

APPENDIX A

Facility Guidelines

Rocky View County

ACTIVE TRANSPORTATION FACILITY GUIDELINES

October 2018



ROCKY VIEW COUNTY
Cultivating Communities



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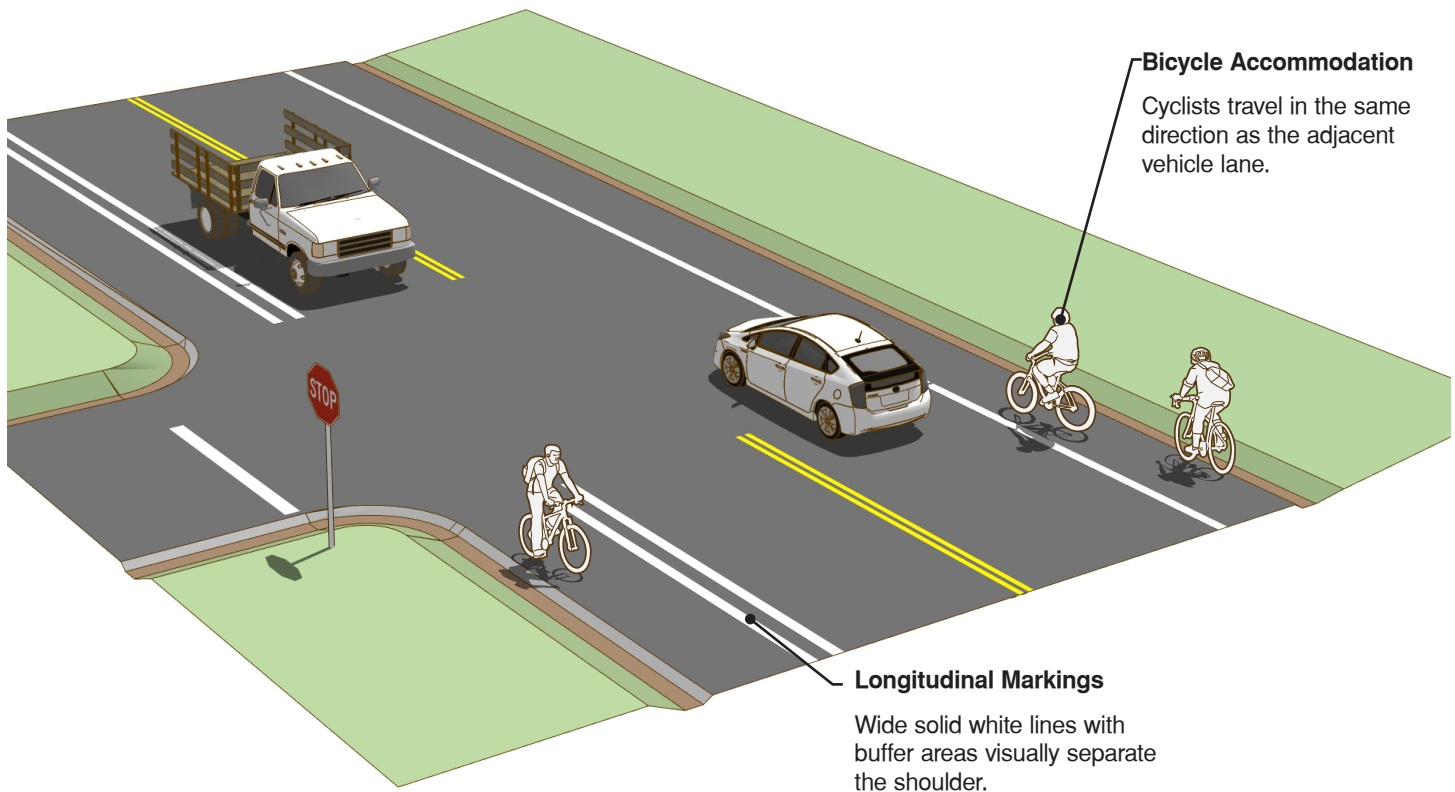


Figure 1: Wide paved shoulders can be bicycle accessible. Image adapted from FHWA Small Town and Rural Multimodal Networks Design Guide.

Paved Shoulder

Paved shoulders are areas between the right of a painted travel lane and the roadway edge which can function as a space for cyclists and pedestrians to travel in the absence of other facilities with more separation.

APPLICATION CRITERIA

- Rural areas (TAC sets density of <400 persons/km²).
- Posted speed is 50 to 80 km/hr.
- ADT >1000 veh/day to <4000 veh/day (or the road is part of a known cycling route).
- Include or upgrade shoulders during roadway resurfacing, rehabilitation, and reconstruction in new construction projects.

BENEFITS

- Improves cyclist experiences on roadways with higher speeds or traffic volumes.
- Provides a stable surface off the roadway for pedestrians to use where sidewalks are not provided.
- Can reduce pedestrian "walking along roadway" crashes.
- Can reduce cyclist "struck from behind" crashes, which represent a significant portion of rural road crashes.
- Provides advantages for all roadway users, by providing space for cyclists, pedestrians, and motor vehicles.

CONSIDERATIONS

- Is not an exclusive bicycle facility.
- Requires a wider roadway to provide an accessible shoulder space.

FACILITY DESIGN

CLEAR PAVED SHOULDER AREA

Paved shoulders should be wide enough to accommodate the horizontal operating envelope of pedestrians and cyclists. Though shoulders are not designed exclusively for cycling as are bicycle lanes, they may be accessible for bicycle use if there is adequate width, a painted separation between the travel lane, and a surface clear of snow or debris.

- Provide a minimum width of 1.5 m adjacent to a road edge or curb, exclusive of any buffer or rumble strip. In higher speed environments or areas of heavy truck traffic, wider shoulders are preferable.
- 1.5 m can be used for low speed roadways, and wider in higher speed environments or areas with heavy truck traffic.
- Where possible, provide greater width for added comfort and user passing.
- A desirable width is 2.0 m to allow for 1.5 m through width and a 0.5 m buffer.
- A maximum practical width is 3.0 m so that motor vehicle drivers are discouraged from using the shoulder as a travel lane.
- Buffers are used where width is available for greater cyclist comfort and delineate wide shoulders so that they are not used as a parking lane.
- Where shoulders are intended for use by pedestrians, they must meet accessibility guidelines.

PAVEMENT MARKINGS

The travel lane edge of paved shoulders should be clearly delineated to discourage unnecessary encroachment by motor vehicles. A 100 mm solid white line is the standard lane marking. Options to visually enhance the space between the travel lane and the shoulder include:

- A wide 200 mm white line.
- A narrow buffer space two 100 mm solid white lines separated by and 0.45 m or greater space.
- A wide buffer space two 100 mm solid white lines, separated by a 1.2 m or greater space and optional crosshatch markings.

At intersections and major driveways, the solid edge line should be discontinued to indicate motor vehicles may cross into the shoulder space.

RUMBLE STRIPS

Shoulder rumble strips are a raised or grooved pattern in the pavement surface and are a proven cost-effective safety measure for reducing vehicle roadway departure crashes. However, rumble strips negatively impact bicycle travel as cyclists riding over rumble strips may experience discomfort or lose control. Where possible, rumble strips should be avoided on bicycle routes. If rumble strips must be included on a bicycle route, refer to the TAC Geometric Design Guide and Alberta Ministry of Transportation Technical Standards for bicycle tolerable rumble strip design details.

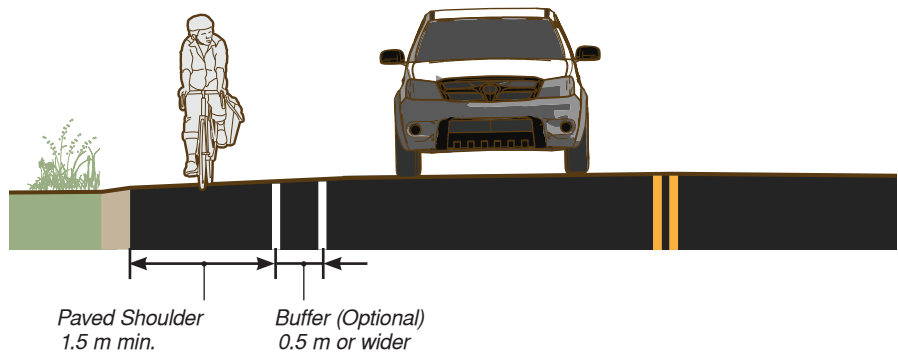


Figure 2: Preferred minimum widths for a paved shoulder. Image adapted from FHWA Small Town and Rural Multimodal Network Design Guide.

	Practical Lower Limit	Recommended Lower Limit	Recommended Upper Limit	Practical Upper Limit
Width (m)	1.5	1.8	3	3

Table 1: Width of paved shoulders adapted from TAC Geometric Design Guide for Canadian Roads Table 5.3.9 Design Domain: Width of Bicycle Accessible Shoulders. Widths are measured from the centre of the edgeline to the outer edge of the paved shoulder.

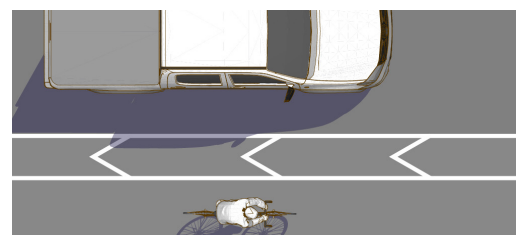
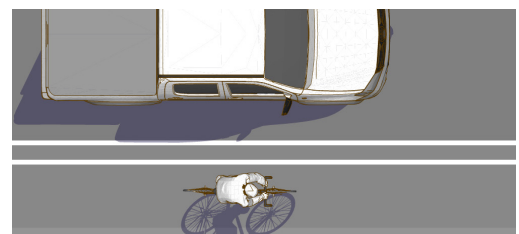
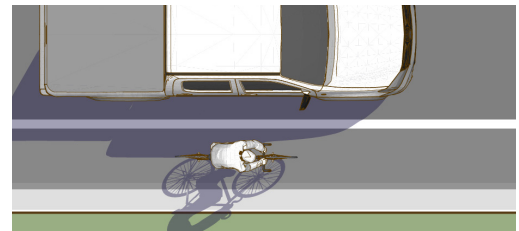


Figure 3: Longitudinal marking options along paved shoulders. Image adapted from the FHWA Small Town and Rural Multimodal Networks Design Guide.

PAVEMENT CONTRAST AND COLOUR

Contrasting or coloured pavement materials may be used to further differentiate the shoulder from the adjacent travel lanes. Coloured pavement in a paved shoulder is an aesthetic treatment to enhance awareness and is not intended to communicate a regulatory, warning, or guidance message to road users.

The colours that can be used are shades of grey through a seal coating or asphalt versus concrete or different concrete aggregates/shades. Green is commonly used to denote bicycle lanes.

Adding pigments or integral colour to asphalt or concrete can create a coloured mixture than goes over the existing asphalt on the road. Some North American cities use a top dressing of coloured aggregate as a seasonal chipseal, which would need regular upkeep. Others use integral colour concrete, however colour continuity from batch to batch can be a concern.

SIGNS

Signs are not required on paved shoulders, but may be used to identify a road as a bicycle route.

- The bike route sign (IB-23) indicates a roadway is part of bicycle route system and alerts motor vehicles to the presence of cyclists.
- The share the road sign (WC-19 or WC-19S) can be installed as a cautionary signs to warn the driver that they should be aware of any cyclists on the road, and give them adequate space.
- While Rocky View County has developed a custom regulatory sign **MOTORISTS AND CYCLISTS SHARE THE ROAD**, it is recommended to replace these signs with standard TAC Share the Road (WC-19 and WC-19S) signage for system wide consistency and enhanced visibility to drivers.

SIGN PLACEMENT

Frequency of bike route signs for periodic confirmation for cyclists should be reduced to 2-3 km in absence of other bicycle signage or pavement markings.

As bike route signs are guide signs, they are of lower priority than regulatory and warning signs. Regulatory and warning sign types will take location precedence over guide signage.

To avoid obstruction of sign visibility between signs, use an 85th percentile speed to determine longitudinal sign spacing. Refer to the MUTCDC Table A1-4 for the amount of time required to read a sign based on its complexity.



Figure 7: Share the Road Sign (WC-19 and WC-19S) can be used as cautionary signs. WC-19S is a supplementary tab sign used to convey the meaning of WC-19. Images from TAC Bikeway Traffic Control Guidelines for Canada 2nd Edition (4.6.7).



Figure 8: Bicycle Route Marker Sign IB-23. Image from TAC Bikeway Traffic Control Guidelines for Canada.

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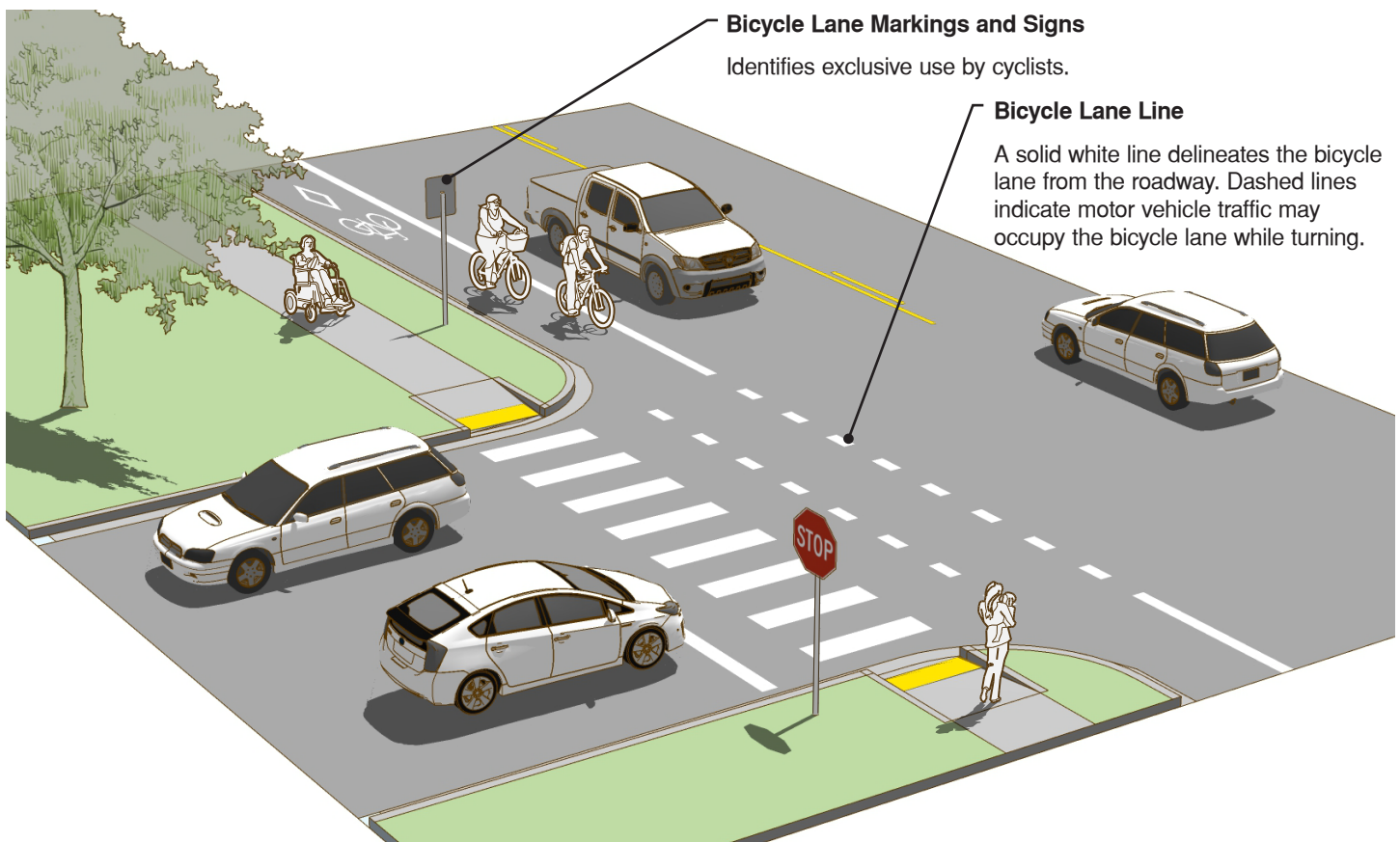


Figure 9: Bicycle lanes are an exclusive facility for cyclists and can be applied in an urban or in a rural setting. Image adapted from FHWA Small Town and Rural Multimodal Networks Design Guide.

