



Regional Complete Streets Toolkit

TOOLE
DESIGN

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Toolkit Overview

This Denver Regional Council of Governments Regional Complete Streets Toolkit provides decision-makers, planners and designers guidance for planning, designing and implementing Complete Streets. The Complete Streets approach gives people walking, rolling, bicycling and taking transit the same access to safe and comfortable streets as those driving a motor vehicle. Complete Streets complement and support desired, surrounding land uses. The toolkit can help DRCOG, local governments, and project sponsors achieve Vision Zero, better define multimodal projects for funding through the Transportation Improvement Program and implement the long-term vision of the 2050 Metro Vision Regional Transportation Plan.

- 1** **Chapter 1** discusses applying a regional approach to Complete Streets and explains the need for a Regional Complete Streets Toolkit. This chapter also describes the benefits of Complete Streets and their relationship to other key planning initiatives.
- 2** **Chapter 2** introduces the regional street typology, how it was developed and how it should be used by local governments, and project sponsors. The chapter describes each of the ten street types, provides example illustrations and defines modal priorities and design element compatibility.
- 3** **Chapter 3** presents Complete Streets design elements and guidance for their implementation with considerations for community context, land use and zoning. This chapter also identifies design elements included in DRCOG’s Taking Action on Regional Vision Zero as crash countermeasures based on land use context compatibility, speed reduction and safety effectiveness.
- 4** **Chapter 4** focuses on Complete Streets implementation and establishes roles and responsibilities for DRCOG, local governments, the Colorado Department of Transportation, the Regional Transportation District, transportation management associations, private developers and others. This chapter also includes guidance and sample language for local governments to create their own local Complete Streets policies.

What is DRCOG?

DRCOG is a planning organization through which local governments collaborate to establish guidelines, set policy and allocate funding in the areas of transportation and personal mobility, growth and development and aging and disability resources.

Vision: Our region is a diverse network of vibrant, connected, lifelong communities with a broad spectrum of housing, transportation and employment, complemented by world class natural and built environments.





Introduction

Background

The Denver Regional Council of Governments Complete Streets Toolkit provides guidance for local jurisdictions and project sponsors to adopt the Complete Streets approach where streets are balanced for all modes of transportation, including walking, bicycling, taking transit, freight, and driving.

The toolkit is intended to:

- 1) Support the implementation of the 2050 Metro Vision Regional Transportation Plan.
- 2) Provide resources for Complete Streets implementation.
- 3) Encourage cross-jurisdictional collaboration to plan, design and build Complete Streets throughout the Denver region.

The toolkit establishes a vision for how local governments and project sponsors can adopt and apply Complete Streets policies, provides a multimodal street typology to supplement traditional roadway functional classifications, outlines design elements and guidelines that support the street typology and multimodal facilities and offers implementation considerations for local, regional and partner organizations.

The Complete Streets approach gives people walking, rolling, bicycling and taking transit the same access to safe and comfortable streets as those driving a motor vehicle. Complete Streets complement and support desired, surrounding land uses.

A regional approach

As a regional planning organization, DRCOG collaborates with local governments to establish guidelines, set policy and allocate funding in the areas of transportation and personal mobility, growth and development and aging and disability resources. The toolkit serves to support collaborative partnerships with local jurisdictions. Through partnerships, a regional approach to Complete Streets will provide benefits to everyone who lives, works and travels in the Denver region.

Some local governments have already committed to Complete Streets. A unified regional approach will ensure that the benefits of Complete Streets are accessible to everyone and will support other key planning efforts.

To achieve these benefits, the DRCOG Regional Complete Streets Toolkit includes a street typology applicable to all streets in the region and design guidance that helps realize streets that balance the needs of all users. By providing a typology and design guidance, DRCOG's staff hopes to incentivize Complete Streets design and encourage cross-jurisdictional collaboration

Community input

Complete Streets should ultimately serve the people that use and enjoy them. To establish an understanding of community interest in and expectations for Complete Streets in the Denver region, DRCOG published an online, interactive map and questionnaire. In total, DRCOG received 725 comments on the interactive map and 375 questionnaire responses, originating from 571 individuals. The input generally indicated a desire for safer streets for all users and better infrastructure for people walking and people bicycling. Additionally, DRCOG worked with a Complete Streets Steering Committee comprising representatives from local jurisdictions across the Denver region. DRCOG met with the Complete Streets Steering Committee four times to inform and review deliverables, with a particular emphasis on the regional street typology, design treatments, Complete Streets policy development, and implementation guidance

Disclaimer:

Photos throughout this document include locations in the Denver Region and throughout the country in order to provide the best representative examples of the concepts described.

Planning principles and approaches

Planning principle or approach	Description	Relationship to Complete Streets
Safe Routes to School 	Safe Routes to School programs and projects encourage walking and bicycling to school and make it safer and more comfortable, especially for K-8 students. Communities that have implemented Complete Streets have found success in street designs that require or encourage slower motor vehicle speeds, include safe and intuitive crossings and provide connected and continuous sidewalks and bicycle facilities along useful routes connecting students' homes to schools.	Streets around schools should be designed as Complete Streets, with a significant emphasis on design issues specific to children and school operations. For example, children's smaller size makes them more easily obscured by parked cars. Often the parked cars belong to parents or guardians of other children. Improving visibility by removing obstructions near intersection corners and by installing curb extensions at intersections can improve sight lines and shorten crossing distances.
Vision Zero 	Vision Zero is a transportation safety philosophy that seeks to eliminate traffic deaths and severe injuries with a proactive, preventive approach that accounts for human error. DRCOG's Taking Action on Regional Vision Zero action plan describes DRCOG's Vision Zero strategy.	Safety is a core element of Complete Streets. Practitioners should use Complete Streets planning and design to prioritize travel safety, especially for vulnerable users such as children, older adults, people walking and people bicycling. Complete Streets facilitate safe travel by providing adequate space for all users, managing motor vehicle speeds or both.
Transportation demand management 	Transportation demand management aims to maximize choices for travelers, especially for commute trips, and to optimize the transportation system. A primary focus area for transportation demand management is reducing the number of single-occupant vehicle trips. DRCOG's Way to Go program works with several Transportation Management Associations to use transportation demand management to reduce traffic congestion, improve air quality and enhance quality of life.	Well-connected multimodal transportation systems serve as the foundation for transportation demand management efforts. Complete Streets can create networks for walking and bicycling that unlock mode choices for travelers and commuters by connecting where they live to where they work and play. Furthermore, planning for a network of Complete Streets allows for greater context-sensitivity and balancing of tradeoffs.
2050 Metro Vision RTP 	The 2050 Metro Vision Regional Transportation Plan (RTP) encourages a thoughtful and strategic approach to sustainable development, including a diversity of land uses and building forms, a diversity of housing and transportation options, infill development and collaborative community engagement.	The 2050 Metro Vision Plan recognizes that Complete Streets, multimodalism and walkability are critical for transportation in sustainable developments. Complete Streets is a way to right-size streets, allowing for better and more appropriate uses of space that might have otherwise been allocated to facilitating the movement or storage of personal motor vehicles.
Transit-oriented development 	Transit-oriented development provides attractive, walkable and livable neighborhoods that benefit from and directly support transit hubs or stations. DRCOG works with local governments and RTD to identify areas and plan for transit-oriented development.	Streets in transit-oriented development areas must prioritize Complete Streets design to be successful. Transit-oriented development is intended to provide housing, employment, retail, mobility options and access to transit for existing or future transit users. Complete Streets reflect adjacent land uses and connect to other transportation systems, such as transit.

Planning principle or approach	Description	Relationship to Complete Streets
Transit-oriented development 	Transit-oriented development provides attractive, walkable and livable neighborhoods that benefit from and directly support transit hubs or stations. DRCOG works with local governments and RTD to identify areas and plan for transit-oriented development.	Streets in transit-oriented development areas must prioritize Complete Streets design to be successful. Transit-oriented development is intended to provide housing, employment, retail, mobility options and access to transit for existing or future transit users. Complete Streets reflect adjacent land uses and connect to other transportation systems, such as transit.
Speed management 	A core strategy of Vision Zero, speed management strategies intend to promote safe, context-sensitive and appropriate driving speeds, resulting in fewer crashes, less severe crashes, improved air quality and less noise pollution. Strategies include traffic calming and geometric design, urban design, speed limit setting, speed enforcement, in-vehicle technologies and awareness campaigns.	Determining a design speed, appropriately setting posted speed limits and matching the street design to the desired operating speed are essential steps in Complete Streets design processes. Traffic calming elements, such as vertical deflection and horizontal deflection, are most appropriate for streets where high pedestrian, high bicyclist activity and low motorist speeds are expected.
Access management 	Access management proactively manages vehicular access along street corridors to adjacent properties. Access management strategies seek to improve roadway efficiency and reduce potential conflict points. These strategies include driveway and intersection spacing, intersection signalization and roundabouts, median treatments and cross-parcel access.	Vehicular traffic congestion and difficult access along major roadways can contribute to crashes, increased travel time and motorists unintentionally cutting through neighborhoods. Designing Complete Streets along arterials may entail access management to improve corridor safety, efficiency and legibility. Effective access management can reduce conflict points between motor vehicles and people walking and bicycling.
Health and quality of life 	Street design and transportation networks can affect health and quality of life in negative and positive ways. Walkable and bikeable transportation design encourages physical activity, discourages sedentary lifestyles, reduces the financial and temporal costs of long commutes, improves air and water quality, combats climate change, improves accessibility for older adults and people with disabilities, strengthens local economies, contributes to neighborhood character, and contributes to community vibrancy.	The Complete Streets approach views streets as places, benefiting a community beyond simply providing a way to get from place to place. Planning, designing and constructing Complete Streets can benefit individual and public health and stimulate local and regional economies. Building networks of Complete Streets can compound the benefits of a single Complete Street.
Environmental sustainability 	Motor vehicles and infrastructure constructed to support them (roadways and parking) contribute to significant energy consumption, waste and air pollution. Reducing the demand for single-occupant vehicle trips is critical to the health and sustainability of our environment and natural resources. Furthermore, streets with landscaping and irrigation can serve a role in improving air and water quality.	Often included in Complete Streets are street trees, landscaping and green infrastructure. Complete Streets can mitigate stormwater runoff, contribute to the tree canopy and filter pollutants from the air. In addition to their environmental benefit, landscaping can provide placemaking and traffic calming benefits. By encouraging nonmotorized travel for shorter trips, Complete Streets can help to reduce energy consumption and pollution.

How can Complete Streets benefit the Denver region?



Promote equity
 Equity in transportation means ensuring that historically marginalized people can meaningfully influence how transportation systems are planned, designed, maintained, and operated. Complete Streets elevate equity in transportation by being places for all people.

Support all modes
 Complete Streets support people walking, rolling, bicycling, taking transit, transporting freight, and using motor vehicles. They consider the characteristics of all modes of travel so that all users are safe and comfortable.

Enrich public space
 Streets represent a significant public resource. Their design and function can enhance the public realm and create multifunctional places that attract people and commerce. Well-designed streets can reflect the history and identity of each neighborhood while allowing for flexibility in design to strengthen the attributes that make these areas unique.

Foster economic activity
 Complete Streets support vital local economies by providing efficient access and mobility, enhancing the public space and creating unique places that attract people and commerce. Public investments in Complete Streets also create value for private property owners along those streets.

Enhance safety and accessibility
 Complete Streets promote safety for all users, including children, older adults and individuals with disabilities with a particular emphasis on the protection of vulnerable road users. Streets that are safe for all modes promote health and independence for all people. Street design can minimize the negative effects of traffic and strive to protect all users.

How do Complete Streets complement other DRCOG plans & programs?



Taking action on Regional Vision Zero
 The Complete Streets Toolkit includes safety countermeasures from Regional Vision Zero. The regional street typology was informed by the area types in Regional Vision Zero.

Way to Go
 The regional street typology and the design treatment guidance in the Complete Streets Toolkit represents a vision for a regional network of Complete Streets, directly advancing Way to Go's mission to provide mobility choices.

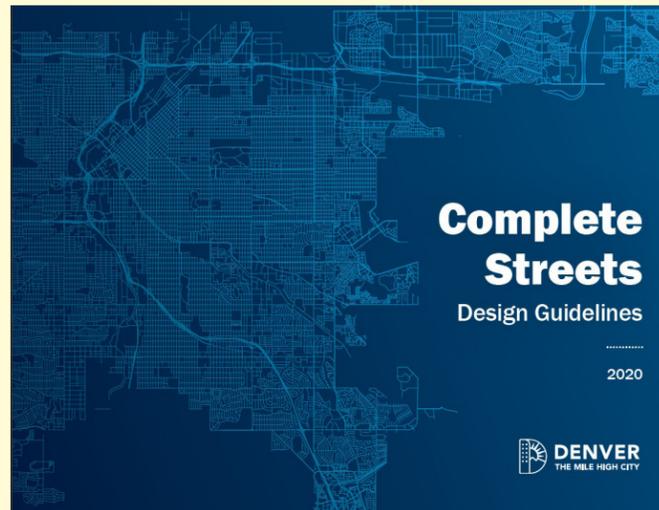
Transportation Improvement Program
 The Complete Streets Toolkit provides guidance for project sponsors to define projects for Transportation Improvement Program funding that best implement the 2050 Regional Transportation Plan and Metro Vision.

Metro Vision
 Complete Streets will help the region achieve the aspirational goals set forth in Metro Vision, directly addressing present and future needs related to place, mobility, the environment, livability and economic vitality.

Metro Vision Regional Transportation Plan
 The 2050 Metro Vision Regional Transportation Plan includes the regional street typology — created during the development of the Complete Streets Toolkit — to encourage and incentivize Complete Streets design.

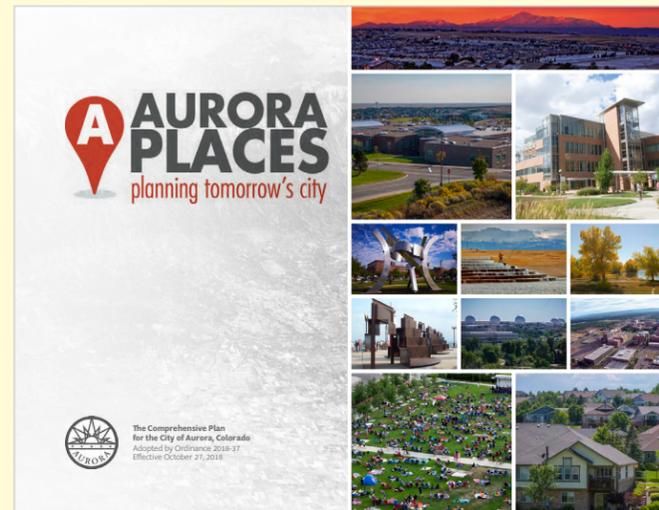
Active Transportation Plan
 The Complete Streets Toolkit includes guidance for including and designing pedestrian and bicycle infrastructure, and the regional street typology is sensitive to the Active Transportation Corridors established in the Active Transportation Plan.

Regional spotlights



City and County of Denver

Denver has adopted and incorporated Complete Streets into its planning and design process with its [Complete Streets Design Guidelines](#). Its approach has been to design streets “from the outside in,” to reflect the modal priorities of walking and rolling. Denver’s Complete Streets Design Guidelines support progress toward community goals including Vision Zero, reduced single-occupant vehicle trips and reduced greenhouse gas emissions.

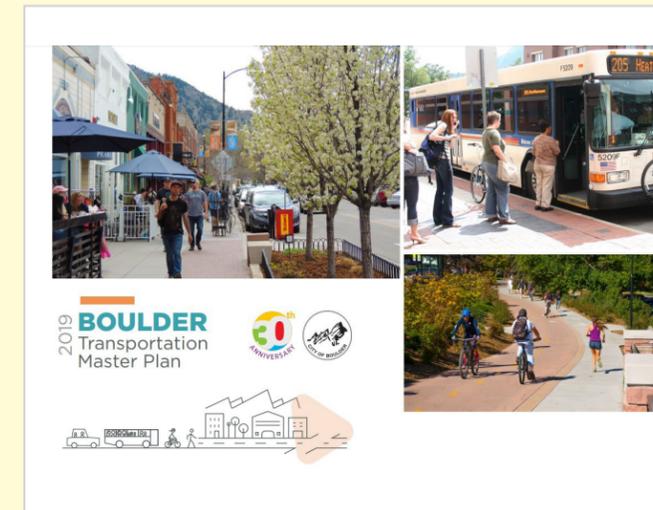


Aurora

The City of Aurora is advancing the development of an overall complete streets policy framework that will fully capture the vision, intent, guidelines/standards that are relevant and pertinent to delivering a logical and complete multimodal transportation system throughout the City. Additionally, the City has a prior adopted set of street standards that are particularly focused and applicable to designated urban centers and transit-oriented developments.

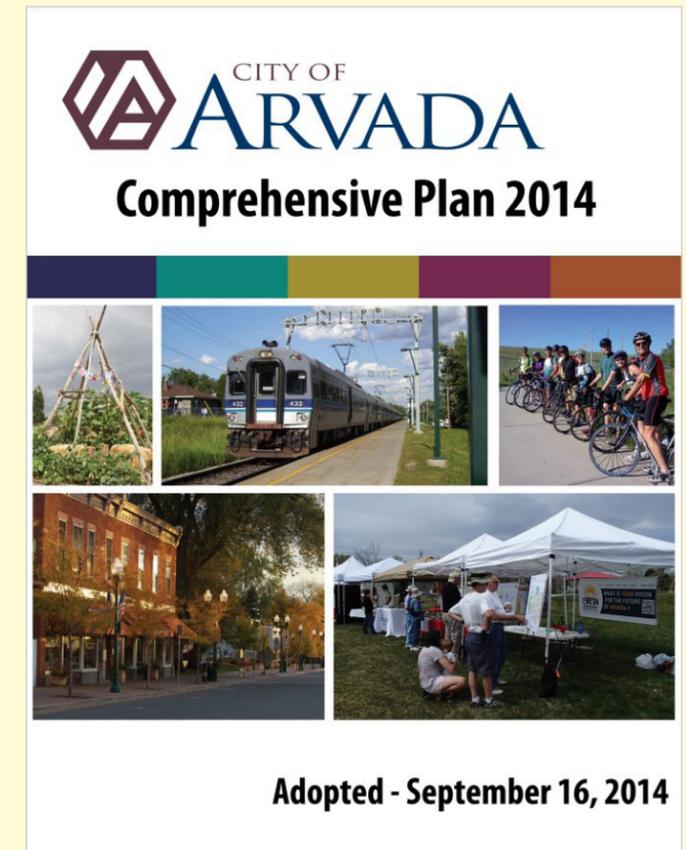
The [Aurora Places 2018 – Comprehensive Plan](#) fully supports crafting a complete streets policy and guideline package that will continue to foster mobility improvements that create a safer and more inviting transportation network for all customers inclusive of bicyclists, motorists, freight/logistics, transit operators and users, and pedestrians of all ages and abilities.

Additionally, the 2016 Aurora Roadway Design & Construction Specifications document is also in the process of being updated in an effort provide state of the practice guidance and local design context and support.



Boulder

The City of Boulder’s [Transportation Master Plan](#) includes a policy to create a complete transportation system for all modes, based on Complete Streets. This includes citywide planning efforts to achieve Vision Zero, to continue to enhance its transit network, to increase walking and bicycling and to improve intracity access with Complete Streets corridors. An additional policy includes the integration of land use and transportation with sustainability initiatives, focusing on land use enhancements that support sustainable transportation programs and choices.



Arvada

The City of Arvada incorporated Complete Streets into its [Comprehensive Plan 2014](#). The Comprehensive Plan includes goals for developing a balanced transportation system with multimodal travel, strengthening the link between land use and transportation and developing comprehensive bicycle, trail and pedestrian systems.

Relationship to regional plans and programs

DRCOG plan or program	Description	Relationship to Regional Complete Streets Toolkit
Metro Vision	Metro Vision is DRCOG's overarching plan to address the region's present and future needs. The needs are categorized into five themes: place, mobility, environment, livability and vitality.	Complete Streets directly support Metro Vision's themes and outcomes. In particular, the Complete Streets Toolkit will help DRCOG and its local governments create a safe, reliable, well-maintained and well-connected transportation system that serves all modes of travel; lower greenhouse gas emissions; support healthy and active choices with the built environment; and foster the health and well-being of people and businesses.
2050 Metro Vision Regional Transportation Plan	Recently updated to reflect a 2050 planning horizon, the 2050 Metro Vision Regional Transportation Plan guides the funding and implementation of transportation projects and programs for all modes to accommodate projected growth.	The 2050 Metro Vision Regional Transportation Plan includes the regional street typology — created during the development of the Regional Complete Streets Toolkit and described in Chapter 2 — to encourage and incentivize Complete Streets design.
Transportation Improvement Program	The Transportation Improvement Program is a staged multiyear plan of projects to implement the Regional Transportation Plan. This multimodal program includes roadway, high-occupancy vehicle, transit, travel demand management, and active transportation facilities and services. The program identifies all current federally funded transportation projects to be completed over a four-year period.	The Complete Streets Toolkit is intended for use by project sponsors to develop complete streets projects for TIP funding to implement and address 2050 Metro Vision Regional Active Transportation Plan priorities.
Taking Action on Regional Vision Zero	Taking Action on Regional Vision Zero is DRCOG's safety action plan to eliminate traffic fatalities and serious injuries in the Denver region. The plan provides resources to local governments to make their own progress toward Vision Zero.	The Regional Complete Streets Toolkit includes many of the safety countermeasures included in Taking Action on Regional Vision Zero. The area types in Taking Action on Regional Vision Zero also informed the development of the regional street typology.
DRCOG Active Transportation Plan	The DRCOG Active Transportation Plan establishes a vision for infrastructure, programs and policies to facilitate the safe and convenient use of self-propelled, human-powered modes of transportation.	Guidance for including and designing pedestrian and bicycle infrastructure is included in the Regional Complete Streets Toolkit and the regional street typology is sensitive to the Active Transportation Corridors established in the Active Transportation Plan.
Way to Go	Way to Go is a regional partnership between DRCOG and seven transportation management associations to advance Transportation Demand Management.	The regional street typology and the design treatment guidance in the Regional Complete Streets Toolkit paint a vision for a regional network of Complete Streets, directly advancing Way to Go's mission to provide mobility choices.

Other resources for Complete Streets planning and design

In addition to local policies and design guidelines, several regional, statewide and national resources exist to guide the planning and design of Complete Streets, including those listed below.

Regional

- DRCOG Active Transportation Plan
- DRCOG Shared Micromobility in the Denver Region
- DRCOG Taking Action on Regional Vision Zero
- RTD Bus Infrastructure Design Guidelines and Criteria

Statewide

- Colorado Downtown Streets: A Tool for Communities, Planners and Engineers
- CDOT High Demand Bicycle Corridors

CDOT Bicycle and Pedestrian Plan

- CDOT Roadway Design Guide—Chapter 14
- CDOT Bicycle/Pedestrian Design Guidance - Chief Engineer Memo

National

- Manual on Uniform Traffic Control Devices
- Pedestrian and Bicycle Info Center
- United States Access Board Right-of-Way Accessibility Guidelines
- American Association of State Highway and Transportation Officials
- A Policy on Geometric Design of Highways and Streets
- Guide for the Development of Bicycle Facilities
- Guide for the Planning, Design and Operation of Pedestrian Facilities
- Association of Pedestrian and Bicycle Professionals
- Bicycle Parking Guidelines

- Federal Highway Administration
- Bikeway Selection Guide
- Separated Bike Lane Planning and Design Guide
- Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations
- Small Town and Rural Multimodal Networks
- Accessible Shared Streets Guide
- Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts
- Road Diet Informational Guide
- Incorporating On-Road Bicycle Networks into Resurfacing Projects
- Institute of Transportation Engineers
- Designing Walkable Urban Thoroughfares
- National Association of City Transportation Officials
- Urban Street Design Guide
- Urban Bikeway Design Guide
- Don't Give Up at the Intersection
- Transit Street Design Guide
- Urban Street Stormwater Guide
- Smart Growth America
- National Complete Streets Coalition Program

2



Regional Street Typology

The purpose and function of a street typology

In contrast to traditional functional classification systems that are based primarily on motor vehicle volumes and motor vehicle speeds, street typologies provide design recommendations tailored to the land uses, transportation functions and user needs that shape different streets. A street typology comprises a number of street types.

