



Transportation Engineering Design (TED) Manual

2025



Acknowledgments

PROJECT TEAM

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STEERING COMMITTEE

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CITY COUNCIL

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CHAPTER 1

Introduction & Purpose

1 Introduction

The Transportation Engineering Design Manual informs the planning and design of all future street and pathways projects in Teton County and the Town of Jackson, including street reconstructions and street retrofit projects. The Manual also informs how the County and Town will approach street projects led by partner agencies such as the Wyoming Department of Transportation (WYDOT) and state or federal agencies. This manual standardizes street design elements where necessary for consistency and to ensure that minimum requirements are met for efficiency, safety for all users, welfare, convenience, aesthetics, environmental sensitivity, and economical maintenance.

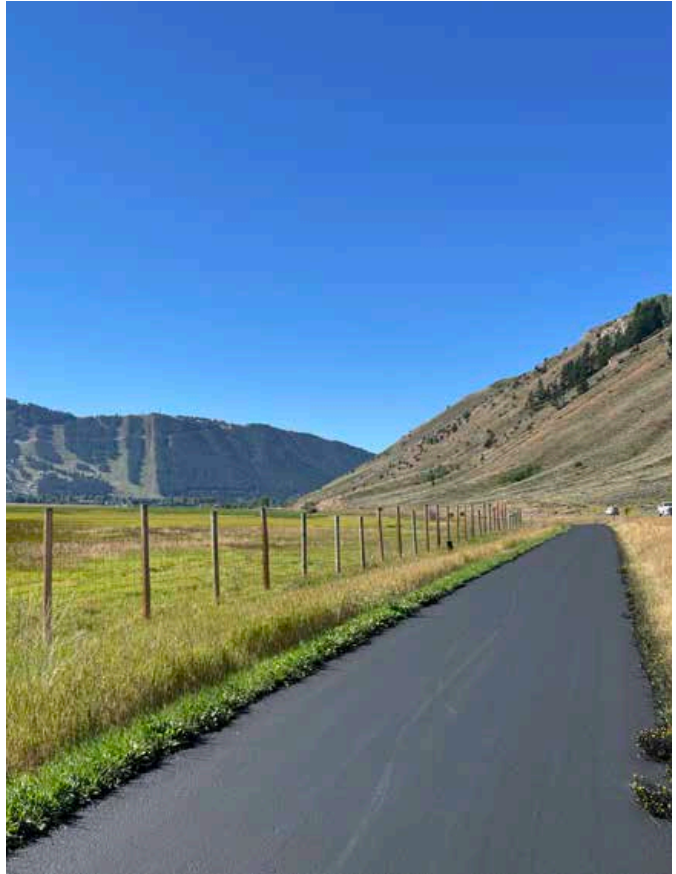
The guidance in this Manual advances the Jackson/Teton County Comprehensive Plan (2020), the 2009 Pathways Master Plan, the 2013 Town of Jackson Bicycle Improvement Plan, the 2015 Town of Jackson Community Streets Plan, the 2012 Town of Jackson Construction Standards, and the 2025-2030 START Transit Routing Plan, and was developed in tandem with the 2025 Town of Jackson and Teton County Comprehensive Safety Action Plan. This Manual is a key step to make walking, biking, and transit real options for people of all backgrounds throughout the County and Town.

This Manual, along with the updated Community Streets Plan (2025), will provide the Town and County with a more systematic approach to transportation design, from the planning and decision-making process to implementation. This Manual should be used during the design process, but it should also be used earlier in the project development process to ensure that the concepts are incorporated at the outset of project development, not as an afterthought.

Street maintenance, from snow plowing operations to infrastructure repair, should always be considered during the planning and design of all street and pathway projects. The last chapter in this Manual provides information and guidance related to street maintenance.

Lastly, while this Manual is intended as a best-practices guide, it cannot address every scenario

that may arise, so elements such as project context, intent, and other constraints should always be taken into consideration. The manual is intended to inform all projects, but each project has unique characteristics that impact final design decisions and, in some cases, the best design for a particular situation might not be found in this manual.



Source: Alta Planning + Design

1.2 HOW TO USE

This Manual provides both general design guidance and additional considerations for many street design elements that would be found within the streetscape. These are referred to as ‘elements’ or ‘facilities’. For the purposes of this document ‘street’ refers to the public right of way that forms the transportation network. For example, sidewalks and vehicle lanes are both elements that make up part of the street. Each section of this manual is organized into categories including **General Guidance, Considerations, Relevant Resources, and Applicable Street Typologies**. Some sections within the TED Manual may not have each of the following subsections depending on applicability.

GENERAL GUIDANCE

This subsection provides general design guidance that should largely be applied regardless of context.

CONSIDERATIONS

This subsection provides additional discussion about specific design details and nuance, and provides guidance for unique contexts.



Relevant Resources

Much of this design guidance was developed or adapted from other resources. For each design element/facility or group of similar design elements, the Manual provides information on which external guidance resource(s) are relevant for that element . Where applicable, specific chapters or sections of those resources are referenced as well.



Applicable Street Typologies

This subsection ties the design guidance to the Community Streets Plan (CSP) typologies. This is an attempt to provide useful guidance on which types of streets each element will typically be most applicable to; it should not be used to supersede project-specific needs or other contextual considerations.

1.3 RELATIONSHIP TO OTHER STANDARDS & GUIDANCE

The TED Manual provides local street design guidance that builds on state and national standards and best practices. This Manual is intended to assist Town and County staff and those working within the two jurisdictions with the planning and design of streets that both reflect Town and County policies and guidelines and are informed by national multi-modal planning and design best practices. The Wyoming Department of Transportation (WYDOT) Standard Plans and Town of Jackson Construction Standards offer additional standards and information to guide detailed design.

1.3.1 BASIS OF GUIDANCE

The guidance in this Manual is based on national best practices, including guidance from the American Association of State Highway and Transportation Officials (AASHTO), the Federal Highway Administration (FHWA), and the National Association of City Transportation Officials (NACTO). Specific guidance referenced in this document includes, but is not limited to:

AASHTO

- ▶ A Policy on Geometric Design of Highways & Streets (2018)
- ▶ Guide for the Development of Bicycle Facilities (2024)
- ▶ Guide for the Planning, Design, & Operation of Pedestrian Facilities (2021)

FHWA

- ▶ [Manual of Uniform Traffic Control Devices \(2023\)](#)
- ▶ [Small Town and Rural Multimodal Networks \(2016\)](#)

NACTO

- ▶ Urban Bikeway Design Guide (3rd Edition, 2025)
- ▶ Urban Street Design Guide (2013)

UNITED STATES ACCESS BOARD

- ▶ [Public Right of Way Access Guidelines \(2023\)](#)

While the versions cited above were used to develop this Manual, the user is directed to ensure that they are following the most current and recent version of the referenced document.

1.4 LOCAL POLICY GUIDANCE

The TED Manual is one of the three primary documents that will inform street planning and design in Teton County and the Town of Jackson. Paired with the Land Development Regulations (LDRs) and 2025 Community Streets Plan (CSP), these documents will regulate and guide land development, the street network, street cross sections, and street design elements. The following table summarizes the coordination between the regulatory tools and applicability for different elements.

The TED Manual includes applicable references to the LDRs and the CSP, but these documents themselves should also be referenced by designers and developers during projects as needed. For projects within the Town of Jackson, the Town LDRs will apply. Teton County's LDRs apply outside of the Town of Jackson.

Table 1. *Coordinated Regulatory Tools*

	THIS MANUAL (TED) <i>TOWN & COUNTY</i>	LAND DEVELOPMENT REGULATIONS (LDRS) <i>TOWN & COUNTY</i>	COMMUNITY STREETS PLAN (CSP) <i>TOWN ONLY</i>
Street Network & Uses	Refers to CSP	- Generally, refers to CSP and other relevant County plans. - Includes TS-1 zoning district Boardwalk requirement.	Primary source for guidance on street networks in the Town of Jackson. Defines typologies and modal priorities for each street in the Town.
Street Cross Sections	Refers to CSP, and provides dimensions based on context. See Section 1.6 for more information.	- Refers to CSP (§2.2.1B) - In some cases, contains specific standards for right-of-way and facility widths.	Provides typical street cross sections without dimensions.
Street Design Elements	Primary source for detailed road facility dimensions, design guidance, and street elements.	Provides standards for certain amenities that are often constructed as part of private development projects.	- Includes cross section elements for each street typology. - Refers to TED for facility details.
Private Development	Refers to LDRs. Private development projects that construct public facilities such as sidewalks should reference the TED Manual for consistency.	Contains minimum standards for private streets and public facilities (like sidewalks and boardwalks) developed as part of private development projects.	Not applicable, except in cases where LDRs refer to CSP cross sections.

1.5 SAFETY ACTION PLAN

The TED Manual was developed in tandem with the Town of Jackson and Teton County Comprehensive Safety Action Plan (2025) and the updated Town of Jackson Community Streets Plan (2025) , both of which envision a street network that is safe for people of all ages, abilities, and modes. Teton County and the Town of Jackson intend to incorporate safety for all users into every facet of street design, and the guidance in this Manual reflects that.

1.5.1 SAFETY COUNTERMEASURES

The Safety Action Plan identifies countermeasures that can be used to address common crash types and high frequency crash locations in Teton County and the Town of Jackson with the goal of reducing fatalities and serious injuries. Additional information for each countermeasure, such as crash profile applicability and crash modification factor, is also provided. Further design guidance for many of these countermeasures is provided here in the TED Manual.



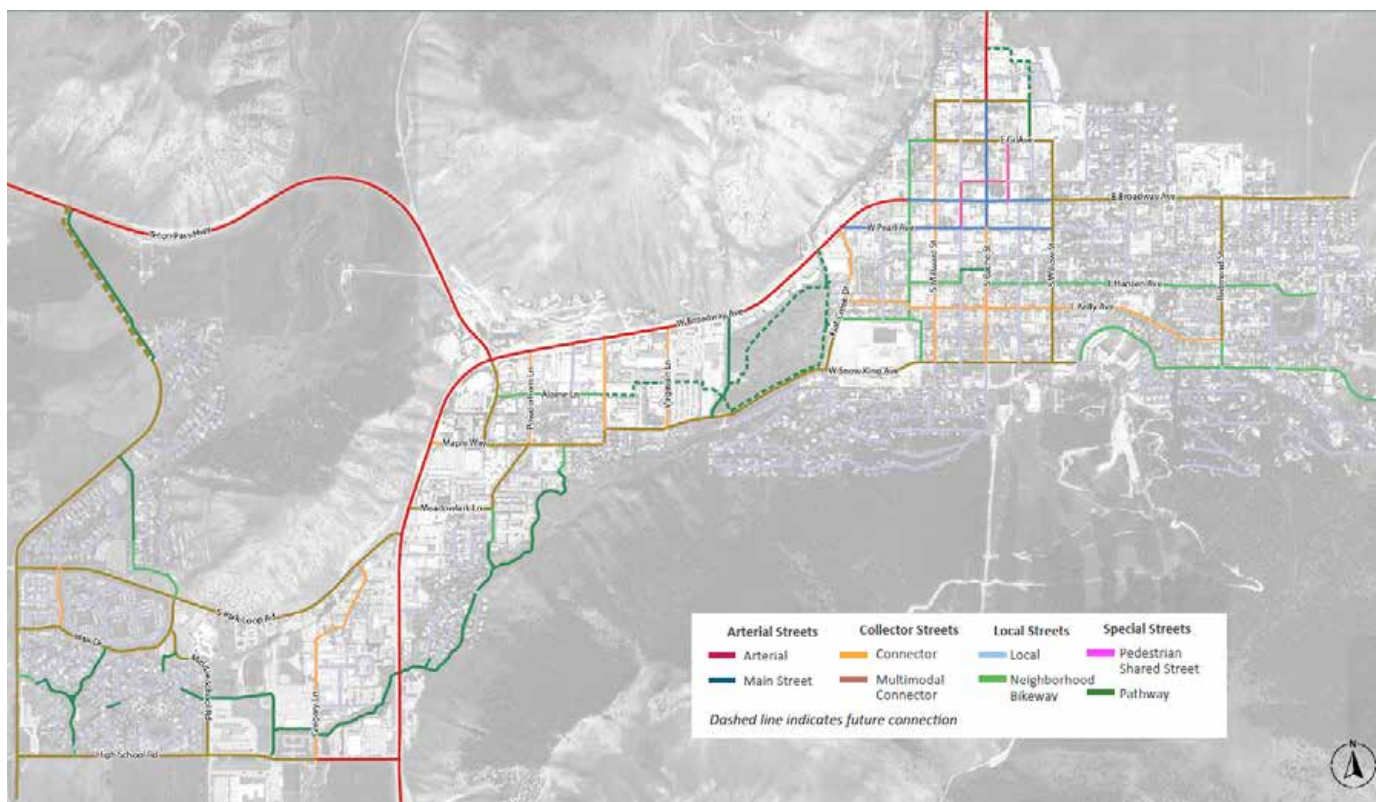
Relevant Resources

- ▶ [FHWA Proven Safety Countermeasures](#)
- ▶ [FHWA Pedestrian Safety Guide & Countermeasure Selection System](#)

1.6 COMMUNITY STREETS PLAN

The Community Streets Plan (CSP) is an updated mobility framework for the Town of Jackson and includes eight Street Typologies within four categories: Arterial Streets, Connector Streets, Local Streets, and Special Streets. These street typologies and typical sections are based upon the intended type and level of use for each street. The adopted street typologies in the Community Streets Plan are shown on the Street Typologies Map below.

Figure 1. Community Streets Plan's Street Typologies Map



1.6.1 IMPLEMENTING THE STREET TYPOLOGIES

The Town of Jackson will use the design guidance in this Manual to implement the Street Typologies and associated typical sections found in the CSP. For more information on these Street Typologies and to view all the typical sections for each Street Typology, please refer to the Community Streets Plan.

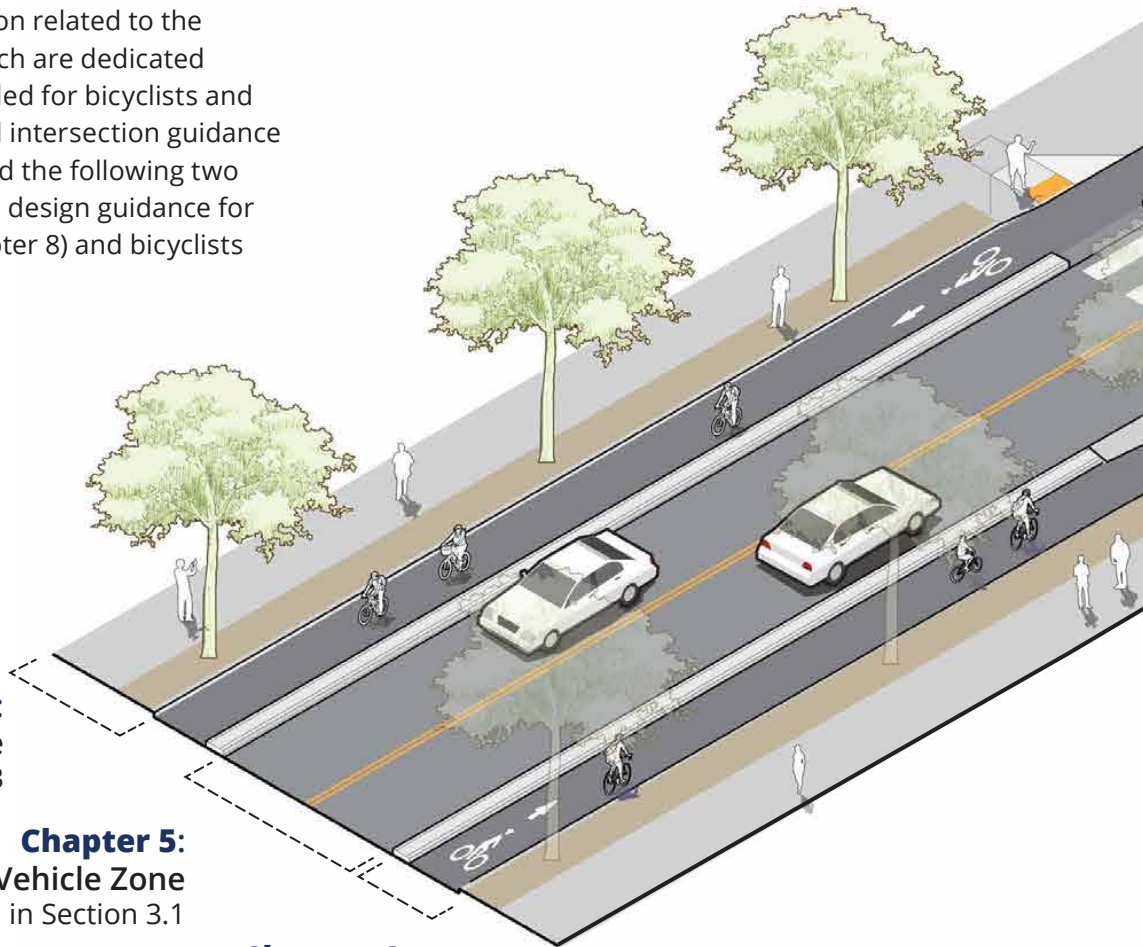
The typical sections show what a typical street of that Typology may contain, but do not provide dimensional or contextual guidance, as that guidance instead resides within this Manual. The guidance in this Manual is organized by the primary zones found within a given street; the Vehicle Street Zone (Chapter 3), the Pedestrian/ Sidewalk Zone (Chapter 4), and the Bikeway Zone (Chapter 5).

Chapter 6 provides information related to the Pathway Street Typology, which are dedicated paths, often off-street, intended for bicyclists and pedestrians to share. General intersection guidance can be found in Chapter 7, and the following two chapters provide intersection design guidance for specifically pedestrians (Chapter 8) and bicyclists (Chapter 9).

Chapter 4:
Sidewalk/Pedestrian Zone
Widths found in Section 4.3

Chapter 5:
Vehicle Zone
Widths found in Section 3.1

Chapter 6:
Bicycle Zone
Widths found in Section 5.2 and 5.3





Safety is paramount. We prioritize eliminating transportation fatalities and serious injuries, reducing crashes, and ensuring all streets, sidewalks, and pathways are safe, comfortable, and accessible for all.

CHAPTER 2

Design Needs & Users

2 Design Needs and Users

The design of each Street Design Element should consider the specific context of its application and its use by the intended design users. Judgement and flexibility are important factors in ensuring that the street is designed appropriately for its context with regards to the design users and the needs for the roadway and individual elements. A common problem in traffic engineering is streets that are overdesigned for their needs, which leads to lower safety and decreased comfort of users. This Manual is a tool to help “right-size” the design of streets to best serve all users.



Source: Alta Planning + Design

2.1 VEHICLES

Vehicles are the “user” of the vehicle lanes. The design vehicle of a street should be appropriate for the surrounding environment and context. The Mobility overlays from the CSP can help to identify modal priority on a given street, which can help guide design vehicle selection.

A large variety of vehicles use the street network, occupying different dimensions and operating space while making turns. Based on adjacent land use, traffic counts or assumptions can be made to determine the number and type of heavy vehicles that need to be accommodated along a roadway or at an intersection. Design vehicles and their applications are discussed within the Intersections Chapter (Chapter 7) in [Section 7.1](#), with discussion of appropriate vehicle selection and design flexibility/assumptions for accommodating them at intersections.

2.2 PEDESTRIANS

Pedestrians of all ages and abilities represent a key part of the transportation landscape and are made up of a wide range of physical, cognitive, and sensory capabilities. Pedestrians may include children, adults, and older individuals; people walking, running, or rolling in wheelchairs or other mobility devices; people pushing strollers, using canes or walkers, and people who are blind or have impaired vision. The needs of all of these pedestrian users must be considered when designing streets.

Generally, a pedestrian design speed of 3.5 ft/sec should be used when designing for pedestrians at signalized intersections. In areas with larger populations of older pedestrians or pedestrians with physical disabilities, a design speed of 3.0 ft/sec may be more appropriate.

The average adult pedestrian operates in a width of about 2.5 ft when walking in a straight line. Those using mobility devices, pushing strollers, or carrying bags typically require 3-4 ft of operating space. These widths factor into minimum sidewalk requirements discussed in the Sidewalk chapter.



Relevant Resources

- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities (Chapter 2.4)

2.3 BICYCLISTS AND OTHER MICROMOBILITY USERS

Bikeway users include children, teens, adults, older adults, and people with disabilities using a variety of different bicycle types and other micromobility devices (see Devices below). Children, older adults, and people with disabilities all have different abilities when it comes to riding a bicycle than able-bodied adults, and all are particularly vulnerable in the event of a crash. The needs and comfort of all these bikeway users should be considered during design.

The average adult bicyclist cycles 8 to 12 mph on level grades, but some can maintain up to 25-30 mph. Electric bicycles, or e-bikes, can travel at speeds of 15 mph or faster, depending on the class of e-bike. It should be kept in mind that even among adults, the ability, knowledge, and comfort levels of people on bikes vary widely. Children typically cycle 6.5 to 11.5 mph and have lower physical, spatial, and temporal abilities than adults. This means they may have slower reaction times, less-developed motor skills, less understanding of the 'rules-of-the-road', and often cannot judge the speed or distance of approaching vehicles. Older adults also require special consideration, as they may ride slower and have reduced stability and slower reaction times.

People with a wide range of disabilities ride bikes, and for some people with disabilities, bicycling is a critical mobility alternative to driving. Those with disabilities may use many devices such as e-bikes, recumbent bicycles, hand-cycles, trikes, or assistive mobility devices such as scooters or wheelchairs. These bikeway users benefit from wider bicycle lanes and less physical obstacles at or near the bikeway. People with low vision benefit from clear and legible wayfinding, delineation, and pavement markings.

An All Ages and Abilities (AA&A) bikeway is one that is comfortable for all users. Most bikeways should be designed as AA&A facilities, as this will not only encourage more people to use them, but it will also provide a higher level of comfort and safety for everyone. Anticipated speed differentials between users is another important consideration in bikeway design.

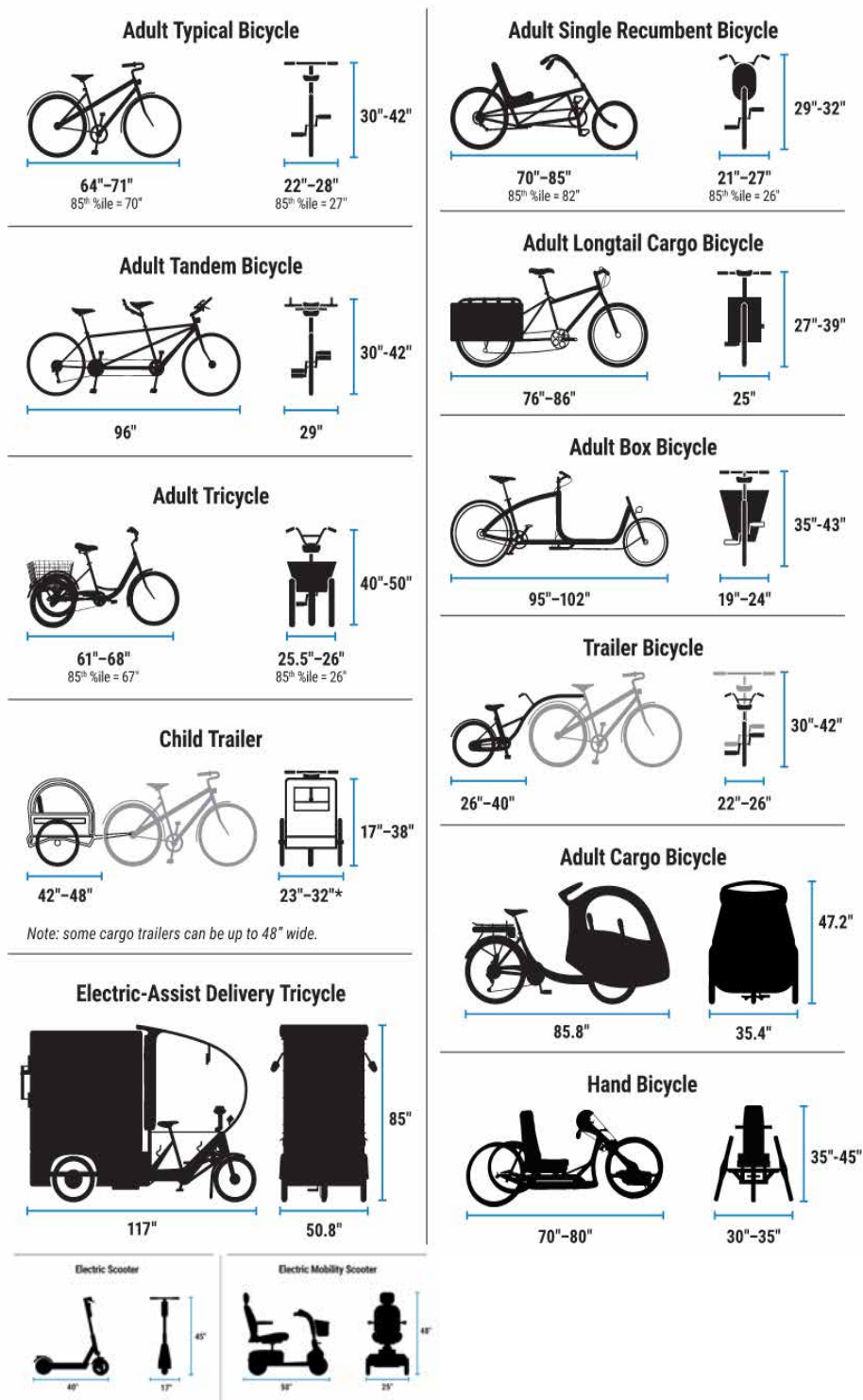
The speed and operation of bikeway users also depends on the bike or micromobility device they are riding; for example, e-bikes reach and maintain significantly higher average speeds. Some of the typical bikeway devices are shown in the graphic below, along with typical operating dimensions.

Bikeway design and bicycle parking should account for non-standard bicycles and devices that may be wider, longer, and/or lower to the ground than standard bicycles.

CONSIDERATIONS

The Town of Jackson and Teton County Pathway system serves pedestrians, bicyclists, e-bikers, and other users such as joggers and rollerbladers. See [Section 6.1](#) for additional information on those design users.

Figure 2. Common Adult Bicycles and Electric Assist Mobility Devices (AASHTO Guide for the Development of Bicycle Facilities, Figure 2-3)



Relevant Resources

- ▶ AASHTO Guide for the Development of Bicycle Facilities (Chapter 2.3, 2.4, 2.5, 5.2, 5.3)
- ▶ NACTO Urban Bikeway Design Guide (Chapter 3.1)

CHAPTER 3

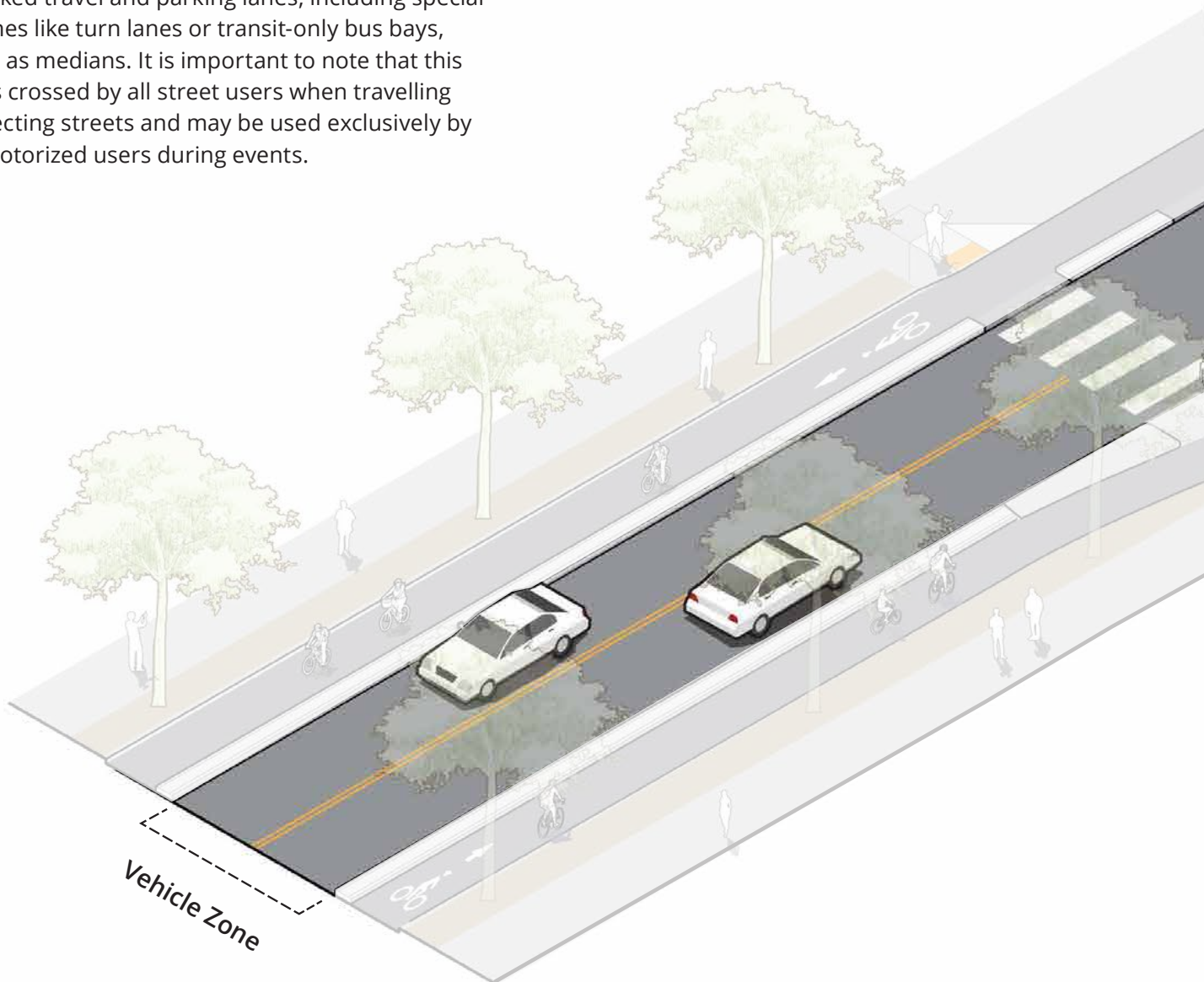
Vehicle Zone

3 Vehicle Zone

The zone for motorized vehicles is typically located in the center of the right-of-way. This zone provides space for people driving and riding in motor vehicles, including transit. On many corridors, people riding bicycles and micromobility also share this space, and the bikeway zone – if present – may be in the street zone as well. The edges of this zone often provide space for motor vehicle parking, stopping buses, loading and unloading, or parklets and bicycle corrals.

The vehicle zone may contain multiple marked or unmarked travel and parking lanes, including special use lanes like turn lanes or transit-only bus bays, as well as medians. It is important to note that this zone is crossed by all street users when travelling intersecting streets and may be used exclusively by non-motorized users during events.

Gutters and catch basins are also included typically at the edge of the vehicle zone; they provide critical space for conveyance of stormwater and are generally not considered functional travel space for vehicles or bicyclists/micromobility users but can be included in width considerations with respect to vehicle parking.



3.1 LANE WIDTHS

GENERAL GUIDANCE

The widths allocated to lanes for vehicles, bikes, and parked vehicles is a sensitive and crucial aspect of street design. The space provided for each street element should serve all needs and reflect the intent, context, and character of the street. Vehicle lane widths should be informed by an understanding of the goals for traffic calming as well as making adequate space for larger vehicles such as trucks and buses.