Bicycle Lane

Bicycle lanes designate an exclusive space for cyclists through the use of pavement markings and signs. A bicycle lane is located adjacent to a curb or parking lane, and generally follows the same direction as motor vehicle traffic.

APPLICATION CRITERIA

- Used in rural or urban areas with low to medium average daily traffic (ADT) and high bicycle volumes.
- Posted speed is <50 km/hr
- ADT <4,000 veh/day

BENEFITS

- Provides an exclusive, designated space on the roadway for cyclists.
- Provides additional separation distance between the sidewalk (if present) and the motor vehicle lanes.
- Provides visual cues to drivers to anticipate cyclists on the roadway.

CONSIDERATIONS

- Reflects a more urban visual atmosphere.
- Requires a wider roadway to provide adequate space for bicycle lanes.
- It is important to have clear visual separation of bicycle lanes through either extending a solid white line marking, or a double white line with buffer space in between. Refer to Buffered Bike Lanes.
- May require additional width adjacent to on-street parallel vehicle parking.
- Requires a separate pedestrian sidewalk or pathway. Where multi-modal use is needed, consider a shared use pathway, or in low volume rural areas, a paved shoulder.

FACILITY DESIGN

DIRECTION

Bicycle lanes travel in the same direction as adjacent motor vehicle lanes.

BICYCLE LANE WIDTH

- The preferred minimum width of a bicycle lane is 1.8 m to allow single-file bicycle traffic and basic passing movements.
- The practical lower limit width of a bicycle lane is 1.5 m and should only be used in constrained conditions for short distances.
- Adjacent to on-street parallel parking lanes, bicycle lanes should be a minimum of 2.1 m wide to allow a 0.6 m buffer for opening vehicle doors.
- Where bicycle volumes are high (>1500 bicycles/day) the bicycle lane should be wider (up to 2.1 m) to make passing movements easier.
- The minimum bicycle lane width is 1.5 m. Where a gutter is wider than 375 mm, the minimum bicycle lane width is 1.8 m to prevent the lip of the gutter from interfering with the bicycle wheel.
- Widths 2.1 m or greater may encourage motor vehicle use of bicycle lane for parking or driving. If extra width is available or desired, configure the bicycle lane with a buffer zone to delineate space, or consider a protected bicycle lane.

BUFFER WIDTH

Bicycle lanes may be enhanced with a longitudinal marked buffer for greater vehicle separation distance. This treatment is appropriate for bicycle lanes on roadways with high motor vehicle traffic volumes and speed, adjacent to parking lanes, or a high volume of truck or oversized vehicle traffic. Refer to Buffered Bike Lanes for further detail.

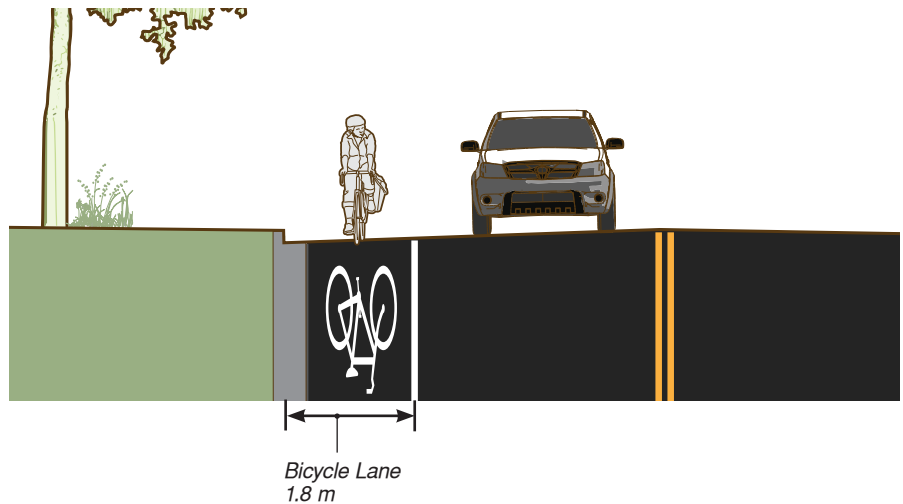


Figure 10: Preferred minimum widths for bicycle lanes. Image adapted from FHWA Small Town and Rural Multimodal Networks Design Guide.

Width (m)	Practical Lower Limit	Recommended Lower Limit	Recommended Upper Limit	Practical Upper Limit
Bicycle lane	1.5	1.8	2.1	2.1

Table 2: Width of bicycle lanes adapted from TAC Geometric Design Guide for Canadian Roads Table 5.3.1 Design Domain: Width of Unbuffered Bike Lane.



Figure 11: Depending on roadway context, bicycle lanes can be applicable in urban, small town, and rural areas. This example is in Canmore, AB.

PAVEMENT MARKINGS

- Bicycle lanes are delineated by a 100 mm solid white line and bicycle pavement markings. Detailed standards and guidance for applying these elements can be found in the TAC Bikeway Traffic Control Guidelines for Canada.
- Bicycle lanes that are positioned away from the curb in the roadway, such as lanes adjacent to on street parking, should have an additional solid white line on the curb side to delineate both sides of the bicycle lane.
- Bicycle lanes are defined as a type of reserved lane in the MUTCDC. A diamond pavement marking indicates a reserved lane.
- Dashed lane lines are used where vehicles are permitted to cross the bicycle lane to perform a turning movement. A 15 m minimum broken line is used, with a 1.0 m segment and 1.0 m gap.
- Green can be used as a colour treatment to increase the conspicuity of bicycle lanes at conflict areas such as driveways and intersections.

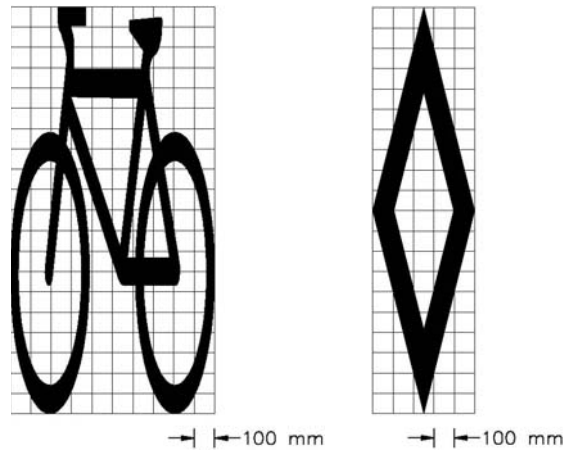


Figure 12: TAC Bikeway Traffic Control Guidelines for Canada 7.4.1 Bicycle Symbols and 7.4.2 Diamond Symbols

SIGNS

A reserved bicycle lane sign (RB-90, RB-91) and a reserved bicycle lane ends sign (RB-92) accompanies the diamond and bicycle pavement markings to indicate a reserved bicycle lane. Dimensions and guidance for these signs can be found in section A2.9.9 of the MUTCDC as well as the TAC Bikeway Traffic Control Guidelines for Canada.

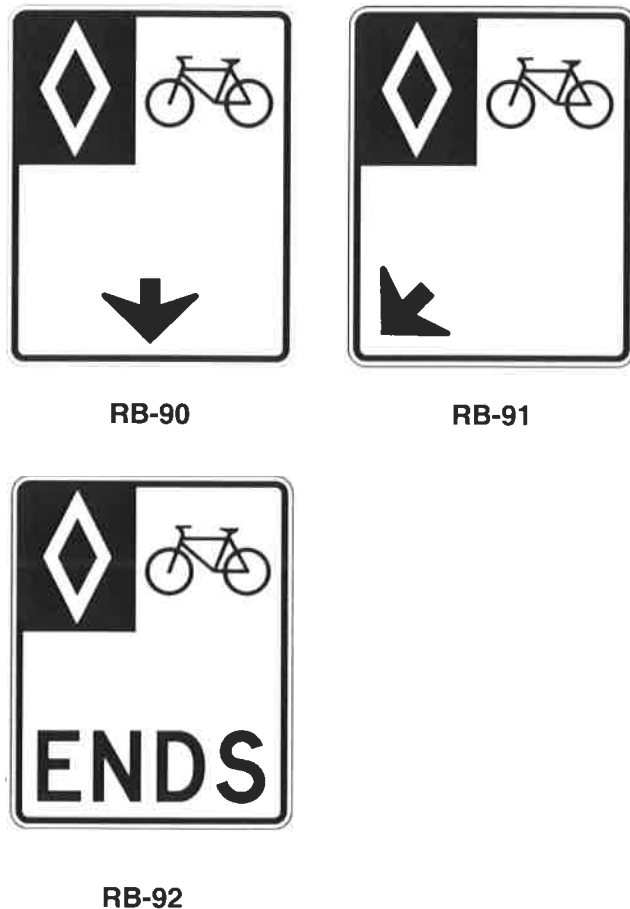


Figure 13: RB-90, 91, and 92 signs are positioned directly above or adjacent to reserved bicycle lanes. Images TAC Bikeway Traffic Control Guidelines for Canada Reserved Bicycle Lane Signs.

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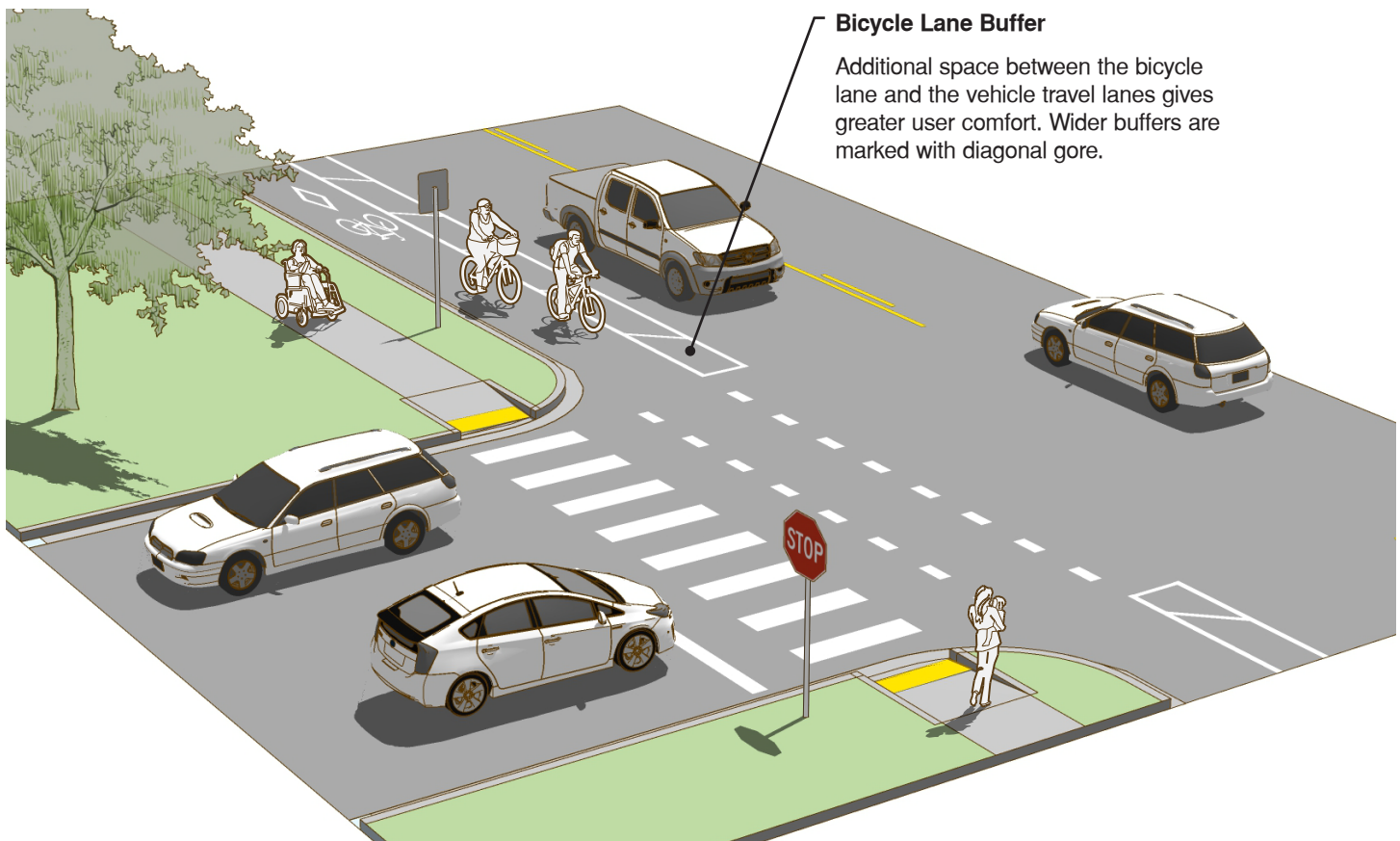


Figure 14: Buffered bicycle lanes add separation between the bicycle lane and motor vehicle lanes. Image adapted from FHWA Small Town and Rural Multimodal Networks Design Guide.

Buffered Bicycle Lane

Buffered bicycle lanes add a designated buffer space between a bicycle lane and adjacent motor vehicle travel lanes and/or parking lanes for greater user comfort.