Streets play complex roles in our communities. They provide access to nearby places, support mobility for travelers and contribute to the feel and character of the neighborhood. In developed areas, streets can provide a range of amenities such as street furniture, visitor information, trees and landscaping and stormwater management. In rural areas, streets support longer-distance travel through open spaces, natural habitats and working farm or forest lands. When designed well, streets fulfill all of these roles while contributing to the quality, character and sustainability of the built and

natural environment.

When planners, engineers, decision-makers and the public come together to design a Complete Street, they must balance multiple needs while considering how to accommodate all travel modes safely. Street typologies are useful tools in supporting successful design collaborations. By matching a real street to an abstract but similar street type, local governments and their stakeholders can identify the core functions and priority uses of the corridor under study. They can determine how to balance the safety, comfort and convenience of different travelers with the needs and character of the surrounding place. Planning partners can use design recommendations organized by street type as a starting place for envisioning how to reconfigure or redesign a real street to support the achievement of local and regional priorities. Chapter 3 in the toolkit will provide guidance for customizing these designs based on



Developing the Denver region street typology

To help DRCOG and local governments achieve their vision for a regional network of Complete Streets, this toolkit includes a regional street typology that respects existing places and corridors in the Denver region while pointing to an aspirational future of a Complete Streets network.

To inform the development of street types, the project team reviewed available local and regional data and guidance. This included detailed local planning and geographic information such as zoning; housing and employment forecasts; short trip opportunity zones; pedestrian focus areas; and urban centers. Transportation information included the functional classifications of existing facilities; current and planned multimodal networks; regional high-injury and Vision Zero analysis; and street design typologies and classifications currently used by local governments. RTD provided data regarding existing and planned transit routes, stops, stations and mobility hubs.

Multiple rounds of development and refinement of the street typology by the project team and a committee of jurisdictions and organizational representatives produced ten street types for the Denver region, which are described in detail later in this chapter:

- 1) Downtown Commercial Street, pages 20–21
- 2) Downtown Mixed-Use Street, pages 22–23
- 3) Neighborhood Main Street, pages 24–25
- 4) Mixed-Use Street, pages 26–27
- 5) Regional Connector Street, pages 28–29
- 6) Neighborhood Connector Street, pages 30–31
- 7) Industrial Street, pages 32–33
- 8) Special-Use Street, pages 34–35
- 9) Rural Road, pages 36–37
- 10) Mountain Road, pages 38–39

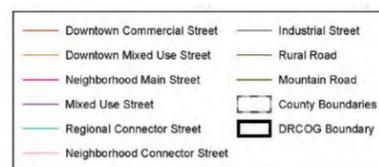
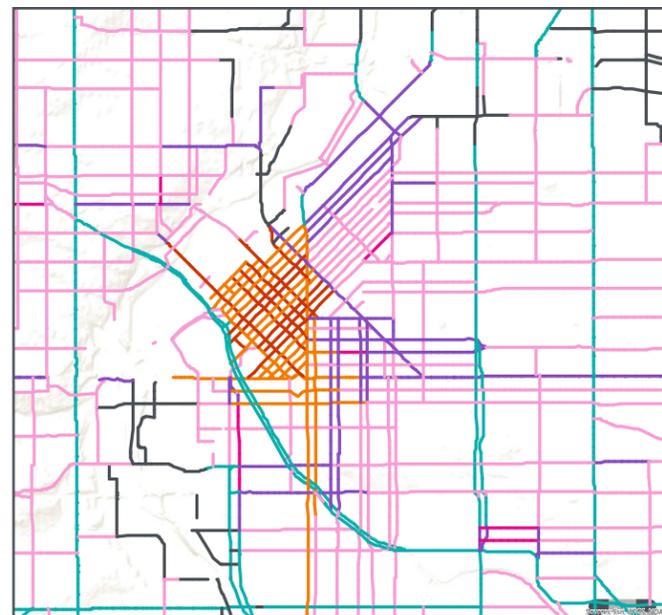
Assigning street types

After developing the regional street typology, DRCOG synthesized GIS data and local knowledge in the planning process to assign a street type to each highway and major road across the region. The regional street typology does not include limited access highways or local streets. The process was finalized with a review of street type assignments at the local, county and regional level to ensure that street types were being assigned consistently across the range of contexts and communities within the Denver region.

These street types are part of the adopted 2050 Metro Vision Regional Transportation Plan.
See Map 2.4: Regional Complete Streets typology.

The link below explains the Regional Complete Streets typology in more detail and provides an interactive map of streets in the Denver region.

<https://arcg.is/r9f18>



SOURCE DATA: DRCOG, Esri
Geographic Information System (GIS) data
information and disclaimer in appendix

Modal priority framework

When using a Complete Streets approach, local governments and their communities seek to design streets that can accommodate the needs of all travelers, whether walking, rolling with assistive devices, bicycling, taking transit, moving freight, or driving. However, modal priorities will differ for each street, depending on the surrounding land use context, travel patterns in the area and the role the street plays in the local and regional transportation network. Regardless of modal priority, all streets should include accessibility features. Each street type in the toolkit represents a unique mix of modal priorities that reflect a set of consistent principles:

Walking and rolling

Nearly every trip starts and ends with walking or rolling (i.e. the use of mobility aids like a wheelchair or electric mobility assisting device). For this reason, walking is a high-priority mode in all urban, suburban and small community settings. On sections of Rural Roads and Mountain Roads located some distance from the nearest destination, people are less likely to walk to meet travel needs and dedicated walkways may be a lower priority.

Bicycling (and micromobility)

For short- to medium-length trips, bicycling and micromobility can be attractive travel options for anyone to meet daily needs and for recreation. In dense, mixed-use and highly active settings such as Downtown Commercial Streets, Downtown Mixed-Use Streets and Special-Use Streets, designing for bicycling as a high-priority mode allows local governments to provide travel options while reducing the need for vehicle parking. Rural Roads and Mountain Roads may attract longer-distance bicycle trips from both recreational and utility riders and they should provide safe space for bicyclists (such as dedicated bikeways, paved shoulders or shared lanes).

Transit

Design decisions by jurisdictions should place a high priority on transit in downtowns and on Regional Connector Streets. These locations are often core transit service areas, support high volumes of travel by multiple modes and may have strong time-of-day peaks. Prioritizing transit in design decisions can increase the attractiveness of transit as a space-efficient and environmentally sustainable option, while improving transit operating efficiency in congested places and times. Transit service is often supported by capital and traffic signal improvements as well as stop and station enhancements. For other urban and suburban streets, RTD and transit provider maps of current and planned routes offer an excellent resource for determining where to design with transit in mind. Transit is less likely to operate on Rural Roads and Mountain Roads and may be treated as a lower modal priority in these areas, depending on local context.



Freight and deliveries

Goods movement on conventional freight-specific vehicles is a high priority on Industrial Streets, on mobility-focused routes such as Regional Connector Streets and in locations such as Neighborhood Main Streets that support local businesses that depend on pickups and deliveries. These streets and places are critical origins, destinations and links in the flow of regional goods and can offer sufficient on- and off-street space for loading and unloading.

Downtown Commercial Streets, Downtown Mixed-Use Streets and Mixed-Use Streets also see significant goods movement, but design decisions there need to balance freight needs with those of other travel modes and with the desired neighborhood character.

Rural Roads and Mountain Roads act as important through-routes for regional freight, though origins and destinations for goods movement will be more dispersed. Freight delivery will be infrequent and lower priority on streets with few businesses or on Special-Use that limit vehicular access.



Driving

Offering a well-designed network of Complete Streets can provide increased travel options and reduce car dependence for people who live, work and play in the Denver region. However, some people will choose to drive out of preference or because other modes do not easily support the kinds of trips they need to make.

Driving will be a higher modal priority on routes that support longer-distance travel and in industrial and rural areas. In dense, mixed-use areas that can be well-served by other travel options and where space is at a premium — such as Downtown Commercial Streets, Downtown Mixed-Use Streets and Neighborhood Main Streets — maximizing person-throughput should be treated as a high design priority. This supports the safety, comfort and convenience of more space-efficient modes of travel, while reducing the amount of public space and developable land that needs to be reserved for car storage (such as parking). Private vehicles may be prohibited entirely on Special-Use Streets.

How to use the street type design profiles

The design guidance for each street type is presented through a two-page design profile. The content on the profiles should be used by practitioners as follows:

- A** Each street type includes a brief description of the land use context, neighborhood character and role in the transportation network.
- B** Street type graphics represent one aspirational iteration of the street type. The images are not intended to include all Complete Streets design elements. Local governments must coordinate with their partners to plan and design Complete Streets that meet local and regional needs.

- C** Each street type also identifies the recommended modal priorities that will guide the selection of appropriate design elements to incorporate into the street design.
- D** The Potential Street Design Elements list includes the most appropriate design elements for a particular street type. Each of these has corresponding content in Chapter 3, which includes a description, planning considerations and design parameters and additional resources. Including every street design element designated as highly compatible is not mandatory.

Intersections of two different street types should generally be designed to conservatively include design elements for the street type where vulnerable users are a higher priority.

A **Neighborhood Connector Street**

Neighborhood Connector Streets support residential areas, schools, parks and small retail nodes. They connect local streets to higher-intensity street types such as Regional Connector Streets.

B This illustration is intended to represent one type of street. Practitioners should use the Toolkit and other resources to their judgement based on street and land use context.

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C **Modal priority**

- High: Pedestrian, Bicycle
- Medium: Transit, Truck
- Low: Car

D **Design element compatibility**

Pedestrian elements	
H Sidewalks	M Street furniture
H Lighting	M Shade
General roadway elements	
M Traffic calming	M Medians
M Access management	— Pavement types
H Travel lanes	
Bicycle/micromobility elements	
M Bicycle facilities	L Bicycle/micromobility parking
Transit elements	
— Transit lanes	M Transit signal priority
M Transit stops	L Mobility hubs
Intersection and crossing elements	
M Crosswalks	— Corner Radii
H Curb ramps	M Hardened centerlines
M Signalization	— Raised crossings
M Bikeways at intersections	M Median refuges
M Curb extensions	— Driveways
Curbside elements	
L Loading	L Wayfinding
L Placemaking	L Parking
Landscaping and irrigation elements	
M Street trees	M Green infrastructure

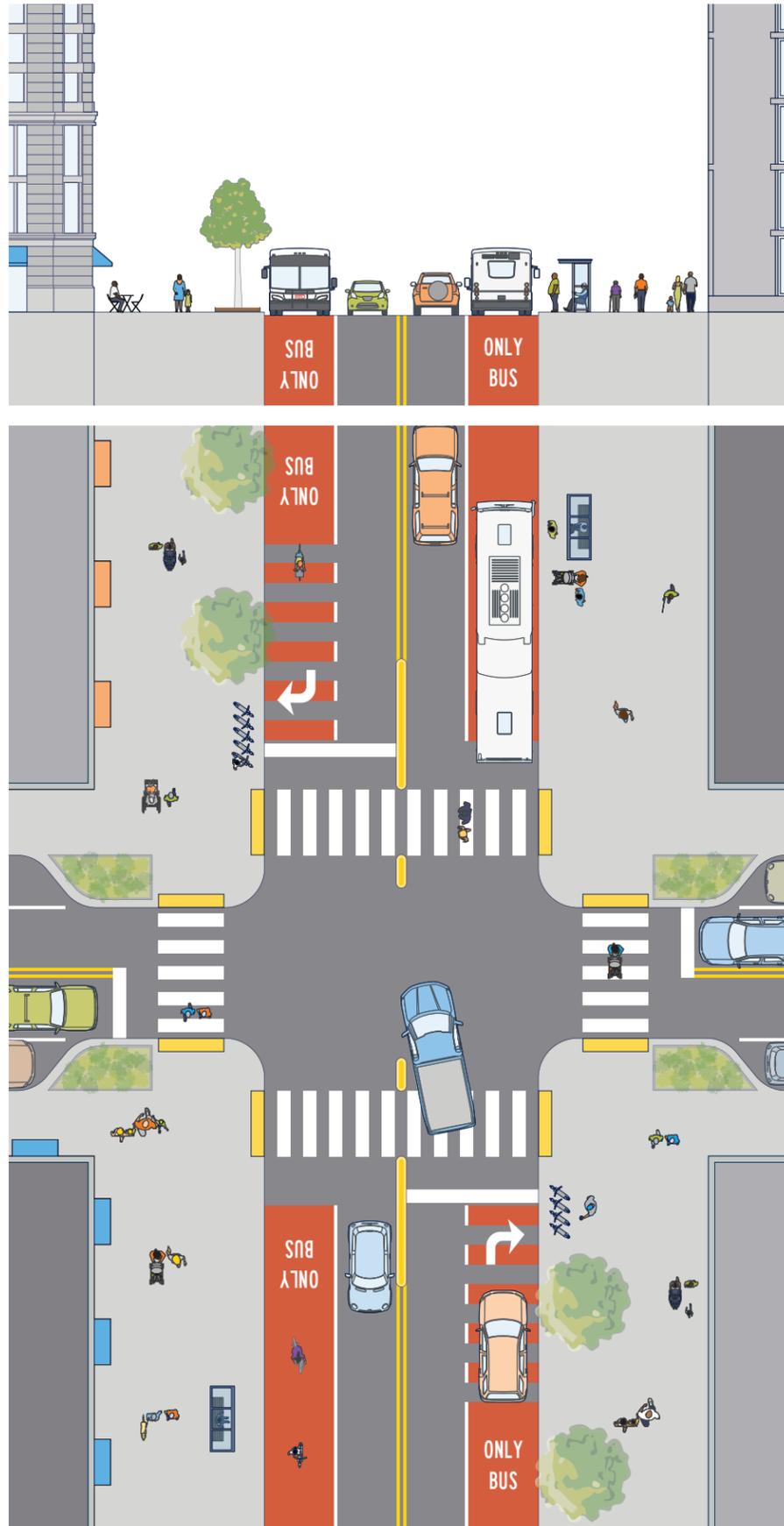
KEY: H High M Medium L Low — N/A

Regional Street Typology

DRCOG Regional Complete Streets Toolkit 31

Downtown Commercial Street

Downtown Commercial Streets are generally located in central business districts or larger urban cores, support a relatively continuous row of street-facing buildings that encourage street activity, facilitate high user volumes and include short blocks.



This illustration is intended to represent one type of street. Practitioners should use the Toolkit and other resources to their judgement based on street and land use context.

Modal priority



Design element compatibility

Pedestrian elements

- H** Sidewalks
- H** Street furniture
- H** Lighting
- H** Shade

General roadway elements

- H** Traffic calming
- L** Medians
- H** Access management
- Pavement types
- L** Travel lanes

Bicycle/micromobility elements

- H** Bicycle facilities
- H** Bicycle/micromobility parking

Transit elements

- H** Transit lanes
- H** Transit signal priority
- H** Transit stops
- H** Mobility hubs

Intersection and crossing elements

- H** Crosswalks
- Corner Radii
- H** Curb ramps
- H** Hardened centerlines
- H** Signalization
- L** Raised crossings
- H** Bikeways at intersections
- L** Median refuges
- H** Curb extensions
- Driveways

Curbside elements

- H** Loading
- H** Wayfinding
- H** Placemaking
- M** Parking

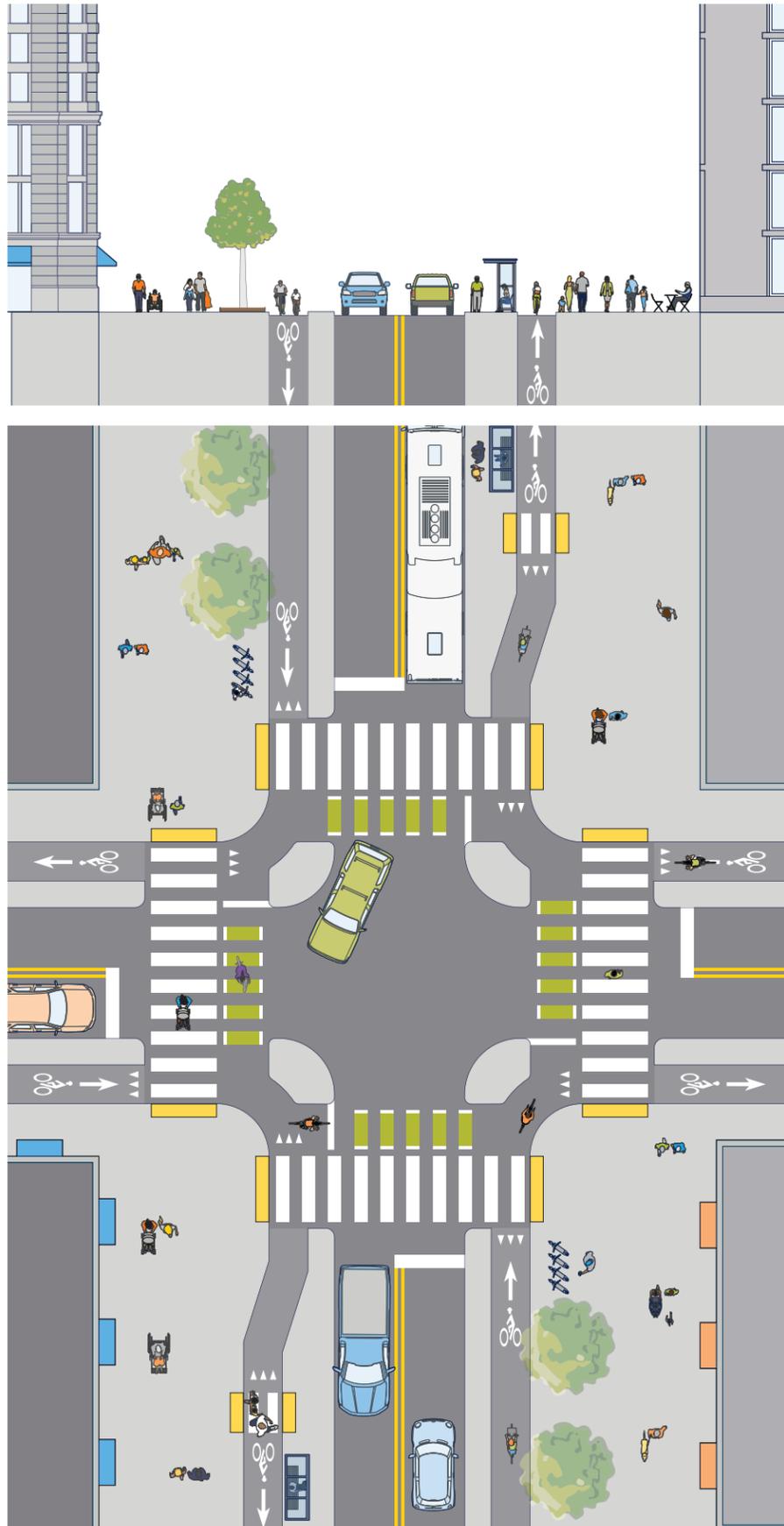
Landscaping and irrigation elements

- H** Street trees
- H** Green infrastructure

KEY: **H** High **M** Medium **L** Low – N/A

Downtown Mixed-Use Street

Downtown Mixed-Use Streets are generally located in central business districts and support a mix of land uses (retail, office, residential, restaurants), are typically smaller in scale than Downtown Commercial Streets and support high levels of multimodal travel and parking turnover.



This illustration is intended to represent one type of street. Practitioners should use the Toolkit and other resources to their judgement based on street and land use context.

Modal priority



High



High



High



Medium



Low

Design element compatibility

Pedestrian elements

- | | |
|--------------------|---------------------------|
| H Sidewalks | H Street furniture |
| H Lighting | H Shade |

General roadway elements

- | | |
|----------------------------|------------------|
| H Traffic calming | L Medians |
| H Access management | – Pavement types |
| L Travel lanes | |

Bicycle/micromobility elements

- | | |
|-----------------------------|--|
| H Bicycle facilities | H Bicycle/micromobility parking |
|-----------------------------|--|

Transit elements

- | | |
|------------------------|----------------------------------|
| H Transit lanes | H Transit signal priority |
| H Transit stops | H Mobility hubs |

Intersection and crossing elements

- | | |
|------------------------------------|-------------------------------|
| H Crosswalks | – Corner Radii |
| H Curb ramps | H Hardened centerlines |
| H Signalization | L Raised crossings |
| H Bikeways at intersections | L Median refuges |
| H Curb extensions | – Driveways |

Curbside elements

- | | |
|----------------------|---------------------|
| H Loading | H Wayfinding |
| H Placemaking | M Parking |

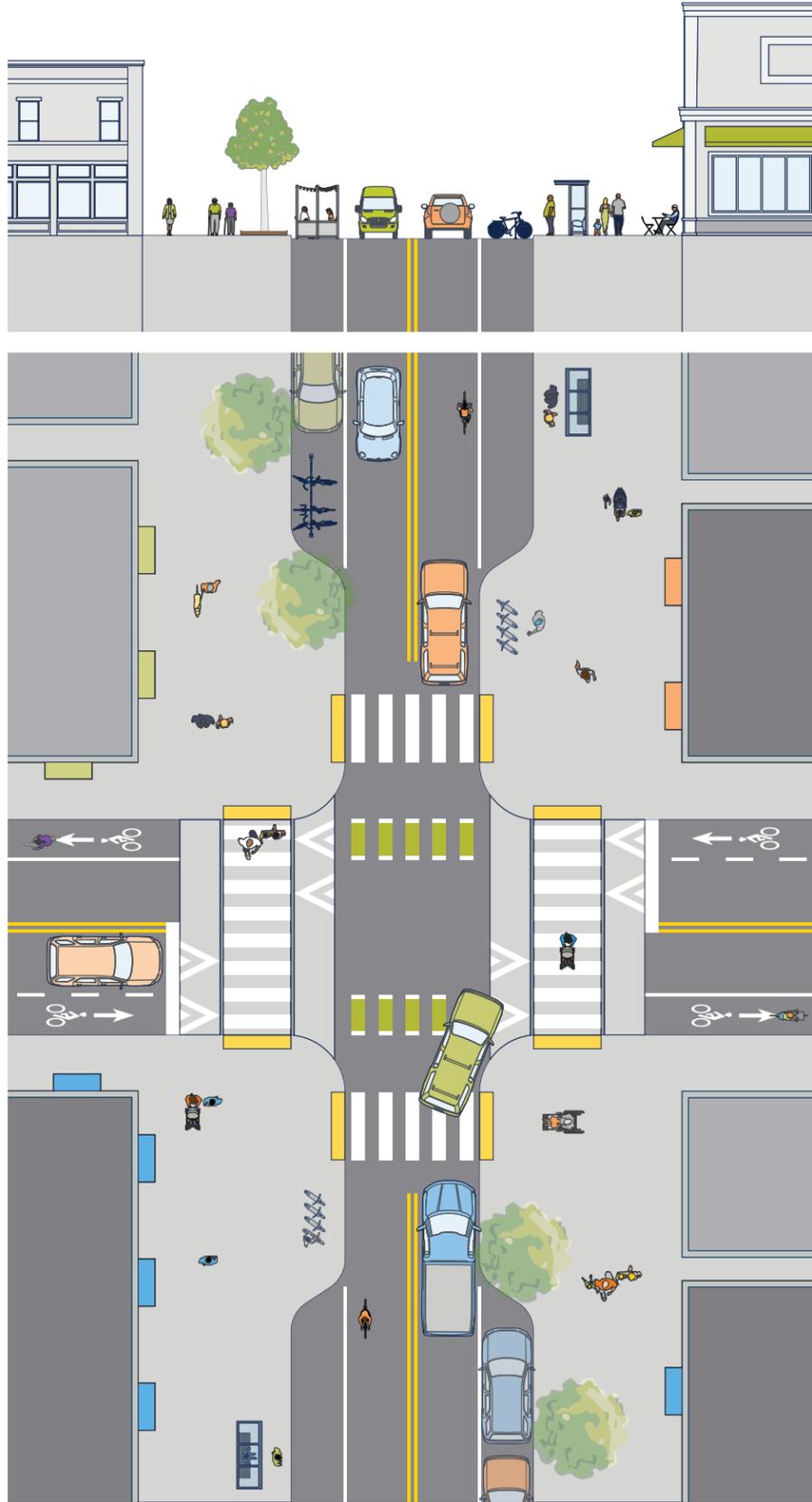
Landscaping and irrigation elements

- | | |
|-----------------------|-------------------------------|
| H Street trees | H Green infrastructure |
|-----------------------|-------------------------------|

KEY: **H** High **M** Medium **L** Low – N/A

Neighborhood Main Street

Neighborhood Main Streets are generally located in smaller communities or commercial areas, support buildings consistently and continuously oriented to the street with ground-floor retail, include a highly activated pedestrian space and support gathering and community events.