Wider vehicle lanes correlate with higher vehicle speeds, which in turn increases crash severity and potential for serious injury or death, especially for vulnerable users. Care should be taken to minimize vehicle lane widths while still providing adequate space for larger vehicles.

3.1.2 TYPICAL DIMENSIONS

The following table provides guidance for lane widths based on CSP Street Typology. Refer to the CSP for specific context for each Typology.

Lane widths are typically measured from center of pavement marking stripe to center of adjacent lane stripe or face of curb. On streets without curb, the edge of pavement should be used in determining dimensions.

Table 2. *Recommended Lane Widths*

Street Typology	RECOMMENDED LANE WIDTHS (FT)					
	Travel Lane	Turn-Only	Bus-Only	Median	Parking	Bus Pull-Out
Arterial	11	10	11*	6+	n/a	10
Main Street	11	10	11*	6+	9	10
Connector	10	10	11*	6+	8	10
Multimodal Connector	10	10	11*	6+	8	10
Local	8-10**	10	n/a	***	7-8	n/a
Neighborhood Bikeway	8-10**	10	n/a	***	7-8	n/a
Pedestrian Shared Street		n/a	n/a	n/a		n/a

* 10' if adjacent to 2' gutter pan

** Local streets often do not have nor require center-line striping. In this case, street width can be as narrow as 16' for the two-way un-striped travel space.

*** See traffic calming section

CONSIDERATIONS

1. For streets with frequent transit or heavy truck volumes, one travel lane of 11 ft in each direction may be considered.
2. For turn lanes with heavy bus or heavy truck volumes, 11 ft may be considered.
3. 4-6 ft medians can be considered in constrained rights-of-way but crosswalk striping should be maintained through the median where applicable. See Median section.
4. 7 ft wide parking lanes should be considered in residential areas with constrained right-of-way. In some industrial areas or streets with heavy truck volumes, 9 ft wide parking lanes may be considered.
5. In constrained right-of-way, an 8 ft wide bus pull out may be considered. A bus pull-out of 4 ft may be used on local streets to provide space for the bus to pull partly out of the travel lane to provide space for traffic to pass while the bus is stopped.
6. For County Roads, refer to Teton County LDR Div. 7.6.4 for lane widths. widths.
7. Variations from these widths should be approved by the Town or County Engineer.



Relevant Resources

- ▶ AASHTO A Policy on Geometric Design of Highways and Streets
- ▶ AASHTO Guide for Geometric Design of Transit Facilities on Highway and Streets
- ▶ [FHWA Achieving Multimodal Networks \(2016\)](#) (Part 1)
- ▶ NACTO Urban Street Design Guide

3.2 DESIGN SPEED

Safe traffic speeds are essential to eliminate traffic deaths and severe injuries. Streets also help define the character of neighborhoods and the ability of all street users to get around safely and comfortably regardless of their mode. A street’s design should interact with the surrounding context including its history, character, land uses, and nearby landmarks. Design speed contributes to the function and character of a street to be more walkable and bikeable, support investments in transit, foster social engagement and community pride, support the local economy and property values, and improve livability.

GENERAL GUIDANCE

Design speed should be established considering surrounding land uses, available right-of-way, street type, adopted general and specific plans, and overall intent of the corridor in coordination with other Town or County codes and ordinances.

Recommended design speeds apply to design factors that impact vehicle speed (e.g. horizontal and vertical

curves, stopping sight distance, and traffic calming measures). Design speeds on individual streets should generally match the desired speed limit after construction. The table below provides design speeds based on street classification or typology and differentiates between Town and County streets.

Designing streets with a design speed that matches the target speed for vehicles can result in “self-enforcing” streets, encouraging operating speeds that match the posted, target speeds of the street, resulting in safer driver behaviors and street environments.

Table 3. *Vehicular Design Speed*

Street Typology	DESIGN SPEED (MPH)	
	Town Street	County Street
Arterial	Per WYDOT Standard	Per WYDOT Standard
Main Street	15-20	Per WYDOT Standard
Connector/Collector	25	Per County LDR (25-40)
Multimodal Connector	20-25	Per County LDR (25-40)
Local	15-20	Per County LDR (15-30)
Neighborhood Bikeway	15-20	15-20
Pedestrian Shared street	15-20	5
Pathway	10-15	10-15

CONSIDERATIONS

Pedestrian Shared Streets, Neighborhood Bikeways, Local Streets, and Multimodal Connectors may have posted speed limits lower than the design speed to encourage safety and reflect modal priority such as walking and biking.

The addition of vertical and horizontal traffic calming elements may be used to align the design speed with the posted speed. See [Section 3.5](#) for guidance on traffic calming.

Design and posted speed limits on Town and County streets should be appropriate based on factors such as crash history, level of bicycle and pedestrian activity, surrounding land use, intersection spacing and driveway frequency, roadway geometry and terrain, traffic volumes, and observed and target speeds.



Relevant Resources

- ▶ AASHTO A Policy on Geometric Design of Highways and Streets
- ▶ FHWA Proven Safety Countermeasures ([Appropriate Speed Limits for All Road Users](#))
- ▶ FHWA [Self-Enforcing Roadways: A Guidance Report](#) (2018)
- ▶ NACTO City Limits (2020)

3.3 CURBSIDE AREA

The curbside area of the street zone is often used for uses such as -- but not limited to -- vehicle parking, freight loading and unloading, bus boarding and alighting, passenger drop-off, bicycle corrals, mobility hubs, parklets, street cafes, expanded landscaping/greening, signage, and furniture.



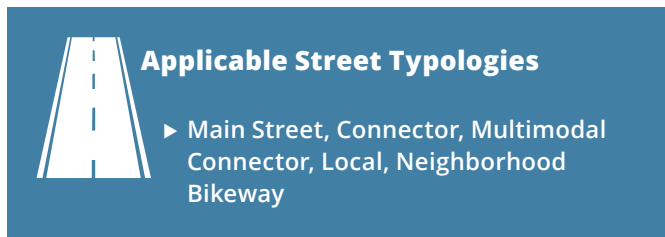
Source: Nick Falbo, Mobycon

3.3.1 VEHICLE PARKING

General Guidance

Vehicle parking may be provided on-street based on the available right of way and intended street use. Parking may sometimes be reduced to allocate space for bicycle, pedestrian, and frontage facilities.

For guidance on parking lane widths, see [Section 3.1](#).



3.3.2 ACCESSIBLE PARKING ZONES

General guidance

Generally, accessible parking spaces are required on streets where parking is metered or designated for public use. Accessible parking spaces must comply with the most recent version of the Public Right of Way Access Guidelines (PROWAG). Accessible parking spaces must be 13 ft by 24 ft long. For dimensions and the required number of accessibility parking spaces please refer to PROWAG. Please also see Teton County LDR 6.2 and Town of Jackson LDR 6.2 for additional accessible parking requirements.

Accessible parking spaces should be located near a crosswalk wherever possible, both midblock and at intersections, with access to the crosswalk via a curb ramp or blended transition. Ramps that only serve accessible parking spaces do not require detectable warnings. Tactile directional indicators (TDIs) may be used to guide blind or pedestrians with low vision to the accessible parking space.

Considerations

Where adjacent to a separated bikeway, access to the sidewalk should be provided with a curb ramp or blended transition. The bikeway may be narrowed to a minimum width of 4 ft along the accessible parking space to provide the width for the parking space.

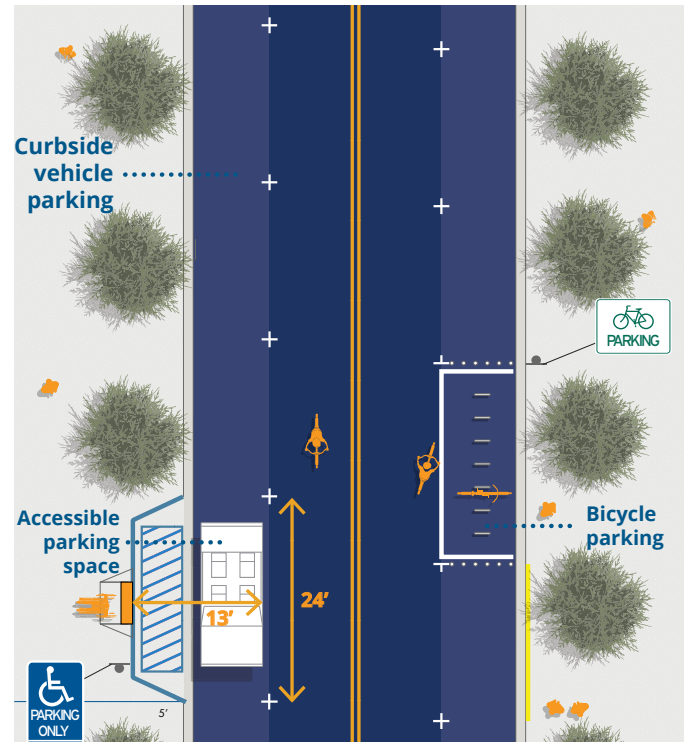
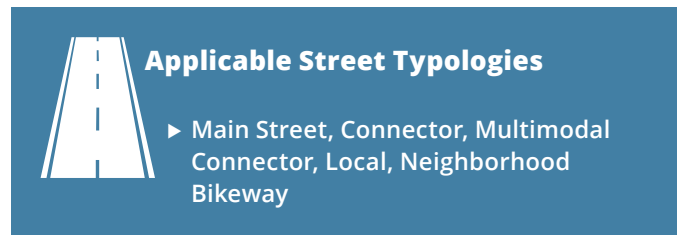


Figure 3. Curbside Uses



3.3.3 BICYCLE CORRALS AND MOBILITY HUBS

The curbside area on streets with sufficient space may be utilized to provide parking and amenity space that supports multiple modes of transportation. These spaces often occupy the space of one or two on-street parking spaces to accommodate on-street bicycle parking (also called bicycle corrals) and/or micromobility share (bikes, scooters). For additional information on bicycle parking, see [Section 4.7](#).



Applicable Street Typologies

- ▶ Main Street, Connector, Multimodal Connector



Relevant Resources

- ▶ AASHTO Guide for the Development of Bicycle Facilities (Chapter 16.3)
- ▶ NACTO Urban Bikeway Design Guide (Chapter 5.3)
- ▶ APBP Essentials of Bike Parking: Selecting and Installing Bike Parking That Works (Section 2)

3.3.4 LOADING ZONES

General Guidance

Where possible, locate both passenger and commercial loading zones at block ends for easier maneuverability and turnover.

For passenger loading, the site design should provide the lengths below for one vehicle. If more than one vehicle is expected to be accommodated at once, add 20' per extra vehicle.

- ▶ 20' length for far-side locations
- ▶ 40' length for near-side locations
- ▶ 60' length for mid-block locations, to provide maneuvering in and out

For commercial loading for box trucks or vans, provide 50' to accommodate entering, exiting, and parking within the loading zone.

Considerations

If a loading zone is adjacent to a bikeway, the design should minimize conflicts between users.

If a loading zone is next to a separated bikeway where the bikeway remains curbside, such as a parking-protected bikeway (see [Section 5.3](#)), the bikeway may be narrowed to a minimum width of 4 ft along the length of the loading zone (or a minimum of 8 ft if a two-way bike facility) with a minimum 5 ft buffer between the loading zone and bikeway. This 5 ft buffer provides space for various loading/ unloading activities to occur outside of the bikeway.

If a loading zone is next to a striped bike lane (See [Section 5.2](#)) where the loading zone is curbside, loading/ unloading vehicles will need to cross the striped bike lane to enter the loading zone. As with parking-adjacent striped bike lanes, the bike lane must be a minimum of 6 ft in width when adjacent to loading zones. This width allows for bicyclists to maneuver around the hazard of loading/ unloading activities. Green crossbikes and warning signage should be provided along the length of the loading zone to alert both bikeway users and loading zone users to the potential conflict.



Applicable Street Typologies

- ▶ Main Street, Connector, Multimodal Connector, Pedestrian Shared Street



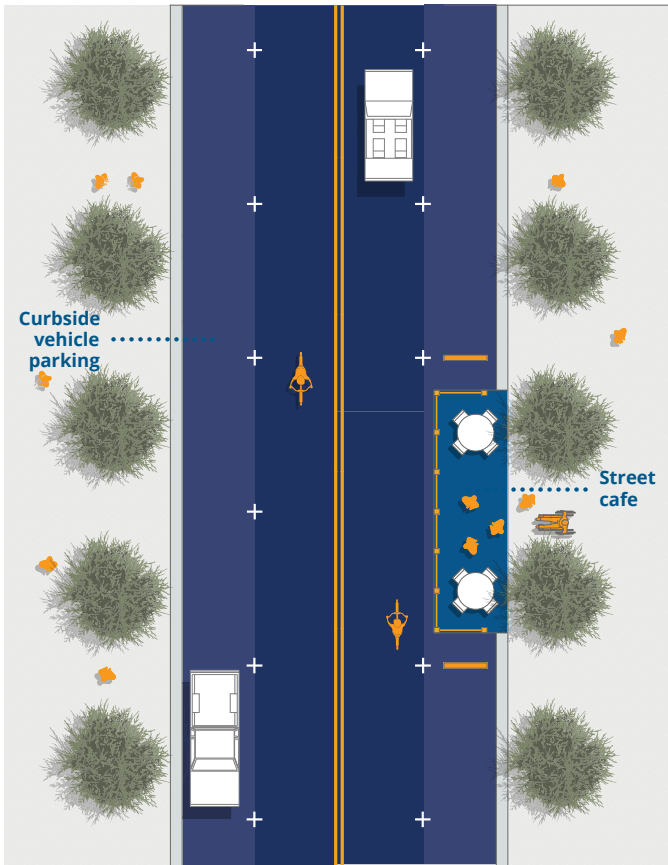
Relevant Resources

- ▶ NACTO Urban Bikeway Design Guide (Chapter 3.6)

3.3.5 PARKLETS AND STREET CAFES

Curbside parking lanes may also accommodate parklets and/or street cafes to extend the pedestrian zone into the street. Care should be taken when designing parklets and seating space within the parking lane to protect pedestrians from the travel lanes. Reference Town LDR Chapter 12.10 for additional requirements regarding parklets.

Figure 4. *Curbside Street Cafe*





Applicable Street Typologies

- ▶ Main Street, Connector, Multimodal Connector, Local, Pedestrian Shared Street



Relevant Resources

- ▶ NACTO Urban Street Design Guide

3.4 MEDIANS

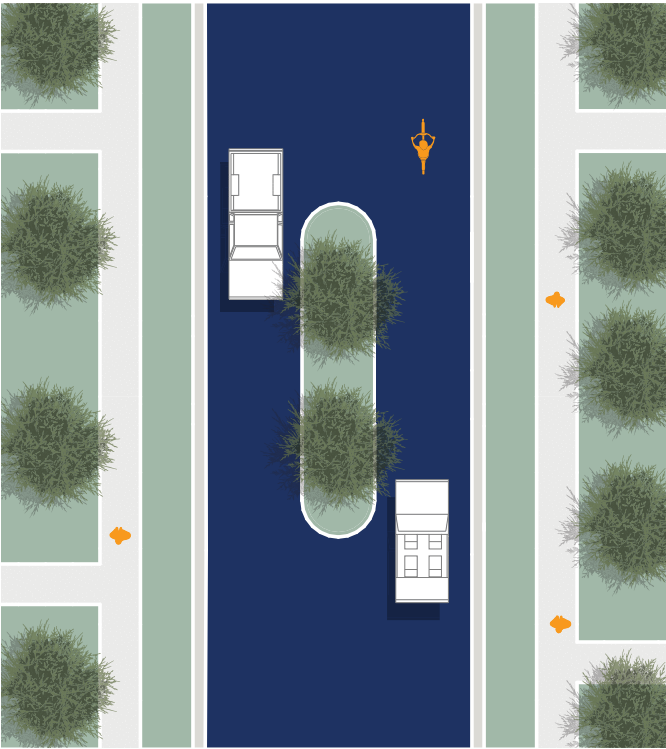
Medians provide a physical, typically raised, barrier between traffic lanes. They are an effective speed-calming measure, and are mentioned below in Traffic Calming, but they are also used for other intended benefits. They can be used to provide refuge for people walking and biking, to protect against head-on motor vehicle crashes, to prevent turns, and to provide space for greening. Medians can be installed as part of street reconstruction or retrofit projects.

GENERAL GUIDANCE

A 1 ft gutter pan is typically used with medians, but storm infrastructure such as catch basins may require a 2 ft gutter pan. The width of the gutter pan should not be calculated as part of the usable travel lane width. If parking is provided adjacent to a median, the gutter pan should be included in the width of the parking lane. See Lane Width section.

Medians should be landscaped, where possible, to provide street greening, shade, beautification, and green stormwater infrastructure where feasible. Landscaping shorter than 3 ft in height allows for continuous visibility across the median. Where trees are planted, gaps should be provided to create clear sight lines. Maintenance of median landscaping should be coordinated ahead of installation with the appropriate Town and/or County staff.

Figure 5. *Median*



CONSIDERATIONS

Medians may be designed to be mountable where there is a desire to maintain traversability while discouraging most vehicles from crossing. This consideration is typically for emergency vehicles near hospitals or fire stations. Mountable medians do not have the same benefits as typical curbed medians as they can be crossed by all types of vehicles.

Table 4. *Median Width Design Guidance & Applicability*

MEDIAN WIDTH (FEET)	GUIDANCE & APPLICABILITY
<6	On streets with constrained right of way, medians of <4 ft may be considered, but cannot serve as pedestrian refuge space; any pedestrian crossings through the median should assume the full street width for signal timing purposes and the median should not have detectable warning devices. Often found on local streets as traffic diverter 'islands'.
6	A median width of 6 ft is the absolute minimum that allows for an accessible pedestrian refuge space within the median per PROWAG. Detectable warning surfaces must be at least 2 ft from each other, and each DWS must be at least 2 ft.
8-10	Widths of 8 ft or greater are preferred as they allow for comfortable storage of bicycles and higher volume of pedestrians within the median refuge.
10-11	Widths of 10-11 ft allow for a consistent cross section with two-way left turn lanes (TWLTLs) or dedicated left turn lanes at intersections.

Medians may be placed on local streets, typically spaced periodically as traffic calming islands. These medians, or splitter islands, create a pinch-point in the center of the street, slowing vehicles as they navigate around the island. On most local streets, installation of an island will impact on-street parking for the full length of the island as well as at least one space on either end of the island to allow maneuvering back to the normal travel lanes.

Low-cost or interim/pilot medians may be implemented using paint and delineator posts. These may be effective during street retrofit projects before reconstruction. See Chapter 11 for additional information.

3.4.2 MEDIAN PEDESTRIAN REFUGE

Median refuges are spaces within median islands that accommodate (typically midblock) pedestrian crossings. The refuge shortens pedestrian crossing distances and minimizes potential conflict by splitting the crossing into two stages, requiring pedestrians to cross only one direction of travel at a time.

General Guidance

To provide an accessible refuge, the median must be 6 ft wide to provide detectable warning strips (2 ft) on each edge of the median with a 2 ft minimum gap in between.

To promote safe pedestrian behavior and better driver yielding, angling the cut-through or a z-crossing encourages eye contact between pedestrians and drivers. However, the detectable warnings, crosswalk, and receiving ramps should provide a perpendicular crossing of the street and not be angled or skewed. Rectangular Rapid Flashing Beacons (RRFBs) may be installed in tandem with Median Refuges to further enhance the crossing and promote driver yielding.



Applicable Street Typologies

- ▶ Arterial, Main Street, Connector, Multimodal Connector, Local, Neighborhood Bikeway



Relevant Resources

- ▶ AASHTO A Policy on Geometric Design of Highways and Streets (Chapter 4.11)
- ▶ AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities (Chapter 3.6)
- ▶ Public Right of Way Access Guidelines
- ▶ AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities (Chapter 3.6)

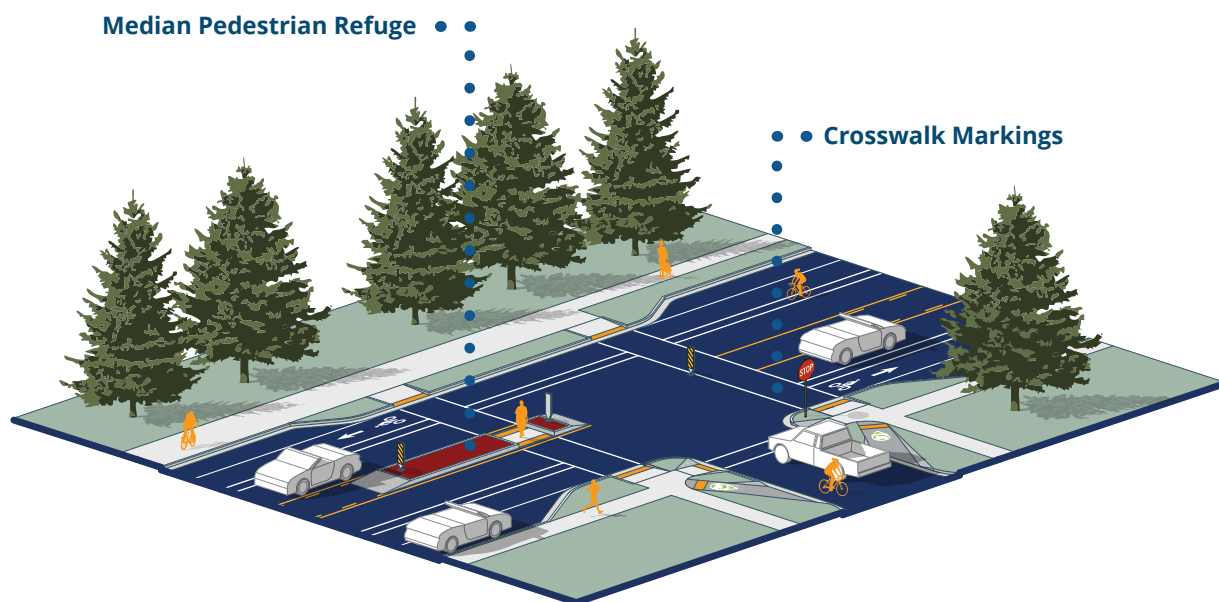


Figure 6. Median Pedestrian Refuge

3.5 TRAFFIC CALMING AND SPEED MANAGEMENT

A combination of vertical and horizontal traffic calming elements can be effective at managing safe speeds and traffic volumes appropriate for the street context. These features are most commonly applied on lower speed and volume neighborhood streets, but some of these features can be effectively applied on higher speed and volume roads as well.

GENERAL GUIDANCE

The matrix below outlines the various traffic calming elements that may be installed, as well as information related to the intended outcome of each. Design guidance for each individual element is provided in more detail following the matrix. Design guidance for intersection treatments can be found within the Intersection Section.

CONSIDERATIONS

Emergency services should be consulted prior to installation of vertical and horizontal speed control elements. Identification of designated emergency response routes can aid in the selection of streets to install speed control. The design details of speed humps, tables, and/or cushions can be informed by emergency vehicle specifications to allow emergency vehicles to pass over or through with little to no interference but still have the intended speed control for passenger vehicles.

Applications that narrow the travel way, such as medians, chicanes, and neck-downs/gateways should accommodate the minimum width required by emergency services and maintenance vehicles.

Coordination with emergency services to determine a length at which the minimum width requirement can be deviated from can be useful in placing traffic calming on narrower local streets.

Design and implementation of traffic calming features should include coordination with those responsible for street maintenance. Designs should limit debris, snow, and ice buildup. Sweeping and snow removal methods may need to be adjusted, including specific removal procedures and the use of operators who are familiar with the locations of traffic calming elements. See Chapter 12 for more information.

Table 5. *Intended Outcome of Traffic Calming Treatments*

Intended Outcome of Traffic Calming Installation								
Traffic Calming Element	Reduce Vehicular Operating Speeds	Reduce Vehicular Crash Severity, Frequency	Increase Pedestrian & Bicyclist Safety					
			Reduce Crossing Distance	Decrease Pedestrian Exposure	Increase Pedestrian Safety and Comfort	Reduce Conflict Points	Improved Visibility	Improved Sight Lines
Horizontal Deflection								
Curb Extension	X	X	X	X	X		X	X
Chicane	X							
Neckdown/ Gateway	X				X			
Traffic Circle/ Roundabout	X	X	X		X	X	X	
Median/ Median Refuge	X	X	X	X	X	X	X	X
Vertical Deflection								
Speed Hump	X	X			X			
Speed Cushions	X	X						
Speed Table/ Raised Crosswalk	X	X			X		X	X
Raised intersection	X	X	X		X		X	X



Relevant Resources

- ▶ NACTO Urban Street Design Guide
- ▶ NACTO Urban Bikeway Design Guide (Chapter 3)
- ▶ AASHTO Guide for the Development of Bicycle Facilities (8.4)
- ▶ FHWA Small Town and Rural Multimodal Networks (Chapter 2, 5)

3.5.1 VERTICAL DEFLECTION

Vertical traffic calming elements slow vehicle speeds through raised vertical deflections on the street that vehicles need to navigate over. They are most appropriate on streets with speed limits of 30 mph or less. Vertical deflections include speed humps, speed cushions, raised crosswalks, and raised intersections (discussed in [Section 7.7](#)).

Speed Humps and Cushions

Speed humps and cushions are parabolic vertical speed control devices designed to lower speeds to 15-20 mph. Speed humps are singular devices that span the full width of the travel way or street. Speed cushions are speed humps with cut-throughs that allow bicycles and emergency vehicles to pass through unimpeded while still requiring typical passenger vehicles to slow down. They are typically used on key emergency response routes.

Speed humps and speed cushions should be placed in a series and at regular intervals for speed calming purposes to maintain an 85th percentile speed of 20-25 mph along the street. For most local streets and neighborhood bikeways, the spacing should be less than 500 ft to maintain target speeds. Signs, like the MUTCD W17-1 “SPEED HUMP” with an advisory speed plaque, should accompany speed humps and cushions to warn drivers of the upcoming device. Speed humps and cushions shall not be placed in front of driveways or other accesses.

- 3-6" high, 12-14' long, with ramps 3-6' long

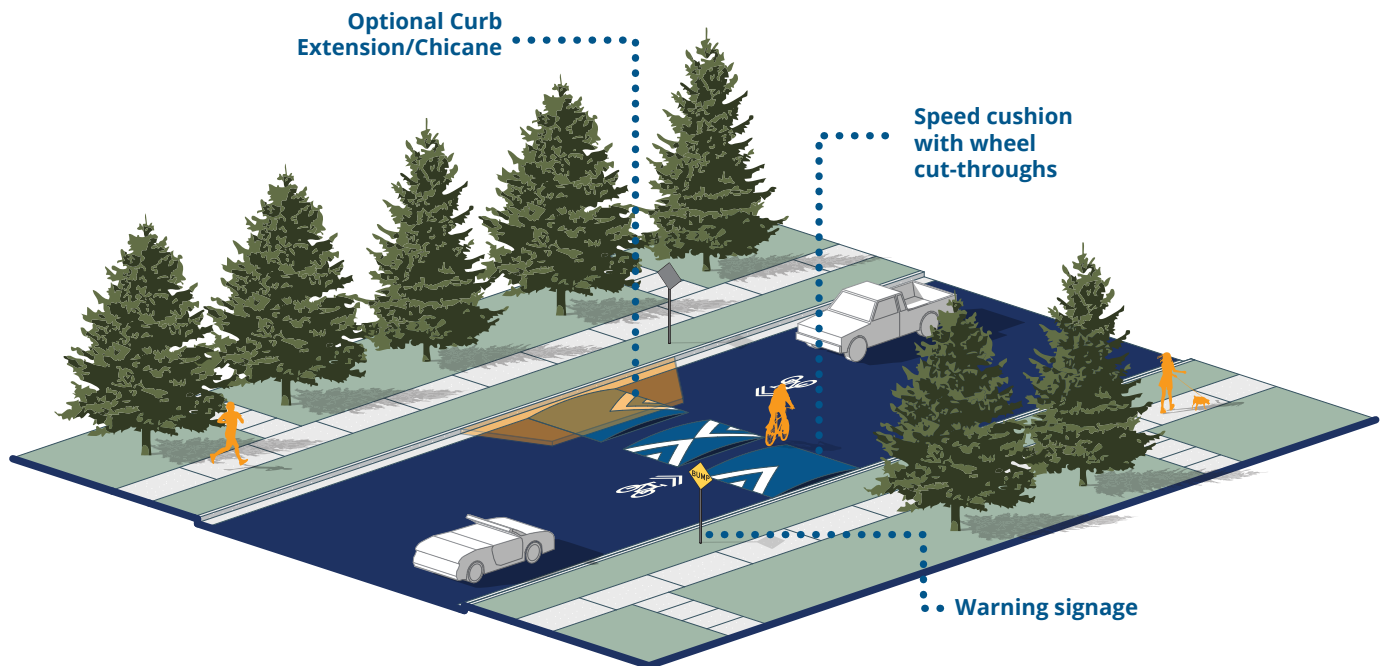


Figure 7. *Speed Cushion*

Speed Tables, Raised Crosswalks, and Continuous Sidewalks

Speed tables are longer than speed humps and raise the entire wheelbase of a passenger car when traversing to reduce traffic speed. When located at a pedestrian crossing location, midblock, or at an intersection, a speed table serves as a raised crosswalk. Similar to speed humps and cushions, signs (MUTCD W17-1 "SPEED HUMP") should be installed with speed tables to warn drivers of the raised element. If used as raised crosswalk, a MUTCD W11-2 Pedestrian Crossing sign with arrow plaque should be installed at the crossing location.

- ▶ 3-6" high, 22' long including ramps 3-6' long

Raised crosswalks increase visibility of pedestrians by keeping them at sidewalk height and encourage driver yielding behavior by slowing vehicles down prior to the crossing. Reference the Raised Crosswalk Section for additional information.

Continuous sidewalks and bikeways are a side street application of a raised crosswalk, maintaining a continuous surface for pedestrians and cyclists and slowing vehicles turning onto or off of the side street as they cross the sidewalk or cycle track. Reference [Section 8.5](#) for additional information.



Applicable Street Typologies

- ▶ Local, Neighborhood Bikeway, Pedestrian Shared Street, Main Street

3.5.2 HORIZONTAL DEFLECTION

General Guidance

Horizontal traffic calming elements slow vehicle speeds through horizontal deflection that alters the configuration of the street. Horizontal traffic calming treatments include chicanes and neck-downs, discussed in this section; as well as median islands discussed in [Section 3.4](#); and curb extensions and traffic circles, discussed in [Section 7.4](#) and [Section 7.8](#), respectively.

Chicanes

Chicanes slow driving speeds by creating a sinusoidal travel path with the use of islands or on-street parking that alternates sides of the street. Chicanes may be implemented with curb extensions, islands, or alternating parking. Parking-only applications are best used on streets with high parking utilization to achieve the desired horizontal deflection.

Chicanes have an impact on on-street parking to provide adequate space for the lateral shift in travel path. Drive path simulations should be performed to identify the space needed at the target speed of 15-20 mph. Signs that clearly mark where cars can and cannot park should be installed to maintain maneuvering space and, especially in parking-only applications, to create the desired chicane effect.

Neck-Downs / Gateways

Neck-downs or gateways, also referred to as chokers or pinch points, utilize curb extensions to narrow the street width to deter traveling at high speeds. When installed at midblock crossing locations, neck-downs increase pedestrian visibility and safety by shortening the crossing distance and bringing pedestrian visibility in front of parked cars.