APPLICATION CRITERIA

- Used in areas with low to medium average daily traffic (ADT) and high bicycle volumes.
- Posted speed is <60 km/hr
- ADT <7000 veh/day

BENEFITS

- Provides a designated space on the roadway for cyclists.
- Provides additional separation distance between the sidewalk (if present) and the motor vehicle lanes.
- Provides visual cues to drivers to anticipate cyclists on the roadway.
- Provides clear visual separation of the lanes through a double white line with buffer space in between.

CONSIDERATIONS

- Reflects a more urban visual atmosphere.
- Requires a wider roadway to provide adequate space.
- Requires a separate pedestrian sidewalk or pathway. Where multi-modal use is needed, consider a shared use pathway.
- May require additional width adjacent to on-street parallel vehicle parking.

BUFFER ZONE

Bike lanes may be enhanced with a longitudinal marked buffer area for more separation distance. This treatment is appropriate for bike lanes on roadways with high motor vehicle traffic volumes and speed, adjacent to parking lanes, or a high volume of truck or oversized vehicle traffic. Buffers may be placed between the bike lane and the motor vehicle lane, and between the bike lane and the parking lane, if present.

PAVEMENT MARKINGS

- A minimum width buffer of 0.3 m is delineated by two 100 mm solid lines without interior markings.
- If the buffer is 0.5 m or wider, mark the interior with diagonal or chevron hatching to clearly demarcate the space.
- Adjacent to a parking lane, the buffer must be a minimum of 0.6 m to allow space for opening motor vehicle doors.
- Dashed lane lines are used where vehicles are permitted to cross the bicycle lane to perform a turning movement. A 15 m minimum broken line is used, with a 1.0 m segment and 1.0 m gap.
- Green can be used as a colour treatment to increase the conspicuity of bicycle lanes at conflict areas such as driveways and intersections.

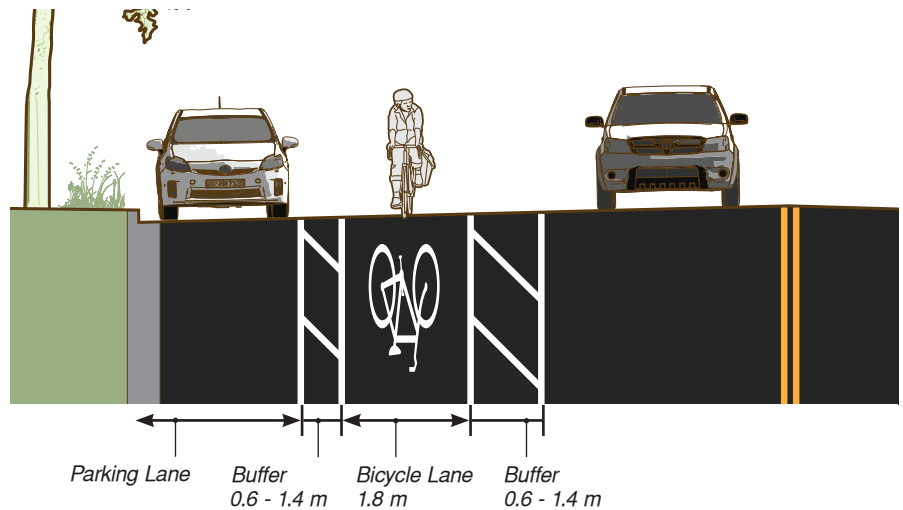


Figure 15: Preferred minimum widths for bicycle lanes and buffers configured adjacent to motor vehicle parking lanes.

Width (m)	Practical Lower Limit	Recommended Lower Limit	Recommended Upper Limit	Practical Upper Limit
Bicycle lane	1.5	1.8	2.1	2.1
Buffer	0.3*	0.3*	0.9	1.4
Total Width Buffered Bicycle Lane	1.8	2.1	3.0	3.5

*NOTE: A minimum buffer width of 0.6 m is required when bicycle lanes are adjacent to motor vehicle parking.

Table 3: Width of bicycle lanes adapted from TAC Geometric Design Guide for Canadian Roads Table 5.3.2 Design Domain: Width of Buffered Bicycle lane.

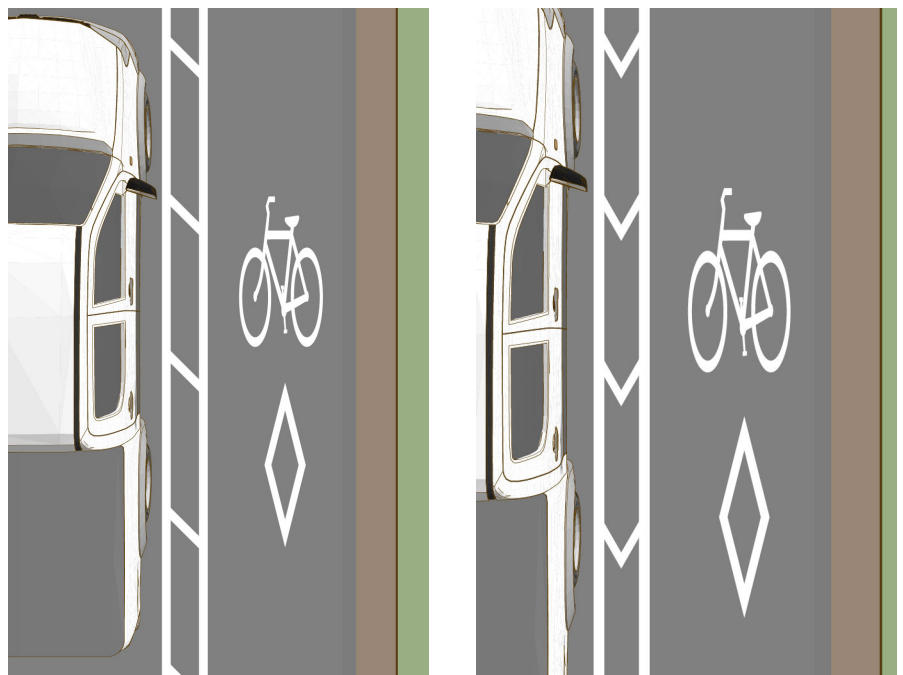


Figure 16: Bicycle pavement marking with a reserved lane diamond symbol and buffer with diagonal or chevron interior markings.

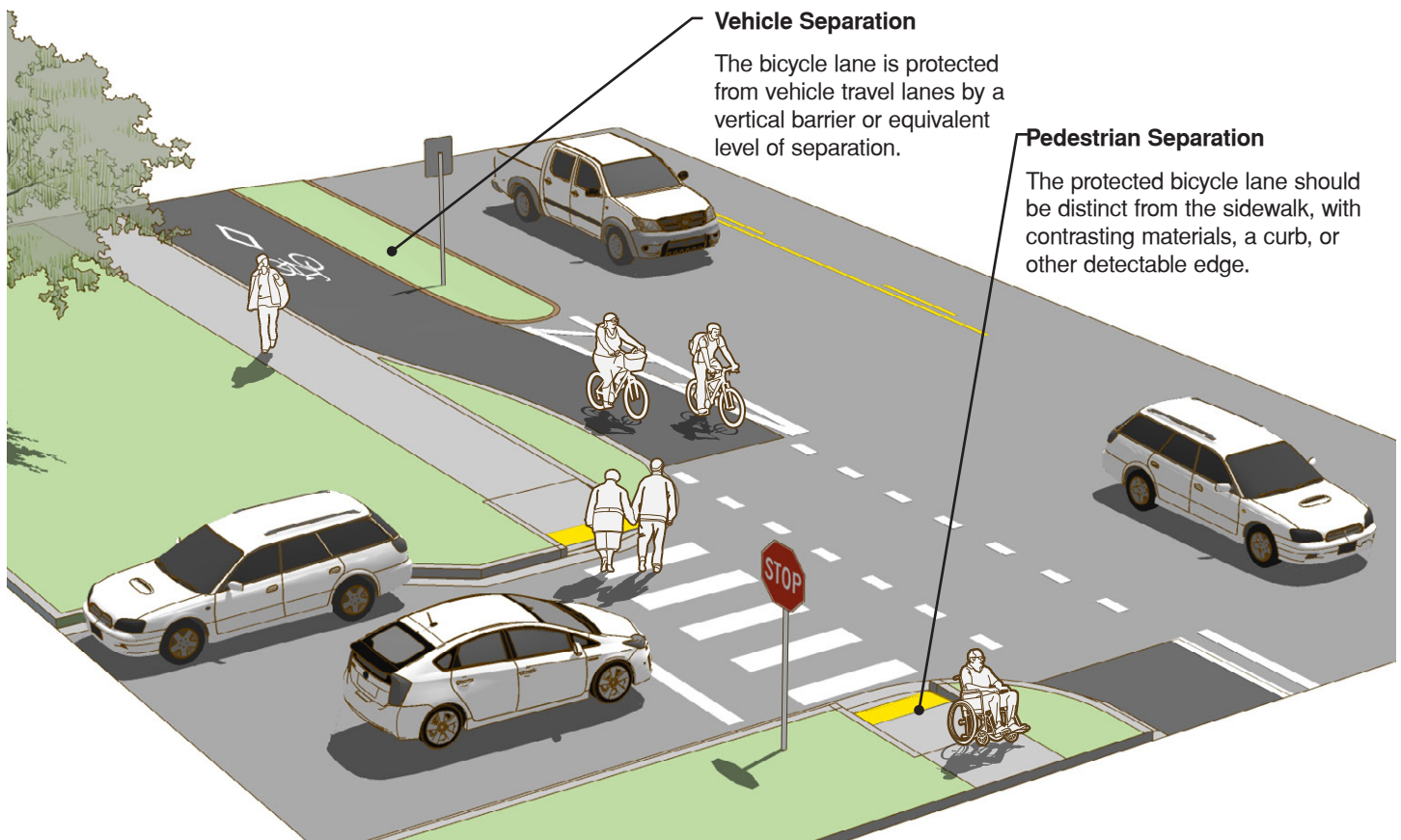


Figure 17: Protected bicycle lanes in a rural setting. Image: FHWA Small Town and Rural Multimodal Networks Design Guide.

Protected Bicycle Lane

A protected bicycle lane, also called a cycle track, is an exclusive facility for cycling that is located on or directly adjacent to the roadway and is protected from motor vehicle traffic by a vertical barrier or equivalent physical separation.

APPLICATION CRITERIA

- Used in urban areas with high average daily traffic (ADT) and high bicycle volumes.
- Posted speed is >40 km/hr and <80 km/hr, since a protected facility is not required for speeds lower than 40 km/hr.
- Transition areas into towns with higher speeds.
- Can be achieved in road retrofits as well as resurfacing or full road reconstruction.

BENEFITS

- Provides a more comfortable experience than paved shoulders, bicycle lanes, or buffered bicycle lanes.
- Can reduce the incidence of sidewalk riding and potential user conflicts.
- Protected bike lanes offer cyclists a similar riding experience to multi-use paths but with fewer operational and safety concerns, particularly in areas with high-volumes of pedestrians.

CONSIDERATIONS

- Reflects a more urban visual atmosphere. Use of a wide landscaped buffer may lessen visual impact concerns.
- Requires a wide roadside environment to provide for protection, bicycle lane, and sidewalk areas.
- May require specialized equipment for sweeping and snow clearing.
- May require extra signage and pavement treatments at driveways and intersections.

FACILITY DESIGN

DIRECTION

Protected bicycle lanes may be unidirectional on both sides of the roadway, or bidirectional on one side of the roadway.

ELEVATION

Protected bicycle lanes may be at roadway grade, sidewalk grade, or an elevation in between.

- Elevation differences between the bicycle lane and the roadway are possible with a mountable or vertical curb face.
- Wide barrier widths of 1 m or greater are recommended to accommodate grade differences between the bikeway and the roadway.

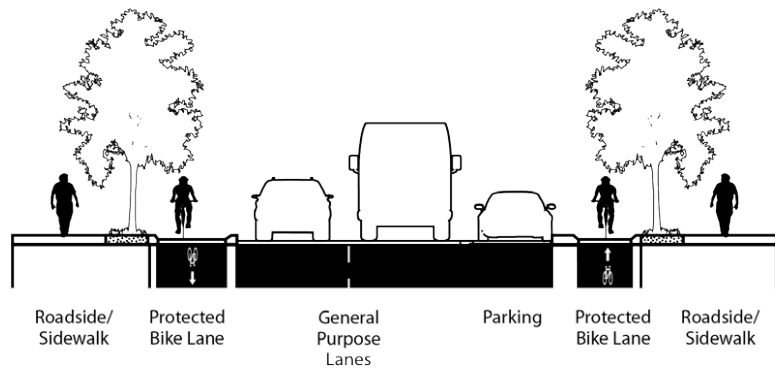
PROTECTED BICYCLE LANE WIDTH

The protected bicycle lane should be a comfortable width for a clear operating area for cyclist travel.

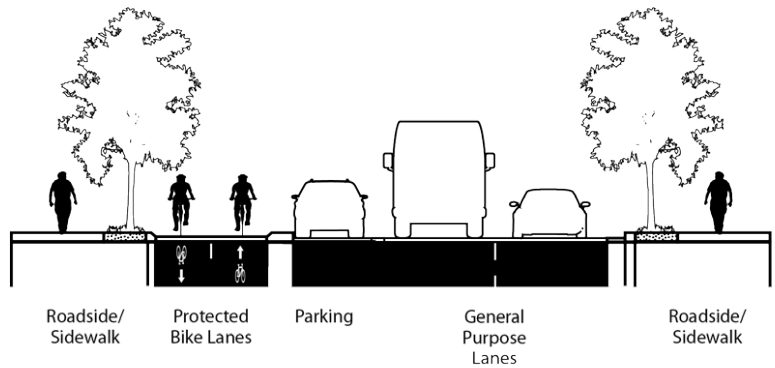
- Preferred minimum width of a one-way protected bicycle lane is 2.1 m, excluding the buffer. This width allows for side-by-side riding or passing.
- Preferred minimum width for a two-way protected bicycle lane is 3.0 m, excluding the buffer. This width accommodates the operational envelope of two cyclists in each direction with horizontal clearances for passing movements.
- The absolute minimum one-way protected bicycle lane width is 1.5 m, excluding the buffer. At this width, cyclists will not be able to pass slower users until there is a break in the facility and an opportunity to overtake.
- A wide through area of 3.0 m is beneficial to allow access for snow plows and street sweeping equipment.

BARRIER WIDTH

- The width of the buffer ranges from 0.3 - 1.0 m, depending on the type of barrier selected, see following page for barrier types.
- Adjacent to parked vehicles, there must be a minimum of 0.6 m to accommodate opening vehicle doors.



(A) Unidirectional Protected Bike Lane



(B) Bidirectional Protected Bike Lane

Figure 18: Unidirectional and bidirectional protected bicycle lanes. Image: TAC Geometric Design Guide for Canadian Roads Figure 5.3.3 Protected Bike Lanes.