This illustration is intended to represent one type of street. Practitioners should use the Toolkit and other resources to their judgement based on street and land use context.

Modal priority



Design element compatibility

Pedestrian elements

- H** Sidewalks
- H** Lighting
- H** Street furniture
- H** Shade

General roadway elements

- H** Traffic calming
- H** Access management
- M** Travel lanes
- L** Medians
- Pavement types

Bicycle/micromobility elements

- H** Bicycle/micromobility parking
- M** Bicycle facilities

Transit elements

- L** Transit lanes
- H** Transit stops
- H** Transit signal priority
- H** Mobility hubs

Intersection and crossing elements

- H** Crosswalks
- H** Curb ramps
- M** Signalization
- M** Bikeways at intersections
- H** Curb extensions
- Corner Radii
- H** Hardened centerlines
- Raised crossings
- L** Median refuges
- Driveways

Curbside elements

- H** Loading
- H** Placemaking
- H** Wayfinding
- H** Parking

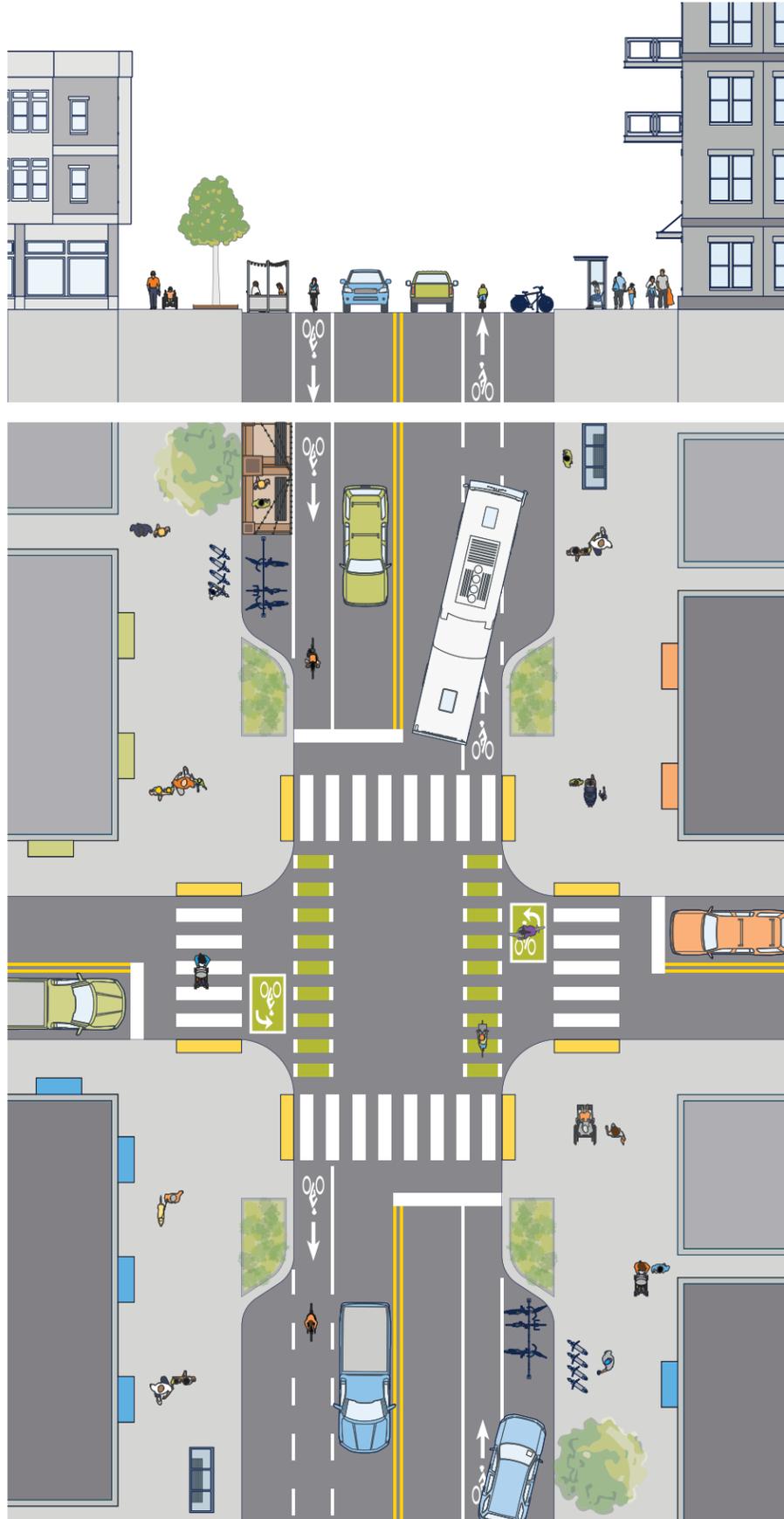
Landscaping and irrigation elements

- H** Street trees
- H** Green infrastructure

KEY: **H** High **M** Medium **L** Low – N/A

Mixed-Use Street

Mixed-Use Streets support a mix of land uses (retail, office, residential and restaurants) and tend to include building forms that are pedestrian-oriented, multistory and with shallow setbacks.



This illustration is intended to represent one type of street. Practitioners should use the Toolkit and other resources to their judgement based on street and land use context.

Modal priority



Design element compatibility

Pedestrian elements

- H** Sidewalks
- H** Street furniture
- H** Lighting
- H** Shade

General roadway elements

- M** Traffic calming
- M** Medians
- M** Access management
- Pavement types
- M** Travel lanes

Bicycle/micromobility elements

- M** Bicycle facilities
- H** Bicycle/micromobility parking

Transit elements

- M** Transit lanes
- L** Transit signal priority
- H** Transit stops
- M** Mobility hubs

Intersection and crossing elements

- H** Crosswalks
- Corner Radii
- H** Curb ramps
- M** Hardened centerlines
- H** Signalization
- H** Raised crossings
- M** Bikeways at intersections
- M** Median refuges
- H** Curb extensions
- Driveways

Curbside elements

- M** Loading
- H** Wayfinding
- M** Placemaking
- M** Parking

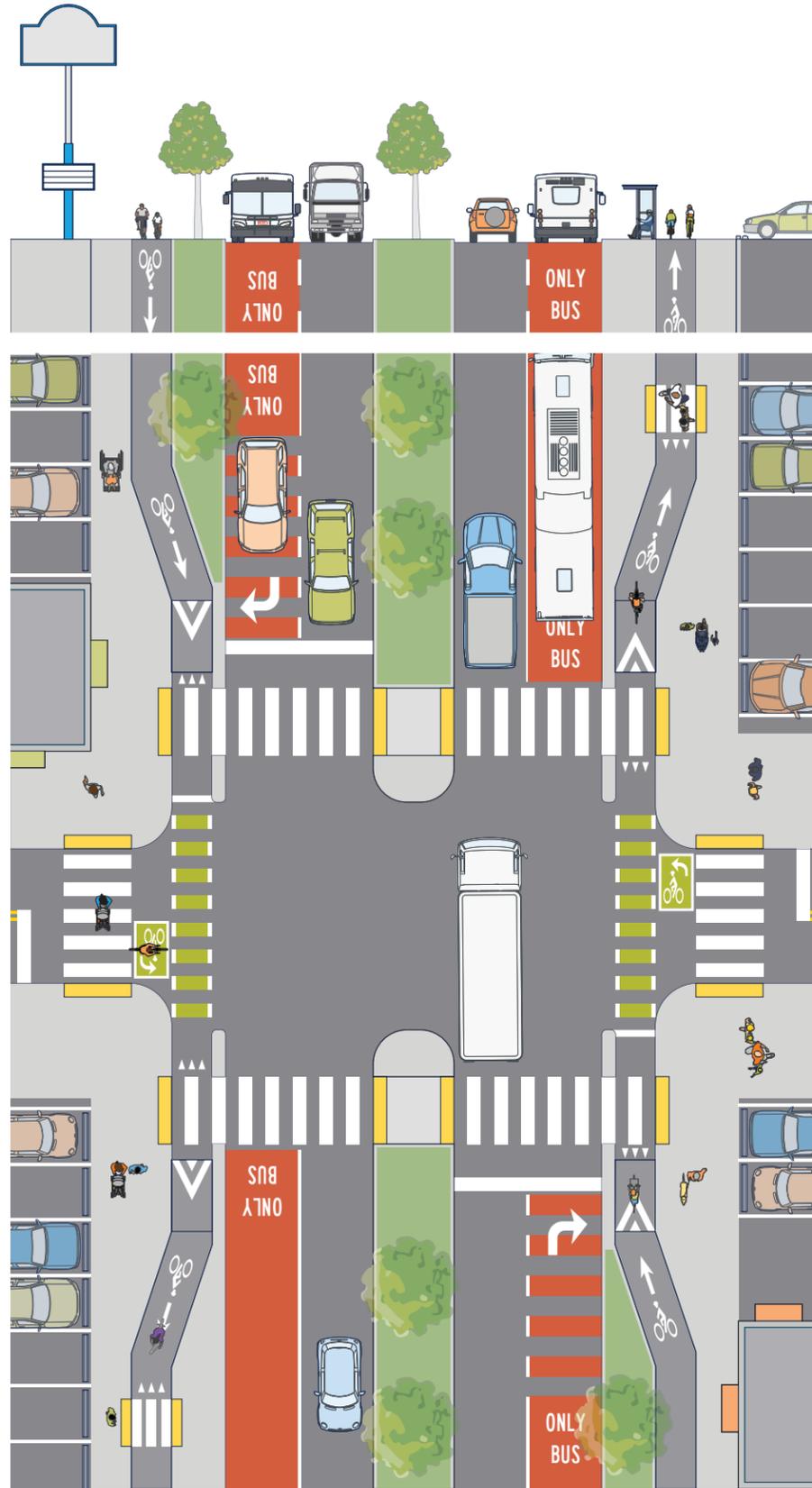
Landscaping and irrigation elements

- H** Street trees
- H** Green infrastructure

KEY: **H** High **M** Medium **L** Low – N/A

Regional Connector Street

Regional Connector Streets mainly support commercial land uses, include buildings with large setbacks and off-street parking and facilitate long-distance trips for transit and driving.



This illustration is intended to represent one type of street. Practitioners should use the Toolkit and other resources to their judgement based on street and land use context.

Modal priority



Design element compatibility

Pedestrian elements

- H** Sidewalks
- H** Lighting
- M** Street furniture

General roadway elements

- L** Traffic calming
- M** Access management
- H** Travel lanes
- H** Medians
- Pavement types

Bicycle/micromobility elements

- M** Bicycle facilities
- L** Bicycle/micromobility parking

Transit elements

- H** Transit lanes
- H** Transit stops
- H** Transit signal priority
- L** Mobility hubs

Intersection and crossing elements

- M** Crosswalks
- H** Curb ramps
- H** Signalization
- M** Bikeways at intersections
- L** Curb extensions
- Corner Radii
- M** Hardened centerlines
- Raised crossings
- H** Median refuges
- Driveways

Curbside elements

- Loading
- L** Placemaking
- M** Wayfinding
- Parking

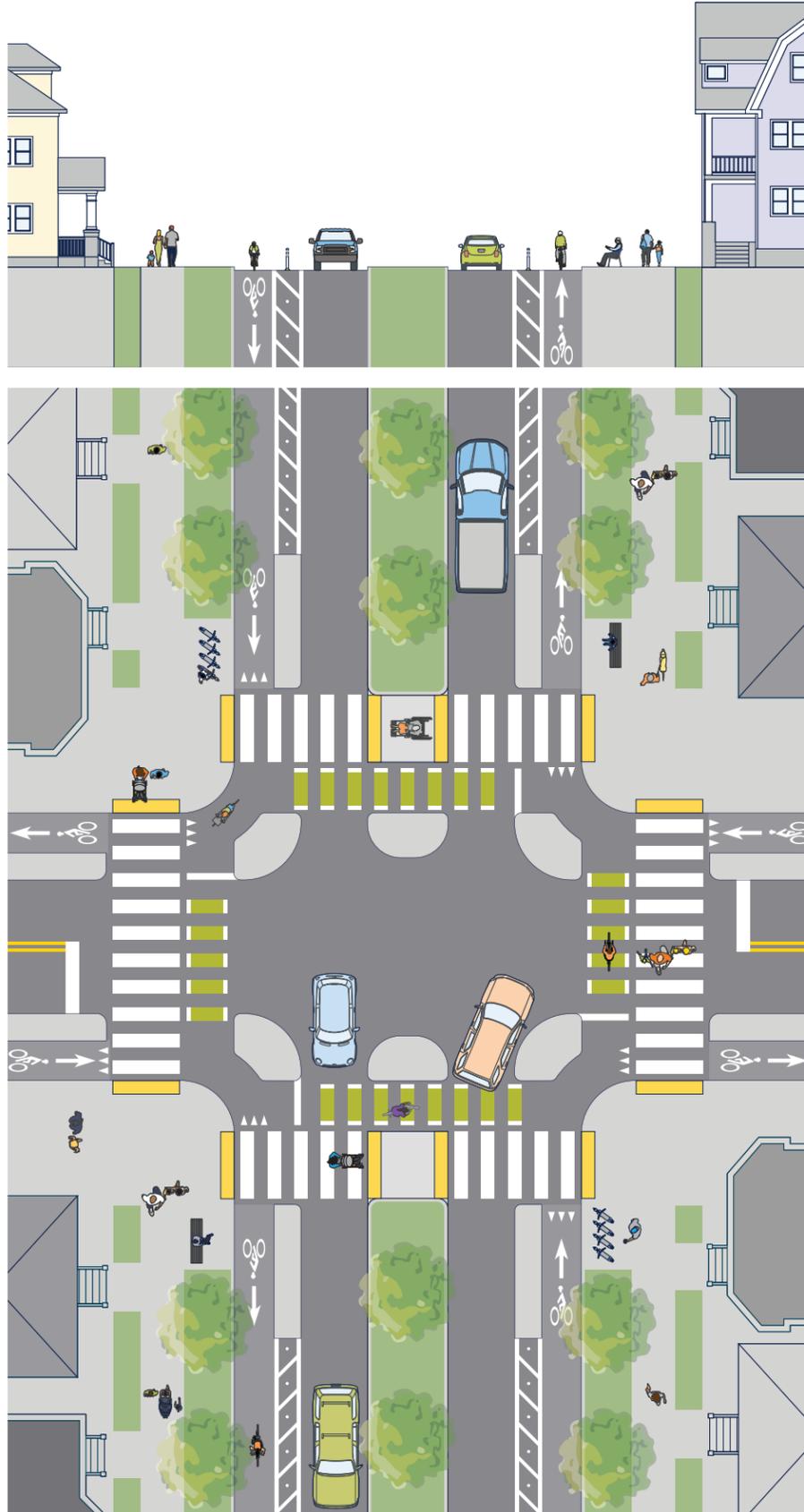
Landscaping and irrigation elements

- M** Street trees
- M** Green infrastructure

KEY: **H** High **M** Medium **L** Low – N/A

Neighborhood Connector Street

Neighborhood Connector Streets support residential areas, schools, parks and small retail nodes. They connect local streets to higher-intensity street types such as Regional Connector Streets.



This illustration is intended to represent one type of street. Practitioners should use the Toolkit and other resources to their judgement based on street and land use context.

Modal priority



Design element compatibility

Pedestrian elements

- H** Sidewalks
- H** Lighting
- M** Street furniture
- M** Shade

General roadway elements

- M** Traffic calming
- M** Access management
- H** Travel lanes
- M** Medians
- Pavement types

Bicycle/micromobility elements

- M** Bicycle facilities
- L** Bicycle/micromobility parking

Transit elements

- Transit lanes
- M** Transit stops
- M** Transit signal priority
- L** Mobility hubs

Intersection and crossing elements

- M** Crosswalks
- H** Curb ramps
- M** Signalization
- M** Bikeways at intersections
- M** Curb extensions
- Corner Radii
- M** Hardened centerlines
- Raised crossings
- M** Median refuges
- Driveways

Curbside elements

- L** Loading
- L** Placemaking
- L** Wayfinding
- L** Parking

Landscaping and irrigation elements

- M** Street trees
- M** Green infrastructure

KEY: **H** High **M** Medium **L** Low – N/A

Industrial Street

Industrial Streets serve industrial land uses, including manufacturing and distribution centers, with large setback, large-footprint, low-rise buildings. If industrial use shifts toward commercial workspaces, modal priorities may shift as well.



This illustration is intended to represent one type of street. Practitioners should use the Toolkit and other resources to their judgement based on street and land use context.

Modal priority



Design element compatibility

Pedestrian elements

- H** Sidewalks
- M** Lighting
- L** Street furniture
- M** Shade

General roadway elements

- L** Traffic calming
- L** Access management
- M** Travel lanes
- L** Medians
- Pavement types

Bicycle/micromobility elements

- L** Bicycle facilities
- L** Bicycle/micromobility parking

Transit elements

- Transit lanes
- M** Transit stops
- L** Transit signal priority
- Mobility hubs

Intersection and crossing elements

- M** Crosswalks
- H** Curb ramps
- M** Signalization
- L** Bikeways at intersections
- L** Curb extensions
- Corner Radii
- L** Hardened centerlines
- Raised crossings
- L** Median refuges
- Driveways

Curbside elements

- H** Loading
- L** Placemaking
- L** Wayfinding
- L** Parking

Landscaping and irrigation elements

- L** Street trees
- M** Green infrastructure

KEY: **H** High **M** Medium **L** Low - N/A

Special-Use Street

Special-Use Streets are distinct streets that play a variety of roles, either short-term or long-term, with the purpose of providing space for special events or to be designed as a destination. They can be located in a variety of land use contexts; however, it is beneficial to designate Special-Use in dense areas with high walking and bicycling volumes. Some special-use streets allow any vehicle traffic, while others restrict traffic to emergency responders, transit, or deliveries only. Either type of design should incorporate robust traffic calming to indicate to drivers they are entering a special street environment where non-motorized users have the highest priority.



This illustration is intended to represent one type of street. Practitioners should use the Toolkit and other resources to their judgement based on street and land use context.

Modal priority



Design element compatibility

Pedestrian elements

- | | |
|--------------------|---------------------------|
| H Sidewalks | H Street furniture |
| H Lighting | H Shade |

General roadway elements

- | | |
|----------------------------|------------------|
| H Traffic calming | – Medians |
| H Access management | – Pavement types |
| L Travel lanes | |

Bicycle/micromobility elements

- | | |
|-----------------------------|--|
| M Bicycle facilities | H Bicycle/micromobility parking |
|-----------------------------|--|

Transit elements

- | | |
|------------------------|----------------------------------|
| – Transit lanes | L Transit signal priority |
| L Transit stops | H Mobility hubs |

Intersection and crossing elements

- | | |
|------------------------------------|--------------------------|
| H Crosswalks | – Corner Radii |
| H Curb ramps | – Hardened centerlines |
| L Signalization | H Raised crossing |
| L Bikeways at intersections | – Median refuges |
| H Curb extensions | – Driveways |

Curbside elements

- | | |
|----------------------|---------------------|
| L Loading | H Wayfinding |
| H Placemaking | L Parking |

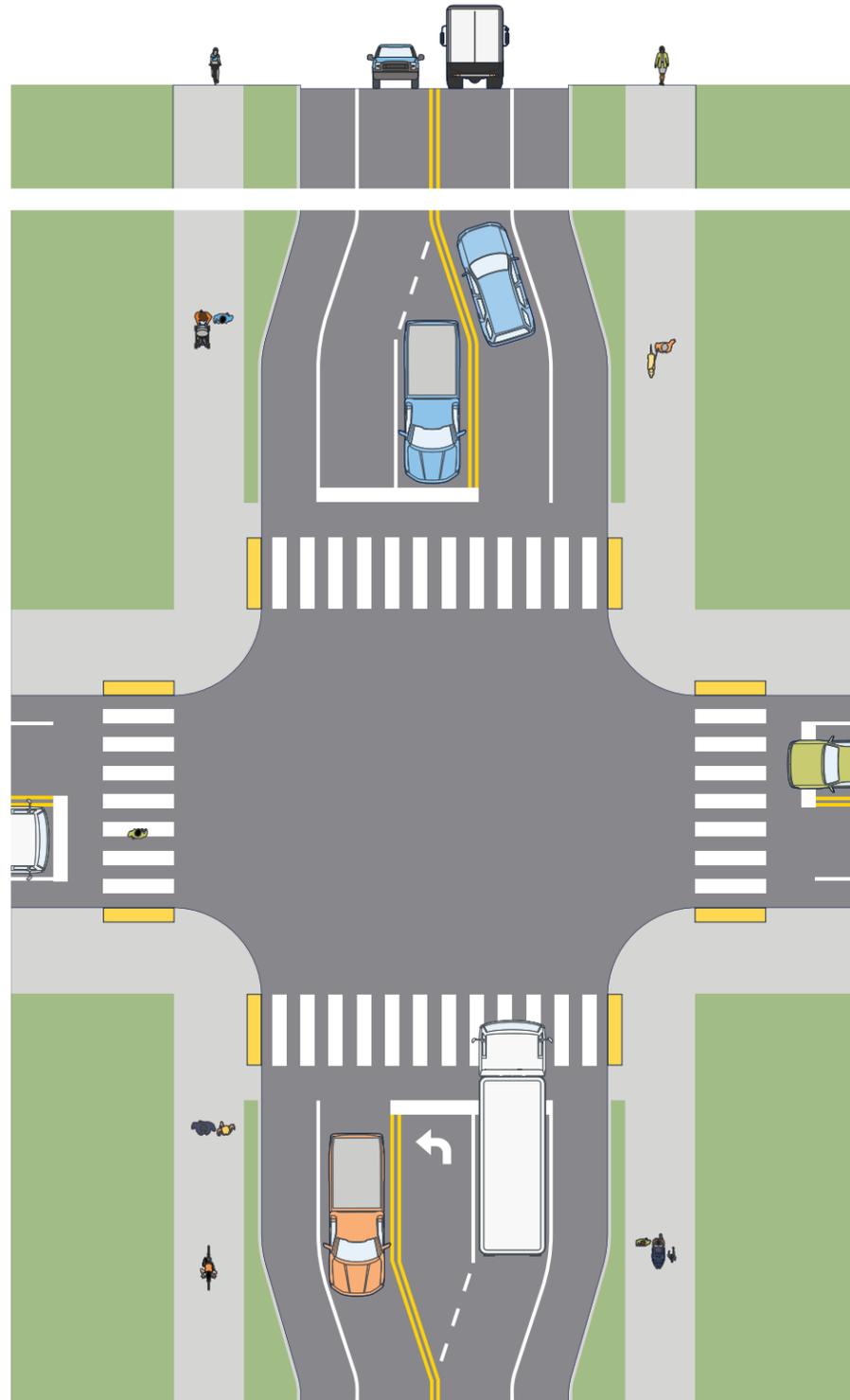
Landscaping and irrigation elements

- | | |
|-----------------------|-------------------------------|
| H Street trees | H Green infrastructure |
|-----------------------|-------------------------------|

KEY: **H** High **M** Medium **L** Low – N/A

Rural Road

Rural Roads are generally located in less-developed areas and are characterized by large setbacks, frontage roads, adjacent open space and infrequent intersections. Road features may vary depending on local context.