Neck-downs or pinch points impact on-street parking for the length of the pinch point and the

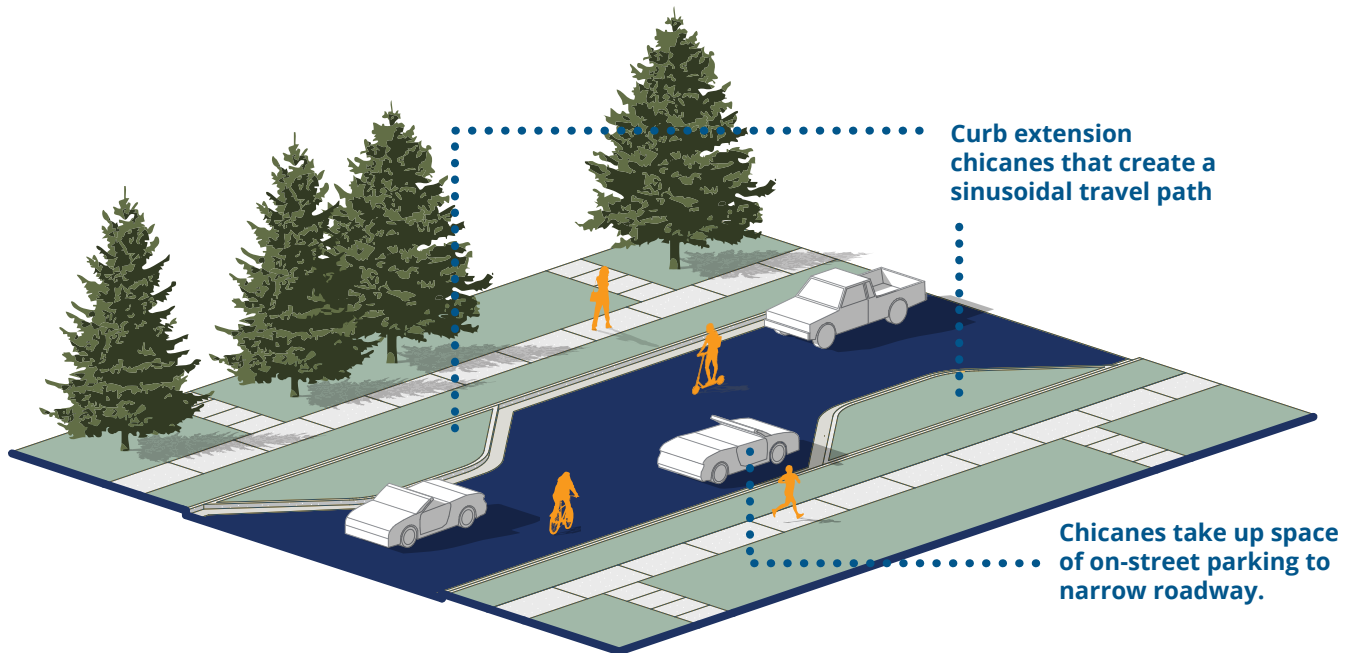


Figure 8. *Chicane*



Applicable Street Typologies

- Main Street, Multimodal Connector, Local, Neighborhood Bikeway, Pedestrian Shared Street

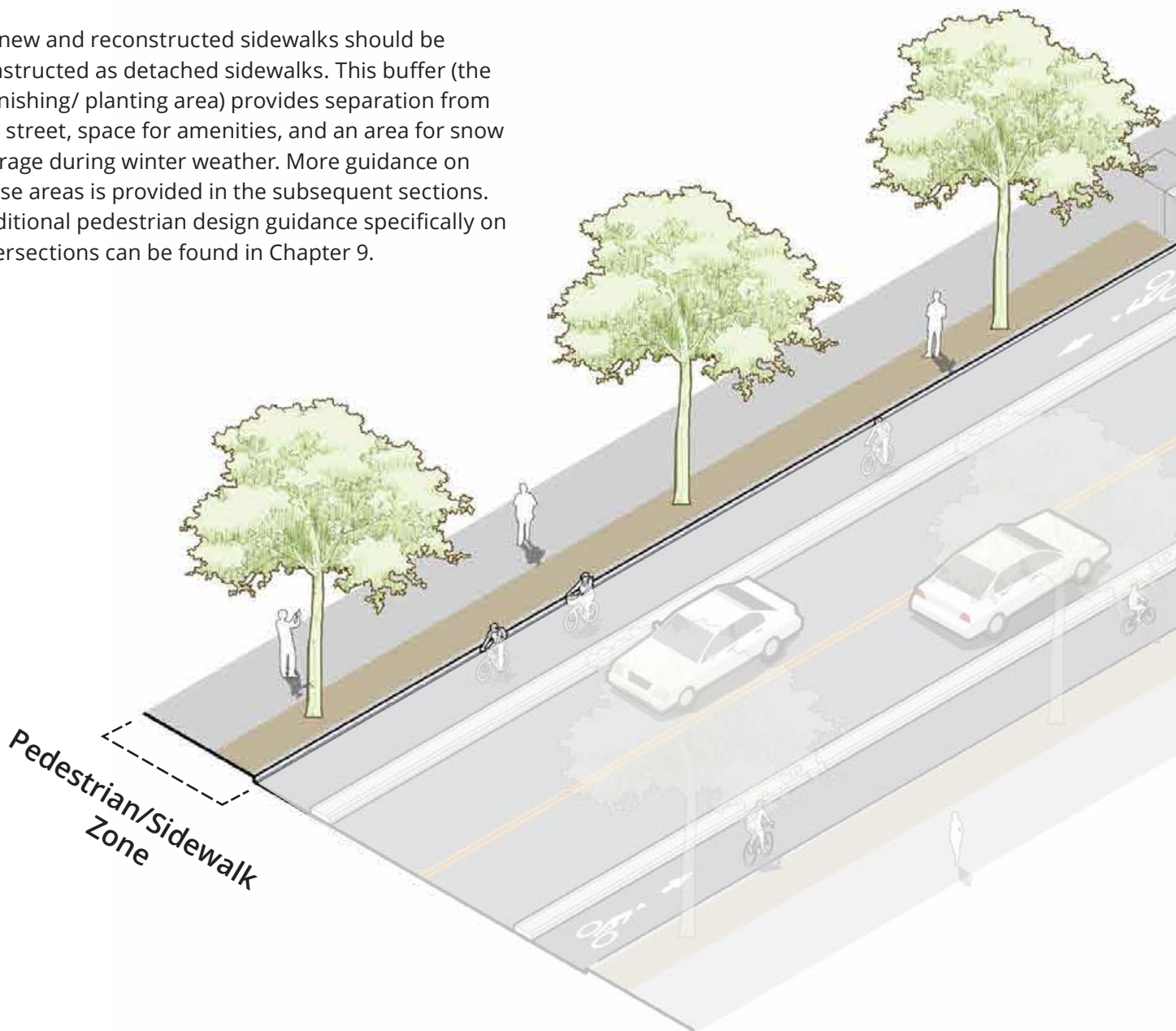
CHAPTER 4

Pedestrian/ Sidewalk Zone

4 Pedestrian/Sidewalk Zone

Comfortable, safe, and accessible pedestrian facilities play an essential role in creating better public spaces for everyone. Building and maintaining accessible sidewalks and adjacent zones is a critical part of any transportation network. The pedestrian zone is the portion of a street that is between the edge of street and the edge of right-of-way. For the purpose of this chapter, sidewalks include the building transition/frontage area adjacent to buildings, the pedestrian through area for people to walk and roll through, and the furnishing/ planting area near the curb.

All new and reconstructed sidewalks should be constructed as detached sidewalks. This buffer (the furnishing/ planting area) provides separation from the street, space for amenities, and an area for snow storage during winter weather. More guidance on these areas is provided in the subsequent sections. Additional pedestrian design guidance specifically on intersections can be found in Chapter 9.



4.1 INCLUSION OF SIDEWALKS

4.1.1 GENERAL GUIDANCE

Sidewalks should be included on both sides of any newly constructed street. Pathways or other facilities intended for shared use by pedestrians and cyclists negate the need for an additional sidewalk as the shared facility is providing use for pedestrians. However, streets with a pathway on one side should aim to provide a sidewalk or pathway on the other side as well.

A street without any local access on one side, such as adjacent to a highway or cemetery, may only have a sidewalk on the side of the street with local access.

Development projects should include construction of a continuous sidewalk system adjacent to the development and connecting to the existing sidewalk system. This includes properties that border an alley or driveway; the sidewalk should be extended across the alley or driveway to connect to the sidewalk on the other side and provide a continuous facility. See [Section 8.4](#) for design guidance on continuous crossings. Sidewalk construction beyond the property frontage or on an adjacent block may be required as a result.



ADA

The Americans with Disabilities Act (ADA) prohibits discrimination on the basis of disability and mandates equal opportunity for individuals with disabilities. Teton County follows the most recent 2010 ADA Standards for Accessible Design and looks to the 2023 Accessibility Guidelines for Pedestrian Facilities in the Public Right of way (PROWAG) for guidance on how to supplement the 2010 ADA Standards. Key elements from those standards are included in this sidewalk guidance to ensure accessibility. Sidewalks shall be designed in accordance with current ADA guidelines.

4.2 SIDEWALK AREAS

The pedestrian/sidewalk zone is one of three street zones (along with vehicle and bicycle zones). The sidewalk zone is typically located directly adjacent to the edge of the public right of way. Sidewalks serve as the backbone of the pedestrian network and support access between private property and streets. Sidewalks are for people to walk or gather. Bicycles may use the sidewalk zone as allowed by law or where pathways are co-located in the sidewalk zone. More information on pathways can be found in Chapter 6. Motor vehicles also may need to travel across the sidewalk zone to access private property via driveways or alleys.

GENERAL GUIDANCE

Building Transition Area

The Building Transition Area is located immediately adjacent to the edge of the public right of way. This area is sometimes referred to as the Frontage Zone/ Area. This area provides space for street users to access land uses and serves as a buffer between the Clear Sidewalk Area and buildings, structures, or elevation changes. Potential uses in this area include landscaping, transit shelters, retail displays, building door-swing buffers, sidewalk cafes and seating, or other features that make the pedestrian environment more attractive.

Clear Sidewalk Area

The Clear Sidewalk Area (often referred to as the sidewalk) is located between the Building Transition Area and the Furnishing/ Planting Area. This area provides space for pedestrians to travel along streets and must be kept clear of obstructions, vertical discontinuities (e.g. manhole or utility covers that protrude up), slippery surfaces (e.g. tree grates or other slick metal), and non-compliant cross slopes. The Clear Sidewalk Area serves as the Pedestrian Access Route (PAR), as defined by the Americans with Disability Act of 1990. The Pedestrian Access Route ensures a minimum passable space for those using mobility devices such as wheelchairs and provides predictability for those using other devices such as canes.

Furnishing/Planting Area

The Furnishing/ Planting Area is located between

the Clear Sidewalk Area and either the bikeway zone or the street zone. This area provides separation between people walking and motor vehicles/ bicyclists. This area also provides space for many activities: space for pedestrians to gather or wait for transit, trees, landscaping, greening, furnishings, snow storage, signs, wayfinding, streetlights, street signal infrastructure, utility cabinets, bicycle and scooter parking, charging stations for electric vehicles, and the curb. Some of these uses are discussed further in this Chapter.

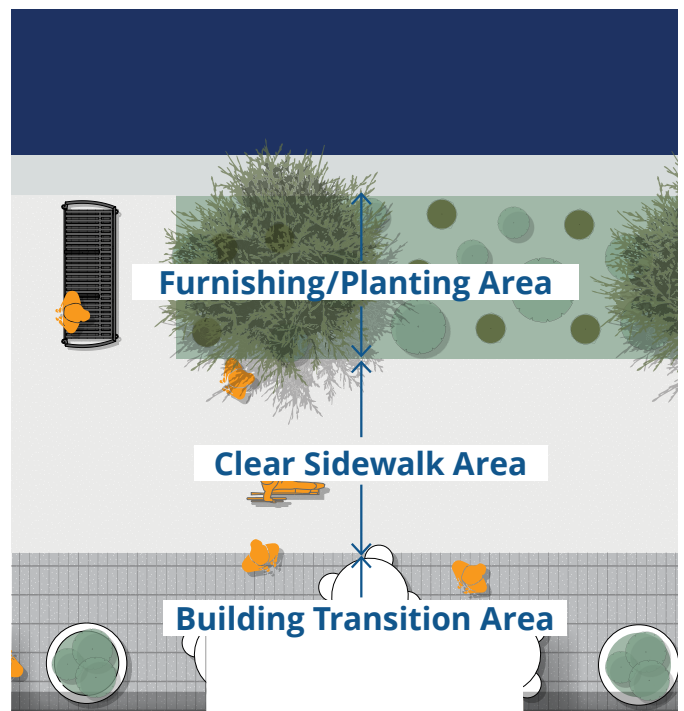
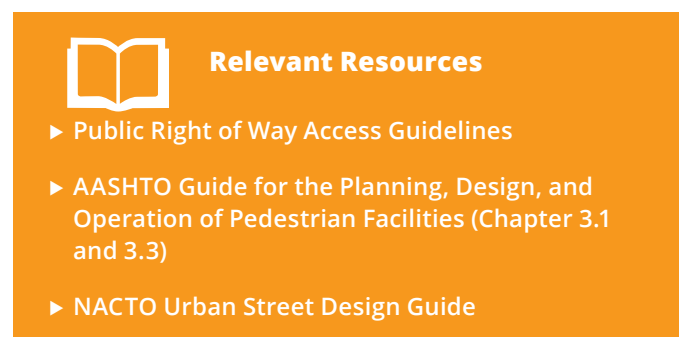
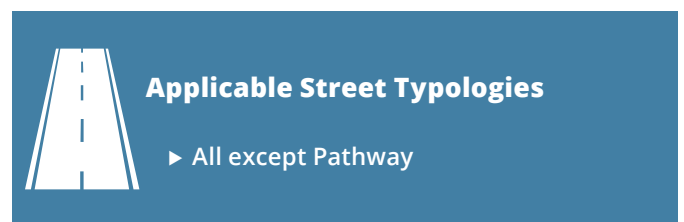


Figure 9. Sidewalk Areas



4.3 SIDEWALK WIDTHS

A balanced approach for determining the width of pedestrian zones begins with an understanding of conditions and must also consider the character of the surrounding neighborhood, existing and anticipated pedestrian activities, and existing and

anticipated land uses and zoning abutting the right-of-way. The width of the pedestrian realm should also be influenced by the street width, traffic volumes, and traffic speeds.

Table 6. Recommended Sidewalk Area Widths (Feet)



Street Typology	Building Transition Area (Feet)	Clear Sidewalk Area* (Feet)		Furnishing/Planting Area (Feet)		Total Width (Feet)
	Recommended	Recommended	Minimum	Recommended	Minimum	
Arterial	2+	8+	6	6	4	12-16+
Main Street	2+	10+	6	6+	4	12-18+
Connector	2+	8+	6	6	4	12-16+
Multimodal Connector	2+	8+	8	6+	4	12-16+
Local	1+	6+	5	4+ for trees	2	7-11+

*Attached sidewalks should be a minimum of 7.5 ft wide, while detached sidewalks should be a minimum of 5 ft wide. Areas with high pedestrian activity should consider wider sidewalks.

4.4 COVERED WALKWAYS

GENERAL GUIDANCE

Within certain areas of the Town of Jackson covered walkways, attached to the adjacent buildings, are provided within the pedestrian zone. The following guidelines apply to the pedestrian frontage to retain and replicate the western character of the historic center of Jackson. Additional information can be found in the Jackson Downtown Design Overlay and Historic Preservation Design Guidelines.

All boardwalks along these covered walkways must meet criteria for providing an unobstructed pedestrian travel way that meets ADA criteria. Roof support posts and a building frontage zone should be fully outside of the Clear Sidewalk Area. Boardwalk surfaces should be 2"x 6" decking without gaps, maintained to be free of protruding screws and/or warped boards. See the relevant Town of Jackson standards for further information.

Clear sidewalk area

The clear area provided for pedestrians travelling on covered boardwalks within downtown commercial areas should, wherever possible, provide 10 ft of clear width to allow pairs of pedestrians to meet and pass. Within the Town Square Zoning Overlay, part of the boardwalk Clear Sidewalk Area may be accommodated on private property if within constrained ROW.

Building transition area

A min. 2.5 ft buffer zone of additional boardwalk width is desired to be provided on private property to accommodate door openings, window shopping, and merchandise displays. Where outdoor dining is desired, the building transition area should be increased to accommodate the boardwalk use without encroachment into the 10 ft pedestrian Clear Sidewalk Area.

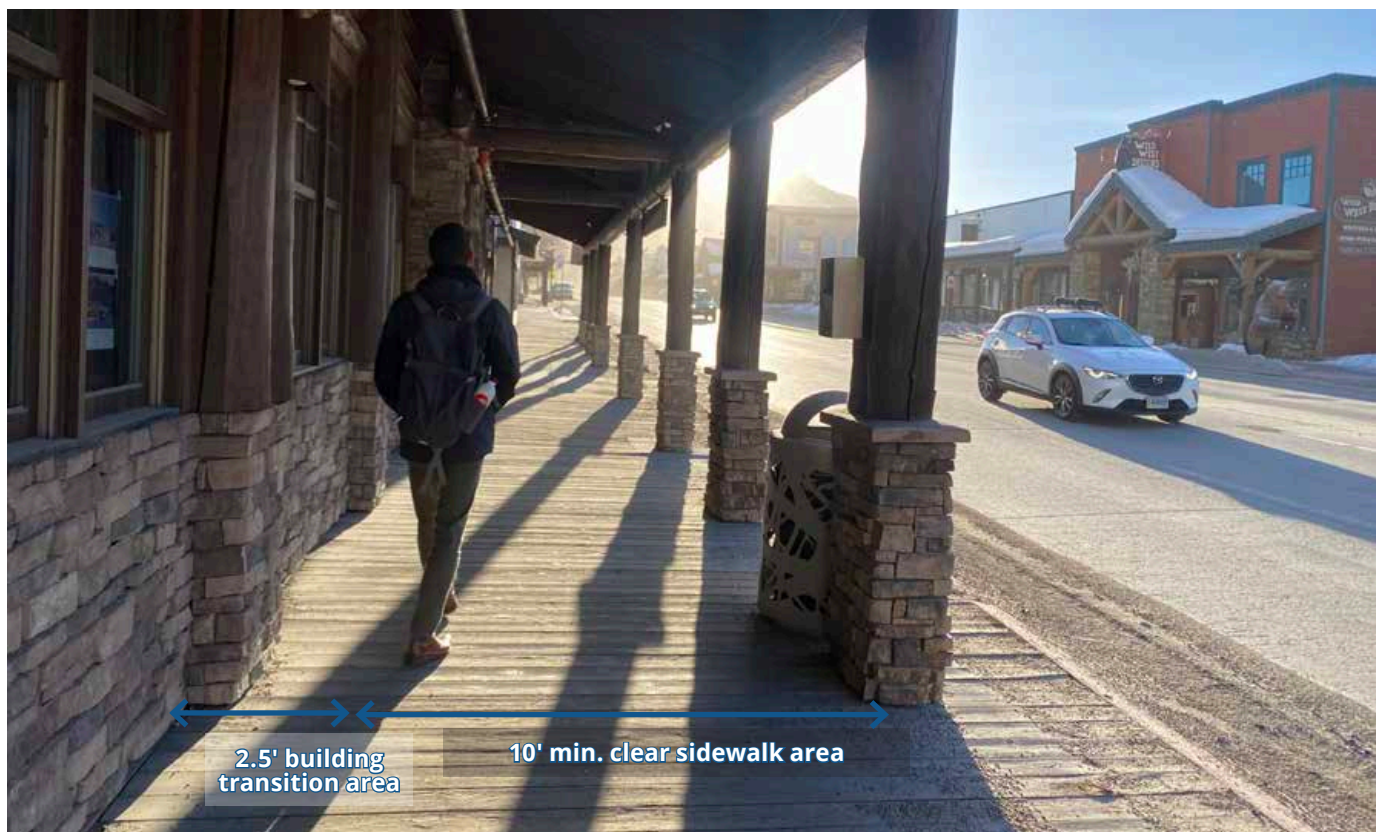


Figure 10. Covered Boardwalk



Applicable Street Typologies

- Main Street, Pedestrian Shared Street

4.5 LANDSCAPING & STORMWATER MANAGEMENT

Street trees, green stormwater infrastructure (GSI), and landscaping/ greening are a critical part of the public right-of-way with numerous benefits. Landscaping and green stormwater infrastructure are typically located within the amenity zone.

GENERAL GUIDANCE

Landscaping encompasses a range of vegetative and pervious treatments that include street trees, grass, native plantings, or GSI, which additionally provide aesthetic, stormwater management, and cooling benefits. Street trees should generally be prioritized over other types of vegetation; designers should make every effort to provide space for street trees on both sides of the street whenever feasible, balancing other demands for the street.

For additional information such as species, spacing, and other requirements, refer to Teton County LDR Div. 5.5 and Town of Jackson LDR Div. 5.5 on Landscaping Standards. Also refer to the Strategic Stormwater Program Plan and Town Municipal Code, Title 12 for best practices, maintenance, clearance, and visibility requirements.

Green stormwater infrastructure along streets includes a variety of storm management practices such as bioretention, bioswales, and permeable pavement. GSI is typically integrated into landscaping, providing greening while capturing, managing, and filtering stormwater. For additional information on stormwater requirements refer to Teton County LDR Div. 5.7.4 and Town of Jackson LDR Div. 5.7.4 on Stormwater Management Standards.

CONSIDERATIONS

More space for street trees/landscaping should be provided whenever feasible while balancing other demands for the street. In most cases, designers should make every effort to include at least 5 ft of space on both sides of the street to support healthy street trees and green stormwater infrastructure. If needed, these strategies should be considered, in combination as needed, to support healthy trees on both sides of the street:

- ▶ Eliminating parking from one side of the street;
- ▶ Provide midblock curb extensions to provide

space for trees in between pockets of parking spaces;

- ▶ Narrowing the Clear Sidewalk Area width to 5 ft can be considered in some street types if needed to accommodate a tree-supporting boulevard or to address critical flooding concerns/green stormwater infrastructure needs. Every effort should be made to first narrow the street zone to accommodate street trees and pedestrian needs before narrowing the pedestrian zone. Narrowing the pedestrian through zone width below 6 ft should not be done on streets with high pedestrian demand.



Relevant Resources

- ▶ [NACTO Urban Street Stormwater Guide](#)
- ▶ [EPA Green Streets Handbook \(2021\)](#)

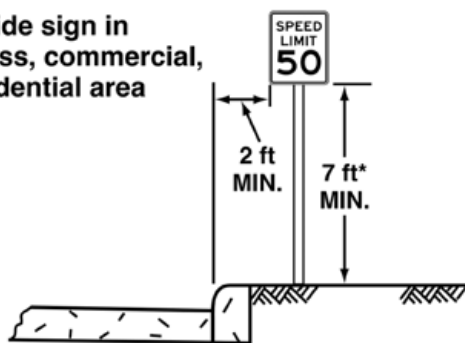
4.6 UTILITIES & SIGNS

GENERAL GUIDANCE

Refer to the MUTCD for sign clearance requirements. 2 ft of clearance is generally required from the face of curb to utilities and signs, including fire hydrants, utility poles, waste bins, signs, and bike racks. 1 ft minimum clearance should be used between the face of curb and the edge of the foundation for streetlights. 7 ft of vertical clearance should be provided for signs placed adjacent to a pedestrian facility, especially if the Furnishing/ Planting Area is less than 3 ft, to provide space for pedestrians to walk unimpeded by the sign panel.

For maintaining pedestrian and bicycle clear zones, utilities and signs (besides signal push buttons) should not be located in the clear corner zone, the pedestrian clear zone, or bikeways. Refer to the Public Right of Way Access Guidelines (PROWAG) and the AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities guide for detailed obstruction limits.

C – Roadside sign in business, commercial, or residential area



*Where parking or pedestrian movements are likely to occur

Figure 11. MUTCD Figure 2A-2



Relevant Resources

- ▶ AASHTO Guide for Planning, Design, and Operation of Pedestrian Facilities (Chapter 3.3)
- ▶ Manual on Uniform Traffic Control Devices (Part 2)
- ▶ Public Right of Way Access Guidelines
- ▶ WYDOT Standards

4.7 BICYCLE PARKING

GENERAL GUIDANCE

Location and Spacing

Refer to Teton County LDR Div. 6.2.2 and Town of Jackson LDR Div. 6.2.2 for required bicycle parking facilities and location and Town of Jackson LDR Appendix A – Short-Term Bicycle Parking Specifications for detailed layout options and design considerations.

The best location for racks is immediately adjacent to the entrance it serves. The rack area should be as close or closer to the front entrance than the nearest car parking space. Racks should not be placed in the clear corner zone, in the accessible boarding/ landing area of a transit stop, in a loading/unloading zone, or in a location that would block a fire escape.

Bike racks should accommodate a variety of bicycle types and sizes. See [Section 2.3](#) for additional information on the types of bicycles and micromobility devices that should be planned for.

Mounted bike racks should be placed on a flat, hardscape surface not to exceed a 2% slope. Bike parking should be easily accessible for cyclists to get to from the street or bicycle facility, either in a parking corral adjacent to the street/bikeway or via a curb ramp.

NEARBY ELEMENT	MINIMUM CLEARANCE DISTANCE
Edge of Door	2'
Utilities	2'
Fire Hydrants	10'
Face of Curb	2.5'
Street Furnishings that Require Access (e.g. benches)	5'

Table 7. Clearance Minimums for Bicycle Parking

Proper clearance should be maintained from bicycle rack to other elements. The minimum distances should be as follows:

Additional bike rack installation and layout standards may be found in Appendix A of the LDRs.

Maintaining Pedestrian Access Routes

A minimum 6 ft Clear Sidewalk Area must be retained adjacent to bicycle racks to ensure that the minimum Pedestrian Access Route (PAR, as defined by the Americans with Disability Act of 1990) is retained when bicycles are parked as they may extend into the sidewalk area.



Applicable Street Typologies

► All



Relevant Resources

- [AASHTO Guide to the Development of Bicycle Facilities \(Chapter 16\)](#)
- [NACTO Urban Bikeway Design Guide \(Chapter 5.3\)](#)
- [APBP Essentials of Bike Parking: Selecting and Installing Bike Parking That Works \(2015\)](#)

4.8 STREET LIGHTING

GENERAL GUIDANCE

Street lighting contributes to the safety and comfort of all street users by increasing visibility of the street context and of other users. On pedestrian-priority streets, pedestrian-scale lighting should be considered along pedestrian sidewalks, paths, and boardwalks and prioritized at intersections to improve the visibility and safety of pedestrians traveling during darker times of day. Lighting contributes to pedestrian safety by improving their ability to see their designated space and any obstructions as well as drivers' ability to see the pedestrians and other users.

Street lighting should generally be placed at intersections with multi-user crossings and as needed in the Furnishing/ Planting Area, between the sidewalk and the street. When adjacent to a bikeway, there should generally be a minimum clearance of 2 ft between the streetlight foundation and the bikeway.

CONSIDERATIONS

Street lighting designers should consider light pollution and avoid excessive lighting. Dark-sky policies may impact the quantity and brightness of lighting allowed. For additional lighting guidance and standards, refer to Teton County LDR Div.5.3.1 and Town of Jackson LDR Div. 5.3.1.



Relevant Resources

- ▶ AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities (Chapter 3.3.10)



Applicable Street Typologies

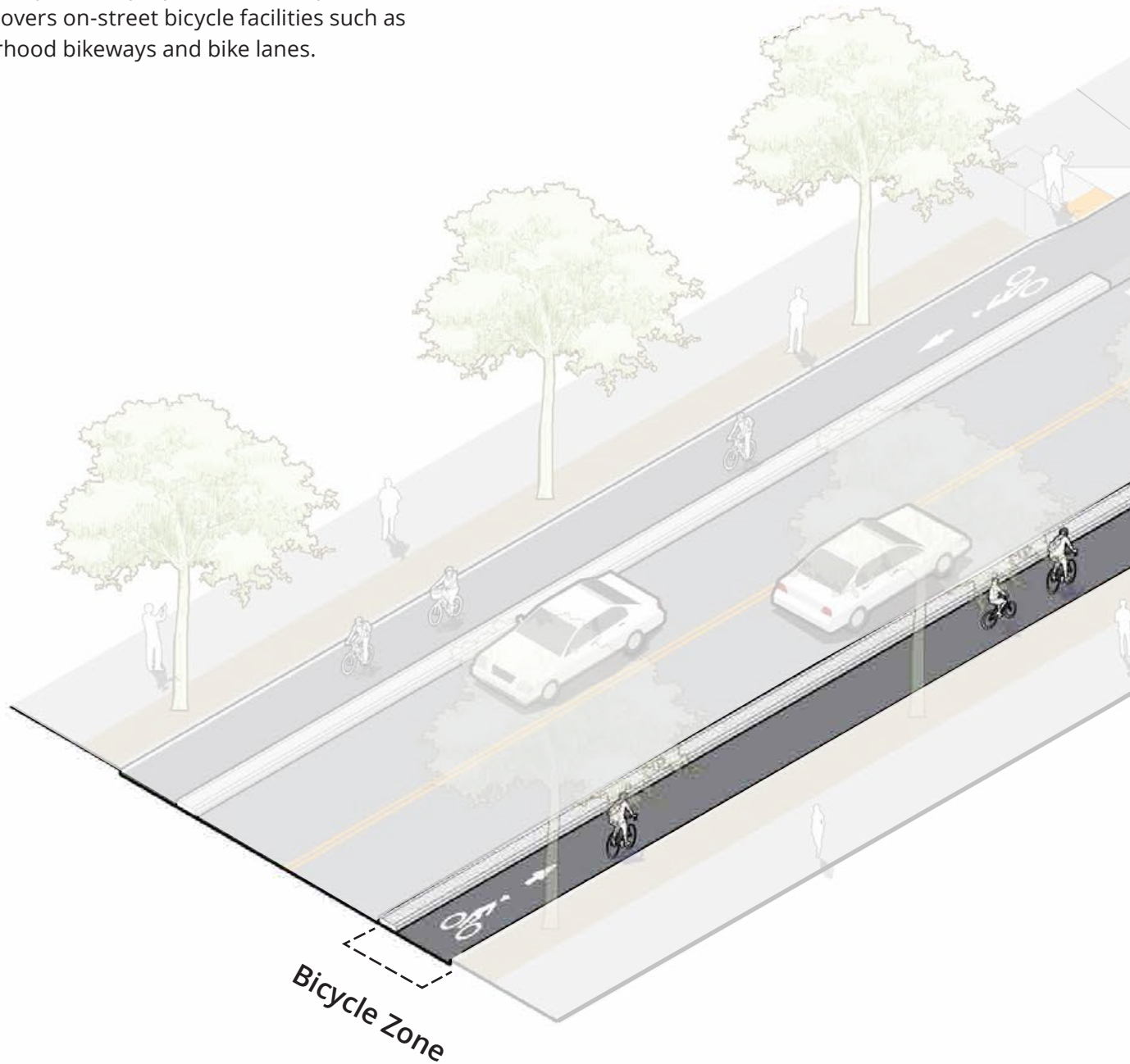
- ▶ Main Street, Multimodal Connector, Local, Neighborhood Bikeway

CHAPTER 5

Bicycle Zone

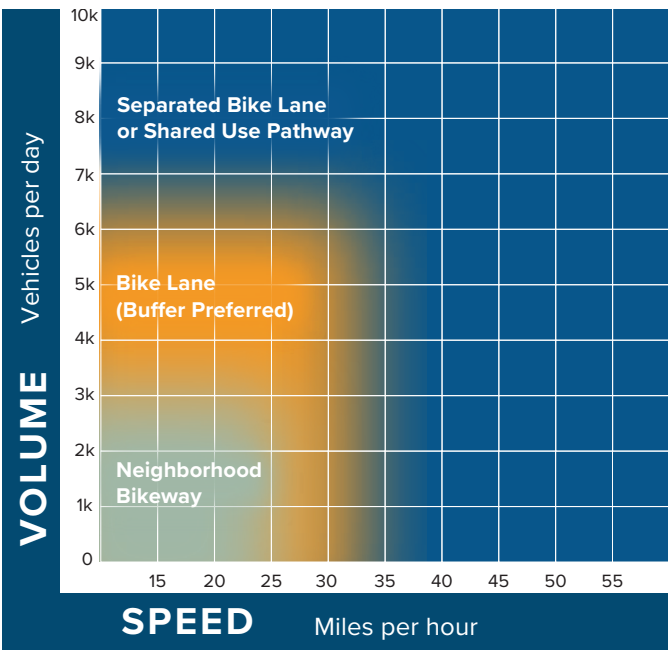
5 Bicycle Zone

Building and maintaining a safe, comfortable, and connected bicycle network is critical to a complete transportation network. Reference the Community Streets Plan for prioritized bikeway corridors. A comprehensive bicycle system typically consists of a variety of facility types, based on street contexts, expected users, and intended function. For design guidance related to the Town of Jackson/Teton County Pathways, please see Chapter 6. This section covers on-street bicycle facilities such as neighborhood bikeways and bike lanes.