Width (m)	Practical Lower Limit	Recommended Lower Limit	Recommended Upper Limit	Practical Upper Limit
Unidirectional protected bicycle lane, including barrier	1.8	2.7	3.5	5
Bicycle lane	1.5	2.1	2.5	3
Barrier**	0.3*	0.6*	1.5	2
Bidirectional protected bicycle lane, including barrier	2.7	3.3	4.6	6
Bicycle lanes	2.4	3	3.6	4
Barrier	0.3*	0.3*	1	2

*NOTE: A minimum barrier width of 0.6 m is required when bicycle lanes are adjacent to motor vehicle parking.

**NOTE: A low curb barrier is suggested as 0.5 m required for shy distance to vertical obstruction.

Table 4: Width of protected bicycle lanes adapted from TAC Geometric Design Guide for Canadian Roads Table 5.3.3 Design Domain: Width of Protected Bike Lane.

ROADWAY PROTECTION

There are a number of barrier options to protect a bicycle lane from the motor vehicle lanes. The TAC Geometric Design Guide lists a number of criteria for selecting a vertical barrier type including:

- Presence or absence of a parking lane.
- Roadway speed.
- Available width.
- Sight lines.
- Drainage.
- Maintenance requirements.
- Streetscape design.

New barrier types are being developed and refined, however the FHWA Separated Bicycle lane Planning and Design Guide provides an overview of the general types of barriers:

- Delineator posts.
- Bollards.
- Concrete barrier.
- Raised median.
- Raised lane.
- Planters.
- Parking stops.
- Parked cars.
- Combination thereof.

Table 5 outlines the appropriate context applications of the various barrier types.

WINTER MAINTENANCE

A protected bicycle lane buffer of at least 1.0 m is required for snow storage. It is expected that a clear path of at least 1.5 m will be maintained within protected bicycle lanes and that snow will be cleared into the buffer zone following a snowfall. This policy may differ for built up areas as opposed to more rural settings.

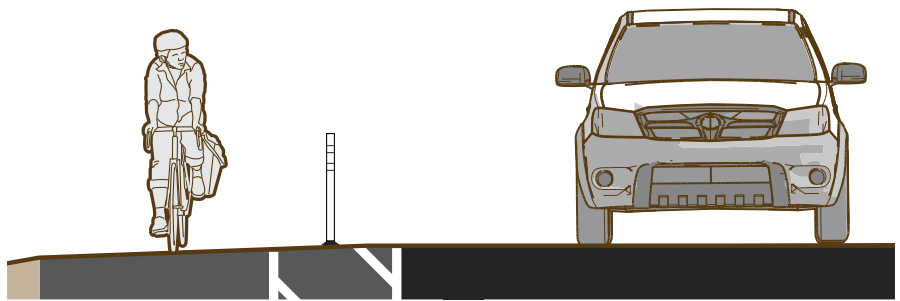


Figure 19: Protected bicycle lanes may be separated by a paved roadway separation, and a vertical element. Note this type of treatment is only appropriate for roadways with vehicle speeds up to 60 km/hr, refer to Table 5 below. Image adapted from FHWA Small Town and Rural Multimodal Networks.

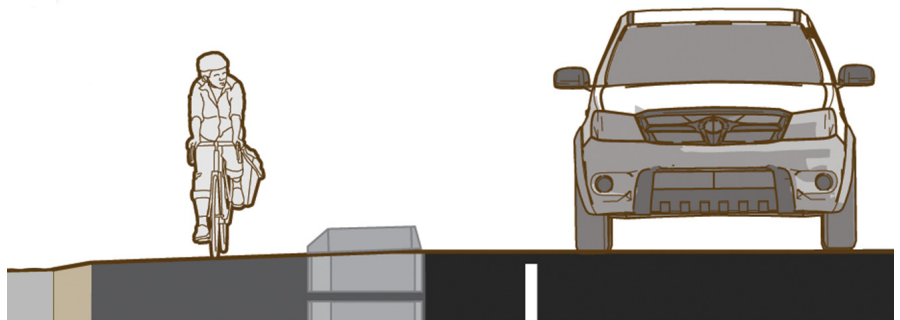


Figure 20: Protected bicycle lanes may be configured on an existing roadway surface by using a physical barrier such as a curb or median to separate the bikeway from the roadway. Image from the FHWA Small Town and Rural Multimodal Networks Design Guide pg 4-28.

Adjacent Lane	Examples of Suitable Delineators
Parking lane	<p>A raised median, with a width of at least 0.6 m to avoid collisions with potential opening passenger-side car doors</p> <p>Other delineators at least 0.6 m wide</p> <p>If flexible bollards and buffered pavement markings are used, bollards should be longitudinally spaced at a maximum of 5.0 m</p> <p>If used, parking stops should be spaced with longitudinal gaps of 2.0 m or less</p>
General purpose lane 50 km/hr or less	<p>75 mm raised median, minimum 0.3 m wide</p> <p>Parking stops with longitudinal gaps of 2.0 m or less</p> <p>Flexible bollards longitudinally spaced at a maximum of 5.0 m, centred laterally on 300 mm buffered bicycle lane pavement markings</p>
General purpose lane 50-60 km/hr	<p>150 mm raised median, minimum 0.3 m wide</p> <p>Semi-rigid barrier (such as a guardrail)</p> <p>Flexible bollards longitudinally spaced at a maximum of 2.0 m, centred laterally on 0.5 m buffered bicycle lane pavement markings</p> <p>Precast curb (i.e.: parking stops), longitudinally continuous, 200 mm high</p> <p>Planter boxes</p>
General purpose lane 60-80 km/hr	<p>Rigid barrier (such as a concrete safety shape or masonry wall)</p>

Table 5: Application of various barrier options for protected bicycle lanes adapted from TAC Geometric Design Guide for Canadian Roads Table 5.7.1 Delineators Based on Type and Speed of Adjacent Lane.

PEDESTRIAN SEPARATION

Separation from pedestrians is particularly important in areas with high volumes of pedestrian traffic, and where a protected bicycle lane is configured at the same elevation as a sidewalk. Protected bicycle lanes can be clearly distinguished from the sidewalk by:

- Buffer space.
- Different pavement or surface treatments.
- Detectable tactile guidance strips. These are detectable by colour contrast, width, height differential and texture.



Figure 21: Separation from the sidewalk is valuable for reducing pedestrian use of the bicycle lane. The use of physical separation with vertical elements is one configuration. Image from the FHWA Small Town and Rural Multimodal Networks Design Guide.

PAVEMENT MARKINGS

Protected bicycle lanes use markings to clarify intended users and travel direction.

- Standard bicycle and diamond symbol markings clarify that the lanes are for the exclusive use of cyclists.

SIGNS

A Reserved Bicycle Lane (RB-90) sign must be used to supplement the bicycle lane pavement markings. Standards and guidance can be found in the TAC Bikeway Traffic Control Guidelines for Canada.



Figure 22: Visual delineation can also be supplemented. Image from the FHWA Small Town and Rural Multimodal Networks Design Guide.



Figure 23: Bicycle pavement marking, textured delineation, tree buffer space, and varying materials distinguish the protected bicycle lane from the sidewalk in Vancouver, BC.

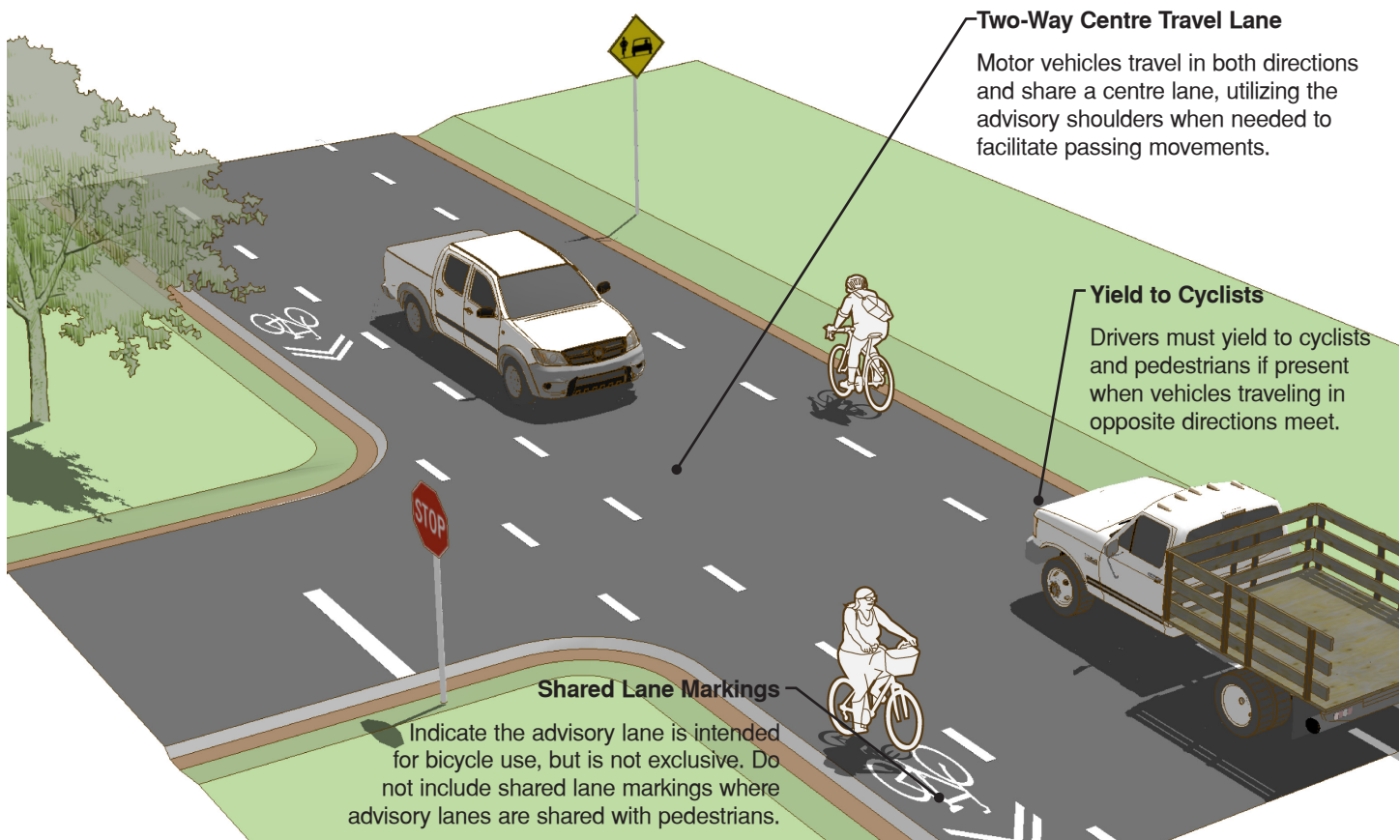


Figure 24: Advisory bicycle lanes in a rural setting. Image adapted from the FHWA Small Town and Rural Multimodal Networks Design Guide.

Advisory Lane

An advisory lane is a dashed line on narrow roadways which delineates space for walking or cycling, but allows motor vehicles to enter the space in order to yield to oncoming traffic or complete passing maneuvers.

APPLICATION CRITERIA

- Posted speed is <50 km/hr.
- Low volume areas, <4000 veh/day, ideally <2500 veh/day.
- Narrow roadways ≤11.1 m.
- Roadway segments without frequent stop or signal controlled intersections.
- Functions well within a rural and small town traffic and land use context.

BENEFITS

- Increases predictability by clarifying lateral positioning space for people driving and people walking or cycling on a narrow roadway.
- Reduces motor vehicle speeds.
- Provides delineated space for cycling where ROW is limited.
- May be an appropriate interim measure to future road widening.

CONSIDERATIONS

- Is not an exclusive bicycle facility.
- Relies on motor vehicle drivers to yield to bicycle traffic.
- May be shared with pedestrians in rural areas with no sidewalks.

FACILITY DESIGN

DIRECTION

Advisory bicycle lanes are part of the traveled way and prioritize roadway space to allow vulnerable road users to travel in the same direction as adjacent motor vehicles. It is expected that motor vehicles will encounter meeting or passing situations in the centre travel lane, and will enter the advisory lane where necessary. Motor vehicles are expected to yield to pedestrians or bicycles prior to entering the advisory lane to complete a passing maneuver.

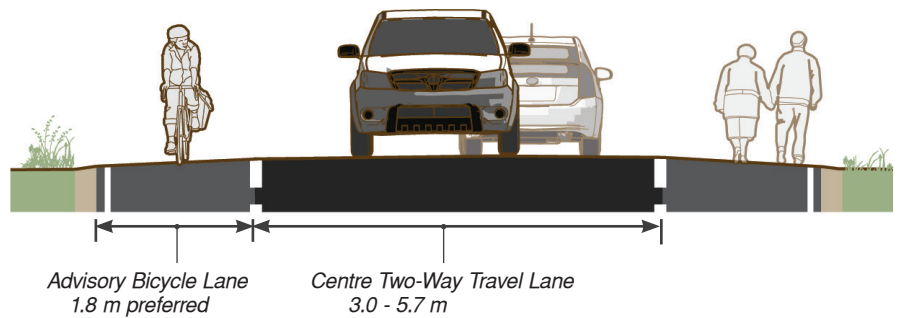


Figure 25: Advisory lanes clarify positioning and yield priority on roads too narrow to provide exclusive travel space. When pedestrians or cyclists are present, motorists may need to yield to users present in the advisory shoulder before passing. Image from the FHWA Small Town and Rural Multimodal Networks Design Guide.

PEDESTRIAN USE

Where advisory shoulders are intended for use by pedestrians, they must meet accessibility standards.

ADVISORY BICYCLE LANE WIDTH

- The preferred minimum width of an advisory bicycle lane is 1.8 m to allow single-file bicycle traffic and basic passing movements.
- The minimum advisory bicycle lane width is 1.5 m.

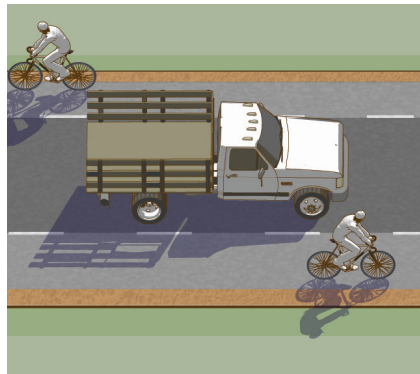
CENTRE TRAVEL LANE WIDTH

The maximum width of the centre travel lane should be 5.7 m so that it does not appear to be the full width of a two-way two lane roadway. At this width, two passenger vehicles may be able to pass one another without encroaching into the advisory lane, though at lower speeds. Ideally, the centre travel lane is narrower than 5.7 m to require bidirectional traffic to share the centre lane and use the advisory lane space to allow oncoming traffic to pass. This configuration reduces vehicle speeds and encourages yielding to cyclists or pedestrians in the advisory lanes.