This illustration is intended to represent one type of street. Practitioners should use the Toolkit and other resources to their judgement based on street and land use context.

Modal priority



Design element compatibility

Pedestrian elements

- L** Sidewalks
- L** Lighting
- Street furniture
- Shade

General roadway elements

- L** Traffic calming
- L** Access management
- H** Travel lanes
- L** Medians
- Pavement types

Bicycle/micromobility elements

- M** Bicycle facilities
- Bicycle/mobility parking

Transit elements

- Transit lanes
- L** Transit stops
- Transit signal priority
- Mobility hubs

Intersection and crossing elements

- L** Crosswalks
- M** Curb ramps
- L** Signalization
- L** Bikeways at intersections
- Curb extensions
- Corner Radii
- Hardened centerlines
- Raised crossings
- L** Median refuges
- Driveways

Curbside elements

- Loading
- Placemaking
- L** Wayfinding
- Parking

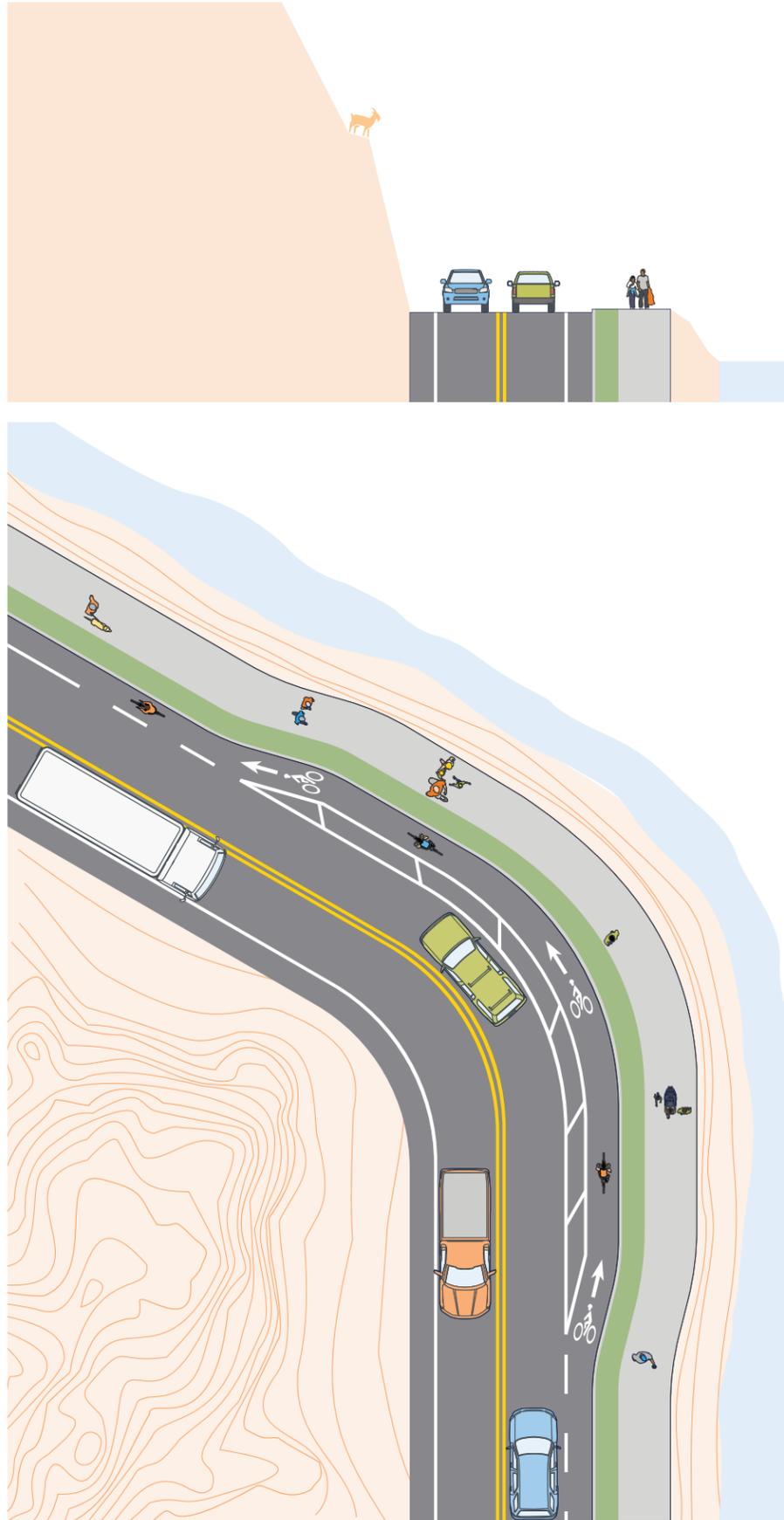
Landscaping and irrigation elements

- Street trees
- Green infrastructure

KEY: **H** High **M** Medium **L** Low — N/A

Mountain Road

Mountain Roads are characterized by steep and variable grades, topographic constraints, adjacent forest and open space and limited sight distance and switchbacks.



This illustration is intended to represent one type of street. Practitioners should use the Toolkit and other resources to their judgement based on street and land use context.

Modal priority



Design element compatibility

Pedestrian elements

- L** Sidewalks
- L** Lighting
- Street furniture
- Shade

General roadway elements

- L** Traffic calming
- L** Access management
- H** Travel lanes
- L** Medians
- Pavement types

Bicycle/micromobility elements

- M** Bicycle facilities
- Bicycle/mobility parking

Transit elements

- Transit lanes
- L** Transit stops
- Transit signal priority
- Mobility hubs

Intersection and crossing elements

- L** Crosswalks
- M** Curb ramps
- L** Signalization
- L** Bikeways at intersections
- Curb extensions
- Corner Radii
- Hardened centerlines
- Raised crossings
- L** Median refuges
- Driveways

Curbside elements

- Loading
- Placemaking
- L** Wayfinding
- Parking

Landscaping and irrigation elements

- Street trees
- Green infrastructure

KEY: **H** High **M** Medium **L** Low — N/A

Considering Local Plans and Priorities

The Regional Street Typology is intended to support the Denver region's progress toward a connected and comprehensive network of Complete Streets. However, the street typology is not intended to supersede local plans and priorities that may reflect a deeper and more context-sensitive understanding of street design. Where guidance differs between this toolkit and local plans, local governments should coordinate with DRCOG and other partners to advance street planning and design efforts that optimize return on investment at both the local and regional scales.

Data Access and Future Updates

The regional street typology and the assignment of its street types across the Denver region are flexible and adaptable. The latest version of the regional street typology GIS layer is available through DRCOG's Regional Data Catalog. In addition to the annual data request sent to local governments, DRCOG will also request any recommended updates to the regional street typology from local governments. Local governments should consider reviewing the street type assignment in their community whenever significant changes occur, including new planning efforts, new private development or redevelopment and shifts in traffic patterns.





Design Elements

Chapter 3 presents street design elements that support desired outcomes for the street types described in Chapter 2. To plan and design Complete Streets at the local level that contribute to a vision for a regional Complete Streets network, local governments should partner with DRCOG, CDOT, RTD, transportation management associations, business owners and residents and other partners to determine the most appropriate design elements to include in street projects.

The matrix below presents each of the design elements included in the toolkit and their compatibility with each of the ten street types. For any given street type, a design element with high compatibility should be included by project staff in the street design if at all possible, while a design element with low compatibility may be omitted unless local conditions suggest otherwise. When developing street designs, practitioners should consider the assigned street type, its modal priorities, compatible design elements, adjacent land uses, existing and anticipated travel conditions and local plans and projects.

Design Element Compatibility Matrix

High high compatibility
Medium medium compatibility
Low low compatibility

Design elements:	Page Number	Downtown Commercial Street	Downtown Mixed-Use Street	Neighborhood Main Street	Mixed-Use Street	Regional Connector Street	Neighborhood Connector Street	Industrial Street	Special-Use Street	Rural Road	Mountain Road
Pedestrian elements											
Sidewalks	47	High	High	High	High	High	High	High	High	Low	Low
Lighting	48	High	High	High	High	High	High	Medium	High	Low	Low
Street Furniture	49	High	High	High	High	Medium	Medium	Low	High	n/a	n/a
Shade	50	High	High	High	High	Medium	Medium	Medium	High	n/a	n/a
General roadway elements											
Travel Lanes	51	Low	Low	Medium	Medium	High	High	Medium	Low	High	High
Traffic Calming	52	High	High	High	Medium	Low	Medium	Low	High	Low	Low
Medians	53	Low	Low	Low	Medium	High	Medium	Low	n/a	Low	Low
Access Management	54	High	High	High	Medium	Medium	Medium	Low	High	Low	Low
Pavement Types	55	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bicycle and micromobility elements											
Bikeway Types and Selection Guid-	56	High	High	Medium	Medium	Medium	Medium	Low	Medium	Medium	Medium
Bicycle and Micromobility Parking	57	High	High	High	High	Low	Low	Low	High	n/a	n/a
Transit elements											
Transit Lanes	58	High	High	Low	Medium	High	n/a	n/a	n/a	n/a	n/a
Transit Stops	59	High	High	High	High	High	Medium	Medium	Low	Low	Low
Transit Signal Priority	60	High	High	High	Low	High	Medium	Low	Low	n/a	n/a
Mobility Hubs	61	High	High	High	Medium	Low	Low	n/a	High	n/a	n/a
Intersection and crossing elements											
Crosswalks	62	High	High	High	High	Medium	Medium	Medium	High	Low	Low
Curb Ramps	63	High	High	High	High	High	High	High	High	Medium	Medium
Signalization	64	High	High	Medium	High	High	Medium	Medium	Low	Low	Low
Raised Crossings	65	Low	Low	High	High	n/a	n/a	n/a	High	n/a	n/a
Bikeways at Intersections	66	High	High	Medium	Medium	Medium	Medium	Low	Low	Low	Low
Median Refuge Islands	67	Low	Low	Low	Medium	High	Medium	Low	n/a	Low	Low
Curb Extensions	68	High	High	High	High	Low	Medium	Low	High	n/a	n/a
Corner Radii	69	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Hardened Centerlines	70	High	High	High	Medium	Medium	Medium	Low	n/a	n/a	n/a
Driveways	71	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Curbside elements											
Loading	72	High	High	High	Medium	n/a	Low	High	Low	n/a	n/a
Placemaking	73	High	High	High	Medium	Low	Low	Low	High	n/a	n/a
Wayfinding	74	High	High	High	High	Medium	Low	Low	High	Low	Low
Parking	75	Medium	Medium	High	Low	n/a	Low	Low	Low	n/a	n/a
Landscape and irrigation elements											
Street Trees	76	High	High	High	High	Medium	Medium	Low	High	n/a	n/a

Land Use and Community Context

A key consideration to implementing Complete Streets design elements is current and future land use. Land use and transportation should complement one another to create great places for all roadway users.

Local governments should consider their local context when implementing right-of-way changes for Complete Streets projects. Each local government regulates land according to local codes and must be flexible when applying the design elements outlined in this chapter. Practitioners must consider community context, short- and long-term growth to direct land development that complements and supports Complete Streets.

Complete Streets guidance, whether taken from the toolkit or from local policies, should be considered during the land use development review process. Decisions on short- and long-term land use planning and street design should reinforce each other.



Pedestrian elements

Sidewalks

The sidewalk is a crucial space for people to walk and use mobility assistive devices. Sidewalks include the frontage zone adjacent to buildings, the throughway zone for people to walk and roll through and the amenity zone for street furniture, utility boxes, traffic control devices, street lights, trees/plantings, furnishings and bicycle and dockless and docked mobility vehicle parking. It is critical for the throughway zone to be kept clear of all obstructions that are better suited for the amenity zone. Street reconstruction projects should locate all utility access points including electrical, telecommunication and irrigation control access boxes outside of the sidewalk zone as much as possible. Sidewalk installation is a priority in locations without them. Sidewalks are also noted as a countermeasure in the DRCOG's Taking Action on Regional Vision Zero.

A balanced approach for determining the width of pedestrian space zones begins with an understanding of conditions, but 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.

Sidewalks are priorities for most types with limited exceptions. Applicable street types include Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets, Mixed-Use Streets,

Regional Connector Streets, Neighborhood Connector Streets, Industrial Streets and Special-Use Streets.

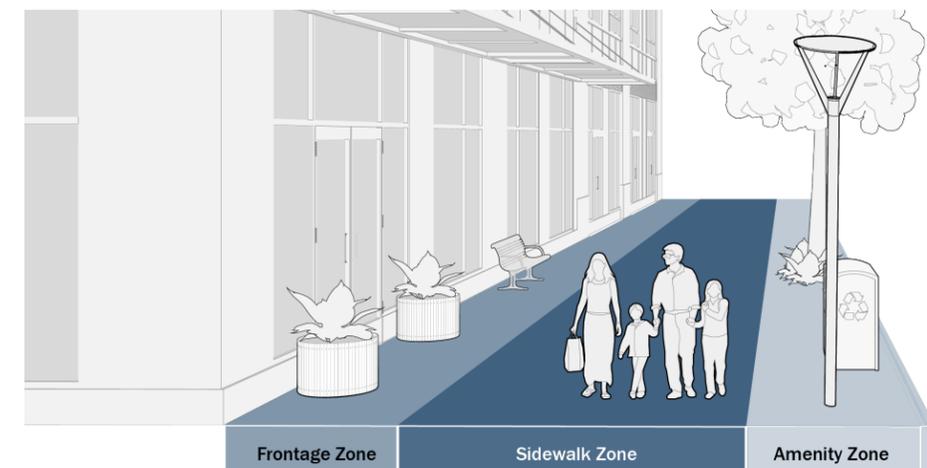
Planning and design guidance

When allocating space within the pedestrian realm, the most critical dimension is the throughway zone width with a 1.5% cross slope. Generally, sidewalk alignments should be straight and avoid meandering. In some special cases in more suburban contexts or adjacent to open space areas, meandering sidewalks may be desirable to enhance visual interest. Specific sidewalk width preferences will depend on the street type; however, sidewalks at a minimum should have a 5-foot clear width in the throughway zone, free of obstructions. Widths for frontage zone and amenity zones will depend on street context and typology. Sidewalk widths can be increased during street reconstruction projects, but they should be fully integrated with the adjacent amenity zone, frontage zone and curbspace uses.

Transit stops or accessible parking should account for vehicle ramp deployment on the sidewalk.

Supporting resources

- [National Association of City Transportation Officials Urban Street Design Guide](#)
- [American Association of State Highway and Transportation Officials Guide for the Planning, Design, and Operations of Facilities](#)
- [Institute of Transportation Engineers Designing Walkable Urban Thoroughfares](#)



Sidewalks usually include a frontage zone adjacent to the building, a sidewalk zone for walking and an amenity zone for landscaping, street furniture, lighting, recycling and trash and bicycle and micromobility parking.

Pedestrian elements

Lighting

Street lighting, including pedestrian-scale lighting, is an important component to streetscape design that improves visibility and safety. Consistent spacing of pedestrian light poles is critical to ensuring continuity of light along the street. This results in a perceived pattern of light that delineates a district or destinations within a district. Street lighting is noted as a countermeasure in DRCOG's Taking Action on Regional Vision Zero.

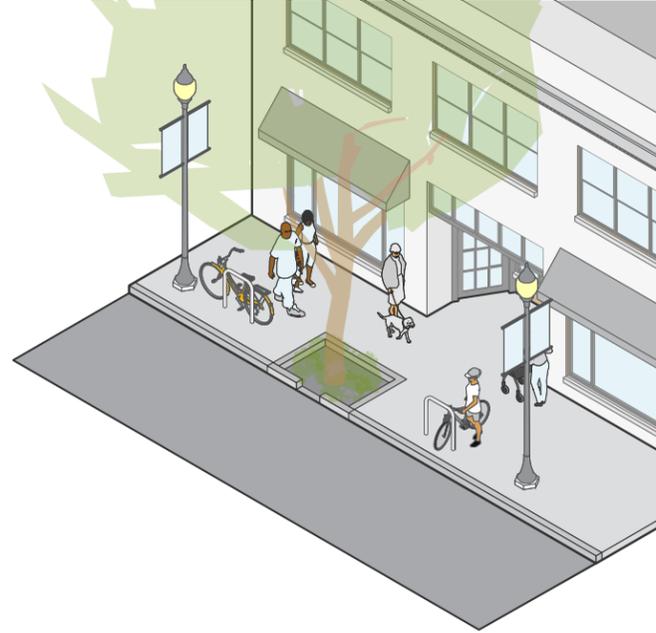
Street lighting is most applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets, Mixed-Use Streets, Regional Connector Streets, Neighborhood Connector Streets and Special-Use Streets.

Planning and design guidance

Consider the appropriate level of light lumens for outdoor spaces and when possible, install LED lighting. For utility location, space must be provided for the requisite transformer, solar-powered lighting, meter and control box. Designers should use light fixtures that are compliant with the Illuminating Engineering Society and International Dark Sky Association Model Lighting Ordinance. This model ordinance provides detailed guidance about how to provide effective lighting in a community without producing adverse impacts on the local ecosystem. Additionally, the ordinance provides tables with Backlight, Uplight, and Glare (BUG) maximum allowable ratings for light fixtures to achieve compliance.

Supporting resources

- [International Dark-Sky Association: Outdoor Lighting](#)
- [Illuminating Engineering Society and International Dark-Sky Association: Model Lighting Ordinance](#)
- [Project for Public Spaces](#)



Lighting is an essential element to creating welcoming spaces for people walking.

Pedestrian elements

Street Furniture

Street furniture includes an array of elements, including benches, trash and recycling receptacles, bollards, transit stops and shelters, decorative planters and more. Seating is an essential component to each street and includes temporary and permanent fixtures such as chairs, benches, seat walls, steps, public art, and raised planters. The location and type of seating element should respond to adjacent land uses, available shade from either structures or street trees, the presence of parallel parking buffering the seating area from vehicular traffic and the width of the amenity zone.

Trash and recycling receptacles are important to keep active, busy streetscapes clean and are necessary to minimize litter. Receptacles should be located in areas with high volume of travel and all transit stops. Other street furniture such as bollards, transit stops and shelters and decorative planters are important for comfortable travel on many types of streets. Site-specific conditions and project goals will dictate where these elements are most appropriate. Ensure that street furniture does not impair sight distance for street users.

Street furniture is most applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets, Mixed-Use Streets and Special-Use Streets.

Planning and design guidance

Permanently installed furnishings must not impede pedestrian access to adjacent structures for safe and comfortable travel or create conflicts with the opening of car doors and access to fire hydrants.

Durable, vandal-resistant materials and designs should be selected to withstand both climate and urban environments, as well as sun damage and deter pest infiltration. Trash or recycling receptacles with internal bins should be readily accessible by and convenient for maintenance crews.



Street furniture includes an array of elements and should not impede pedestrian access to maintain a clear and comfortable pathway.

Repurposed Streets

The COVID-19 pandemic has changed the way streets are used. Some streets that were formerly focused on motor vehicle travel were redesigned temporarily during the pandemic to create safe spaces to walk and bike, to support recreation and well-being, and to help boost local businesses and the economy. These types of improvements can be made permanent, supporting local businesses with additional outdoor dining space, and where appropriate, restricting traffic to create shared streets.

Pedestrian elements

Shade

The Denver region's arid, high-altitude climate makes providing much-needed shade an important consideration for the comfort and health of pedestrians. During warm seasons, shade can provide relief, make streets more attractive, provide an opportunity for public art and create a comfortable and pedestrian-friendly environment. Shade is a critical element of making plazas inviting and reclaiming spaces and also helps to reduce the urban heat island effect.

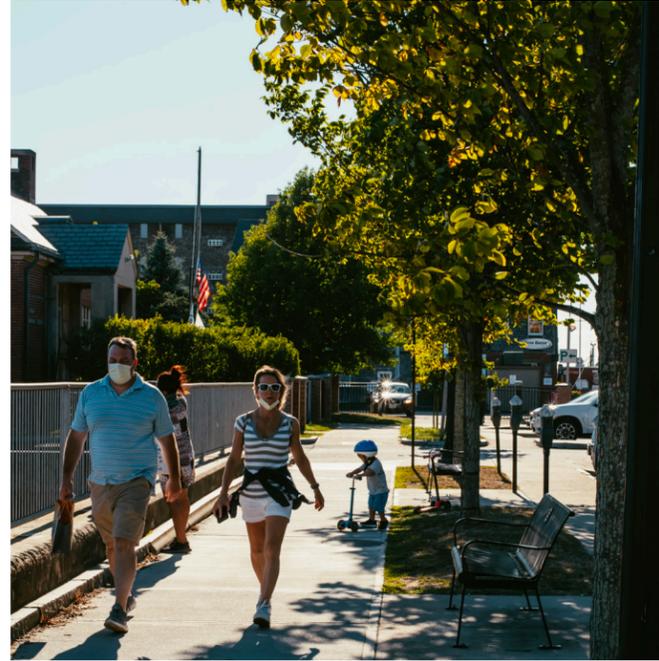
Shade as a design element is most applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets, Mixed-Use Streets and Special-Use Streets.

Planning and design guidance

Consider providing shade structures or native trees adjacent to street seating and within the vicinity of transit stops. Large shade trees are ideal for delineating outdoor spaces; select appropriate species that support a diverse urban forest. Consider daily temperature differences and a street's orientation to the sun when planning and designing shade to be most effective during the hottest part of the day. Designers should also be aware of the effects of shade on the formation of ice dams on streets and sidewalks during the winter months and associated maintenance costs. Also consider any conflicts with sightlines or visibility.

Supporting resources

- [Colorado State University – Native Trees for Colorado Landscape](#)
- [Environmental Protection Agency – Heat Island Resources](#)



Shade can provide much needed relief and creates a pedestrian-friendly environment.

General roadway elements

Travel Lanes

Vehicle travel lanes make up the largest portion of the roadway on most streets. To build Complete Streets, the number and width of vehicle travel lanes should be minimized to the safest extent possible in order to maintain the narrowest cross section and allow room to accommodate other modes. Travel lanes will have the greatest impact on the availability of space on public streets. In creating project plans that minimize delay to motor vehicles, planners may simultaneously prioritize the safety and comfort of vulnerable roadway users. This supports the comfort of other users of the street, reduces speeding and decreases impervious surfaces.

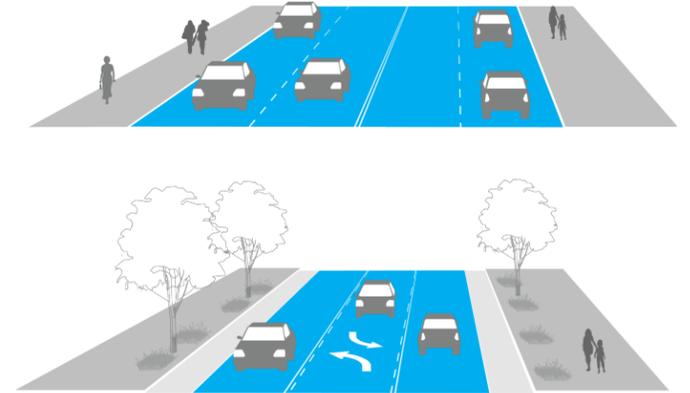
Travel lanes may be reconfigured to reduce overall roadway width, with the possibility of repurposing motor vehicle travel lanes for the space and comfort of people walking or biking or for public transit.

Travel lane design elements are most applicable to Regional Connector Street and Neighborhood Connector Streets.

Planning and design guidance

There are two main ways to reduce space dedicated to vehicle travel lanes — a road diet and a lane narrowing. A road diet reduces the number of lanes. A lane narrowing reduces the width of the lanes but maintains the number of lanes. General travel lanes may be 10 feet. Curbside travel lanes that are on bus routes should accommodate buses by using a minimum width of 11 feet. Curbside travel lanes in areas with heavy freight truck traffic may also need 11' travel lanes to accommodate the full width of the trucks.