5.1 FACILITY SELECTION

Bikeway facility design should meet the needs of a diverse array of potential bike riders. An All Ages and Abilities (AA&A) bikeway is one that is comfortable for all users. Many people are interested in bicycling, both for recreation or transportation purposes, but are dissuaded by stressful and uncomfortable interactions with motor vehicles. AA&A facilities are designed with considerations for age, ability, type of bicycle, socioeconomic status, race, and gender. High quality AA&A facilities can encourage and increase usage by a broader variety of people.



Notes
1 Chart assumes operating speeds are similar to posted speeds. If they differ, use operating speed rather than posted speed.

Figure 12. Bicycle Facility Selection Chart (AASHTO Guide for the Development of Bicycle Facilities)

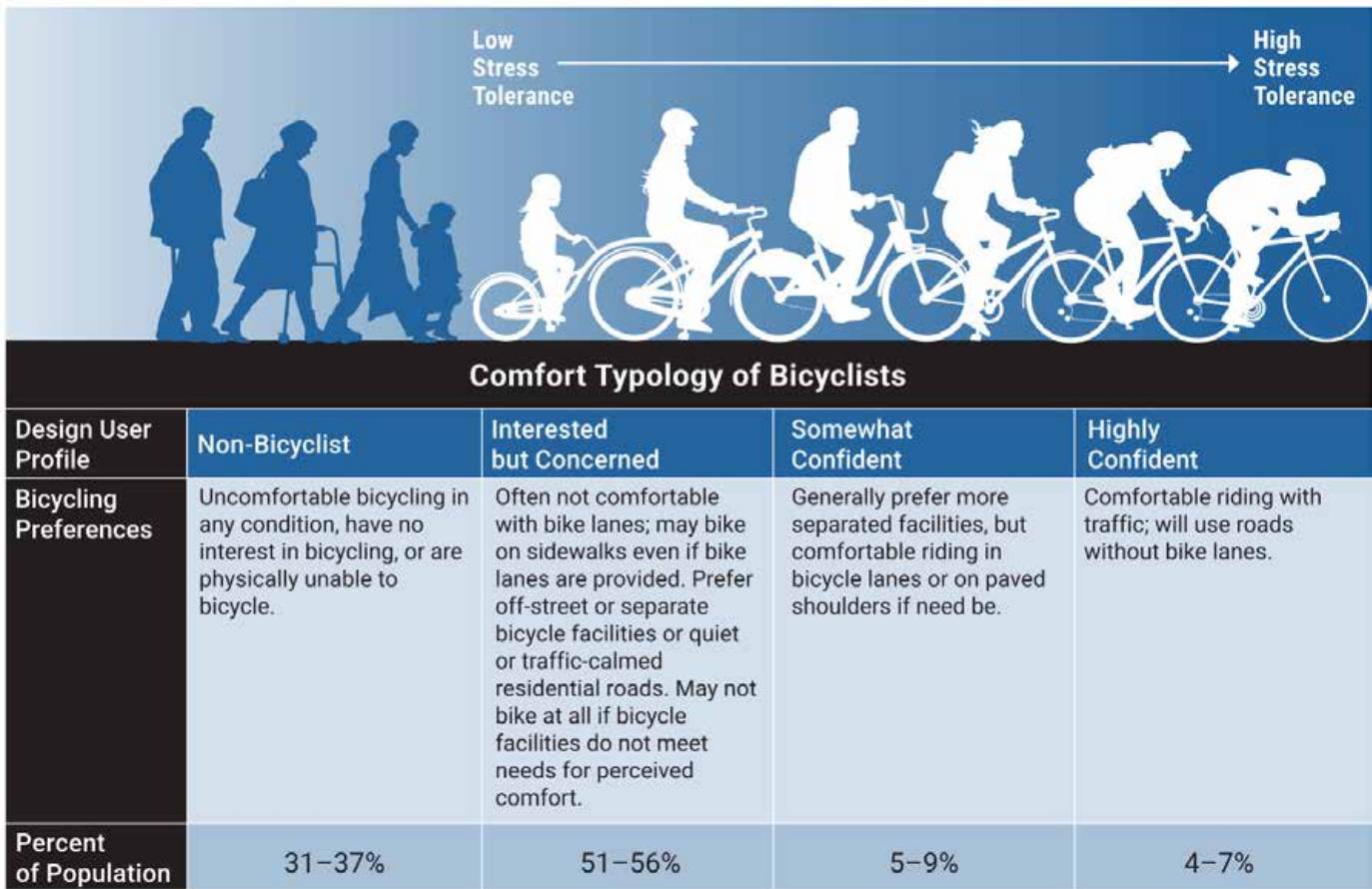


Figure 13. Comfort Typology of Bicyclists (AASHTO Guide for the Development of Bicycle Facilities, Section 2.3)

The table below provides general recommended AA&A facility types based on street volumes and speeds. When selecting a bikeway facility, other considerations should be made such as broader network goals, transit use, adjacent land use, and curbside demand. The following sections provide information and guidance on each type of bicycle facility.

Table 8. *Bicycle Facility Selection Guidance*

BICYCLE FACILITY SELECTION GUIDANCE	AADT	SPEED	APPLICABLE STREET TYPOLOGY
Neighborhood Bikeway	Desired <2k, max 3k	Desired 20 mph, max 25 mph	Neighborhood Bikeway, Local
Bike Lane <i>Should have buffer wherever space permits regardless of low speeds / volumes</i>	Desired <3k without buffer, max 6k with buffer	Desired 20 mph, max 30 mph	Connector, Multimodal Connector, Main Street
Separated Bike Lane	Applicable with any AADT, strongly desired anywhere >6k	Applicable with any speeds, strongly desired anywhere >25 mph	Arterial, Connector, Multimodal Connector, Main Street
Pathway	N/A	N/A	Pathway

CONSIDERATIONS

In some cases, a bicycle facility may face constraints that cause it to fall short of the desired criteria. This improved bicycle facility can still significantly improve comfort and safety for bicyclists; the inability to meet desired criteria should not be used as an excuse to avoid implementing a bikeway but engineering judgement should be used to balance all other street design elements to provide the best facility possible.



Relevant Resources

- ▶ [AASHTO Guide for the Development of Bicycle Facilities \(Chapter 4\)](#)
- ▶ [NACTO Urban Bikeway Design Guide \(Chapter 2.1 and 3.1\)](#)

5.2 STRIPED BIKE LANES

This section refers to conventional striped bicycle lanes that are not physically separated from the adjacent traffic, although they may be buffered. Where space allows all striped bike lanes should have a buffer between adjacent vehicular traffic, regardless of vehicular speeds and volumes. This type of bicycle lane is only appropriate on streets with low enough traffic speeds and volumes, see Section 5.1 for additional guidance.General Guidance

GENERAL GUIDANCE

The gutter should not be included in the width for any bike lane adjacent to the curb.

CONSIDERATIONS

In constrained areas, vehicle lanes should be narrowed as much as possible to accommodate preferred bicycle lane widths and buffers adjacent to on-street parking.

On streets with low volumes and speeds, conventional bike lanes adjacent to on-street parking with low turnover may omit the buffer between the bike lane and parked cars. On streets with posted speed limits greater than 25 mph and daily traffic volumes greater than 3000 vehicles per

day, consider speed and/or volume management strategies (see Section 3.5) to bring the street within these thresholds or consider removing parking on one or both sides of the street to provide buffers. Constrained bike lanes adjacent to parking without a buffer on streets with greater speeds and/or volumes than these will not serve cyclists of all ages and abilities comfortably.



Applicable Street Typologies

- ▶ Arterial, Main Street, Connector, Multimodal Connector, Local



Relevant Resources

- ▶ AASHTO Guide for the Development of Bicycle Facilities (Chapter 9.4, 9.5)
- ▶ NACTO Urban Bikeway Design Guide (Chapter 3.2.4)

Table 9. Bike Lane Width Recommendations

BIKE LANE CONTEXT	ADJACENT CONTEXT	BIKE LANE WIDTH MINIMUM WIDTH (FEET)	BIKE LANE WIDTH PREFERRED (FEET)
	Adjacent to edge of pavement or curb (exclusive of gutter)	5	6-7
	Between vehicle through-lanes and turn-lanes	5	6-7
	Between striped buffers	4	6-7
	Adjacent to parking	6	6-7
High Volume of Bicyclists (passing and/or side-by-side riding expected)		6.5	8-10 - with buffer to discourage use as parking lane
Cargo bikes or other large bikes expected		6.5	8-9 - with buffer to discourage use as parking lane

5.3 SEPARATED BIKEWAYS

Separated bikeways provide safe and comfortable facilities for people of all ages and abilities (AA&A). Separated bikeways is a term for any facility intended primarily for bicyclists that provides a certain level of separation and protection from the adjacent motor vehicle traffic. Protected bike lanes, raised bike lanes, and two-way bike lanes (often called cycle tracks) are all types of separated bikeways. They are an important tool in the effort to create a safer and more inclusive multimodal network.

GENERAL GUIDANCE

A separated bikeway physically separates bicyclists from both motor vehicle traffic and the sidewalk. They may be one-way or two-way, and may be at street level, at sidewalk level, or at an intermediate level. A variety of treatments and methods can be used to physically separate these bike lanes from traffic.

Separation options can include raised medians, raised landscaped medians, cast-in-place curb, pre-cast curb, bollards, and flexible delineators between the striped bike lane and travel lane, typically in a buffer space. Parked cars may also be used as bikeway separation when parking is provided between the travel lane and bicycle lane. The roadway volume, speeds, and other characteristics should be considered when selecting the separation type. Generally flexible delineators or other quick-build materials are best for either temporary use or on lower volume/speed streets. Curbs, medians, and parked cars provide more comfortable protection for bicyclists at street level, and raised bikeways with a buffer provide the highest level of comfort.

See Table 10 for general consideration for eactype of protection/ separation. The context, intent, expected/ design user, and network connectivity should all be considered when choosing the protection type.

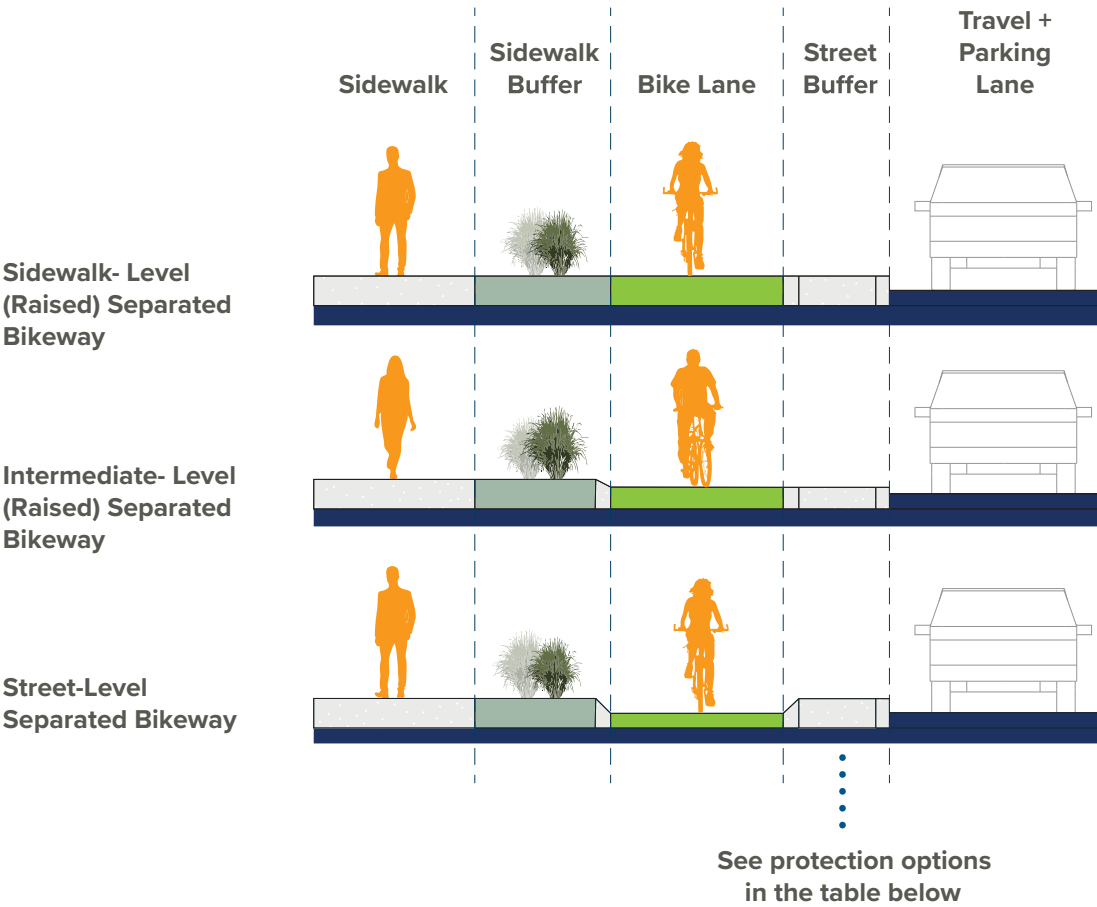


Figure 15. Protected Bike Lane

Table 10. *Separated Bike Lane Protection Recommendations*

PROTECTION TYPE	MINIMUM BUFFER WIDTH (FEET)	PREFERRED BUFFER WIDTH (FEET)	CONSIDERATIONS
Flexible Delineator / Bollard 	2	3-4	▶ Can allow encroachment by motor vehicles ▶ Required regular maintenance, including seasonal maintenance after snow
Precast or Cast-in-Place Curb 	2	3-4	▶ Provides a more comfortable facility ▶ Requires a street sweeper that can fit in facility ▶ Some vertical elements such as flexible delineators may still be needed for maintaining visibility in winter months ▶ More expensive
Parked Cars 	3	3-5	▶ May allow vehicle encroachment into buffer/bike lane if additional vertical elements are not added within street buffer ▶ Low parking utilization may not provide as much separation ▶ Potential for dooring with improper (<3 ft) buffer width or parking positioning ▶ Potential for passenger-bicycle conflicts between car and sidewalk

PROTECTION TYPE	MINIMUM BUFFER WIDTH (FEET)	PREFERRED BUFFER WIDTH (FEET)	CONSIDERATIONS
Median with or without landscaping 	2	3-5	► Provides a more comfortable facility ► Requires a street sweeper that can fit in facility ► More expensive ► Allows for landscaping and green stormwater infrastructure (required min. 3' width) ► Landscaping can be expensive to maintain ► Provides space for snow storage outside of bicycle facility
Raised Bikeway 	1	3 for snow storage	► Minimizes need for buffer space or treatments ► Most expensive ► No special snowplow or sweeper needed for sidewalk-level bikeway ► Requires a detectable edge between pedestrian facility ► Can be sidewalk level or intermediate level

CONSIDERATIONS

Drainage and snow operations should be considered when adding vertical elements to separate a street-level bike lane. Providing frequent breaks in the separation type will allow water and debris to flow to the flowline and towards inlets.

Separated bike lanes that maintain the bikeway at street grade or an intermediate level between the sidewalk and street may require special equipment for sweeping and snow removal. Where the bikeway is raised to sidewalk level, snow and debris removal may be done in tandem with the sidewalk.

The separation between the bikeway and the adjacent sidewalk must be separated by a cane-detectable edge treatment, including curbs, landscaped buffer, or tactile delineators. Similarly, ensure that the pedestrian travel way is clearly identified across protected bike lanes to provide ADA access to intersecting sidewalks and pedestrian spaces.



Applicable Street Typologies

- ▶ Arterial, Main Street, Connector, Multimodal Connector



Relevant Resources

- ▶ AASHTO Guide for the Development of Bicycle Facilities (Chapter 7)
- ▶ NACTO Urban Bikeway Design Guide (Chapter 3.3)

5.4 NEIGHBORHOOD BIKEWAYS

Neighborhood Bikeways are neighborhood streets that give bicyclists transportation priority and are pleasant streets for pedestrians to walk. They are characterized by low motor vehicle speeds and volumes. Neighborhood Bikeways are also sometimes referred to as bicycle boulevards.

GENERAL GUIDANCE

Pavement Markings

Shared lane markings on neighborhood bikeways should be placed within 50 ft of the beginning and end of every block, and approximately every 250 ft midblock. They should typically be placed in the center of each directional lane to encourage full use of the lane by bicyclists and to avoid the door zone on streets with on-street parallel parking. Shared lane markings may also be used in intersections or during roadway shifts to help cyclists navigate those shifts and turns.

Centerline stripes should be omitted along midblock sections for neighborhood bikeways to encourage slower speeds.

Signing

Green MUTCD “Bike Route” (D11-1) signs are typically used to designate neighborhood bikeways in Jackson. See Section 5.5 for additional bike route signs. It is also recommended to provide BICYCLES ALLOWED FULL USE OF LANE (R9-20) along designated neighborhood bikeways. See MUTCD Section 9B.14 for additional guidance.

Traffic Calming

Neighborhood bikeways should include traffic calming elements to manage vehicle speeds and volumes. The ideal traffic speed on neighborhood bikeways is 20 mph and traffic volumes should be less than 3,000 vehicles per day. Traffic calming includes both midblock treatments and intersection treatments. See [Section 3.5](#) for guidance on traffic calming treatments.

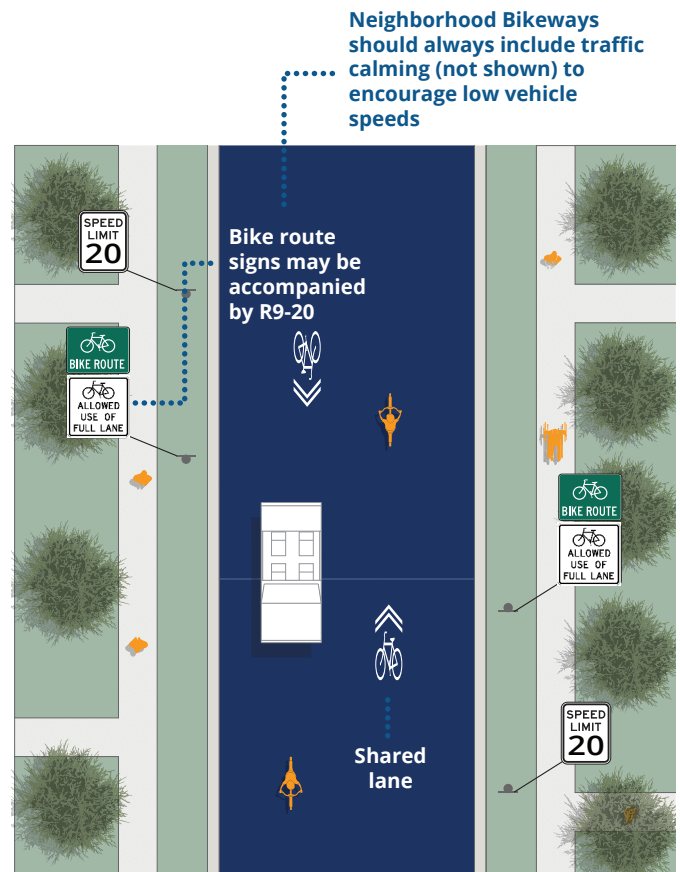


Figure 16. *Neighborhood Bikeway*



Figure 17. *D11-1 Sign*

CONSIDERATIONS

Where a neighborhood bikeway crosses a larger, higher volume street, care should be taken to provide a comfortable and accessible crossing for people biking and walking. All portions of the bicycle route should be similarly low-stress and accessible, including the major roadway crossings.

For Neighborhood Bikeway intersection design, please refer to Chapter 9.



Applicable Street Typologies

- ▶ Local, Neighborhood Bikeway, Pedestrian Shared Street



Relevant Resources

- ▶ AASHTO Guide for the Development of Bicycle Facilities (Chapter 8 and 9)
- ▶ NACTO Urban Bikeway Design Guide (Chapter 3.1.2 and 3.2)

5.5 WAYFINDING

GENERAL GUIDANCE

Bicycle wayfinding signage helps guide and orient bicyclists along designated bicycle routes and provides indication to motorists that bicyclists will be present along a given segment of street. Wayfinding along shared facilities such as pathways or bikeways adjacent to sidewalks is also useful for pedestrians.

Green Jackson Hole “Bike Route” wayfinding signs with directional arrows and supplemental destination information should be placed along bicycle routes where applicable. Wayfinding signs should be placed at regular intervals frequently enough to keep bicyclists (and pedestrians) informed

of changes in route direction. Wayfinding signs should be consistent with and integrated into the citywide wayfinding network.

Table 11. Wayfinding Signs

	CONFIRMATION	DECISION	TURN
Sign Example			
Purpose	To notify people of the type of route they are on and the name of the route.	Marks the junction of different bikeway routes; provides direction, distance, and mileage to important locations on the route.	To direct people to turn onto different streets when required to remain on a particular route.
Location	At the beginning of the route or up to 100' from the intersection; after junction of another bikeway or pathway; along the route between long gaps of decision signs.	Prior to a point of divergence (intersection of another bikeway or pathway) to reach a key destination.	Installed at the intersection or up to 50' prior to the intersection.
Message	Route name	Direction; destination and mileage	Route name and direction

CONSIDERATIONS

Wayfinding signs should be easy to read and understand, even at a distance. Wayfinding signs should be visible to people on bikes, which may require locating them in different places than for people in cars or on foot.



Relevant Resources

- ▶ MUTCD Section 9D
- ▶ AASHTO Guide for the Development of Bicycle Facilities (Chapter 14)
- ▶ NACTO Urban Bikeway Design Guide (Chapter 3.7)

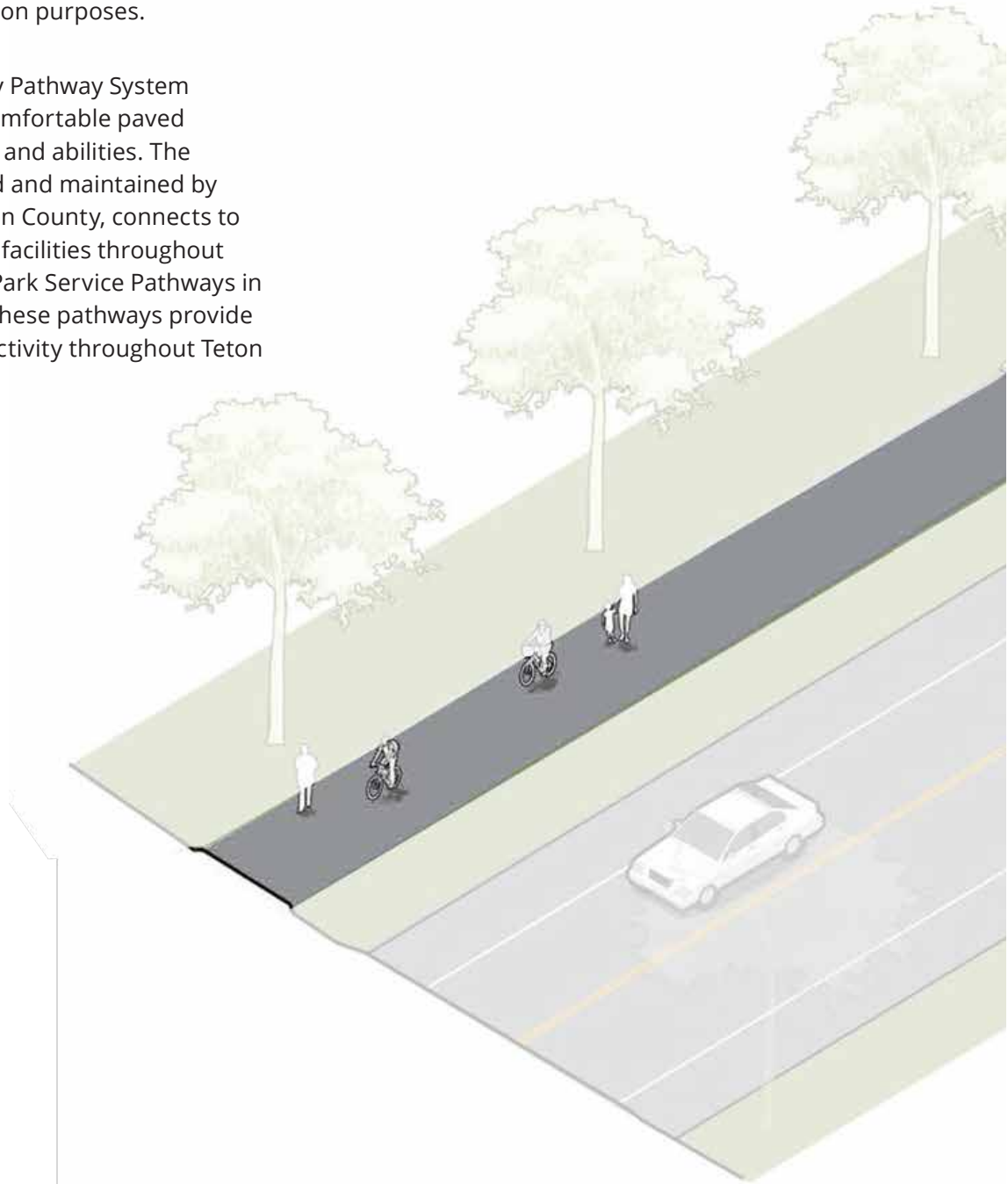
CHAPTER 6

Pathways

6 Pathways

Pathways are shared facilities designed for people walking, biking, running, and rolling. Pathways may be located along greenways, waterways, utility corridors, or existing streets, and they serve both recreational and transportation purposes.

The Jackson Hole Community Pathway System provides miles of safe and comfortable paved shared-use paths for all ages and abilities. The Pathway System, constructed and maintained by the Town of Jackson and Teton County, connects to other pedestrian and bicycle facilities throughout the area, including National Park Service Pathways in Grand Teton National Park. These pathways provide enhanced multimodal connectivity throughout Teton County and its communities.



6.1 DESIGN NEEDS AND USERS

GENERAL GUIDANCE

The varied use and diverse user group of pathways mean that the design criteria for pathways needs to accommodate many different operating widths and speeds, travel in both directions, and be accessible and comfortable for people with disabilities. The table below describes general operating speeds for different uses and considerations related to desired width or elements that may affect comfort. These operating speeds and considerations should guide pathway design for width and vertical and horizontal curvature.

Table 12. *Pathway Users & Design Considerations*

PERMITTED USES	SPEED OF TRAVEL	DEFINITIONS / CONSIDERATIONS
Walking / Running	1 to 9 mph	• Need wider areas for traveling in groups or walking dogs • Prefer separation from faster-moving trail users • Prefer trails with consistent lighting • May prefer a soft-surface tread
Wheelchairs	1 to 3 mph (nonmotorized) 3 to 5 mph (motorized)	• Prefer separation from faster-moving trail users
Equestrians	3 to 8 mph (trot)	• Prefer a soft-surface tread separate from people riding bicycles
Pedal Cycles	6 to 25 mph (20 mph limit on trails)	• Human Powered • Includes unicycles, bicycles, tricycles, and adaptive pedal cycles
Class 1 E-bikes	20 mph max.	• 750 watt motor or less; pedal assist only (no throttle); number of wheels not specified
Class 2 E-bikes	20 mph max.	• 750 watt motor or less; pedal assist only (no throttle); number of wheels not specified
Class 3 E-bikes	28 mph max. (20 mph limit on trails)	• 750 watt motor or less; pedal assist only (no throttle); number of wheels not specified • Commonly used as transportation device for bicycle commuters
Other Personal Mobility Devices	20 mph max.	• Includes in-line skates, one-wheels, hover boards, electric scooters, electric skateboards, segways, or other personal mobility devices that do NOT exceed 20 mph exclusively using motor power

6.2 GENERAL PATHWAY DESIGN

GENERAL GUIDANCE

Width

Pathways should generally be a minimum of 12 ft wide to allow for a variety of users, comfortable passing, and side-by-side riding. A width of 10 ft may serve lower volumes in more constrained areas. An absolute minimum pathway width of 8 ft is allowable to avoid obstacles like trees, utilities, or other elements that narrow the available space for a short length of the pathway.

Path width greater than 12-feet is recommended where high volumes of path users are expected, where the desired travel speed for cyclists is 20-30 mph, on regional travel corridors, to accommodate maintenance vehicles, and/or to navigate steep grades or through curves and tunnels.

Available right of way (ROW) may limit the space for a pathway. Typically, ROW 10-15 feet greater than the pathway width is desired, to allow for maintenance and path-side amenities and shy distance. If the ROW does not provide for this additional width, an easement may be necessary. The Town or County engineer should be consulted in pathway cases with limited ROW.

Sight Distance

Appropriate sight distances provide an unrestricted view of upcoming potential conflict points (such as intersections or pathway crossings) in order for users to slow and come to a stop if necessary based on the speed of travel and distance. They are typically calculated according to the fastest design vehicle (e.g. electric bicycles) and take into account grades and curves. The AASHTO Guide for the Development of Bicycle Facilities provides guidance on calculating sight distance for pathways.

Grades

Typically, pathways that serve all ages and abilities should strive for a maximum running grade of 5% or less to meet ADA guidelines. This may not be feasible in all locations due to natural topography. Where this cannot be met, sections of pathway steeper than 5% should be limited as much as possible. A cross slope of 1.5% is preferred for drainage and accessibility but

may go up to 2% in constrained conditions.

CONSIDERATIONS

Pathways that run parallel to Town streets should have a 5-ft minimum buffer space between the pathway and the street. Pathways along state highways require a wider buffer, with a preferred separation of 17 feet for clear zone considerations; refer to WYDOT standards for clear zone widths. This separation from the roadway improves comfort while traveling alongside vehicle traffic, and provides space for amenities, snow storage and rain splashing, etc. Where these buffer widths cannot be met, a physical barrier should be provided between the pathway and the roadway.



Applicable Street Typologies

► Pathway



Relevant Resources

- AASHTO Guide for the Development of Bicycle Facilities (Chapter 6, 7, 12.6)
- NACTO Urban Bicycle Design Guide (Chapter 3.4)
- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities (Chapter 3.4)
- FHWA Small Town and Rural Multimodal Networks (Chapter 4-3 and 4-11)

6.3 PATHWAY ENTRANCES AND TRAILHEADS

Pathway entrances and trailheads serve as information and gathering spaces, as well as transition spaces between the pathway and sidewalk or street facilities.

GENERAL GUIDANCE

Pathway entrances should be wider than the primary pathway alignment, where possible, to accommodate groups of people and people waiting or looking at signage and maps. Larger entrance or trailhead spaces also reduce potential for conflicts by allowing space to maneuver.

Any amenities provided in the entrance or trailhead space should be located outside of the primary path of travel, but still accessible to users with disabilities. Pathway entrances are great places for additional trail information, kiosks, and wayfinding signage.