Width (m)	Practical Lower Limit	Recommended Lower Limit	Recommended Upper Limit	Practical Upper Limit
Roadway with advisory bicycle lanes	6	6.6	9.9	11.1
Advisory bicycle lane	1.5	1.8	2.1	2.9
Two-way centre travel lane	3	3	5.7	5.7

Table 6: Width of protected bicycle lanes adapted from TAC Geometric Design Guide for Canadian Roads Table 5.3.8 Design Domain: Width of Advisory Bike Lanes.

3.0 m Centre Travel Lane



5.7 m Centre Travel Lane

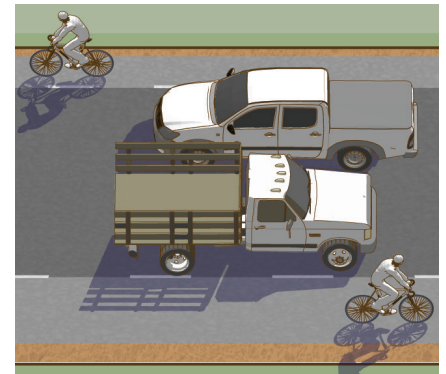


Figure 26: Total roadway width affects the number of road users that can meet and pass simultaneously. Wider roadways allow for more simultaneous interactions and can support higher volumes of motor vehicles. Images from the FHWA Small Town and Rural Multimodal Networks Design Guide.

PAVEMENT MARKINGS

- Advisory bicycle lanes are delineated with dashed 100 mm wide white lines to indicate motor vehicles may enter the space. The dashed pattern consists of a 1 m long stripe followed by a 1 m gap per TAC Bikeway Traffic Control Guidelines for Canada.
- The dashed lane line markings should continue through intersections and across major driveways.
- As this is not an exclusive bicycle facility, shared lane markings may be placed in the centre of the advisory lane to indicate roadway positioning to people riding bicycles. Shared lane markings should not be used where the advisory lane will be used by pedestrians.
- In general, do not mark a centre line on the roadway. Short sections may be marked with yellow centre line pavement markings to separate opposing traffic flows at specific locations, such as around curves, over hills, on approaches to at-grade crossings, and at bridges. At these locations, widen the paved roadway surface to provide space for paved bicycle-accessible shoulders and conventional width travel lanes. Refer to MUTCDC section C2.2 for no passing zone application and sight distance requirements.



Figure 27: Advisory lane with shared lane markings in Gibsons, BC.

PAVEMENT CONTRAST AND COLOUR

Contrasting or coloured pavement materials may be used to further differentiate the advisory bicycle lane from the adjacent travel lanes. Coloured pavement in an advisory lane is an aesthetic treatment to enhance awareness and is not intended to communicate a regulatory, warning, or guidance message to road users.

If a contrasting or coloured pavement material is used, it should also be applied through driveway crossings and minor intersections to visually maintain the advisory lane.

SIGNS

Potential signs for use with advisory shoulders include:

- A modified Two-Way Traffic Ahead warning sign (WB-3) to clarify two-way operation of the roadway. The sign is modified to remove the centre line, since roadways with advisory bicycle lanes do not have a centre line.
- A Share the Road warning sign (WC-19, supplementary tab WC-19S) to indicate to vehicle drivers the presence of cyclists on the roadway.
- Parking Prohibited (RB-51) signs to discourage parking within the advisory shoulder.
- Temporary educational signage.



Figure 28: Share the Road Sign WC-19 and supplementary tab sign WC-19S can be used as cautionary signs with advisory lanes. Images from TAC Bikeway Traffic Control Guidelines for Canada 2nd Edition (4.6.7).



Figure 29: The modified WB-3 Two-Way Traffic Ahead warning sign can clarify undivided two-way operation of the advisory shoulder configuration. Image modified from MUTCDC (A3.6.3).



RB-51
300 mm x 300 mm

Figure 30: The RB-51 Parking Prohibited sign. Image from MUTCDC (A2.8.3).

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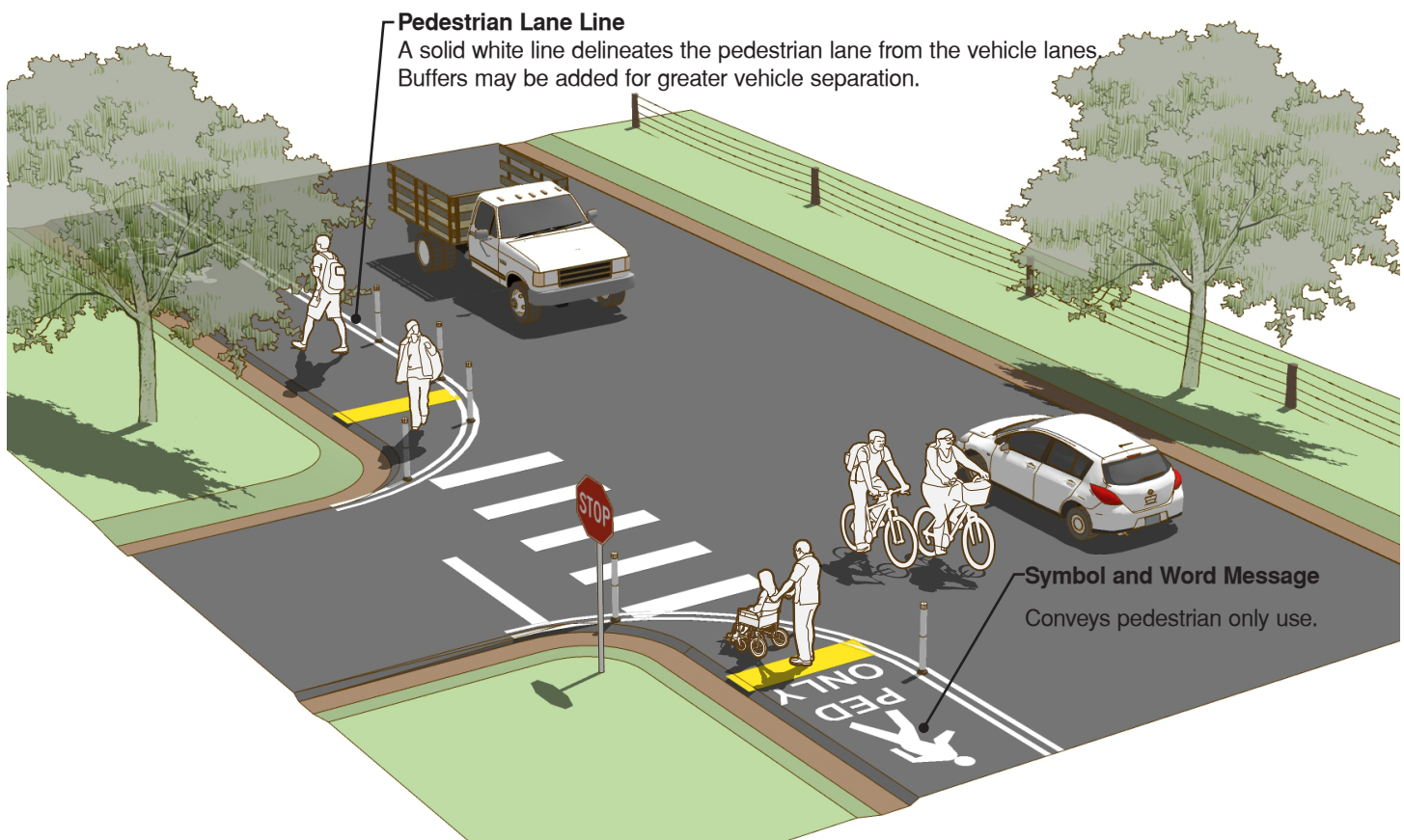


Figure 31: Pedestrian lanes are an interim low-cost measure in areas with low vehicle volumes and low pedestrian volumes.

Pedestrian Lane

A pedestrian lane is a temporary or interim measure which designates space on the roadway for the exclusive use of pedestrians. The lane may be on one or both sides of the roadway and can fill gaps between important destinations.

APPLICATION CRITERIA

- Posted speed is ≤ 40 km/hr.
- Volumes of ≤ 2500 veh/day.
- Rural areas (TAC sets density of <400 persons/km²).

BENEFITS

- May fill in gaps between sidewalks.
- Low cost measure.

CONSIDERATIONS

- Detectability by people with vision disabilities.
- Undesired use by cyclists.
- Accessible cross-slope requirements.
- Maintenance strategies, such as sweeping and snow removal.
- Lighting for night-time visibility.

FACILITY DESIGN

Pedestrian lanes function similarly to paved shoulders, however they are marked for pedestrian only use. Pedestrian lanes provide interim or temporary pedestrian accommodation on roadways lacking sidewalks. They are not intended to be an alternative to sidewalks.

- 2.4 m width is preferred for side by side walking.
- 1.2 m width is the minimum operational width of a single pedestrian.
- Because of the lack of physical separation between people walking and vehicle travel lanes, additional buffer width beyond the pedestrian lane should be included where possible for added comfort. Buffers may include flexible delineators as a vertical element. Buffers and delineators should be a priority at intersections, if they are being added.
- Buffers may range from 0.3 m - 1.2 m wide.
- Pedestrian lanes are intended for use by pedestrians and must meet accessibility guidelines. The cross slope shall be 2 percent maximum, and the surface of shall be firm, stable, and slip resistant.

PAVEMENT MARKINGS

- Use a 100 mm solid white line for longitudinal delineation of the lane.
- The lane may also be delineated by a buffer space of two 100 mm solid white lines separated by 0.1 m - 1.2 m space. For buffers 0.5 m or wider, mark the interior with diagonal or chevron hatching to clearly demarcate the space.
- Use a PED ONLY word pavement message to designate exclusive pedestrian use of the lane. A pedestrian pavement marking symbol can add conspicuity to the lane and communicate exclusive pedestrian use.

SIGNS

- A modified WC-2R may be considered to indicate to drivers the presence of pedestrians on the roadway.

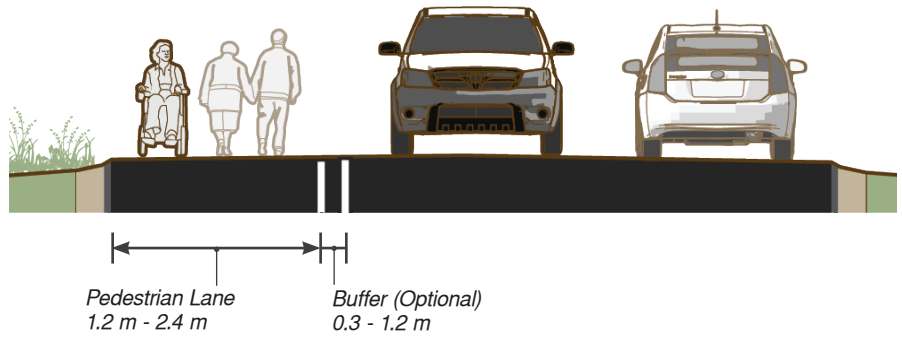


Figure 32: Pedestrian lane widths. Image adapted from the FHWA Small Town and Rural Multimodal Networks Design Guide.



Figure 33: Pavement markings for pedestrian lanes. Image from the FHWA Small Town and Rural Multimodal Networks Design Guide pg 5-7.



WC-2R
600 mm x 600 mm

Figure 34: A modified WC-2R Sign. Image modified from MUTCDC (A6.4.3).

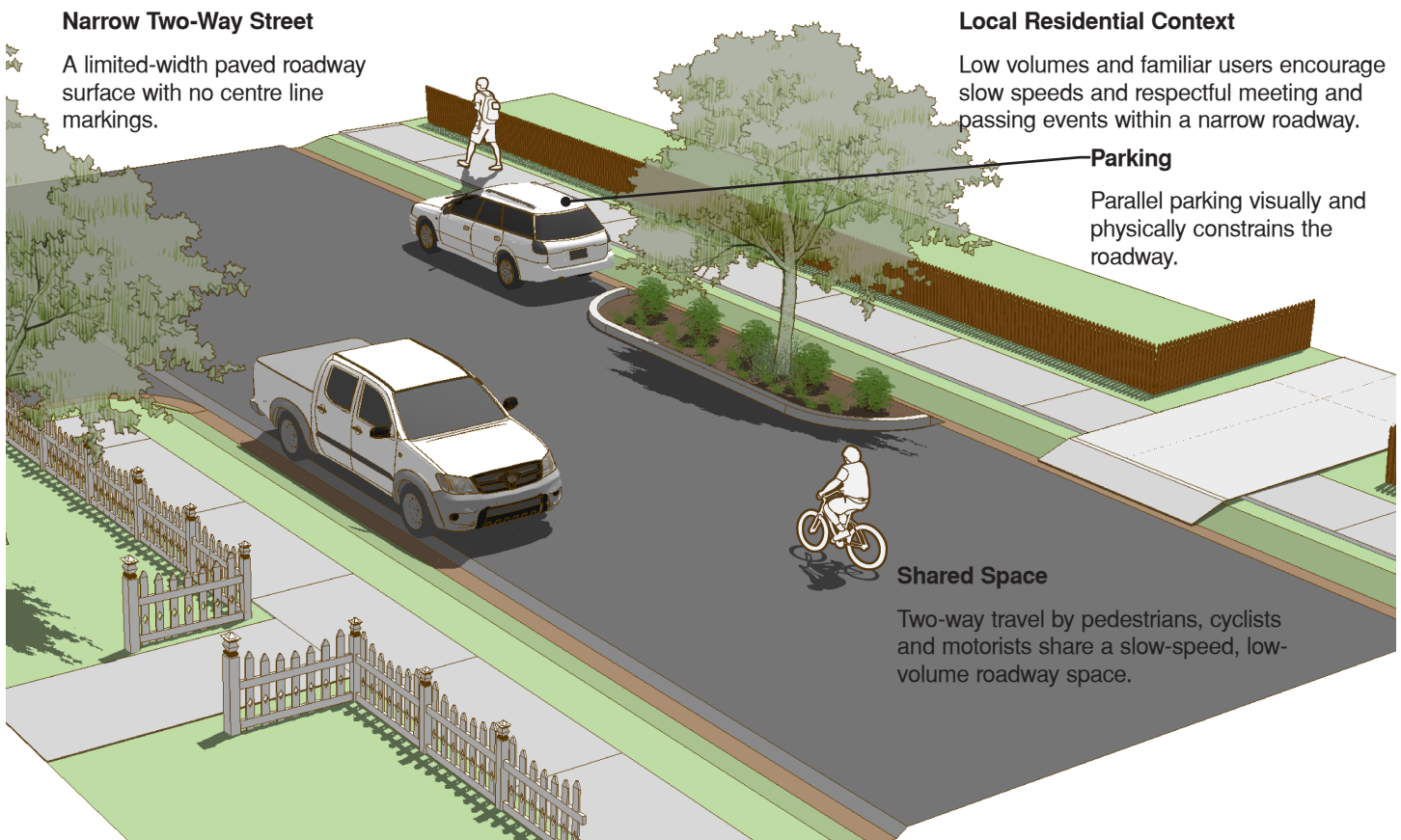


Figure 35: Shared roadway treatments along a residential street.