A road diet from four to three lanes is most common and results in two travel lanes with a turn lane in the center. This is often as productive (or more productive) than a four-lane configuration with two lanes in each direction and no dedicated turn lane. Consider vehicle volumes, throughput and turning movements for efficient use of travel lanes. The minimum width of the center turn lane is 12 feet. General travel lanes may be 10 feet wide.



Travel lanes should be minimized to the extent possible to maintain the narrowest cross section and support the comfort of other road users such as people walking or bicycling.

Reconfiguration of the roadway may also require significant reconfiguration of signalized intersections and may require a complete rebuild of traffic signals.

While many existing streets have multiple lanes to accommodate vehicular throughput, wider roadways are counter to other local and regional goals including safety, multimodal connectivity, livability, and air and water quality.

Additional safety elements such as guard rails and rumble strips may be applicable in certain contexts for Rural Roads and Mountain Roads street types.

Supporting resources

- [National Association of City Transportation Officials Urban Street Design Guide](#)
- [Federal Highway Administration Road Diet Informational Guide](#)
- [American Association of State Highway and Transportation Officials](#)

General roadway elements

Traffic Calming

Traffic calming relies on physical and visual cues in and adjacent to, the roadway to encourage drivers to travel at slower speeds. This is a self-enforcing strategy that results in the desired effect, without relying on compliance with traffic control devices such as signals, signs and enforcement.

Traffic calming includes many treatments, such as traffic circles, chicanes and pinchpoints, corner islands and turning wedges, speed cushions, humps and tables, raised crosswalks, median crossing islands and curb bulbouts.

Traffic calming is a countermeasure in DRCOG's Taking Action on Regional Vision Zero and is most applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets and Special-Use Streets.

Planning and design guidance

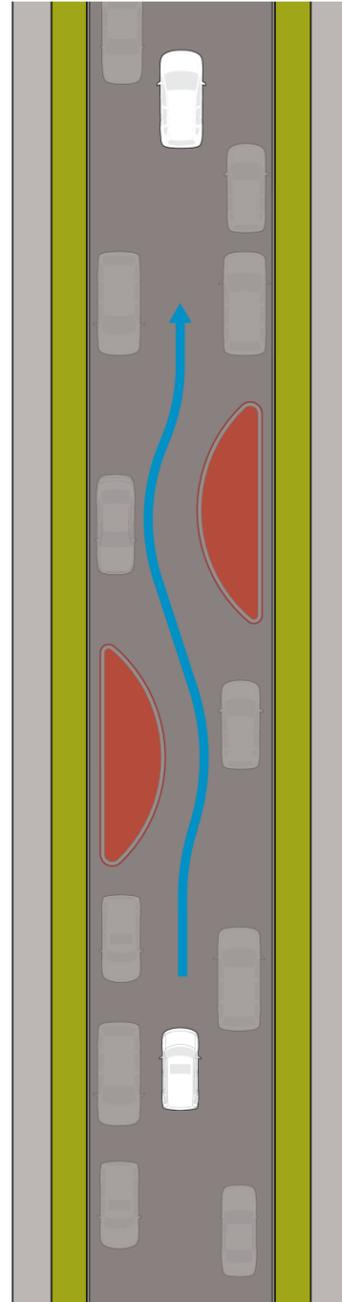
Traffic calming designs should be predictable and easy to understand by all people. Traffic calming measures should accommodate emergency vehicles, especially on non-arterial emergency routes. Emergency response times should be taken into consideration during project review.

People walking, rolling with assistive devices, and bicycling should be prioritized in decision-making about traffic calming measures. Their movements should be balanced with vehicle movement in the design and implementation of arterial traffic calming projects.

In considering traffic calming tactics, planning partners are encouraged to consider the areawide street system so drivers of motor vehicles do not avoid roadways with traffic calming features in favor of those without traffic calming tactics.

Supporting resources

- [National Association of City Transportation Officials Urban Street Design Guide](#)
- [Global Designing Cities Initiative](#)



Chicanes are a type of traffic calming that encourages drivers to travel at slower speeds while balancing the needs of people talking and bicycling.

General roadway elements

Medians

Medians are an effective way to improve the safety and accessibility of arterial streets. They provide a traffic calming effect by separating directional traffic and, coupled with landscaping elements, can encourage drivers to slow speeds. Medians with landscaping and green infrastructure, such as bioretention areas, make a street more attractive. Raised medians are noted as a countermeasure in DRCOG's Taking Action on Regional Vision Zero.

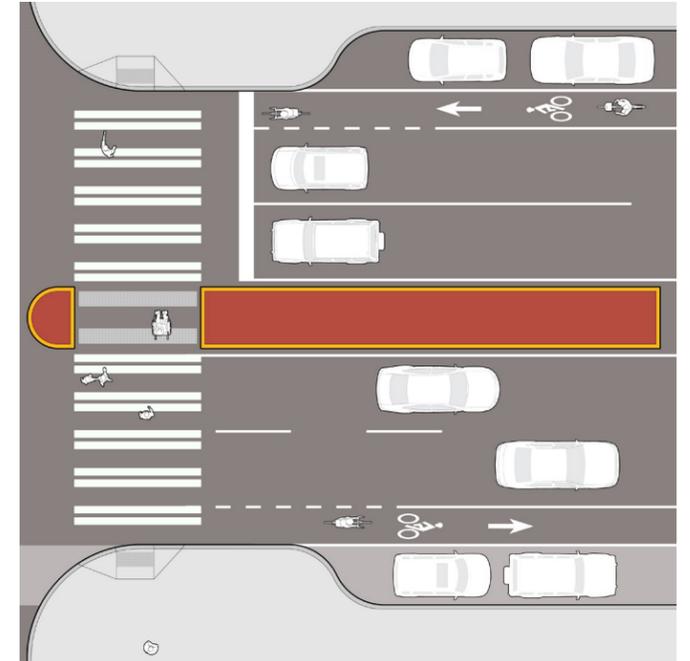
Medians are most applicable to Regional Connector Streets.

Planning and design guidance

Medians are most useful on high volume, high speed roads. Landscaping in medians should not obstruct the visibility between pedestrians and approaching motorists. To provide a pedestrian refuge, medians should be at least 6 feet wide and 6 feet deep to allow enough room for a pedestrian and a wheelchair to meet within a pedestrian refuge while crossing the street. An 8-to-10-footwide median is preferred and should be considered especially on streets where people are likely to be using it with a bicycle.

Supporting resources

- [National Association of City Transportation Officials Urban Street Design Guide](#)
- [Global Designing Cities Initiative](#)



Medians provide a traffic calming effect by separating directional traffic on high-volume and high-speed roads.

General roadway elements

Access Management

For streets with traffic volumes that exceed those recommended based on classification and function, access management is a tool for practitioners to shift traffic away from a roadway (particularly bikeways and shared streets) by using curb extensions or medians to limit motor vehicle access and encourage walking, rolling and bicycling instead of driving. Half closures, a type of access management, restrict access from one direction onto a street. Diverters are a form of access management that force drivers to make turns, preventing them from traveling straight down a route. Access management features can be designed to allow emergency access while restricting other motor vehicles.

Access management is most applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets and Special-Use Streets.

Planning and design guidance

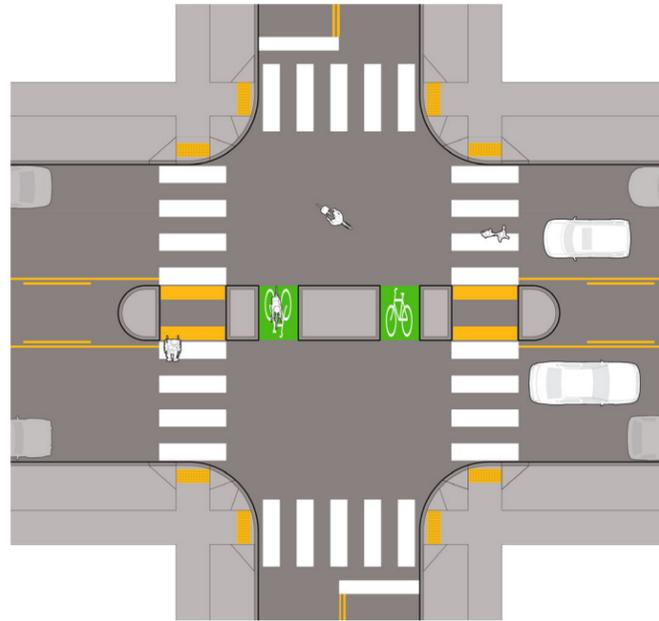
Provide accessible routes for people walking and rolling through access control features using flush surfaces and curb ramps at crossings. Provide bike and pedestrian crossing warning signage (signs W11-2 or W11-15) where bicyclists and pedestrian crossings may be unexpected.

Ensure emergency vehicle access is provided by considering the wheelbase of fire and other emergency vehicles when designing diverter islands. Consider using mountable curbs and providing a width that is clear of landscaping and rigid vertical elements within the diverter to allow emergency vehicle passage and larger motor vehicles like delivery and garbage trucks to encroach on barriers when turning.

Ensure that drainage and ice and snow removal is considered in the design of access management.

Supporting resources

- [National Association of City Transportation Officials Urban Bikeway Design Guide](#)
- [CDOT State Highway Access Code](#)



Practitioners use access management as a tool to limit motor vehicle access on roadways that prioritizes people walking and bicycling.

General roadway elements

Pavement Types

Roadway materials can have significant effects on traffic safety and speeds, user comfort, vehicle maintenance costs, stormwater management, noise and the urban heat island effect. Most streets are paved in asphalt or concrete. Special paving treatments can be used over the length of a street or in specific locations such as a special intersection or a parking lane. Special pavements include:

- 1) Textured pavement such as stamped concrete or asphalt.
- 2) Low-volume materials such as chip seal, brick, gravel, asphalt pavers and colored pavements.
- 3) Porous pavements such as pavers and porous asphalt.

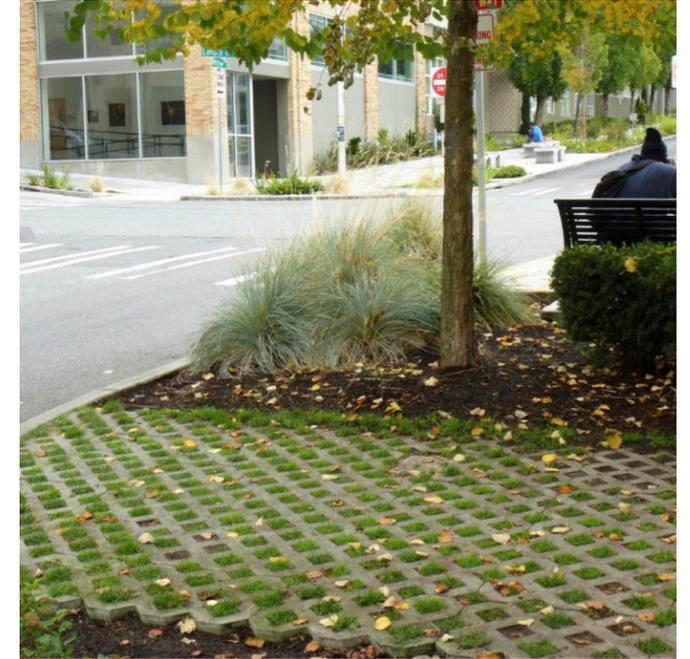
Special paving treatments can reduce motor vehicle speeds and are more commonly used on streets with high volumes of pedestrians and lower volumes of motor vehicle traffic.

Regardless of the material used on the roadway, an accessible, smooth travel path must be provided at crosswalks in order to accommodate people with disabilities.

Pavement types are most applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets, Mixed-Use Streets, Regional Connector Street, Neighborhood Connector Streets, Industrial Streets and Special-Use Streets.

Planning and design guidance

Consider vehicle volumes and types, as well as a comfortable travel experience for all users when assessing pavement types. Porous pavements must be tied into a street's stormwater system and considered by practitioners early on in the street design process. Heavy use of sand may compromise the drainage capacity of these pavements and a maintenance plan is essential to continued operation. Care must be taken by practitioners to ensure textured pavements are structurally sound and able to support the type and volume of vehicles that are likely to use the street. Noise can be a concern with textured pavements.



Consider different pavement types, such as permeable pavement, in appropriate locations to provide green infrastructure.

The use of colored pavements for traffic control purposes (for example, to communicate a regulatory, warning or guidance message) is narrowly defined by the Manual on Uniform Traffic Control Devices and will be required to follow Federal Highway Administration's experimentation process. Pavement types should also consider accessibility needs, such as color and texture of pavement.

Pavement types should consider maintenance needs. Pavements that resist heaving and rutting should be used for locations where heavy vehicles stand or park or locations that are particularly susceptible to wear such as high-volume intersections or steep grades. Concrete bus pads should be considered on high frequency bus routes.

Supporting resources

- [National Association of City Transportation Officials Urban Street Stormwater Guide](#)
- [Federal Highway Administration Long-Term Pavement Performance](#)
- [National Association of City Transportation Officials Colored Pavement Material Guidance](#)

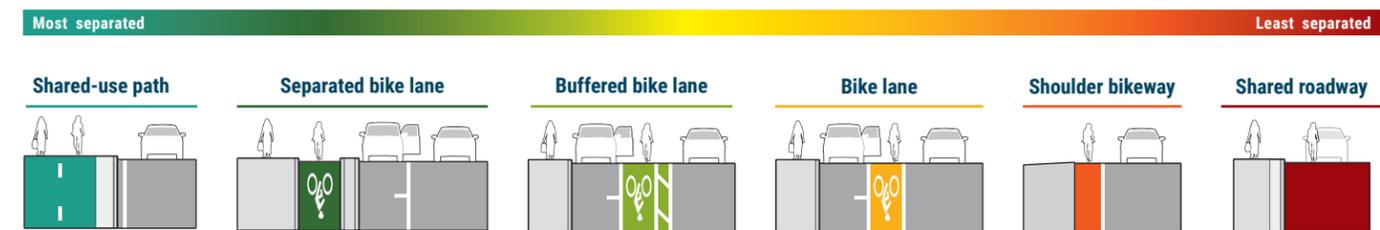
Bicycle/micromobility elements

Bikeway Types and Selection Guidance

The selection of bikeway types primarily depends on the traffic volume and operating speed characteristics of the roadway, which are often implied by their functional classification (arterial, collector, local) within various land use contexts. The land use context will likely have a big effect on the available right-of-way, the mix of roadway users, property access, traffic operating speeds, road operations, safety performance and community goals. All of these will inform street design decision-making.

For streets with higher volumes and higher speeds, consider a bikeway such as a shared-use path or a separated bike lane, that is more separated from motor vehicle traffic to increase the safety and comfort for bikeway users. Less separated bikeways, such as shared roadways and shoulder bikeways, are only acceptable on low-volume and low-speed streets and rural roads. In general, bikeways that accommodate users of all ages and abilities is crucial to creating safe and inviting bikeways.

Bikeway facilities are most applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets. Paved shoulders as space to ride bicycles may be acceptable on Rural Roads, based on speed and volume of the roadway.



Bikeways with more separation from motor vehicle traffic are generally more comfortable for users of all ages and abilities, compared to shared roadways without any separation.

Bicycle/micromobility elements

Bicycle and Micromobility Parking

Parking for bicycles and micromobility devices are key end-of-trip features. Structures for people to securely lock their bicycles or micromobility devices can be installed on- of off-street. Parking may be located near transit stops as well as in the amenity zone, provided there is adequate width to maintain an unobstructed path of travel for people walking and using assistive mobility devices. In addition, bike parking corrals may be located in the curbside lane of streets or in daylighting areas (areas with no visual obstructions) at street corners where there is high parking demand and little available sidewalk space. Local governments should coordinate with one another and RTD where appropriate regarding dockless micromobility parking.

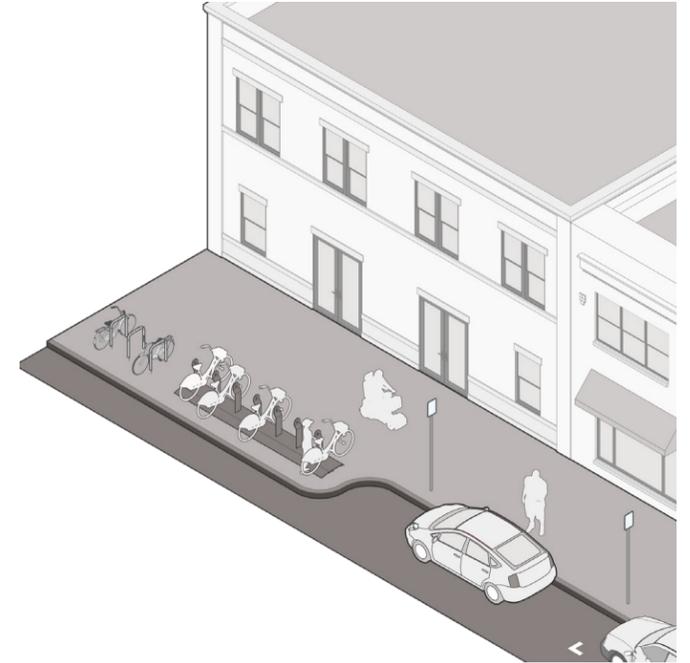
Bicycle and micromobility parking are most applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets and Special-Use Streets.

Planning and design guidance

Bike parking within amenity or frontage zones cannot encroach on the clear sidewalk zone when a bicycle or micromobility device is parked there. A minimum clear width of 5 feet must be preserved. Within the amenity zone, bike parking may be installed perpendicular, parallel or at an angle to the curb. Parking within the amenity zone should be sufficiently set back from the curb to ensure a bicycle of at least 6 feet in length will fit on the curb and will not be damaged by car doors within an adjacent parking lane.

On-street bike parking should be installed a minimum of 24 inches from the curb, with 36 inches being the preferred setback. On-street corrals should be clearly delineated with a vertical element such as a parking stop, concrete barrier or flex post to prevent motor vehicle encroachment. Ensure that drainage and ice and snow removal is considered for bicycle and micromobility parking that is both on-street and in the amenity zone on sidewalks.

Sidewalk bike racks should be placed a minimum of 10 feet from all fire hydrants and should not be placed within 3 feet of a tree grate or any streetscape element or within 4 feet of the corner of any building.



Bicycle/micromobility parking that is convenient and secure is a key end-of-trip feature.

Supporting resources

- [National Association of City Transportation Officials Bikeshare Station Siting Guide](#)
- [Association of Pedestrian and Bicycle Professionals Bicycle Parking Guidelines](#)

Transit elements

Transit Lanes

Investments in transit ensures rapid, reliable, safe and comfortable service which makes transit a convenient choice. Transit-only travel lanes are justified by local jurisdictions and practitioners for many reasons, including converting general-purpose travel lanes to transit lanes, thus increasing the total number of people that can be carried through a corridor. There are a variety of transit lanes, including permanent (24 hours a day, 7 days a week) transit lanes, peak-hour transit lanes, and business access and transit lanes. Additionally, transit-only lanes could be installed to mitigate peak-hour congestion. Transit lanes may be paired with queue jumps and with transit signal priority.

Transit lanes are most applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets and Regional Connector Streets.

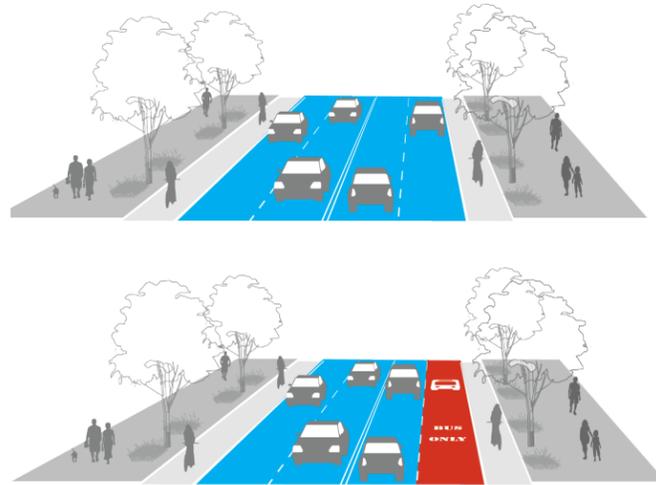
Planning and design guidance

Transit-only lanes, including outside travel lanes alongside a curb used by buses should be 12 feet wide, including the gutter pan where appropriate. Inside travel lanes used by buses should be 11 feet wide. Consult with RTD to ensure compatible street design with buses.

Transit lanes should be clearly delineated with signing, striping, and markings. Pavement may be painted red to indicate bus-only segments of the roadway and reduce personal vehicle encroachment. This treatment has interim approval from the Federal Highway Administration.¹

Supporting resources

- [National Association of City Transportation Officials Transit Street Design Guide](#)
- [RTD Bus Infrastructure Design Guidelines and Criteria](#)



Dedicated lanes for transit increase the total number of people carried through a corridor on congested roadways.

¹ https://mutcd.fhwa.dot.gov/resources/interim_approval/ia22/index.htm

Transit elements

Transit Stops

Transit stops provide a safe designated waiting area for passengers. The installation of bus shelters are encouraged at all bus stops, especially at frequently used bus stops and locations used by vulnerable passengers such as at schools and senior centers. Benches, trash and recycling receptacles and bike parking are other amenities that are often co-located with bus stops and provide additional comfort and functionality to the public transit system. Security cameras, ticket vending machines, level boarding techniques are also important transit stop amenities that should be considered in transit stop design. Transit stops may also be considered in placemaking strategies.

Transit stops are most applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets and Regional Connector Streets. These streets may include enhanced transit stops.

Planning and design guidance

Bus stop location is crucial and should be considered in proximity to a safe street crossing, nearby accessible routes to the stop and consider the needs of the local transit agency.

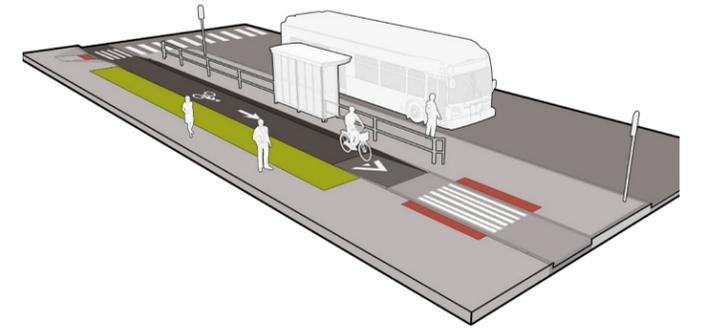
A clear pedestrian access aisle of at least 5 feet wide must be preserved behind the transit stop and the back of the sidewalk or nearest building facade.

Install solar lighting where solar exposure is adequate.

Provide real-time information displays with bus arrival times, delays on connecting lines, weather and news.

Provide bench seating while maintaining a minimum 30 inches wide by 40 inches long accessible space under shelter.

Include transparent wall panels in all shelters to promote feelings of personal safety and security. Consider Crime Prevention Through Environmental Design (CPTED) to address security concerns.



Transit stops amenities, including shelters, lighting and trash and recycling receptacles, are encouraged at all bus stops, but are prioritized at stops serving vulnerable populations.

Supporting resources

- [National Association of City Transportation Officials Transit Street Design Guide](#)
- [RTD Bus Infrastructure Design Guidelines and Criteria](#)

Transit elements

Transit Signal Priority

Transit signal priority enables an approaching transit vehicle to communicate with a traffic signal and alter the signal timing to prioritize transit movements. Transit signal priority may extend the signal green time, truncate the red phase, insert a transit-only phase (a queue jump). Transit signal priority may be paired with transit lanes and queue jumps.

Transit signal priority is most applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets and Neighborhood Main Streets.

Planning and design guidance

Transit signal priority requires special communication technology to facilitate communication between the signal and approaching transit vehicles. Signal priority may be used on either pre-timed or actuated signals.

