encouraging travel by transit, cycling, rolling, and walking, as well as enhanced regional connections. Future street designs should support the overall City vision.

EQUITABLE

Equitable streets accommodate everybody's safe transportation needs. The primary components missing from Nanaimo's street network today are walking, cycling, and rolling infrastructure.

EFFICIENT

Efficient streets make the best use of the space available. As an established city, there is no space to widen Nanaimo's roads. This means that as the population grows, and more people need to travel on our streets, we must make choices about how to best allocate space within the street area.

FUNCTIONAL

Streets must balance the functions of link (moving people from one place to another) and place (functioning as a destination). By designing for street function and location, "link" streets like Arterial Streets can be designed to accommodate higher traffic volumes, while "place" streets like Local Streets can focus more on accommodating places for people.

SAFE

Safe streets separate and protect the most vulnerable users, manage conflicts appropriately, and reduce speeds so that when collisions do occur, the severity is reduced. Complete Streets also encourage people to spend time in an area, creating "eyes on the street," helping to improve personal safety.

HEALTHY

Streets that make it safe and easy to walk, cycle, and roll provide opportunities for people to improve their physical health and their mental wellbeing through their daily routine, potentially reducing healthcare costs.

GREEN

Complete Streets reduce transportation contributions to climate change. They enable more people to travel by active modes and transit, reducing reliance on carbon emissions-generating automobiles.

CLIMATE ADAPTED

Complete Streets can help manage the adverse effects of climate change. For example, streets with tree canopies can provide shade in the hot months and streets with stormwater features can sustainably manage rainfall during wet periods.

CONNECTED

Complete Streets bring the greatest benefit when they form complete networks, providing safe and easy access between origins and destinations.

COMMUNITY FOCUSED

Complete Streets support Complete Communities where people have easy access to day-to-day services and attractive destinations within a short walk, cycle, or roll. We must commit to reversing sprawl and working towards more compact and vibrant urban areas connected by Complete Streets.

Downtown Nanaimo from above

The Downtown network, formed prior to the domination of the automobile, resembles spokes on a wheel leading to the central waterfront hub.

2 NETWORK & CLASSIFICATIONS

The City of Nanaimo's streets have been constructed over many years following design criteria and practices current at the time of their development. This Complete Street Design Guide has been developed to establish forward-looking practices. The City's **Manual of Engineering Standards & Specifications (MoESS)**, which guides design and construction works within existing or future City rights-of-way, has been updated to reflect this current approach.

2.1 Street Function & Land Use

Street classifications in Nanaimo have been updated to reflect variation in street function and adjacent land use. Figure 2.1 illustrates key priorities for each of Nanaimo's street classifications.

Similar to the previous MoESS, Nanaimo's street network continues to include **three primary road classifications** that define the capacity of streets: **Arterial**, **Collector**, and **Local**.

The primary road classifications are now overlain with **three land use classifications** that recognize differences in street function and character in relation to adjacent land uses: **Mobility**, **Urban**, and **Industrial**.

Each of the eight classifications shown are described in more detail in Section 2.3.

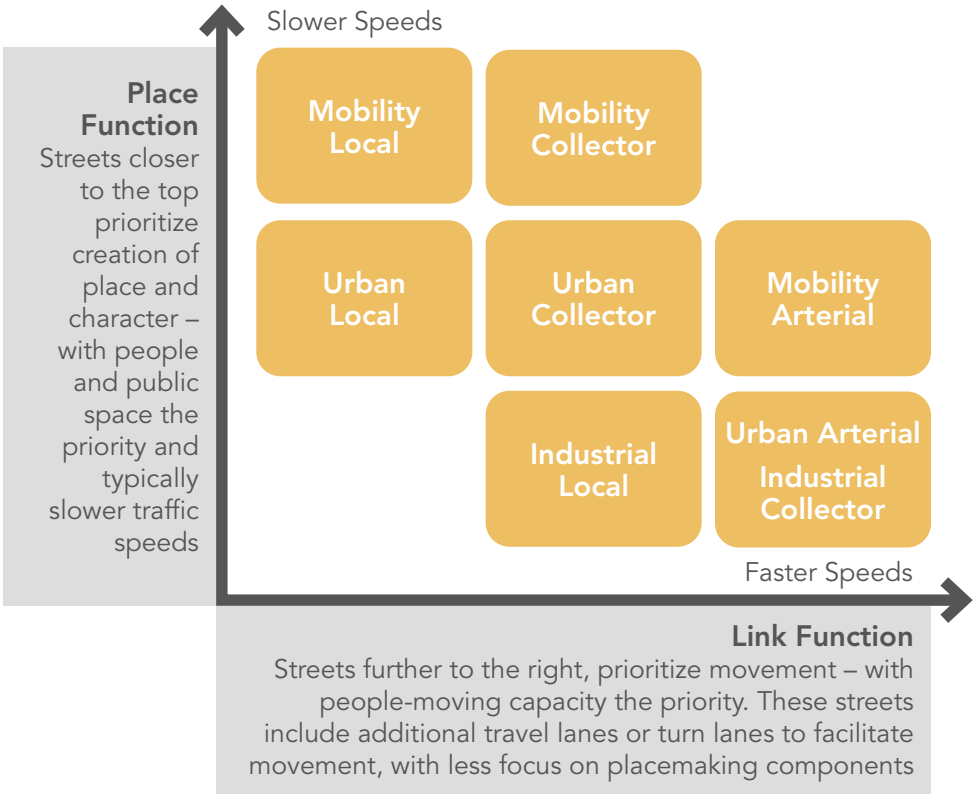


Figure 2.1 Street Classifications & Functions Matrix

2.2 Network Classification Map

The network classification map identifies Nanaimo's streets by the updated classifications.

Over time, as the streets are upgraded, a comprehensive network of connections will be established between key origins and destinations for all modes of transportation.

COMPLETE STREET CLASSIFICATION

- Provincial Highway*

Arterial Streets

- Mobility Arterial
- Urban Arterial

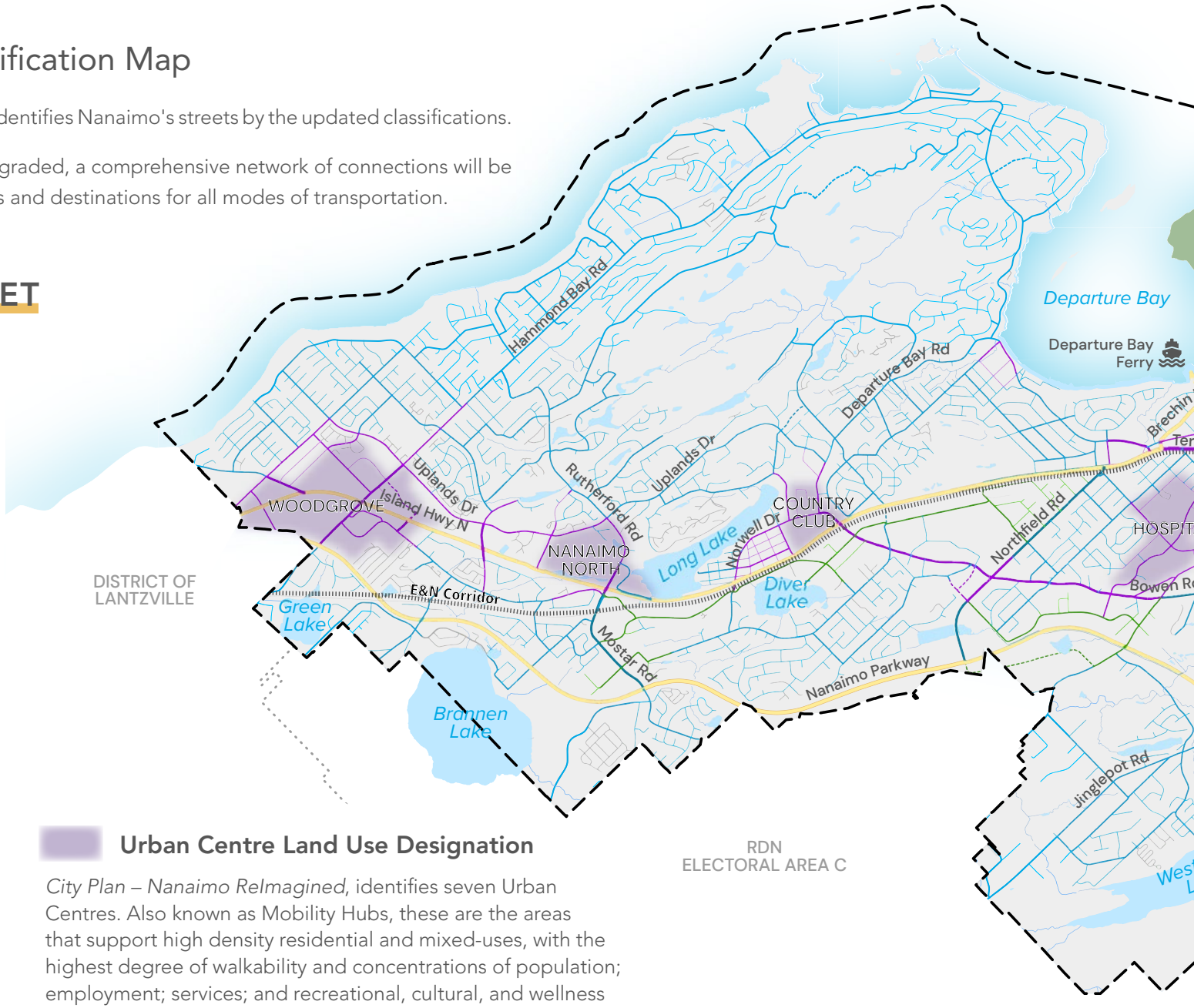
Collector Streets

- Mobility Collector
- Urban Collector
- Industrial Collector
- Private Collector*

Local Streets

- Mobility Local
- Urban Local
- Industrial Local
- Private Local*

*Note: The City does not manage Provincial Highways (Province of BC) or Private Local and Private Collector Streets (private organizations).



Urban Centre Land Use Designation

City Plan – Nanaimo ReImagined, identifies seven Urban Centres. Also known as Mobility Hubs, these are the areas that support high density residential and mixed-uses, with the highest degree of walkability and concentrations of population; employment; services; and recreational, cultural, and wellness amenities. The **Mobility Street** designations are closely aligned with and connecting to these centres.

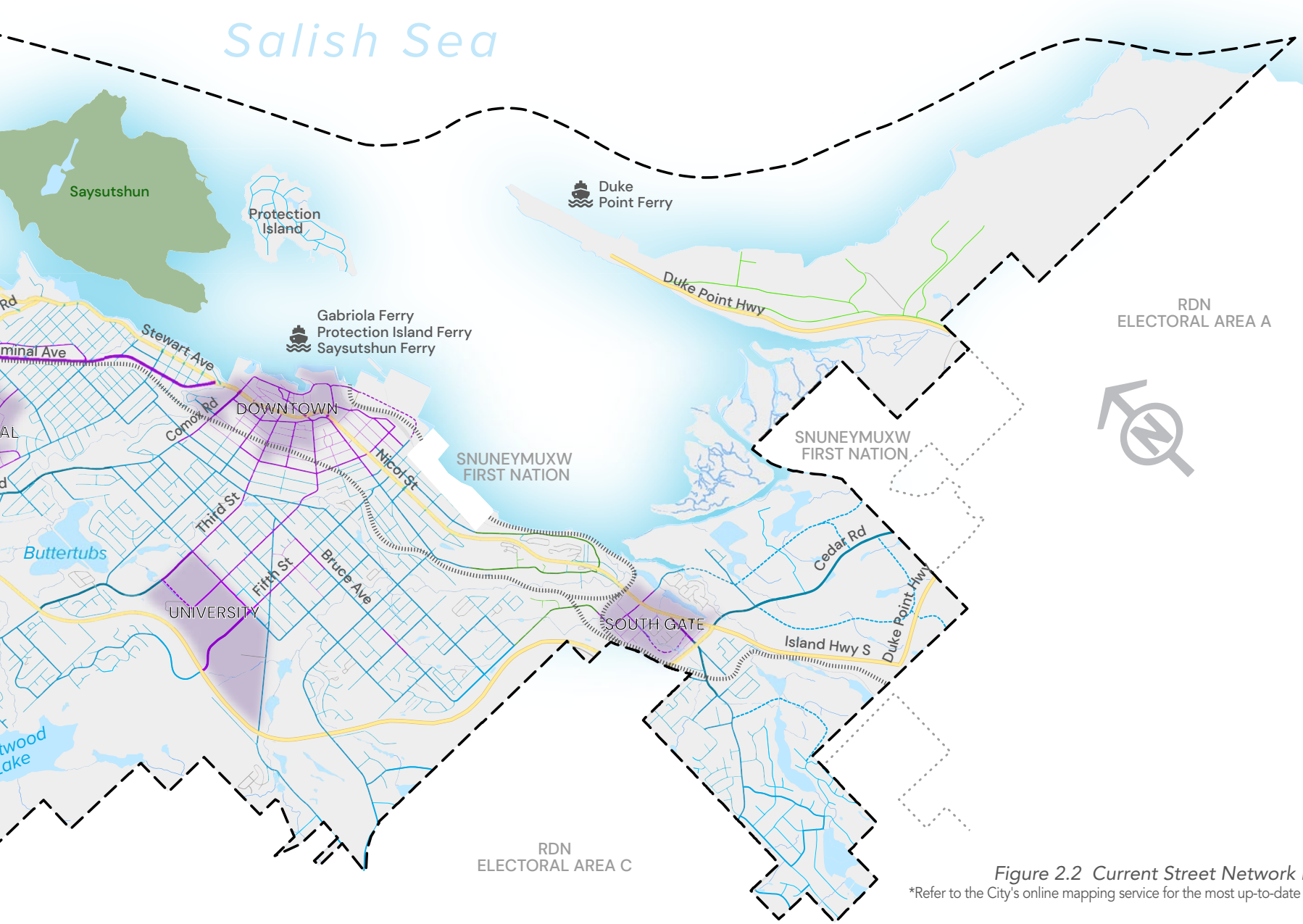


Figure 2.2 Current Street Network Map

*Refer to the City's online mapping service for the most up-to-date maps.

2.3 Street Classifications

MOBILITY


Commercial Street

Mobility Streets are located in areas where higher density and active commercial development are present or expected to occur. These areas often include multi-unit residential buildings, public amenities, and commercial services.

These streets prioritize a "place" function, focusing on increasing public space and accommodation for all modes, and providing high quality facilities that attract people to the street.

Classifications

- Mobility Local (see Section 2.3.1)
- Mobility Collector (see Section 2.3.2)
- Mobility Arterial (see Section 2.3.3)

Associated Land Uses

- Centre
- Corridor

URBAN


Boundary Avenue / Northfield Road

Urban Streets serve residential areas which typically include a mix of housing types such as single-detached homes and low- to medium-density multi-unit homes, with some small-scale commercial activity.

These streets focus on balancing the needs of all modes, with a higher focus on the "link" function than **Mobility Streets**. They will provide less separation between active modes, as pedestrian activity is expected to be lower.

Classifications

- Urban Local (see Section 2.3.4)
- Urban Collector (see Section 2.3.5)
- Urban Arterial (see Section 2.3.6)

Associated Land Uses

- Neighbourhood

INDUSTRIAL


Boxwood Road

Industrial Streets service industrial developments which typically include uses like industrial parks, technology, research and development, and warehousing and distribution. These areas can often be significant employment centres.

These streets prioritize a "link" function and are designed to accommodate larger vehicles. While active modes are expected to be lower than on other streets, they are included through multi-use pathways or sidewalks and cycle tracks.

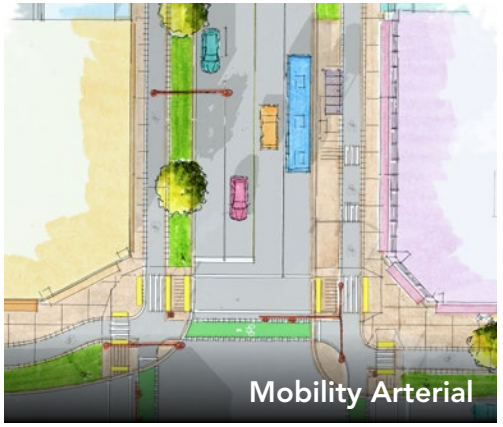
Classifications

- Industrial Local (see Section 2.3.7)
- Industrial Collector (see Section 2.3.8)

Associated Land Uses

- Industrial

MOBILITY



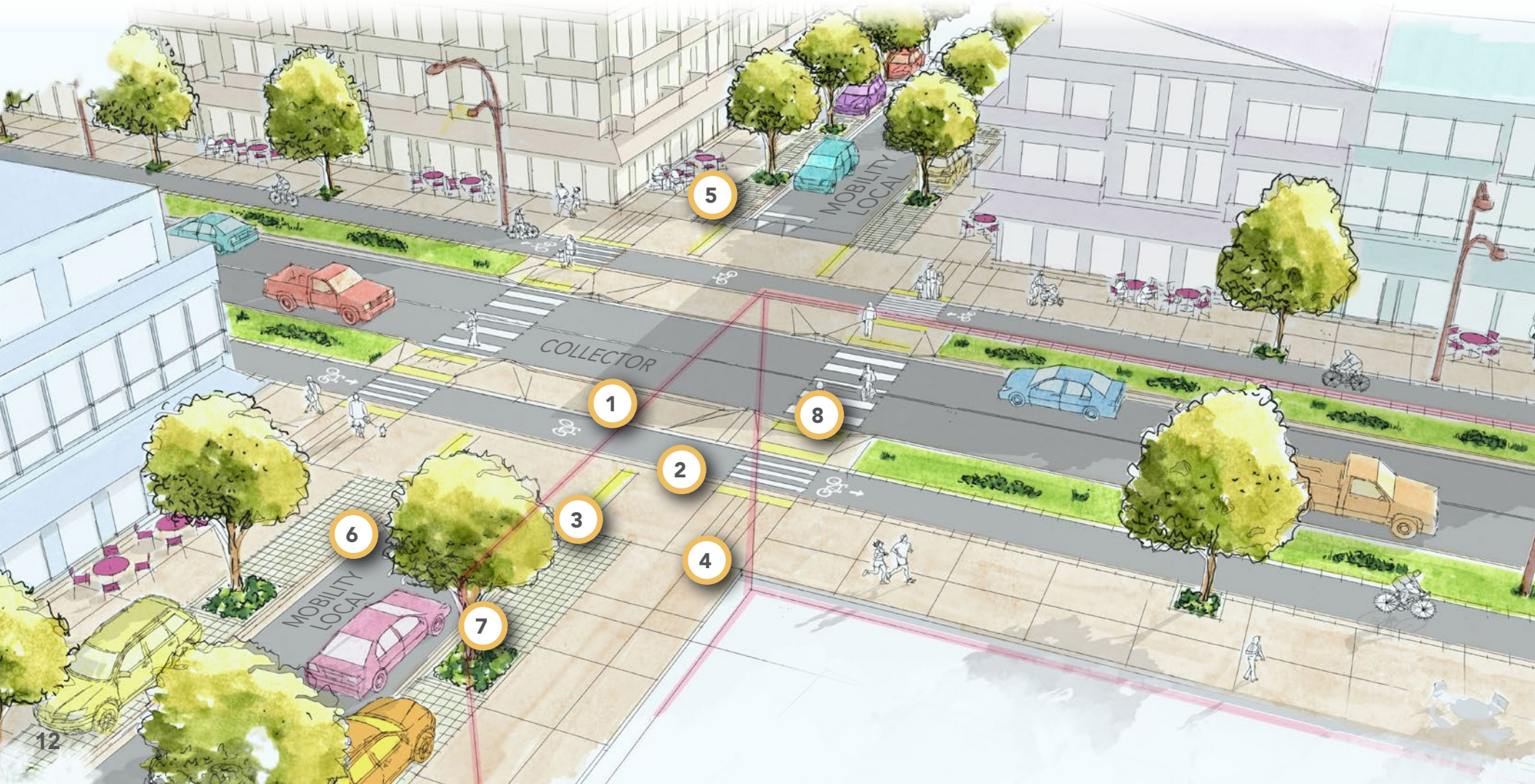
URBAN

INDUSTRIAL

2.3.1 MOBILITY LOCAL STREETS

Mobility Local Streets are a destination. Commercial businesses in these areas will attract people, who may arrive by foot from high-density mixed-use development nearby or via bicycle, transit, or car from further afield. The street design encourages lower vehicle speeds, allowing bicycles to safely mix with vehicle traffic. Pedestrian space is prioritized, with wide sidewalks that have places for seating and activity to spill out from adjacent businesses, turning the street into a vibrant public space. Where on-street parking is provided, a focus is on making the street pedestrian-friendly, including breaks in parking where street trees provide green accents and shade.

Figure 2.3 Mobility Local Street Overview



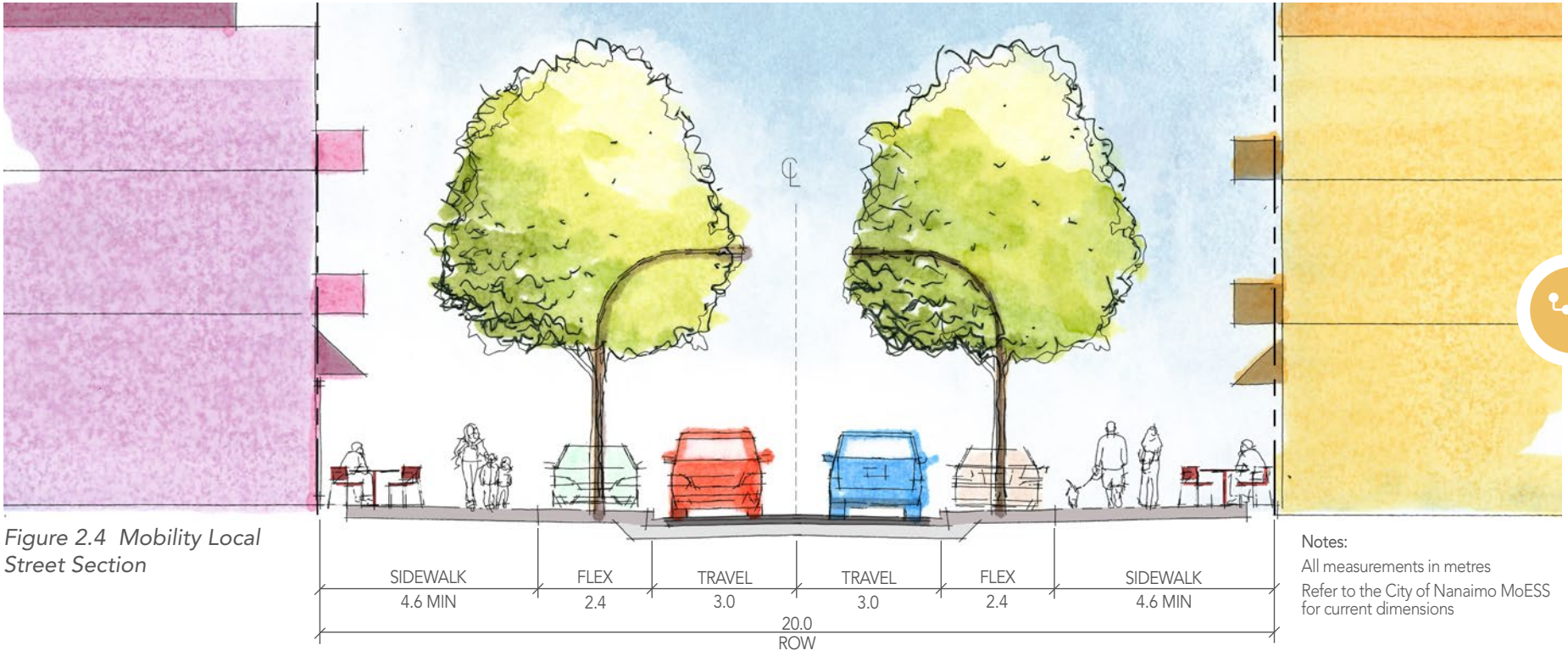


Figure 2.4 Mobility Local Street Section

Notes:
All measurements in metres
Refer to the City of Nanaimo MoESS for current dimensions

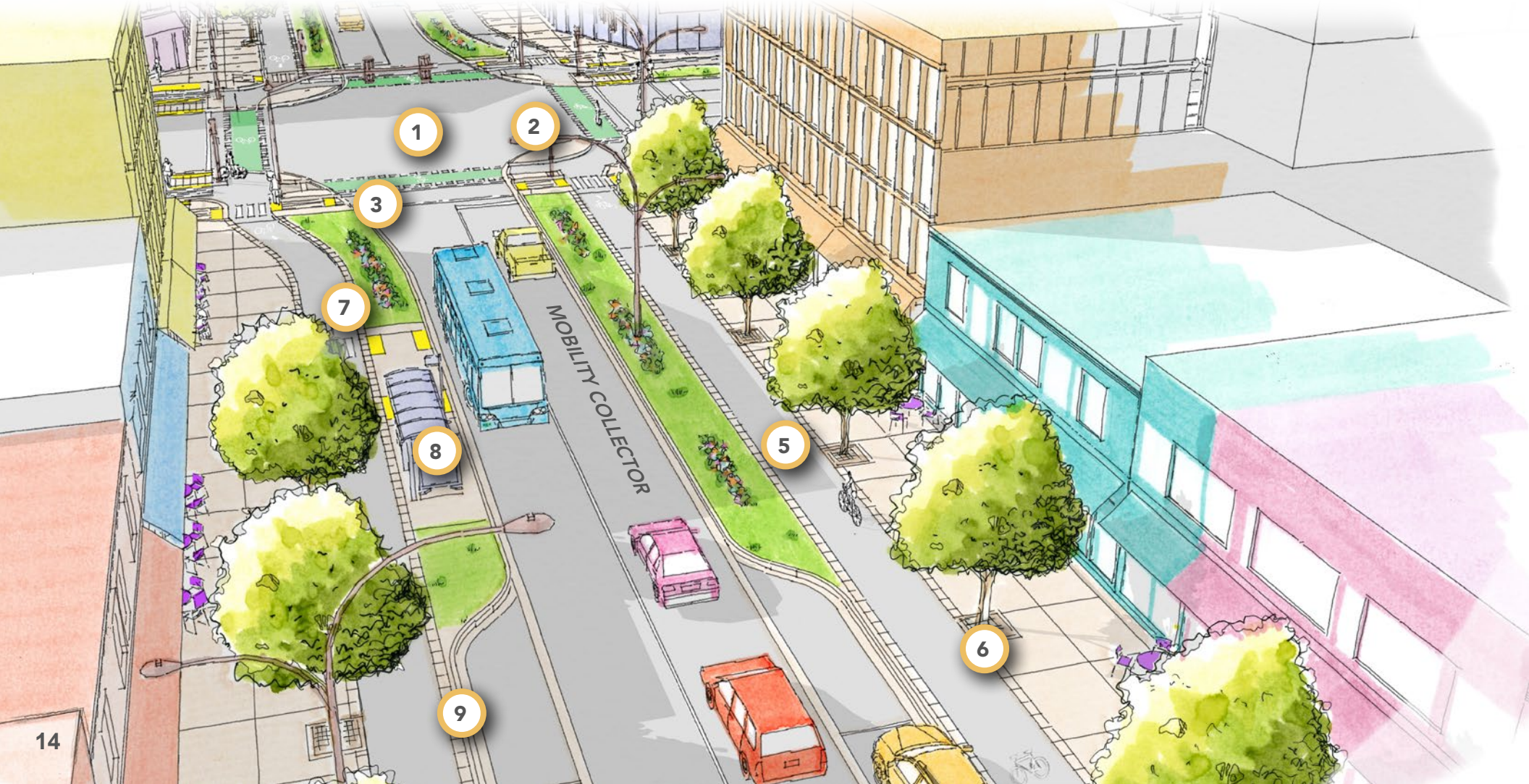
FEATURES

1. A driveway-style curb ramp will be used where the **Mobility Local Street** meets a connecting **Collector** or **Arterial Street**.
2. The sidewalk and cycle track on the intersecting **Mobility Collector Street** will continue at the same grade past the **Mobility Local Street**. Motor vehicle traffic on the **Mobility Local Street** will have to drive up and over the sidewalk and cycle track, reducing turning speed at this higher conflict area.
3. Tactile Warning Surface Indicators (TWSIs) will be provided on the sidewalk to indicate to pedestrians with low vision or who are blind that they are approaching a street with vehicle traffic.
4. Crosswalks on the **Mobility Collector Street** will be identified by score lines in the sidewalk perpendicular to the direction of travel.
5. Sidewalks and/or Flex Zone on the **Mobility Local Street** will be sufficiently wide to accommodate patio seating and active frontage space.
6. The roadway on the **Mobility Local Street** will be separated from the Flex Zone by mountable curb, helping to soften the line between vehicle and pedestrian space. Optionally, all surfaces may be at the same grade.
7. Trees will be provided in the Flex Zone between parking stalls to narrow the street and provide shade.
8. Pedestrian curb ramps at crosswalks will be separated from motor vehicle curb ramps.
9. Vehicle access to properties fronting onto **Mobility Local Streets** will be from rear lanes, where lane access is available (not shown on diagram).

2.3.2 MOBILITY COLLECTOR STREETS

Mobility Collector Streets provide a connection for all modes between destinations but can also be destinations themselves. These streets have many functions: access to businesses, on-street parking where it supports adjacent land uses, and accommodation of higher volumes of traffic than a **Local Street**. Commercial activity is expected to be a priority on these streets and sidewalks are wide to accommodate spillover uses from adjacent businesses and add vibrant life to the street. Parking is provided in pockets to allow space for landscaping, furnishings, and bicycle parking. Street trees are provided between the cycle track and sidewalk, helping to separate bicycles and pedestrians while providing shade and green space on these high-activity streets.