Entrances should be designed to discourage large, motorized vehicles from entering the path through signage, striping, and geometric design. A

conspicuous center island that splits the entryway into two sections can be used to prevent motor vehicles from entering the pathway. Very tight curb returns can also discourage motor vehicles from entering at pathway entrances. Routine use of bollards or similar barriers to vehicle entry is not typically recommended because they often pose a hazard to path users. If used, bollards shall be set back 30' from the street and marked with retroreflective material.

Most pathway entrances are also at street crossings/intersections. See [Section 6.4](#) for additional guidance on pathways design at street crossings.



Source: Alta Planning + Design

6.4 STREET CROSSINGS/INTERSECTION DESIGN

Where pathways intersect streets, the design of the pathway crossing should minimize exposure to vehicle traffic and minimize the speed differential as much as possible. Right-of-way for all intersection users should be clear and intuitive based on design features.

GENERAL GUIDANCE

The following guiding principles should be followed at all street crossings:

- ▶ Make pathway users highly visible at crossing locations and maintain unobstructed sight lines.
- ▶ Ensure that pathway users and vehicle drivers can see both the intersection and one another.
- ▶ Slow and warn both vehicles and pathways users in advance of crossings locations.
- ▶ Develop a clear hierarchy and delineation of modes.
- ▶ Minimize crossing distances across streets.
- ▶ Cross streets at established intersections, where feasible.
- ▶ Create intuitive designs to minimize the needs to clutter crossings with signs.
- ▶ Establish recognizable crossing designs and features across the Pathway System.

Pathway intersection crossings use many of the same design elements and treatments that pedestrian intersection crossings do. The considerations provided for pedestrian and bicycle safety across intersections in Chapter 8 and 9 should be applied to pathway intersection crossings as well.

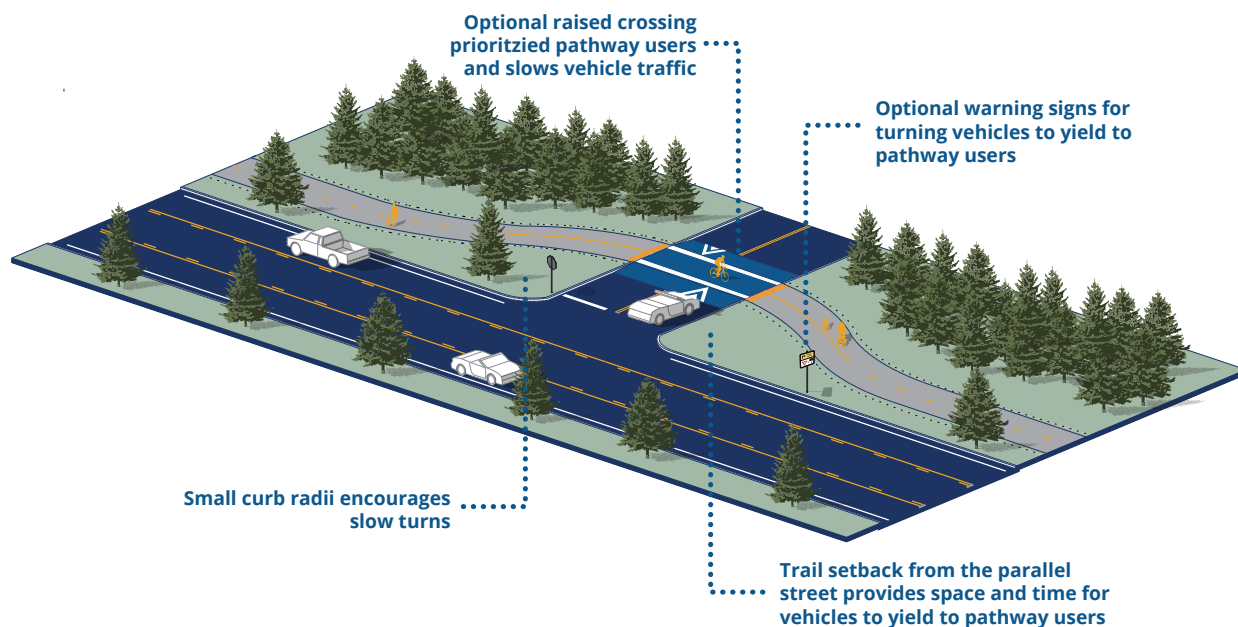
If a pathway crosses at an uncontrolled intersection, the **Crossing Treatment Selection Table** in [Section 8.1](#) should be used to determine the appropriate treatment. If a pathway crosses at a signalized intersection, the pedestrian and bicycle signal considerations found in [Section 7.6](#) apply.

Side Street Crossing

If a pathway crosses a side street or driveway while running parallel to a larger street, it is recommended to continue the pathway at curb level height to visually and physically emphasize trail-user priority. The design recommendations in [Section 8.3](#) for raised crossings and [Section 8.4](#) for continuous crossings apply. Similar to protected bikeway intersection design discussed in [Section 9.2](#), a setback from the parallel street can help to give motorists space and time to yield to pathway users.

Signing and pavement markings should be used to inform pathway users of the approaching intersection and proper right-of-way behaviors. The application of signing and marking pathways is

Figure 18. *Pathway Side Street Crossing*



largely dependent on pathway characteristics such as horizontal and vertical curvature, sight lines, design speed, and the same characteristics for the intersecting roads or driveways.

Curb ramps at pathway crossings must extend at least the full width of the pathway, not including the width of ramp flares. Pathway ramps should be designed to meet accessibility standards and include detectable warning surfaces at the edge of the street to ensure usability for individuals with disabilities.

High-visibility style crosswalks, also extending the full width of the pathway, should be used where a pathway crosses a street. A marked crosswalk of some kind must be provided at every street crossing per the MUTCD. Sidewalks on the crossing road should continue/ extend across the pathway to indicate pedestrian priority.

CONSIDERATIONS

Changes in the horizontal alignment of the pathway via chicanes or horizontal curves in advance of the intersection can help reduce pathway users' approach speed. If used, chicanes or other horizontal alignment changes should be done far enough in advance of the intersection to allow navigation through the curves before focusing on yielding or stopping and navigating through the intersection. Warning signs of upcoming curvature or alignment changes and solid centerline striping through chicanes can help delineate the proper positioning and speeds for cyclists through the curves.



Relevant Resources

- ▶ FHWA Guide for Improving Pedestrian Safety at Uncontrolled Intersections
- ▶ AASHTO Guide for the Development of Bicycle Facilities (Chapter 5, 6.7, 7.9, and 11)
- ▶ AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities (Chapter 3.6)
- ▶ Manual on Uniform Traffic Control Devices (Part 9)
- ▶ NACTO Urban Bikeway Design Guide (Chapter 4)
- ▶ FHWA Small Town and Rural Multimodal Networks (Chapter 4-3 and 4-11)

6.5 SIGNING AND MARKING

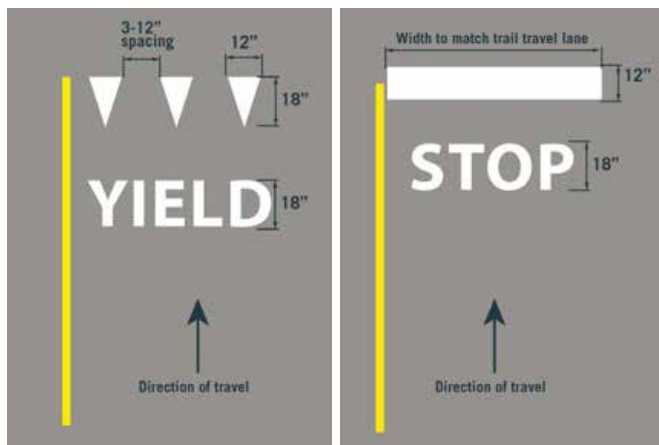
Signing and pavement markings may be used to delineate pathways and directions of travel, to alert bicyclists and pedestrians of potential conflict zones, and to warn both pathway users and motorists where streets or driveways intersect with the pathway.

GENERAL GUIDANCE

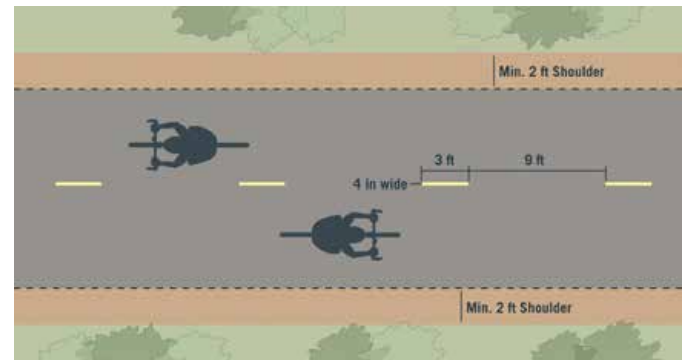
Pathway centerline striping may be used to delineate lanes of travel if desired. Centerline striping may also be omitted for the majority of the pathway and only used when needed. Striping patterns can include:

- ▶ Dashed yellow lines to separate directions of travel where sight lines allow safe passing
- ▶ Solid yellow lines to separate directions of travel and indicate no passing due to limited sight lines, upcoming conflict points, or upcoming obstructions in the center of the pathway

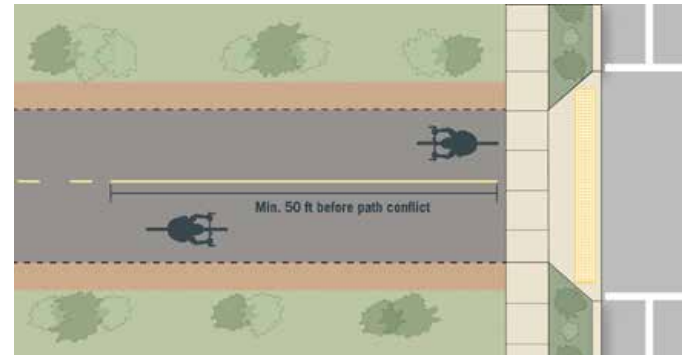
STOP and YIELD signs must be placed along the pathway where pathway users are required to stop or yield. Optional pavement markings may be used to supplement these signs. These pavement markings may be similar to pavement markings intended for vehicles but smaller in size. Signs intended for pathways users are typically smaller than signs intended for vehicles and should follow the sign size guidance found in the MUTCD Part 9. Signs intended only for pathways users should face towards the pathway and may need to be shielded from motorists to avoid confusion.



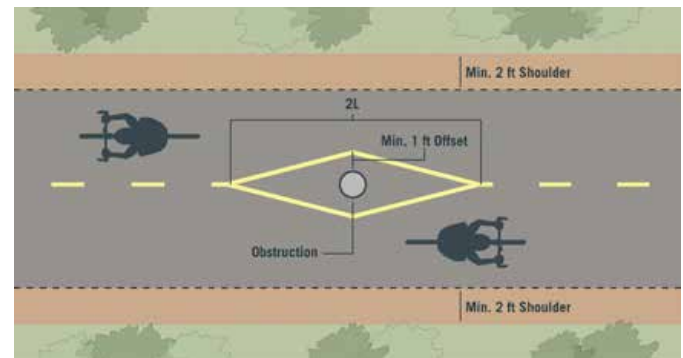
Dashed Yellow



Solid Yellow



Solid Yellow - Obstruction within Pathway



Stop and yield controls should be determined based on priority, not just volume or speed. STOP signs should not be placed when YIELD signs would provide adequate control. More information on assigning priority and determining appropriate traffic control for pathways can be found in the AASHTO Guide for the Development of Bicycle Facilities, Chapter 5.9.

Advanced warning signs may be used on pathways to warn pathway users about upcoming intersections where there is insufficient sight distance to the intersection. AASHTO Guide for the Development of Bicycle Facilities provides sight distance guidance in Chapter 5.5, and additional signing and striping guidance in Chapter 6.6. Advanced warning signs may be placed on streets to warn motorists prior to

uncontrolled pathway crossings. See Section 6.4 in this Manual for additional information.

NO MOTOR VEHICLES or similar signs may be used at pathway entrances if there are concerns about vehicles entering the pathway. See [Section 6.3](#) for additional guidance on entrance design.

Street name and pathway name signs should be placed at all pathway intersections with streets to help orient pathway users. Other wayfinding signage may also be placed along pathways to guide pathway users. See [Section 5.5](#) for additional Wayfinding guidance.

Etiquette signs may be placed along pathways. Etiquette signs are informal signs intended to promote courtesy and educate path users on how to perform passing and other maneuvers safely. Potential signs may include 'Pass on Left', 'Slow Down', 'Yield to Pedestrians' or 'Use Voice or Bell to Pass'.

The AASHTO Guide for the Development of Bicycle Facilities provides additional guidance for pavement markings and signage on pathways in Chapter 6.6.

CONSIDERATIONS

Pathway pavement markings may have longer duration than roadway markings, due to lighter vehicles (bicycles) tracking over. However, plowing, weather, and pathway use will cause wear and fading over time. Regular maintenance of signs and markings should be maintained, especially at areas with geometric or topographic changes that signs and markings provide warnings for. More general maintenance guidance is provided in Chapter 12.



Relevant Resources

- ▶ [Manual on Uniform Traffic Control Devices \(Part 9\)](#)
- ▶ [Guide for the Development of Bicycle Facilities \(Chapter 5.5, 5.9, 6.6\)](#)

6.6 OTHER PATHWAY DESIGN CONSIDERATIONS

BRIDGES AND UNDERPASSES FOR PATHWAYS

Refer to the following guidance for best practices related to Bridges and Underpasses: AASHTO Guide for the Development of Bicycle Facilities Chapter 13: 13.2.2 Bikeway Structures, 13.3 Design Details for Bridges, and 13.4 Design Details for Tunnels and Underpasses

SHARED USE PATH TRANSITIONS

Refer to AASHTO Guide for the Development of Bicycle Facilities Chapter 6.7.5

AMENITIES AND LIGHTING

Refer to AASHTO Guide for the Development of Bicycle Facilities Chapter 6.7.5

CHAPTER 7

Intersections

7 Intersections

Intersections should be designed to be safe, comfortable, and predictable for all street users, including people walking, biking, and using transit in addition to people driving.

Intersections should be designed to be as compact as possible while accommodating the appropriate design vehicles, to reduce exposure for vulnerable road users, and to slow turning vehicles. They should be accessible for people with disabilities and provide clear sightlines between all road users for safe and predictable interactions. Intersections should maintain the modal priorities of the streets they serve, delineate space for each mode, and manage the interactions and conflict points between modes.

When designing intersections, the following details should be considered. More detail for each is provided in the subsequent sections.

- ▶ Managed, design, and control vehicles
- ▶ Corner radii
- ▶ Visibility
- ▶ Pedestrian Crossings
- ▶ Bikeway Crossings
- ▶ Truck aprons and corner islands

7.1 MANAGED, DESIGN, AND CONTROL VEHICLES

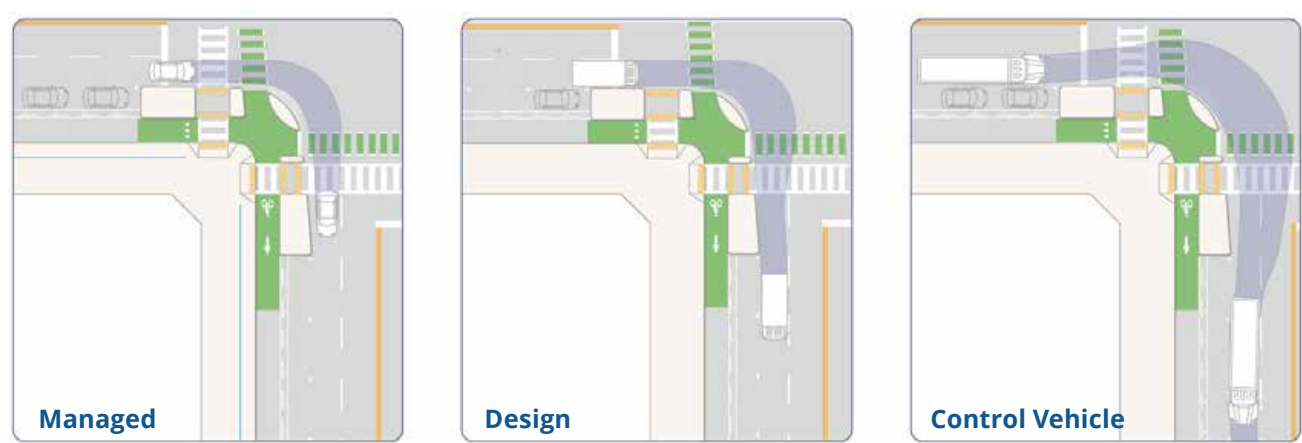
The managed, design, and control vehicles are important determinants for designing intersections and curb-return radii. Selection of an appropriately sized vehicle is a critical aspect of achieving streets that prioritize safety for the most vulnerable users of the street. When designed to accommodate vehicles larger than typically necessary, the safety of people walking, biking, and driving is negatively impacted by intersections that are larger than necessary, promoting higher turning speeds and longer crossing distances. Conversely, designing for vehicles smaller

than appropriate also compromises the safety of people biking and walking, as large vehicles may frequently be required to mount the curb to complete a turn.

GENERAL GUIDANCE

The sections below describe the difference between and application of the managed, design, and control vehicles. Tables for each vehicle group identify the recommended design and control vehicles based on street typology.

Figure 19. *Managed, Designed and Control Vehicles* (Source: NACTO UBDG 3, Section 4.1.1)



TURN ENCROACHMENT				
	Approach	Corner Elements or Roundabout Center Island	Receiving Street Lane Line	Receiving Street Centerline
Managed Vehicle	No encroachment.	No overtracking is necessary.	No encroachment.	No overtracking.
Design Vehicle	Encroachment is acceptable within the same direction of travel.	Overtracking of mountable corner or truck apron is expected. No overtracking of pedestrian space or protected bike space is allowed.	Encroachment within the same direction of travel is expected.	Overtracking permitted.
Control Vehicle	On arterial streets, may use the full approach width within the same direction of travel. On collector or local streets, may approach into opposing flow on local streets.		Encroachment within the same direction of travel is expected.	On arterials, minor overtracking into opposing flow is expected. On collector or local streets, overtracking into opposing flow is expected.

Managed Vehicle

The managed vehicle is the most common vehicle to use the intersection. It is typically a passenger car or light truck, and due to its smaller size is capable of higher turning speeds than larger design and control vehicles. When designing, the managed vehicle should be able to make turns slowly from within its lane and into the receiving lane without encroaching into adjacent or opposing lanes and without traversing buffers, truck aprons, or vertical elements.

- Ideal intersection turning speed: <10 mph

Design Vehicle

The design vehicle is the least maneuverable vehicle expected to regularly use the intersection; it informs what vehicular operations need to be accommodated regularly in the geometric design of the intersection. Design vehicles should typically be accommodated to use all of the first lane of the receiving street and part of a second or opposing lane. Design vehicles are expected to traverse buffers and mountable elements.

- Ideal intersection turning speed: 5 mph

The smallest appropriate design vehicle should be selected based upon the street type and adjacent land use context. The table below provides recommended design vehicle types for intersecting street typologies..

- Connectors where higher volumes of heavy vehicle traffic are expected, a WB-62 semi-trailer truck should typically be used as the control vehicle.

Table 13. *Typical Design Vehicles by Intersecting Street Typology*

	STREET TYPE	PEDES- TRIAN SHARED STREET	NEIGH- BORHOOD BIKEWAY	LOCAL STREET	MULTI- MODAL CONNEC- TOR	CONNEC- TOR	MAIN STREET	ARTERIAL STREET
DESIGN VEHICLE	Pedestrian Shared Street	DL-23	DL-23	DL-23	SU-30	SU-30	SU-30	SU-30
	Neighborhood Bikeway	DL-23	DL-23	DL-23	SU-30	SU-30	SU-30	SU-30
	Local Street	DL-23	DL-23	DL-23	SU-30	SU-30	SU-30	SU-30
	Multimodal Connector	SU-30	SU-30	SU-30	SU-30	SU-30	SU-30	WB-40
	Connector	SU-30	SU-30	SU-30	SU-30	SU-30	SU-30	WB-40
	Main Street*	SU-30	SU-30	SU-30	SU-30	SU-30	SU-30	WB-40
	Arterial Street*	SU-30	SU-30	SU-30	WB-40	WB-40	WB-40	WB-40

*Or WYDOT Standard

Table 14. *Typical Control Vehicles by Intersecting Street Typology*

	STREET TYPE	PEDESTRIAN SHARED ST.	NEIGHBORHOOD BIKEWAY	LOCAL ST.	MULTI-MODAL CONNECTOR	CONNECTOR	MAIN ST.	ARTERIAL ST.
DESIGN VEHICLE	Pedestrian Shared Street	FIRE	FIRE	FIRE	FIRE	FIRE	FIRE	FIRE
	Neighborhood Bikeway	FIRE	FIRE	FIRE	FIRE	FIRE	FIRE	FIRE
	Local Street	FIRE	FIRE	FIRE	FIRE	FIRE	FIRE	FIRE
	Multimodal Connector	FIRE	FIRE	FIRE	FIRE	FIRE	WB-62**	WB-62**
	Connector	FIRE	FIRE	FIRE	FIRE	FIRE	WB-62**	WB-62**
	Main Street*	FIRE	FIRE	FIRE	FIRE	WB-62*	FIRE	WB-62**
	Arterial Street*	FIRE	FIRE	FIRE	WB-62*	WB-62*	WB-62**	WB-62**

*Or WYDOT Standard

** Project managers should confirm whether WB-62 turning movements need to be accommodated at all intersections during the design process

Control Vehicle

The control vehicle is the largest vehicle that will use the intersection infrequently. In design, the control vehicle should be expected to make turns very slowly, traverse mountable elements, use adjacent receiving lane space, and/or overtrack the centerline of the intersecting street. Stop lines may need to be moved back to accommodate any overtracking or encroachment.

- Ideal turning movement speed: 1-5 mph
- For Local Streets, Neighborhood Bikeways, and streets without a striped centerline, control vehicles may generally use the full curb-to-curb width to complete their turns.
- Emergency vehicles always need to be accommodated, regardless of street type. Therefore, a fire truck (Aerial Fire Truck) is the identified control vehicle for most street types with low volumes of heavy vehicle traffic. The Aerial Fire Truck will accommodate turning movements for all vehicles including and smaller than a WB-40.

- For truck routes, Arterials, and Multimodal Connectors where higher volumes of heavy vehicle traffic are expected, a WB-62 semi-trailer truck should typically be used as the control vehicle.

CONSIDERATIONS

County and WYDOT Roads: City staff should encourage design and control vehicles in line with the guidance in this section when coordinating with Teton County and WYDOT staff on intersections with County and WYDOT roads.



Relevant Resources

- NACTO Urban Bikeway Design Guide (Chapter 4.1.1)

7.2 CURB-RETURN RADII

GENERAL GUIDANCE

The smallest practical curb-return radius should be used at all intersections to manage the speed of turning vehicles, shorten the length of pedestrian crosswalks, and provide adequate space at the corner for properly aligned curb ramps. See [Section 8.2](#) for additional guidance on curb ramp design. It is important to choose a practical radius based on street classification and appropriate design/control vehicles as selecting design and control vehicles smaller than appropriate can compromise the safety of people biking and walking if large vehicles are required to frequently mount the curb to complete a turn.

Choose the smallest practical radius with all other intersection safety improvements included. Designers should weigh the balance of wider radii with other safety treatments in each situation.

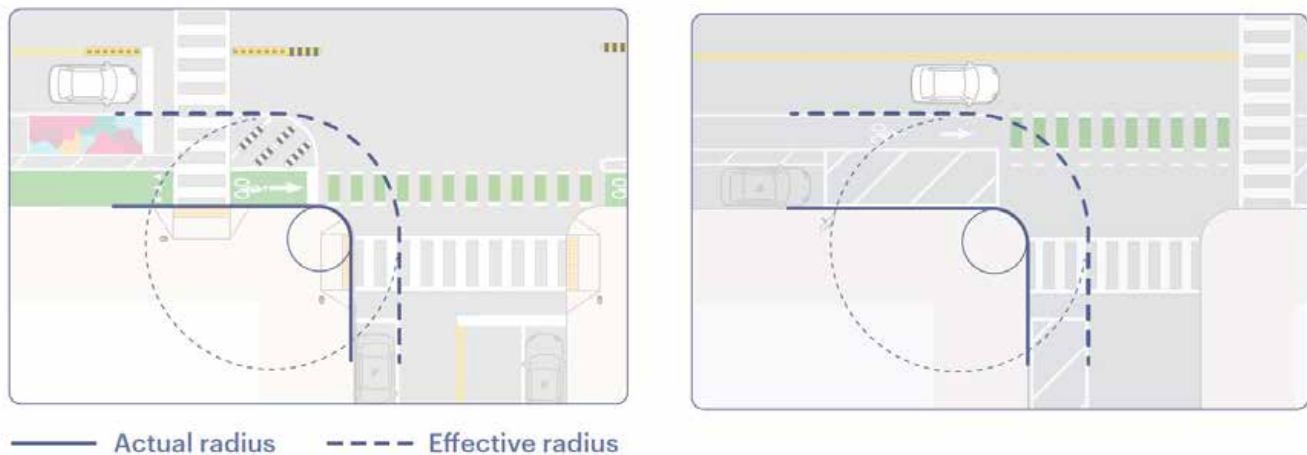
Extra attention should be paid to tightening curb-return radii where:

- ▶ There are adjacent or nearby trip generators where high pedestrian volumes are observed or anticipated;
- ▶ Turning vehicles will cross a protected bike lane, shared use path, or trail;
- ▶ There is no existing or anticipated future need to regularly accommodate large turning transit buses or trucks; and
- ▶ Where adjacent parking lanes, on-street bike lanes, or striped shoulders create a larger effective radius.

Table 15. *Curb Return Radii*

STREET TYPE	CURB RETURN RADIUS (FEET)
Arterial	20
Main Street	20
Connector	18
Multimodal Connector	18
Local	15
Neighborhood Bikeway	15
Pedestrian Shared Street	5

Figure 20. *Actual vs. Effective Radius* (Source: NACTO Urban Bikeway Design Guide 3.4.1.3)



Actual vs Effective Radius

The effective radius of an intersection corner may differ from the actual radius when elements such as on-street parking, bike lanes, or striped shoulders are present.

Turning movements for the design vehicle can inform the effective radius. Once determined, a tighter corner radius should be implemented where practicable. Some strategies to tighten curb radii include:

- ▶ Compound radii, which can encourage slower speeds with smaller radii as drivers approach crosswalks and a larger radius as the turn progresses beyond the crosswalk;
- ▶ Corner islands, single or dual-radius; fixed or mountable
- ▶ Hardened centerlines and lane lines
- ▶ Curb extensions
- ▶ Adjusting stop bar locations to accommodate control vehicle turn tracking;
- ▶ Access or turning restrictions based on land use

CONSIDERATIONS

On Major and Minor Transit streets, a 28 ft effective radius should be provided to accommodate turning transit vehicles.



Relevant Resources

- ▶ NACTO Urban Bikeway Design Guide (Chapter 4.1.3)

7.3 TRUCK APRONS AND CORNER ISLANDS

Truck aprons, typically applied at roundabouts, are effective treatments at standard intersection corners to slow the frequent use by managed and design vehicles, while accommodating the infrequent control vehicle. Where on-street bikeways are present, corner islands have the same effect. See [Section 9.2](#) for more information on bicycle protected corners. The path of the control vehicle shall be completely outside of the intended bicycle and pedestrian path of travel and waiting areas.

GENERAL GUIDANCE

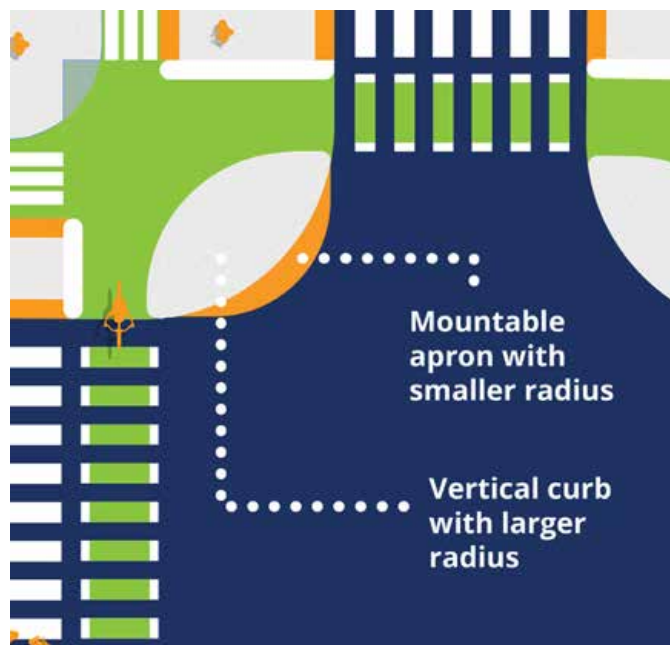
There are two primary applications of truck aprons and corner islands that may be implemented. Each has multiple variations based on intersection and modal context.

► Single Radius, Mountable Corner

Single Radius designs guide turning movements for managed and design vehicles without tracking over the radius. Control vehicles will mount the corner in order to complete the turning movement

- » Concrete single radius designs should have traversable curbs and a flat top.
 - » Quick build applications of single radius corners should utilize edge striping for the managed radius and mountable, flexible materials
- Dual Radius with Defined Mountable Apron
- » Dual radius designs provide a smaller radius for managed vehicles, and a secondary larger radius to accommodate design and control vehicles
 - » The small radius may be flush with the roadway, or fully traversable. Contrasting pavement colors and/or surfaces, or a striped edge line, delineate the intended path for managed vehicles.
 - » If not flush, a mountable, beveled curb 2-3 inches in height should be used for the mountable area between the small and large areas. .
 - » The larger radius is provided with a vertical curb 5-6 inches in height that is not intended to be mounted. The tightest radius possible should be used for this inner radius.

Figure 21. Mountable Truck Apron



Elevation and Curb Profile

The elevation of a raised apron or corner island may be between the existing road grade and the adjacent sidewalk or pedestrian corner area. Many raised aprons use an intermediate height between the two, allowing for a mountable surface while still providing clear vertical distinction from the sidewalk.

For raised aprons, the profile of the edge of the mountable element determines how easily a vehicle can mount it.

- ▶ A traversable curb is better for the stability of larger design and control vehicles, but may not provide enough deterrence for some managed passenger vehicles.
- ▶ A mountable curb typically has a steeper bevel, providing more deterrence to passenger vehicles.
- ▶ Dual-radius applications allow for curb profiles with a vertical plus a mountable/traversable portion.

Less frequent control vehicles should be accommodated with greater vertical portions, to increase the penalty for encroachment. If pedestrians or bicyclists need to cross the apron, traversable curbs may be more suitable.

Color and Materials

Color reinforces the distinction between the apron and other road elements. A surface material that is the same color as the sidewalk reinforces the distinction from the street for drivers, but may encourage pedestrians to dwell on it, as it may be mistaken as a continuation of the pedestrian area. A more aesthetically enhanced apron distinguishes it from both the street and sidewalk, but if the surface finish looks too “nice” it may be unclear to truck drivers that the surface is intended to be driven over. Edge striping can also specifically reinforce the desired turning path, especially in applications where the turning path may not be clearly conveyed by the apron shape, such as corner speed humps (see Rumbles, Humps, and Bumps section below).

- ▶ Color options may include brick or other colored pavements that differ from the street and sidewalk/path treatment.

- ▶ Stamped or other textured pavement treatments indicate the apron is not a walking surface, but will deter smaller passenger vehicles from regularly mounting the apron.

CONSIDERATIONS

If frequently tracked over by larger vehicles than designed for, mountable corners may need more frequent maintenance to replace chipped concrete or broken flex-posts.