Transit signal priority should be considered on all priority transit routes and should be installed only when there are documented schedule adherence issues. Consult with RTD to ensure compatible street design with buses.

Supporting resources

- [National Association of City Transportation Officials Transit Street Design Guide](#)
- [RTD – Transit Signal Priority Project](#)
- [RTD Transit Priority Analysis of Select Corridors](#)



Transit signal priority should be considered on all priority transit routes and should be installed only when there are documented schedule adherence issues.

Transit elements

Mobility Hubs

A mobility hub is a combination of loading zones, car-sharing program spaces, bike parking and micromobility services located near bike routes or bus/rail stops. Mobility hubs may provide designated parking areas or corrals for shared micromobility to reduce sidewalk clutter. They can also serve as transit hubs, rideshare dropoff and pickup zones, car-share parking, bicycle repair stations, a placemaking element, and much more. As new mobility options continue to emerge, dockless mobility hubs provide the opportune places for experimentation and transfer points between modes.

Mobility hubs are most applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets and Special-Use Streets.

Planning and design guidance

A 5-foot minimum clear pedestrian access route (8 feet clear for arterials and streetscapes 21 feet wide and greater) must be maintained behind any designated dock or designated bicycle or dockless mobility parking area.

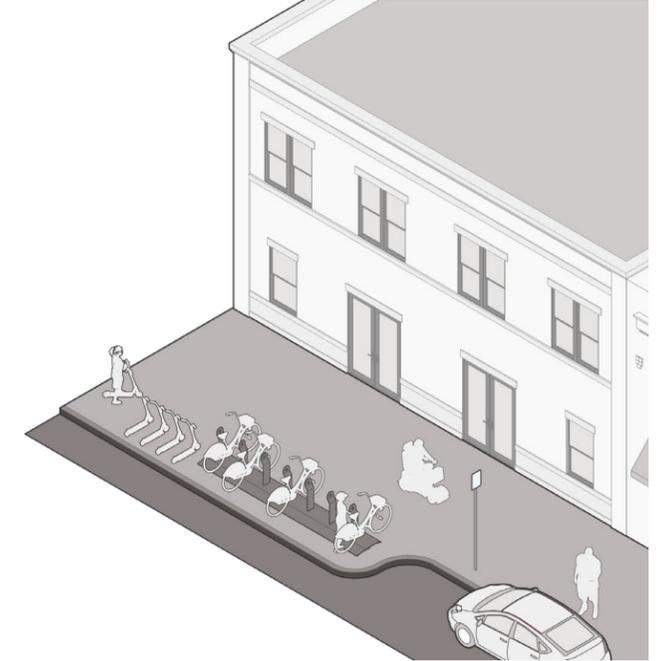
Orient docks to facilitate easy access to dockless mobility vehicles. Payment and informational kiosks (if provided) should be accessible from the sidewalk.

Mobility hubs should be clearly delineated with striping, paint and signage. Locate hubs in well-lit areas with clear sight lines from sidewalks and pedestrian areas. Locate hubs within the amenity zone in curb extensions and near bus stops to preserve maximum pedestrian access. On-street placement near intersections can daylight intersections and improve visibility. Co-locate multiple dockless mobility options in the same location to maximize transportation choices efficiency and to minimize clutter.

Include power supply, wayfinding, transit information, seating and other design elements in hub design. Adequate sun exposure should be ensured if docks are solar powered.

Supporting resources

- [National Association of City Transportation Officials Bikeshare Station Siting Guide](#)



Mobility hubs provide designated parking areas or corrals for shared micromobility devices and should be oriented for easy access and be clearly delineated in well-lit areas.

Intersection and crossing elements

Crosswalks

Well-designed crosswalks are important to create a pedestrian-friendly city. Safety for all pedestrians, especially for those with limited mobility and with disabilities, is a key criterion informing crosswalk design. Marked crosswalks indicate a designated path for people walking and rolling through intersections, midblock crossings and high-volume driveways. Curb extensions can contribute to safer crosswalks by shortening the crossing distance and therefore reducing pedestrian exposure to motor vehicles. High-visibility crosswalks, including continental crosswalk striping and accompanying warning signage, are noted as a countermeasure in DRCOG's Taking Action on Regional Vision Zero.

Crosswalks are most applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets, Mixed-Use Streets and Special-Use Streets.

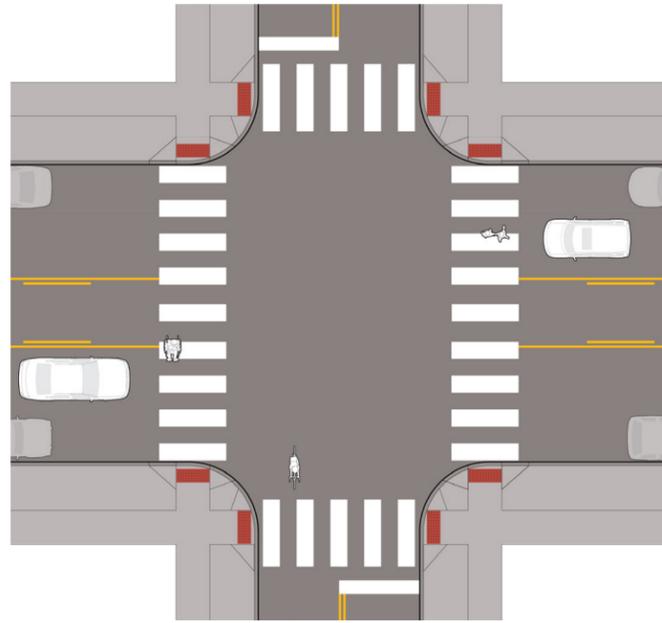
Design of crosswalks should be the highest priority in school zones to ensure students and caregivers can walk to and from school safely. Special attention should be paid to the signal timing and traffic calming associated with crosswalks in school zones as younger students are more vulnerable than adults and deserve low-stress walking infrastructure.

Planning and design guidance

Continental crosswalk striping should be used in all locations except in districts where crosswalks consist of brick paver material.

Install ADA-compliant curb ramps (or blended transitions for raised crosswalks) to connect to accessible routes when constructing new crosswalks. Crosswalks should be as wide or wider than the connecting sidewalk.

At controlled intersections, provide a stop bar in advance of the crosswalk and consider signal timing guidance that prioritize pedestrians at signalized intersections. Consider location of vehicle stop bars based on design vehicle turning envelope. Restrict on-street motor vehicle parking at least 20 feet in advance of the crossing to provide adequate sight distance. Depending on context, signage, paint or curb extensions or other strategies to daylight crosswalks may be appropriate.



Crosswalks are a key element of a pedestrian-friendly city, in particular marked crosswalks and high-visibility marked crosswalks.

Crosswalks may be used at midblock crossings with the appropriate infrastructure, such as rectangular rapid flashing beacons (RRFBs), pedestrian hybrid beacons (PHB)s, median refuges, warning signage, and other elements as appropriate.

Supporting resources

- [NACTO Urban Street Design Guide](#)
- [Federal Highway Administration Safe Transportation for Every Pedestrian Guide](#)
- [Federal Highway Administration Manual on Uniform Traffic Control Devices](#)

Intersection and crossing elements

Curb Ramps

ADA-compliant curb ramps are federally required at all intersection, midblock and other crossings where curbs and vertical elevation changes are present along the pedestrian route. Accessible curb ramps support independent travel for all people, including people with physical disabilities, people pushing strollers or people towing suitcases or other wheeled objects.

Curb ramps are most applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets, Mixed-Use Streets, Regional Connector Street, Neighborhood Connector Streets, Industrial Streets and Special-Use Streets.

Planning and design guidance

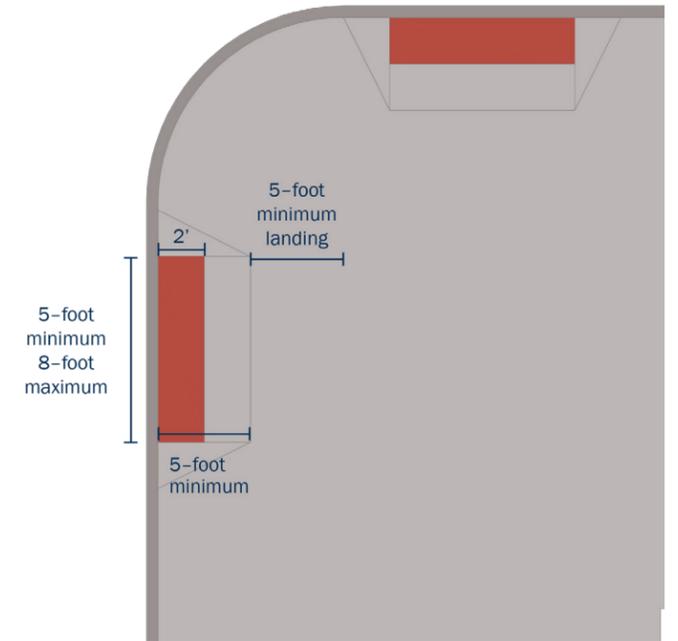
Use directional curb ramps (as illustrated to the right) instead of diagonal (blended transition) curb ramps to channelize pedestrian traffic and improve navigability for people with low vision.

Lengthen ramp and reduce slope below the maximum allowable standards where possible.

Widen ramp to match the sidewalk's clear width and to accommodate multiple user types when connecting to a shared-use path or sidewalk-level bikeway.

Supporting resources

- [Public Right-of-Way Accessibility Guidelines](#)
- [National Association of City Transportation Officials Urban Street Design Guide](#)



Curb ramps are required at all intersection, midblock and other crossings where there is a vertical change present along the pedestrian route. Directional curb ramps are preferred over diagonal (blended corner) curb ramps.

Intersection and crossing elements

Signalization

Signal coordination times a series of traffic lights along a corridor to permit smooth progression of traffic. This progression reduces overall traffic congestion thus ensuring efficient transit travel times together with those of other vehicular travelers. Signal coordination uses a pre-timed signal timing program. Buses and emergency vehicles may preempt signal timing plans at certain intersections and with accompanying technology.

Pedestrian signals are part of a system of traffic signals that control intersection operations for people walking and rolling. Pedestrian signal phasing is intended to minimize exposure of people walking and rolling to motor vehicles, minimize delay for people waiting to cross the street, reduce noncompliant and unsafe crossing behavior and provide accessibility benefits to people with disabilities. Pedestrian phasing falls into three categories: concurrent with vehicles, exclusive to pedestrians or a hybrid of the two. Lead pedestrian intervals are a hybrid that give pedestrians a few seconds to begin crossing prior to signals turning green, thus improving safety and visibility of pedestrians. As much as possible, consistent approaches to pedestrian phasing should be used across the jurisdiction to help make the pedestrian network predictable and consistent and to signals signals proximate to jurisdictional boundaries.

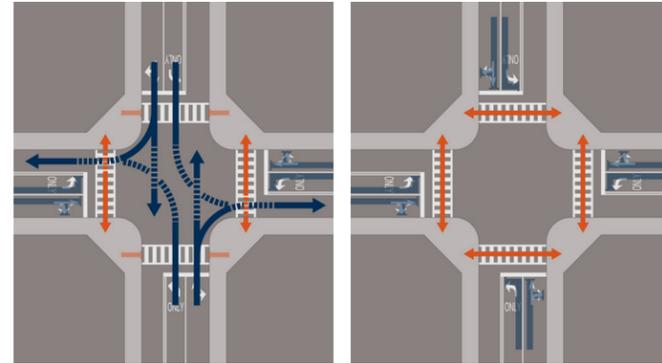
For more information on transit signalization, see Transit Signal Priority.

Signalization is most applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets, Mixed-Use Streets and Regional Connector Streets.

Planning and design guidance

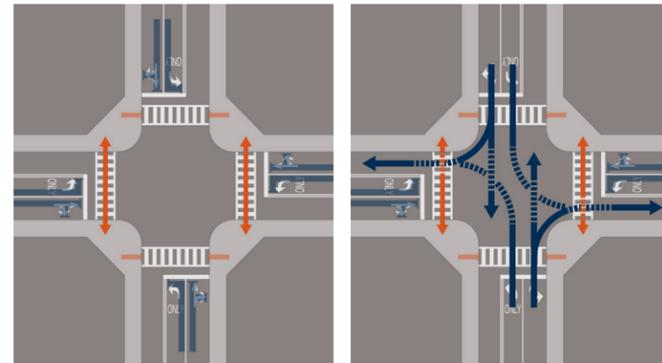
A walking and rolling speed of 3.5 feet per second should be used to time all pedestrian phases and provide adequate time for people to cross the street. Consider protected only left turn phasing and prohibiting right turns on red to better protect pedestrians against right- or left-turning vehicles.

Use accessible pedestrian signals that provide timing cues in nonvisual forms such as audible tones, verbal messages, vibrating surfaces. Accessible pedestrian signals (APS) can provide information such as existence/



Concurrent phasing

Exclusive pedestrian Phase



Leading pedestrian interval Phase 1

Leading pedestrian interval Phase 2

location of push button, beginning of WALK interval (most critical information, needed on any APS) and direction of crosswalk and location of the destination curb. Accessible pedestrian signals can also provide information on intersection street names in Braille, raised print or speech messages; intersection signalization in speech messages and intersection geometry through tactile diagrams or speech messages.

The ideal placement of pushbutton-integrated APS is between 1.5 and 6 feet from the edge of the curb, shoulder or pavement and between the edge of the curb ramp and edge of the crosswalk, on the side farthest from the center of the intersection.

Supporting resources

- [National Association of City Transportation Officials Urban Street Design Guide](#)
- [Federal Highway Administration Manual on Uniform Traffic Control Devices](#)
- [Accessible Pedestrian Signals](#)

Intersection and crossing elements

Raised Crossings

Raised crossings are used for traffic calming and to improve motorist yielding to people walking, rolling and biking at intersections and midblock crossings. In this design, crosswalks are elevated to reduce or eliminate the transition from the sidewalk to the street crossing. Transition aprons on each approach to the raised crossing are marked with pavement markings to alert drivers of the grade change.

Use trail-level and sidewalk-level bikeway crossings and locations where increased visibility, priority or accessibility for people walking, riding bicycles or using dockless mobility vehicles is desired or needed, including school zones. Raised crosswalks are not appropriate on streets with steep roadway grades higher than 8%.

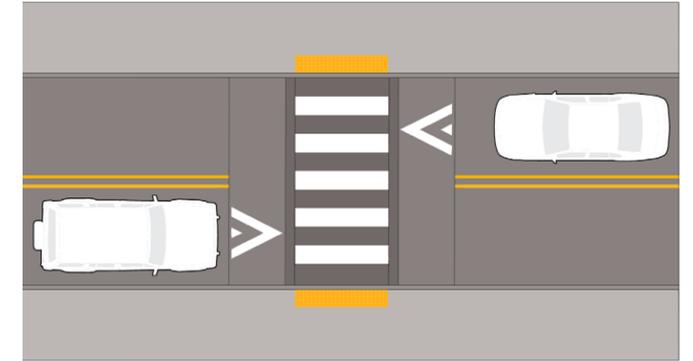
Raised crossings are most applicable to Neighborhood Main Streets, Mixed-Use Streets and Special-Use Streets.

Planning and design guidance

Ensure a raised crosswalk is at least as wide as the connecting sidewalk or path of travel. Additionally, ensure that drainage and maintenance needs are accounted for in raised crossing design.

Provide detectable warning strips at the edge of the sidewalk to indicate to pedestrians that they are exiting the sidewalk and entering the street. Also ensure that raised crossing meets accessible slope requirements. Provide street transition apron slopes between 5% and 8%.

Restrict on-street parking and loading at least 20 feet before the marked crosswalk to provide adequate sight distance and visibility between people crossing and people driving. Distance of on-street parking and loading restriction may vary based to vehicle approach speeds. Include warning pavement markings for drivers on transition aprons and “Raised Crosswalk” signs at the crossing. Supplement parking restrictions with signage, pavement markings and vertical elements such as flexible delineators, bollards or planters.



Raised crossings are considered traffic calming tactics and use vertical changes to provide a sidewalk-level crossing and to alerts drivers of a crossing.

Ensure that drainage and ice and snow removal is considered for raised crossings.

Raised crossings may be used as midblock crossings with the appropriate infrastructure, such as rectangular rapid flashing beacons (RRFBs), pedestrian hybrid beacons (PHB)s, median refuges, warning signage, and other elements as appropriate.

Supporting resources

- [National Association of City Transportation Officials Urban Street Design Guide](#)

Intersection and crossing elements

Bikeways at Intersections

Bikeway design and intersection design, should follow three key principles for safe design: motor vehicle speed minimization, visibility of all users and separation of vulnerable roadway users. Intersection design is a key component to building bikeways that serve riders of all ages and abilities. The approaches to intersections should maintain continuity of bicycle facilities to the maximum extent possible.

Considerations for bikeways at intersections are best applied to Downtown Commercial Streets and Downtown Mixed-Use Streets.

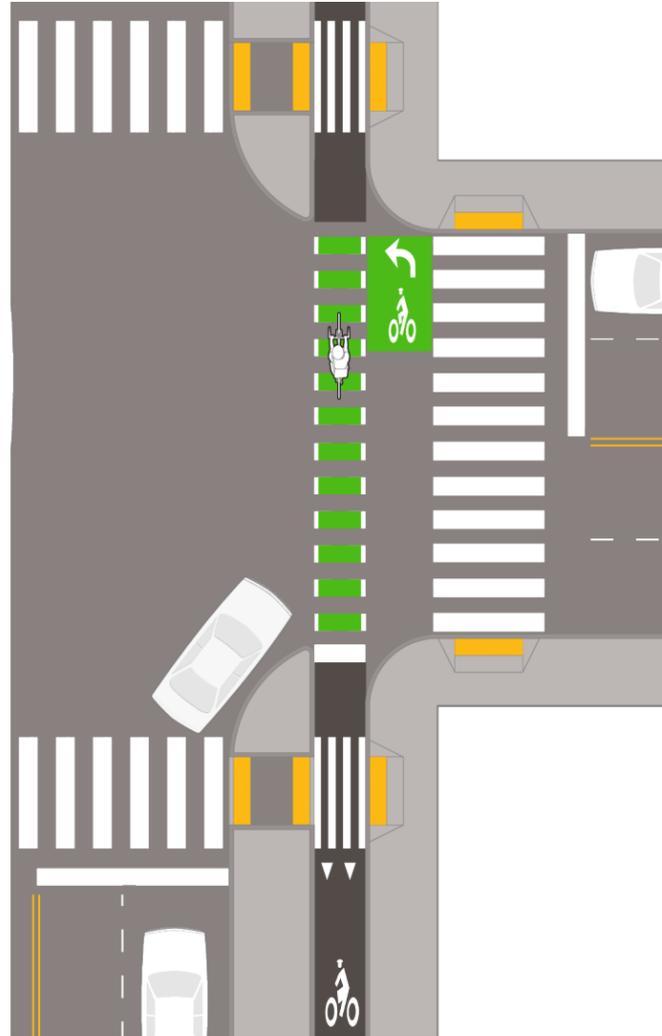
Planning and design guidance

The choice of the intersection treatment for bike lanes is a function of the intersection control, the presence of parking, bikeway configuration (one-way or two-way) and the presence of a dedicated turn lane. In all cases, the intersection treatment preferred by users is to continue the bike lane up to the intersection, minimizing exposure to motor vehicles.

At intersections with high volumes of motor vehicles turning across the bike facility, bicycle signals and phase separation are recommended to limit conflict. Bicycle detection technology may be necessary to provide a safe crossing environment for bicycles. Traffic signals along a corridor may be timed and coordinated to facilitate continuous, uninterrupted flow for bicyclists while managing motor vehicle speeds.

Where space is available, protected intersection elements should be installed to minimize conflicts.

Where bicyclists are anticipated to make turning movements, bicycle boxes or two-stage turn boxes can be installed. Bicycle lane markings, including green-colored pavement markings, shared-lane markings, dashed bicycle lane lines and signage may be provided through intersections.



Bikeway design and intersection design should follow three key principles: motor vehicle speed minimization, visibility of all users and separation of vulnerable roadway users.

Supporting resources

- [National Association of City Transportation Officials Don't Give Up at the Intersection](#)
- [American Association of State Highway and Transportation Officials Bikeway Guide](#)
- [Federal Highway Administration Manual on Uniform Traffic Control Devices](#)

Intersection and crossing elements

Median Refuge Islands

Median refuge islands provide a protected refuge space in the center of two-way streets to allow pedestrians to cross the street in two phases. Median refuge islands are particularly beneficial to ease pedestrian crossing stress where crossings are long or where a person must walk across more than one lane of traffic per direction to reach the other side of the street. Islands also provide traffic calming by narrowing the roadway and creating edge friction. Raised medians are noted as a countermeasure in DRCOG's Taking Action on Regional Vision Zero.

Median refuge islands are best applicable to Regional Connector Streets.

Planning and design guidance

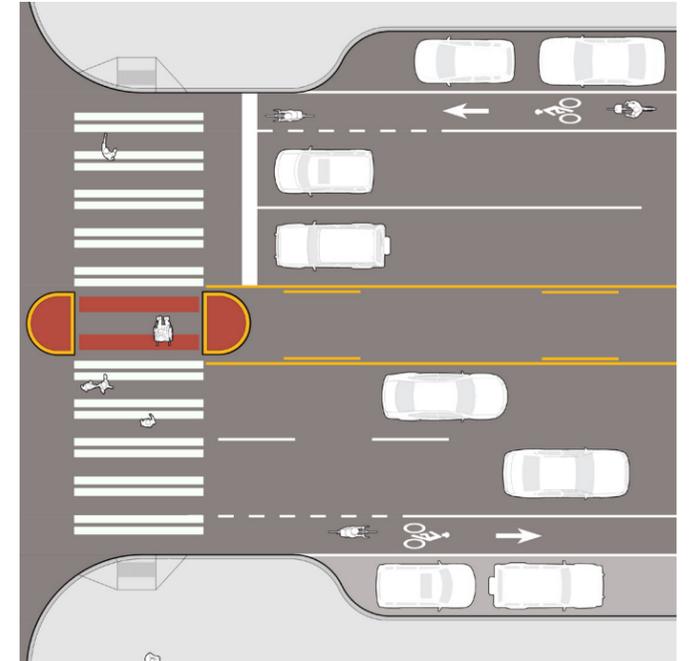
Provide a minimum pedestrian refuge island width that matches the width of the crosswalk and is a minimum of 6 feet in depth. Consider maximizing the width of the crossing island to narrow motor vehicle travel lanes and increase pedestrian safety and comfort. An 8-to-10-foot wide island is preferred.

Provide a detectable warning strip at the entrance and exit to the refuge island or any time a person walking or rolling will enter the motor vehicle travelway.

Ensure landings meet accessible slope requirements and consider making the waiting area at the refuge island flush with the roadway to improve crossing experiences for people using assisted mobility devices.

At signalized intersections, pedestrian signal heads must be oriented and timed to serve people in the refuge island. Where pedestrian signalization is not on automatic recall, a button for pedestrians to push should be provided in the refuge island.

Follow the Manual on Uniform Traffic Control Devices guidance for warning signage, signalization and pavement markings on the island approach.



Median refuges provide a protected space in the center of two-way streets to allow pedestrians to cross each direction of travel one at a time..

Supporting resources

- [National Association of City Transportation Officials Urban Street Design Guide](#)
- [Federal Highway Administration Manual on Uniform Traffic Control Devices](#)

Intersection and crossing elements

Curb Extensions

Extending the curb beyond the sidewalk or buffer edge shortens crosswalk length and increases visibility of people walking and rolling, particularly where there is on-street parking. Curb extensions are also effective tools for narrowing streets or tightening intersections to reduce motor vehicle turning speeds. Curb extensions may also be used to create a chicane or a bus bulb.

Curb extensions are best applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets, Mixed-Use Streets and Special-Use Streets.

Planning and design guidance

Keep corner radii as small as possible while still accommodating the vehicle for which the corner was designed for.