Figure 2.5 Mobility Collector Street Overview



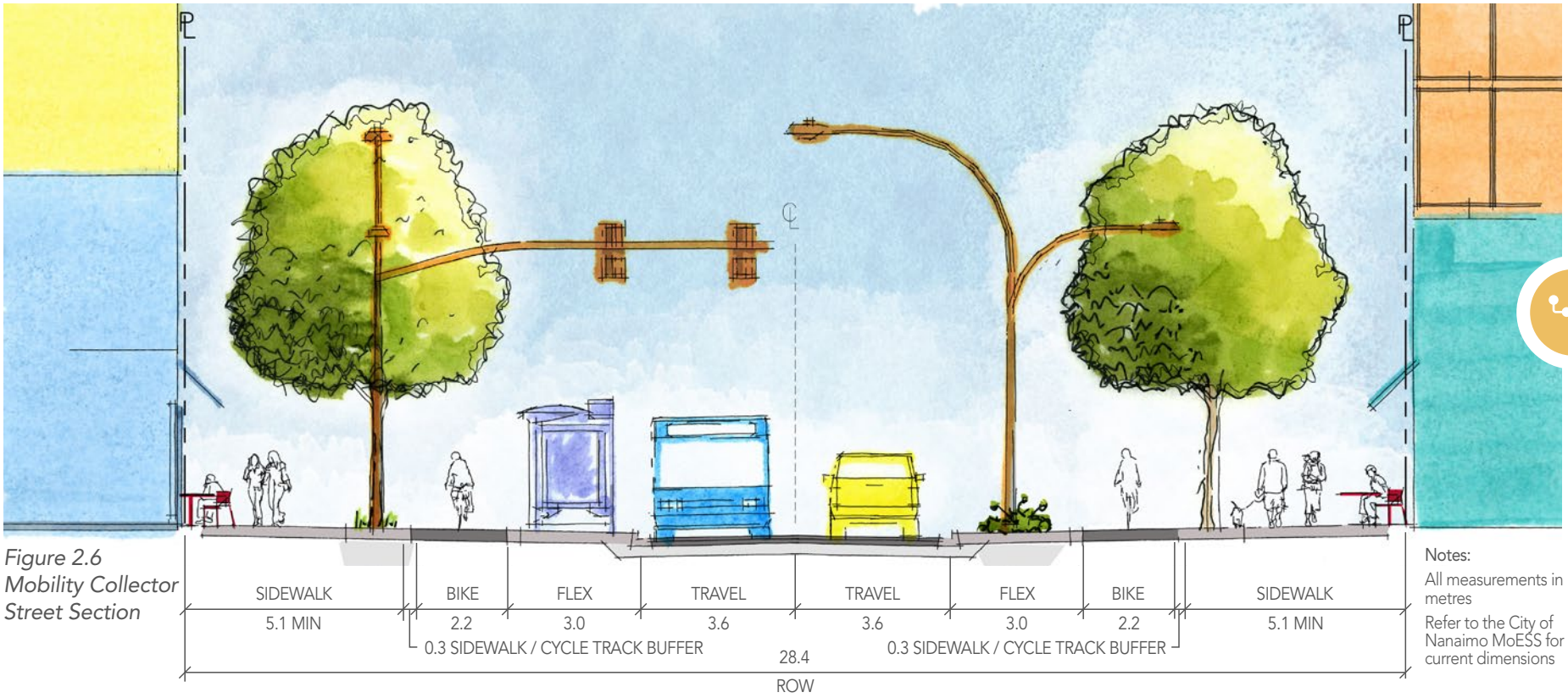


Figure 2.6
Mobility Collector Street Section

Notes:
All measurements in metres
Refer to the City of Nanaimo MoESS for current dimensions

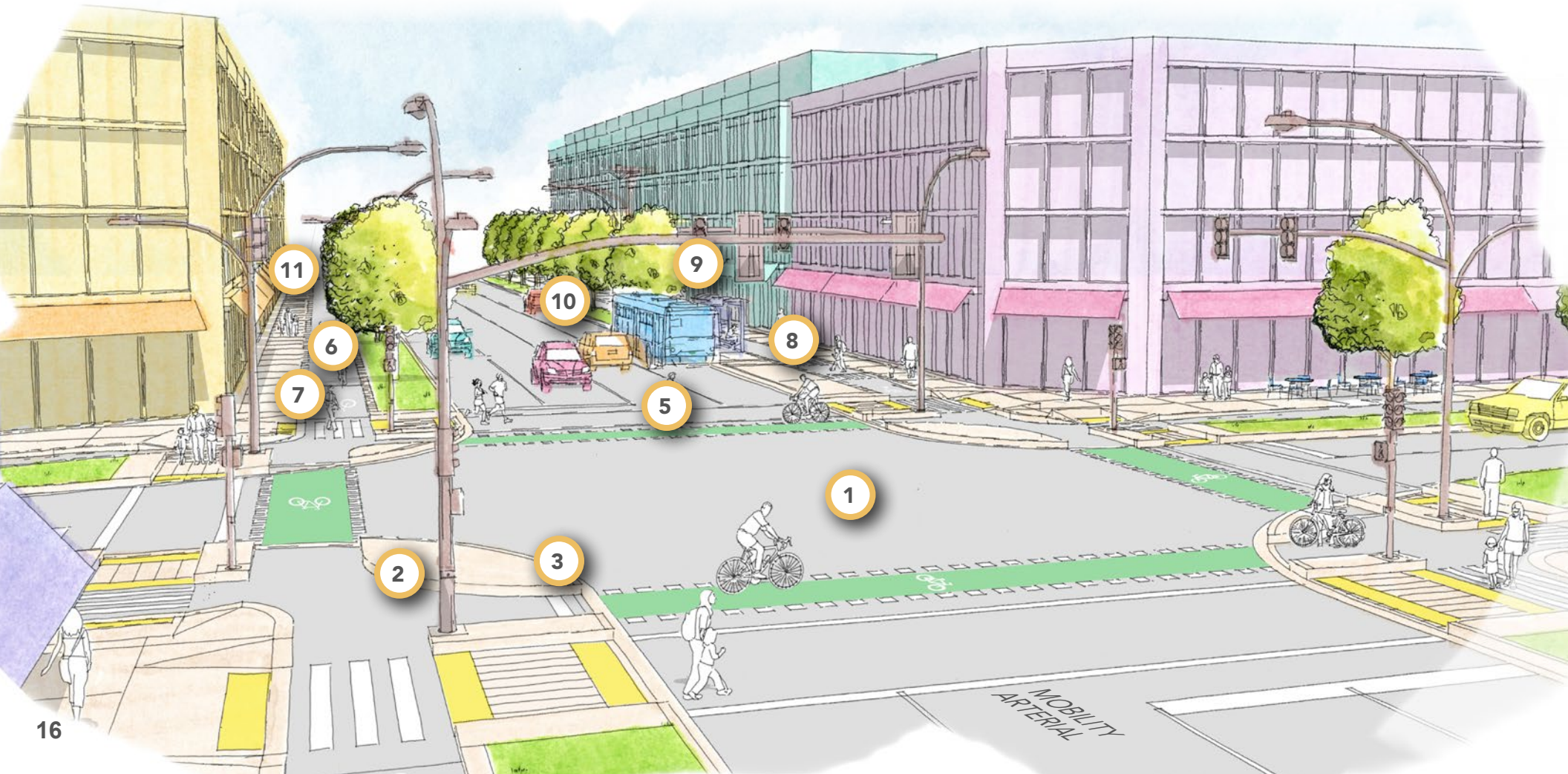
FEATURES

1. Intersections where **Mobility Collector Streets** intersect with other **Collector** or **Arterial Streets** will typically be signalized. Dedicated bicycle signals will be used to reinforce priority for pedestrians and cyclists / rollers.
2. Intersections will include corner protection for cyclists to safely make two-stage left turns.
3. Intersection corner radii will vary based on the design vehicle and number of receiving lanes.
4. If provided, left turn lanes may be set back to accommodate turn paths (not shown on diagram).
5. The cycle track will typically be located between the flex zone and the sidewalk and will be at the same elevation as the sidewalk.
6. A textured buffer for shoreline detection by people with low vision or who are blind will be located between the cycle track and sidewalk. Street trees will further separate pedestrians and cyclists where high pedestrian activity is anticipated.
7. Crosswalk markings will be provided on cycle tracks adjacent to bus door locations, or the sidewalk material will extend continuously to the bus stop, interrupting the cycle track, indicating pedestrian priority.
8. Transit shelters will be located downstream from the bus stop to improve sight lines to bicycles on uni-directional cycle tracks.
9. On-street parking may be provided on **Mobility Collector Streets**. Where it is, at least 0.6 m should be provided between the face of curb and the adjacent cycle track to limit conflicts.
10. Vehicle access to properties fronting onto **Mobility Collector Streets** will be from rear lane, where lane access is available (not shown on diagram).

2.3.3 MOBILITY ARTERIAL

Mobility Arterial Streets carry traffic for all modes between key areas of activity. Because these streets carry more vehicular traffic, pedestrians are less likely to linger, so sidewalk widths are reduced. Driveway accesses into adjacent development along **Mobility Arterial Streets** are minimized, with access preferred from adjoining **Collector** or **Local Streets**. On-street parking is prohibited. Because **Mobility Arterial Streets** are located in busy Urban Centres where pedestrian activity is high, vehicle speeds are lower than more suburban environments, with less separation needed between opposing directions of traffic. Median islands are generally not present in order to maximize space for active transportation modes. Bicycles are accommodated on cycle tracks between the sidewalk and Flex Zone, with protected facilities at intersections.

Figure 2.7 Mobility Arterial Street Overview



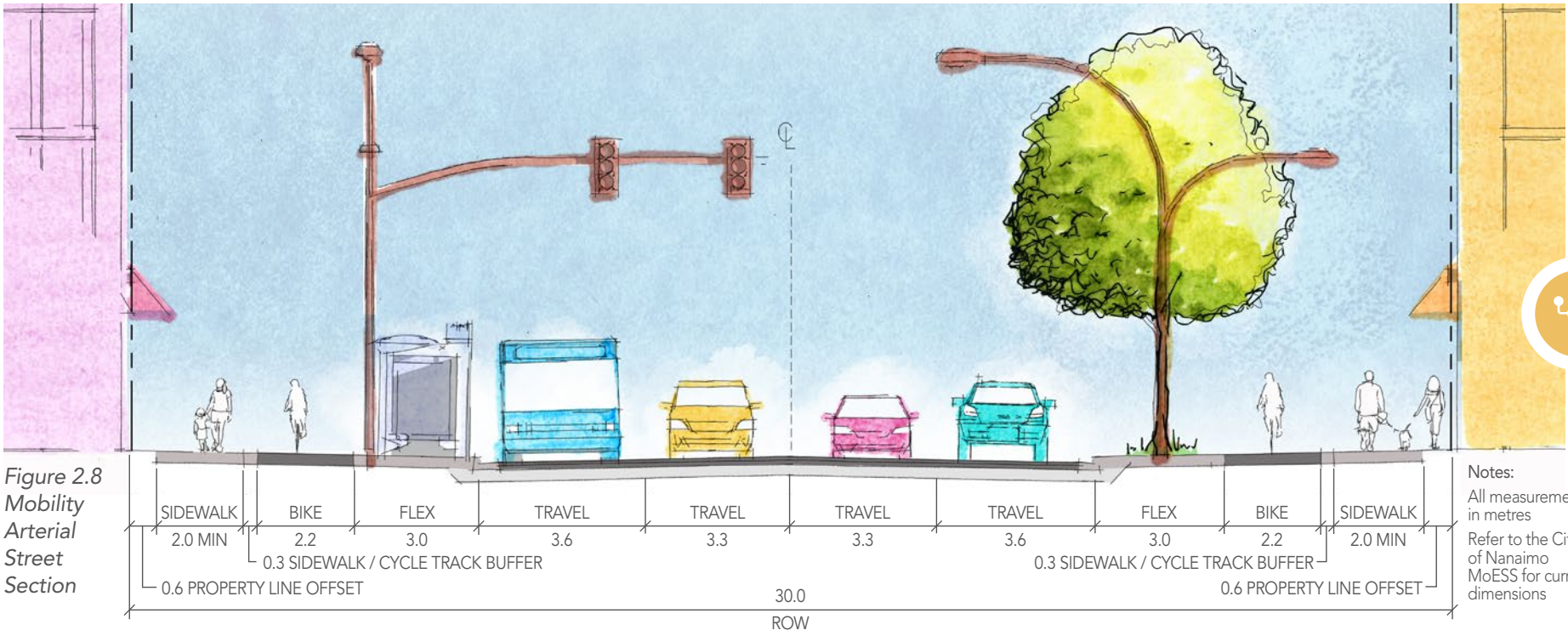


Figure 2.8 Mobility Arterial Street Section

Notes:
All measurements in metres
Refer to the City of Nanaimo MoESS for current dimensions

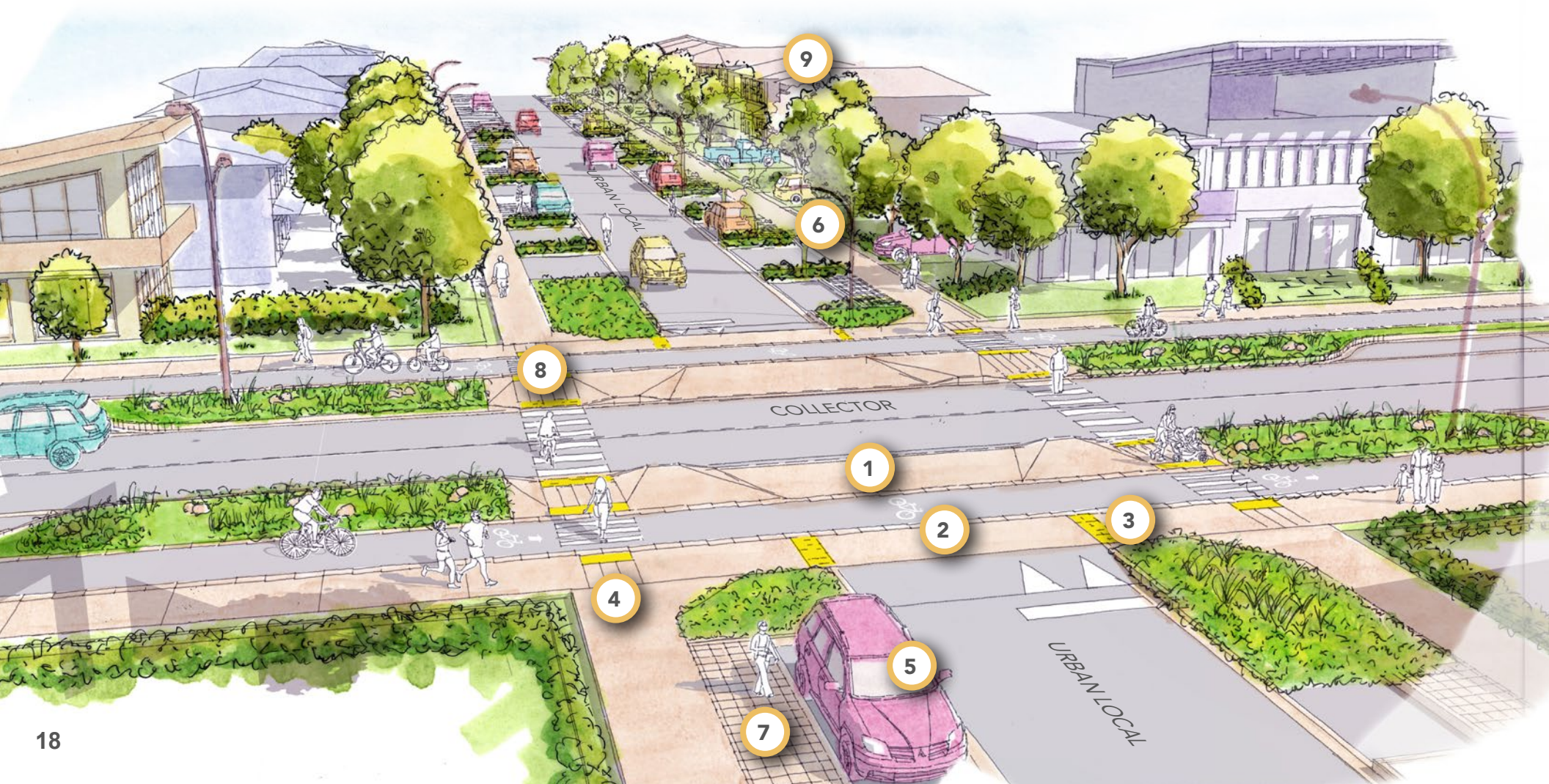
FEATURES

1. Intersections where **Mobility Arterial Streets** intersect with other **Arterial** or **Collector Streets** will typically be signalized. Dedicated bicycle signals will be used to reinforce priority for pedestrians and cyclists / rollers.
2. Intersections will include corner protection for cyclists to safely make two-stage left turns.
3. Intersection corner radii will vary based on the design vehicle and number of receiving lanes.
4. Traffic capacity is a lower priority on **Mobility Arterial Streets** than on **Urban Arterial Streets**, thus turn lanes are a lower priority. If provided, left turn lanes may be set back to accommodate turn paths (not shown on diagram).
5. Vehicle travel lanes will be the lowest possible width.
6. The cycle track will be located behind the Flex Zone and will be at the same elevation as the sidewalk.
7. A textured buffer for shoreline detection by people with low vision or who are blind will be located between the cycle track and sidewalk.
8. Crosswalk markings will be provided on cycle tracks adjacent to bus door locations, or the sidewalk material will extend continuously to the bus stop, interrupting the cycle track, indicating pedestrian priority.
9. Transit shelters will be located downstream from the bus stop to improve sight lines to bicycles on cycle tracks.
10. Driveway access to adjacent development and on-street parking will be restricted on **Mobility Arterial Streets**.
11. Due to the width of the required cross sectional elements, building setback distances of adjacent properties on **Mobility Arterial Streets** are expected to be limited. Because of the higher volume of vehicle traffic, these streets are less suitable for patios than **Mobility Collector** or **Mobility Local Streets**.

2.3.4 URBAN LOCAL

Urban Local Streets are typically slow-moving streets that provide access to homes. To slow vehicles, entry and exit from these streets where they meet with **Collector** or **Arterial Streets** is across raised continuous sidewalks. The street itself has narrow vehicle lanes. On-street parking is provided in pockets with street trees and landscaping at frequent spacing between driveways to create an attractive streetscape and narrow the street in locations where no vehicles are parked. The sidewalk is intended to remain level across private driveways, with ramps to access the private driveways.

Figure 2.9 Urban Local Street Overview



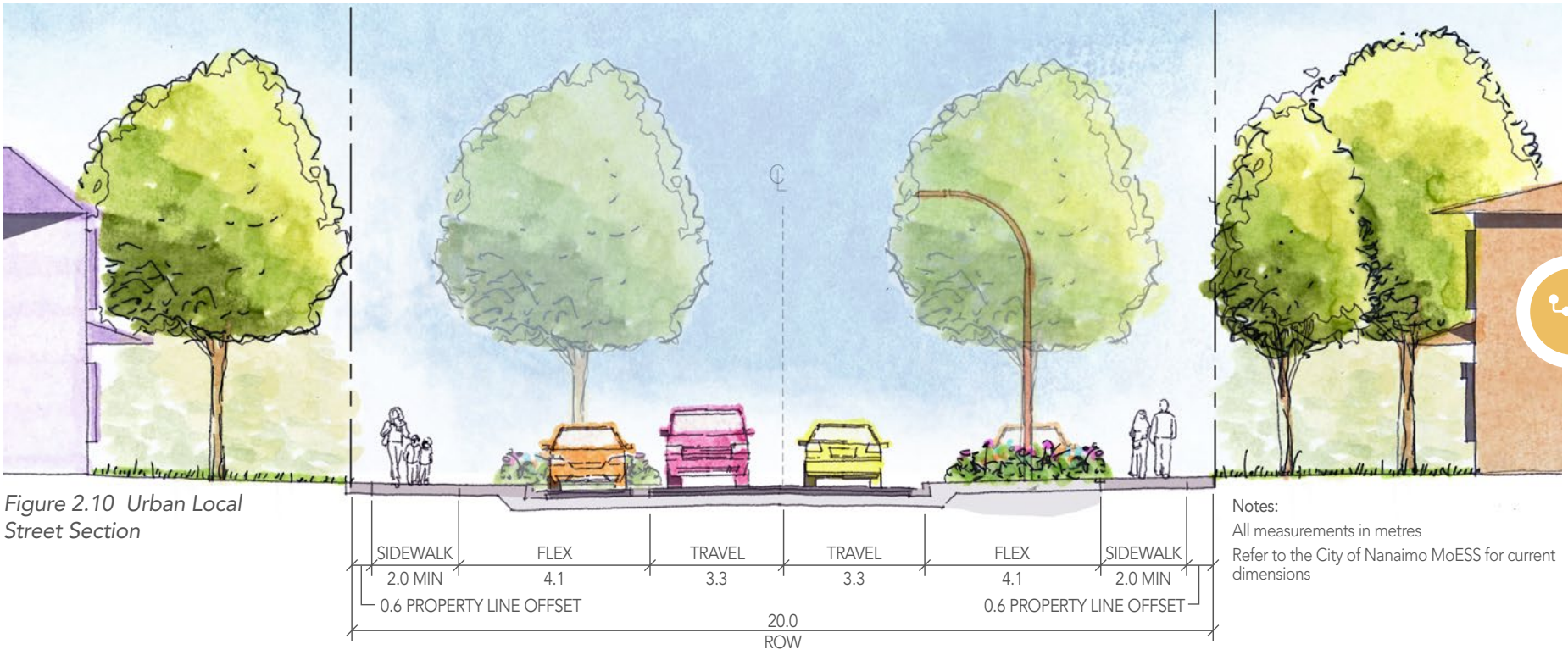


Figure 2.10 Urban Local Street Section

Notes:
All measurements in metres
Refer to the City of Nanaimo MoESS for current dimensions

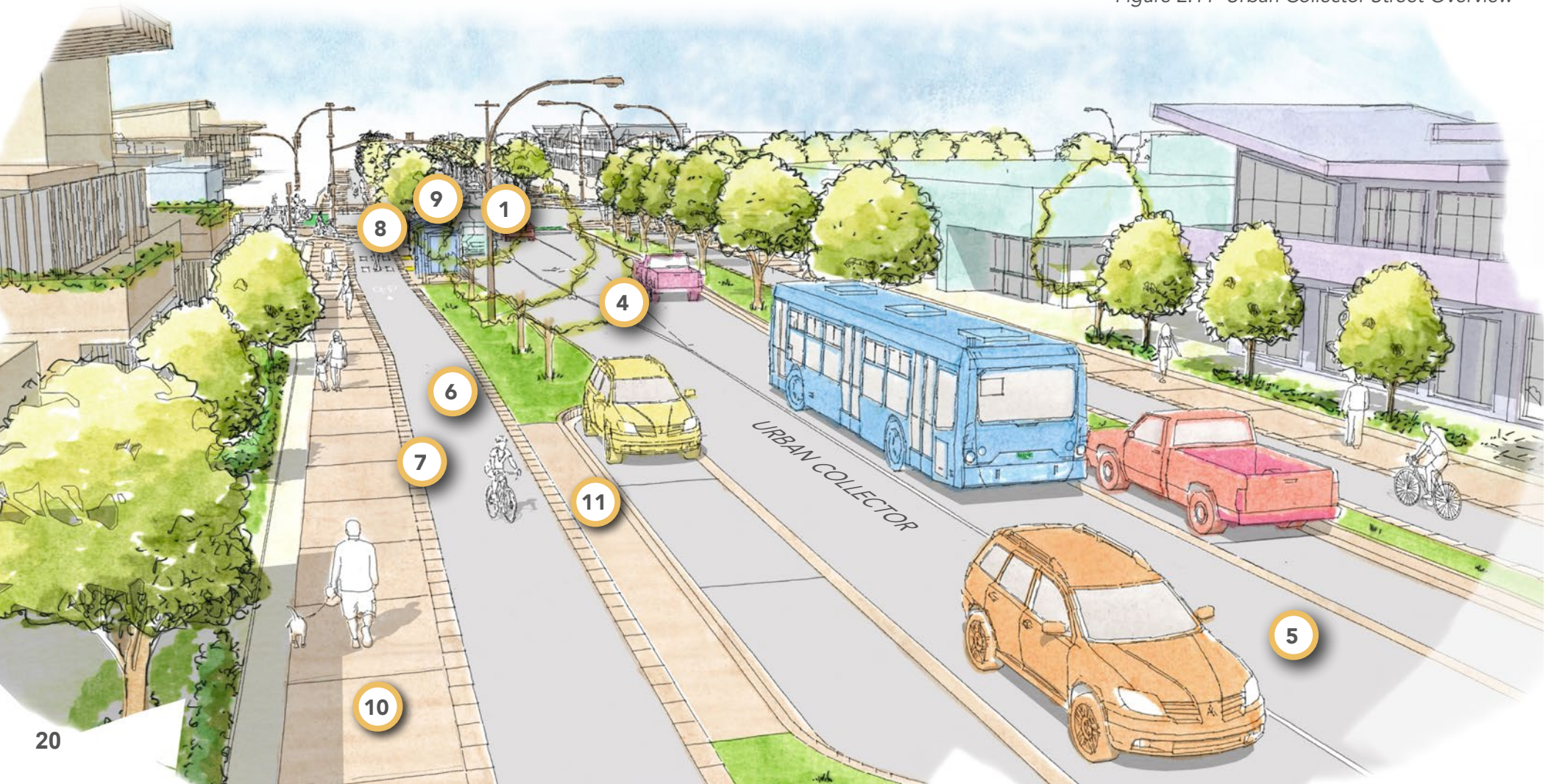
FEATURES

1. A driveway-style curb ramp will be used where the **Urban Local Street** meets a connecting **Collector or Arterial Street**.
2. The sidewalk and cycle track on the intersecting **Collector Street** will continue at the same grade past the **Urban Local Street**. Motor vehicle traffic on the **Urban Local Street** will have to drive up and over the sidewalk and cycle track, reducing turning speed at this higher conflict area.
3. Tactile Warning Surface Indicators (TWSIs) will be provided on the sidewalk as it approaches the **Urban Local Street** to indicate to pedestrians with low vision or who are blind that they are approaching a street with vehicle traffic.
4. Crosswalks on the intersecting **Collector Street** will be identified by score lines in the sidewalk perpendicular to the direction of travel.
5. On-street parking will be provided in pockets where possible and necessary. Parking will be separated from driveways by landscaping to keep the street narrow, even when no vehicles are parked on the street.
6. Sidewalks will be continuous and level across driveways.
7. A paved area will be provided between on-street parking stalls and the sidewalk to allow access to the passenger door.
8. Pedestrian curb ramps at crosswalks will be separate from motor vehicle curb ramps.
9. The adjacent land use will typically be single-detached or low-density multi-unit homes.

2.3.5 URBAN COLLECTOR

Urban Collector Streets provide a connection for all modes between **Local Streets** and **Arterial Streets**. They typically accommodate higher volumes of traffic than a **Local Street**, acting as a linkage, while also providing access to adjacent land uses. They are likely to have turn lanes where they intersect with other **Collector** or **Arterial Streets**. Where turn lanes are included, a wider right-of-way is required. Sidewalks are typically a conventional width, recognizing that commercial and residential activities on these streets will not likely require patio or active frontage space. On-street parking is provided in pockets, with spaces between used for landscaping, furniture, and bicycle parking. Street trees are provided in the Flex Zone wherever space permits, helping to separate pedestrians, cyclists, and rollers from vehicle traffic.

Figure 2.11 Urban Collector Street Overview



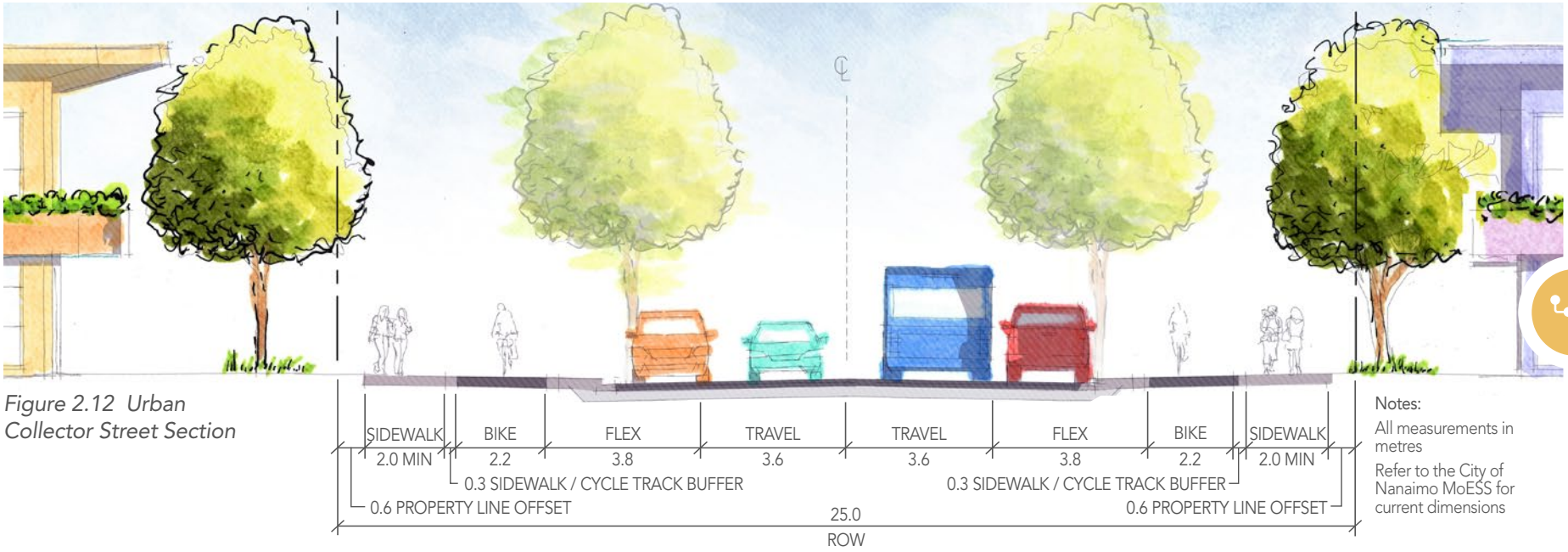


Figure 2.12 Urban Collector Street Section

Notes:

All measurements in metres

Refer to the City of Nanaimo MoESS for current dimensions

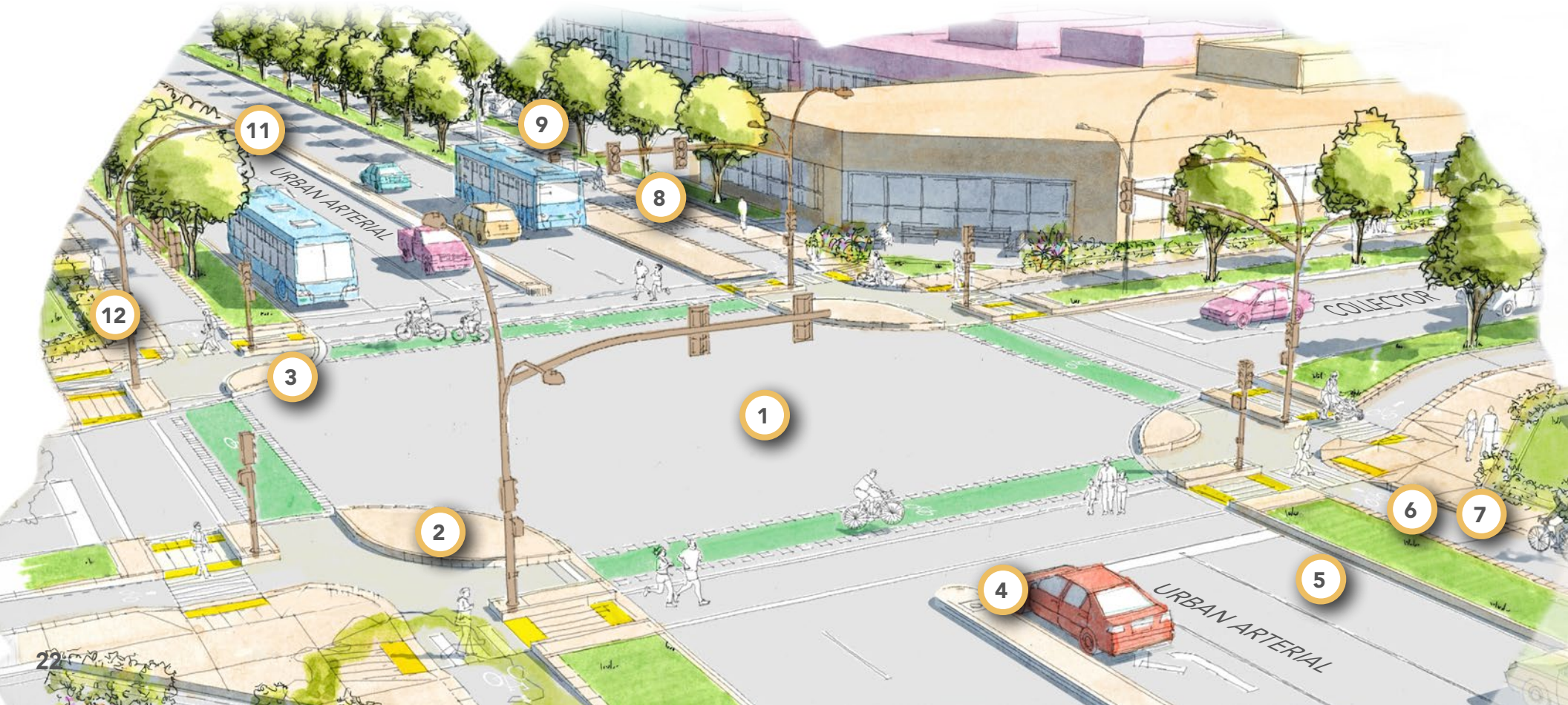
FEATURES

1. Intersections where **Urban Collector Streets** intersect with other **Collector** or **Arterial Streets** will most often be signalized. Dedicated bicycle signals will be considered to reinforce priority for pedestrians and cyclists / rollers.
2. Intersections will include corner protection for cyclists to safely make two-stage left turns (not shown on diagram).
3. Intersection corner radii will vary based on the design vehicle and number of receiving lanes (not shown on diagram).
4. At intersections with **Collector** or **Arterial Streets**, left turn lanes will be provided where possible, to reduce delays to through traffic. If provided, left turn lanes may be set back to accommodate turn paths.
5. Vehicle travel lanes will be the lowest possible width.
6. The cycle track will typically be located behind the boulevard and will be at the same elevation as the sidewalk.
7. A textured buffer for shoreline detection by people with low vision or who are blind will be located between the cycle track and the sidewalk.
8. Crosswalk markings will be provided on cycle tracks adjacent to bus door locations, or the sidewalk material will extend continuously to the bus stop, interrupting the cycle track, indicating pedestrian priority.
9. Transit shelters will be located downstream from the bus stop to improve sight lines to bicycles on cycle tracks.
10. Because pedestrian volumes are expected to be lower on **Urban Collector Streets**, sidewalks may be narrower with less need for separation between pedestrians and cyclists, allowing more space for separation of cyclists from motor vehicles.
11. On-street parking may be provided on **Urban Collector Streets**. Where provided, a suitable door zone buffer from the adjacent cycle track will be maintained to limit conflicts and will be paved to facilitate access.
12. Vehicle access to properties fronting onto **Urban Collector Streets** will be from rear lanes, where lane access is available (not shown on diagram).

2.3.6 URBAN ARTERIAL

Urban Arterial Streets carry traffic for all modes between key areas of activity. Pedestrian activity on the street is expected to be lower, and therefore sidewalk widths are reduced. These routes will provide direct connections for cyclists, therefore bicycles will be accommodated on separated cycle tracks between sidewalk and boulevard, with protected facilities at intersections. With a focus on vehicle movement, driveway accesses into adjacent development along **Urban Arterial Streets** will be minimized, with access preferred from adjoining **Collector** or **Local Streets**. Posted speed will typically remain at 50 km/h. On-street parking is prohibited and these streets will often feature left turn lanes (where those turns are permitted) and centre median barriers to separate opposing traffic. The number of travel and turn lanes will be subject to existing and/or projected traffic volumes and available right-of-way. Where the right-of-way is constrained, the need for additional travel or turn lanes will not take precedence over provision of safe facilities for all modes of transportation. Where only one travel lane in each direction is provided, care is required to accommodate the design vehicle, potentially requiring larger corner radii or compound curves and larger corner cuts.