Drainage should be considered when modifying the existing flowline to install dual-radius corners. Inlets may need to be relocated and/or added to maintain positive drainage around the corner.

Snowplowing and street sweeping vehicles and operation should be considered in the design of dual-radius corners.



Applicable Street Typologies

- ▶ Arterial, Main Street, Connector, Multimodal Connector



Relevant Resources

- ▶ NACTO Urban Bikeway Design Guide (2025), 4.1.3
- ▶ AASHTO Guide for the Development of Bicycle Facilities (2024), 5.10.4

7.4 CURB EXTENSIONS

Curb extensions, or bump outs, extend the pedestrian zone or curb line into the street zone. Curb extensions are most often applied at intersections or midblock crossings but may also be used at transit stops or for traffic calming purposes.

Curb extensions improve sight lines between pedestrians and drivers, reduce pedestrian crossing distances, may slow turning vehicles with tighter curb radii and narrower streets, and allow for space to build perpendicular curb ramps.

Streets with on-street parking or excess travel lane width should generally have curb extensions installed at all intersections. The curb extensions bookend the parking lanes, clearly delineating the travel space and parking lane, while also shortening pedestrian crossing distances, improving sightlines between all intersection users, slowing vehicle turns and providing space for amenities and/or landscaping.

Curb extensions may also be placed at mid-block locations to enhance pedestrian crossing locations, calm traffic, and/or provide space for amenities and greening. If not specifically intended to serve a pedestrian crossing, midblock curb extensions should be designed so as not to encourage crossing the street, by placing trees or other elements to discourage crossing.

GENERAL GUIDANCE

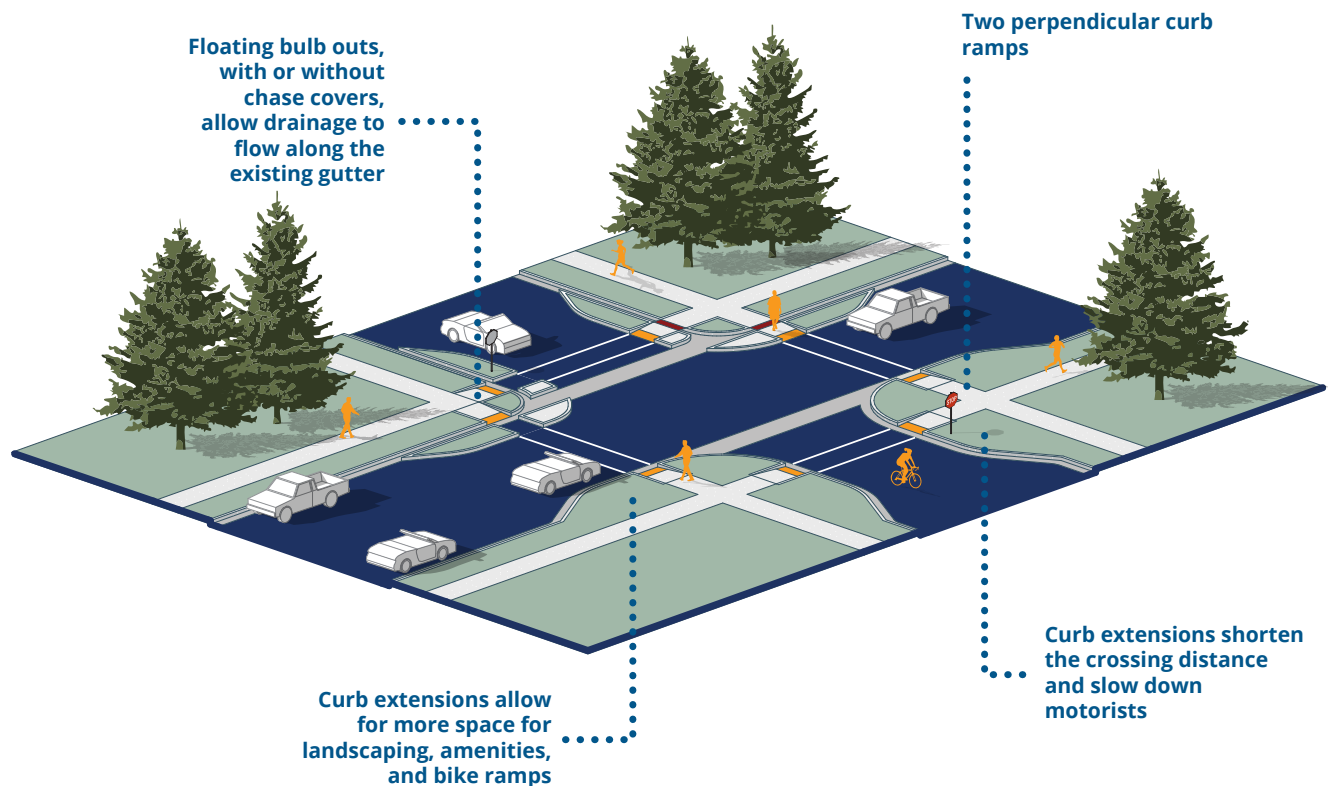
Curb extensions should extend far enough into the street to narrow travel lanes to the desired width. The gutter pan of curb extensions should not encroach into the desired travel lane width (see [Section 3.1](#)) or reduce bike lane width below the minimum width (see [Section 5.2](#) for bike lane widths).

For constructability and maintenance, curb extensions should be a minimum of 3 ft wide. For a typical 8 ft parallel parking lane, a curb extension should be 6 ft wide to keep the gutter out of the travel or bike lane. On one-way streets, a minimum curb-to-curb width of 13 ft should be maintained for emergency and street maintenance vehicles.

A 5:1 taper is preferred for the extension of the curb. In areas with high parking demand, a 3:1 taper may be used. When curb extensions are used at intersection corners, the corner radius should be determined based on street classification and anticipated design and control vehicles. Reducing the width of curb extensions can accommodate larger turning movements and maintain the safety and visibility benefits before eliminating the curb extensions entirely.

Curb extensions should be designed, where feasible, to include two perpendicular curb ramps that align with sidewalks and crosswalks. The pedestrian clear zone at intersections and midblock crossings should not be impeded by the addition of street furniture, landscaping, or other amenities placed in the curb extension.

Figure 22. *Curb Extensions*



7.4.2 CONSIDERATIONS

The following considerations should be taken when implementing curb extensions at intersections:

- ▶ On streets and intersections with high volumes of large trucks, curb extensions may not be feasible given large turning movements.
- ▶ Streets and intersections that serve bus routes may benefit from turn lanes or bus pull-out areas over curb extensions.
- ▶ Streets that have a high volume of bicycle traffic may need to accommodate bicyclists within the curb extension

The design of curb extensions should maintain proper drainage and avoid ponding and debris buildup, especially at pedestrian ramps. Catch basins may need to be relocated or added to accommodate changes in drainage flow patterns. Other drainage design options include floating bulbouts, or floating bulbouts with chase covers.

Curb radii on the curb extension should be designed to accommodate street maintenance such as sweeping and plowing. Using a wide radius for the minor corners of curb extensions can also

help reduce debris, snow, and ice accumulation at the inside corners and reduce the likelihood of maintenance equipment snagging the corner. A minimum of 5 ft inner corner radii is suggested.

Curb extensions can be built with specific high-strength concrete if there are concerns about heavy vehicles and maintenance equipment frequently hitting the curb extensions.



Applicable Street Typologies

- ▶ Arterial, Main Street, Connector, Multimodal Connector, Local, Neighborhood Bikeway



Relevant Resources

- ▶ NACTO UBDG (Chapter 4)
- ▶ AASHTO Guide for the Development of Bicycle Facilities (Chapter 5.10.2)

7.5 PARKING AND INTERSECTION VISIBILITY

GENERAL GUIDANCE

On-street parking can impede visibility at intersections, which can impact safety for all street users at the intersection. Therefore, it is important to effectively and consistently manage parking near intersections. Parking restriction, or intersection daylighting, can be done in a number of ways, including using curb extensions to physically prohibit parking, and/or with signage informing drivers of where they may or may not park.

The table below outlines general parking restrictions for various contexts. Wyoming statutes require no parking within 20 feet between parking and a marked crosswalk.

CONSIDERATIONS

- ▶ Parking restrictions through code or ordinance alone is often not effective without enforcement or the use of signs or curb

extensions. Red curbs are typically not visible during winter, so signs indicating the end of the parking zone should be used.

- ▶ Curb extensions should generally be included at intersections on streets with full-time on-street parking. See Curb Extensions.



Applicable Street Typologies

- ▶ Arterial, Main, Connector, Multimodal Connector, Local, Neighborhood Bikeway, Pedestrian Shared Street



Relevant Resources

- ▶ NACTO Urban Street Design Guide
- ▶ FHWA [Proven Safety Countermeasures](#)

Table 16. *Parking Restrictions at Intersections*

INTERSECTION / STREET CONTEXT	GENERAL PARKING RESTRICTION (FEET)	NOTES / EXCEPTIONS
Traffic Signal	30	
Stop Sign, without concrete curb extension	30	
Stop Sign, with concrete curb extension	18	Curb extension should be 6 ft wide to fill parking lane
Crosswalk at intersection, marked or unmarked	20	Crosswalks on the far side of one-way street may consider shorter parking restrictions, if WY statutes are met.
Marked midblock crosswalk	20	
Alleyway or Driveway	5	
Fire Hydrant	10	
Marked Bus Stop	Length of Bus Stop + Maneuvering Space	
Railroad Crossing	50	
Fire Station Driveway	20	

7.6 SIGNALIZED INTERSECTIONS FOR SAFETY

GENERAL GUIDANCE

Traffic signal design and operation should take into consideration both vehicle and pedestrian and bicycle comfort and safety. Traffic signals create gaps in the traffic flow and allow pedestrians and bicyclists to cross the street at locations where they would often otherwise experience excessive delay. Modifying the signal timing and phasing can also improve pedestrian and cyclist safety by mitigating potential conflicts through separation in time.

Where pedestrian traffic is regular, pedestrian phases should be activated automatically. Pedestrian activation should only be used when pedestrian crossings are infrequent and intermittent.

CONSIDERATIONS

Marked crosswalks should be placed at all signalized intersections where pedestrians cross. High-visibility crosswalks can be used to improve the conspicuity of the crossing. Advanced stop bars should be placed 4 ft back from the marked crosswalk to limit motorists encroaching upon the pedestrian crossing.



Relevant Resources

- ▶ Public Right of Way Access Guidelines
- ▶ FHWA Proven Safety Countermeasures
- ▶ Manual on Uniform Traffic Control Devices (Part 4)
- ▶ WYDOT Standards

Table 17. *Signal Treatments*

SIGNAL TREATMENT	DESCRIPTION	WHERE / WHEN IT SHOULD BE CONSIDERED
Accessible Pedestrian Signals (APS)	A pedestrian pushbutton with integrated vibro-tactile and audible versions of the visual indications presented by the pedestrian signal displays.	Recommended at all new or modified traffic signals. Installation and operation should be consistent with PROWAG R308.1
Leading Pedestrian Intervals (LPIs)	A 3-7 second 'head start' for the pedestrian signal prior to the parallel vehicle signal. Partially protects the pedestrian movement and allows pedestrians to get through the turn conflict zone prior to vehicular traffic being given a green light.	Recommended as a wide-spread treatment for signalized intersections with pedestrian signals.
Leading Bicycle Intervals (LBIs)	A 3-7 second 'head start' for the bicycle signal prior to the parallel vehicle signal. Partially protects the bicycle movement and allows cyclists to get through the turn conflict zone prior to vehicular traffic being given a green LBI. LBIs typically last the same duration as the LPI when implemented together.	Recommended as a wide-spread treatment for signalized intersections with bicycle signals.
Bicycle Signals	A signal head for bicyclists. They indicate bike signal phases and other bike-specific timing strategies.	Intersections with bicycle lanes and high vehicular turning movements where exclusive, protected, or specifically timed bicycle phases are desired to mitigate conflicts.
No Right Turn on Red	A restriction on vehicles turning right on a red light. Eliminates right-hook conflict with pedestrians and cyclists as well as oncoming vehicles.	Recommended in areas with medium-high pedestrian volumes or concerns of pedestrian/ right turn conflicts. Time of day restrictions may be appropriate.
Left Turn Phasing	A protected left turn phase provides a green arrow for left turning vehicles while stopping parallel traffic and pedestrian crossings.	Recommended in areas with concerns of left-turn conflicts. Requires a left turn arrow signal and an exclusive left turn lane. May be used as protected-only left turns or protected-permissive.
Pedestrian Exclusive Phase	A traffic signal phase exclusively for pedestrians. Pedestrians may cross in all directions during this phase. Also known as a pedestrian scramble.	Recommendation for intersections with high pedestrian volumes and high vehicle turning volumes. Requires No Right on Red. Increases intersection delay for all users and may have poor compliance if ped and vehicle volumes are not high.
Bike Boxes	A dedicated space for bicyclists to line up ahead of vehicles in order to enter the intersection first.	Recommended on minor street approaches to intersections without bicycle signals. May serve as a two-stage box for intersecting bikeways. Requires No Right on Red implementation.

7.7 RAISED INTERSECTIONS

GENERAL GUIDANCE

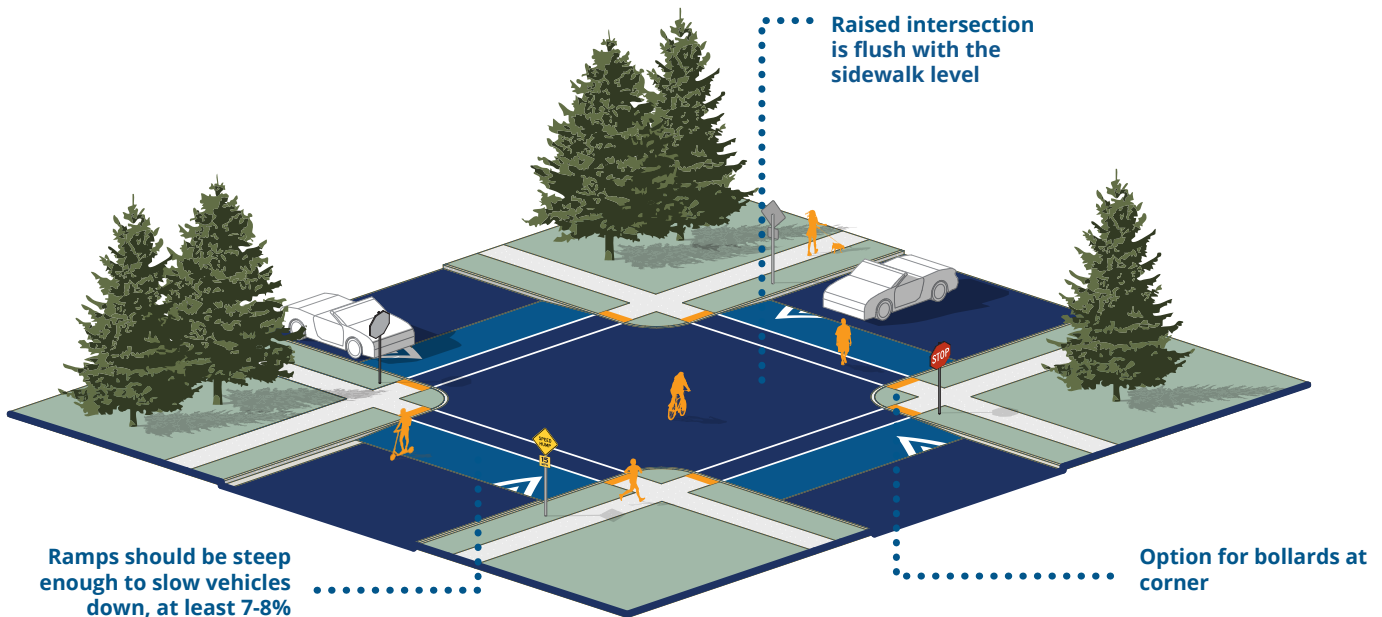
Raised intersections lower speeds and slow turns for vehicles traveling through an intersection, creating a high-comfort facility for people walking and biking across streets. Raised intersections may be appropriate at locations with high pedestrian activity, where neighborhood bikeways turn to a cross street, or intersections that are offset.

The full intersection is raised to sidewalk level, ramping streets up in advance of pedestrian crosswalks.

Raised intersections should be designed so that:

- Approach and departure ramps for vehicles use a slope of at least 7-8%, for smooth transitions for bikes and vehicles that effectively slow vehicles through the intersection;
- The smallest possible curb radius is used on intersection corners, while still accommodating design vehicles; and
- The intersection is flush with the sidewalk and detectable warning surfaces are provided to inform non-visual cues that pedestrians are leaving the pedestrian zone and entering the street zone.

Figure 23. *Raised Intersection*



CONSIDERATIONS

Bollards or planters may be placed at the corners of raised intersections to help prevent drivers from turning into the pedestrian space. Clear pedestrian paths through the crosswalks should be maintained and not impeded upon by bollards or other vertical elements. Clear sight lines must be maintained at intersection corners with any vertical elements that are installed.

The center of the raised intersection may be enhanced with various materials, patterns, or colors to create a visual aesthetic in areas such as downtown main streets. Crosswalks and crossbikes shall be kept smooth and should meet MUTCD compliance for colors and striping.

Drainage – raised intersections modify the flow line of the roadway. Drainage at the intersection should be evaluated and additional storm infrastructure may need to be considered.

Snow plowing – the design of the raised intersection should consider snow and street sweeping operations to accommodate maintenance vehicles. Additionally, snow removal methods will need to be adjusted, including specific removal procedures and the use of operators who are familiar with the locations of raised intersections.



Applicable Street Typologies

- Main Street, Multimodal Connector, Local, Neighborhood Bikeway



Relevant Resources

- NACTO Urban Bikeway Design Guide (Chapter 4.2)
- AASHTO Guide for the Development of Bicycle Facilities (Chapter 8.4.3.2)

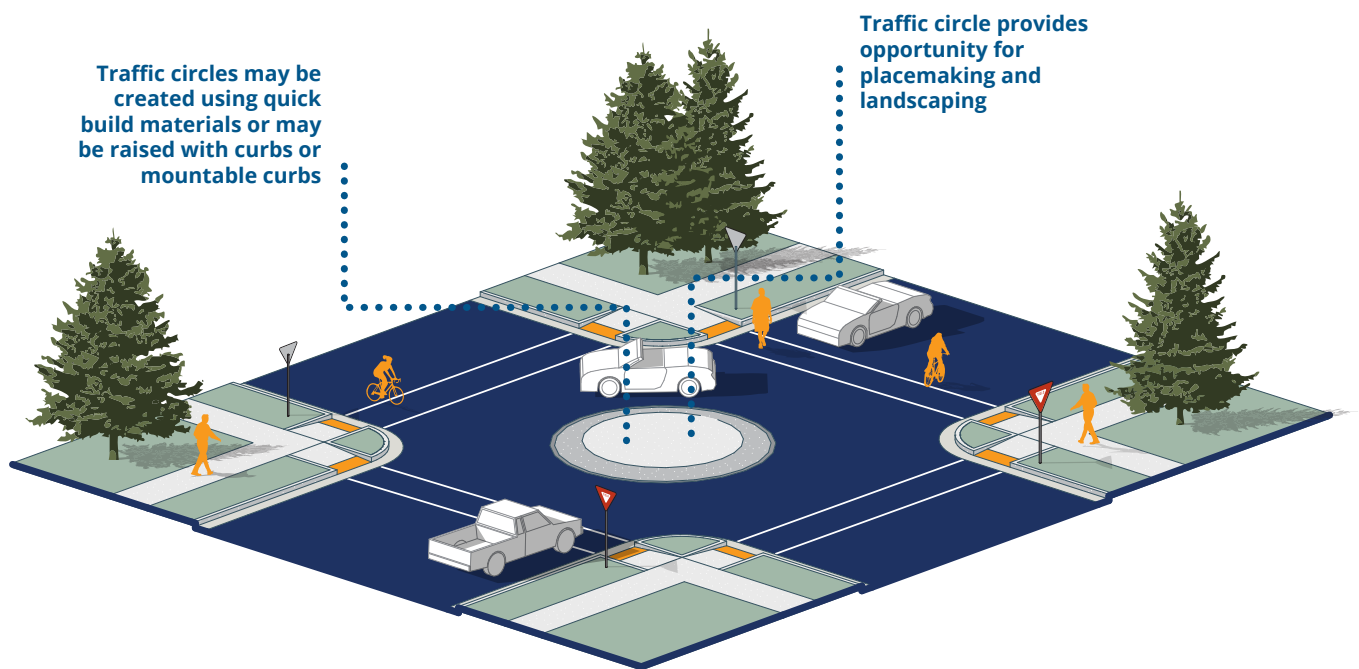
7.8 TRAFFIC CIRCLE

GENERAL GUIDANCE

Traffic circles are raised or delineated islands placed in the center of minor street intersections. They encourage slower motor vehicle movements through the intersection and are recommended with yield on entry control for all legs. Raised traffic circle design can vary and may include mountable curbs, landscaping, and signage.

Most traffic circles feature 15 ft clear from the corner to the edge of the circle. Traffic circles can include both paved aprons and mountable curbs as needed to accommodate the turning movements of larger vehicles.

Figure 24. *Traffic Circle*



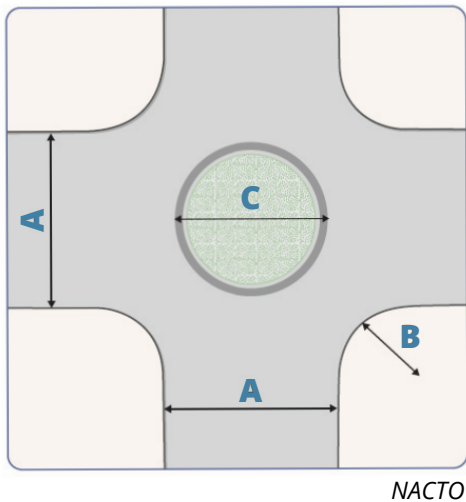


Table 18. *Traffic Circle Radii and Diameter*

STREET WIDTH (A)	CURB RETURN RADII (B)	CENTER ISLAND DIAMETER (C)
20 ft	15 ft	9 ft
	20 ft	11 ft
	25 ft	12 ft
25 ft	15 ft	15 ft
	20 ft	16 ft
	25 ft	18 ft
30 ft	10 ft	19 ft
	15 ft	20 ft
	20 ft	22 ft
	25 ft	24 ft
36 ft	10 ft	26 ft
	15 ft	27 ft
	20 ft	29 ft
	25 ft	33 ft
40ft	10 ft	30 ft
	15 ft	32 ft
	20 ft	34 ft
	25 ft	38 ft

CONSIDERATIONS

Landscaping within the traffic should be low level and preserve sight distance.

Emergency services should be consulted when planning the design of traffic circles. If placed on emergency routes, design for full traversing of the circle by the emergency vehicle or making left turns on the inside of the circle.



Applicable Street Typologies

- Local, Neighborhood Bikeway



Relevant Resources

- NACTO Urban Bikeway Design Guide (Chapter 4.2)
- AASHTO Guide for the Development of Bicycle Facilities (Chapter 8.4.2.3)

7.9 MODAL FILTERS

Modal Filters, sometimes referred to as Diverters, are a form of traffic volume control by restricting – or filtering out – vehicular movements at intersections while maintaining connectivity for pedestrians and cyclists. Modal filters also limit neighborhood cut-through traffic, i.e. diversion of vehicles onto local streets adjacent to busier corridors during times of congestion.

Modal filters can be applied on the centerline of the major street, creating right-only movements on minor streets at intersections. Diagonal modal filters are another application, maintaining two directions of vehicular travel but forcing a turn and restricting through-movements on both of the intersecting streets. In both applications, bicyclists and pedestrians are unrestricted in their movements through the modal filter and are accommodated through cut-throughs and refuge islands.

Emergency routes may limit applicability of modal filters. The design should consider the needs of emergency vehicles and offer alternative routing or mounting of the median by emergency vehicles. Street maintenance, snow plowing, and waste services should be considered when designing modal filters.

a 6 ft or wider median filter allows refuge space for people walking and biking to make the crossing in two stages. A refuge for pedestrians and bicyclists (see [Section 3.4.2](#)) should be prioritized on higher volume streets and crossing enhancements like Rectangular Rapid Flashing Beacons (See [Section 8.5](#)) should also be considered. If less than 6 ft wide, pedestrian crosswalks should be striped continuous through the filter.

The bicycle gaps in the filter should not allow for vehicles to turn through.



Applicable Street Typologies

- Local, Neighbor Local, Neighborhood Bikeway, Connector, Multimodal Connector hood Bikeway



Relevant Resources

- AASHTO Guide for the Development of Bicycle Facilities (2024), 8.5.3
- NACTO Urban Bikeway Design Guide (2025), 4.2.3

7.9.1 CENTERLINE MODAL FILTERS

General guidance

Centerline modal filters create a hardened centerline along the major street, restricting through movements on the minor street. Vehicles traveling along the minor street are limited to a right-only movement onto the major street. The centerline filter may be achieved using concrete median islands, delineator posts, or planters.

Considerations

Additional volume control may be accomplished by creating one-way approaches on the minor street. A segment of protected bicycle lane restricts vehicles from turning onto the minor street from the major street, and only allows right turns off of the minor street.

Gaps in the centerline filter provide through access for people on bikes and pedestrians. If space allows,

7.9.2 DIAGONAL MODAL FILTERS

General guidance

Diagonal modal filters are typically installed at intersections of two local streets. They restrict through movements in all directions, forcing left or right turns for vehicles.

Pedestrian access to the diagonal islands should be restricted. This can be done by constructing corner curb extensions with perpendicular ramps to maintain the desired pedestrian crossing alignment. On retrofit projects with apex corner ramps, floating curb extension islands may be installed to minimize impact to drainage flowlines but enforce perpendicular crossings.

Considerations

Diagonal filters may be implemented with concrete or landscaped islands and curb extensions, or flexible delineator posts and paint. Gaps in the islands allow bicycles to continue through but should not be wide enough to allow for cars to access.



Applicable Street Typologies

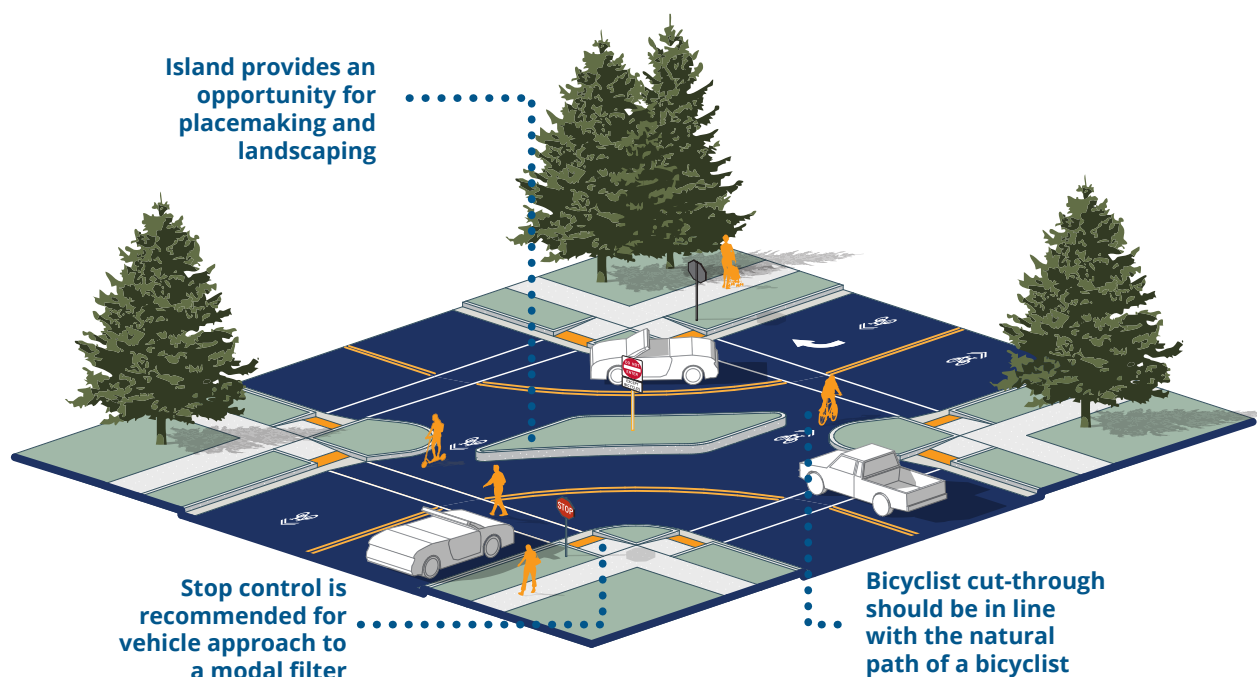
- ▶ Local, Neighborhood Bikeway



Relevant Resources

- ▶ AASHTO Guide for the Development of Bicycle Facilities (Chapter 8.5.3)
- ▶ NACTO Urban Bikeway Design Guide (Chapter 4.2.3)

Figure 25. *Diagonal Modal Filters*



CHAPTER 8

Pedestrian Intersection Design

8 Pedestrian Intersection Design

Pedestrian safety at intersections is a crucial part of the pedestrian mobility network. All people who walk and roll on sidewalks should be able to cross intersections safely, comfortably, and without excessive delay. Pedestrian crossing safety includes safe pedestrian waiting areas, accessible curb ramps, pedestrian signals, crosswalk markings, and vehicle traffic control that allows for pedestrian crossings, among other things.

GENERAL GUIDANCE

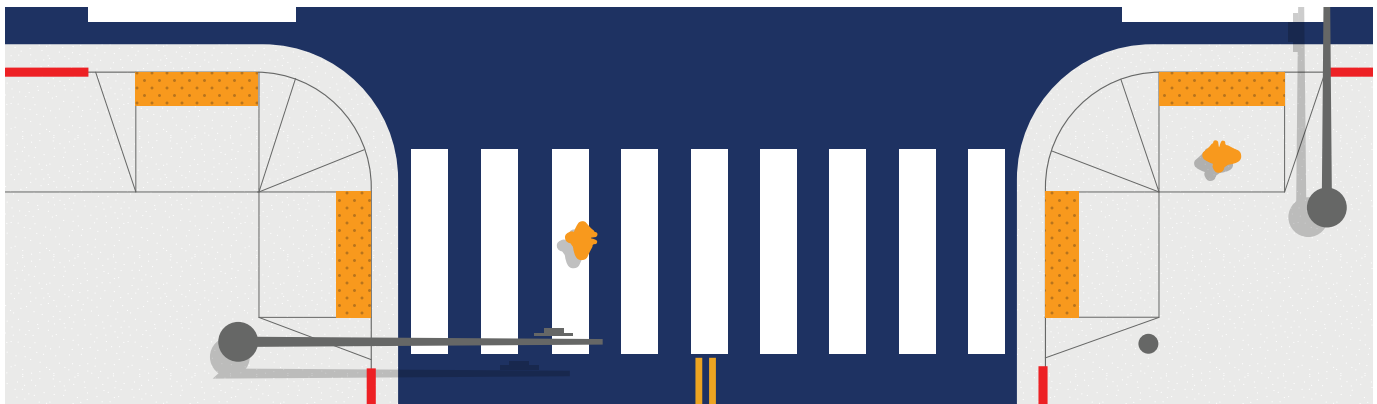
- ▶ Crossing frequency should be appropriate to the street and land use context.
- ▶ Pedestrian crossing length should be as short as possible to reduce conflict exposure.

Narrowing the street as much as possible, through the use of curb extensions, narrow lane widths, and median islands shortens the pedestrian crossing distance and reduces the exposure to conflicts as well as slowing vehicles. Median islands can simplify crossings to one direction of travel at a time.