Provide accessible curb ramps at each crosswalk, except in the case of raised crosswalks or intersections, where tactile warnings should be used instead.

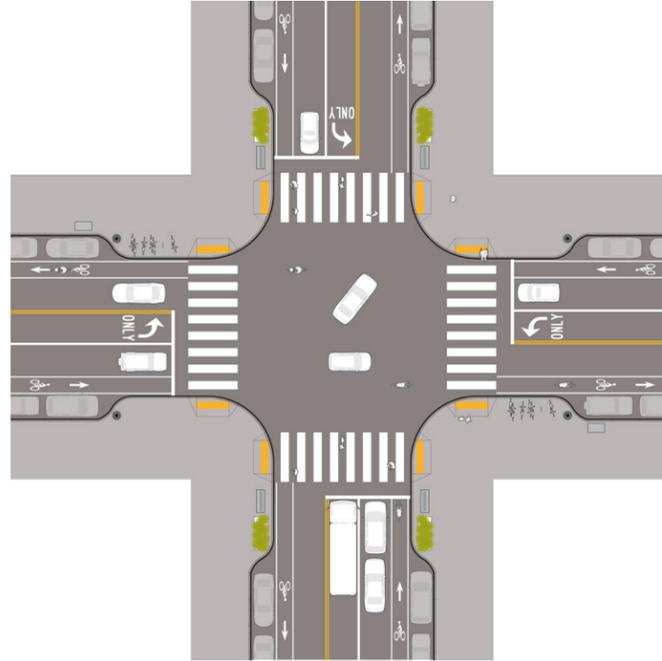
Ensure curb extensions do not impede stormwater management and drainage criteria. Consider any maintenance impacts for cleaning and maintenance of stormwater facilities. Incorporate green infrastructure into curb extensions to collect stormwater and provide a planting area.

Accommodate large design vehicles with mountable curbs or more low-profile aprons while keeping corner radii tight to maintain slow turning speeds.

As per the Manual on Uniform Traffic Control Devices, the location of the pedestrian push buttons or the use of pedestrian detection is an important consideration here. Depending on the location of the signal poles, supplemental poles at the crosswalks may be required for the push buttons.

Supporting resources

- [National Association of City Transportation Officials Urban Street Design Guide](#)



Curb extensions increase visibility of people walking and rolling and narrow the street or tighten intersections.

Intersection and crossing elements

Corner Radii

Corner design has a significant effect on how well an intersection serves the diversity of roadway users. A well-designed intersection with appropriate corner radii helps slow turning vehicles, improve visibility and can improve yielding compliance.

Two of the most important corner design elements are the effective corner radius and the actual curb radius. Actual curb radius refers to the curve that the face of curb line makes at the corner, while the effective corner radius refers to the curve which motor vehicles follow when turning, which may be affected by on-street parking, bicycle lanes, medians and other roadway features. A smaller effective corner radius requires drivers to make a tighter turn, reducing the speed they can carry to comfortably navigate the turn. Conversely, a larger effective corner radius allows drivers to carry more speed through a turn, increasing the risk to vulnerable roadway users, lengthening stopping distances and decreasing the likelihood of a driver to yield to a crossing pedestrian or bicyclist.

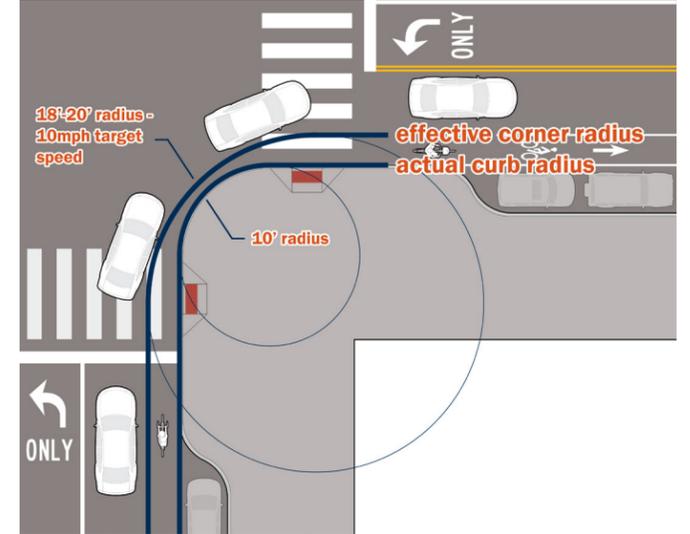
Corner radii considerations are foundational to street geometric design and are applicable to all street types.

Planning and design guidance

Designers should select the smallest possible design vehicle when designing intersections, considering the volume and frequency of which vehicles will traverse the intersection. Intersection design should strive for an actual curb radii that is between 10 and 25 feet.

While pedestrian safety is negatively affected by wide crossings, pedestrians are also placed at risk if the curb radius is too small and the rear wheels of a truck track over the pedestrian waiting area at the corner. Maintenance problems are also caused when trucks must regularly drive over street corners to make turns.

In locations where larger design vehicles need to be accommodated, designers can take a two-stage approach that still slows smaller design vehicles through the use of mountable truck aprons. These elements cause smaller vehicles to traverse intersections more slowly while still accommodating larger vehicles that can track over the mountable elements to make a turn.



The effective corner radius has a direct effect on the comfortable turning speed for drivers.



Mountable truck aprons slow the most common passenger vehicles while still allowing larger vehicles to make the turn. Rapid implementation versions can also be installed using rubber speed humps.

Supporting resources

- [National Association of City Transportation Officials Don't Give Up at the Intersection](#)
- [New York City DOT Cycling at a Crossroads](#)

Intersection and crossing elements

Hardened Centerlines

Hardened centerlines include vertical elements such as mountable curb or flex posts that force turning drivers to slow down and keep them from crossing the double yellow lines when making turning movements. They have been shown to reduce motorist-pedestrian conflicts and reduce the speed of left-turning vehicles.

Use at intersections with instances of crashes involving people walking or rolling and left-turning motor vehicles, at intersections with high volumes of people walking, rolling and biking crossing the street or at intersections where motor vehicles are frequently turning across double yellow lines at high speeds.

Hardened centerlines are best applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets and Neighborhood Main Streets.

Planning and design guidance

Hardened centerlines can be constructed using any combination of plastic curbing, rubber speed bumps and flex posts. Material choices depend on turning radii, lane width and the need to accommodate large motor vehicle turning movements. Where space allows, install a rubber speed bump “nose” extending into the intersection.

Consider the implications of snow clearance and street sweeping operations on hardened centerlines.

Supporting resources

- [National Association of City Transportation Officials Don't Give Up at the Intersection](#)



Hardened centerlines encourage wider left turns by motor vehicles, which increases the visibility of pedestrians crossing.

Intersection and crossing elements

Driveways

Ideally, driveways for residential or commercial uses should be constructed to be level with the sidewalk or pedestrian path of travel and provide a minimum clear width of 5 feet across the driveway. A level, continuous sidewalk eliminates the need for vertical transitions while also communicating priority for people walking and rolling along the sidewalk. Raised driveway crossings can also enhance protected bike lanes by raising the bike lane to sidewalk level and ramping up the driveway in the buffer area.

Driveway considerations are applicable to all street types.

Planning and design guidance

Design for adequate sight distance for people driving using daylighting where necessary. Consider sight distance with regard to placement of signs, trees, and other elements that may block visibility when designing driveways.

Contain driveway apron (the mountable section that transitions from the street to the driveway) to the sidewalk buffer, where provided, to maintain sidewalk grade for entire length of the driveway crossing.

Raise street-level protected bike lanes to sidewalk grade for high-volume driveway crossings. Where the density of major driveway crossings would result in a rapid succession of transition ramps, practitioners should consider raising the entire bike lane to sidewalk level.

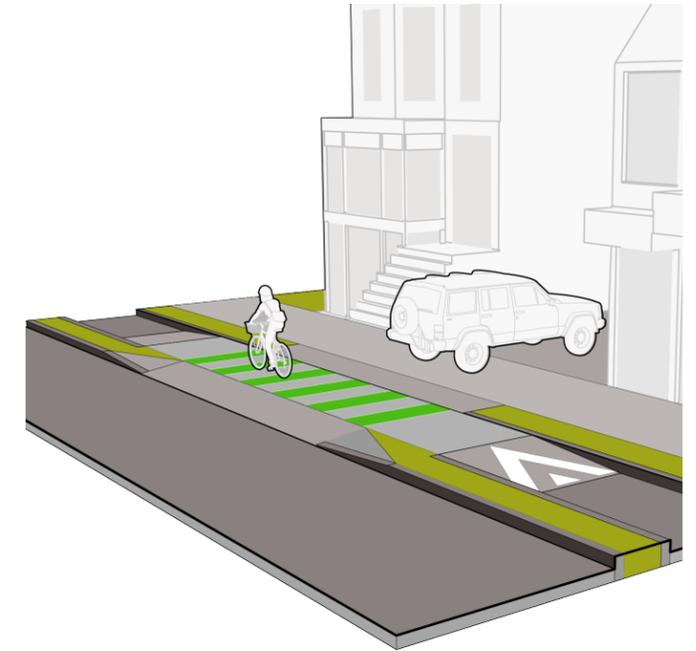
Maintain a continuous sidewalk grade crossing width of at least 5 feet across all driveway crossings.

The design of all driveways, like all street elements, should consider stormwater drainage to maintain usable and comfortable streets.

Design driveways to be the minimum width possible to accommodate the most common design vehicles expected to use the driveway on a daily basis.

Supporting resources

- [National Association of City Transportation Officials Don't Give Up at the Intersection](#)



Driveways should ideally be constructed at-grade with sidewalks to provide a continuous pedestrian route and continuous protected bikeway.

Curbside elements

Loading

Curbside, on-street deliveries and freight loading zones may be located on any street type where local businesses have frequent freight loading needs and do not have a private parking lot, alley access or loading dock on their property. Loading zones can serve multiple businesses along a street and do not belong to any specific business.

General Loading Zones are typically 40 feet long and are intended to serve all motor vehicles (such as trucks, passenger cars, limos, buses) for active loading. Overweight motor vehicles may be restricted in certain areas. Passenger Loading Zones are typically 20 feet or longer and are intended to serve as a location for quick passenger pick up and drop-off where the motor vehicle is always attended and does not typically occupy the space for more than a few minutes.

Loading considerations are best applicable to Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets and Industrial Streets.

Planning and design guidance

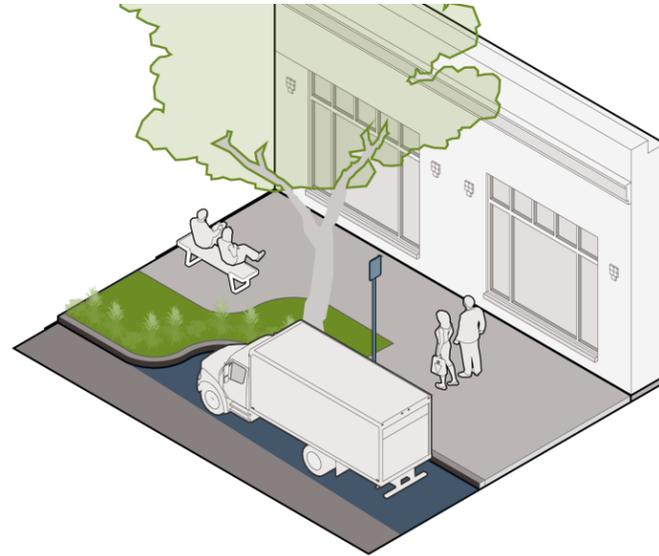
Clearly designate loading zones to prevent private motor vehicles from parking in them. For passenger loading, signs indicating a maximum five-minute load time are recommended.

Establish loading zones near beginnings and ends of blocks, midblock near driveways or alleys or where it is easy for trucks to pull in or out of the space.

Traffic enforcement will be key to success. Refer to the Mobility Choice Blueprint tactical action “3.4 Implement curbside management standards” for more information.

Supporting resources

- [National Association of City Transportation Officials Urban Street Design Guide](#)
- [National Association of City Transportation Officials Curb Appeal Guide](#)
- [DRCOG Mobility Choice Blueprint](#)



On-street loading for freight vehicles may be available for businesses with frequent loading needs that do not have an off-street loading zone and should have clear signage to prohibit motor vehicles from parking.

Curbside elements

Placemaking

Placemaking covers a range of ideas that create appealing places while also supporting communities and local businesses. Placemaking includes creative tactics such as parklets, public art, street murals, traffic signal box artwork, as well as business-supportive “streeteries” and sidewalk cafes. Public space can also be temporarily activated by communities with events, such as neighborhood block parties, play streets, adaptive streets, farmers markets or by taking advantage of a festival street.

Consider context-sensitive placemaking, especially placemaking that contributes or accentuates community character.

Placemaking is best suited for Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets and Special-Use Streets.

Planning and design guidance

Planning and design guidance will vary based on the type of placemaking treatment. Placemaking should fit the land use context and, in certain situations, be located in high-volume pedestrian-friendly areas. Planning should be done in conjunction with members of the community to ensure public support and project vitality. Placemaking design should consider materials that range from easy-to-implement to more permanent.

Supporting resources

- [Project for Public Spaces](#)



Placemaking includes a range of activities, such as street spaces and can enliven pedestrian- and bicycling-oriented spaces.

Curbside elements

Wayfinding

A standardized system for wayfinding can provide people walking, rolling, and biking with consistent answers to their navigation questions. By providing clear information, local jurisdictions and transportation agencies can encourage people to walk, bike or use transit rather than drive short distances. A reliable wayfinding system can also enhance access to neighborhoods and employment centers by providing orientation and simplifying first-and last-mile journeys.

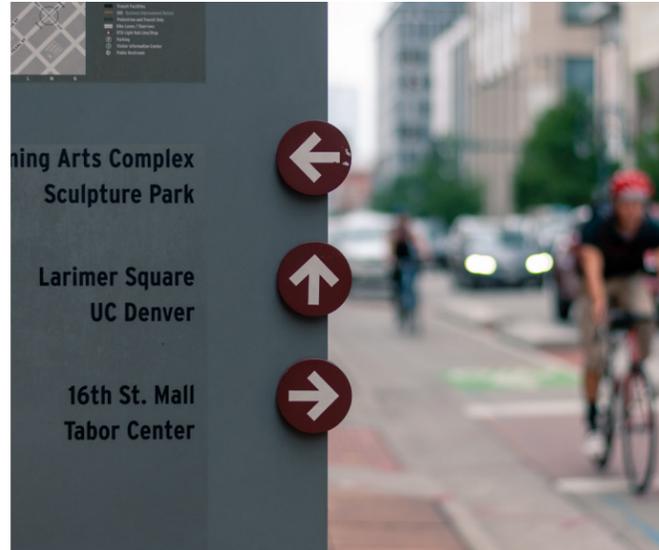
Wayfinding is best suited for Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets, Mixed-Use Streets and Special-Use Streets.

Planning and design guidance

Place wayfinding signage at key locations, such as mobility hubs, areas with many tourists and transit stops. Wayfinding signage should have consistent branding at the local level for ease of use; consider integrating wayfinding into existing wayfinding systems and should be scaled appropriately for people walking, rolling, and biking. Use durable materials for signage. Consider technology opportunities to display dynamic information.

For visually accessible wayfinding, provide visual contrast between pedestrian access routes and non-walking areas of the sidewalk and provide route edges and tactile walking surface indicators that are clear and detectable by canes. Directional indicators (such as a surface with raised linear elements delineating the path of travel) are used internationally to support wayfinding and are commonly used in the US (see Federal Highway Administration Accessible Shared Streets Guide).

Place crossings and curb ramps in line with the direction of travel and keep crossings as short and direct as possible for directional navigational purposes.



A standardized wayfinding system helps orient pedestrians, bicyclists and transit users to their location and nearby places.

Supporting resources

- [National Association of City Transportation Officials Urban Bikeway Design Guide](#)
- [Walk \[Your City\]](#)
- [The US Federal Access Board](#)
- [Federal Highway Administration Accessible Shared Streets Guide](#)
- [\(Proposed\) Public Rights-of-Way Accessibility Guidelines \(PROWAG, 2013\)](#)

Curbside elements

Parking

On-street parking provides short-term and convenient access to businesses and residences.

Street redesigns that improve walking, rolling, biking, and transit often include shifting parking, reviewing parking restrictions, and/or removing on-street parking lanes. This requires considering trade-offs in the allocation of street space and rethinking how the street functions to serve all users best. Street width dedicated to on-street parking is highly valuable space that may be better utilized for increased person-throughput capacity, for people walking, rolling, biking, or taking transit.

Areas with significant off-street parking may warrant limited or no on-street parking.

Street types that are able to integrate parking include Downtown Commercial Streets, Downtown Mixed-Use Streets and Neighborhood Main Streets.

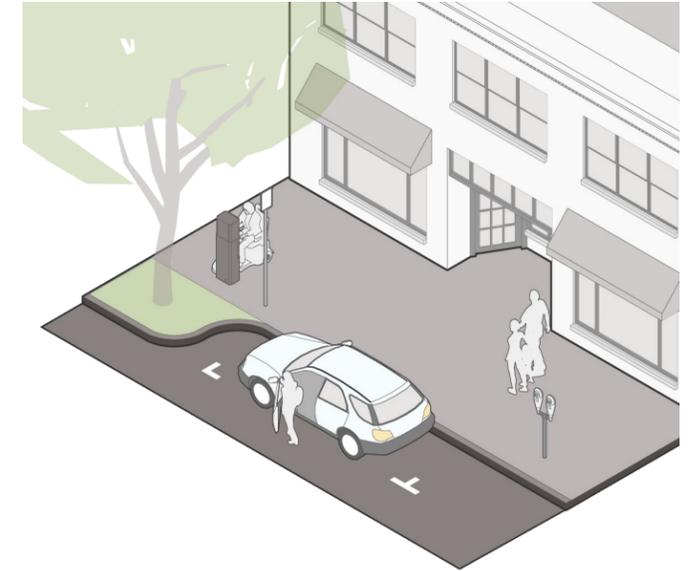
Planning and design guidance

Typical motor vehicles are 6- to 6.5-feet wide. Minimum parking lane widths should be 7 feet in constrained areas, with 8 feet preferred.

Practitioners should evaluate and manage parking to ensure the highest and best use of the public right-of-way to support multimodal transportation access and safety.

Parking can act as a buffer for protected bike lanes. When using parking as a protected bike lane buffer, ensure a minimum of 3 feet of buffer space between the parking lane and the bike lane to allow for car doors to open without intruding into the bicycle riding space.

Reverse-angle parking should be considered where possible. Reverse-angle parking can narrow excessively wide travel lanes and slow vehicles. It can also be easier to use for drivers and safer in locations with high bicycle and pedestrian traffic.



On-street motor vehicle parking provides short-term and convenient access to restaurants and businesses and may be removed during street reconfigurations to accommodate more space for people walking, rolling, and bicycling.

Supporting resources

- [National Association of City Transportation Officials Curb Appeal Guide](#)
- [National Association of City Transportation Officials Urban Street Design Guide](#)

Landscaping and irrigation elements

Street Trees

Trees provide a wide range of environmental, social and economic benefits. Street trees are a valuable resource that contribute to the character and ambiance of the public realm and provide much-needed shade in the Denver region's arid, high-altitude climate. Trees remove pollution from the atmosphere and water, improve air quality and human health and mitigate the effects of climate change.

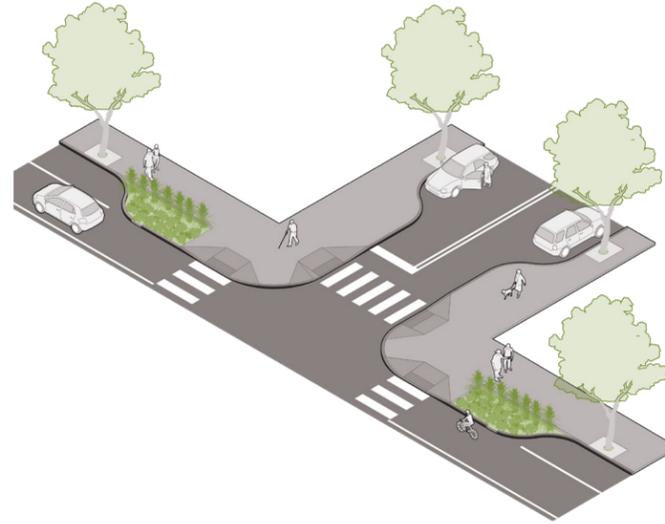
Street types that work best with street trees include Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets, Mixed-Use Streets and Special-Use Streets.

Planning and design guidance

Street trees are critical to establishing scale and transforming streets into memorable corridors and parkways. Understanding mature tree size above and below ground, maintenance routines and budgets is critical for long term sustainability and resiliency of trees in the streetscape.

Tree roots are three dimensional and it is far more important to provide a specific volume of soil than any given dimension. Street trees will thrive when provided 1,000 cubic feet of uncompacted soil volume and require a minimum of 600 cubic feet and at least 3 feet of rooting depth to simply survive.

Practitioners should consider street trees and plants that are best suited for the climate and habitat of the city or region, and should consider their required care and maintenance, such as water needs. Consider also tree branch maintenance and visibility for users of all modes. In particular, consider tree branch intrusions into bikeway spaces.



Street trees provide a wide range of benefits and require an understanding of environmental needs such as providing adequate root space for growth and maintenance needs.

Coordinate tree locations with emergency vehicle, sight triangle, transit stops (see RTD Design Guidelines) sign placement and utility equipment requirements.

The use of tree grates surrounding tree trunks is discouraged unless there is no other option. Tree grates should not encroach into the minimum 5 foot wide accessible pedestrian route.

Street trees in medians have been shown to have a traffic calming effect.

Supporting resources

- [National Association of City Transportation Officials Urban Street Stormwater Guide](#)

Landscaping and irrigation elements

Green Infrastructure

Green infrastructure can include numerous elements, including pervious surfaces, bioretention practices and stormwater tree trenches. Street types that work best with green infrastructure include Downtown Commercial Streets, Downtown Mixed-Use Streets, Neighborhood Main Streets, Mixed-Use Streets and Special-Use Streets.

Pervious paving (paving that allows water to pass into the ground) is an important component of green infrastructure. In areas that require hardscape or paved surfaces, pervious paving can provide stormwater infiltration and prevent surface runoff. Initial installation costs may be offset by eliminating the need for installation of drainage structures and piping.

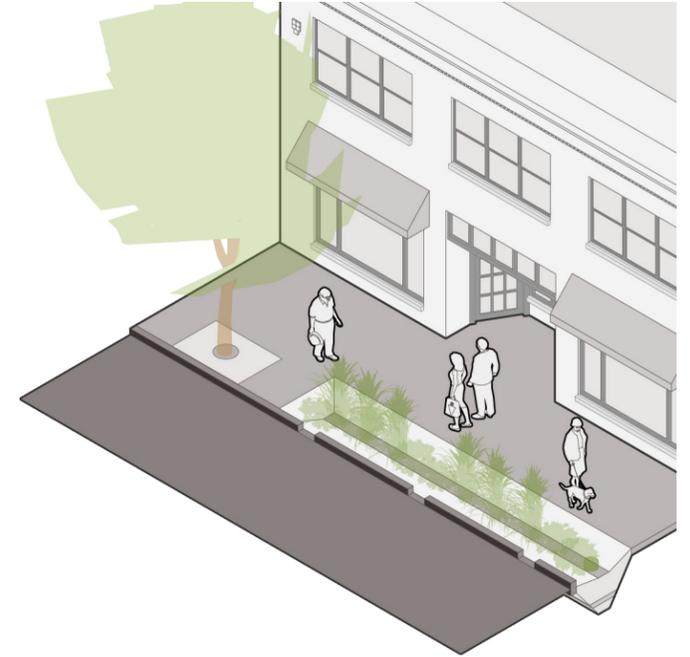
Bioretention treatment areas, such as bioswales, are landscaped areas that temporarily store, infiltrate and filter stormwater runoff from impervious paved surfaces (surfaces such as sidewalks and roadways that do not allow water to drain through the surface). Depending on their location, bioretention facilities may also provide traffic calming benefits. Bioretention facilities must not interfere with the pedestrian accessible route.