Figure 2.13 Urban Arterial Street Overview



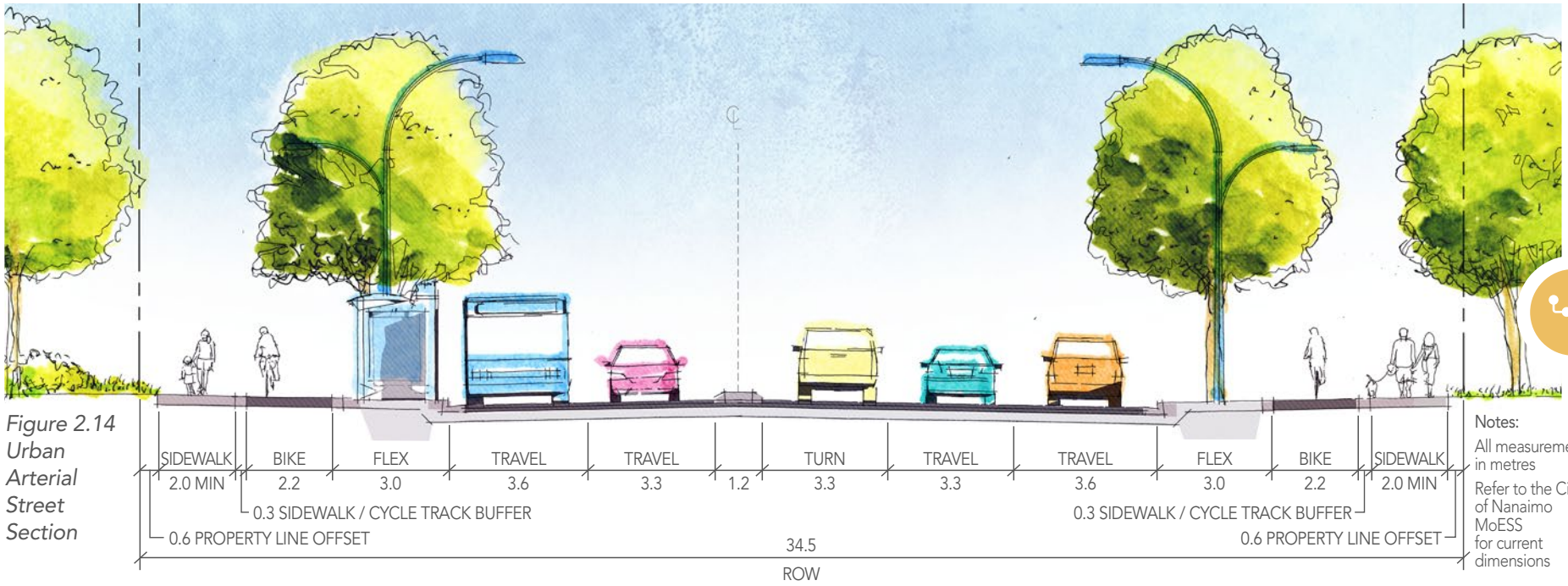


Figure 2.14 Urban Arterial Street Section

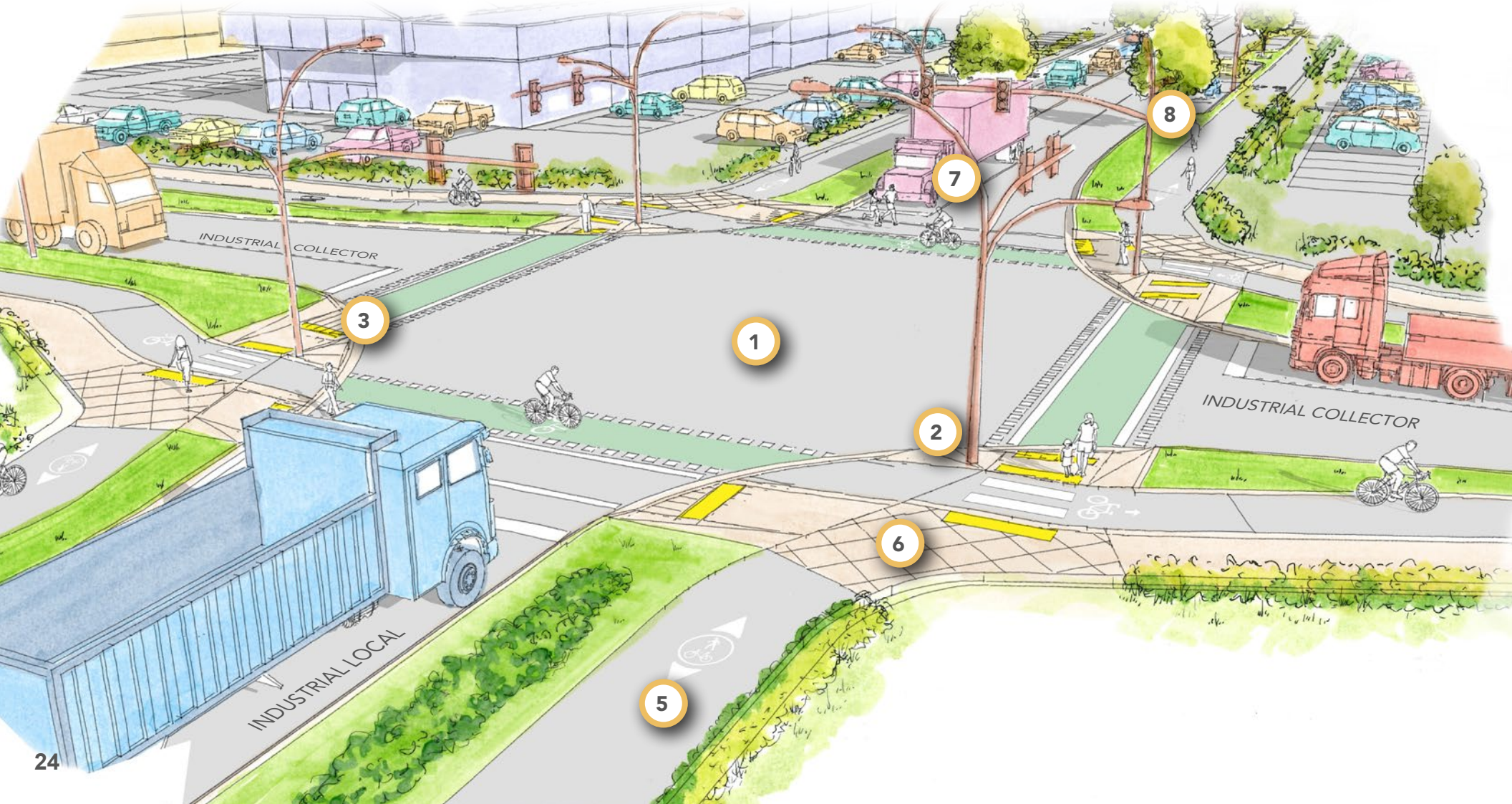
FEATURES

1. Intersections where **Urban Arterial Streets** intersect with other **Arterial** or **Collector Streets** will typically be signalized. Dedicated bicycle signals will be considered to reinforce priority for pedestrians and cyclists / rollers.
2. Intersections will include corner protection for cyclists to safely make two-stage left turns.
3. Intersection corner radii will vary based on the design vehicle and number of receiving lanes.
4. Traffic capacity is a priority on **Urban Arterial Streets**, thus turn lanes will be provided where possible to reduce delays to through traffic. If provided, left turn lanes may be set back to accommodate turn paths.
5. Vehicle travel lanes will be the lowest possible width.
6. The cycle track will typically be located behind the boulevard and will be at the same elevation as the sidewalk.
7. A textured buffer for shoreline detection by people with low vision or who are blind will be located between the cycle track and sidewalk.
8. Crosswalk markings will be provided on cycle tracks adjacent to bus door locations, or the sidewalk material will extend continuously to the bus stop, interrupting the cycle track, indicating pedestrian priority.
9. Transit shelters will be located downstream from the bus stop to improve sight lines to bicycles on cycle tracks.
10. Driveway access to adjacent development and on-street parking will be restricted on **Urban Arterial Streets** (not shown on diagram).
11. Centre median islands will separate opposing traffic and provide opportunity for street trees.
12. Because pedestrian volumes are expected to be lower on **Urban Arterial Streets**, sidewalks may be narrower with less need for separation between pedestrians and cyclists, allowing more space for separation of cyclists from motor vehicles.

2.3.7 INDUSTRIAL LOCAL

Industrial Local Streets are likely to experience higher volumes of large trucks. To accommodate this type of traffic, they include features like wider vehicle travel and parking lanes, along with larger corner radii and compound curves to accommodate tractor / trailer movements. Like other street types, parking will continue to be provided in pockets to narrow the street in locations where fewer parked cars are expected. Lower pedestrian volumes are expected on **Industrial Streets** than on other street types, meaning that cyclists can comfortably share a multi-use path with pedestrians.

Figure 2.15 Industrial Local Street Overview



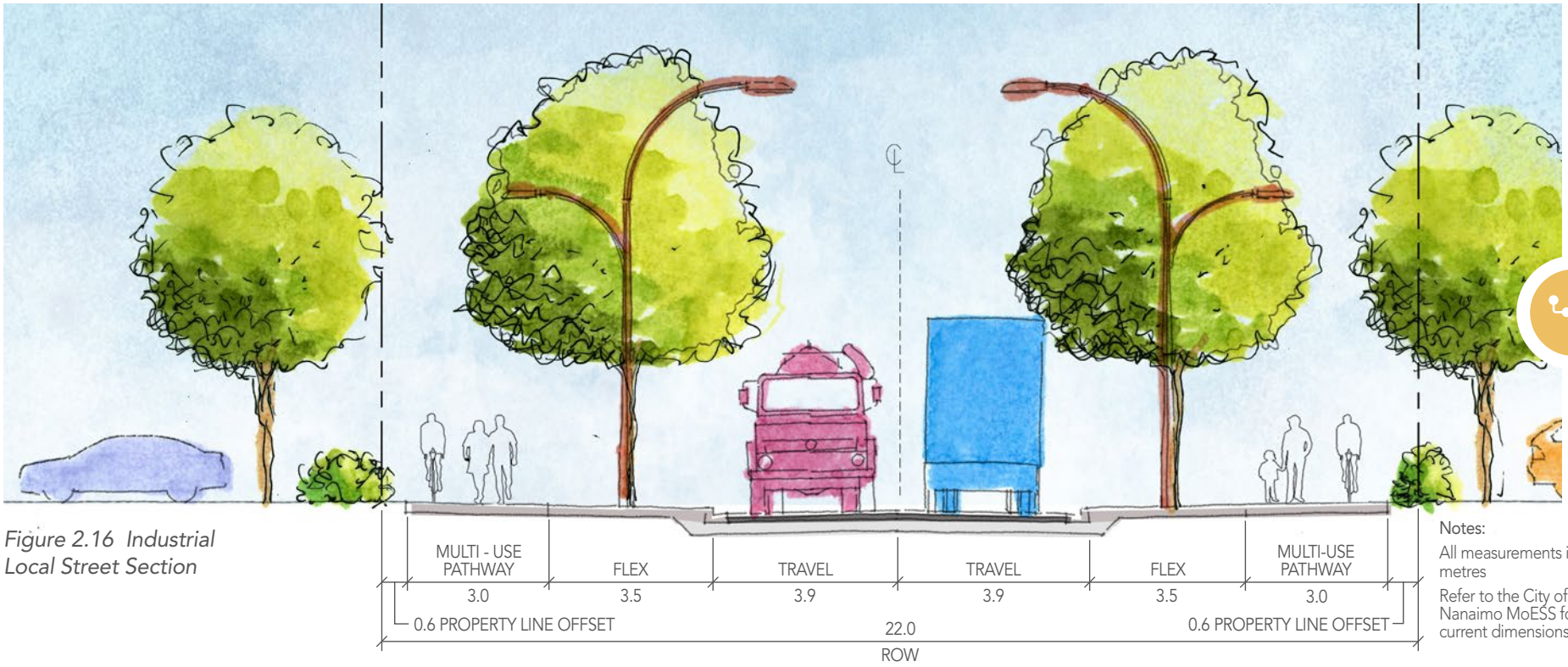


Figure 2.16 Industrial Local Street Section

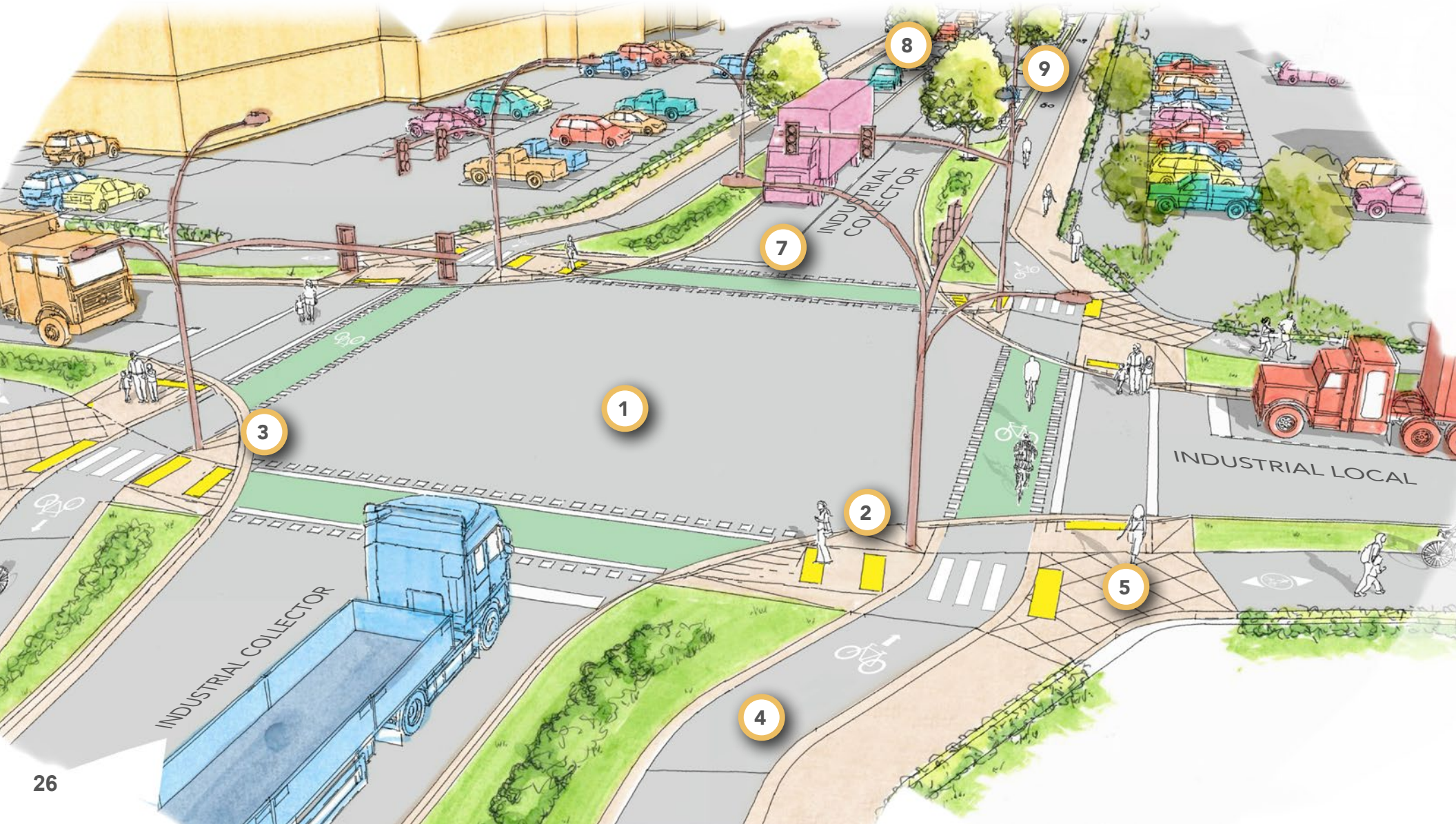
FEATURES

1. **Industrial Local Street** intersections may be signalized or stop controlled.
2. Intersections will allow cyclists to safely make two-stage left turns.
3. Intersection corner radii will vary based on design vehicle and number of receiving lanes.
4. At intersections with **Collector** or **Arterial Streets**, left turn lanes will be provided where possible, to reduce delays to through traffic. If provided, left turn lanes may be set back to accommodate turn paths (not shown on diagram).
5. Because pedestrian and cyclist volumes are expected to be lower on **Industrial Local Streets**, a multi-use path is provided instead of separate facilities for cyclists and pedestrians. Unlike other **Local Streets**, cycling facilities on **Industrial Local Streets** are kept off-street due to the greater likelihood of truck traffic.
6. Pedestrian and cycling facilities will transition from separated cycle tracks on the **Industrial Collector Street** to a multi-use path on the **Industrial Local Street**.
7. Travel lanes and parking lanes will typically be wider for **Industrial Streets** than other street types.
8. On-street parking will be provided in pockets where possible and necessary, with landscaped areas between to maintain a relatively narrow roadway when no vehicles are parked.
9. Where on-street parking is provided, a suitable door-zone buffer from the adjacent multi-use path will be maintained to limit conflicts and will be paved to facilitate access (not shown on diagram).

2.3.8 INDUSTRIAL COLLECTOR

Industrial Collector Streets, like the **Industrial Local Streets**, features wider travel lanes, parking pockets, and corner radii to accommodate larger design vehicles. Pedestrians and cyclists are provided with their own separated sidewalk and cycle track respectively.

Figure 2.17 Industrial Collector Street Overview



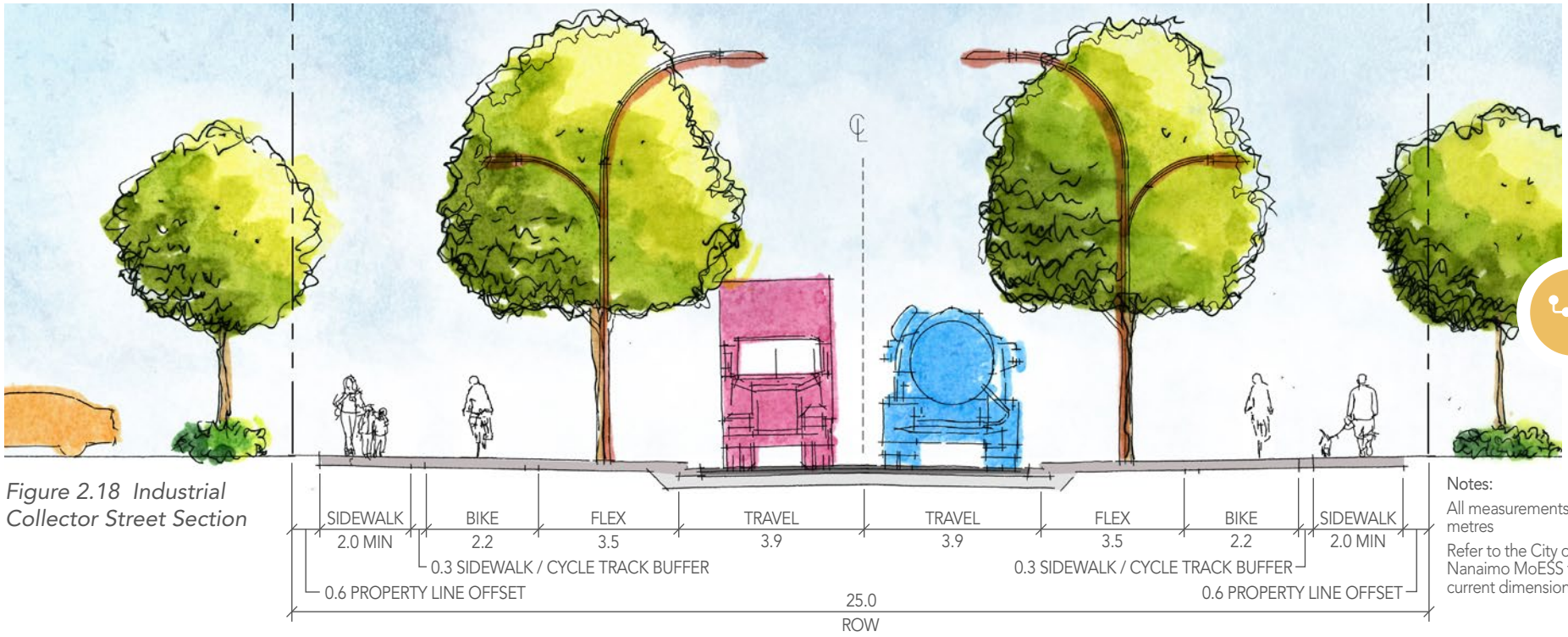


Figure 2.18 Industrial Collector Street Section

Notes:

All measurements in metres

Refer to the City of Nanaimo MoESS for current dimensions

FEATURES

1. Intersections where **Industrial Collector Streets** intersect with other **Collector** or **Arterial Streets** will most often be signalized. Where they intersect with **Local Streets**, the **Local Street** may be signalized or stop controlled.
2. Intersections will include corner protection for cyclists to safely make two-stage left turns.
3. Intersection corner radii will vary based on the design vehicle and number of receiving lanes.
4. Because **Collector Streets** typically form key linkages in the bicycle network, a separated cycle track is provided adjacent to the sidewalk.
5. Pedestrian and cycling facilities will transition from a multi-use path on the **Industrial Local Street** to separated cycle tracks on the **Industrial Collector Street**.
6. At intersections with **Collector** or **Arterial Streets**, left turn lanes may be provided to reduce delays to through traffic. If provided, left turn lanes may be set back to accommodate turn paths (not shown on diagram).
7. Travel lanes and parking lanes will typically be wider for **Industrial Streets** than other street types.
8. On-street parking may be provided on **Industrial Collector Streets**. Where provided, it will be in parking pockets with landscaped areas between to maintain a relatively narrow roadway when no vehicles are parked.
9. Where on-street parking is provided, a suitable door-zone buffer from the adjacent cycle track will be maintained to limit conflicts and will be paved to facilitate access.

2.4 Special Streets

The eight street types identified in Section 2.3 are intended to create a network of connected facilities that are safe and comfortable for all modes of travel and all ages and abilities. While the typical cross-sections will apply in most circumstances, there will be occasions where something different may be appropriate. Adaptability, innovation, and creativity are encouraged for Nanaimo's street network.

Special Streets are those that will not fit easily within one of the typical street types. These are often spaces where vehicle activity is extremely limited and sense of place is prioritized. **Special Streets** can be places for people to walk, roll, or relax, with places to sit and enjoy a quiet coffee or a design that encourages people to wander freely from side to side between buildings. They are most likely to be located in Urban Centres, potentially becoming a main focal point for activity.

Fort William, Scotland

Barcelona, Spain

Amsterdam, Netherlands

Commercial Street Concept, Nanaimo

Nanaimo's future Commercial Street is envisioned to have many characteristics of a special street, including slow vehicle speeds, special paving, outdoor seating, and fluid pedestrian and vehicle zones.

Metral Drive, Nanaimo

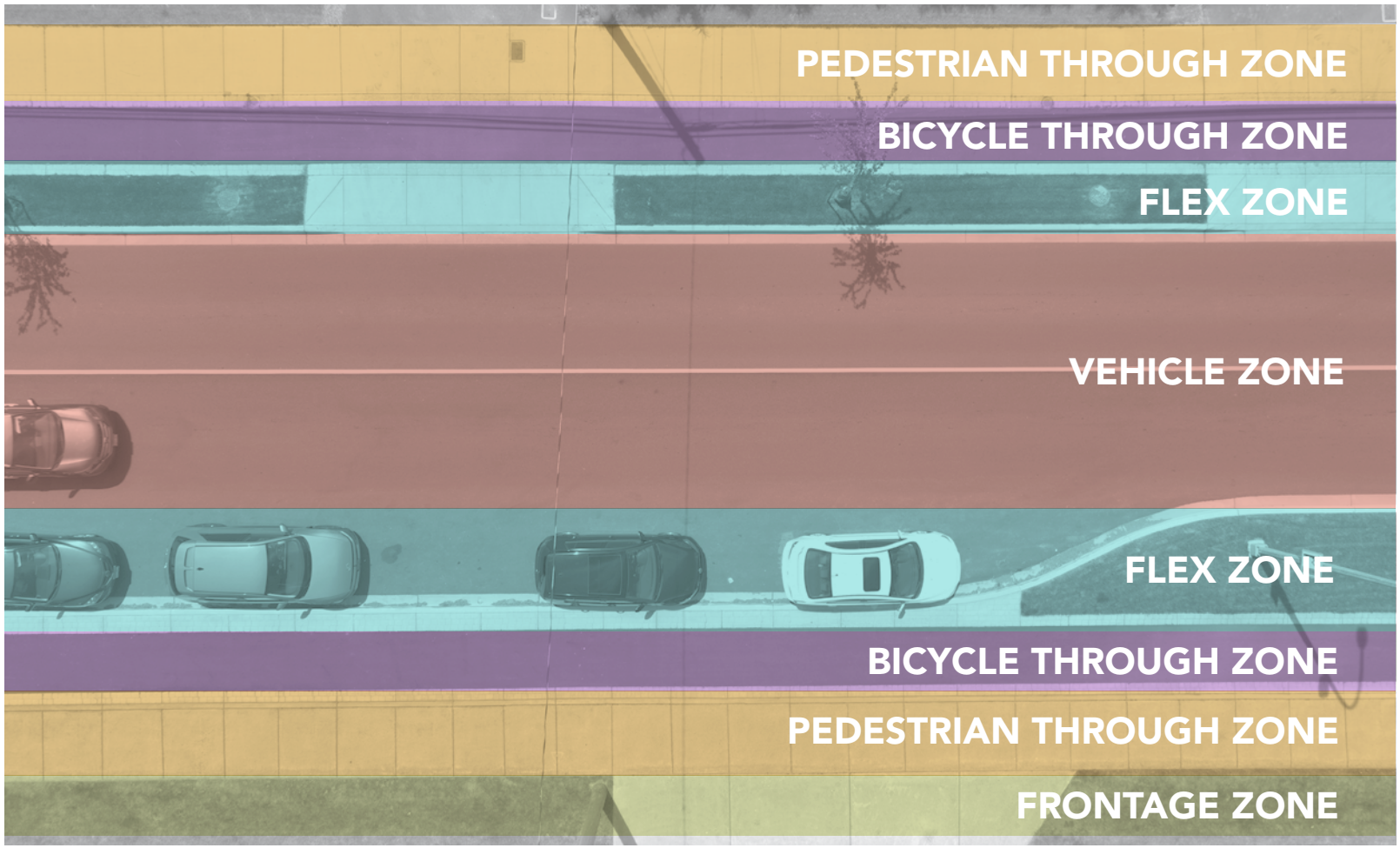
The recently completed Metral Drive improvements implement the Complete Street Design Guide directions for an **Urban Collector Street** in a constrained right-of-way.

3 COMPLETE STREET DESIGN

A Complete Street is made up of a typical set of zones. Depending on a street's classification (see Section 2), the arrangement and size of each zone varies. Within each zone, there are different street features. Table 3.1 to 3.4 highlight typical street features found in each Complete Street zone.

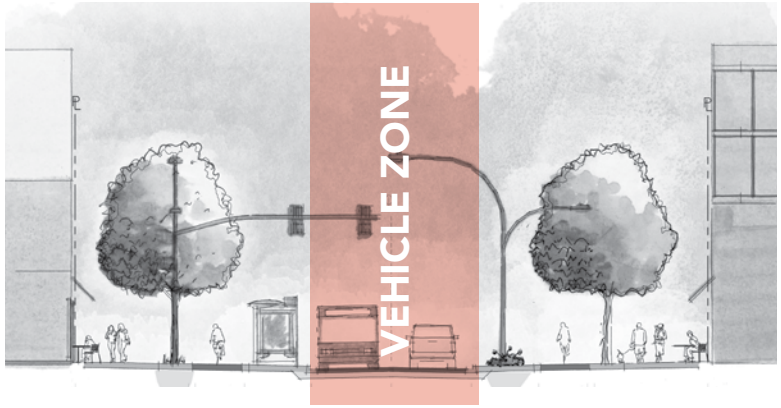
3.1 Complete Street Zones

Figure 3.1 Anatomy of a Complete Street



VEHICLE ZONE

The **Vehicle Zone** includes travel lanes and turn lanes where motor vehicles are accommodated.



The number and width of travel and turn lanes for motor vehicles in the **Vehicle Zone** will be determined based on the design and control vehicles and traffic capacity requirements, balanced with the need to accommodate facilities for other modes of travel.

On some **Local Streets** where traffic volume and speed are low, the **Vehicle Zone** may be shared with cyclists / rollers, and as per the Motor Vehicle Act, the **Vehicle Zone** is always available for use by cyclists / rollers if they are comfortable in this shared environment.

Table 3.1 Vehicle Zone Features **Note:** Information in this table is provided for reference only and in no way replaces engineering analysis and design.

Street Feature	Mobility Streets			Urban Street			Industrial Street	
	Local	Collector	Arterial	Local	Collector	Arterial	Local	Collector
One Way Vehicle Travel Lane Multi-lane or including parking, travelling one direction only	O	O	-	O	O	-	O	O
Bi-directional Vehicle Travel Lane (single lane) Space for 1 motor vehicle to travel each way	✓	✓	-	✓	✓	-	✓	✓
Bi-directional Vehicle Travel Lanes (multi-lane) Space for 2+ motor vehicles to travel each way	-	-	✓	-	-	✓	-	-
Dedicated Turning Lanes To allow through traffic unobstructed passage	-	O	O	-	O	✓	-	-
Raised Centre Median Barriers between moving vehicles	-	O	O	-	O	✓	-	-
Curbless Streets To allow more fluid movements and slow streets	O	-	-	-	-	-	-	-
Traffic Calming Elements that slow vehicle movement	✓	O	-	✓	O	-	✓	O

LEGEND

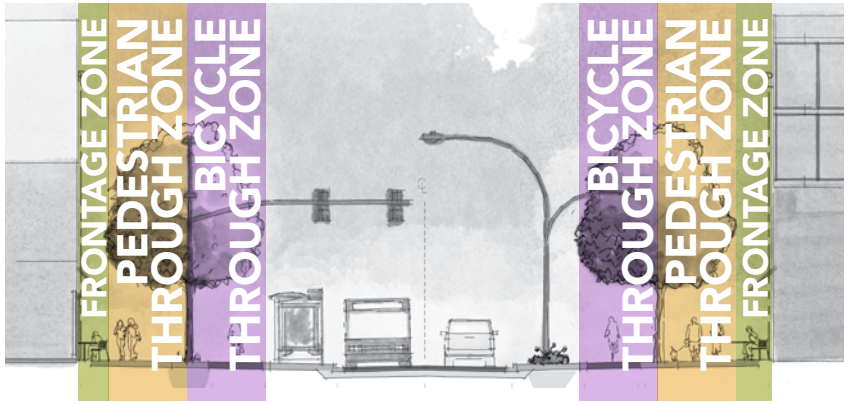
✓ Expected
This feature is prioritized within the street classification.

O Optional
This feature could be provided within the street classification, if warranted and space permits.

- Not Appropriate
This feature is not required or not appropriate for the street classification.

PEDESTRIAN & BICYCLE THROUGH ZONES

The **Pedestrian** and **Bicycle Through Zones** provide clear, unobstructed routes that prioritize walking, cycling, rolling, and other forms of micromobility travel along the street, separated from vehicle traffic.



All street classifications will have, at a minimum, a **Pedestrian Through Zone** in the form of a sidewalk or multi-use path. This zone will typically sit between the Frontage and Flex Zones or the Frontage and Bicycle Through Zones. It should have a clear, unobstructed, paved path wide enough to allow a minimum of two people walking or using a mobility device to pass.

Collector and **Arterial Streets** will have a **Bicycle Through Zone** in the form of a separated cycle track. This zone will typically be located in between the Pedestrian Through Zone and Flex Zone and will be a paved path wide enough to allow a person cycling or rolling faster to overtake those moving slower.

Table 3.2 Pedestrian & Bicycle Through Zone Features **Note:** Information in this table is provided for reference only and in no way replaces engineering analysis and design.

Street Feature	Mobility			Urban			Industrial	
	Local	Collector	Arterial	Local	Collector	Arterial	Local	Collector
Sidewalk Typical sidewalk, wide enough for people to pass	-	-	✓	✓	✓	✓	-	✓
Sidewalk + Frontage Zone Wider area with spaces for patios or displays	✓	✓	O	O	O	O	O	O
Multi-Use Pathway Pathway for pedestrians, cyclists, and rollers	-	-	-	-	-	-	✓	-
Uni-Directional Cycle Track Facility that allows cycling/rolling in one direction, separated from vehicle and pedestrian zones	-	✓	✓	-	✓	✓	-	✓
Bi-Directional Cycle Track Facility that allows cycling/rolling in both directions, separated from vehicle and pedestrian zones	-	◇	◇	-	◇	◇	◇	◇
Painted or Buffered Bike Lane Delineated area of vehicle zone for cycling	-	◇	◇	-	◇	◇	◇	◇

LEGEND

✓ Expected
This feature is prioritized within the street classification.