Yield Roadway

A yield roadway, also called a shared roadway, is a narrow, slow-speed roadway in which pedestrians, cyclists, and two-way vehicle traffic share the same space. Typically parking is allowed on both sides of the roadway, limiting overall width.

APPLICATION CRITERIA

- Posted speed is ≤ 40 km/hr.
- Volumes of ≤ 2500 veh/day. Ideal volumes are ≤ 1000 veh/day.
- Residential areas or local streets that connect to other active transportation facilities

BENEFITS

- Connects local residential areas to destinations on the network.
- Encourages slow travel speeds when narrower than 6.0 m.
- Supports on-street or shoulder parking for property access.
- Low maintenance needs over time.
- Maintains rural or small town aesthetic.

CONSIDERATIONS

- Yield roadways are not designated bicycle facilities, but can be low volume, low speed connectors for the bicycle network.
- Low speed, low volume shared roadways are ideal candidates for bicycle boulevard traffic calming treatments.
- Emergency vehicle access.

FACILITY DESIGN

ROADWAY WIDTH

- Yield roadways are narrow roadways that allow bidirectional travel on a shared centre travel lane. Bidirectional movements are accomplished by one direction of travel yielding to the other by waiting in the parallel parking lane.
- Parking may be on one or both sides of the shared travel lane. Depending on this configuration, yield roadways are ideally 5.5 m to 8.0 m wide. Where the roadway is wide enough to provide a travel lane in either direction, the roadway should be configured with shared lane markings in the centre of each lane, or as advisory bicycle lanes.
- Parking may be prohibited in advance of intersections for clear sight lines and turning movements of larger vehicles.
- Trees may be planted within the parking lane area at regular intervals to visually and physically narrow the roadway and encourage slow speeds.

PEDESTRIAN USE

If pedestrians will be accommodated on the roadway rather than on sidewalks, the roadway must meet accessibility standards for exterior paths of travel including surface and slope requirements.

PAVEMENT MARKINGS

- Shared roadways may be marked or unmarked with shared lane markings. Sharrows are applied according to the TAC Bikeway Traffic Control Guidelines for Canada.
- Centrelines are not marked on yield roadways.

SIGNS

Potential signs for use with on yield roadways include:

- A modified Two-Way Traffic Ahead warning sign (WB-3) to clarify two-way operation of the roadway. The sign is modified to remove the centre line.
- A Share the Road warning sign (WC-19, supplementary tab WC-19S) to indicate to vehicle drivers the presence of cyclists on the roadway.

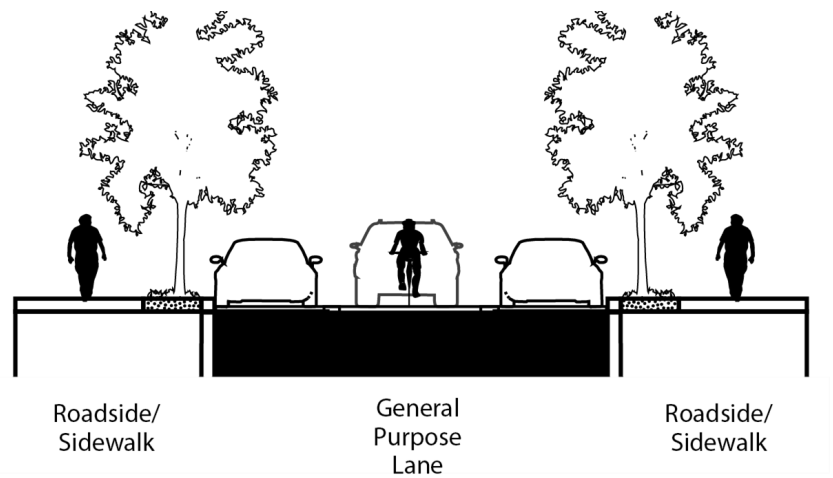


Figure 36: Configuration of shared roadways. Image from TAC Geometric Design Guide for Canadian Roads.

Width (m)	Practical Lower Limit	Recommended Lower Limit	Recommended Upper Limit	Practical Upper Limit
Shared roadway with parking both sides and two-way traffic flow, typically one direction at a time	8	8	9	10
Shared roadway with parking on one side and two-way traffic flow, typically one direction at a time	5.5	5.5	7	7.5

Table 7: Width of shared roadways adapted from TAC Geometric Design Guide for Canadian Roads Table 5.3.6 Design Domain: Width of Shared Roadways.



Figure 37: Share the Road Sign WC-19 and supplementary tab sign WC-19S can be used as cautionary signs. Images from TAC Bikeway Traffic Control Guidelines for Canada 2nd Edition (4.6.7).

Figure 38: The modified WB-3 Two-Way Traffic Ahead warning sign can clarify undivided two-way operation of the roadway. Image modified from MUTCDC (A3.6.3).

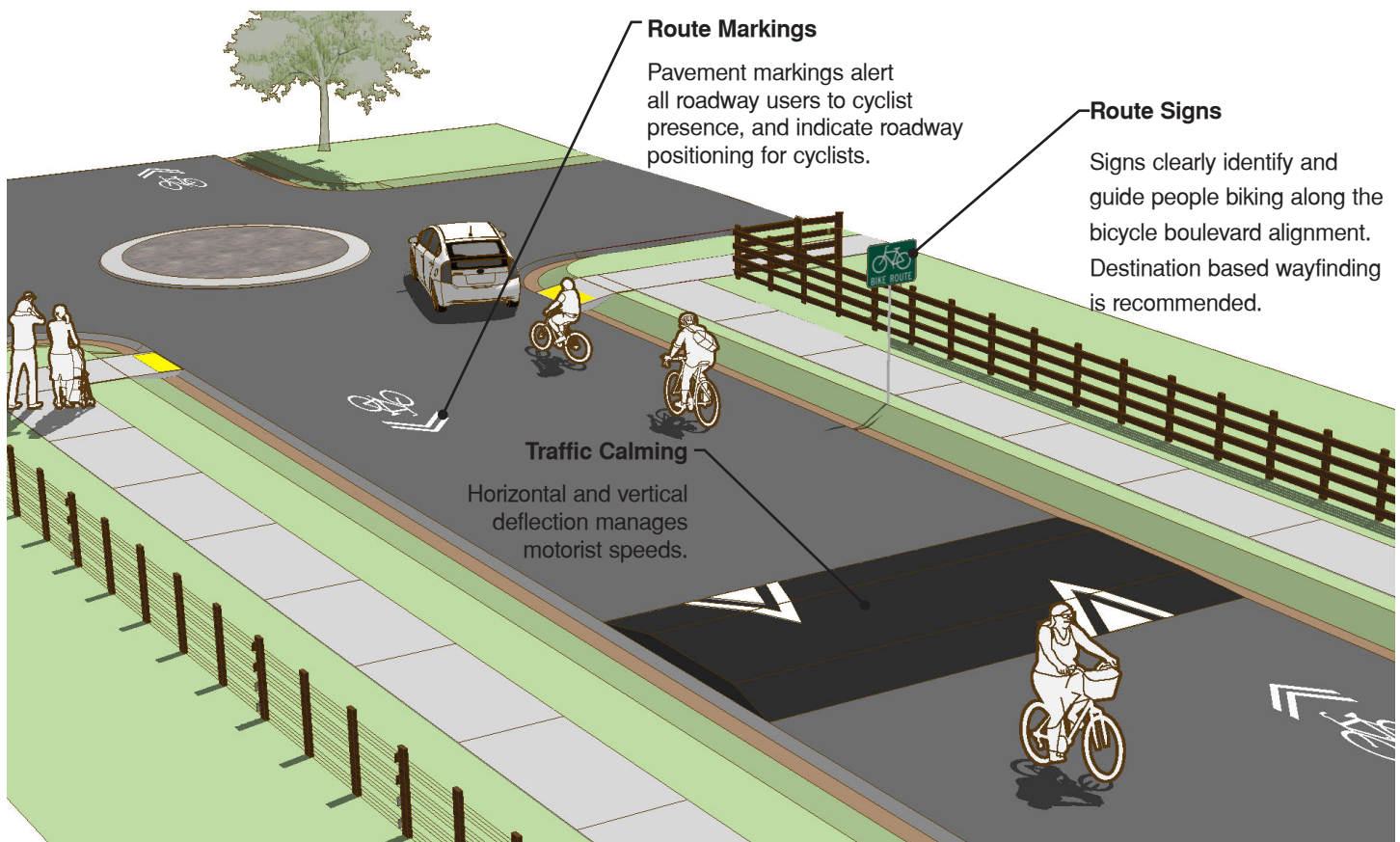


Figure 39: Bicycle boulevard treatments along a residential street.

Bicycle Boulevard

A bicycle boulevard, also known as a local street bikeway, is a low-stress bike route shared with motor vehicle traffic that is designed to prioritize bicycle traffic by reducing motor vehicle volumes and speeds.

APPLICATION CRITERIA

- Posted speed is ≤ 40 km/hr.
- Volumes of ≤ 2500 veh/day. Ideal volumes are around ≤ 1000 veh/day.
- Residential areas or local streets.

BENEFITS

- Increases comfort for people cycling by reducing motor vehicle operating speeds and volumes.
- Improves the quality of life for residents through calmer traffic streets and safer crossings.
- Visually less impacting than separated facilities.

CONSIDERATIONS

- May be an indirect route for cyclists.
- May divert vehicle traffic to other roadways or require route planning for vehicle traffic.
- Rural roadway networks may not have through connections for bicycle connectivity.
- May require additional paved surface to provide sidewalk space for pedestrians.

FACILITY DESIGN

TRAFFIC CALMING

Where speeds and volumes do not meet preferred values for a bicycle boulevard, traffic-calming techniques may be used.

- Intersections may have diagonal diverters, median diverters, and neighbourhood traffic circles to restrict vehicle speeds, but allow the through movement by bicycle.
- Between intersections, chicanes and speeds humps or speed cushions can reduce speeds.
- Stop signs are oriented to control cross routes intersecting the bicycle boulevard to prioritize the through movement of the bicycle boulevard and reduce motor vehicle speeds prior to intersecting with the bicycle boulevard.
- It is recommended to reduce the posted speed limit if it is higher than 40 km/hr.

WIDTH

To further calm vehicle speeds, bicycle boulevards can be designed as shared roadways, which have parking on one or both sides of a narrow centre travel lane for bidirectional traffic. This restricts motor vehicle traffic to flow in one direction at a time while the opposing vehicles wait in the parking lane.

PEDESTRIAN USE

On bicycle boulevards, the appropriate pedestrian facility is a sidewalk. If pedestrian travel must be facilitated within the roadway, it must meet accessibility standards for exterior paths of travel including surface and slope requirements.

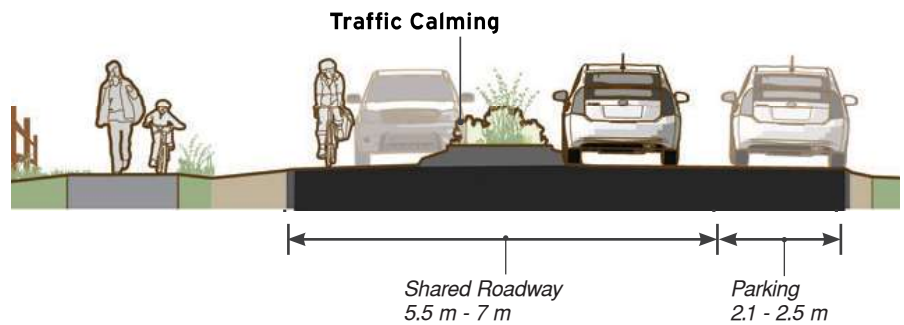


Figure 40: Typical shared roadway widths. At intersections, neighbourhood traffic circles can also narrow roadway width and reduce vehicle speeds. Image from the FHWA Small Town and Rural Multimodal Networks Design Guide.

Width (m)	Practical Lower Limit	Recommended Lower Limit	Recommended Upper Limit	Practical Upper Limit
Shared roadway with parking both sides and two-way traffic flow, typically one direction at a time	8	8	9	10
Shared roadway with parking on one side and two-way traffic flow, typically one direction at a time	5.5	5.5	7	7.5

Table 8: Width of shared roadways adapted from TAC Geometric Design Guide for Canadian Roads Table 5.3.6 Design Domain: Width of Shared Roadways.

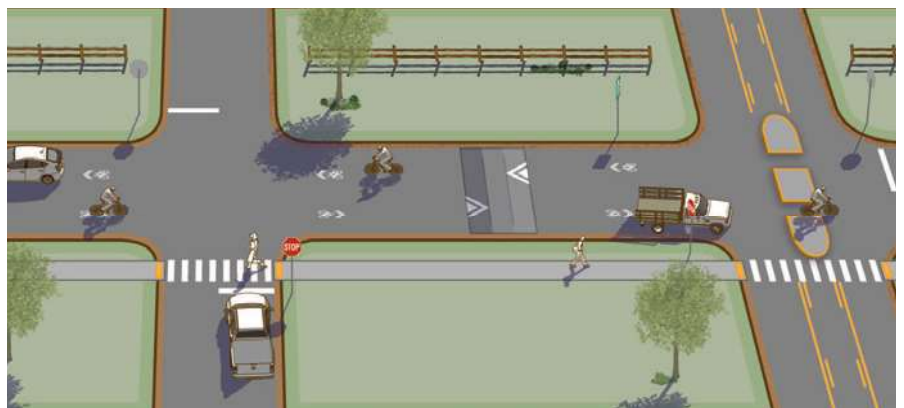


Figure 41: Bicycle boulevards combine road markings, traffic-calming measures, and crossing improvements to enhance the comfort and priority of cyclists traveling along the route. Image from the FHWA Small Town and Rural Multimodal Networks Design Guide.

PAVEMENT MARKINGS

Pavement markings can identify a route as a bicycle boulevard and alert motor vehicle drivers to the presence of people cycling.

- Shared lane markings or "sharrows" are the standard marking for indicating shared roadway bicycle operations (Figure 42).
- Sharrows indicate cyclist positioning on the roadway. Place sharrows in the centre of the travel lane to minimize vehicle tire wear and to encourage cycling a safe distance from potentially opening vehicle doors of parked cars. The markings should be centred at least 3.4 m from the face of the curb to avoid the door zone of parked cars.
- Refer to section 7.4.3 of the TAC Bikeway Traffic Control Guidelines for Canada for longitudinal placement.
- Centrelines are not marked on bicycle boulevards unless it is a short channelization at intersections.