- ▶ Curb-return radii should be as small as feasible to balance the needs of turning vehicles and proper curb ramp design. See Curb-Return Radii section.
- ▶ Crossing locations and right-of-way expectations should be clear to all pedestrians and street users.

High-visibility crosswalk markings should be installed at most marked pedestrian crossings, especially in areas with high pedestrian and vehicular traffic volumes. On local-local intersections, it may be acceptable not to stripe pedestrian crosswalks, however sight lines should be clear and painted stop bars may be needed to encourage proper stopping location outside of the pedestrian crossing line.

- ▶ Signalized crossings should provide sufficient crossing time and frequency with minimal delay to accommodate pedestrians of all ages and abilities. See MUTCD crossing guidance and Signalized Intersections section.



8.1 CROSSING TREATMENT SELECTION

At controlled intersections, such as signalized intersections and all-way stop-controlled intersections, pedestrian (and bicycle and pathway) crossings should be safe and comfortable and provide enough time for pedestrians and bicyclists to cross vehicular traffic.

For uncontrolled intersections, or intersections where only the minor roadway is stop-controlled, additional crossing treatments may be needed to provide a safe and comfortable crossing without excessive delay. These crossing treatments can typically serve both pedestrians and bicyclists, and should be considered at sidewalk, pathway, and bikeway crossings. A few additional bikeway-specific crossings are discussed in Chapter 9.

GENERAL GUIDANCE

The recommendations in this table are based on FHWA's Guide for Improving Pedestrian Safety at

Uncontrolled Intersections. Engineering judgment should be used on a case-by-case basis to determine final recommendations for safety countermeasures at uncontrolled crossings. Designers should provide adequate justification for any recommendations that deviate from those outlined in the table.



Relevant Resources

- ▶ [FHWA Guide for Improving Pedestrian Safety at Uncontrolled Intersections](#)
- ▶ AASHTO Guide for the Development of Bicycle Facilities (Chapter 10 and 11)
- ▶ AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities
- ▶ NACTO Urban Bikeway Design Guide (Chapter 4)

Table 20. *Crossing Treatment Selection*

Roadway Type	ADT < 9,000			ADT 9,000 - 15,000			ADT > 15,000		
	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph
2 lanes	A 1 2 4 5	A 4 5	B 4 5 7	A 2 4 6	B 4 6	C 4 6 7	B 2 4 6	B 4 6	C 4 6 7
3 lanes w/ raised median	A 1 2 3 5	A 3 5	B 3 5 7	B 2 3 6	B 3 6	B 3 6 7	B 2 3 6	B 3 6	C 3 6 7
3 lanes w/o raised median	A 1 2 3 4 5	B 3 4 5	C 3 4 5 7	B 2 3 4 6	B 3 4 6	C 3 4 6 7	C 2 3 4 6	C 3 4 6	C 3 4 6 7
4+ lanes w/ raised median	A 3 5 6	B 3 5 6	C 3 5 6 7	B 3 5 6	B 3 5 6	C 3 5 6 7	C 3 5 6	C 3 5 6	C 3 5 6 7
4+ lanes w/o raised median	A 3 4 5 6	B 3 4 5 6	C 3 4 5 6 7	B 3 4 5 6	B 3 4 5 6	C 3 4 5 6 7	C 3 4 5 6 7	C 3 4 5 6 7	C 3 4 5 6 7

A

Marked crosswalk and signage

B

RRFB + "A" treatments

C

PHB or Signal + "A" treatments

Additional Enhancements:

1. Raised Crosswalk
2. In-street pedestrian sign
3. Advanced "yield here to" markings & signage
4. Pedestrian refuge island
5. Curb extensions/bulbouts
6. Road diet
7. Grade separation

Notes:

- Suggested additional enhancements should be considered and implemented based on context and feasibility
- Use actual speed data where available
- On-street parking should be restricted within 30' of all crossings on both sides

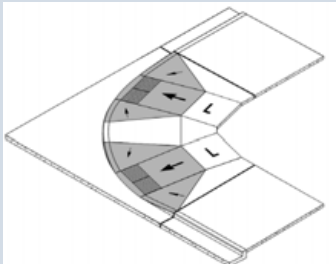
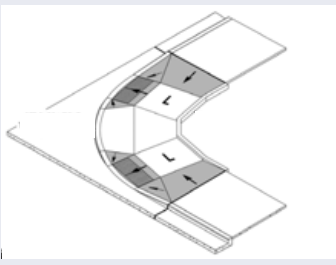
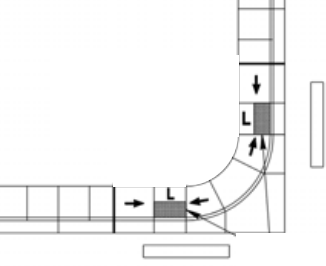
8.2 CURB RAMPS

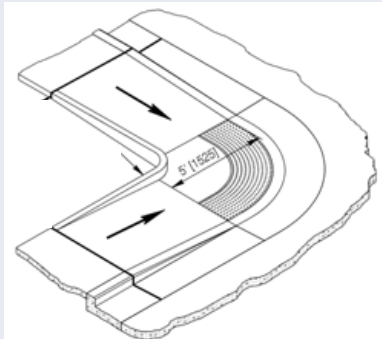
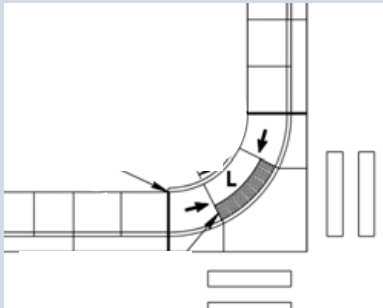
GENERAL GUIDANCE

Pedestrian crossings must be accessible and compliant with ADA and PROWAG requirements, including compliant curb ramps and pedestrian signals. Applicable Town of Jackson and/or WYDOT Standard Details should be used for Town and County projects.

Designers should prioritize directional curb ramps in line with the direction of pedestrian travel instead of a single diagonal curb ramp on the apex of the corner. However, street context and available right of way often create constraints that do not always allow for directional curb ramp design. The table below describes various types of ramp design, and considerations for each.

Table 21. *Curb Ramp Types*

RAMP TYPE	DESIRABILITY	PROS	CONS
Two Perpendicular (Directional) 	Preferred	- Provides directionality and physical wayfinding for the visually impaired - Eliminates grade changes within the pedestrian access route	Requires more ROW/space to construct ramps
Two Combined Perpendicular (Directional) 	Acceptable, less preferred than non-combined perpendicular	- Fits in more constrained conditions - Provides directionality and physical wayfinding for the visually impaired	Creates some grade changes within the pedestrian access route
Two Parallel 	Acceptable, less preferred than combined perpendicular	- Fits in constrained conditions - Provides directionality and physical wayfinding for the visually impaired	Creates multiple grade changes within the pedestrian access route

RAMP TYPE	DESIRABILITY	PROS	CONS
Blended Transition/Depressed Corner (Square Back Radius) 	Undesirable, but accessible if two ramps can't be fit	Fits in constrained conditions	- Does not provide directionality or wayfinding - Drainage and debris concerns - Easier for vehicles to track over
Single Parallel or Perpendicular (Diagonal) 	Undesirable, but acceptable if no other ramp option will work	Fits in constrained conditions	- Does not align pedestrians with path of travel - Requires more maneuvering for wheelchairs and other wheeled devices within roadway - Drainage and debris concerns - Difficult to site push button and pedestrian signals



Applicable Street Typologies

► All



Relevant Resources

- Public Right of Way Access Guidelines (PROWAG)
- WYDOT Standards

8.3 RAISED CROSSWALK

GENERAL GUIDANCE

Raised crosswalks elevate a pedestrian, bicycle, or trail crossing to sidewalk level or an intermediate level between the street and sidewalk/trail across a street. Raised crosswalks are intended to slow vehicles, improve visibility and comfort of vulnerable road users, and improve yielding rates.

Raised crosswalks may be installed at intersections and midblock crossing locations to improve safety and visibility of pedestrian, bike, and trail crossings. They should generally be included at busy pedestrian crossing locations, sidewalk-level protected bikeways or shared-use paths.

CONSIDERATIONS

Raised crosswalks should be designed to fit the specific location context, including drainage. Additional or relocated storm infrastructure may be required to maintain proper drainage flows. Chase drains may be used to maintain the existing flowline.



Applicable Street Typologies

- Main Street, Connector, Local, Neighborhood Bikeway, Pedestrian Shared Street



Relevant Resources

- NACTO Urban Bikeway Design Guide (Chapter 4.2)
- AASHTO Guide for the Development of Bicycle Facilities (Chapter 8.4.3.2)

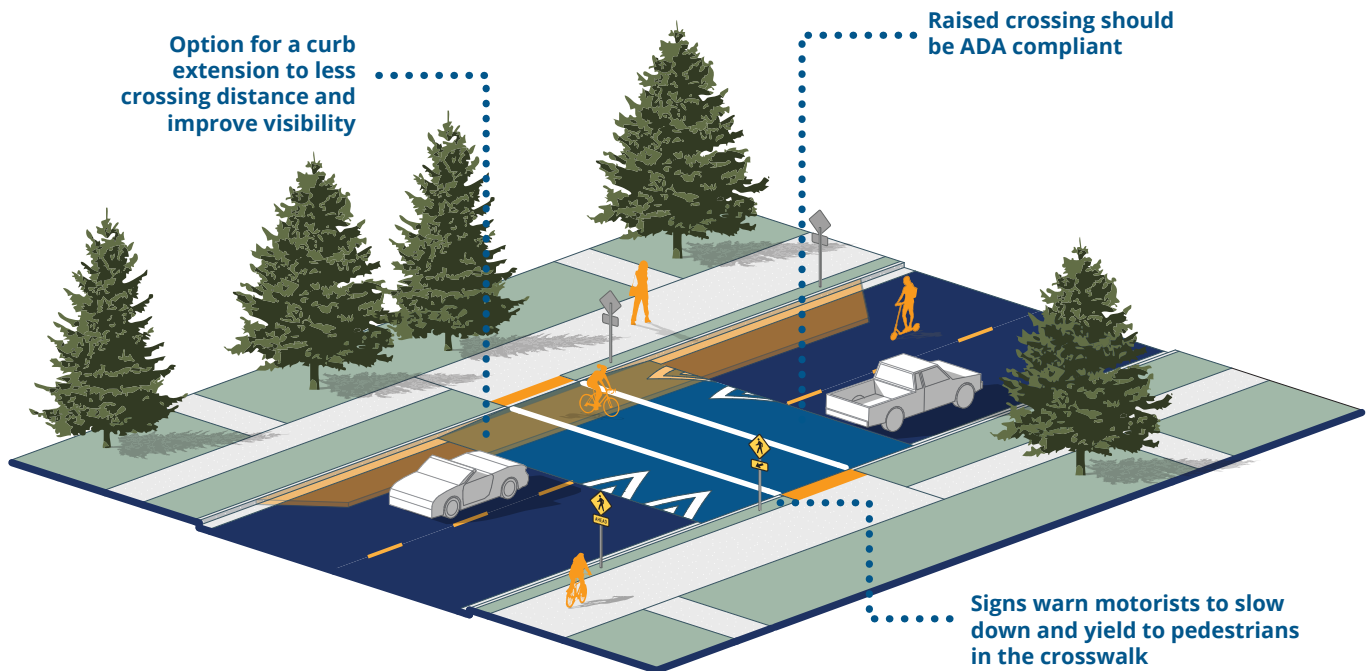


Figure 26. *Raised Crosswalk*

8.4 CONTINUOUS CROSSINGS

Continuous crossings provide a continuous surface and material throughout the crossing of a side street or major driveway instead of ramping down the sidewalk, raised bicycle lane, or shared-use pathway to street level for pedestrians and bicyclists to cross. Traditional intersection design requires pedestrians to step down off the sidewalk onto the street to cross, despite having the right-of-way. A continuous crossing indicates and reinforces pedestrian priority, shifting the paradigm from a pedestrian entering the vehicle space (street) to the vehicle entering the pedestrian space. Continuous crossings also increase accessibility and comfort by reducing the need for curb ramps.

Continuous crossings function very similarly to raised crosswalks in that they slow vehicles, improve visibility and comfort of vulnerable road users, and improve yielding rates. Continuous crossings are typically used when the pedestrian/ bicycle facility crosses a side street or major driveway.

GENERAL GUIDANCE

For continuous crossings, the material from which the sidewalk (or raised bicycle lane or shared-use path) is constructed is extended to create a continuous surface. This creates a visual and tactile effect that further emphasizes pedestrian and bicycle priority. Crosswalk markings are not typically used with continuous sidewalks, but detectable warning surfaces should still be used to indicate to visually impaired pedestrians that they are encountering a side street.

Continuous crossings should be designed with steep and short vehicle crossing ramps to effectively slow vehicles down. Typically, continuous crossings have steeper vehicle ramps than raised crosswalks.

The Furnishing/ Planting Area between the roadway and bikeway and/or sidewalk creates the width of the ramp between the roadway and the continuous crossing. To create an equal slope on both sides of the continuous crossing, the width and slope of the ramp on the side-street side of the crossing may match.

CONSIDERATIONS

Continuous crossings can be supplemented with warning signage for the side street if concerns remain about yielding. Additional or relocated storm infrastructure may be required to maintain proper drainage flows.



Source: Mobycon

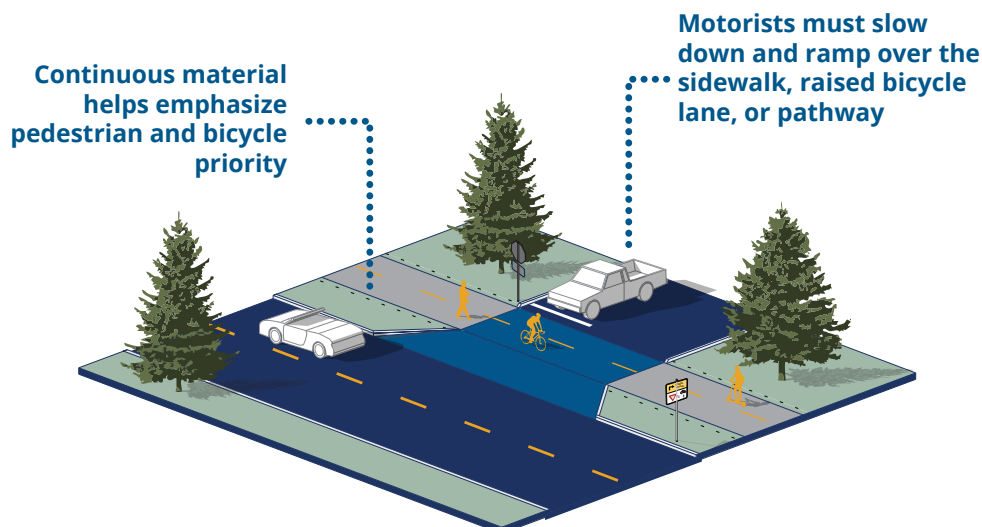


Figure 27. Continuous Crossing

8.5 RECTANGULAR RAPID FLASHING BEACON (RRFB)

GENERAL GUIDANCE

Rectangular Rapid Flashing Beacons (RRFBs) are used at uncontrolled crossing locations to enhance pedestrian and bicycle conspicuity. While an RRFB is applicable in many types of crossings, they are recommended for two- to three-lane crossings with speeds less than 35 miles per hour. See [Section 8.1](#) for additional selection guidance. On three-lane roads, a pedestrian refuge island is recommended to decrease exposure for pedestrians in the roadway. RRFB may also be used on four-lane roads with median islands. Consider a Pedestrian Hybrid Beacon (PHB) for higher volume and higher speed roads (guidance provided in Section 8.6).

CONSIDERATIONS

RRFBs can be placed at a mid-block crossing or an intersection crossing. Advanced RRFB assemblies can be placed prior to the RRFB crossing in locations with roadway curvature or other sight line concerns. The

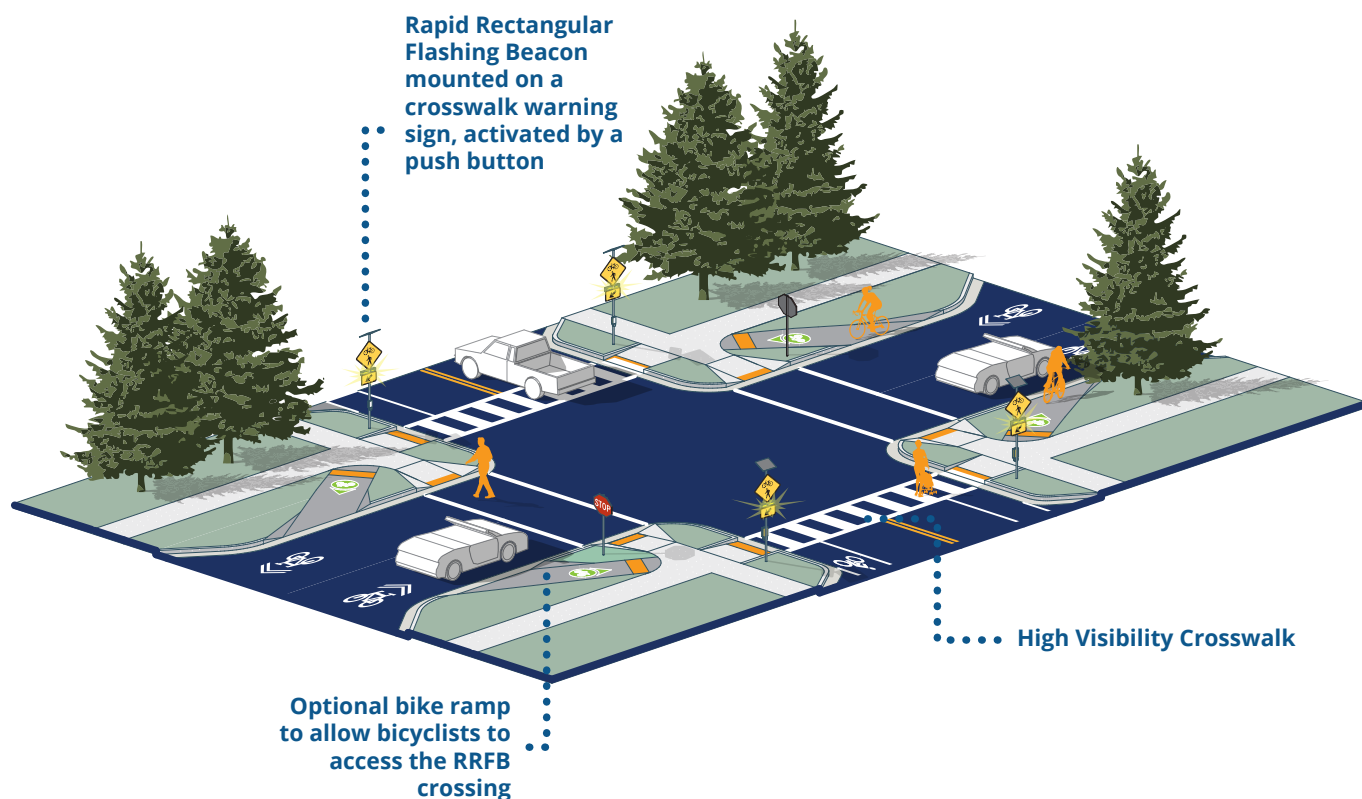
advanced RRFB is activated at the same time as the RRFB located at the crosswalk and provides an early warning to drivers that a pedestrian may be crossing ahead and they should yield.

For RRFB crossings on a bicycle route, green crossbike pavement markings should be provided adjacent to the crosswalk. A bicycle ramp or protected corner can also be used to enhance bicyclist protection and visibility at the crossing. See Protected Intersection for additional information on protected corner design. Additional bike push buttons may be provided.



Relevant Resources

- ▶ NACTO Urban Bikeway Design Guide (Chapter 4.2)
- ▶ Manual on Uniform Traffic Control Devices (Part 4L and 9)

Figure 28. *RRFB*

8.6 PEDESTRIAN HYBRID BEACON (PHB)

GENERAL GUIDANCE

A Pedestrian Hybrid Beacon (PHB), sometimes referred to as a High Intensity Activated Crosswalk (HAWK), is best suited for uncontrolled crossings of multilane, higher speed or higher volume streets where there is a need to provide occasional pedestrian and/or bicyclist crossings without the warrant for a full signal. See [Section 8.1](#) for additional treatment selection guidance.

The beacons on PHBs remain unlit until activated by a pedestrian or bicyclist wishing to cross. The lights then first flash yellow to signal to motorists to slow down, then they turn solid red. This is when a bicyclist or pedestrian can cross. After a set interval the beacons flash red, signaling that motorists may proceed once the crosswalk is clear, and finally return to their unlit status.

CONSIDERATIONS

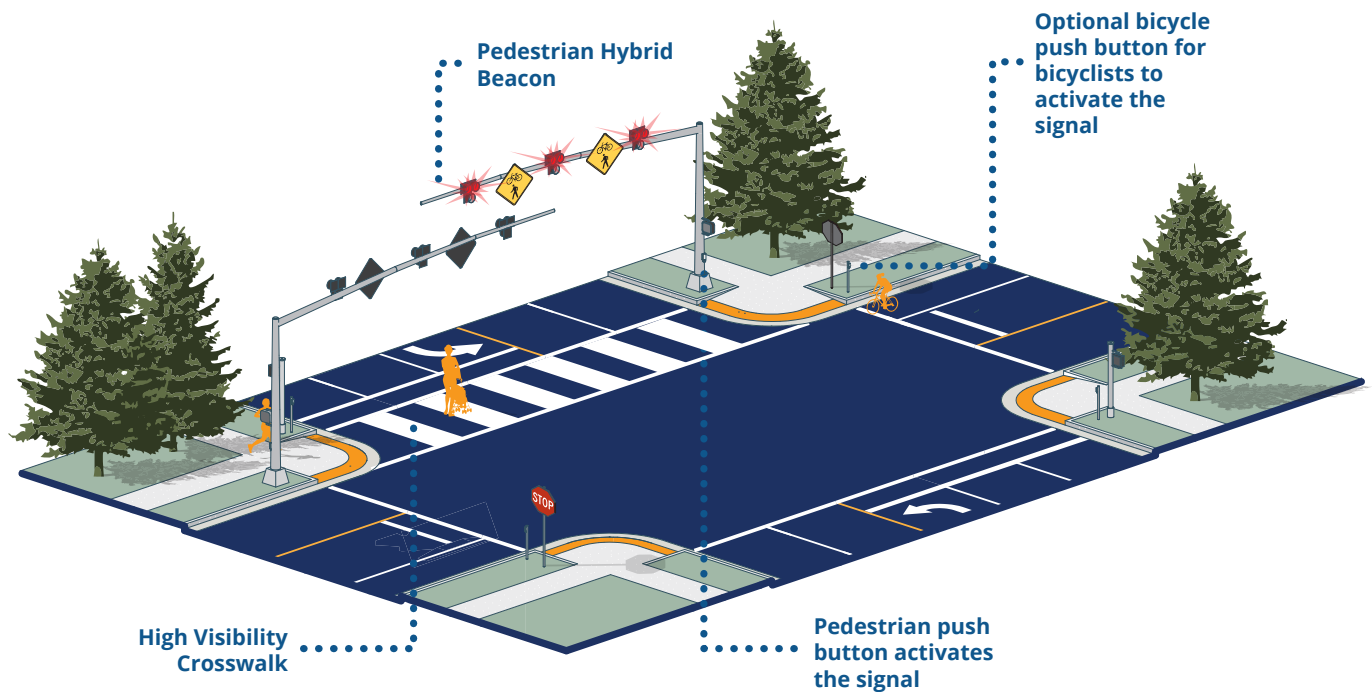
For PHBs intended to serve bicyclists as well as pedestrians, provide green crossbike pavement markings directly adjacent to the crosswalk. A bicycle ramp or protected corner can also be used to enhance bicyclist protection and visibility at the crossing. See Protected Intersection for additional information on protected corner design. Additional bike push buttons may be provided.



Relevant Resources

- ▶ AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities
- ▶ NACTO Urban Bikeway Design Guide (Chapter 4.2.5)
- ▶ Manual on Uniform Traffic Control Devices (Part 4J and 9)

Figure 29. PHB



CHAPTER 9

Bikeway Intersection Design

9 Bikeway Intersection Design

Bicyclists' comfort and safety at intersections is a crucial part of the bike network. A high-quality, protected, all ages and abilities (AA&A) suitable bikeway facility that does not provide a safe AA&A suitable street crossing does not serve the broader bicycle network, and will not be used by all people. Bicyclists should be able to cross intersections safely, comfortably, and without excessive delay.

GENERAL GUIDANCE

- ▶ Limit the bikeway crossing length as much as possible. Use curb extensions, lane reductions, and medians to reduce crossing distances.
- ▶ To slow traffic and improve visibility, apply roundabout concepts. If a roundabout isn't possible, some elements of roundabout design can still be applied, such as intersection setbacks and median islands.
- ▶ Reduce speed and volume. Apply traffic calming measures along all streets approaching an intersection or volume management strategies such as modal filters. At the intersection, consider methods to make yielding and turning safer, such as approach speed humps, median refuge islands, parking restrictions, protected corners, and appropriate lighting.
- ▶ Identify appropriate intersection crossing control. This should be done after speed reduction measures have been selected.
- ▶ In lower-volume and lower-speed intersections, assign priority to bikeways (stop control or by applying geometric design such as traffic circles to create all-yield conditions). More intensive traffic controls, such as RRFBs, PHBs, or signals are appropriate where bikeways cross higher-volumes or higher-speed streets. Additional guidance on crossing treatment selection can be found in the next section.
- ▶ Use crossbikes (green bike conflict markings) and crosswalks. They should be considered at all bikeway crossings.

9.1 BIKEWAY CROSSING TREATMENT SELECTION

Bicycle crossing safety includes many of the same design considerations that pedestrian crossings require. For bicycle intersection crossing treatments, the Crossing Treatment Selection Table from the Pedestrian Intersection Design Chapter has been provided, with a few additional bikeway-specific treatments.



Relevant Resources

- ▶ AASHTO Guide for the Development of Bicycle Facilities (Chapter 10 and 11)
- ▶ NACTO Urban Bikeway Design Guide (Chapter 4)

GENERAL GUIDANCE

Engineering judgment should be used on a case-by-case basis to determine final recommendations for safety countermeasures at uncontrolled crossings. Designers should provide adequate justification for any recommendations that deviate from those outlined in the table.

Table 22. *Bicycle Crossing Treatment Selection*

Roadway Type	ADT < 9,000			ADT 9,000 - 15,000			ADT > 15,000		
	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph
2 lanes	A 1 2 4 5	A 4 5	B 4 5 7	A 2 4 6	B 4 6	C 4 6 7 5	B 2 4 6	B 4 6 5	C 4 6 7 5
3 lanes w/ raised median	A 1 2 3 5	A 3 5	B 3 5 7	B 2 3 6 5	B 3 6 5	B 3 6 7 5	B 2 3 6 5	B 3 6 5	C 3 6 7 5
3 lanes w/o raised median	A 1 2 3 4 5	B 3 4 5	C 3 4 5 7	B 2 3 4 6 5	B 3 4 6 5	C 3 4 6 7	C 2 3 4 6 5	C 3 4 6 5	C 3 4 6 7 5
4+ lanes w/ raised median	A 3 5 6	B 3 5 6	C 3 5 6 7	B 3 5 6	B 3 5 6	C 3 5 6 7	C 3 5 6	C 3 5 6	C 3 5 6 7
4+ lanes w/o raised median	A 3 4 5 6	B 3 4 5 6	C 3 4 5 6 7	B 3 4 5 6	B 3 4 5 6	C 3 4 5 6 7	C 3 4 5 6 7	C 3 4 5 6 7	C 3 4 5 6 7

A

Crossbike and signage

B

RRFB + "A" treatments

C

PHB, Signal, or TOUCAN + "A" treatments

Additional Enhancements:

1. Approach speed humps
2. Advanced crossing warning signage
3. Advanced "yield here to" markings & signage
4. Median refuge island
5. Protected corners / corner islands
6. Road diet
7. Grade separation

Notes:

- Suggested additional enhancements should be considered and implemented based on context and feasibility
- Use actual speed data where available
- On-street parking should be restricted within 30' of all crossings on both sides

9.2 PROTECTED INTERSECTIONS

GENERAL GUIDANCE

Protected intersections and corners provide physical separation between bicycles, pedestrians, and vehicle traffic at the corners of intersection, creating greater visibility and encouraging proper yielding behavior and slower turns through geometric and signal design elements including a setback of the crossbike and crosswalk locations, raised corner islands, advance queuing areas and refuge spaces, bike and pedestrian signals, etc. Well-designed protected intersections create low-stress transitions between intersecting bikeways, reduce the conflict zones between vehicles and cyclists, add predictability to movements for all intersection users, and are comfortable for cyclists of all ages and abilities.

Protected intersections and corners can be implemented in a number of ways, including quick build, constrained on-street configurations, and with raised bikeways. Regardless of configuration, protected intersections include the following core design elements:

- ▶ Offset (setback) bikeway approach;
- ▶ Bicycle and pedestrian forward queuing area; and,
- ▶ Reduced corner radius or corner islands.

Offset Bikeway Approach

As the bikeway approaches the intersection, it should be designed to be setback from the street to improve sight lines between cyclists and drivers and create space for drivers to yield to bicyclists and pedestrians crossing the street. A maximum taper of 3:1 should be used to bend out the bikeway, though rates of 5-7:1 are preferred for more gradual transitions at comfortable speed.

Bending out the bikeway to create the offset often places the bikeway adjacent to the sidewalk. A detectable edge and/or buffer should be placed between adjacent bike- and pedways for accessibility concerns.

The offset of the bikeway creates the driver yielding area. The ideal setback is 16.5 ft to allow for most vehicles to yield to crossing bicyclists

and pedestrians outside of the path of through vehicles. However, a setback of at least 6 ft can still be effective. The setback should generally not be greater than 20 ft in order to maintain slow turning speeds and encourage driver yielding at the slowest part of the vehicle turn movement.

Bicycle and Pedestrian Forward Queuing Area

To create queuing space outside of the bikeway, a setback of at least 6 ft creates an accessible refuge space for pedestrians. A minimum of 6 ft also provides space for bikes to queue without encroaching into the through bikeway space.

Pedestrian access to dedicated pedestrian queuing areas should be perpendicular to the bikeway and align with the street crosswalk. Detectable warnings should be placed at the edge of the sidewalk before entering the bikeway, and on either edge of the pedestrian queuing/refuge area.

The width of pedestrian and bike queuing areas should generally match the width of the bicycle facility and pedestrian crosswalk, no less than 6 ft. Where the bicycle and pedestrian queue areas are adjacent to each other without vertical separation, detectable warnings should be placed across the full length of both facilities.