O Optional
This feature could be provided within the street classification, if warranted and space permits.

- Not Appropriate
This feature is not required or not appropriate for the street classification.

◇ Retrofit Only
This feature could be considered in retrofit situations where the preferred section is not achievable.

FLEX ZONE

The **Flex Zone** provides multiple purposes, depending on the street classification and the amenities needed to serve the area.

The **Flex Zone** is typically located in between the Pedestrian or Bicycle Through Zone and the Vehicle Zone. This zone may include streetlights, fire hydrants, signs, trees, newspaper boxes, recycling and waste receptacles, bike racks, benches, transit shelters, parking, parking meters, and potentially seating for patios. This zone is also the preferred location for snow storage in the winter and can be used for green stormwater infrastructure or overload drainage. The **Flex Zone** is especially valuable on higher speed roadways where it provides separation between moving vehicles and pedestrians and cyclists / rollers.

Table 3.3 Flex Zone Features **Note:** Information in this table is provided for reference only and in no way replaces engineering analysis and design.

Street Feature	Mobility			Urban			Industrial	
	Local	Collector	Arterial	Local	Collector	Arterial	Local	Collector
Boulevard	✓	✓	✓	✓	✓	✓	✓	✓
Street Trees	✓	✓	✓	✓	✓	✓	✓	✓
Streetlights	✓	✓	✓	✓	✓	✓	✓	✓
On-Street Parking	O	O	-	O	O	-	O	O
Loading Zone	O	O	-	O	O	-	O	O
Bus Stop / Shelter	-	O	O	-	O	O	-	O
Benches & Waste Receptacles	O	✓	✓	O	✓	✓	O	✓
Bicycle Parking	✓	✓	✓	O	✓	✓	O	✓
Patios / Parklets	✓	✓	✓	O	O	O	O	O
Green Stormwater Infrastructure	O	O	O	O	O	O	O	O

LEGEND

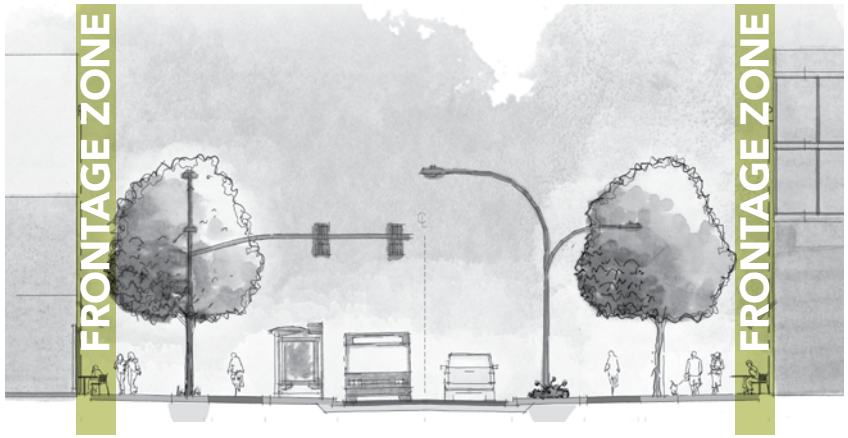
✓ Expected
This feature is prioritized within the street classification.

O Optional
This feature could be provided within the street classification, if warranted and space permits.

- Not Appropriate
This feature is not required or not appropriate for the street classification.

FRONTAGE ZONE

The **Frontage Zone** is the space next to adjacent properties that connect to the street.



Located adjacent to the property line, the **Frontage Zone** is often provided in the Urban Centre context where there are commercial uses connecting with the street. This space may be used for ground floor retail displays, café seating, temporary signage, queuing areas, and other features that support active use of the street by people and businesses. These spaces contribute heavily to placemaking and experience. The width of this zone can vary greatly, depending on the adjacent frontages and their needs.

Examples of Active Frontage Zones

Commercial Street, Nanaimo. Seats, sandwich board, and dog water.

Italy. Cafe seating.

Vancouver. Retail display.

INTERSECTIONS

Intersections are where two streets meet, requiring management of how all modes safely navigate through the area.

Table 3.4 Intersection Features **Note:** Information in this table is provided for reference only and in no way replaces engineering analysis and design.

Street Feature	Mobility			Urban			Industrial	
	Local	Collector	Arterial	Local	Collector	Arterial	Local	Collector
Rectangular Rapid Flashing Beacon (RRFB) Vehicles must yield when flashers are activated	-	O	-	-	O	-	-	O
Stop Control Vehicles must stop until adjoining street is clear	O	O	-	O	O	-	O	O
Traffic Signal Vehicles must follow traffic lights (red, yellow, green)	-	O	O	-	O	O	-	O
Traffic Circle Smaller-scale raised island for smaller intersections	O	-	-	O	-	-	-	-
Roundabout Larger-scale raised island for busier intersections	-	O	O	-	O	O	O	O
Raised Intersection Elevates pedestrian crossings to encourage drivers to slow	O	O	-	O	O	-	O	O
Protected Intersection Space that keeps cyclists / rollers separated from vehicles at intersections	-	O	O	-	O	O	-	O
Bicycle Signals Traffic signals specific to cycle track movements	-	O	O	-	O	O	-	O
Leading Pedestrian or Bike Interval (LPI/LBI) Give these groups a head start when entering intersection	-	O	O	-	O	O	-	O
Driveways Access points to adjacent properties	O	O	-	O	O	-	O	O
Continuous Sidewalks / Cycle Tracks Paths continue uninterrupted through the intersection	O	O	-	O	-	-	-	-

LEGEND

O Optional
This feature could be provided within the street classification, if warranted and space permits.

- Not Appropriate
This feature is not required or not appropriate for the street classification.

3.2 Process for Creating Complete Streets

The transition of Nanaimo's existing streets into Complete Streets will happen over time, through a combination of upgrades related to private development and City-led initiatives. For all street development, the most current version of the City's MoESS will be the legal requirement for up-to-date street classifications and cross-sections.

In an ideal world, the full cross-section for each street classification would be achieved in every project. In the reality of an existing city that has developed over many years, Nanaimo's road right-of-way widths vary. This means, in some cases, there may not be enough space in the available right-of-way to accommodate the full spectrum of zones and features for a street classification. In these cases, trade-offs will need to be considered.

Over time, it is the intent to expand undersized rights-of-way wherever possible to support future realization of each full Complete Street cross-section. Whenever new development is proposed, the developer will provide an increase in the dedicated right-of-way or a statutory right-of-way to accommodate the ultimate Complete Street cross-section for the street classification; however, an interim design may be required to fit street upgrades into existing conditions.

It will be the responsibility of design teams, working with the City Engineer, to achieve the intent of required street classification cross-sections. In constrained conditions, the team will need to select appropriate street components or width reductions to generally achieve the intent of Complete Streets. First and foremost, the priority is to provide a safe, accessible street for people, no matter their mode of transportation.

When a Complete Street project is undertaken, one of two scenarios is likely:

1. **There is <u>Sufficient</u> Right-of-Way for the Desired Cross-Section:** In these cases, the cross-section should be built as per current MoESS guidance. Minor deviations identified through the design process will be reviewed and approved by the City Engineer.

2. **There is <u>Insufficient</u> Right-of-Way for the Desired Cross-Section:** In these cases, a process will need to be undertaken to identify appropriate modifications to the cross-section in order to fit the constrained space, while maintaining the intent of Complete Streets. There are two types of projects under this scenario:

   - **Reconstruction Projects:** Reconstruction typically involves full redevelopment of a street, including moving curbs and changing features to create a Complete Street. Reconstruction Projects are typically long-term investments, meant to be in place for many years.
   - **Retrofit Projects:** Retrofits endeavour to introduce Complete Street elements to an existing street, without substantive changes to curb lines or other higher-cost updates. Retrofit Projects are often interim solutions where full reconstruction may not be feasible or desirable due to inconsistencies in the right-of-way width along the street or other barriers.

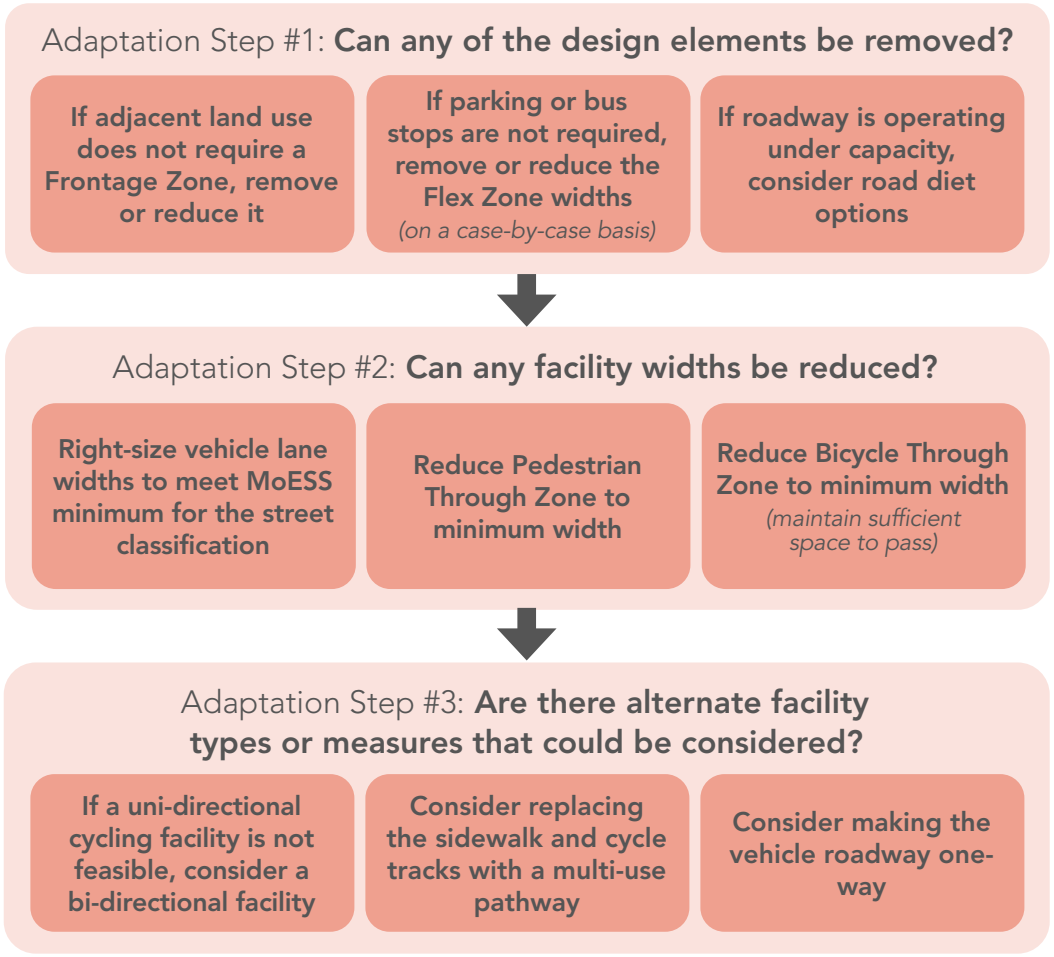
This section provides decision-making support tools and illustrative examples for **Reconstruction Projects** and **Retrofit Projects**.

3.2.1 RECONSTRUCTION PROJECTS

A **Reconstruction Project** involves the full redevelopment of a street, typically involving major construction efforts. While it is preferred that a sufficient right-of-way be secured to accommodate the ultimate Complete Street cross-section, scenarios will arise where adaptation is required. Figure 3.2 outlines a series of adaptation steps that should be considered to adapt **Reconstruction Projects** to available right-of-way space.

Figure 3.2 Reconstruction Adaptation Workflow

Note: While the workflow shown provides general guidance, each reconstruction project will require engineering analysis and approval from the City Engineer.



3.2.2 RETROFIT PROJECTS

Retrofit Projects are adaptations to an existing street to support addition of Complete Street features such as bike lanes, a multi-use pathway, or a Frontage Zone. In many cases, these projects can provide quick wins and lower-cost solutions where a full reconstruction effort is not feasible. They can often be implemented at a fraction of the cost of a permanent design. In some cases, **Retrofit Projects** can act as pilot projects for the City to gain insight on community response and functionality of a Complete Street prior to undertaking major reconstruction efforts. Quick-build **Retrofit Projects**, if implemented on a network-wide basis, can help the City realize the potential mode-shift of protected infrastructure much sooner than waiting until higher cost designs can be implemented. Figure 3.3 outlines a series of adaptation considerations that should be considered to align **Retrofit Projects** with available right-of-way space.

Figure 3.3 Retrofit Adaptation Workflow

Note: While the workflow shown provides general guidance, each retrofit project will require engineering analysis and approval from the City Engineer.

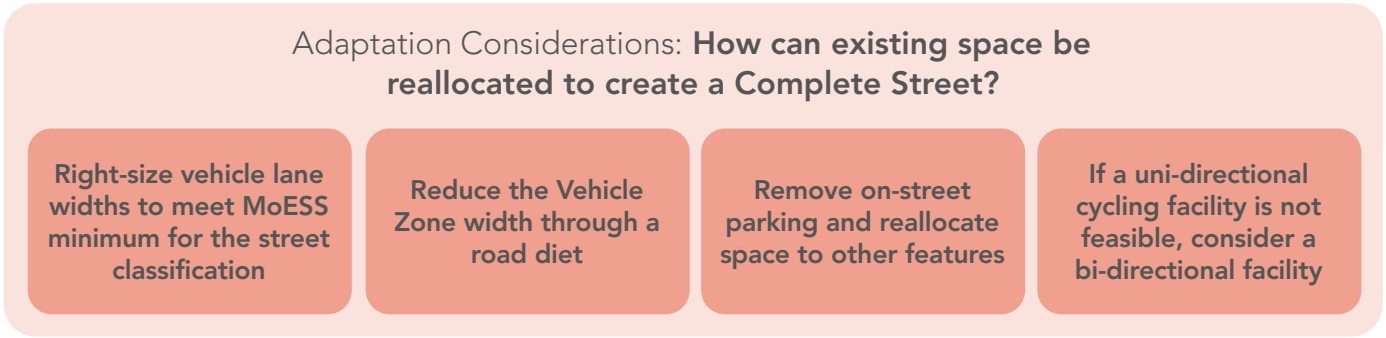


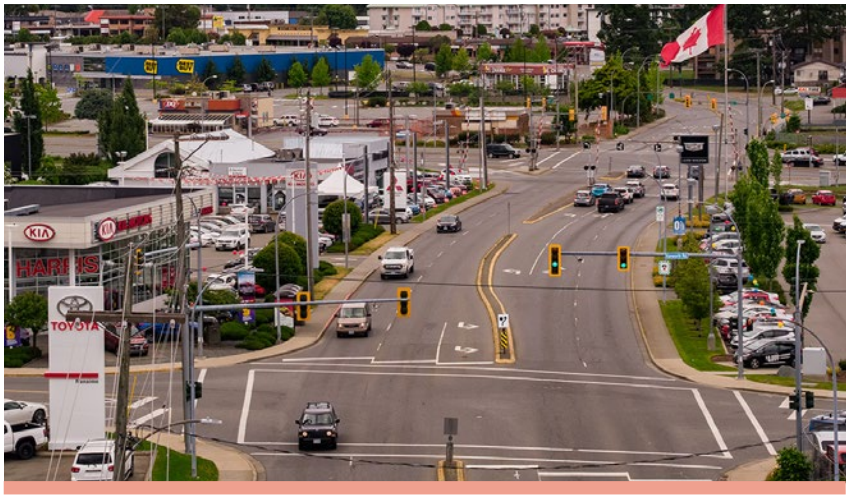
Figure 3.4 Example Retrofit Projects

FRONT STREET

Front Street, 2014. Four vehicle lanes with sidewalks.

Front Street, 2021. Vehicle lanes reduced to two, with addition of bi-directional cycle track.

BOWEN ROAD



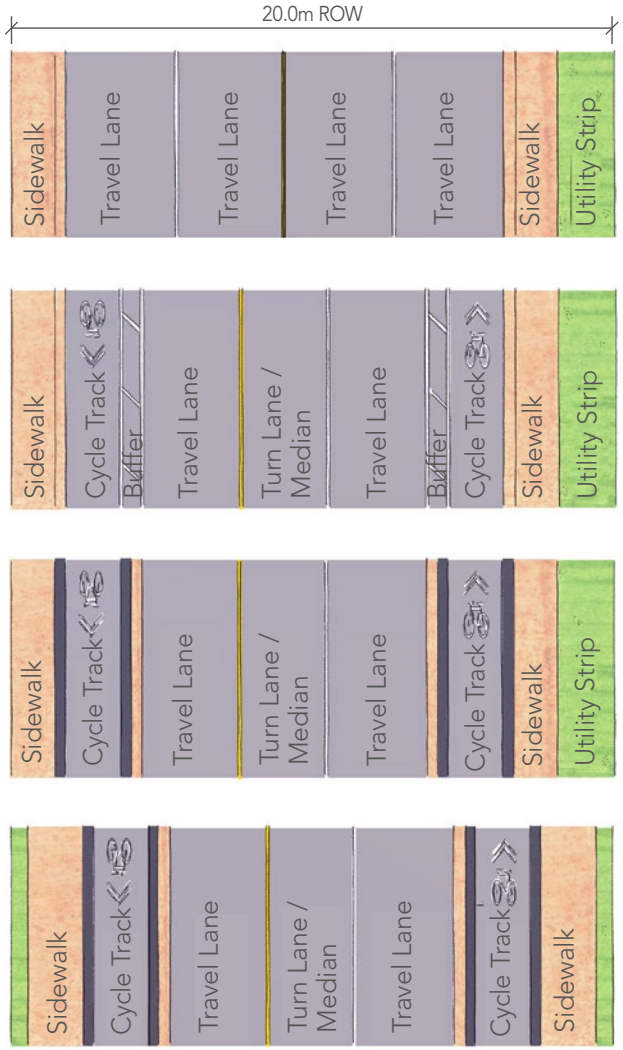
Bowen Road, 2011. Five wide vehicle lanes with sidewalks.

Bowen Road, 2021. Vehicle lanes right-sized, with addition of centre median and raised cycle tracks.

Illustration of a Sample Retrofit Project to Add Cycling Facilities

Cycling facilities are often a missing Complete Street element that can be introduced through retrofits that re-purpose right-of-way space. For streets with multiple or wider-than-minimum vehicle travel lanes, vehicle lanes can be reduced – in number, width, or both – to make space for cycling facilities. Figure 3.5 illustrates a sample of retrofit options to add cycling facilities to an **Urban Arterial Street**.

Figure 3.5 Retrofit Examples for Repurposing Right-of-Way in an Urban Arterial Cross-Section for Cycling Facilities



Existing Cross-Section: Four vehicle travel lanes (two in each direction), no cycling features, narrow sidewalks

A low-cost method of introducing cycling facilities is to re-purpose space through a road diet. Often, a three lane cross-section with centre turn lane will provide similar vehicle capacity to the existing four lane cross-section with no turn lanes. Both configurations typically can accommodate approximately 20,000 vehicles per day.

Lower Cost Interim Retrofit: Two vehicle travel lanes + one vehicle turn lane / median, cycle tracks with painted or pre-cast curb buffers

Without making changes to the curbs (which increases retrofit costs), the space from the removed vehicle lane can be used to add low-cost cycle tracks with either painted or pre-cast concrete curb buffers. Estevan Road represents a bi-directional example of this technique.

Medium-Cost Retrofit: Two vehicle travel lanes + one vehicle turn lane / median, curbs updated, separated cycle tracks introduced and raised to sidewalk level

If more funds are available, the cycle track could be constructed behind a new curb. The cycle track would be raised to be the same level as the sidewalk, separating the road surface and the cycle track and increasing comfort for cyclists. Bowen Road uses this technique, while retaining five vehicle lanes by right-sizing the lanes.

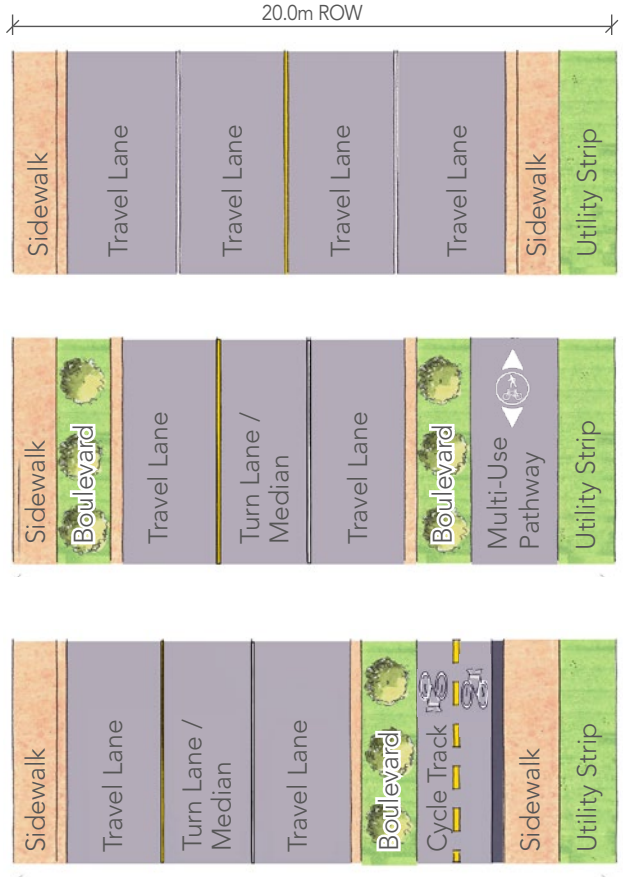
Higher Cost Retrofit: Two vehicle travel lanes + one vehicle turn lane / median, curbs realigned, separated cycle tracks introduced and raised to level of sidewalk, sidewalks widened

If the street is due for a complete reconstruction, or where there may not have been existing sidewalks, the utility strip can be reduced and distributed and the road and curbs fully realigned. This would allow the sidewalks to be widened to accommodate more people and improved space for passing.

Illustration of a Sample Retrofit to Add Other Features

If the street is not conducive to introduce lower cost on-street cycling facilities, space can be re-purposed to accommodate all modes and introduce landscape elements that better separate people from motor vehicles, while also providing beautification and green stormwater infrastructure opportunities. Figure 3.6 illustrates a sample of retrofit options to add other features to an Urban Arterial Street.

Figure 3.6 Retrofit Examples for Repurposing Right-of-Way in an Urban Arterial Cross-Section for Other Features



Existing Cross-Section: Four vehicle travel lanes (two in each direction), no cycling features, narrow sidewalks

As in the previous illustration, the options look at re-purposing space in a four lane cross-section through a road diet. While these examples all consider a typical 20 metre right-of-way, similar strategies can be considered for other right-of-way widths.

Higher Cost Retrofit: Two vehicle travel lanes + one vehicle turn lane / median, both curbs updated, treed boulevards, multi-use pathway on one side

Accommodating pedestrians and cyclists together on a multi-use pathway on one side of the roadway may be feasible if pedestrian, cyclist, and roller volumes / conflicts are expected to be relatively low. This would allow boulevards to be provided on both sides of the street. This retrofit may work best where it connects similar multi-use pathways at either end of the project.

Medium Cost Retrofit: Two vehicle travel lanes + one vehicle turn lane / median, one curb updated, treed boulevard, bi-directional cycling facility, wider sidewalk on one side

Where pedestrian, cyclist, and roller volumes are higher, separation between these uses may be required. A bi-directional cycle track on one side of the street adjacent to one of the existing sidewalks could be included and still leave space for a boulevard between the cycle track and roadway. This works best where it connects to similar facilities on one side of the street.

Illustration of Phased Transitions

When new development is proposed, the developer will be required to provide an increase in the dedicated right-of-way or a statutory right-of-way to support the ultimate street classification cross-section. However, until the full cross-section width is secured for the entire length of street, interim solutions may be needed to maintain consistent curb lines and connections. The developer will work with the City Engineer to determine how best to construct Complete Street elements to meet interim and ultimate needs. Figure 3.7 illustrates potential phased transitions.

Figure 3.7 Illustration of Phased Transition of an Urban Arterial Cross-Section

Ultimate Cross-Section: Four vehicle travel lanes (two in each direction) + turn lane / median, Flex Zone, cycle tracks, and sidewalks

Existing Cross-Section: Four vehicle travel lanes (two in each direction), no cycling features, narrow sidewalks

Interim Cross-Section that Maintains Existing Curb Lines: The existing vehicle lanes remain unchanged and the Flex Zone is increased for the interim.

Interim Cross-Section with New Curb Line: A new curb line is developed where suitable laning can be achieved. For example, widening on approach to an intersection may provide an opportunity for an interim turn lane assuming suitable tie-ins can be provided up and downstream.

Bernard Avenue, Kelowna

Bernard Avenue in Kelowna's downtown was designed with special consideration of Universal Design by prioritizing surfaces, furnishings, and navigational cues for all ages and abilities.

4 PEDESTRIAN DESIGN

Typically, at some point in every journey, a person is a pedestrian. Pedestrians include people of all ages and abilities, including those using mobility devices and strollers. Providing safe, accessible pedestrian environments is critical to Complete Streets.

4.1 Universal Design

The ability to freely and fully access your community is an essential part of wellbeing. Universal Design creates an environment that can be accessed, understood, and used, to the greatest extent possible, by all ages and abilities. The following are key Universal Design considerations for Complete Street projects:

- To accommodate people with low vision or who are blind, accessible pedestrian signals, guide strips, directional score lines, Tactile Warning Surface Indicators (TWSIs) with high contrast TWSI tiles, and/or safety barriers, should be installed where the pedestrian route intersects with other modes.
- To accommodate people with varied cognitive abilities, use of pictures, universal symbols, and colours, should be prioritized over text on wayfinding signage.
- To accommodate people with a hearing loss, there should be highly visible pedestrian signals, markings, and sight lines.
- To accommodate people using mobility devices, including wheelchairs, scooters, walkers, canes, and other devices, smooth surfaces should be prioritized and awkward grades and transitions should be avoided.
- To accommodate people with limited mobility, accessible parking spaces and sidewalk curb ramps should be conveniently located near adjacent businesses. Shaded places to rest are also important, particularly where the street lies on a steep grade.

Metral Drive, Nanaimo. High contrast TWSIs indicate where pedestrians may cross the path of a motor vehicle or bicycle.

Curbside accessible parking with flush curb access.

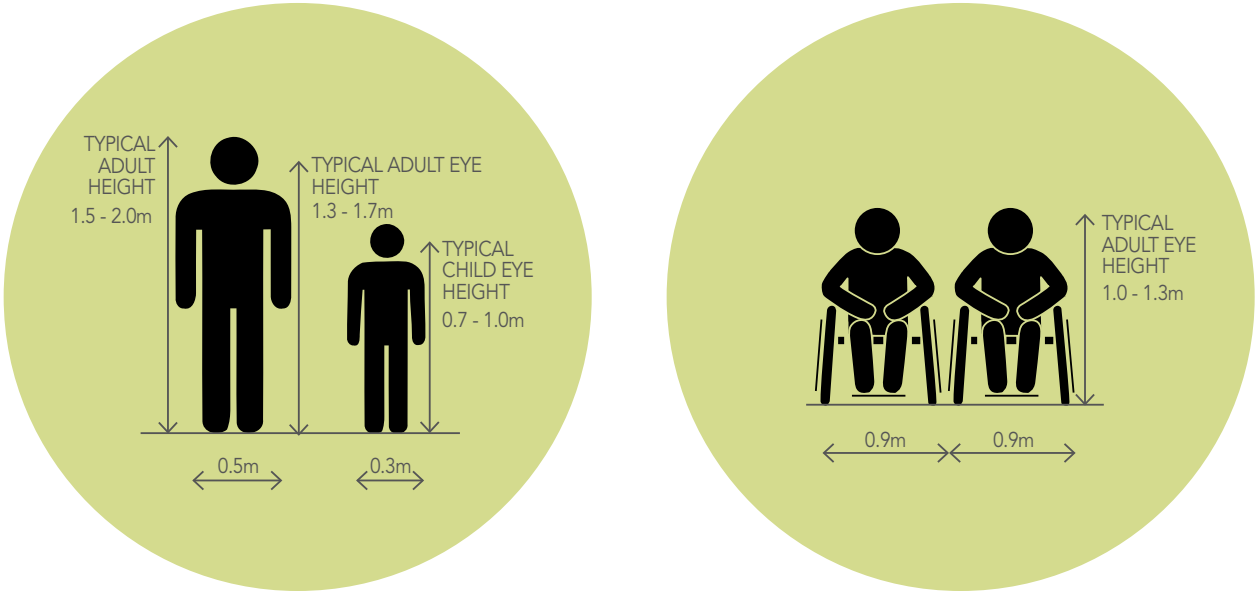
4.2 Pedestrian Design User

The design user for the pedestrian realm is diverse. Users of all ages and abilities, including able-bodied pedestrians; younger and older pedestrians with varied needs; people with visual, cognitive, or physical limitations that affect their ability to navigate the street, including those who may require the support of a mobility device. Pedestrians may have baggage, may be pushing a bicycle or stroller, may be walking or running. Children may be playing. People may be walking a pet.

Common pedestrian dimensions are shown in Figure 4.1. When considering sight lines, the eye height of a child or someone in a wheelchair should be prioritized over the typical adult.

Pedestrians will have designated facilities such as sidewalks, multi-use paths, and crosswalks that provide them safe spaces, protected from other modes. However, in a street environment there are many places where pedestrians will intersect with other travel modes. For example, they may be required to access transit stops or cross a boulevard from on-street parking to reach the sidewalk. They may have to cross a cycle track to reach an intersection or transit stop. On a shared street, pedestrians may mix with all users, including motor vehicles. Reducing potential pedestrian conflict points and prioritizing pedestrians over other modes will be important for safe Complete Streets.

Figure 4.1 Typical Pedestrian Design User Dimensions & Operating Space Requirements
(Adapted from the BC AT Design Guide)



4.3 Pedestrian Facility Types

SIDEWALKS

Sidewalks are the most common facility type for pedestrians. These spaces must feature a universally-accessible Pedestrian Through Zone that is wide enough for comfortable movement and passing. How the Pedestrian Through Zone interfaces with adjacent zones affects the comfort and amenity provided to pedestrians.

Sidewalk with Adjacent Flex Zone

On streets with space limitations, sidewalks can be directly adjacent to vehicle lanes. However, close proximity to moving vehicles can be uncomfortable for pedestrians, especially when vehicles are moving at higher speeds. Where possible, a Flex Zone should separate the sidewalk from the travelled roadway, typically including features like a boulevard or on-street parking. A key advantage of an adjacent Flex Zone is that this area can contain curb ramps so that the sidewalk remains level across driveways and local streets. Flex Zones also provide space for snow storage, waste receptacles, street trees, etc.

Sidewalk with Adjacent Frontage Zone

In more urban areas within the **Mobility Local** and **Mobility Collector** designations, businesses will face the street. In these areas, Frontage Zones connecting to the sidewalk are important to provide space for placemaking elements like patios, retail displays, and plazas that create a more vibrant street. A Frontage Zone allows activation of the area, while maintaining a Pedestrian Through Zone clear of obstructions.

Sidewalk with Adjacent Cycle Track

In many cases, sidewalks will be adjacent to the Bicycle Through Zone, typically a cycle track facility. When these adjacencies occur, and especially when pedestrian and cyclist activity is high, it will be important to delineate the different functions though changes in materials, a textured buffer, and/or potentially grade separation.

MULTI-USE PATHS

Multi-use paths are a shared space, with pedestrians using the same route as cyclists and people on other micromobility devices (rollers). Because multi-use paths allow multiple modes to share the same space, they are useful options where space is constrained. However, pedestrians and cyclists / rollers typically move at very different speeds especially on steep grades, which can leave pedestrians feeling vulnerable when cyclists / rollers approach quickly. Multi-use paths may have different design features, depending on their level of use.

Low Volume Multi-Use Path

Where pedestrian and cyclist / roller volumes are typically low, unmarked multi-use paths can provide a comfortable experience.

Centre Line on a Multi-Use Path

To manage the challenges of shared use on busier pathways, wider paths or local separation where higher volumes or speed differentials are expected can be a mitigation. A centre line on the path can help educate those moving slower to keep to one side, rather than walking in the middle, thereby leaving space for those moving faster to comfortably pass.