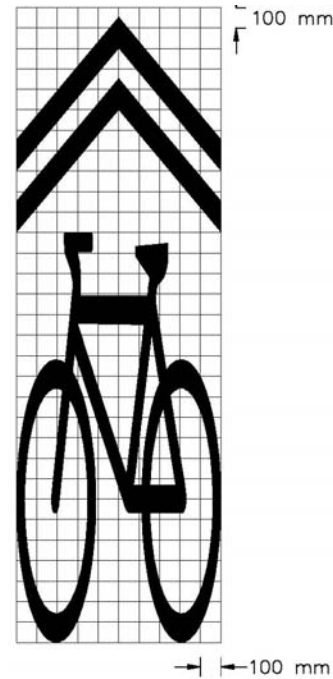


Figure 42: Shared use lane symbol from TAC Bikeway Traffic Control Guidelines for Canada.

SIGNS

Signs can also be used to identify a bicycle boulevard. It is recommended that all bicycle routes include route and wayfinding signage. This is particularly important for non linear bicycle boulevard routes. There are three functional types of bicycle wayfinding signs:

- Decision Signs. Decision signs, such as IA-3 scaled to bicycle traffic, can mark the junction of two or more bikeways and provide cyclists directional guidance to access key destinations. Decision signs are typically placed 15-60 m in advance of a bikeway junction to allow a bicyclist enough time to slow, change lanes, and prepare for any turns that may be necessary.
- Confirmation Signs. Bicycle Route Marker (IB-23) (Figure 43) signs indicate to cyclists that they are on a designated bikeway and make motorists aware of the bicycle route. Confirmation signs are placed 15-30 m after a turn movement or intersection. These signs need not occur after every intersection, but should be prioritized at locations where a designated route is not linear, as well as after complex intersections such as those having more than four approaches at greater or less than 90 degrees and roundabouts.
- Turn Signs. Turn signs indicate where a bike route turns from one street onto another street. Turn signs may include a destination name, or may simply be an arrow plaque, such as the IS-5 through IS-9 (Figure 45) tab signs. Turn signs are placed 15-60 m in advance of turns to give cyclists adequate time to slow down or, if necessary, change lanes to prepare for a turn.



Figure 43: Bicycle Route Marker Sign IB-23. Image from TAC Bikeway Traffic Control Guidelines for Canada.



Figure 44. MUTCDC guide signs IA-2 or IA-3 can be appropriately scaled for active transportation users (refer to MUTCDC Table A1-5), and assembled with the IB-23 for bicycle navigation. Image from the MUTCDC A4.2.1.



IS-7



IS-8R



IS-9R

Figure 45: Directional arrow tab signs which can be assembled with an IB-23 sign for bicycle turn navigation. Image from TAC Bikeway Traffic Control Guidelines for Canada.

GENERAL SIGN PLACEMENT

Where two or more bikeways intersect, the general approach is to place a decision sign prior to the decision point followed by a confirmation sign or pavement marking after the intersection to confirm intended direction. While this approach provides redundant information, it ensures continuity in the wayfinding system, even if a particular sign is damaged. See Figure 46 for typical sign placement at intersections.

The TAC Bikeway Traffic Control Guidelines for Canada specifies the lateral and vertical clearances for bicycle sign placement. Figure 47 illustrates the minimum sign clearances for signs on bicycle paths, and Figure 48 illustrates sign clearances in urban areas where pedestrian movements are expected.

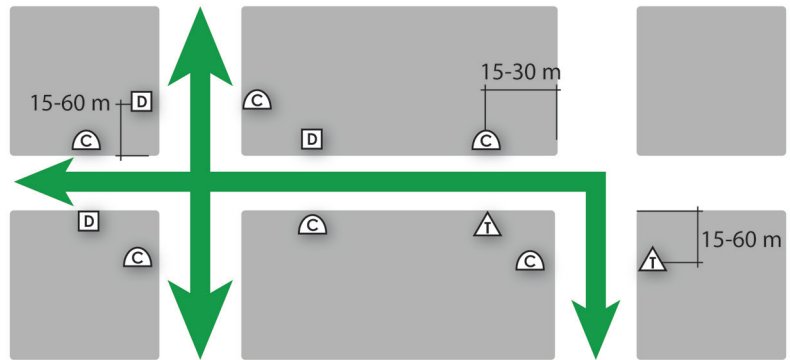


Figure 46: Typical bikeway Decision (D), Confirmation (C), and Turn (T) sign placement.

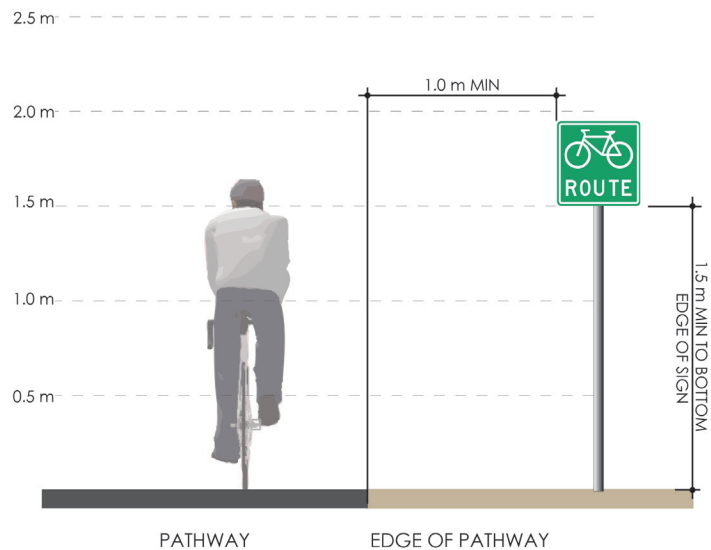


Figure 47: Sign clearances for a bicycle path.

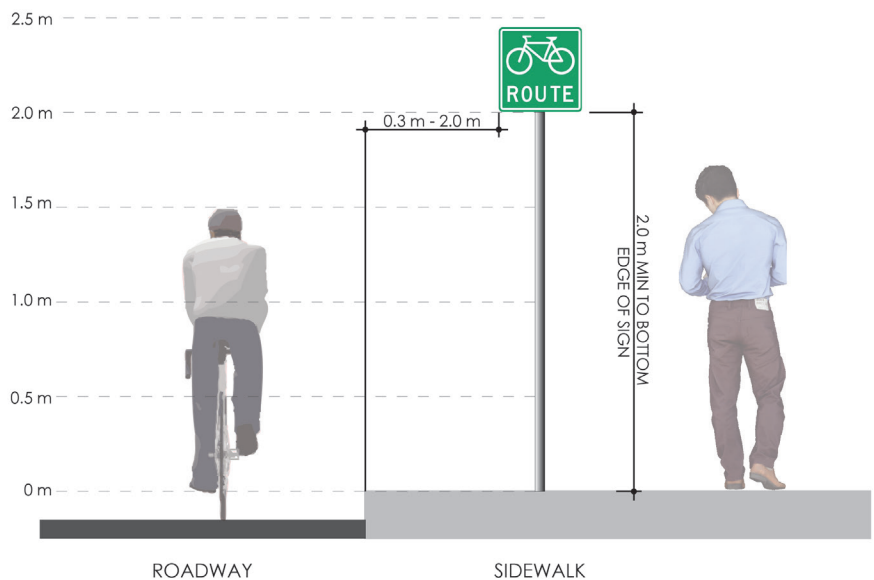


Figure 48: Sign clearances in urban areas with pedestrian traffic.

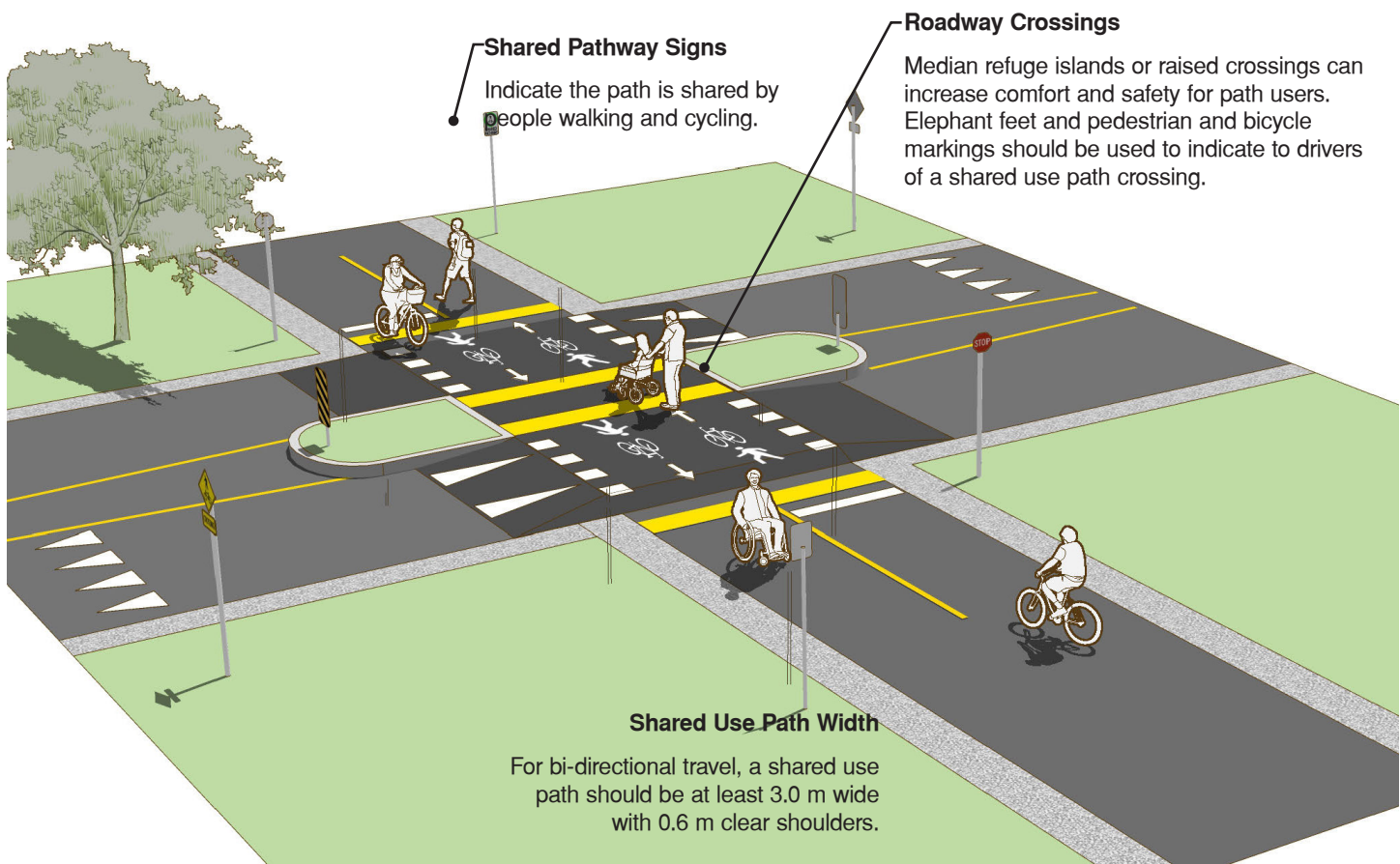


Figure 49: Shared use path at a roadway crossing. Image adapted from the FHWA Small Town and Rural Multimodal Networks Design Guide.

Shared Use Path

A shared use path, also called a multi-use path, provides a travel area separate from motorized traffic for a low-stress experience for a variety of users including cyclists, pedestrians, skaters, joggers, people that use mobility aids, and others.

APPLICATION CRITERIA

- Posted speed is >40 km/hr.
- Volumes of >4000 veh/day.
- Areas with heavy truck volumes.
- Areas with high pedestrian or bicycle volumes.

BENEFITS

- Provides a dedicated facility for users of all ages and abilities.
- May be used for transportation or recreation.
- Paths can have a distinctly rural character.
- Can connect neighbourhood, community, and regional parks through urban and rural areas.

CONSIDERATIONS

- Operational concerns between users.
- Winter maintenance.
- Requires independent ROW, or wide roadway ROW when configured adjacent to a roadway.
- Added design considerations for driveways and side streets when configured adjacent to a roadway.

FACILITY DESIGN

PATH WIDTH

The width of a shared use path will vary depending on if the path is intended for local or regional use, and the amount of user volumes.

- 3.0 m width is recommended in most situations for bi-directional travel and moderate trail use.
- 2.4 m is absolute minimum for two-way bicycle travel. Considering shared use paths would also be used by pedestrians walking abreast, 2.7 m is a more practical minimum. Narrow paths would only be recommended for low trail volumes or for short lengths.
- The Trails in Alberta Highway Rights-of-Way Policies, Guidelines, and Standards recommends wider 3.4 - 4.3 m trails in areas with a high percentage of pedestrians (30% or more), a high usage by users requiring additional operating width such as inline skaters, or where there is high user volumes >300 users at peak times.
- Wider paths are also useful to accommodate maintenance vehicles; on steep grades to allow for comfortable passing and meeting; and through curves to provide more operating space and clear sightlines.

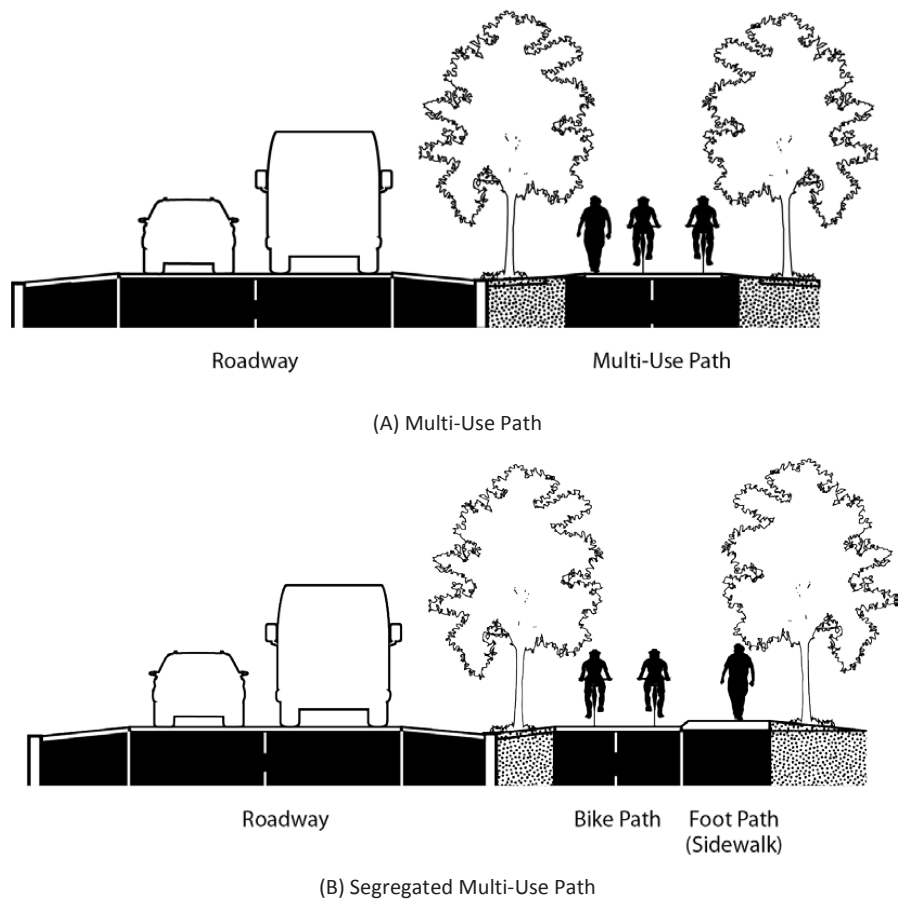


Figure 50: Multi-use paths configured as (A) shared use path and (B) modally separated paths. Image TAC Geometric Design Guide for Canadian Roads Figure 5.3.5 Multi-Use Paths.