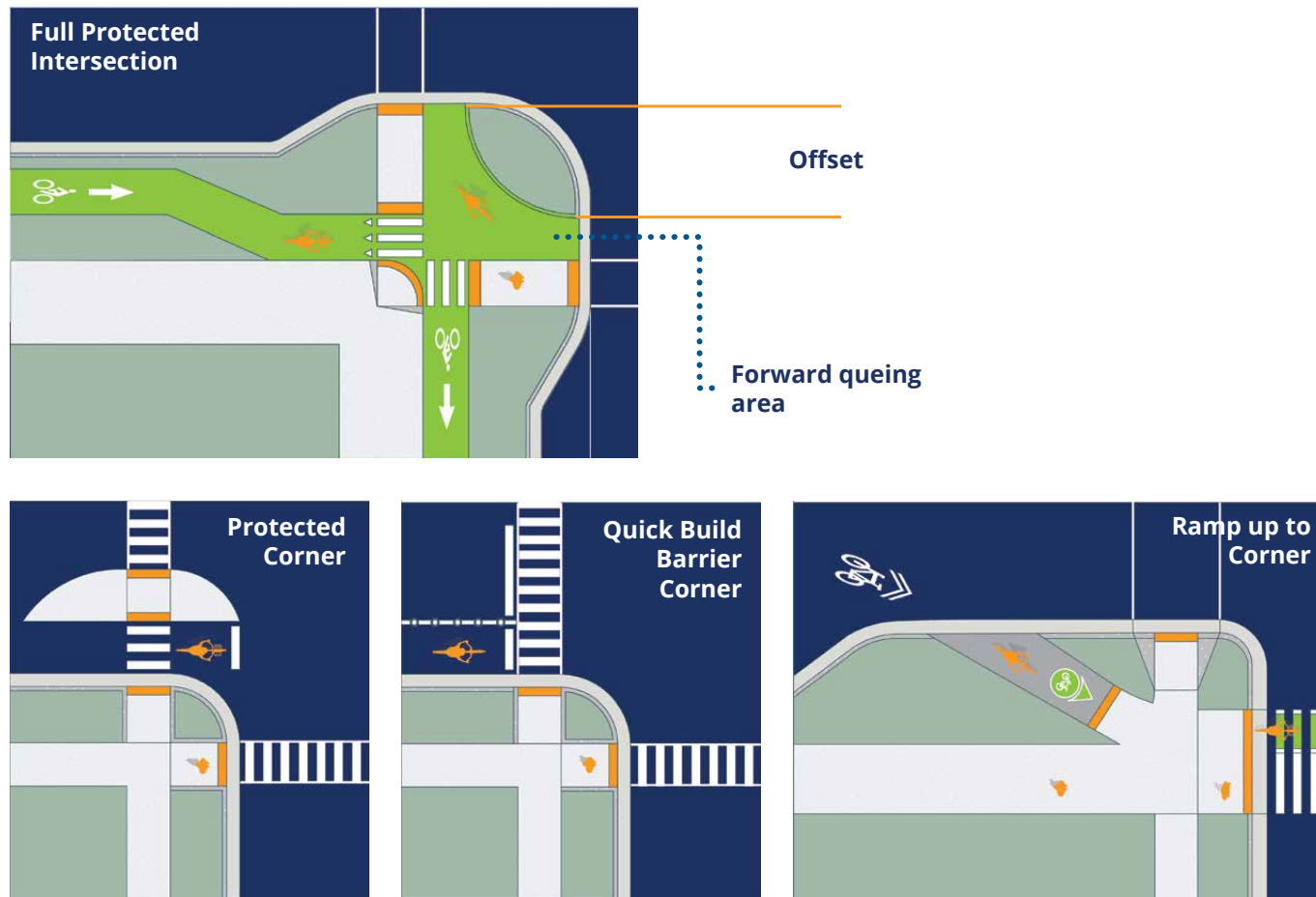
Stop bars for bicyclists and pedestrian detectable warnings should be placed near the edge of the intersecting street, but outside of any large vehicle tracking area.

Corner Radius and Islands

The corner radius of a protected intersection extends the physical separation of the bikeway to provide the setback, queuing area, and driver yield zone. Mountable corner design principles may be used to accommodate the design and control vehicles for the intersection. See earlier design guidance in Chapter 7 for appropriate corner radii, design vehicles, and mountable corners.

Examples of protected corner types can be seen in Figure 34.

Figure 30. *Protected Corner Types*



CONSIDERATIONS

The considerations for separated bikeways and dual radius intersection corners also apply to protected corners/intersections.

Drainage should be considered when modifying curb lines for protected corners and intersections. Inlets may need to be relocated and/or added to maintain positive drainage along the flowline and around corners.

Protected corners or intersections that maintain the bikeway at street grade or an intermediate level between the sidewalk and street may require special equipment for sweeping and snow removal. Where the bikeway is raised, snow and debris removal may be done in tandem with the sidewalk.

Where the bikeway and pedestrian spaces at the corner and crossings are delineated, the bikeway must be separated by a cane-detectable edge treatment.



Applicable Street Typologies

- ▶ Local, Connector, Multimodal Connector, Arterial, Main Street



Relevant Resources

- ▶ AASHTO Guide for the Development of Bicycle Facilities (7.9.7)
- ▶ NACTO Urban Bikeway Design Guide (4.3.1)

9.3 TOUCAN CROSSING

GENERAL GUIDANCE

A Toucan, originating from the phrase ‘Two groups CAN cross’, is a half-signal design intended to allow both pedestrians and bicyclists to safely cross a street while restricting through vehicle traffic. Unlike PHBs, Toucans also function as a volume control measure by restricting vehicle cut-through traffic; motorized traffic on the minor street must turn right at the intersection.

Toucans use a standard signal head for motorists along the major street. The major street traffic signal rests on green until the other direction is activated by a bicyclist or a pedestrian. Bicyclists cross using a bicycle signal, and pedestrians get a standard WALK indication on a pedestrian signal head. This design creates a protected crossing for bicyclists and allows pedestrians to continue through the intersection as well.

CONSIDERATIONS

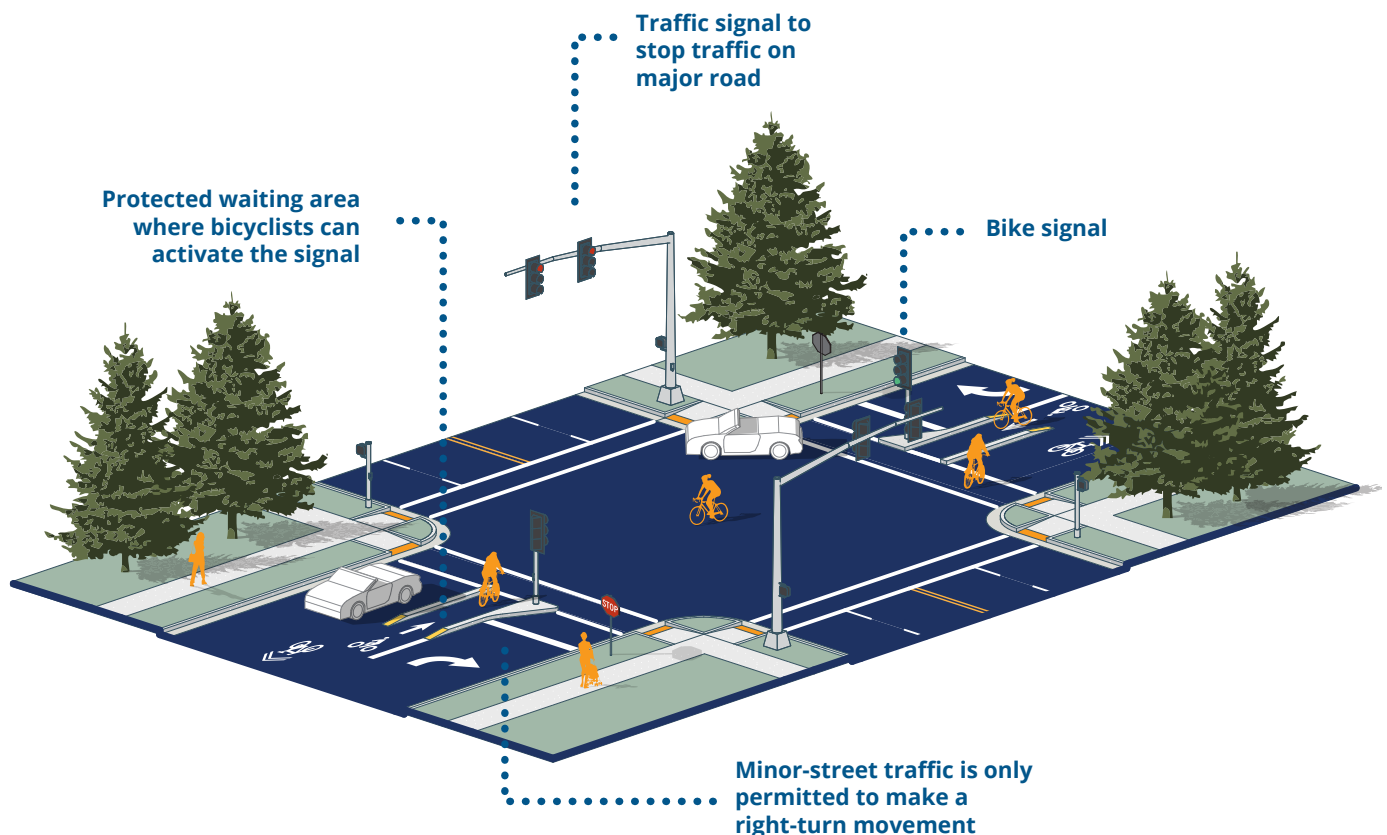
A Toucan requires a traffic signal for the major street traffic but does not require one for the minor street traffic as they are only permitted to make a right-turn movement. This design should be considered for a major arterial crossing where it is not desirable to provide a PHB or a full signal.



Relevant Resources

- ▶ AASHTO Guide for the Development of Bicycle Facilities (Chapter 10.8)
- ▶ NACTO Urban Bikeway Design Guide (Chapter 4.2.5)

Figure 31. *Toucan Crossing*



CHAPTER 10

Bus Stops

10 Bus Stops

Transit plays a critical role in the multimodal transportation system. Bus stops should be well-connected to the broader multimodal network and accessible to all users. Bus stop design should manage interactions between the variety of sidewalk, transit, bikeway, and curbside users and clarify if/where conflict zones may exist. For bus stops and other transit-related elements the Town's transit authority, START, should be consulted.

The Rhode Island Bus Stop Design Guide (2024) may also be referenced for further bus stop design guidance beyond that provided by this Manual.



Bus Vehicle Types

The current bus fleet in Teton County includes 45 ft long MCI coaches and 40 ft long Gilligs. As the fleet changes, bus stop design may need to change to accommodate newer fleet vehicles. Curbside transit bulbs need to accommodate the bus merging in and out of traffic, in addition to the length of the vehicle itself.

10.1 BUS STOP LOCATION

GENERAL GUIDANCE

Bus stop location is an important design consideration that influences transit operations, intersection capacities, and pedestrian safety. Far-side stops are typically preferred in Jackson and Teton County, especially where vehicle or pedestrian volumes are high. Sight distance is improved for pedestrians, and re-entering traffic is typically easier for bus drivers. Near-side stops are sometimes used where traffic conditions aren't critical, and buses are able to use the intersection area to re-enter traffic.

Bus Stop Types

Curbside stops where the bus pulls to the curb to serve the bus stop. They can be used on all types of streets. Parking may be permitted or prohibited. The bus may stop within the vehicle travel lane or pull out of it, depending on the street design.

Bus bays where the bus pulls out of the travel lane into the dedicated curbside 'bay'. They are typically used along streets with higher volumes and speeds.

Bus bulbs where the curb is shifted into the roadway, typically past parking, so that the bus may reach the curb/ bus stop without pulling over. They should be used along streets with permitted parking.

Floating bus stops, or **boarding islands**, where a bicycle facility runs along the street and is routed behind the transit stop to eliminate passenger/ bicycle conflicts. Floating bus stops function similarly to bus bulbs, with the advantage of working along streets with bikeways. See [Section 10.3](#) for additional information.



Applicable Street Typologies

- Arterial, Main Street, Connector, Multimodal Connector, Local



Relevant Resources

- Public Right of Way Access Guidelines (PROWAG)
- AASHTO Guide for Geometric Design of Transit Facilities (2014)
- NACTO Transit Street Design Guide (2016)

10.2 BUS STOP AREAS AND AMENITIES

Every transit rider is also a pedestrian before and after they ride the bus. Pedestrian connectivity, comfort, and accessibility at bus stops are critical parts of the transit service. Bus stops must meet all American with Disabilities Act of 1990 requirements per the Public Right of Way Access Guide (PROWAG).

GENERAL GUIDANCE

Accessible Boarding/Landing Area

An accessible passenger boarding/landing area must be provided at all bus stop locations to comply with PROWAG and to facilitate boarding and unloading of passengers. This area is where passengers enter and exit the bus and where bus operators deploy the lift for passengers using a mobility device such as a wheelchair.

This area must have a minimum clear length of 8 ft (measured from the curb or street edge) and a minimum clear width of 5 ft (measured parallel to the street). This area should be paved, contiguous to the sidewalk, and have a maximum 2% cross slope. The boarding landing area should not be obstructed by any physical features such as sign poles, utility poles, shelters, or other bus stop amenities.

Back-door Access Area

Where feasible, a rear-door access area should be provided as well. Designers should reference the type of bus vehicle that serves that particular route and locate the rear-door access area accordingly.

Pedestrian Access Route

A clear Pedestrian Access Route (PAR), as defined by the Americans with Disability Act and PROWAG, must be provided between the boarding/landing area, the sidewalk, and any bus stop amenities.

This Pedestrian Access Route must be 4 ft minimum clear width, free of obstacles or protruding objects, to comply with PROWAG. The PAR surface should be stable, firm, and slip resistant with a 2% max. cross slope. The PAR is often provided within the Clear Sidewalk Area. See [Section 4.2](#) for additional discussion on sidewalk areas and preferred widths.

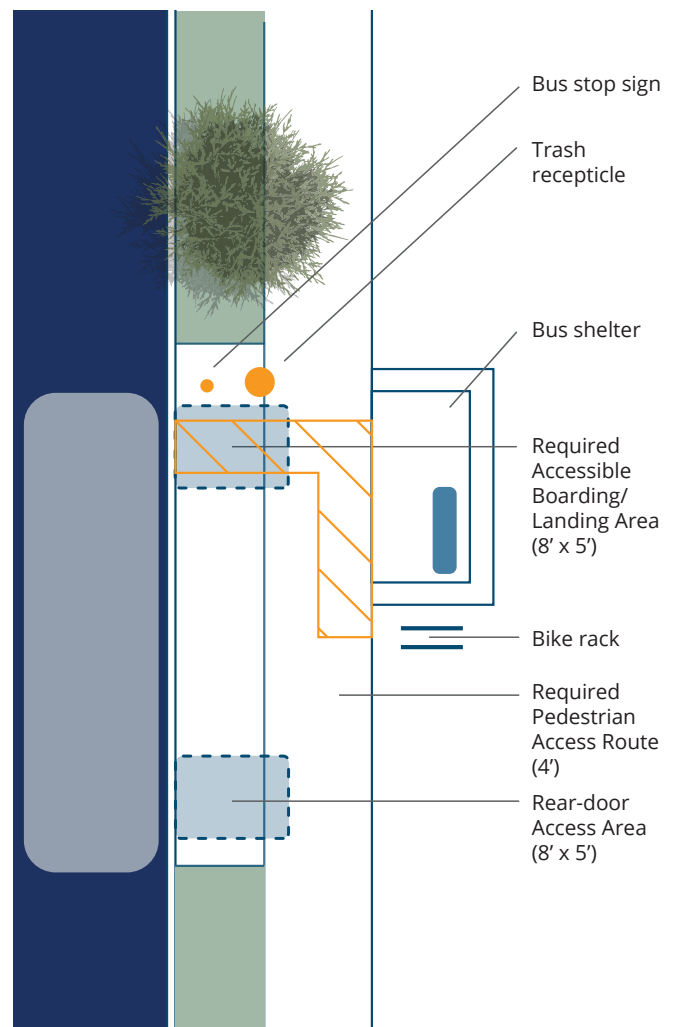
Bus Stop Signs

Bus stop signs must be installed at all bus stops to identify the bus stop. The poles should be placed a minimum of 2.5' from the curb and adjacent to the passenger boarding/landing area so that passengers know where to board, and bus drivers know where to stop.

Amenities

Different amenities and designs should be considered based on the street and route context. Transit stops with higher volumes of passengers and more frequent bus service should provide more space and amenities than stops that serve fewer people. Similarly, transit stops on busy streets with many other street users should provide more space and conflict prevention than stops on small, local streets.

Figure 32. *Bus Stop Areas*





Applicable Street Typologies

- ▶ Arterial, Main Street, Connector, Multimodal Connector, Local



Relevant Resources

- ▶ Public Right of Way Access Guidelines (PROWAG)
- ▶ AASHTO Guide for Geometric Design of Transit Facilities (2014)
- ▶ NACTO Transit Street Design Guide (2016)

10.3 BUS STOPS AND BIKEWAYS

Bikeways and pathways can be integrated into bus stop design in a variety of ways to maintain bus and bicycle operation and minimize conflicts as much as possible.

GENERAL GUIDANCE

Where feasible, a separated bike lane or pathway should be designed to route behind transit stops to eliminate the direct conflict between transit users and the bike lane. This is typically referred to as a floating bus stop or a bus boarding island. Where this is not feasible, the bus must use the same space as the bicycle lane to access the bus stop.

Floating bus stops

Floating bus stops are the preferred design for managing interactions between bus stops and separated bikeways. They allow for improved transit service, as the bus does not have to pull in and out of traffic. They also improve bicycle safety at transit stops by removing the bus-bike conflict at the bus stop entirely. Floating bus stops require pedestrians to cross the bikeway to access the bus stop, and so pedestrian-bicycle conflict zones must be managed.

- ▶ The boarding island should be 8 ft wide or more to accommodate the 8' x 5' accessible boarding/landing area. See Section 10.2, above, for additional information. A boarding island that is wider can accommodate additional amenities such as benches/shelters.
 - » Where space does not allow for an 8 ft island adjacent to the bikeway, the bikeway surface may encompass the 5' x 8' landing area. To do so, the bikeway must be raised to sidewalk level and meet all other PROWAG requirements. This option does present higher potential for bicyclist-pedestrian conflict.
- ▶ The bike lane may be narrowed to no less than 5 ft to fit the full boarding island width.
- ▶ All pedestrian crossings, including across the bikeway, should be marked.
- ▶ Detectable warning surfaces should be provided where pedestrians can expect conflicts with traffic, including bicycles. Tactile directional indicators should be provided to guide people who are blind or low-vision to the accessible boarding/landing area from the sidewalk.

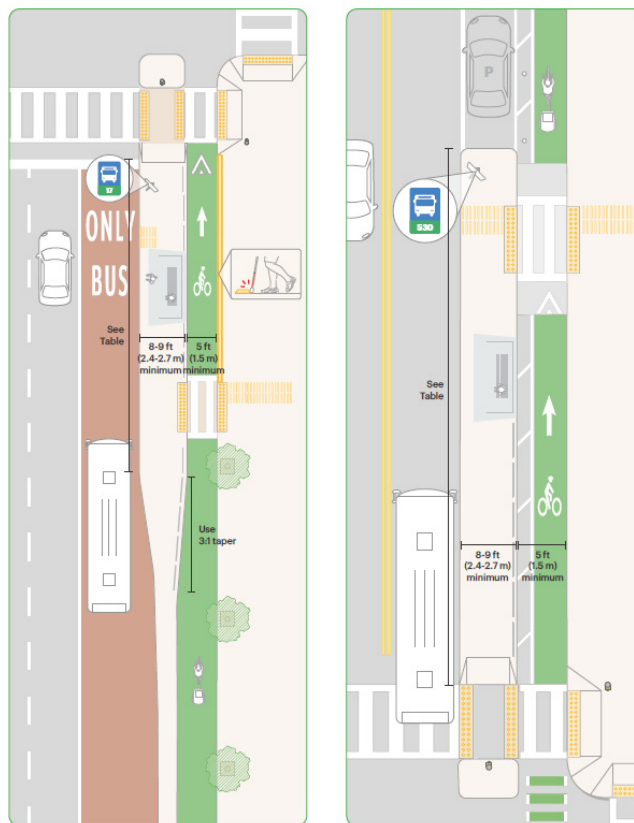


Figure 33. *Floating Bus Stop (NACTO Urban Bikeway Design Guide)*

Curbside bus stops

Floating bus stops are not feasible for every street. Curbside stops along bikeways, where the bus must use the same space as the bicycle lane, may be needed.



Applicable Street Typologies

- ▶ Arterial, Main Street, Connector, Multimodal Connector



Relevant Resources

- ▶ Public Right of Way Access Guidelines (PROWAG)
- ▶ AASHTO Guide for the Development of Bicycle Facilities (Chapter 7.9.14)
- ▶ NACTO Urban Bikeway Design Guide (Chapter 3.5)
- ▶ NACTO Transit Street Design Guide

CHAPTER 11

Quick-Build Treatments

11 Quick-Build Treatments

GENERAL GUIDANCE

Quick-build treatments are designed to address immediate needs and can be deployed quickly to enhance road safety. Quick build treatments utilize low-cost measures, such as paint, plastic delineators, planters, or other separators. The low-cost and non-permanent materials allow for testing and experimentation with designs without significant financial investments. Supporting quick build safety treatments is essential to enacting the Safety Action Plan and reaching Town and County goals to support and promote walking and rolling.

Quick-build facilities are a great way to implement projects quickly, gain public feedback, and iterate on designs. The planning of quick-build facilities should align with long-term planning goals and priorities. Considerations for maintenance, snow storage, and material replacement costs should also be considered within the project context and goals.

11.1 QUICK-BUILD PROJECT CATEGORIES

Demonstration projects, or **pilot projects**, are intended to last anywhere from one month to one year. These projects are typically intended to show the public what a particular treatment or facility looks like.

Interim projects are intended to last for more than a year but are still considered temporary and will need to be replaced or upgraded to more permanent facilities. These projects are a great way to test certain designs, treatments, or facilities without significant financial investment.

Short-term fixes are intended to last for more than a year, and they are built out of more durable, long-lasting materials. These projects are closer to permanent installations and help to bridge the gap between quick-build and permanent facilities.

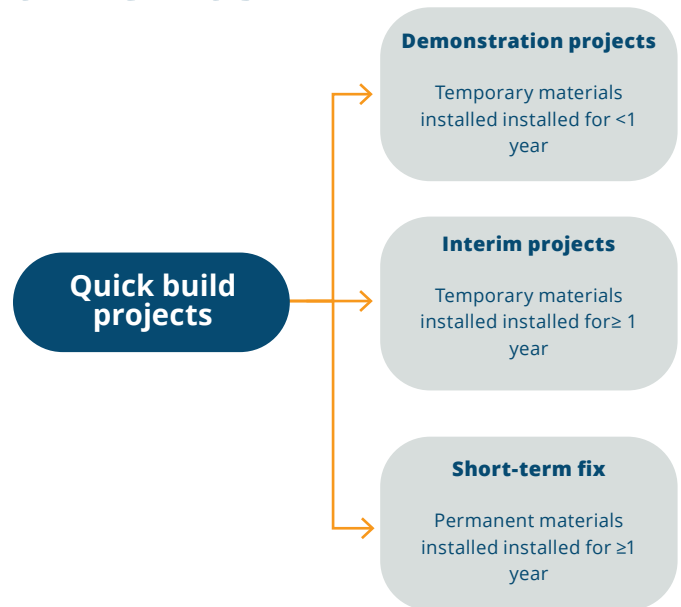


Figure 34. *Quick Build Categories*

11.2 QUICK BUILD TREATMENTS

Quick-build materials should be selected based on the intended project timeline, as different materials have significantly different levels of durability and longevity. Is this project intended to be a quick demonstration project, or a more permanent installation? Short-lived materials are typically faster and cheaper to install, while more durable and permanent treatments are typically more expensive and may require more time and equipment to install.

There are many options for the facility types that can be built with 'quick-built' materials and tactics. A few options include:

Delineator Medians

Low-cost medians can be implemented using delineators and/or raised separators in street retrofit or safety projects

Curb extensions

Low-cost curb extensions can be implemented using delineators and/or raised separators in street retrofit or safety projects

Centerline Hardening

Also referred to as left turn calming, these treatments typically include a combination of mountable separators and delineators to slow vehicular turning speeds and increase yielding to pedestrians

Right-turn Calming

Low-cost treatments that can serve a similar function to corner truck aprons can be implemented using mountable separators. These are intended to allow similar operations between managed, design and control vehicles similar to truck aprons.

Quick-build Bikeways

Quick build bikeways should follow this manual's guidance on bikeways but there is flexibility for the treatment materials and types.



Relevant Resources

- ▶ NACTO Urban Bikeway Design Guide
- ▶ CalBike and Alta Planning + Design Quick-Build Guide (2020)
- ▶ People for Bikes Quick Builds for Better Streets (2016)

CHAPTER 12

Maintenance & Operations

12 Maintenance & Operations

It is crucial that transportation facilities of all modes are maintained to ensure that they are safe and operable for all users. Maintenance is the inspection, preservation, repair, and restoration of facilities, and includes snow, ice, debris, and vegetation removal. Proper maintenance leads to lower costs over time for a transportation system compared to one that needs major repairs due to inconsistent maintenance.

Sidewalk, bikeway, and pathway facilities can require additional resources, knowledge, and coordination to ensure their proper maintenance. As new facility types and designs are built within the Town of Jackson and Teton County, designers should coordinate with maintenance departments and staff to identify appropriate maintenance responsibility and protocols for the facility after construction. Ongoing coordination is important throughout the life cycle of each facility as the process for determining proper design and procedures for maintenance is iterative.

The brief overview of maintenance recommendations provided here in the TED Manual focuses primarily on the maintenance of active transportation facilities. People who walk, bike, and roll are especially susceptible to debris, ice, snow, potholes, cracks, root damage, and other surface imperfections. Active transportation maintenance and operations, where possible, should be combined with maintenance of other transportation infrastructure to ensure that maintenance precedence aligns with Teton County and the Town of Jackson multimodal intents and available resources to sustain.

12.1 YEAR-ROUND MAINTENANCE

GENERAL GUIDANCE

Pavement Maintenance

Pavement maintenance for streets, bikeways, sidewalks, and pathways is one of the most important maintenance tasks. People who walk, bike, and roll are especially susceptible to potholes, cracks, and other surface imperfections. Recommendations include:

- ▶ Regular pavement condition surveys for all paved facilities including streets, bikeways, sidewalks, and pathways to observe potential damage
- ▶ Develop proactive and high-quality maintenance practices for short-term surface fixes, especially in bikeways or pathways where smaller wheels can get stuck in small cracks and minor potholes. Examples of short-medium term surface fixed include:
 - » Asphalt patching
 - » Mastic/gap sealing
 - » Crack sealing
 - » Fog sealing/sealcoating
 - » Chip sealing (not applicable for pathways)
 - » Slurry sealing
- ▶ Develop proactive and intentional maintenance policies for pavement restoration and sidewalk repair. Restoration work for bikeways and pathways should span the width of the facility, placing any longitudinal joints out of the path of wheeled travel.
- ▶ Non-skid surfacing and bike-friendly inlet grates should be used for on-street bikeways
 - » Where possible, work to move stormwater grates and utility covers entirely out of bike lanes
 - » Asphalt or concrete surfaces surrounding existing utility covers should have an even finished grade with the cover, or if bikeways are a new element in a street reconstruction then utility covers should be raised or lowered to match finished grade
- ▶ Utility cuts should cover the entire width of the

on-street bikeways

- ▶ Concrete sidewalks, as much as possible, should be kept even and free of large cracks
- ▶ Concrete surfaces that will accommodate wheeled travel (especially for smaller diameter wheels) should have saw-cut joints rather than troweled joints.

Pavement Markings

Pavement markings deteriorate over time and may become hard to see, especially at night or in snowy conditions. Pavement markings should be maintained and periodically refreshed to a high standard, especially for bikeways and intersections where markings play a crucial role in safe operations. Recommendations include:

- ▶ Conventional bike lanes may need to be refreshed more frequently than protected bike lanes as they typically receive more motor vehicle wear
- ▶ Using durable surfacing treatments such as thermoplastic, preformed tape, or inlaid thermoplastic/ tape will reduce the frequency of maintenance
- ▶ High-visibility crosswalk markings should be placed with vehicle wheel patterns in mind, so that a standard vehicle in the center of the lane will avoid running over the crosswalk markings

Sweeping

Debris, dirt, and leaves on streets typically end up near the gutter, where bikeways are generally placed. These directly impact the safety and comfort of bicyclists. Regularly scheduled maintenance should involve the regular sweeping of debris in the travelled way. Recommendations include:

- ▶ Street sweepers should have access to all bikeways. Design protected bike lanes so that they are wide enough to fit sweeping equipment; these facilities may require special equipment
 - » Raised bikeways may also require special equipment or clearing by hand

- ▶ Street sweepers should also have access to pathways, as pathways that run through wooded areas can have high levels of leaf/vegetation debris
- ▶ Sidewalks should be kept clear of encroaching vegetation, which can impede pedestrians and decrease visibility. Roots should be controlled to limit surface break-up.

Quick-Build Maintenance

Quick build improvements using paint and temporary materials should be monitored regularly to maintain integrity and the intent of the improvements. Temporary materials such as delineator posts and curb stops are easily moved out of place or damaged if hit by a vehicle and should be replaced in a timely manner to maintain safety and efficacy of the improvements. This is especially important for quick-build improvements that are reallocating roadway space for other uses besides vehicular; missing vertical elements or paint may make the space confusing as to who is supposed to utilize it and put pedestrians and cyclists at risk. Budget for replacing materials should be incorporated into the project and maintenance budget for quick-build improvements.



Relevant Resources

- ▶ FHWA Guide for Maintaining Active Transportation Facilities
- ▶ AASHTO Guide for the Development of Bicycle Facilities (Chapter 15)
- ▶ AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities (Chapter 4)
- ▶ NACTO Urban Bikeway Design Guide (Chapter 5)

12.2 SNOW MAINTENANCE

GENERAL GUIDANCE

With the quantity of snowfall received annually in Teton County, special provisions are required for the maintenance of transportation infrastructure throughout the winter months.

Street design should plan for winter conditions and operations. Sufficient snow storage space should be provided outside of the travel way for all modes. Where possible, design snow storage areas that are downslope from the bike lane to reduce icing risk. Typically, the Furnishing/ Planting Area, or sidewalk buffer, functions as a snow storage space.

Sidewalks, curb ramps, pathways, and crosswalks should be cleared to remain safe and accessible to pedestrians.

Bikeways and pathways that are designated as year-round transportation routes should be kept ice-free and clear of snow for year-round bike travel. Pathways designated as winter recreation trails may be groomed for over-snow travel. Conventional bike lanes should be plowed to the curb, and additional de-icing measures applied on vehicular lanes should be extended to include the bike lane. Vertical markers can be installed along bikeways prior to winter events to guide snow clearance during and after storms. Neighborhood bikeways should be prioritized to receive both plowing and de-icing agents.

Protected bike lanes require particular consideration for snow removal as there may be vertical elements such as curb or posts that interfere with typical winter maintenance. Public Works and Parks and Recreation maintenance departments should be consulted early in the design process to ensure a facility that is maintainable in winter for year-round cycling use.

Protected bikeways that are wide enough to accommodate snow storage (this may include independently aligned protected bikeways or bikeways that are immediately adjacent to sidewalks and at the same level as the sidewalk) should be plowed so that the stored snow forms a protective berm between the bikeway and the adjacent street or roadway. Where this is not possible, snow may be stored between the bikeway and the sidewalk.

Make sure bikeways, vehicle travel ways, and adjacent parking lanes are all designed to accommodate equipment for snow clearing and removal. Facility widths, radii, and tapers should all be considered through the lens of snow maintenance. Drainage should also be carefully designed to avoid the pooling of water and accumulation of ice.

Inlaid thermoplastic or tape pavement markings that are recessed below the pavement surface reduce the damage that snowplows do to pavement markings and decrease the need for frequent refreshing of pavement markings.

Coordination with the Town Public Works and Parks and Recreation Departments is advised to understand current snow maintenance prioritization throughout the transportation network. Setting or modifying winter maintenance standards may be done as part of this coordination with Parks and Recreation and/or Public Works.



Relevant Resources

- ▶ FHWA Guide for Maintaining Active Transportation Facilities (Chapter 7.7)
- ▶ AASHTO Guide for the Development of Bicycle Facilities (Chapter 15)
- ▶ AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities (Chapter 4)
- ▶ NACTO Urban Bikeway Design Guide (Chapter 5.1.2)