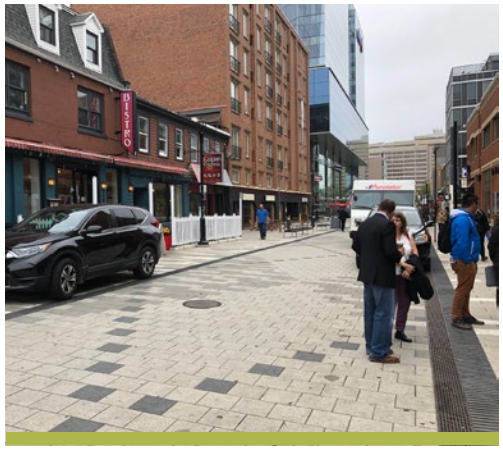
Slow Roll Zone Identification

Where a multi-use path is the most feasible option for a Complete Street and volumes of pedestrians and cyclists are high, additional mitigations may be needed. Signage and pavement markings can be used to define an area as a 'slow roll' zone, providing guidance on expected behaviour.

SHARED SPACES

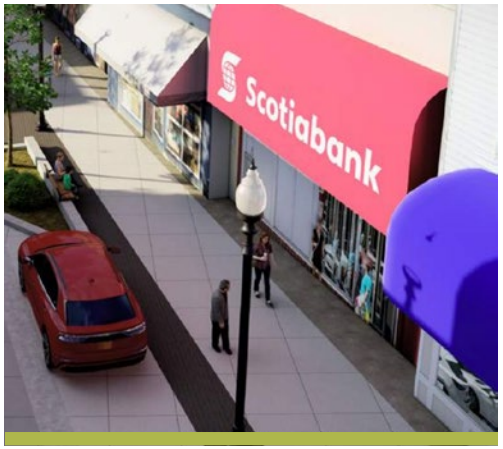
Shared spaces are slow-moving streets (also know as *Woonerfs*) where the formal distinctions between modes of travel are reduced or removed. In these spaces, the street is shared by everyone, with each user becoming increasingly aware and respectful of others, and pedestrian movement prioritized over the movement of motor vehicles. Shared street environments may be suitable in places where pedestrian activity is high and vehicle volumes are low or discouraged.

Argyle Street, Halifax



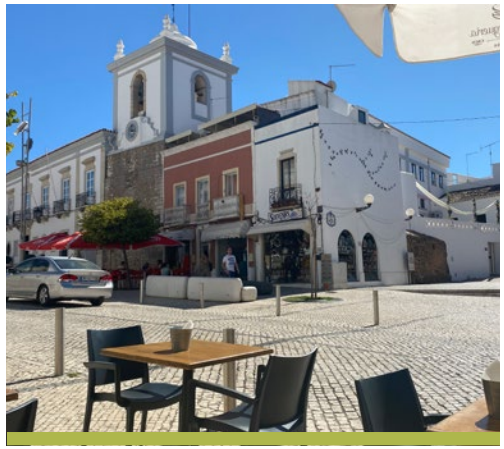
Many cities are creating shared streets in busy commercial areas to reduce the impacts of motor vehicle traffic and allow pedestrians to freely cross the street between commercial establishments. These types of streets support placemaking, helping to create an active and vibrant public realm.

Commercial Street Concept (2022)



In Nanaimo, these streets would be best located in the core of Urban Centres. Design would be unique in each case, but common features include a lack of barrier curb and surface materials such as concrete, pavers, or other feature paving to indicate the area is not a traditional roadway and that vehicles are guests in the space. The 2022 Concept Design for Commercial Street in Nanaimo proposed a shared space with flush curbs and enhanced materials.

Bollard Delineators, Portugal



Street furnishings and landscaping often play an important role in constraining and defining the vehicle path through an area. The intent is that vehicles move through such a space at a walking pace, often no more than 5 km/h. The example above shows bollards delineating the appropriate path for vehicles to follow.

4.4 Pedestrian Zone Layouts & Dimensions

Pedestrian Zone layouts and dimensions vary by street classification, as illustrated in Figure 4.2.

- For those streets where there is expected to be a high level of pedestrian activity – such as **Mobility Local** and **Mobility Collector Streets** – more space is provided for the sidewalk so that adjacent land uses can spill out onto the street while maintaining the Pedestrian Through Zone. Elements like street trees and buffers are positioned to increase separation between pedestrians and cyclists / rollers, reducing conflict in high activity areas.
- Streets where pedestrian volumes are expected to be lower – such as **Urban Collector**, **Urban Arterial**, and **Industrial Collector Streets** – have less emphasis on separating pedestrians and cyclists / rollers, with the cycle track and sidewalk adjacent to each other, separated by a small textured buffer.
- Multi-use paths are only recommended for **Industrial Local Streets** where pedestrian and cyclist / roller volumes are both expected to be sufficiently low to reduce the likelihood of conflicts.

Typical Minimum Widths

Typical minimum widths for pedestrian facilities are summarized in Table 4.1; however, there may be occasion to construct pathways and sidewalks of other dimensions, subject to agreement with the City Engineer.

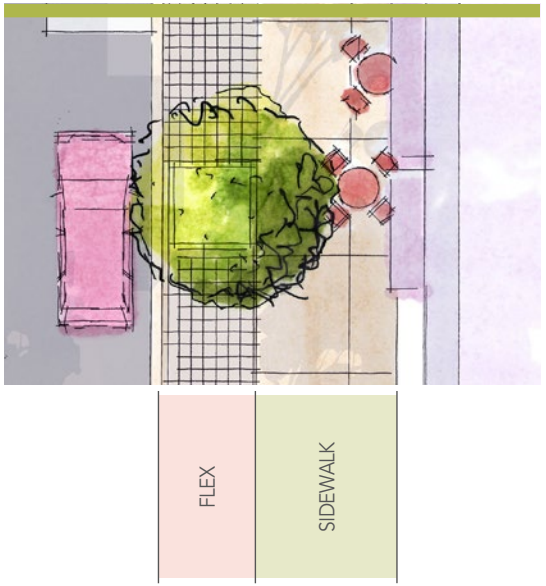
Table 4.1 Pedestrian Facility Typical Minimum Widths

Facility	Typical Minimum Widths*
Sidewalk	2.0 m, allowing for two wheelchairs to pass
Multi-Use Path	3.0 - 4.0 m, allowing for two bicycles to pass
Multi-Use Path Adjacent to Structures / Buildings / Bridges	4.0 m, allowing for comfortable movement without conflict with a structure
Boulevard	1.5 m, allowing for accommodation of a curb ramp, snow storage, waste receptacles, and tree plantings
Sidewalk & Cycle Track Buffers	0.3 m

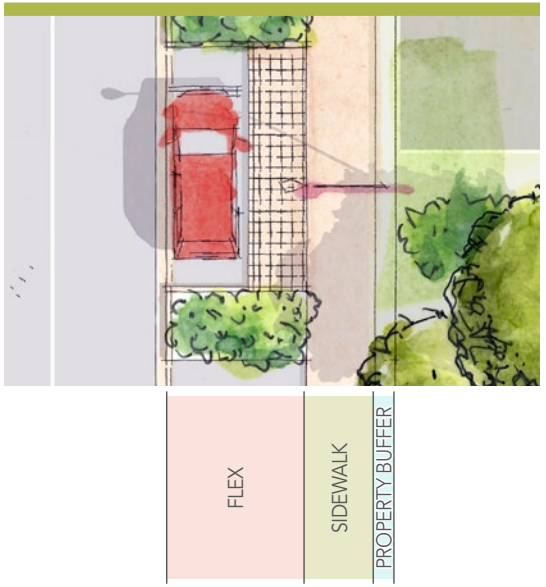
*Note: Refer to the City of Nanaimo MoESS for most current dimensions. All exceptions to be discussed with and approved by the City Engineer.

Figure 4.2 Typical Layouts for the Pedestrian Zone in Different Street Classifications

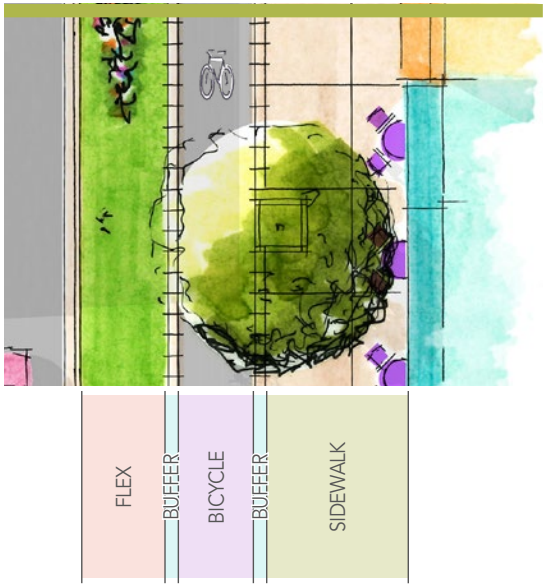
Mobility Local Street



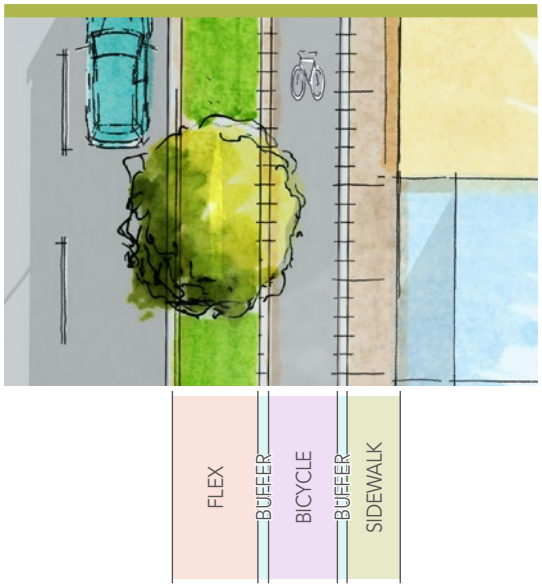
Urban Local Street



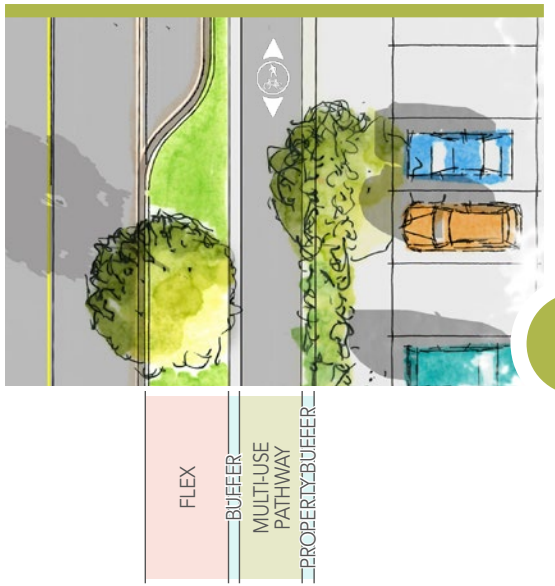
Mobility Collector Street



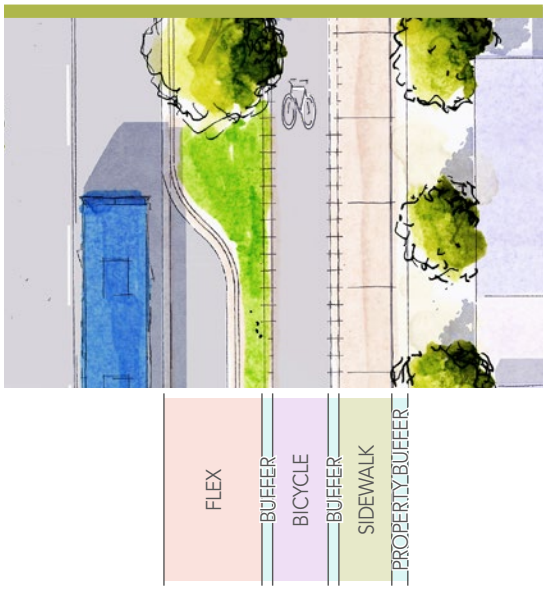
Mobility Arterial Street



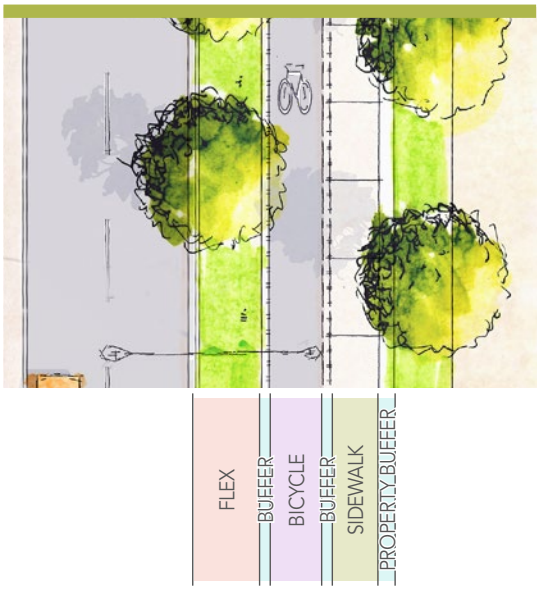
Industrial Local Street



Urban Collector Street



Urban Arterial Street



Industrial Collector Street

Front Street, Nanaimo

A bi-directional cycling route was constructed along Front Street by reducing the vehicle travel lanes from four to two. This allowed space to add a separated bi-directional facility that provides a route for all ages and abilities.

5 CYCLING DESIGN

Cycling / rolling is an important part of an active and sustainable mobility network. These uses have the opportunity to replace many short- to medium-length automobile trips, in turn, reducing the number of cars on the road, freeing up parking spaces, reducing air pollution, and improving community health. However, a shift will only occur if cycling / rolling is accessible and comfortable for people of all ages and abilities. With new technology, including e-bikes, micromobility alternatives, and cargo bikes, the potential audience for cycling / rolling is growing, requiring a transportation network to support it. Whenever the CSDG refers to cycling it is inclusive of all micromobility options that share the cycling facility.

5.1 Cycling for All Ages & Abilities

Historically, a lack of separated cycling facilities meant those choosing to cycle / roll in Nanaimo were confident riders – willing and able to navigate the road network in a shared environment with motor vehicles. In more recent years, construction of new cycling routes has focused on expanding facilities for all ages and abilities, seeking to thereby expand the cycling / rolling audience.

In past surveys on the general population's interest in cycling / rolling, approximately 60% of participants identify as "interested but concerned" – meaning they would like to try cycling / rolling but are not confident to do so on the current network. This represents the potential demand for cycling facilities that are safe for all ages and abilities.

In order to achieve a shift in our modal split – increasing the proportion of people cycling / rolling and decreasing the proportion driving – cycling / rolling must become more appealing to those who are currently not taking part. This means designing cycling facilities that will attract the "interested but concerned" cyclist / roller. With improved facilities that reduce the stress of potential traffic interaction, these people can shift towards "enthused and confident."

Cyclists and those rolling by micromobility move at a wide range of speeds. The confident rider will typically move faster and be more willing to take risks. New cyclists / rollers will be slower and more risk averse. In addition, the growing popularity of electric devices and Nanaimo's hilly topography mean different users will operate at varied speeds. These factors underline a design approach that safely accommodates riders of different abilities and allows opportunity for safe passing.

Regardless of age or ability, most cyclists / rollers prefer protected facilities that are separated from vehicle traffic. As the network of all ages and abilities facilities expands, the proportion of the population willing to try cycling / rolling is expected to grow.

5.2 Cycling Design Vehicle, User, & Considerations

CYCLING VEHICLES

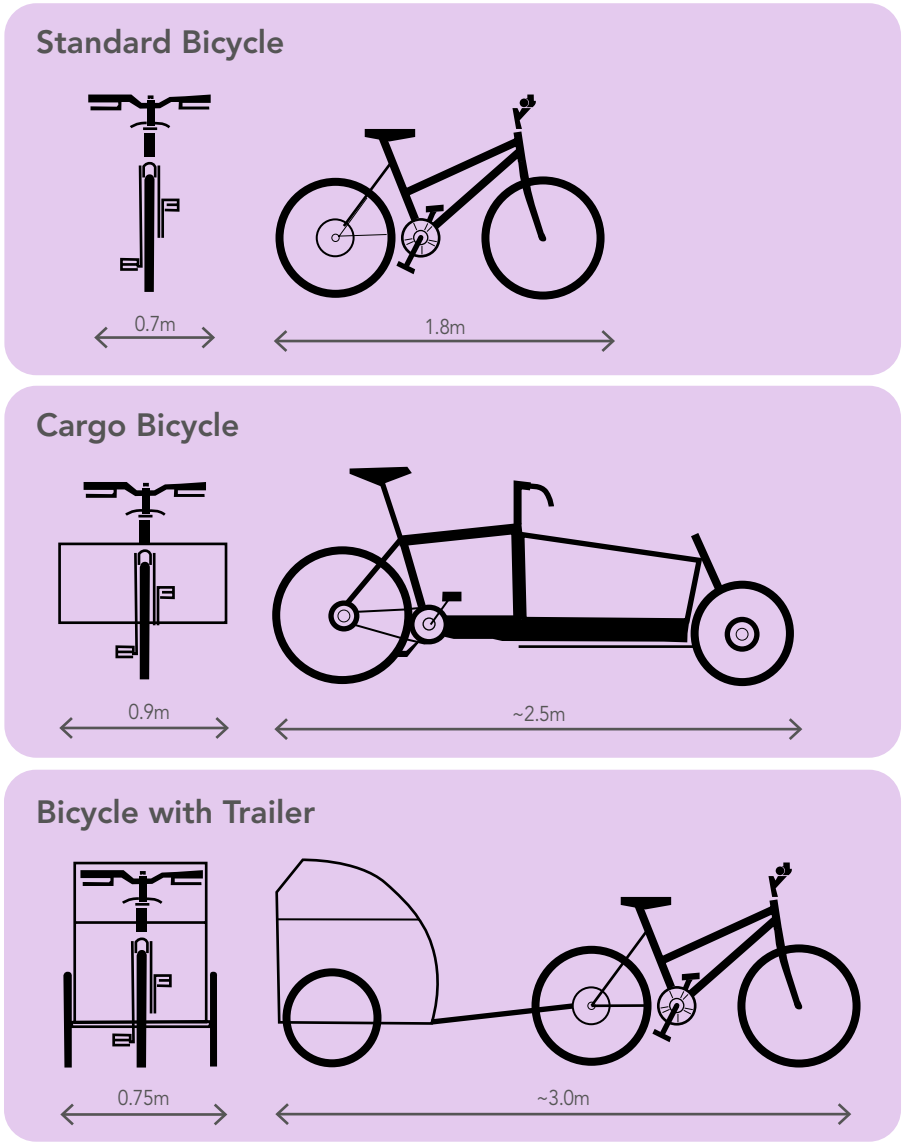
The bicycle and other micromobility devices come in many shapes and forms. When designing cycling facilities, the width and space must consider all users where possible. Figure 5.1 illustrates common bicycle dimensions. Typical types of cycling / rolling vehicles to consider include:

- A standard bicycle
- Longer bicycles, such as cargo bikes or bikes with child or cargo trailers
- Adaptive bicycles for those with special needs
- Smaller bicycles for children
- Recumbent-style bicycles where the rider is seated lower than typical
- Pedal and throttle assist electric bicycles where the rider is often traveling faster than a conventional bicycle
- Other electric and non-motorized micromobility devices such as scooters, Segways, skateboards, one-wheel devices, and more

SPACE TO WAIT

Where cycling routes intersect with facilities for other modes, cyclists / rollers may be required to wait in a refuge, such as a median island or protected intersection, before making a turn or crossing the path of another mode. In these cases, facility design must consider if a waiting cyclist / roller would block the path for other cyclists / rollers or would encroach into the pedestrian or vehicle realms. 3.0 metres typically allows sufficient refuge space for all cycling vehicle types.

Figure 5.1 Typical Bicycle Dimensions (Adapted from the BC AT Design Guide)



OPERATING SPACE & SIGHT LINES

While a bicycle is typically around 0.7 metres at its widest point, cycling / rolling movements are imperfect. Cycling facilities should provide space to accommodate cyclists / rollers off-tracking and clearance from adjacent vertical obstructions. A preferred operating space is 1.5 metres, while a minimum operating space of 1.2 metres could be considered in constrained situations such as short distances to pass immovable obstructions, or in a limited right-of-way as part of a bi-directional cycling facility. Operating space becomes more important on steeper grades where people cycling tend to weave more.

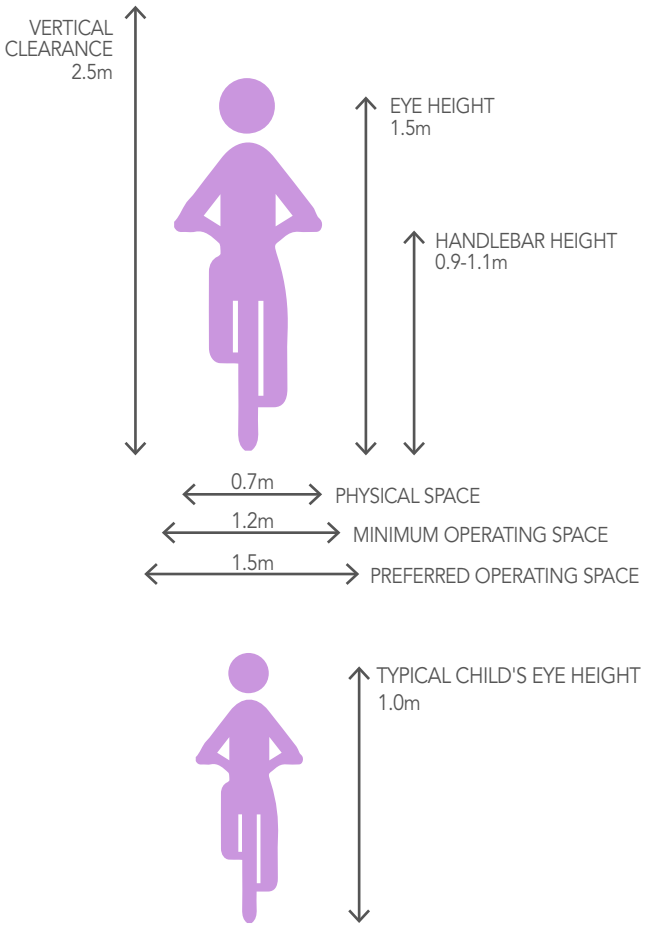
When considering sight lines for an all ages and abilities cycling facility, it should be expected that children will be among the users. As such, sight lines should be checked from or to the eye height of a child cycling / rolling. Operating space and sight line dimensions to consider are shown in Figure 5.2.

SPACE TO PASS

Because cyclists / rollers move at varied speeds, due to ability, use of electric assist, or other reasons, space to pass is important in cycling facility design. Edge conditions of the facility, for example whether it is right next to a building, curb, or other vertical feature, are important when determining space to pass. For example:

- Two people could ride side-by-side, albeit closely, in a 1.5 metre bike lane if adjacent surfaces on either side were at the same grade, allowing a margin of error, and little consequence if they stray outside the intended space.
- The preferred width for passing is 2.2 metres of paved asphalt with edge conditions at a similar grade. These guidelines recommend a 0.3 metre stamped concrete buffer between cycling facilities and adjacent spaces.
- If it is not feasible to provide a uni-directional cycling facility with sufficient space to pass, consideration can be given to a bi-directional facility that can accommodate passing in the opposing lane.

Figure 5.2 Typical Bicycle Operation Space Requirements
(Adapted from the BC AT Design Guide)



5.3 Cycling Facility Types

Cycling facilities are unique to each street classification and situation. Five typical facilities are outlined below, each with different considerations for protection, space requirements, and usage. The CSDG primarily recommends uni-directional (one-way) protected cycle tracks at the same grade as the sidewalk on all **Arterial** and **Collector Streets**, but recognizes there may be circumstances where other types of facilities are more suitable.

UNI-DIRECTIONAL PROTECTED CYCLE TRACK

A **uni-directional protected cycle track** is a separated facility that supports one way cycling on either side of the street, traveling in the same direction as motor vehicle traffic.

Uni-directional cycle tracks are recommended in most circumstances, as research indicates they are typically safer than bi-directional facilities. They place cyclists on the side of the street that drivers expect them and where they are looking when making turns at intersections.

BI-DIRECTIONAL PROTECTED CYCLE TRACK

A **bi-directional protected cycle track** is a separated facility that allows cycling movement in both directions on one side of the street.

While preferable to unprotected facilities, bi-directional protected cycle tracks can introduce unexpected cyclist movements at intersections, increasing risk of collisions with motor vehicles. These facilities may be appropriate in retrofits where space is limited, as they require less space than two uni-directional cycle tracks. There may also be occasions, for example if connecting with multi-use paths, where a bi-directional cycle track on one side of the street provides a better connection. These facilities often require dedicated bike signals and turn phasing.

MULTI-USE PATHS

Multi-use paths are shared spaces, with cyclists / rollers using the same space as pedestrians, separated from motor vehicle traffic.

Multi-use paths support all ages and abilities; however, because they are shared with pedestrians, likelihood of conflicts between these modes increases. Conflict will become a greater issue on multi-use paths as e-bike use increases. Multi-use paths are best located in areas with flat topography, as speed differentials increase on steeper paths. In the CSDG, multi-use paths are only recommended for **Industrial Local Streets**, where pedestrian volumes are expected to be low, and separation of cyclists / rollers from trucks is a priority.

NEIGHBOURHOOD BIKEWAYS

Neighbourhood bikeways are located on low-volume, local streets that are designated as a route for cyclists / rollers. They often have some form of traffic calming to reduce vehicle volumes and/or speeds, and are delineated with clear markings or signage.

Mobility Local and **Urban Local Streets** may have low enough volumes and speeds to be reasonably comfortable for most cyclists / rollers.

While neighbourhood bikeways are often considered suitable for all ages and abilities, mixing with vehicle traffic can still create uncomfortable interactions between people cycling / rolling and driving. Where possible, traffic calming should focus on reducing volumes to below 1,000 vehicles per day and vehicle speeds to below 30 km/h on these routes.

PAINTED BIKE LANE

A **painted bike lane** is an at grade unprotected facility sharing the street surface with vehicles. These facilities are typically marked with painted lines or bollards. Historically, these were implemented along **Arterial** and **Collector Streets.**

Painted bike lanes are not suitable for all ages and abilities and provide space only for more confident cyclists / rollers. They will not enable less confident riders to ride on the network. Where painted bike lanes must be used, painted buffers and bollards should be considered and buffers from car doors must be provided. Wherever possible, efforts should be made to prioritize other facilities that are more suitable for all ages and abilities.

FACILITY SELECTION

While these guidelines recommend facility types for each street classification; street upgrade projects inherently contain a unique set of circumstances that will inform the selection of the most suitable cycling facility. Key considerations that will affect facility selection and design include:

- Vehicle traffic volumes
- Available space and demand for other Complete Street features
- Relationship to transit facilities
- Adjacent property uses
- Site topography
- Network connection and access points
- On-street parking provision
- Connections to key destinations including businesses, schools, parks, and other traffic generators
- Budget considerations

Uni-directional protected cycle tracks at sidewalk grade will typically be the preferred facility type for most situations. Other facility types may be identified as suitable through the design process, especially in retrofit projects, constrained situations, temporary, or rapid implementation projects. The selected solution must work within the context of the street and align with up and downstream facilities.

5.4 Cycling Zone Layouts & Dimensions

The cycling network will be made up of a range of cycling facilities, as illustrated in Figure 5.3.

- A 2.2 m asphalt paving width is the typical minimum width for cycle tracks, allowing for comfortable side-by-side riding or passing. Sufficient width will become increasingly important as more electric-powered bikes and micromobility devices use these facilities.
- Cycle track design should include 0.3 m concrete banding (or buffers) on either side of the cycle track, allowing the full asphalt width to be utilized without risk of pedal strikes.
- For those streets where there is expected to be a high level of pedestrian activity – including **Mobility Local** and **Mobility Collector Streets** – street trees should be positioned to increase separation between pedestrians and cyclists / rollers, helping to reduce potential conflict.
- Multi-use pathways are only recommended for **Industrial Local Streets** where pedestrian and cyclist / roller volumes are expected to be sufficiently low to reduce the likelihood of conflicts.

Typical Minimum Widths

Typical minimum widths for cycling facilities are summarized in Table 5.1; however, there may be occasion to construct facilities of other dimensions, subject to agreement with the City Engineer.

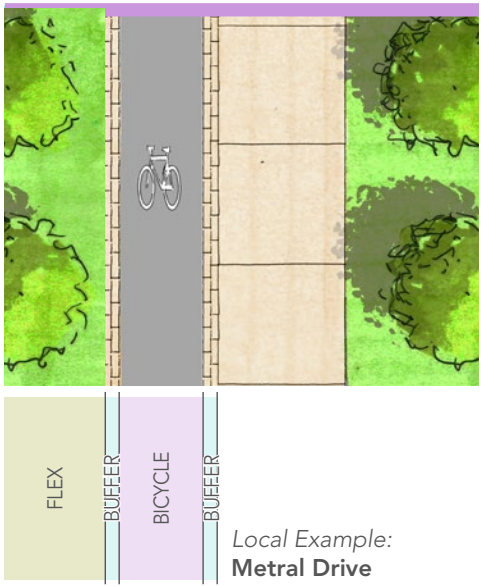
Table 5.1 Cycling Facility Typical Minimum Widths

Facility	Typical Minimum Widths*
Cycle Track	2.2 m width of pavement + buffers / banding
Painted Bike Lane	2.2 m width of pavement + buffers / banding
Multi-Use Path	3.0 - 4.0 m, allowing for two bicycles to pass
Multi-Use Path Adjacent to Structures / Buildings / Bridges	4.0 m, allowing for comfortable movement without conflict with a structure, snow storage, waste receptacles, and tree plantings
Sidewalk / Cycle Track Buffers	0.3 m
Door Zone Buffer next to Parking	0.6 m

*Note: Refer to the City of Nanaimo MoESS for most current dimensions. All exceptions to be discussed with and approved by the City Engineer.

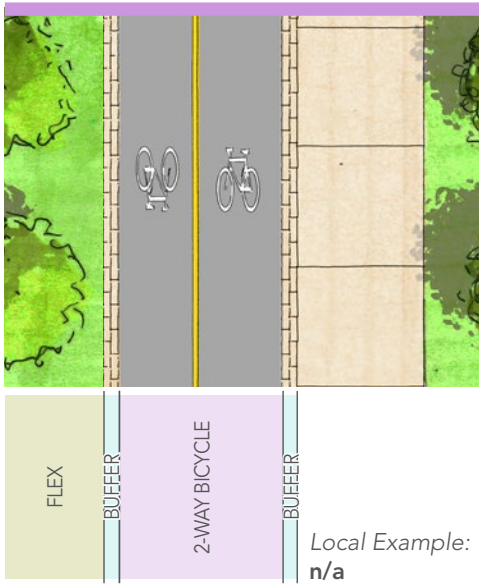
Figure 5.3 Common Layouts for Uni-directional and Bi-directional Cycling Facilities

Separated Cycle Track



Local Example:
Metral Drive

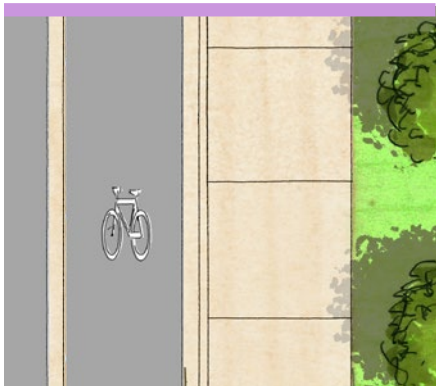
Separated Cycle Track



Local Example:
n/a

UNI-DIRECTIONAL FACILITIES

Raised Cycle Track

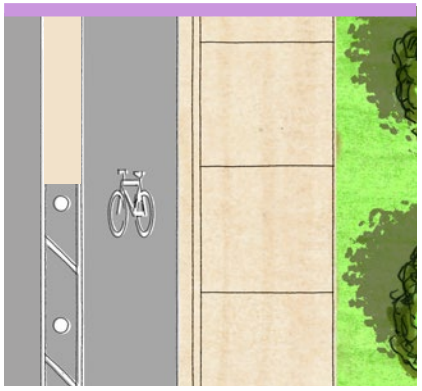


Local Example:
Bowen Road

Parking-Protected, Buffered Bike Lane

Local Example:
Boundary Avenue

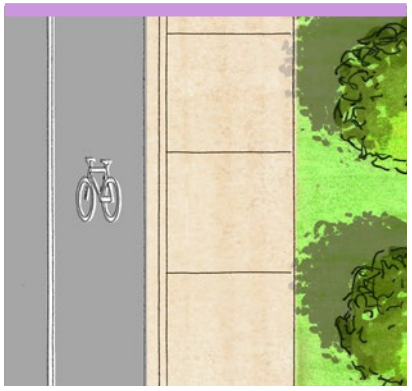
Buffered Bike Lane



Note: Not suitable for all ages and abilities

Local Example:
Fourth Street

Painted Bike Lane

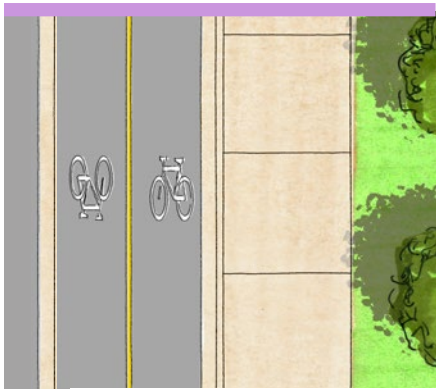


Note: Not suitable for all ages and abilities

Local Example:
Dover Road

BI-DIRECTIONAL FACILITIES

Raised Cycle Track

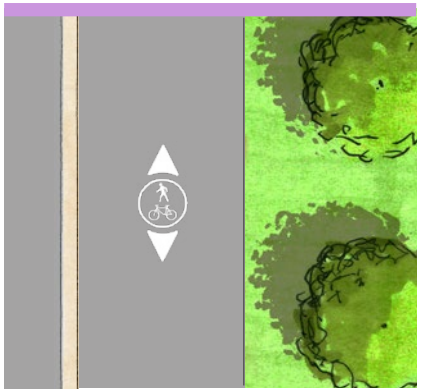


Local Example:
n/a

Buffered Bike Lanes

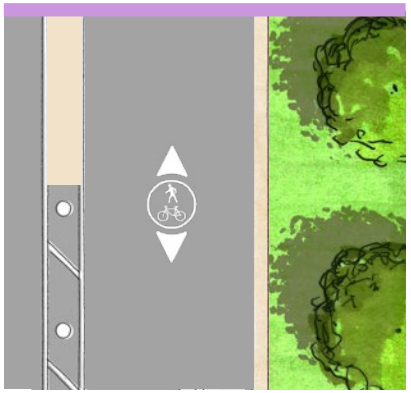
Local Example:
Front Street

Raised Multi-Use Path



Local Example:
Haliburton Street

Buffered Multi-Use Path



Local Example:
Boxwood Road

Bowen Road, Nanaimo

This retrofit project added protected uni-directional cycling tracks. Where the lanes intersect with transit stops, crosswalk markings interrupt the cycle track, indicating to cyclists / rollers that they must stop to give pedestrian priority for bus loading.