USER CONFIGURATION

- In areas with particularly high pedestrian volumes, it may be prudent to modally separate the path users. This would operate similar to a protected bike lane with adjacent pedestrian sidewalk. See Figure 50.
- TAC recommends modal separation for paths with 20% or more pedestrians with user volumes >33 persons/hours/metre, or regardless of pedestrian percentages, paths with total user volumes >50 persons/hour/metre.

SHOULDER WIDTH

- 0.6 m minimum shoulders should be provided on each side of the path, kept clear of vertical elements or obstructions.
- A 1.0 m minimum shoulder is recommended in Rocky View County Parks and Pathways Planning, Development, and Operational Guidelines.
- In areas with significant side slopes, the shoulder may need to be increased to 1.5 m wide or include a vertical barrier. Refer to Table 10 and figures on the following page.

Width (m)	Practical Lower Limit	Recommended Lower Limit	Recommended Upper Limit	Practical Upper Limit
Shared multi-use path	2.7	3.0	6.0	6.0
Bike path, bi-directional	2.4	3.0	3.6	4.0
Pedestrian path <400 ped/15 min	1.5	1.8	2.0	Roadside width
Pedestrian path >400 ped/15 min	2.0	2.25 - 3.0 or based on crowd capacity and maneuvering space		Roadside width

Table 9: Width of shared multi-use paths and modally separated paths adapted from TAC Geometric Design Guide for Canadian Roads Table 5.3.5 Design Domain: Width of Multi-Use Paths, Table 5.3.4 Design Domain: Width of Bike Path, and Table 6.3.1 Design Domain: Pedestrian Through Zone.

SIDE SLOPES

Where shared use paths are located in areas with significant side slopes, safety rails to prevent path users from falling into a slope may be needed if there is not an adequate setback or recovery distance from the paved edge of the path to the slope.

- Ideally paths are set back 1.5 m from the top of the slope. Shoulders can be included in the 1.5 m measurement.
- For locations without a 1.5 m setback from slopes, guardrails should be provided in the conditions outlined in Table 10.
- Safety rails should have a minimum vertical height of 1.05 m with a preferred vertical height of 1.2 m.
- As safety rails may impact the horizontal operating width of a bicycle handlebars, safety rails should be set back a minimum of 0.5 m from the paved edge of the path.

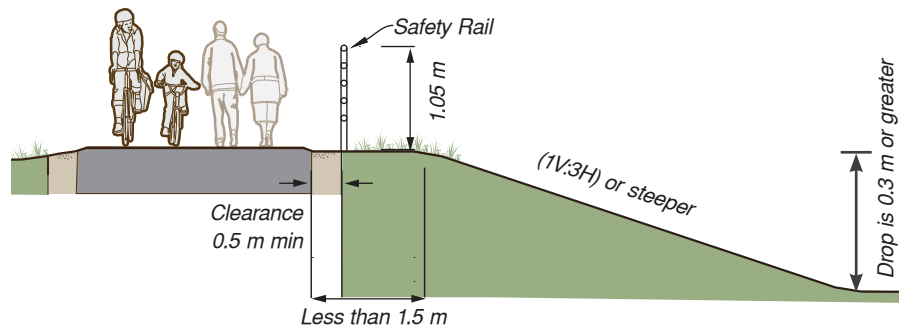


Figure 51: Shared use path clearance dimensions adjacent to significant side slopes. Safety rails should be provided per side slope conditions listed in table below. Image adapted from FHWA Small Town and Rural Multimodal Networks Design Guide.

Side Slope	Vertical Drop
1:1 or steeper	≥ 0.3m
2:1 or steeper	≥ 1.2m
3:1 or steeper	≥ 1.8m or adjacent to water bodies or other hazards

Table 10: side slopes requiring safety rails where 1.5 m path setbacks are not feasible. Dimensions from Trails in Alberta Highway Rights-of-Way Policies, Guidelines, and Standards.

CLEAR ZONE

In rural areas or along highway ROW, shared use paths should be located outside of the roadway clear zone. Refer to the Geometric Design Guide Table 7.3.1 and/or Alberta Transportation's Highway Geometric Design Guide Table C.5.2a for clear zone distances.

- For low volume roadways with <1000 veh/day, clear zones may not be practical or necessary.
- In locations where the only possible location for the path is within the clear zone, a physical barrier should be provided to protect the path from errant vehicles. The barrier will not impact the usable width of the path.
- Paths within the clear zone are ideally no closer to than 2 m from the edge of the roadway shoulder. In very constrained conditions such as retrofitting shared use paths onto existing bridges, this distance may be reduced to 1.5 m with a rigid barrier.
- For paths located within a highway clear zone, warning signs may be added to the roadway to alert motorists of the nearby path.
- Refer to Alberta Transportation Roadside Design Guide for further information on acceptable barrier types.

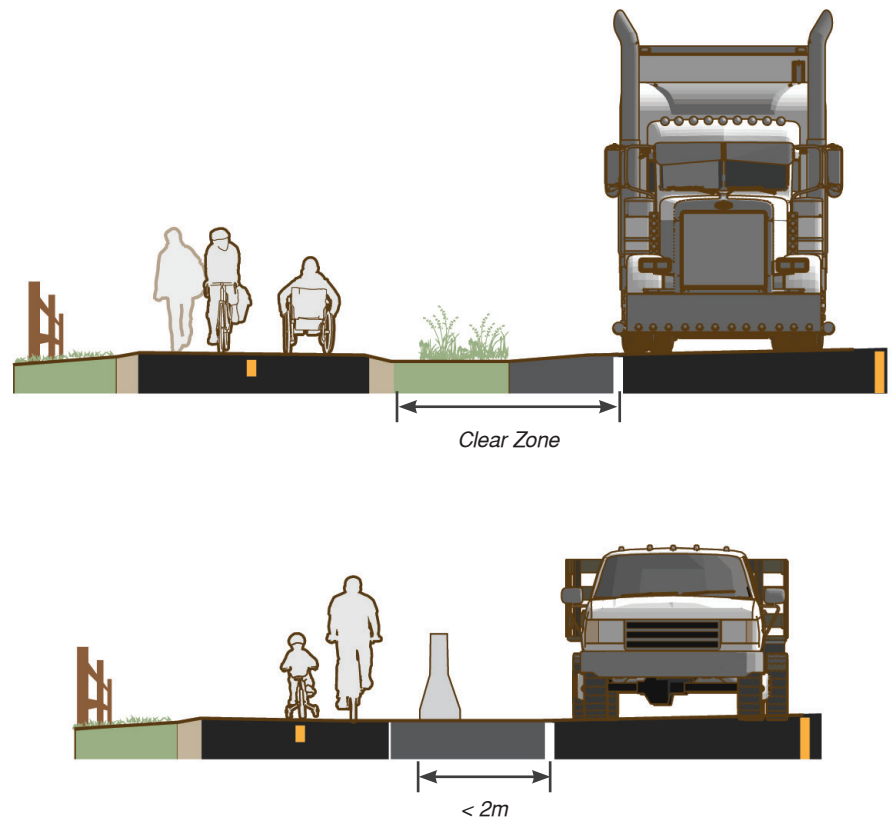


Figure 52: Adjacent to highways, shared use paths are ideally located outside of the vehicle clear zone. Where path locations are constrained, a path may be placed within the vehicle clear zone if a physical barrier is provided between the path and the roadway. Image from the FHWA Small Town and Rural Multimodal Networks Design Guide.

LANDSCAPING

Trees and landscaping can improve the experience of using a path, especially as a buffer between a path and a roadway. Plantings also help to absorb stormwater runoff from the path or adjacent roadway.

- Provide a 1.0 m horizontal clearance between trees and the path to minimize pavement cracking and heaving of the paved surface.
- When trees are desired within the roadway separation area, consider planting small caliper trees with a maximum diameter of 100 mm to alleviate concerns about fixed objects or visual obstructions between the roadway and the path.
- Paths must have a 3.0 m vertical clearance clear from overhanging branches.
- Refer to Rocky View County Parks and Pathways Planning, Development, and Operational Guidelines for plant selections along paths. Consult a local arborist in the selection and placement of trees.

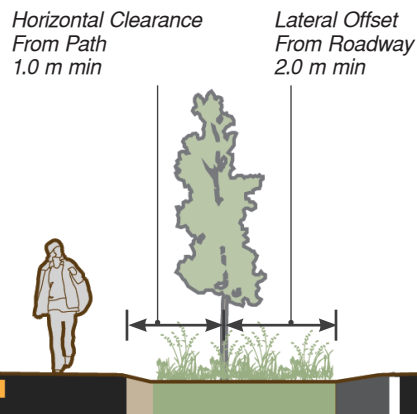


Figure 53: Even small trees can provide an additional feeling of separation between a path and a roadway. Image from FHWA Small Town and Rural Multimodal Networks Design Guide.

PATH SURFACE

- Materials appropriate for a shared use path surface are asphalt and concrete. Asphalt has a lower construction cost with an estimated life span of 10-15 years. Concrete can last up to 25 years but has a much higher construction cost.
- Install paths with a proper foundation of a geotextile fabric and base course to increase the longevity of the path surface and prevent cracks and potholes. Refer to Rocky View County Servicing Standards Figure 400.27 for standard pathway construction details.
- Depending on soil characteristics of the subgrade, the thicknesses of the base course and surfacing may need to increase. Refer to Trails in Alberta Highway Rights-of-Way Policies, Guidelines, and Standards Table 4.12.

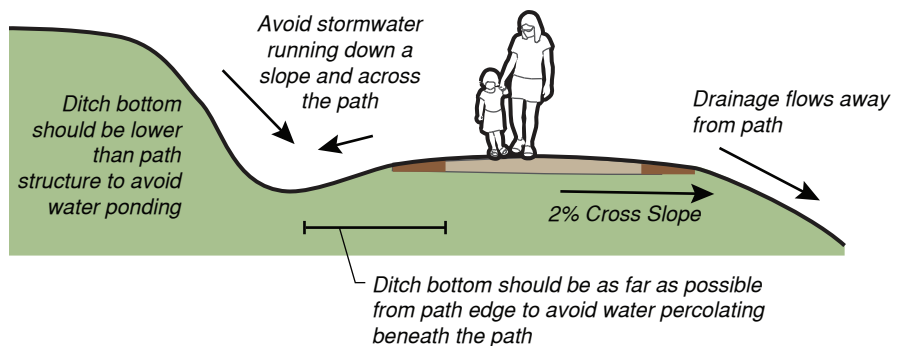


Figure 54: Water should drain away from the trail. Refer to Figure 4.13 Trail Drainage Characteristics in Trails in Alberta Highway Rights-of-Way Policies, Guidelines, and Standards for greater detail.

PATH DRAINAGE

Paths need adequate drainage to avoid ponding, or in the winter, ice patches.

- Paths should have a 2% cross slope from the crown of the path outward in both directions for positive drainage.
- A cross slope should be no greater than 5% for accessibility, and should only be for very limited distances.
- Path shoulders should also have a cross slope of 2%, a maximum cross slope of 6:1.
- Ditches, culverts, and swales may be needed to divert run off onto and from the trail.

BOLLARDS

Bollards are physical barriers intended to restrict motor vehicle access to shared use paths. The routine use of bollards and other similar barriers to restrict motor vehicle traffic is not recommended (AASHTO Bike Guide p. 5-46). Bollards are often ineffective at preventing undesired motor vehicle access to shared use paths, and create obstacles to legitimate path users.

- Although Rocky View County Parks and Pathways Planning, Development, and Operational Guidelines recommend bollards or gates to control path access points, these types of barriers may pose a safety hazard or operational obstacle for path users.
- Alternative design strategies use signage, landscaping and curb cut design to reduce the likelihood of motor vehicle access.
- Landscape medians can be configured to allow emergency vehicle access by straddling the median.



Figure 55: At path access points, the path can be configured as two 1.5 m (min) paths separated by a landscaped median. This example is in Detroit, MI, USA.

PAVEMENT MARKINGS

Although a centreline is included for regional pathways in Rocky View County servicing standards, under most conditions, centreline markings are not necessary, and path users will naturally keep right except to pass.

On shared use paths with heavy peak hour and/or seasonal volumes, the use of a centre line stripe may help organize pathway traffic.

- When striping is required, use a 100 mm broken yellow centreline stripe.
- Solid centrelines can be provided to discourage user passing on tight or blind corners, and on approaches to roadway crossings.
- On paths expecting evening use, path edges can be marked with 100 mm solid white lines.

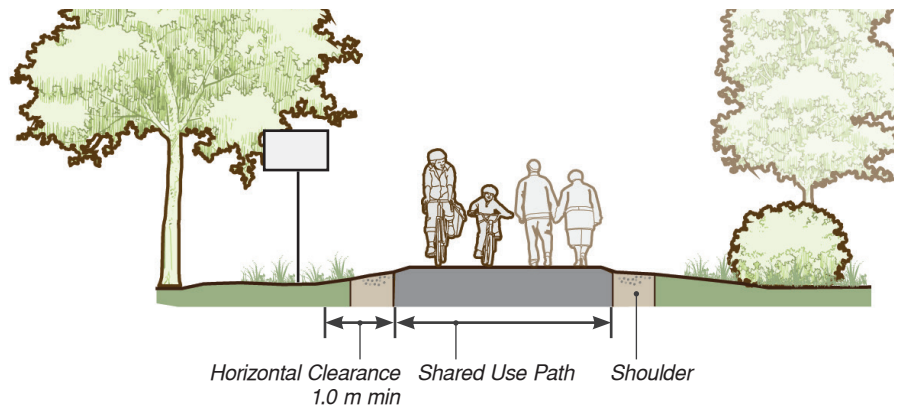


Figure 56: Shared use path horizontal clearances. Image from FHWA Small Town and Rural Multimodal Networks Design Guide pg 4-5.

SIGNS

- Shared Pathway (RB-93) signs may be used at the entrances of path segments.
- Signs should be laterally placed so that the near edge of the sign is located 1.0 m away from the paved edge of a path per TAC Bikeway Traffic Control Guidelines for Canada.



Figure 57: Shared Pathway Sign RB-93. Image from TAC Bikeway Traffic Control Guidelines for Canada.

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