6 TRANSIT DESIGN

Transit is a critical mode of transportation in a growing city. Effective transit service is essential for equitable mobility, allowing people to move safely, reliably, and affordably around their community. In addition, by virtue of space efficiency, when a transit vehicle is reasonably occupied, it significantly increases the people-moving capacity of a street and decreases congestion. One bus carrying 40 people takes significantly less space on the road than 40 motor vehicles with single drivers. For people to choose transit, there must be direct, frequent, and reliable service, alongside amenities that support safety, comfort, and accessibility.

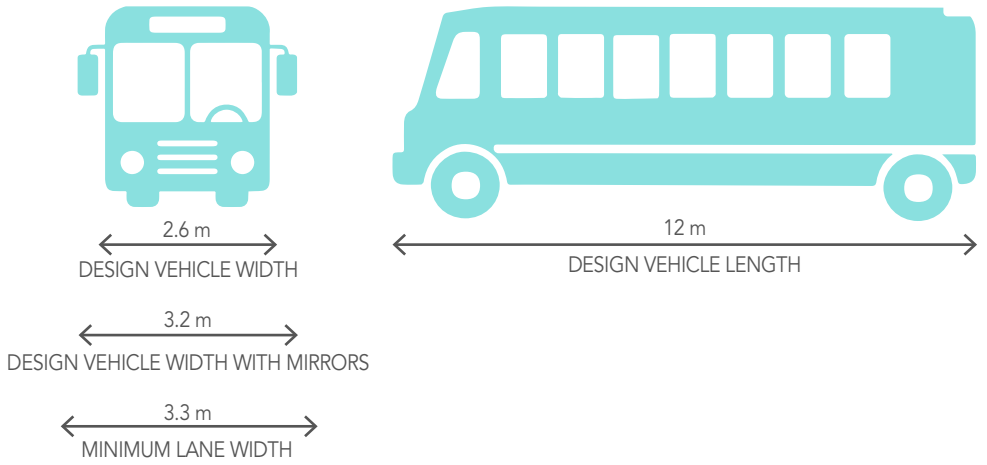
6.1 Transit Design Vehicle

The primary reference for guidance on the design of transit facilities is the most current **BC Transit Infrastructure Design Guidelines**.

The transit design vehicle should reflect the Regional District of Nanaimo's transit fleet vehicles. Current dimensions of the typical transit design vehicle are illustrated in Figure 6.1, though each project should confirm specific route and fleet requirements.

Lane widths for any transit route or potential future transit route should be at least 3.3 m. This would typically include all **Collector** and **Arterial Streets**. Because **Industrial Streets** are designed to accommodate trucks, they will also be sufficiently wide to support transit.

Figure 6.1 Typical Transit Design Vehicle Dimensions



6.2 Route Design

The Regional District of Nanaimo (RDN) provides transit service across the region, including throughout the City of Nanaimo. With input from the community and the City, the RDN continues to identify and undertake transit improvements and route design to support frequent, reliable, and convenient services.

To support a shift in travel modes, it is important that route design balances efforts to maximize the catchment area served by a route, with provision of fast and direct service that is convenient for users. It is typical for a route catchment area to extend approximately 400 m to 500 m from each transit stop, a common distance most people are willing to walk to access the service. The City will continue to collaborate with the RDN to align routes with City planning so that they best support access throughout the community.

Front Street, Nanaimo. The transit network is reviewed and updated on an ongoing basis to best facilitate efficient services across the City.

6.3 Transit Priority

Transit becomes a more attractive travel mode when it can offer competitive or even faster travel times than those offered by personal motor vehicles. Essentially, when both choices are available, people will choose transit if it allows them to arrive at their destination sooner. This is currently not the case in Nanaimo.

Transit speed can be improved using infrastructure tools like transit queue jumper lanes and bypass queues in places where congestion slows transit vehicles and where space permits. Transit priority at signals can also be used in conjunction with queue jumper lanes to get buses ahead of traffic or to hold a green signal so that buses can continue their journey with reduced delay.

In a smaller city like Nanaimo, infrastructure-based priority can be more challenging to integrate as roadways are typically two lanes or less. However, transit priority can also be achieved through alternative solutions such as turn restrictions that only permit transit vehicle turns or creation of transit-only streets in key areas like the Downtown core or other Urban Centres.

Comox Road, Nanaimo. Transit priority through laning, signals, and movement restrictions can increase transit efficiency throughout the City.

6.4 Transit Stop Design

The experience of taking transit begins well before boarding a bus. It is affected significantly by the experience users have while travelling to their stop and waiting for their bus to arrive. The City, in collaboration with the RDN, plays an important role in locating, designing, and maintaining transit stops.

TRANSIT STOP LOCATION & ACCESS

Where a transit stop is located makes a significant difference in rider experience. The following are considerations for selecting transit stop locations.

Connectivity

Streets leading to and from transit stops must be designed with full pedestrian infrastructure that allows riders to get to and from their origins and destinations safely. This includes pedestrian crossings adjacent to transit stops that allow safe and convenient access to and from a stop on the opposite side of the street.

Accessibility

Transit stops should be universally accessible, with a suitable boarding platform from which people using mobility devices will board. Further guidance is provided by BC Transit in their **Infrastructure Design Guidelines**.

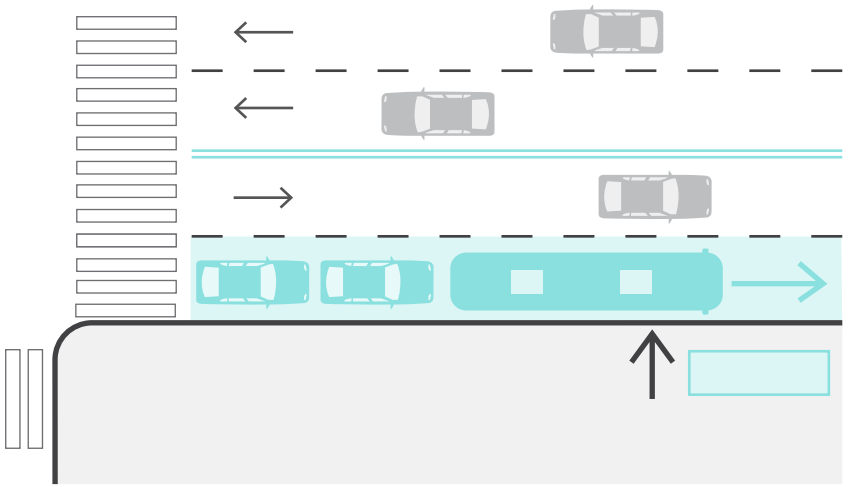
Visibility

Visibility supports safety, comfort, and user experience. Transit stops should be located in highly visible locations, where there are many eyes providing passive surveillance. CPTED (crime prevention through environmental design) principles should be followed, with lighting and shelter design particularly important for supporting good visibility.

IN-LANE & PULL-OUT TRANSIT STOPS

Where a bus stops when loading and unloading passengers, affects transit efficiency and the street network overall. There are two typical types of transit stops in the City: in-lane transit stops and pull-out transit stops.

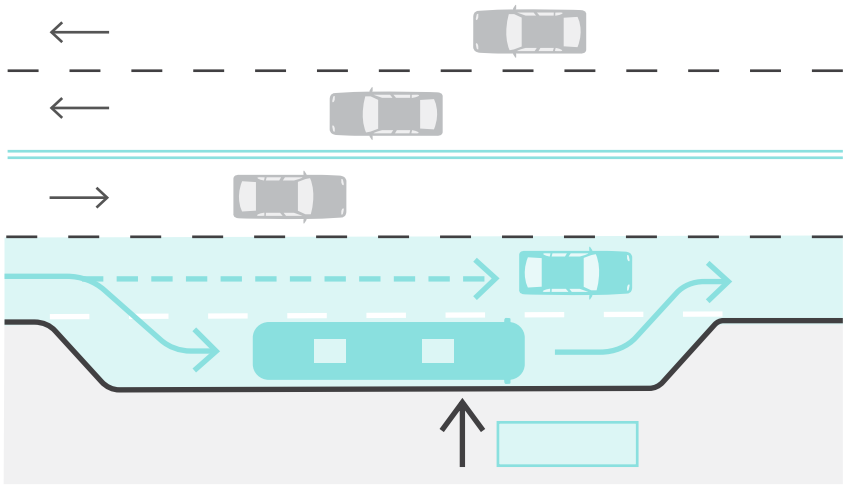
In-Lane Transit Stops



In-lane transit stops allow the bus to stop in a vehicle travel lane, requiring traffic following the bus to also stop. These stops prioritize transit movements, reducing delays caused by a bus needing to merge back into traffic. In-lane transit stops, while adding minor delays to vehicles behind, can benefit traffic by breaking up constant flows and creating gaps for side street traffic to turn.

In most cases, unless an alternative condition is approved by the City Engineer, in-lane transit stops will be used.

Pull-Out Transit Stops



Pull-out transit stops provide a bay for the transit vehicle to pull into the curb for boarding, allowing other vehicles to pass without stopping. After boarding, the bus must then merge back into traffic to continue its journey.

If a stop is used as a timing point or within an exchange where longer layovers are expected, a pull-out transit stop may be appropriate.

TRANSIT STOP AMENITIES

The transit stop is a critical component to encouraging transit use, often making the difference between a comfortable or uncomfortable wait for the bus or certainty of route navigation. A number of amenities affect the transit user experience.

Information

Providing clear, legible route information improves rider satisfaction and ease of transit use. Beneficial information includes route and system maps, schedules, expected travel times, real-time arrival information, and ridership procedures.

Shelters

Shelters provide protection from the sun, wind, or rain, increasing comfort for those using the transit system. Shelters should be prioritized in key locations, including those with high passenger volumes such as transfer points, weather-exposed locations that lack nearby places to find shelter, and stops with high use by senior and child passengers. In some cases, shelters may also be warranted in locations where service frequency is reduced (due to low ridership, low frequency, or basic service coverage), as riders are more likely to arrive early and wait for longer to avoid missing the bus.

Furnishings

Similar to shelters, furnishings including benches and waste receptacles can significantly improve the transit wait. Waste receptacles are especially important at stops with high passenger volumes to keep the area free of litter.

In addition to key amenities, transit stops can include elements like wi-fi access, electric charging stations, art, bicycle lock-up, washroom access, and other elements that improve the journey for riders.

TRANSIT STOPS NEXT TO CYCLING FACILITIES

When a transit stop is adjacent to a cycling facility, transit users are typically required to cross through the cycling area to reach the sidewalk on the other side. Transit stop design should work to encourage safe access by all users through this intersecting space.

Floating transit stops (see Figure 6.2) have commonly been considered best practice for stops next to cycling facilities. In such cases the cycle track typically continues between the floating stop and sidewalk, with crosswalk markings and signage added to the cycle track to indicate pedestrian priority.

Continuous sidewalk transit stops (see Figure 6.3) are an enhanced approach where pedestrian and cycling volumes are higher. Rather than floating stops, there is a continuous sidewalk from the main sidewalk to the transit boarding area. The cycling facility ends at the stop and people cycling / rolling are obligated to roll slowly through the shared area, yielding to pedestrians. This differentiation is subtle but better reflects the modal hierarchy that places people walking above people cycling / rolling. For people with low vision or who are blind, they no longer have to negotiate a cycle track; the person cycling / rolling is responsible for safely negotiating the bus stop area. Pedestrians with low vision or who are blind are alerted to the presence of the bus stop via score lines across the entire bus stop area from back of sidewalk to the curb, where Tactile Warning Surface Indicators (TWSIs) are placed to warn of the curb hazard and identify the boarding location.

Preferred transit stop design will be confirmed with the City Engineer, dependent on pedestrian usage / volume and whether the stop is on an urban or mobility street classification.

Where a shelter is provided at the transit stop, it should be mostly transparent and located such that it does not block sight lines between pedestrians and cyclists.

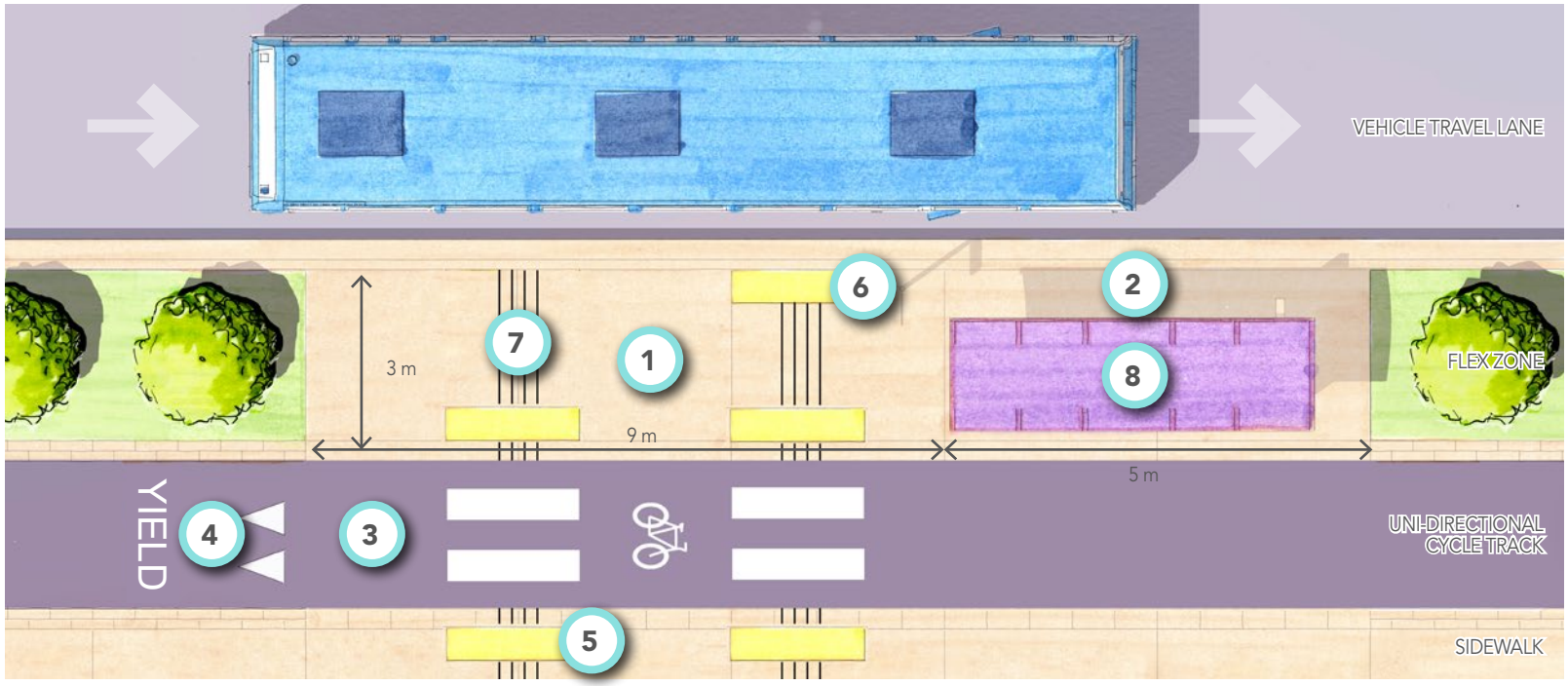
- On a uni-directional cycling facility, the shelter should be located downstream of the boarding area.
- On a bi-directional cycling facility, the nearside bike lane will be traveling in the opposite direction, so shelter placement may be better upstream of the stop location.
- Both configurations of bus stops adjacent to cycling facilities are shown in Figures 6.2 and 6.3.

As further Provincial and National guidance emerges on transit stops, the CSDG may be updated to reflect commonly accepted best practices, while continuing to prioritize pedestrian safety.

Metral Drive, Nanaimo. In a traditional floating bus stop, the cycle track surface continues in asphalt, with TWSIs, signage, and road markings to indicate pedestrian right-of-way.

Front Street, Nanaimo. Continuous sidewalk transit stops extend the sidewalk material (concrete) through the cycling facility in addition to signage and road markings, strengthening the indication that cyclists must yield to pedestrians in this zone.

Figure 6.2 Transit Stop Configuration (using consistent surface material for the cycle track with signage / road marking cues to indicate pedestrian priority)

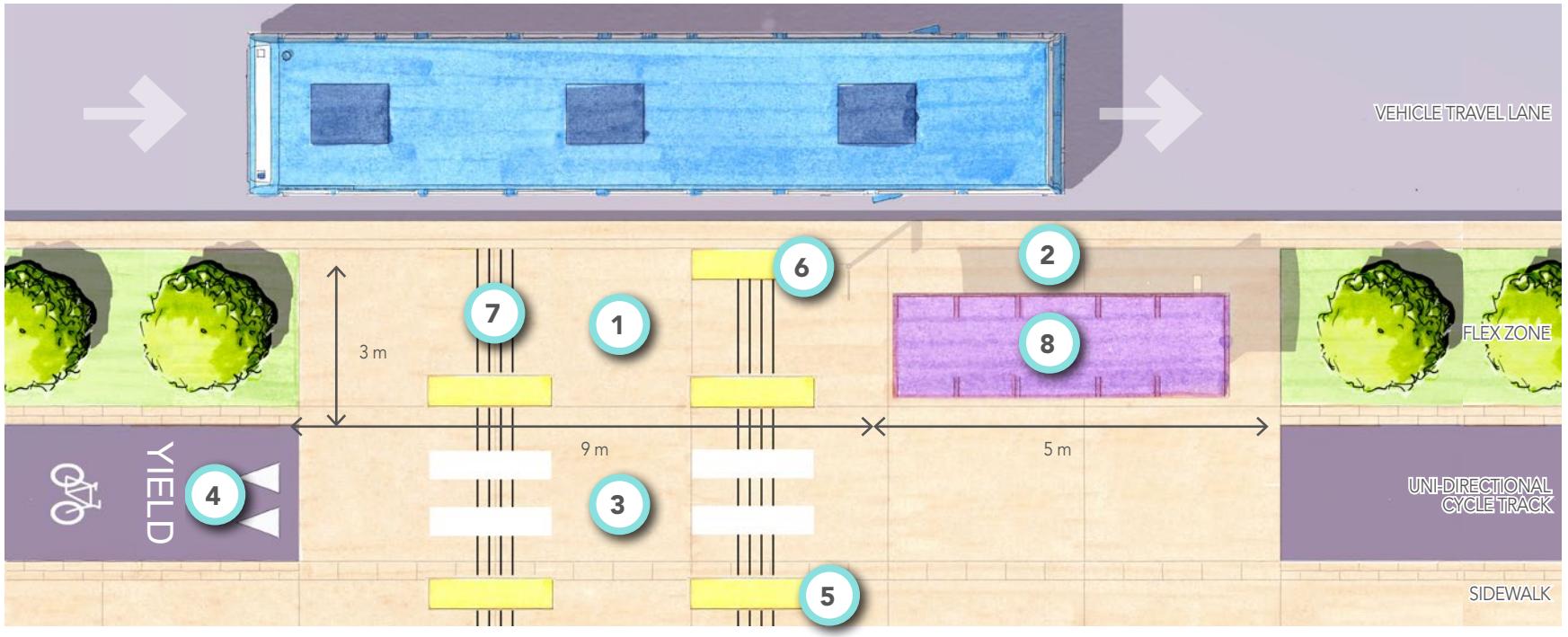


FEATURES

Local Example: **Metral Drive**

1. At transit stops, the Flex Zone can provide space for a loading platform, approximately 3 m wide by 9 m long, with the same surface treatment as the pedestrian sidewalk.
2. The platform should be extended an additional 5 m if a transit shelter is required.
3. The cycle track surface can continue in asphalt between the transit stop and sidewalk.
4. Road markings (yield and crosswalk bars) and signage indicate to cyclists that pedestrians have the right-of-way through the area.
5. Yellow TWSIs are provided at all cycle track crossing points to indicate to pedestrians the area where modes intersect.
6. A yellow TWSI is provided on the platform to indicate the boarding location.
7. Guidance tactile surfaces are provided to direct people with low vision or who are blind to and from boarding and alighting areas.
8. A shelter, if provided, is located downstream of the boarding platform if adjacent to a uni-directional cycle track (as shown), to improve sight lines between people boarding the bus and people cycling. The shelter should be located upstream of the boarding platform if it is adjacent to a bi-directional cycle track (not shown).

Figure 6.3 Transit Stop Configuration (using consistent surface material as pedestrian realm with additional signage / road marking cues to indicate pedestrian priority)



FEATURES

Local Example: **Front Street**

1. At transit stops, the Flex Zone can provide space for a loading platform, approximately 3 m wide by 9 m long, with the same surface treatment as the pedestrian sidewalk.
2. The platform should be extended an additional 5 m if a transit shelter is required.
3. The pedestrian sidewalk material (concrete) extends between the sidewalk and the loading platform (breaking up the cycle track) to indicate pedestrian priority through this area.
4. The uni-directional cycle track ends at the transit stop, with cyclists yielding to pedestrians through the shared area. Road markings (yield and crosswalk bars) and signage further indicate to cyclists that pedestrians have the right-of-way through the area.
5. Yellow TWSIs are provided at all cycle track crossing points to indicate to pedestrians the area where modes intersect.
6. A yellow TWSI is provided on the platform to indicate the boarding location.
7. Guidance tactile surfaces are provided to direct people with low vision or who are blind to and from boarding and alighting areas.
8. A shelter, if provided, is located downstream of the boarding platform if adjacent to a uni-directional cycle track (as shown), to improve sight lines between people boarding the bus and people cycling. The shelter should be located upstream of the boarding platform if it is adjacent to a bi-directional cycle track (not shown).

Front Street, Nanaimo

A continuous sidewalk transit stop where the sidewalk material (concrete) is extended through the cycle track along with additional signage / road marking cues to indicate pedestrian priority.

Boundary Avenue & Northfield Road, Nanaimo

As an established city, the road network in Nanaimo is largely in place, with little room for widening. This means design must best use the space available to accommodate facilities for all modes while increasing the people moving capacity of the street.

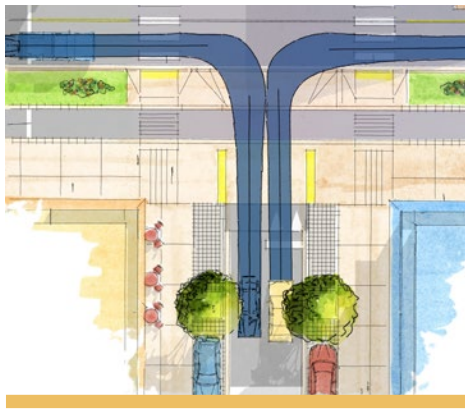
7 MOTOR VEHICLE DESIGN

Historically, streets and intersections have been designed to prioritize capacity for vehicles, and were evaluated based on a Level of Service (LOS) ranging from A (little motor vehicle delay) to F (unacceptable motor vehicle delay). The Complete Street approach considers more than just vehicle capacity to evaluate levels of service, such as the street's place function, traffic management, safety, accessibility, and improvements that support a variety of transportation modes.

7.1 Design & Control Vehicles

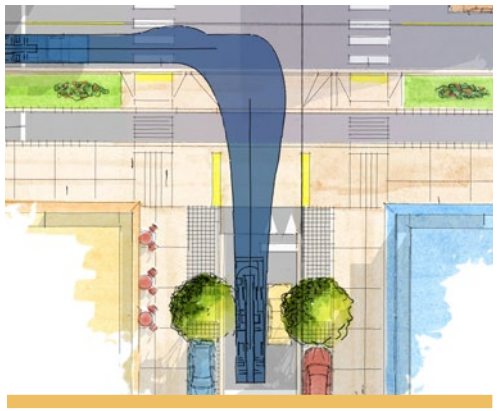
Two vehicle types may be specified when designing for motor vehicles: the **design vehicle** and the **control vehicle**. For each project, the design and control vehicles will be determined in consultation with the City Engineer. Figure 7.1 illustrates and describes the difference between design and control vehicles on a **Local Street**.

Figure 7.1 Illustration of Design & Control Vehicles on a Local Street



Local Street Design Vehicle

The **design vehicle** is the typical vehicle expected to be using the street. In the **Local Street** example, this would be a passenger vehicle. It must be able to make turning movements without crossing the centre line.



Local Street Control Vehicle

The **control vehicle** may be larger and is anticipated to use the street only on occasion. In the **Local Street** example, this could be a garbage or fire truck. This vehicle may cross the centre line when making a turn; however, it must be able to make the turn between the curbs.

DESIGN & CONTROL VEHICLES FOR STREET CLASSIFICATIONS

- **Mobility** and **Urban Local Streets**:
  - Design vehicle: Passenger vehicle
  - Control vehicle: Medium Single Unit (MSU) Truck, Garbage Truck, Fire Truck
- **Mobility** and **Urban Collector** and **Arterial Streets**:
  - Design vehicle: BC Transit Bus, MSU Truck, Garbage Truck, Fire Truck
  - Control vehicle: WB-20 tractor-trailer vehicle if the street is on a truck route. Vehicle may use multiple lanes if turning to a multi-lane receiving roadway.
- **Industrial Local** and **Collector Streets:**
  - Design vehicle: WB-20 tractor-trailer vehicle

7.2 Vehicle Lane Widths

Vehicle lane widths are determined based on the typical vehicle using the street (design vehicle) and the desired speed at which vehicles should travel. Narrower lane widths are favoured to encourage slower vehicle speeds.

City of Nanaimo mobility networks have been constructed over many years using design criteria that was in place at the time. The current MoESS standards are to be used for all new infrastructure projects. When retrofitting existing corridors, compromises may be necessary. Existing facilities will be evaluated on a case-by-case basis. When replacing existing infrastructure, should the existing system not meet current MoESS standards, the design engineer will be responsible to ensure the design is appropriate, founded on solid engineering principles and practices, and approved by the City Engineer.

- **Mobility Local Streets** have the narrowest lane width of 3.0 m (including gutter width). These streets see the most pedestrian activity and include flush or mountable curbs, blurring the transition between pedestrian and vehicle realms. Vehicles are expected to remain below 30 km/h on these streets.
- **Urban Local Streets** have 3.3 m lane widths (including gutter width). These streets have a clearer separation between pedestrian and vehicle space but often include facilities like neighbourhood bikeways that share the Vehicle Zone. The narrow widths again help keep vehicle speeds slow.
- **Mobility** and **Urban Collector Streets** and **Mobility** and **Urban Arterial Streets** adopt a 3.6 m curb lane width (including gutter width) and a 3.3 m inner travel lane width, the narrowest width suitable to accommodate transit vehicles or trucks.
- **Industrial Streets** have wider travel lanes at 3.9 m to accommodate the expected larger vehicles.
- On-street parking lanes for **Mobility** and **Urban Streets** have a width of 2.4 m (including gutter width) and for **Industrial Streets** have a width of 3.0 m (including gutter width).
- For vehicle lane widths, MoESS dimensions should be regarded as the maximum accepted width. For other types of facilities like pedestrian and cyclist facilities, the MoESS dimensions represent minimums.

7.3 Lane Width & Corner Radii

The CSDG, in line with best practices, recommends narrower travel lanes for motor vehicles than were historically provided. Narrower travel lanes help to manage vehicle speed by visually and physically narrowing the street, making the street safer and more welcoming to all travel modes. A trade-off when narrowing motor vehicle travel lanes is that intersection corner radii may need to be increased to allow design vehicles to make turns without crossing the centre line. Smaller corner radii are an effective traffic calming measure and they shorten crosswalk distances, making road crossings easier for pedestrians to navigate. These trade-offs make it critical to consider the relationship between lane width and corner radii in the design process. Figure 7.2 illustrates this relationship.

Figure 7.2 Illustration of the Relationship between Lane Width & Corner Radii

Double Receiving Lane
A double receiving lane, as shown on the left, allows a smaller corner radii to accommodate right-hand turns, as the turning vehicle can track into the second lane

Single Receiving Lane
A single receiving lane, as shown on the right, requires a compound, larger curve to accommodate the same turn

7.4 Traffic Calming

The main objectives of traffic calming are to:

- Reduce vehicle speed, thereby improving safety for all and conditions for non-motorized street users;
- Discourage through traffic in certain areas; and
- Minimize conflicts between travel modes.

It is important that traffic calming is balanced with the need for neighbourhood access.

Complete Streets aim to align the speed of motor vehicles with intended street function. While appropriate speeds will be determined on a street-by-street basis, typical speed targets are described below.

- On **Arterial Streets**, **Collector Streets**, and **Local Industrial Streets**, posted speeds will typically be 50 km/h. Measures that encourage motorists follow these speeds could include narrow travel lanes, curb extensions, and street trees.
- On some **Local Streets**, the desired speed may be lower (e.g., 30 or 40 km/h). Measures such as raised intersections, narrow pavement widths, presence of on-street parking, and street trees could be used to reinforce these slower speeds.

There may be occasions where additional traffic calming measures are required, for example on **Mobility** or **Urban Local Streets**, to reduce the likelihood of drivers speeding, to manage short-cutting, and to limit vehicle volumes. These additions could make the street more suitable for a neighbourhood bikeway or pedestrian activity where there is a higher presence of vulnerable road users such as adjacent to schools or senior centres. There are a broad range of additional traffic calming measures that can be applied. These are outlined in the City's **Neighbourhood Traffic Calming Guidelines**.

Church Street, Nanaimo. Narrow travel lanes, street trees, and limited vehicle access encourages less motor vehicle activity and slower speeds.

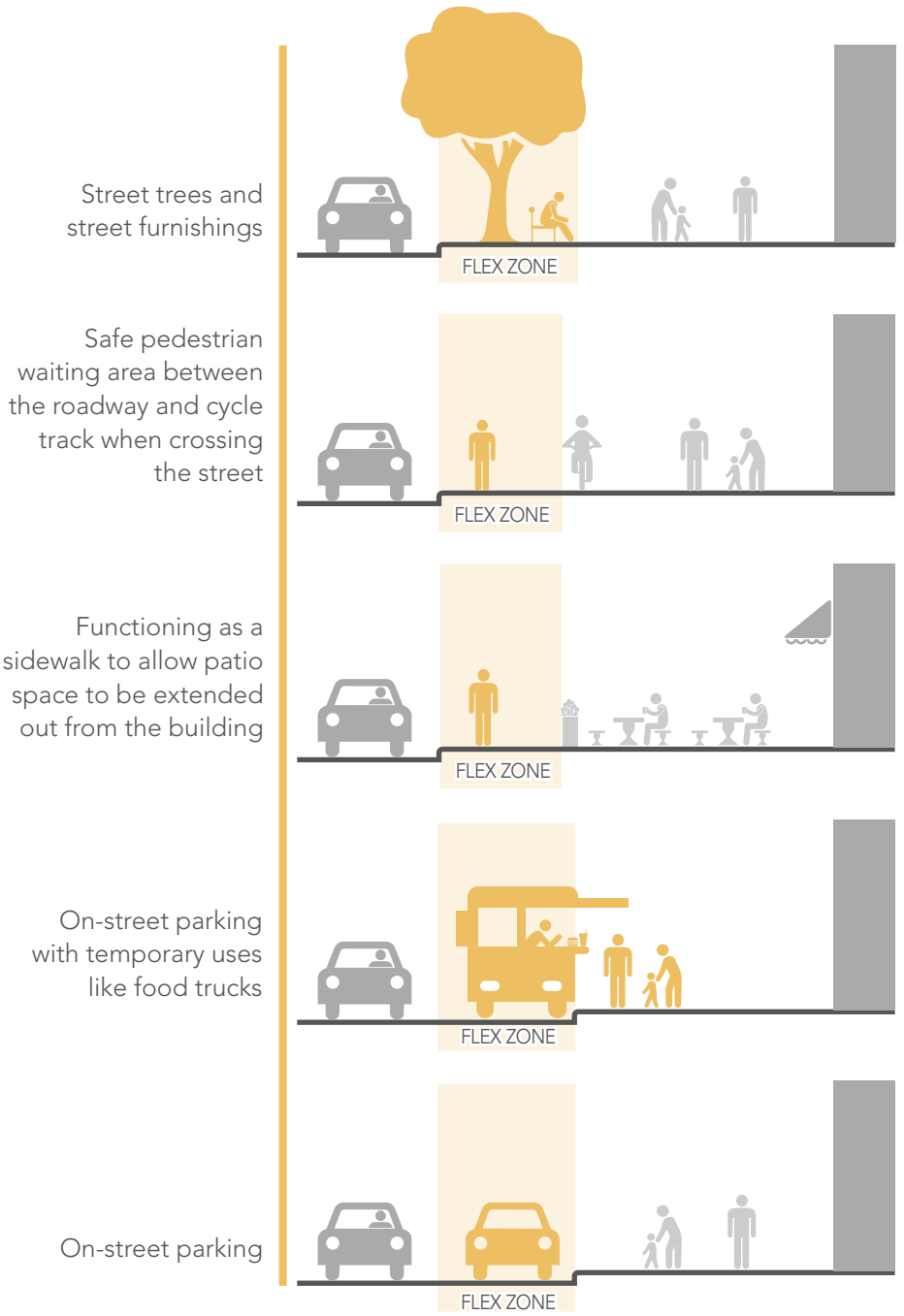
Additional traffic calming measures could make the street more suitable for a higher presence of vulnerable road users.

7.5 Flex Zone Design

The Flex Zone is a space that can be used for several functions depending on the context of the street and adjacent land uses. Most often it provides space for a boulevard, on-street parking, snow storage, or furnishings.

- The Flex Zone plays an important role in Complete Street design by providing space for driveways and for the ramps needed to elevate crosswalks so they remain at the sidewalk grade past a driveway or a **Local Street**.
- Where cycle tracks are provided, a boulevard between the roadway and the cycle track provides a safe space for pedestrians to wait outside the travel path of cyclists when crossing the street. It also shifts the curb beyond the cycle track, allowing for protected intersection components. If there is insufficient space for pedestrians to wait between the cycle track and curb, it is recommended that pedestrians wait prior to the cycle track. However, subject to grade differences and need for curb ramps, this may remove the option to maintain a level sidewalk behind the curb ramp.
- The Flex Zone also plays an important role in supporting the "place" function, providing space for street trees, landscaping, and amenities that enhance the street character and provide valuable functions such as shading.
- Where on-street parking in the Flex Zone is a priority, consideration should be given to breaking up parking with other elements that support adjacent land uses and provide placemaking opportunities. In high activity areas, consideration may also be given to use of on-street parking spaces for temporary functions such as food trucks on a seasonal basis or during special events, or to allow patio space to be extended from the building with the Flex Zone used as sidewalk.

Figure 7.3 Illustrations of Varied Flex Zone Uses



7.6 Curbside Management

Curbside management is the collection of practices used to effectively allocate the use of space beside the curb to its greatest benefit and in a way that balances the needs of varied users. In recent years, demand for use of this space has grown as new users and alternative transportation services require access to it. The best use of curbside space varies depending on location, adjacent uses, and the overall street network.

On-Street Parking

Space for on-street parking and loading supports businesses, improves access for those reliant on a car for mobility, and gets goods to stores. While important, parking should not take precedence over the safety of pedestrians and other travel modes. The CSDG includes street configurations that can accommodate both parking where needed, and safe travel for all modes.

Where on-street parking is provided, it should be in pockets bounded by curb extensions that include street trees and a landscape buffer. These elements are important to visually narrow the street when no vehicles are parked.

Subject to the location and adjacent street uses, parking may be time restricted and may include parking charges. Parking regulations for each street will be determined on a site-specific basis. Typically, where commercial properties front the street, parking regulations will restrict parking duration in order to encourage turnover and accommodate ongoing customer access to the businesses. Short duration delivery or drop-off parking volumes should also be considered when designating parking.

Commercial Street, Nanaimo. Limiting parking duration encourages turnover of customers for adjacent businesses.

Church Street, Nanaimo BC. Food truck occupying on-street parking space during the fair weather season.

Metral Drive &
Enterprise Way, Nanaimo

This intersection is an example of a multi-modal intersection with protected cycling facilities, pedestrian access points, and vehicle traffic components.

8 INTERSECTION & CROSSING DESIGN

Intersections and crossings see a higher frequency of collisions because this is where interactions between multiple transportation modes occur and where vehicles moving in opposing directions cross paths. Intersection and crossing designs are safer where they are designed for the fallibility of people, acknowledging that people make mistakes. By designing our streets and intersections to accommodate human error, the frequency and severity of those mistakes and their outcomes can be reduced.

8.1 Intersection Types

The severity of a collision is primarily determined by the speed and mass of the motor vehicles involved. This means that intersection design must focus on minimizing the potential for vehicles moving quickly colliding with other vehicles or travel modes. There are three primary types of intersections in the City:

Unsignalized Intersections
(see Section 8.3)

Signalized Intersections
(see Section 8.4)

Roundabouts
(see Section 8.5)

Within each intersection type, different mechanisms such as protected turn phases, no right-on-red turn restrictions, leading pedestrian or bike intervals, access management, appropriate lighting levels, sight lines, and geometric designs that discourage high speeds can be used to reduce the potential for conflicts.

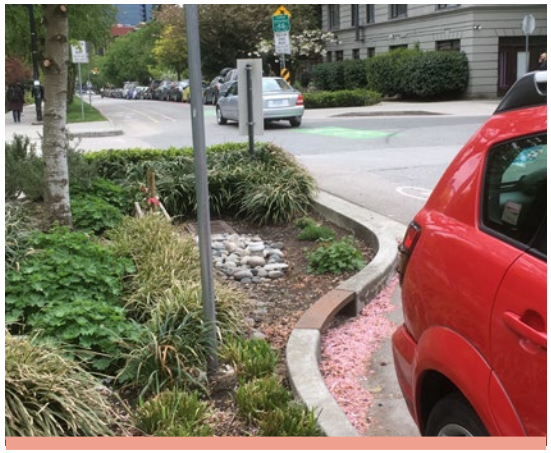
8.2 Design Considerations for All Intersection Types

Certain design considerations apply, regardless of the intersection type:

Corner Radii

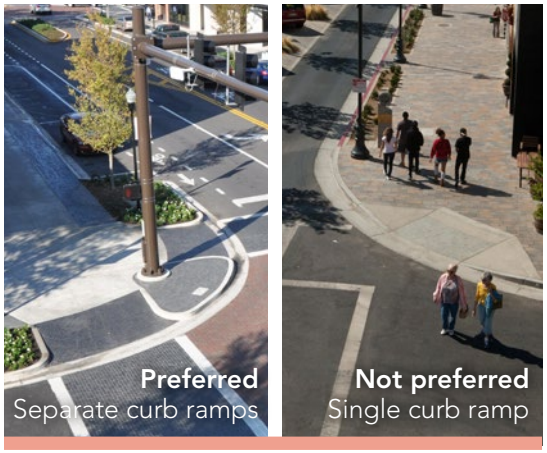
Tighter corner radii can reduce vehicle speeds for turning movements, requiring drivers to slow to negotiate the turn. However, as discussed in Section 7.3, corner radii need to be balanced with the turning path requirements of design vehicles and the widths of vehicle lanes. As illustrated in Figure 7.2 on page 72, where there are multiple receiving lanes, tighter corner radii at intersections can be achieved by allowing turns into adjacent travel lanes. In Nanaimo, where multiple lanes and one-way streets are limited, many streets may require larger corner radii or compound curves to accommodate larger vehicles. Corner radii will be determined on a site-specific basis, and where larger radii are required, truck aprons will be considered.

Curb Extensions



Curb extensions are used at intersections and crossings where pedestrian modes intersect with the Vehicle Zone, and where on-street parking is provided in the Flex Zone. They extend the sidewalk or curb line into the Flex Zone, narrowing the roadway, providing additional pedestrian space and lessening the pedestrian crossing distance. This reduces the likelihood of a collision by reducing the time pedestrians spend in the roadway, making pedestrians more visible by bringing the sidewalk closer the drivers' line of vision, and narrowing the roadway to discourage vehicle speeding.

Curb Ramp



Curb ramps are short ramps that lower the sidewalk or cycle track down to street level for crossing. Unless continuous sidewalks are provided, they are essential for accessibility. At intersection corners, where there are two crosswalks (one across each intersecting street), separate curb ramps are preferred over a single, central one. Separate curb ramps provide directionality for pedestrians with low vision or who are blind.

8.3 Unsignalized Intersections

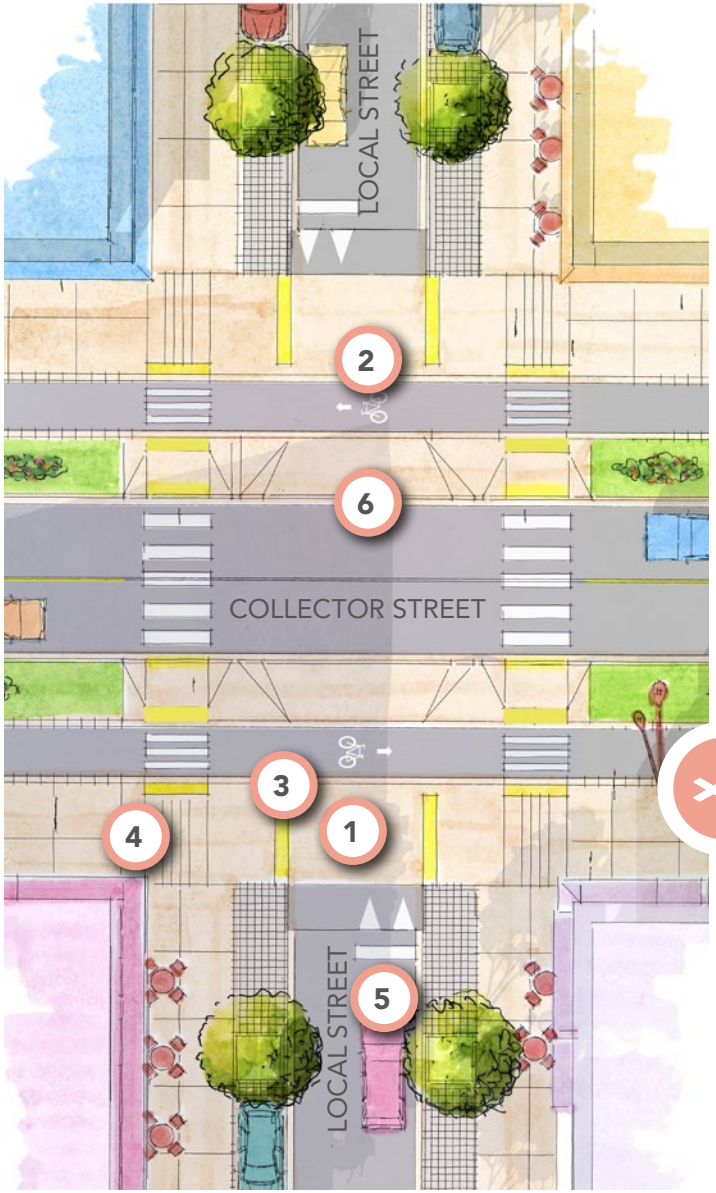
In the CSDG, **unsignalized intersections** include any intersection that is not controlled by a traffic signal, excluding roundabouts. Most commonly, these are either two-way or all-way stop sign-controlled intersections, but may also include intersections with yield signs or other configurations. Other types of unsignalized intersections may be feasible and should comply with all provincial and national design guidelines.

At unsignalized intersections between a **Collector** and **Local Street**, as shown in Figure 8.1, vehicle speeds can be reduced by including traffic calming features in the intersection design. Continuous sidewalks across the **Local Street** slow vehicle turn speeds by requiring vehicles to travel up and over sidewalk grade, conveying pedestrian and cyclist / roller priority over motor vehicles.

FEATURES

1. The continuous sidewalk along the **Collector Street** will require the motor vehicle driver to cross the pedestrian realm, rather than the historic design where pedestrians drop down via a curb ramp to cross the Vehicle Zone.
2. Pedestrians and cyclists / rollers traveling along the **Collector Street** will have an uninterrupted experience, with the sidewalk and cycle track surface treatments remaining unchanged. Pedestrians and cyclists / rollers should be kept separate through the intersection wherever possible.
3. High-contrast TWSIs will provide indication to pedestrians with low vision or who are blind about the **Local Street** crossings.
4. High-contrast TWSIs and score lines across the sidewalk will highlight the presence of a crosswalk across the **Collector Street**.
5. Motor vehicles on the **Local Street** will see a speed hump as they approach the sidewalk.
6. Motor vehicles on the **Collector Street** will see driveway-style curb ramp as they turn towards the sidewalk.

Figure 8.1 Local & Collector Street Unsignalized Intersection



RETROFITTING CONTINUOUS SIDEWALKS

When the design shown in Figure 8.1 occurs in an existing intersection and is not part of a new street or larger reconstruction project, it is possible to retrofit continuous sidewalks along **Collector Streets** where the intersection features a conventional curb return intersection, as illustrated in Figure 8.2. When retrofitting an unsignalized intersection with a continuous sidewalk, drainage updates may need to be made to avoid pooling water where new ramps are added.

Figure 8.2 Retrofit Options for Existing Intersections

Existing Condition: **Conventional Curb Return**

The typical existing condition at intersections is for the sidewalk to end in a curb ramp where pedestrians cross at the grade of the Vehicle Zone.

Retrofit Option: **Continuous Sidewalk with Curb Extension**

Where the curb lane of the **Collector Street** is used for on-street parking, it may be possible to incorporate curb extensions into a retrofit upgrade, providing the space needed for vehicle ramps up to sidewalk grade. This has the advantage of allowing the sidewalk to maintain its existing alignment and continue uninterrupted.

Retrofit Option: **Continuous Sidewalk without Curb Extension**

In cases where there is no on-street parking on the **Collector Street**, and therefore no potential for a curb extension, retrofit can still be achieved with relatively minor construction. This retrofit requires the sidewalk to realign slightly through the intersection in order to create space for the vehicle ramp up to sidewalk grade.

With both retrofit options, the sidewalk would be reconstructed through the intersection in concrete with the driveway-style curb ramp also constructed in concrete.

8.4 Signalized Intersections

Signalized intersections are found along **Collector** and **Arterial Streets**. Speeds along these streets are expected to be higher and for the safety of all road users, often require signal controlled crossings, intersection corner protection, and / or grade changes between travel modes (i.e., cyclists / rollers, pedestrians, vehicles). Some signalized intersections require additional safety precautions where potential conflicts or higher volumes of vulnerable road users are anticipated.

SIGNAL TIMING ELEMENTS

Controlled and anticipated phasing of intersection crossings through signal timing elements can reduce conflicts when pedestrians or cyclists / rollers are crossing through an intersection. Signal timing elements can be automatic, manual, or in place as a permanent restriction.

No-Right-Turn-on-Red Restrictions

No-right-turn-on-red restrictions can dramatically reduce pedestrian-vehicle conflicts as vehicles are prevented from passing through crosswalks when pedestrians are occupying them. It also improves accessibility by avoiding vehicles blocking the crosswalk during the pedestrian crossing period.

Leading Pedestrian Interval (LPI)

Where pedestrians and cyclists / rollers cross parallel to traffic, a **LPI** can be programmed at traffic signals to give these users a head start crossing the road. This makes them more visible to turning motorists once traffic is given the green light a few seconds later. Together, the no-right-turn-on-red and the LPI, can be especially effective at reducing conflicts. Improved safety outcomes outweigh the minor reduction in traffic capacity in most instances.

Bicycle Detection Lights

A common struggle faced by cyclists / rollers sharing vehicle infrastructure is knowing whether the light has been activated for their safe crossing. **Bicycle Detection Lights** visually acknowledge the presence of a cyclist at an intersection to indicate that the light has been triggered.

Protected Turn Phases

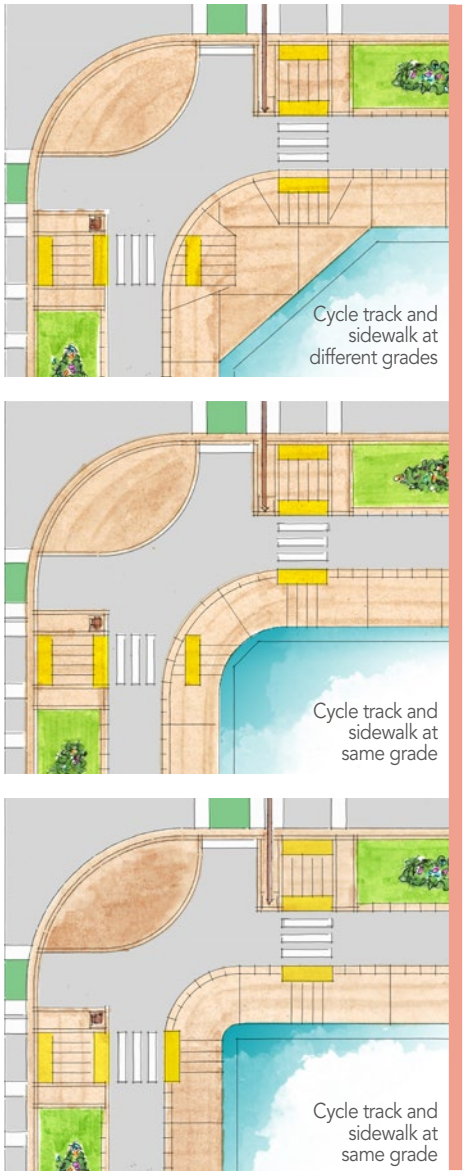
Protected turn phases provide a green arrow for left or right turning vehicles while stopping conflicting traffic and parallel pedestrian and cyclist / roller crossings to reduce conflicts. Protected turn phases are preferred where possible over permissive phases to improve both driver and vulnerable road user safety.

CYCLING-SPECIFIC ELEMENTS

At signalized intersections where cycling facilities are present, Complete Streets should include protected intersection corners. Protected intersections are designed to minimize potential conflicts between people walking, cycling, or rolling and people driving. They include a corner protection island between the cycle track and roadway, separate paths through the intersection for pedestrians and cyclists / rollers, and potentially include dedicated signals.

On Complete Streets, cycle tracks and sidewalks are constructed at the same grade to better separate cyclists / rollers from motor vehicles. Based on site circumstances, a range of alternative treatments for protected intersection corners may be considered. Figure 8.3 illustrates different options. Design variations may also provide appropriate solutions where the need to accommodate larger design vehicles through larger radii and/or compound curves reduces the available space between the curb and property line.

Figure 8.3 Protected Intersection Corner Options



Different Grades

On approach to a signalized protected intersection, the cycle track will ramp down to road grade, vertically separating pedestrians and cyclists / rollers in this high-conflict area. Grade separation helps to clearly define the pedestrian and cycling spaces. Curb ramps are often required in the pedestrian space to cross the cycle track as well as a flat space behind the ramp for people using mobility devices to access the curb ramp.

Same Grade

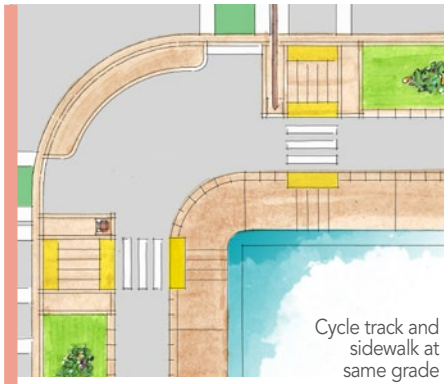
In constrained situations it may be appropriate to keep the pedestrian and cycling facilities at the same grade to remove the need for curb ramps. While this increases the possibility of encroachment into adjacent spaces by pedestrians or cyclists / rollers, it removes the need for curb ramps and the space they require and improves accessibility. This reduces the corner cut required at the adjacent property. With this design, the entire sidewalk and cycle track grade falls gradually from the back of sidewalk to the roadway.

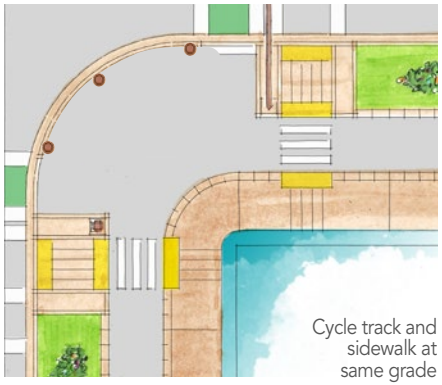
Same Grade, Reduced Radius

The corner cut of the adjacent property can be eliminated completely by tightening the radius of the cycle track right turn. This will require cyclists / rollers to reduce their speed further to negotiate the turn. The reduction in turning radius reduces the space for the cyclist / roller to move through the intersection.

Same Grade, Smaller Corner Island or Bollards

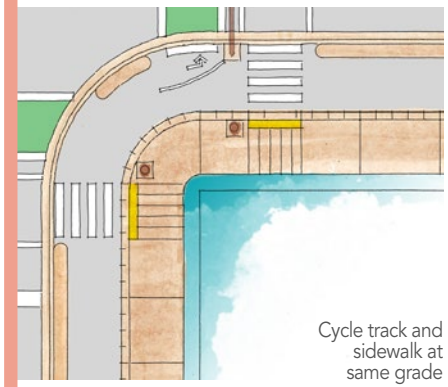
An alternative approach that can be applied is to create a banana-shaped corner protection island or use bollards to increase space in the intersection corner for waiting cyclists / rollers. This can be applied if volumes indicate a need for more space, but places cyclists / rollers closer to the path of turning vehicles.





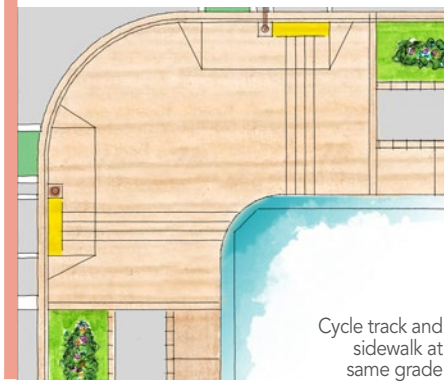
Bike Lane Narrowing

For short distances it may be feasible to apply local narrowing of the bike lane to accommodate the corner radii. Pedestrians crossing the intersection would wait on the sidewalk behind the cycle track for the crossing signal.



Shared Space for Pedestrians & Cyclists

As a last resort, a shared space mixing area for pedestrians and cyclists / rollers at the intersection corner may provide the benefits of protection from vehicle traffic, at the expense of greater interaction between pedestrians and cyclists / rollers. To help provide some separation through a shared space area, it is recommended that separate crosswalk markings through the Vehicle Zone are still used.



8.5 Roundabouts

Roundabouts are an alternative to signalized intersections where traffic proceeds in one direction around a circular area in the centre. These intersections keep traffic moving, while reducing vehicle speed and removing the risk of head-on-collisions. Like other intersections, pedestrians and cyclists / rollers have priority at road crossings. Roundabout designs should include sufficient deflection of the vehicle path to reduce the speed of vehicles entering and exiting. Figure 8.4 illustrates key roundabout considerations.

Figure 8.4 Roundabout Design Considerations

FEATURES

1. Pedestrian crosswalks on all legs. When in crosswalks, pedestrians have priority over other modes, including both cycling / rolling and vehicle traffic.
2. Dedicated cycling facilities through the roundabout (where they are provided on approach roads). "Dutch-style" roundabout design, where cyclists / rollers follow a uni-directional path around the perimeter of the roundabout.
3. Both the cycle track and pedestrian crosswalks are located at least one car length from the edge of the roundabout to reduce the likelihood of vehicles blocking the circulating lanes while waiting on people crossing, and to provide turning motorists a better opportunity to see pedestrians and cyclists / rollers approaching the crosswalk.
4. Refuge islands where possible to provide a safe space for pedestrians when crossing.
5. Decorative paved apron in the centre to accommodate vehicles with larger turning radii.
6. Treatment of the centre island to encourage lower speeds and increase safety by maintaining sight lines and providing visual interest.

Rijnsburg, Netherlands

Example of a "Dutch-style" Complete Street roundabout that provides accommodation for all modes.

Image Credit: Michiel2005

Lougheed Highway, Burnaby

Example of a Complete Street with streetscape design features including stormwater management elements, street trees, seating, and attractive surfacing which enhance the experience of the space.

9 STREETSCAPE DESIGN

When they are well designed, Complete Streets are more than a way to get from one place to the next. They are attractive community spaces that inform the experience people have of a place. Streetscape design is at the heart of creating a welcoming and memorable street experience.

9.1 Street Trees & Landscaping

Landscaping in the form of street trees and planting beds, is transformative for the quality and character of a street. Landscaping enlivens public spaces and makes a community truly livable.

Omotesando Street, Tokyo. Some of the world's most iconic streets – Champs Elysees in Paris, Omotesando Street in Tokyo, Fifth Avenue in New York, and Granville Street in Vancouver – have a common element: a network of well-established street trees.

Campbell Street, Tofino. Planting beds add colour and beauty at the ground plane of the street, while aligning with the unique climate and character of a community.

STREET TREES

The best streets have well-established street trees as part of their streetscape fabric. Street trees in medians and boulevards are part of the street infrastructure, providing many essential services:

- **Support for Transportation Objectives:** A healthy tree canopy supports traffic calming, provides physical delineation between travel modes, reduces driver and pedestrian stress, and creates a safer and more pleasant experience for all users.
- **Environmental Benefits:** Street trees reduce urban heat island impacts, absorb storm water, mitigate greenhouse gases, and provide ecosystem services like habitat and food that support flora and fauna.
- **Aesthetic Benefits:** Street trees break up vast areas of horizontal pavement and vertical building facade, adding a "human" scale and natural element to the street. There is a significant difference in the quality and experience of a street with a healthy street tree canopy and one that is devoid of trees.
- **Social Benefits:** Attractive, treed streets provide shade and comfort and invite people to spend time in them, supporting local businesses and encouraging social interaction.

While street trees should be carefully selected, located, and designed alongside the street engineering, key design considerations include:

- **Continuous Tree Canopy:** Complete Streets should strive for a continuous tree canopy along both street sides or in central medians. Trees should be spaced no more than 12 m apart to create a cohesive character. Placement of trees should avoid impacting critical sight lines that could impede safety.
- **Tree Selection:** Street trees must be capable of tolerating harsh urban conditions. Trees with shallow root systems, weak branching structure, susceptibility to pests and disease, and low tolerance to pollutants, heat, snow loading, or high winds should be avoided. Root barriers can reduce potential damage to utilities, curbs, or sidewalks from root intrusion. Visual cohesiveness can be maintained by using repeated tree species within urban blocks, but with variation between blocks to avoid monocultures and support diversity.
- **Adequate Growing Medium:** Harsh urban environments necessitate provision of adequate growing medium to support the success of street tree investments. In urban areas, where soil volumes are typically limited, soil cells will likely be needed to achieve adequate soil volumes.
- **Adequate Water:** Like growing medium, adequate water is essential to tree health, especially through their establishment period.

Commercial Street, Nanaimo. An established tree canopy supports a pleasant, shady atmosphere for community events.

Terminal Avenue, Nanaimo. The treed median at Terminal Park Mall provides a green respite along a busy corridor.

PLANTING BEDS

Planting beds in boulevards and medians visually enhance a street, soften hard edges, and act as green infrastructure, absorbing rainwater and water runoff from adjacent paved surfaces. These beds, often containing a combination of street trees, shrubs, and perennial plantings, provide seasonal colour, greening, and softening of the paved street. While planting bed design for each project should be developed alongside the street engineering, key design considerations include:

- **Thoughtful Site Selection:** Because planting beds require more intensive maintenance to keep them healthy and attractive, their use should be focused to where they bring the most benefit. They are best located in high profile areas. Medians and curb extensions at roadway intersections are often ideal planting bed locations.
- **Sight Lines:** Plants that have heights that interfere with pedestrian, cyclist / roller, or motorist sight lines at intersections should be avoided.
- **Plant Selection:** Plant selections should provide year-round interest and be well-suited to local, urban growing conditions, with prioritization of opportunities to integrate native plants where conditions allow. Plant materials should be robust, low maintenance, and drought and disease tolerant, and plantings along streets where salt is used in the winter also need to be salt tolerant.
- **Adequate Growing Medium & Water:** Like street trees, the ability of these plants to access soil nutrients and water will define their ability to withstand the harsh streetscape environment. Deep, absorbent growing medium, combined with regular watering, will support the health of initial investments.

Princess Royal Avenue, Nanaimo. Median landscaping provides seasonal colour and vibrancy along the street.

Bowen Road, Nanaimo. Accent shrub plantings at a boulevard end provide fall colour.

9.2 Street Furniture

Street furniture increases comfort and enhances the street experience. These elements work best when their designs are coordinated, giving the streetscape a unified appearance. There may be exceptions along active, pedestrian-oriented streets where unique or historical placemaking elements and custom furnishings are warranted.

Street furnishings are typically located in rest spots along the street, where people can comfortably pause. On streets with heavier pedestrian traffic, it is ideal to have a rest stop approximately every 400 m, about a five-minute walking distance. Rest stops should be located at public transit stops, near sites of major pedestrian draw, at focal features, and near major intersections. Curb extensions with planting beds are typically good locations for rest stops, providing visual interest and screening from adjacent roadway traffic. Furnishings common to rest stops include:

- **Seating:** Seating locations should be designed to maximize the comfort of users, facing benches towards the best views, screening vehicle traffic, and incorporating access to shade. Accessibility is an important consideration, for example including benches with back support and armrests to assist in sitting and standing and organizing seating space to accommodate wheelchairs. Opportunities for movable seating could be considered in plazas, where people may move chairs as necessary to sit in sun or shade, or in groups of varying size.
- **Waste Receptacles:** Conveniently located waste receptacles encourage residents to keep their community clean. They should be located and sized based on anticipated volumes of use and the frequency of their servicing. Their design should complement seating and other furnishings. Source separation of waste should be incorporated into the design.
- **Bicycle Lock-up:** Places to secure a bicycle are ideally located on bike routes where cyclists are likely to stop, especially around uses that attract people like commercial areas. Lock-up facilities should be located to be visible (supporting security) and to not encroach into pedestrian, cyclist, or vehicle travel zones. Some communities integrate artistic lock-ups that combine visual interest and functional service.
- **Wayfinding Signage:** A cohesive signage approach limits visual clutter, provides vital information, and enhances the streetscape. Signage should be located at intersections and other spots that aid pedestrian, cyclist, and roller orientation and should be designed with a consistent style. Incorporate appropriate lighting to ensure adequate visibility.

Commercial Street, Nanaimo. Custom benches beneath shade trees provide places for visitors to stop and rest.

Fitzwilliam Street, Nanaimo. Updated wayfinding signage in Nanaimo's Downtown provides a consistent character.

9.3 Stormwater Features

When streets are developed to include boulevard, median, and/or curb extensions, there are opportunities to incorporate bioswales, rain gardens, and other stormwater infrastructure that capture, detain, and treat roadway runoff. In these locations, planted bioswales and rain gardens double as a visual amenity for the streetscape. In addition, where street trees within soil cells are used, the void spaces created can support stormwater management.

Poets Trail Drive, Nanaimo. Stormwater swales drain road and sidewalk runoff in a residential neighbourhood.

9.4 Utilities

Underground utilities, including water distribution, sewer, and stormwater systems, require upgrades and replacement over time. When replacements are needed, the opportunity to simultaneously make efficient changes to the street should be acted on. Proactive monitoring of the condition and capacity of underground utilities should be completed to align utility replacements or upgrades with streetscape surface improvements. Care should be taken to position surface features on new projects such that repairs and maintenance are not intrusive. Where utility infrastructure extends above ground, consider art wraps and other means to integrate the infrastructure into the surrounding public realm.

Nanaimo. Timing streetscape improvements to coincide with utility upgrades can help manage costs and support efficiencies.

9.5 Street Lighting

In Canadian communities, long hours of winter darkness are part of the seasonal experience. Pedestrian level lighting along streets makes them safer for pedestrians, cyclists, and rollers and can extend the hours of use. The aim of pedestrian level lighting is to provide an adequate and consistent light level on sidewalks and cycle tracks. Care must be taken to avoid light spillage into adjacent properties through the use of appropriate light fixtures to control the direction in which light is cast.

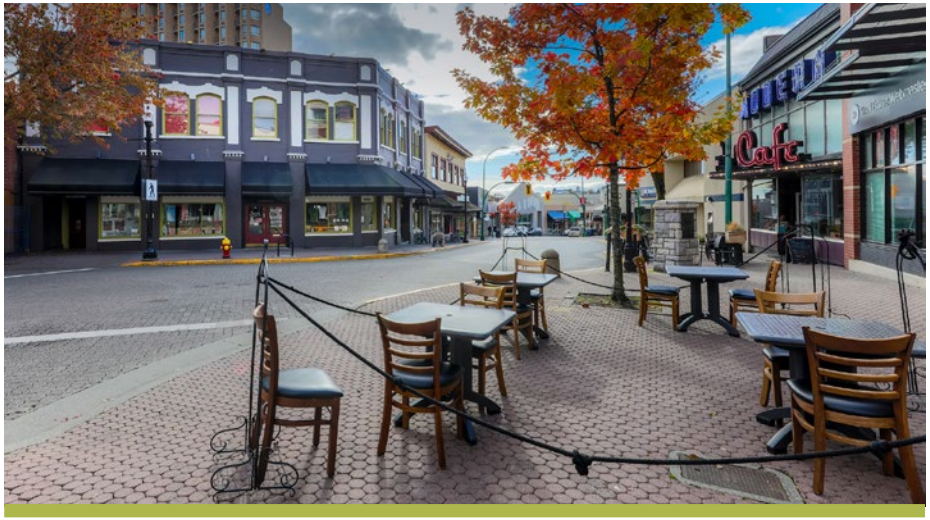
Lighting also represents a significant opportunity for placemaking, through integration of decorative and seasonal lighting that make street spaces warm and inviting in the dark hours.

Front Street, Nanaimo. Lighting illuminates the street.

9.6 Property Frontage

Streetscape design must be responsive to adjacent property frontages, accounting for driveway and lane accesses, elevation differences between private and public sites, and location of existing elements on adjacent properties such as utilities, trees, or retaining walls. The relationship between commercial signage and sight lines will also need to be considered.

Opportunities should be identified to align public and private realms so they can accommodate high-quality streetscapes that are supportive of adjacent land uses. **Mobility Streets** are expected to have more commercial activity, and as such, feature wider sidewalks and space to accommodate seating, patios, and other activities spilling out into the street.



Church Street, Nanaimo. As a Mobility Street, the streetscape features larger areas for restaurant patios.

9.7 Placemaking

Placemaking is an expression of the distinct character of a city, neighbourhood, or street itself, increasing visual interest, enhancing experience, and fostering civic pride. Placemaking features include elements like iconic structures, art, special paving patterns and materials, custom furnishings, and specialty lighting. Focal features are best positioned in visually prominent locations such as a gateway to the city or neighbourhood, a central point of interest such as a square or plaza, a location with a view, or a street that sees high levels of pedestrian activity. Placemaking can be opportunistic, aligning with infrastructure upgrades or other investments. Placemaking elements used in isolation cannot create sense of place on their own; they must be combined with safe streets, land uses that attract people, and an overall streetscape this is inviting and comfortable.

Fitzwilliam Gate, Nanaimo. Placemaking creating an inviting gateway to explore.

9.8 Surface Materials

Choices about streetscape surface materials can help achieve the goals of a safe, accessible, and inviting place for all users. Surface material palettes should create a visually cohesive streetscape. The following are key material considerations for different streetscape elements:

- Cycle tracks will typically be laid with asphalt, providing a smooth surface suitable for bicycles and other micromobility devices to roll without disruption. Cycle tracks will be bordered by stamped concrete on either side to provide visual and textured separation from adjacent uses.
- Sidewalks will typically be concrete, providing a smooth, accessible surface for all users.
- Concrete and stone unit pavers may be introduced as accents in areas of more limited movement, such as in rest spots or in boulevards.

Victoria Crescent, Nanaimo. Broom-finished concrete with tooled joints and integrated wayfinding elements.

9.9 Maintenance

Maintenance is a critical part of preserving intended streetscape character and protecting capital investments. Without appropriate maintenance, the streetscape will fail to perform as intended and may require replacement before the end of its planned lifespan. All designs for streetscape elements should include consultation with stakeholders responsible for the future maintenance of proposed features. Ongoing maintenance should be coordinated alongside streetscape design to:

- Articulate expectations of private and public maintenance contributions. Typically, in streetscape environments, the City is responsible for maintaining the public realm, while private landowners maintain their adjacent properties and frontages. In some locations, notably **Mobility Streets** where the private and public realms intentionally co-mingle, responsibilities can be shared, if expectations and responsibilities are agreed upon.
- Identify the frequency, level of effort, staffing, and costs required to maintain streets in an attractive state. Tasks like landscape maintenance can be time-intensive, and in the absence of proper and timely attention, issues like weed growth, fallen fruit and leaves, irrigation break-down, or lack of pruning can rapidly compound and compromise the quality of the street. Similarly, picking up litter and removing graffiti in a timely manner can require a significant effort, but are essential tasks to maintaining an attractive streetscape.
- Consider how maintenance personnel will safely access sites, especially in locations where vehicle activity is directly adjacent. Small design changes like wider buffers or access ramps can make a difference in the ease of day-to-day maintenance procedures.
- Identify materials that are durable, readily replaceable, and locally-sourced where possible, to facilitate longevity and streamline future repairs.
- Plan ahead for future utility maintenance that may impact the street surface. Utility repairs can leave unattractive surface patches, impacting the street character. Advance consideration of utility locations and surface materials (for example, siting utilities beneath asphalt or soft surface finishes rather than finished concrete) could support easier future access and repair.
- Plan for future water requirements, recognizing that because Nanaimo's climate sees long periods of drought and streetscape environments are inherently harsh, irrigation will be required to maintain healthy streetscape plantings. Selecting drought-tolerant, hardy species can support water conservation and healthy streetscapes.

Considering maintenance during design helps plan for aspects like access and safety for maintenance workers.

In **Mobility Streets** with commercial activity, local shop owners may help maintain a clean pedestrian environment.

Commercial Street, Nanaimo

Great streets include placemaking features that create beautiful, welcoming spaces for all. Prioritizing placemaking in key locations will support the vision for vibrant, inclusive, and active city spaces.

Metral Drive, Nanaimo

As Complete Street projects like Metral Drive are implemented, a complete network will begin to form, ultimately increasing the choices people have for mobility throughout the City.

10 LOOKING FORWARD

The CSDG articulates a path towards Complete Streets in Nanaimo. Like all guidelines, they are based on the knowledge, transportation modes, and technologies of the current time. Undoubtedly, our City and our world will continue to evolve. The CSDG should be treated as a living document, with ongoing refinement and improvement to Complete Street practices as projects are implemented in the Nanaimo context.

10.1 Monitoring

Monitoring allows us to take stock of our progress and identify potential adjustments based on what we learn. Collection and analysis of metrics that tell a meaningful story of Nanaimo's Complete Streets journey are suggested for consideration. The following metrics provide a measurable gauge of the success of a Complete Street project. Selecting and tracking metrics will depend on capacity, data, and resources.

Metrics the City Could Collect

- **Vehicle speed or travel time before and after a Complete Street project** can provide a measure of the effects of the updated street design elements in comparison to the previous condition.
- **Vehicle volumes before and after a traffic calming project** can provide a measure of reductions in vehicle traffic using the street. These metrics are typically most applicable to traffic calming projects on **Local Streets**, for instance, whether raised intersection designs have reduced short-cutting.
- **Bicycle and pedestrian volumes before and after a Complete Street project** can measure increase in usage. In these metrics, care should be taken to understand if the volume increase is attributable to users being attracted from adjacent streets to the new facility or to a mode shift. Screenline counts can be used to study this.
- **Stated preference surveys** can gauge public opinion on street designs before and after implementation, and to ask if people have changed travel modes for different types of trips as a result.
- **Transit ridership on routes along a Complete Street** can be measured to assess if improved pedestrian connectivity and waiting facilities are attracting ridership. Care must be taken to understand other potential causes of ridership growth such as increased population, improved frequency, or fare changes.
- **Percentage of different types of cycling and pedestrian facilities within the network** provides a basic measure of the extent and quality of the Complete Street network. When compared over time, these metrics can indicate how the network is growing. It is important to look at facility type, recognizing that quality of the facility (e.g., all ages and abilities) and the linkages created are critical to the success of the network.

Census Metrics

- **Census mode share for travel to work** will provide a generally consistent measure of people's travel choices in the City every five years. Increased walking, cycling / rolling, and transit mode share would be indicative of successful implementation of Complete Streets. Note that mode share changes may also be attributable to other factors such as cost of living, price of gas, levels of congestion, employment trends, etc.

Other Relevant Metrics

- **Increased economic activity along a recently improved Complete Street** may be partly attributable to the benefits of an accessible and attractive streetscape. Care must be taken to consider streetscape upgrades among other factors that influence economic activity.
- **Property value increases and development activity due to Complete Street improvements**. Complete Streets increase Walk and Bike Scores, which are measures that indicate how accessible a property is to popular and essential amenities by walking or cycling / rolling. Many people want to live on a property that is easily accessible by all travel modes and properties on or near Complete Streets often sell for a higher value after improvements are completed.
- **Reductions in car ownership** may be an indicator that Complete Streets are allowing people to become less reliant on the automobile. When Complete Streets combine to create complete networks, it may allow some to forgo car ownership or downsize from a two-car to one-car household. Changes in car ownership will be influenced by other factors as well.

Many metrics can help tell the story of Complete Streets, but must be interpreted in context, recognizing that positive changes may not be entirely the result of introducing Complete Streets. For example, comparing population levels and gas prices from earlier times to present day are two major factors that should be included when interpreting changes in travel patterns. Care must be taken when using metrics to tell the story and apply the metrics appropriately.

10.2 Updates

As with all guides, updates to the Complete Street Design Guide will be needed to keep the information relevant and progressive. Best practices for Complete Streets have evolved rapidly in the last decade and will continue to do so. In addition, transportation technology is quickly increasing the choices people have for mobility.

Nanaimo is early in its implementation of Complete Streets and each future project will reveal learnings to be applied. As Complete Street projects are implemented, public and stakeholder feedback should be recorded, and where appropriate, considered for inclusion in future updates.

Metral Drive Complete Street, Nanaimo. Each completed project will reveal learnings to be applied for the future.

10.3 Complimentary Policies

Complete Streets provide the physical infrastructure that can support changes in travel modes. In addition to this physical infrastructure, the demand on streets can be influenced by policy positions and the manner in which they are implemented. The following policy areas could be considered to support Complete Streets.

Integrated Planning

To maximize return on investment, it is recommended that Complete Street projects, wherever possible, be coordinated and integrated with other capital works. For example, where underground utilities are being replaced, upgrades to the street design on the surface should be completed at the same time.

Travel Demand Management

Travel Demand Management (TDM) is a term used to describe a suite of initiatives that help encourage desirable travel patterns, including a shift towards active transportation. The toolbox of measures is vast, but examples include Complete Streets, introduction of new modes, incentives to change modes, disincentives to use certain modes, reallocation of street space, subsidies for some modes and increased user fees for others, education, flexible work schedules, increased or more secure bike parking, congestion pricing, and more.

Parking Regulation

Parking is one of the most important aspects in managing vehicle demand and a key part of TDM. Where abundant and/or free parking is provided, there is little incentive to choose other travel modes. The City can influence both off-street parking, which occurs on private lands in parking lots or structures, and on-street parking, which occurs within the Flex Zone of streets.

- **Off-street Parking:** Off-street parking in Nanaimo is regulated through a bylaw that sets out minimum parking requirements for different land uses. Some limited relaxations in parking numbers are currently permitted. The City can support mode shift by reviewing their approach to off-street parking, for example reducing off-street parking requirements for new development, adopting maximum rather than minimum parking requirements, or allowing development of residential units Downtown with limited parking. Parking reductions can reduce construction costs, allow for lower cost housing, and attract residents who are less reliant on a car. Off-street parking provision needs to be balanced, so that unmet demand does not result in parking spilling over onto adjacent streets.
- **On-street Parking:** On-street parking is affected by the number of parking spaces available and restrictions including time limits and fees, which can vary by day and time. Nanaimo already manages on-street parking by both methods, but as the City grows, regulations will need to be updated. Through the use of on-street parking limits and fees, parking availability can be increased at high-demand locations like commercial streets and for those who need it most. A common target is 15% of parking spaces available per block at peak times, which helps to manage traffic volumes related to people searching for a parking space. While parking fee increases can impact car owners with lower incomes, transportation improvements funded through parking charges can also bring significant improvements for other lower cost travel modes.

Electric Micromobility Policy

Modes of electric transport, including various types of pedal and throttle assist electric bicycles, electric scooters, and electric skateboards, are becoming increasingly prevalent. With this shift, guidance for how these modes use Complete Streets may be required. It is likely that due to similar speed capabilities, electric scooters and skateboards will be better served mixing with bicycles rather than pedestrians. Likewise, those with mobility devices may prefer the smoother asphalt surface of a cycle track over a sidewalk with frequent joints.

The City may consider developing policy to regulate where different modes are permitted to ride. Furthermore, where modes may mix such as multi-use paths, implementation of speed limits or "slow roll" policies may be warranted. As mobility variety and technology continues to evolve, it is likely that policies will need to be refined.

Reduced Speeds

The Motor Vehicle Act currently sets the default speed limit on streets as 50 km/h. In recent years, some communities have explored reducing speed limits on select streets to 30 or 40 km/h to lessen the frequency and severity of collisions.

In Nanaimo, some individual streets and zones such as school zones are already signposted as 30 km/h. The City may wish to explore other streets that warrant lower posted speeds. This would primarily apply to **Local Streets** that may be used as neighbourhood bikeways or see significant activity by more vulnerable users.

It is important to note that wide vehicle lanes are an environmental cue that encourage faster driving, even when speeds are posted to be lower. To be effective, speed limit reductions may require concurrent efforts to right-size vehicle lanes or integrate traffic calming.

Electric bicycles, scooters, and other devices will expand the range of speeds these users are traveling, potentially leading to speed regulation requirements of devices in certain areas.

On Local Streets where travel lanes are shared between motor vehicles and cyclists / rollers, reduced speed limits may warrant consideration.

Traffic Calming Policy

The City already has **Neighbourhood Traffic Calming Guidelines** that guide response to neighbourhood speeding concerns that are brought to the City's attention. Implementation of Complete Streets will support traffic calming; however, there will continue to be occasions where additional traffic calming measures will support specific objectives for a street or where interim traffic calming measures are used until a Complete Street project moves forward.

Vision Zero Policy

Vision Zero means taking a proactive, preventative approach that prioritizes traffic safety as a public health issue. Vision Zero starts with the belief that everyone has the right to move safely in their community and seeks to enhance the design of our networks to improve the roadway environment and enhance traffic management systems to lessen the severity of crashes. The City adopted a Vision Zero policy in *City Plan – Nanaimo ReImagined*. A next step could be developing an implementation toolkit / guide to identify supporting actions. Complete Streets would be a component of this toolkit.

Road Rehabilitation Policy

When roads are rehabilitated or dug up to repair or replace underground utilities, they are often repaired to reflect their existing condition. Going forward, before any street is rehabilitated or dug up, there should be a requirement to review the needs of the street based on current planning documents and the CSDG.

Development Contributions

Currently Provincial legislation and City bylaws permit the City to require the construction of works and services across the frontage of a development property, up to the centreline of the road, at the time of building permit and subdivision, and additional works may be secured through rezoning or land use permits. While this allows the City to require construction to the final street standard, development occurs incrementally. Therefore, in many cases, the final standard cannot always be achieved at the time of development as the updated street must tie in to existing roadworks on either side. Consideration of policy or regulation that could expand works and services requirements to a more useful extent or secure funding for future works and services may warrant consideration.

Complete Streets will be designed to encourage vehicles to follow posted speeds; however, in some cases further traffic calming may be warranted.

New development presents opportunities for upgrades to adjacent streetscapes.

Climate Adaptation Strategy

The City of Nanaimo has declared a Climate Emergency. As the City continues to plan for its future, plans and policies should indicate how the declaration will integrate with the City's activities with respect to prioritization of transportation investment, mode priority, construction techniques and materials, contributors to the carbon footprint, as well as measures to deal with rising sea levels.

Data Collection & Monitoring Strategy

Section 10.1 identifies potential metrics that may be used to measure the success of Complete Street projects. The City may wish to include these, or similar metrics, as part of a formal data collection and monitoring strategy.

Empty Lots

Empty lots, sometimes referred to as "missing teeth" on a street, can make a street feel less welcoming, reducing desirable activity and impacting revenue from property taxes and developer contributions. In some cases, these sites may have limitations that make the costs of development untenable. Policies or relaxations could be warranted to reduce barriers to redevelopment in areas where infill and redevelopment is a priority.

Access Management

Access management speaks to how private properties are accessed from the street network. The CSDG identifies a general approach consistent with historic principles whereby direct access to private properties from **Arterial Streets** is not permitted, while it is from **Collector** and **Local Streets**. A formal access management policy could clarify these statements and provide further guidance on details such as access spacing and volume thresholds.

The Climate Emergency provides an impetus for the City to identify policy and planning that prioritizes climate-friendly modes.

Opportunities to fill empty lots supports a more vibrant streetscape that welcomes positive activity.

New Technologies

Like all technologies, those related to transportation are accelerating. There are many emerging transportation trends that will influence use of the street. The full scale of their impact, including changes in traffic volumes and travel patterns, cannot be fully predicted. The City should keep up-to-date with emerging trends and be prepared to develop responsive policies to effectively manage their use. Such technologies include:

- **Electric vehicles:** While electric vehicles will reduce greenhouse gas emissions, they also have potential to reduce the cost of driving which will have the negative impacts of increasing trips, contributing to congestion, increasing parking demand, and reducing road safety.
- **Electric bicycles:** Electric bicycles allow people of all ages and abilities to travel by bicycle. However, electric bicycles can travel at higher speeds than human-powered bicycles. These speed differentials will increase demand for wider facilities with space to pass, and possibly require regulation of speeds on facilities shared with pedestrians.
- **Ride hailing:** While off to a slow start in BC, ride hailing may replace trips made by other modes, particularly transit and taxi. Ride hailing makes vehicle trips accessible to more people, potentially increasing the motor vehicle mode share. Drivers circling for passengers may increase vehicle volumes.
- **Car share:** Car share is a service that allows members access to a vehicle when needed, for short periods of time. This trend allows people to own fewer cars, and one car to be more productive compared to privately-owned vehicles that spend most of their time parked.
- **Bike share:** Bike shares allow members to access a bicycle for trips when needed. The trend requires appropriate facilities and sufficient demand to be worthwhile for the operator.
- **Scooter share and other micromobility options:** Electric scooter shares are becoming an increasingly popular option in urban centres. Like a bike share, micromobility options require suitable facilities and demand. Policies on where they can be dropped may be required.
- **Autonomous vehicles:** While autonomous vehicles are not yet readily available, it can be anticipated that they will form part of the transportation future. If they reduce the cost of driving or make it easier for those without a license to drive, they may increase vehicle trips.
- **Employment changes:** The recent trend of work-from-home and flexible employment is shifting commuting patterns. If the work landscape remains more flexible, work-related travel patterns will be different in coming years.
- **Other technologies:** Companies are exploring the use of drones and autonomous vehicles for deliveries which could shift the delivery landscape. Furthermore, there will be technologies that are not yet at the test stage that may transform transportation choices in the future. It will be important to study new technologies as they arise and update Complete Street guidance accordingly.

How we move around the City will evolve. Adapting Complete Streets to align with current trends will be important.

Wharf Street, Victoria

As Nanaimo creates Complete Streets, choices and trade-offs will need to be considered. Making informed choices using Complete Street principles will support a future where streets support all ages and abilities.

11 REFERENCE

This section includes a consolidated summary of key reference information articulated throughout the CSDG.

11.1 Quick Reference Checklists

The checklists below provide a series of guiding questions related to the aspects discussed in the CSDG. The intent is for a designer to develop and review their design concept with these questions in mind. The reference checklists are a starting point, but should not be considered a comprehensive listing of all aspects required in a Complete Street project. The designer is responsible for determining other considerations that will need to be made throughout the design process. Where Complete Street elements cannot be provided, trade-offs must be reviewed with the City Engineer and a design deviation memo submitted, per MoESS Section 8.01.7.b.ii.

COMPLETE STREET DESIGN	Y	N	n/a
Does the design support the City vision to enable more people to walk, cycle, roll, or take transit?	☐	☐	☐
Does the street design accommodate all modes?	☐	☐	☐
If the street design accommodates all modes, does it favour one mode over another?	☐	☐	☐
Does design comply with the City MoESS and other leading industry guidelines?	☐	☐	☐

For more details, see Section 2: Network & Classifications

MULTI-USE PATH DESIGN	Y	N	n/a
Is this the right facility type for the street classification and site circumstances?	☐	☐	☐
Can separate facilities for walking and cycling / rolling be provided?	☐	☐	☐
Are pedestrian and cyclists / roller volumes low enough to avoid significant conflicts?	☐	☐	☐
If pedestrian and cycling / rolling volumes are expected to be higher, is the facility able to be widened and/or have modes separated?	☐	☐	☐
Does the facility have significant grades that could lead to increased speed differentials between people walking and cycling / rolling, thereby requiring consideration for widening and/or mode separation?	☐	☐	☐
Where conflict is higher, should signage and pavement markings be used to encourage people to cycle / roll slowly?	☐	☐	☐

For more details, see Section 3: Complete Street Design, Section 4: Pedestrian Design, and Section 5: Cycling Design

PEDESTRIAN DESIGN	Y	N	n/a
Are sidewalks from the Vehicle Zone separated with a boulevard?	☐	☐	☐
Are sidewalks accommodating to all ages and abilities?	☐	☐	☐
Are sidewalks / crosswalks direct and accommodating of desire lines?	☐	☐	☐
Are there any gaps in the sidewalk network within the project boundaries?	☐	☐	☐
Are steep grades managed to accommodate accessibility?	☐	☐	☐
Are sidewalks wide enough for two mobility devices to pass?	☐	☐	☐
Are appropriate ramps provided at crosswalks and to building entrances?	☐	☐	☐
Are high contrast tactile walking surface indicators (TWSIs) used where a pedestrian crosses a vehicle route or cycle track?	☐	☐	☐
Are score lines provided across the sidewalk to alert someone to the presence of a crosswalk?	☐	☐	☐
Is there opportunity to include braille wayfinding elements?	☐	☐	☐
Where a sidewalk passes a driveway or **Local Street** is it raised and continuous?	☐	☐	☐
Could a Leading Pedestrian Interval (LPI) at signalized intersections improve pedestrian safety?	☐	☐	☐
Could restricting Right-Turn-On-Red (RTOR) improve pedestrian safety?	☐	☐	☐
Are sidewalks in active areas wide enough to enable adjacent activity to spill onto the street, e.g., patios?	☐	☐	☐
Does the design avoid routing people past areas where there are personal safety / CPTED concerns, i.e., few eyes on the street?	☐	☐	☐
Are blind spots, created by the design of buildings or landscaping, effectively managed?	☐	☐	☐
Is sufficient lighting provided?	☐	☐	☐

For more details, see Section 4: Pedestrian Design

CYCLING DESIGN	Y	N	n/a
Should the cycling facility be separated from vehicles based on the street classification, traffic volumes, and speeds?	☐	☐	☐
Is the cycling facility wide enough to safely pass? (More important where grades exacerbate different physical abilities and/or electric micromobility devices are anticipated.)	☐	☐	☐
If cycling facility widths need to be reduced, do edge conditions still provide sufficient space for passing?	☐	☐	☐
Is there suitable separation between a cycling facility and adjacent sidewalk where pedestrian and/or cyclist / roller volumes are expected to be high?	☐	☐	☐
If bi-directional cycling facilities are selected, do they safely connect with adjoining facilities at either end?	☐	☐	☐
If bi-directional cycling facilities are selected, can turning traffic be provided its own lane and signal controlled to reduce turning conflicts?	☐	☐	☐
If cyclists / rollers are routed on neighbourhood bikeways along **Local Streets**, are street design or traffic calming sufficient to reduce motor vehicle volume or speeds to safer levels?	☐	☐	☐
Is there well located and sufficient bicycle parking provided in highly visible locations?	☐	☐	☐
Can cyclists / rollers make a safe two-stage left turn at intersections, i.e., protected intersection or turn boxes provided?	☐	☐	☐
Are bike signals and bicycle detection lights warranted at intersections to provide reassurance to cyclists of their priority?	☐	☐	☐
Where median islands are provided at intersections, is there space for cargo bikes or bikes with trailers to wait safely?	☐	☐	☐
Where there are constrained sections, i.e., tight turns or narrow gaps, can cargo bikes or bikes with trailers navigate them safely?	☐	☐	☐
If cycling facilities cross a roundabout are crossings at least one car length from the edge of the roundabout?	☐	☐	☐

For more details, see Section 5: Cycling Design

TRANSIT DESIGN	Y	N	n/a
If the street is a transit route, are vehicle lanes wide enough to accommodate transit vehicles?	☐	☐	☐
Does the street leading to/from the transit stop have full pedestrian infrastructure?	☐	☐	☐
Are all transit stops wheelchair accessible with suitable boarding platforms?	☐	☐	☐
If transit stops are used as layover or timing points, is a pull-out stop provided (unless on a multi-lane roadway)?	☐	☐	☐
Where transit user waits are expected to be longer, i.e., low frequency services, is weather protection provided to improve wait time comfort?	☐	☐	☐
Where transit stops are expected to see high volumes of passengers boarding and alighting, is sufficient waiting space provided to avoid blocking adjacent sidewalks or cycle tracks?	☐	☐	☐
Where cycle tracks are adjacent to a transit stop, are they routed behind a stop island with appropriate measures (e.g., road markings, signage and/or continuous sidewalk material) provided to show pedestrian priority?	☐	☐	☐
Are transit stop locations convenient and visible with CPTED considerations taken into account?	☐	☐	☐
Have transit priority opportunities been explored and implemented where feasible?	☐	☐	☐

For more details, see Section 6: Transit Design

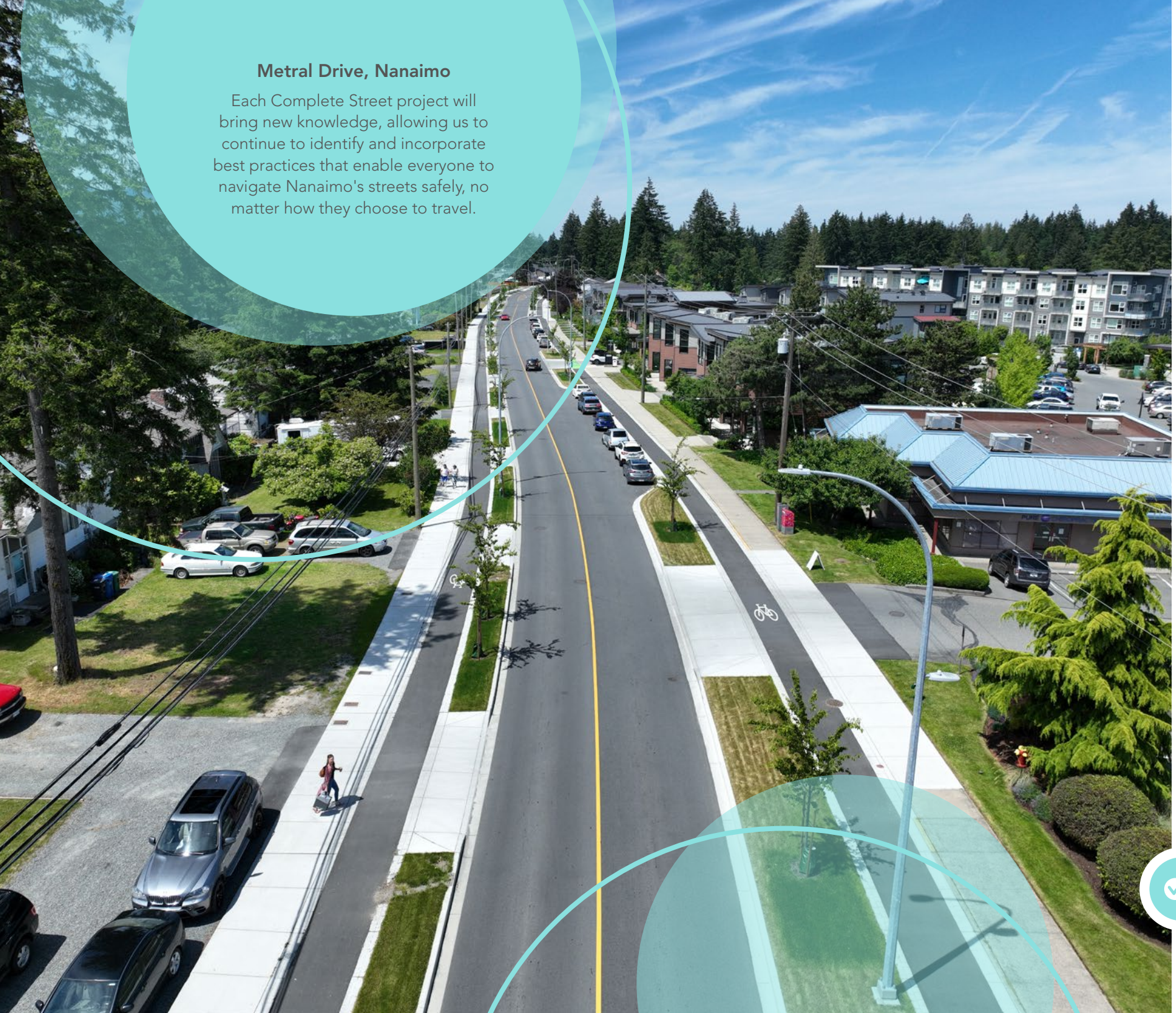
MOTOR VEHICLE DESIGN	Y	N	n/a
Does the street design encourage motorists to travel at the posted speed?	☐	☐	☐
Is a road diet appropriate in this condition?	☐	☐	☐
Has collision data been considered in design decisions?	☐	☐	☐
Are turning lanes necessary?	☐	☐	☐
Do intersection designs meet the needs of the street classification and adjacent amenities?	☐	☐	☐
Do intersection designs encourage reduced turning speeds to increase safety?	☐	☐	☐
Are protected turn phases appropriate to separate opposing movements?	☐	☐	☐
Are curb radii and lane widths at intersections and on horizontal curves appropriate for the design / control vehicles identified?	☐	☐	☐
If on-street parking is provided, is it in pockets with curb extensions / streetscaping provided to maintain a narrow street when no cars are parked?	☐	☐	☐
If on-street parking is provided, is the sidewalk easily accessible from the parking spaces?	☐	☐	☐
If on-street parking is provided, are time restrictions or a pricing structure appropriate to create sufficient turnover for adjacent land uses?	☐	☐	☐
Are there appropriate loading areas for adjacent land uses with no rear service access?	☐	☐	☐
Are appropriate accessible parking spaces provided on-street in close proximity to key destinations?	☐	☐	☐
Should on-street parking spaces be allocated for car-share parking?	☐	☐	☐
Is there a need for drop-off zones prioritized over on-street parking?	☐	☐	☐

For more details, see Section 7: Motor Vehicle Design and Section 8: Intersection & Crossing Design

STREETSCAPE DESIGN	Y	N	n/a
Does or can the timeline of the Complete Street project coincide with other infrastructure upgrades (e.g., utility upgrades)?	☐	☐	☐
Does the streetscape design align with and support adjacent private realms?	☐	☐	☐
Have street trees been integrated into medians and/or boulevards creating a continuous tree canopy with adequate growing conditions?	☐	☐	☐
Does the design integrate planting beds in high-visibility locations to provide colour and green infrastructure?	☐	☐	☐
Have furnishings been provided at rest stops?	☐	☐	☐
Has adequate and consistent lighting been provided along sidewalks and cycle tracks?	☐	☐	☐
Does the design integrate placemaking features in visually prominent locations?	☐	☐	☐
Has stormwater management infrastructure been integrated?	☐	☐	☐
Are selected surface materials durable and inviting for all users?	☐	☐	☐
Do the selected surface materials create a visually cohesive streetscape?	☐	☐	☐
Does the design account for access and safety for maintenance procedures?	☐	☐	☐
Have maintenance efforts, staffing, and cost implications been identified and addressed?	☐	☐	☐

For more details, see Section 9: Streetscape Design

CONSTRUCTION	Y	N	n/a
Is a safe and convenient detour provided for any sidewalk or cycling facility obstructed by construction activity?	☐	☐	☐
Is any detour provided accessible by people using mobility devices?	☐	☐	☐
Have construction signs been placed in a manner that does not block the path of people either walking or cycling / rolling?	☐	☐	☐



Metral Drive, Nanaimo

Each Complete Street project will bring new knowledge, allowing us to continue to identify and incorporate best practices that enable everyone to navigate Nanaimo's streets safely, no matter how they choose to travel.

CITY OF NANAIMO
THE HARBOUR CITY

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