Planning and design guidance

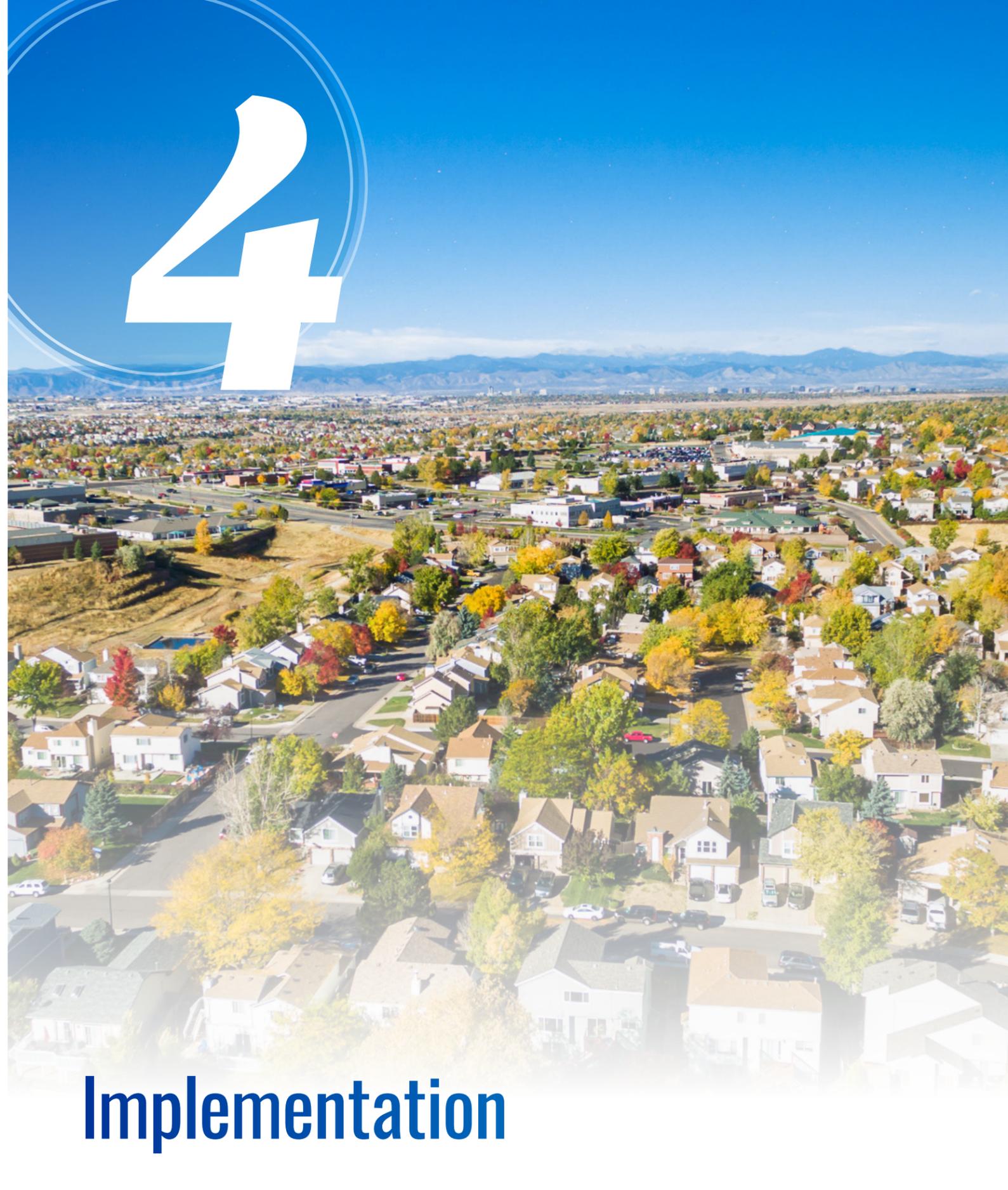
Green infrastructure can integrate into traffic calming treatments, such as chicanes or pinch points, as pervious surfaces that provide stormwater management. It can also become a street feature and be integrated into curbside elements such as transit stops. Planning and design guidance should consider the management of stormwater volume, water quality treatment requirements and designing for the reduction of flow at peak volumes. Ensure that green infrastructure elements do not impair sight distance for street users.

Supporting resources

- [National Association of City Transportation Officials Urban Street Stormwater Guide](#)



Green infrastructure includes numerous elements, such as bioswales, that capture and filter stormwater runoff.



Roles and responsibilities

Street improvements are complex processes that require the cooperation of many stakeholders. These include both stakeholders internal to local governments and project sponsors (such as planning and engineering departments) and external ones (such as landowners and members of the public). In successful Complete Streets strategies, all departments take responsibility for implementation, and each department's role is clearly defined. The various roles needed for successful Complete Streets implementation include scoping, designing, constructing and maintaining Complete Streets; network planning at all scales; and integrating Complete Streets into development review. Often, this work is carried out by multiple departments and diverse project teams that oversee the development of individual street projects.

Street projects originate from many sources. Implementing the Complete Streets philosophy into all phases of the development process improves various participants' understanding of key decision points. Street projects within the Denver region can be grouped into four broad categories: major street projects that are led by the local government, major street projects led by the state, programmatic pavement resurfacing (led by local and state governments) and developer-led street projects.

Developing and publishing communitywide plans is critical to successfully implementing Complete Streets projects through yearly resurfacing programs and private development. Resurfacing projects are often identified, prioritized and funded within a calendar year, and are a great time to implement roadway striping changes such as adding a bike lane, so any Complete Streets upgrades would need to be ready for implementation within that time frame. For major construction projects, the design and construction process typically takes multiple years.

Development projects identify street improvements early in the process through standard checklists, traffic impact studies and established review processes often external to the transportation authority. Complete Streets priorities must be built into the development review process so that potential street improvements are identified early.

DRCOG provides signal timing support to regional partners. The Advanced Mobility Partnership between DRCOG, the Denver Metro Chamber, RTD, and CDOT, as well as the Regional Transportation Operations and Technology, contribute to the planning, deployment and operation of technology supporting Complete Streets, which includes signal operations, transit signal priority, traveler information and pedestrian and bicycle detection.

Stakeholders

DRCOG

As the metropolitan planning organization, DRCOG sets a regional vision and selects projects for funding. DRCOG also provides guidance and resources through plans such as Taking Action on Regional Vision Zero, the Active Transportation Plan, and this Toolkit. DRCOG may incorporate Complete Streets in future grant application processes. Finally, DRCOG acts as a convener of local governments and other stakeholders, encouraging cross-jurisdictional coordination and collaboration.

Local governments

Local governments plan, design, operate and maintain streets and intersections. They are directly responsible for implementing Complete Streets and can create local plans, policies, guidelines, and standards to advance the Complete Streets vision. Local governments may require business owners and property owners to maintain the pedestrian realm adjacent to their properties.

Private developers

Private developers build and reconstruct streets in and adjacent to new development or redevelopment. Providing clear standards for Complete Streets during the development review process is critical to ensuring streets constructed by private developers are consistent with the member government's and DRCOG's expectations for Complete Streets.

Colorado Department of Transportation

CDOT owns and operates many major roadways and intersections, including those on the regional high-injury network. CDOT is a critical partner in implementing Complete Streets appropriate to the street typology, land use context and local community needs.

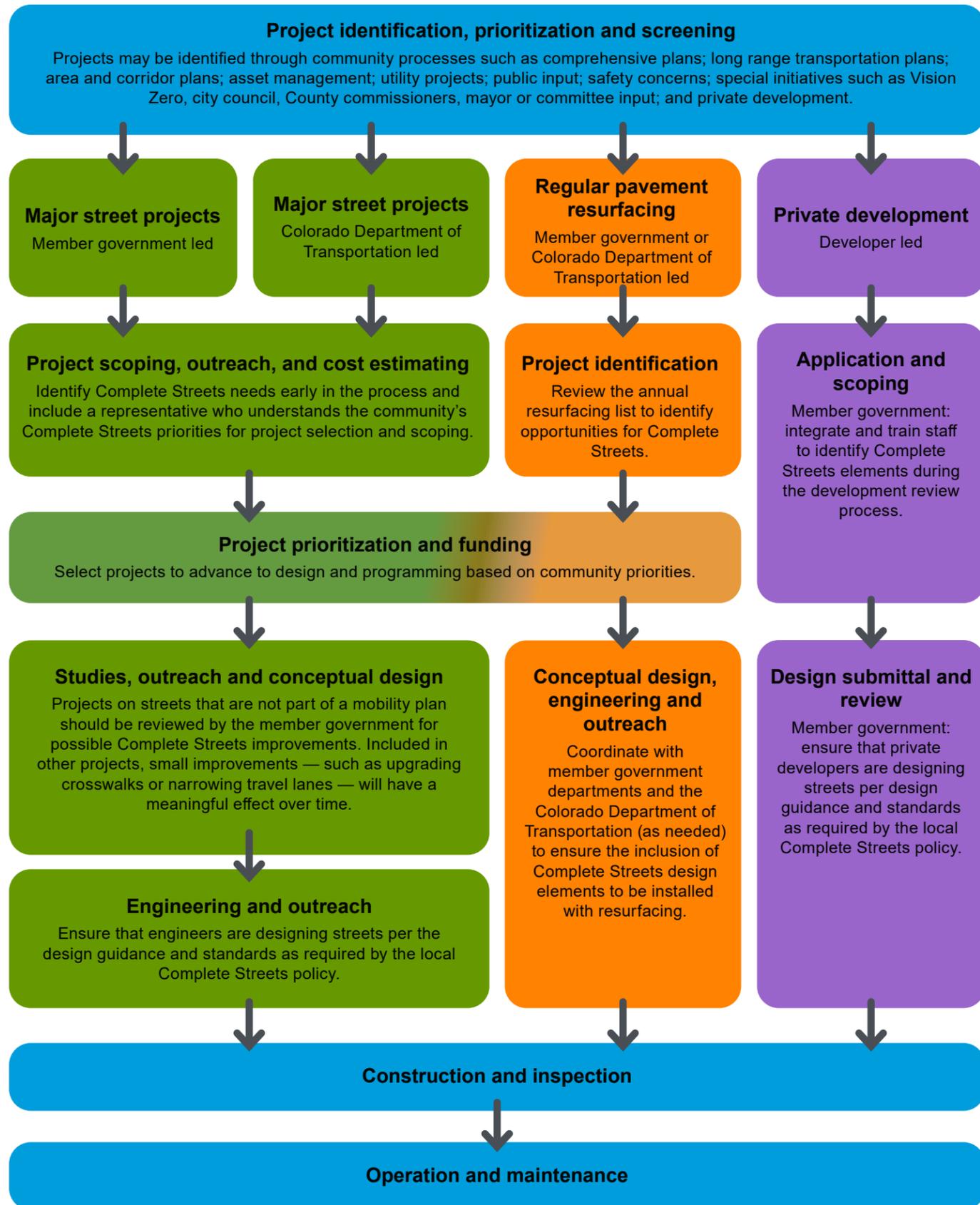
Regional Transportation District

RTD constructs and maintains transit assets in the right-of-way with transit-supported infrastructure from jurisdictions. The planning and design of Complete Streets must include RTD wherever RTD operates transit service, around transit hubs, and where the street is intended to provide multimodal connectivity to transit.

Transportation Management Associations

Transportation management associations collect data and provide services to local jurisdictions and employers. Transportation management associations address cross-jurisdictional transportation demand management on a regional scale to address congestion and air quality problems through programs. Transportation management associations can advocate for and support the implementation of Complete Streets.





Guidance for developing local Complete Streets policies

Policy types

A successful Complete Streets policy will fit into a community's existing policies, practices and politics. A community's existing transportation decision-making processes; existing plans, policies and procedures; project prioritization, selection and funding; and existing community, departmental and elected official support for

Complete Streets will help communities decide on the correct policy type. The chart below, adapted from Smart Growth America's *Complete Streets Policy Workbook*, describes legislative tools available for communities to adopt Complete Streets policies.

Adoption type	Policy type	Description	Best fit	Considerations
Council driven	Ordinance	Legally binding legislation.	Communities that have strong support from elected officials and stakeholders.	Requires robust inter-departmental involvement with the legislative branch and a clear exception process.
	Resolution	Nonbinding, official statements of support by a governing body.	Communities that do not yet have strong support from elected officials.	The most common policy type. Should include clear implementation steps that will strengthen the policy over time.
Council approved	City policy	Nonbinding, detailed policy typically developed by a broad group of stakeholders and adopted by a governing body.	Communities that have an engaged and supportive stakeholder group.	Tend to result in broader shared responsibility due to the development process.
	Plan	Policy included as part of a larger plan, such as citywide transportation or comprehensive plans.	Communities about to begin or undergoing a related citywide planning process.	Integrate Complete Streets comprehensively in the plan to maximize effectiveness.
	Design guidance	Policy language included as part of street design guidance or standards.	Communities undergoing design guidance or standard updates.	Design guidelines typically take a long time to develop and can delay adoption of a local Complete Streets policy.
Directives	Executive order	Issued by a municipality's chief executive or mayor.	Communities with strong executive and departmental support, but weak legislative support.	Although executive orders reflect strong political will, they only last as long as the current chief executive or mayor is in office.
	Departmental policy	An internal policy directive issued by a city department (for example, transportation, public works, or planning).	Communities with strong departmental support where legislative support is still developing.	Department directives typically include more procedural changes and are likely to result in changes in practice.
Public vote	Tax levy	Policy included as part of a tax to fund transportation projects.	Communities that have previously enacted tax levies for similar initiatives.	Consider other existing taxes and the potential for local acceptance or rejection of an additional tax.
	Ballot measure	Legally binding, resident-led ballot measure.	Communities with a high level of community support.	Requires strong education and advocacy to garner support.

Policy components

The table below, adapted from Smart Growth America’s *The Elements of a Complete Streets Policy*, lists 10 policy components that reflect over a decade of reviewing Complete Streets policies and tracking post-

adoption successes in communities of all sizes. The list is intended to help local governments in the Denver region develop policies that are implementable and balance the needs of all users.

No.	Component	Description
1	Vision and intent	Complete Streets policies should include a statement about the community’s vision for Complete Streets and the intent of the policy to help them achieve that vision. The vision and intent should be clear and immediately understandable by a broad audience.
2	Inclusivity of all people	Complete Streets benefit all users equitably, particularly vulnerable users and the most underinvested and underserved communities. Complete Streets policies should be inclusive of all people, regardless of age, race, gender, background, ability, mode or any other characteristic.
3	Integration into project development	Complete Streets policies should apply to projects of all types and to all phases of project development. All project types include but are not limited to new capital projects, reconstruction or retrofit projects, and private development projects. All project development phases include planning, design, funding, construction, operation, and maintenance.
4	Process for exceptions	Good Complete Streets policies describe a clear process for exceptions to the policy. They specify the circumstances in which exceptions can be made and clearly define a procedure that may require high-level approval and public notice to grant exceptions.
5	Jurisdictional influence	Denver region communities can influence the design of streets outside of their jurisdiction by partnering and collaborating with other local governments, DRCOG, the Colorado Department of Transportation, RTD, private developers, and others.
6	Design guidance	To support the design of Complete Streets as required by a Complete Streets policy, the policy should require the use of specific design guidance and standards that support Complete Streets. If local guidance doesn’t exist, the policy can include the adoption of national guidance and standards such as those published by NACTO, FHWA, and AASHTO.
7	Land use and context sensitivity	Good Complete Streets are designed to be context-sensitive and complementary of adjacent land uses. While the Regional Street Typology, modal priority framework, and design compatibility matrix seek to consider the function of streets for both transportation and placemaking, local Complete Streets policies should further support the relationship between transportation and land use considering existing and expected land use and transportation needs.
8	Performance measures	Complete Streets policies should outline specific, measurable, and equitable metrics to measure the success of individual street projects as well as the progress a community is making toward implementing a Complete Streets network. A Complete Streets policy can also prescribe the frequency for evaluating performance.
9	Project selection criteria	The scoring, ranking, and selection of projects for funding should be tied to community goals and values, and project selection criteria should ideally be supported by performance measures. These project selection criteria should outline how local governments prioritize projects.
10	Implementation steps	The success of Complete Streets policies is made apparent through the implementation of Complete Streets. Complete Streets policies should describe critical steps to implementation and assign responsibility to internal and external parties.

Model policy

The following model policy is based on the [National Complete Streets Coalition’s *The Best Complete Streets Policies of 2018*](#) report and is intended to provide a starting point for DRCOG local governments seeking to develop their own local Complete Streets policy. The structure of the policy is based on the National Complete Streets Coalition’s 10 components for quality and effective Complete Streets policies, described in the previous section. Guidance for modifying the language to reflect the culture and structure of each local government accompanies each section of the policy.

Section 1: vision and intent

This Complete Streets policy directs the [MUNICIPALITY] to design and maintain streets that are safe and accessible for all anticipated users and uses of a street. Complete Streets bring many benefits to the community, including enhanced economic opportunities, public health and safety, quality of life, transportation access, affordability and community character.

Local modifications to section 1

The vision should be customized based on a community’s unique priorities, goals and values. Communities are encouraged to write a vision that resonates with residents and implementors while ensuring that it addresses improvements for ‘all people’ and ‘all modes.’ A community’s vision should also consider existing supporting policies, and possible policy changes.

Section 2: all users and modes

The [MUNICIPALITY] will routinely design, build and maintain public streets for safe use by people of all ages, all abilities and all income levels. This policy outlines a process for decision-makers and implementors to accommodate all anticipated roadway users, including but not limited to pedestrians, bicyclists, motorists, transit vehicles, emergency vehicles and city maintenance and utility vehicles; business-owners [INSERT OTHER USERS AS APPROPRIATE].

Local modifications to section 2

This section should be modified to include all anticipated modes in a community that should be considered during street design. Additions might include paratransit, freight and commercial vehicles, agricultural vehicles, equestrians, or others.

Section 3: all projects and phases

This Complete Streets policy applies to all transportation infrastructure projects including new construction, reconstruction, retrofit, repaving, rehabilitation and any changes in the allocation of pavement space on existing streets.

Local modifications to section 3

This language is strong and clear, and it is recommended that Section 3 not be modified. Instead, modify the exceptions that are included in Section 4 and clearly outline the exception process and responsible decision-makers.

Section 4: exception process

Exceptions to this policy must be approved by [TOWN/ VILLAGE BOARD, CITY COUNCIL, TRANSPORTATION COMMITTEE, PUBLIC WORKS COMMITTEE, ETC.]. Documentation must be provided and include supporting data that indicates the basis for decision-making. Such documentation will be made available to the public.

Exceptions may be considered when:

- 1) An affected roadway prohibits, by law, use by specific users (such as interstate highways) in which case a greater effort shall be made to accommodate those specified users elsewhere, including on roadways that cross or otherwise intersect with the affected roadway.
- 2) The costs of providing accommodations are excessively disproportionate to the need or probable use.
- 3) The existing and planned population, employment densities, traffic volumes or level of transit service around a particular roadway is so low as to demonstrate an absence of current and future need.
- 4) Transit accommodations are not required where there is no existing or planned service.
- 5) Routine maintenance of the transportation network does not change the roadway geometry or operations, such as mowing, sweeping and spot repair.
- 6) There is a reasonable and equivalent project along the same corridor that is already programmed to provide facilities exempted from the project at hand.

Local modifications to section 4

Each member government should identify the appropriate organization for overseeing the application of this policy and approving or denying exceptions. In some communities, this might be a group of a few appointees rather than an existing committee. If modifying the list of exceptions, carefully consider how they may render the policy less effective. Projects that are deemed “excessively disproportionate” (Exception #2) typically refers to projects where the changes from this policy would result in a cost increase of 20 percent or more of the total project cost.

Section 5: jurisdiction

This policy applies to the [MUNICIPALITY], private developers, [COUNTY], the Colorado Department of Transportation and any other body that constructs or maintains streets and roads within the incorporated boundaries of the [MUNICIPALITY].

Local modifications to section 5

It is important that a municipality’s policy recognize this fact that many organizations, private companies and public agencies play a role in a community’s transportation network. This section declares this policy’s applicability to projects performed by other entities.

Section 6: design

All projects within [MUNICIPALITY] and applicable under this Complete Streets policy will use the latest and best design guidance standards when designing streets, including but not limited to the latest editions of the following:

- Institute of Transportation Engineers
 - *Designing Walkable Urban Thoroughfares*
- National Association of City Transportation Officials
 - *Urban Street Design Guide*
 - *Transit Street Design Guide*
 - *Urban Bikeway Design Guide*
 - *Don’t Give Up at the Intersection*
 - *Urban Street Stormwater Guide*
- Federal Highway Administration
 - *Manual on Uniform Traffic Control Devices*
 - *Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts*
 - *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*
 - *Separated Bike Lane Planning and Design Guide*
 - *Small Town and Rural Multimodal Networks*

- *Bikeway Selection Guide*
- *Accessible Shared Streets Guide*
- *Road Diet Informational Guide*
- *Incorporating On-Road Bicycle Networks into Resurfacing Projects*
- American Association of State Highway and Transportation Officials
 - *Guide for the Development of Bicycle Facilities*
 - *Guide for the Planning, Design, and Operation of Pedestrian Facilities*
 - *A Policy on Geometric Design of Highways and Streets*
- United State Access Board
 - *Public Rights-of-Way Accessibility Guidelines*
- DRCOG Regional Complete Streets Toolkit guidance
 - *Active Transportation Plan*
 - *Taking Action on Regional Vision Zero*
- [MUNICIPALITY] street design guidelines or construction standards
- Regional Transportation District
 - *Bus Infrastructure Design Guidelines and Criteria*
- Colorado Department of Transportation
 - *Colorado Downtown Streets: A Tool for Communities, Planners, and Engineers*
 - *Roadway Design Guide – Chapter 14*
 - *Bicycle/Pedestrian Design Guidance - Chief Engineer Memo*

Local modifications to section 6

The list of standards and guidelines can be edited and should include any local design guidelines not listed here. This list is an overall guidance and should not be seen as a mandate to consult every publication on every project.

Section 7: land use, network and context sensitivity

The [MUNICIPALITY] recognizes the need for a safe, comfortable, connected, integrated network for all modes that improves multimodal connectivity and provides transportation options to residents’ and visitors’ many potential destinations. Not every mode will be accommodated the same way on every street, but the street network should be planned and built in a way that allows all street users to travel safely and conveniently throughout the community.

Every street will be designed in a context-sensitive manner to respond to its characteristics—such as volume, speed, turning movements and curbside uses—and the character of the surrounding neighborhood, its current and planned building form and use and its current and expected transportation needs.

Local modifications to section 7

It is important that policies recognize that Complete Streets are not stand-alone projects. The design of Complete Streets must be sensitive to a location’s land use context and the overall mobility network. The language in this section can be modified to name specific transportation and land use plans.

Section 8: performance measures

The [MUNICIPALITY] will regularly measure and publicize the success of this policy using various performance measures, including but not limited to:

- Number of crashes by severity
- Number of accessible curb ramps
- Number of pedestrian countdown signals
- Miles of routes accessible for people with disabilities
- Sidewalk condition ratings
- Travel time by mode in key corridors (point A to point B)
- Emergency vehicle response times
- Number or percentage of students who walk or bicycle to school

- Number or percentage of commuters who walk, bicycle or take transit to work
- Commercial vacancies in business districts
- Change in store rental rates
- Changes in business gross receipts
- Comparison of business gross receipts to adjacent, unchanged streets”
- Bikeway connections to off-road trails (equitable distribution across all districts of the community)
- Resident and business surveys of satisfaction with streets and sidewalks
- Number of bicycle and micromobility parking spaces

The [MUNICIPAL DEPARTMENT, ADMINISTRATOR, ETC.] will present an annual report to the [TOWN/ VILLAGE BOARD, CITY COUNCIL, TRANSPORTATION COMMITTEE, or PUBLIC WORKS COMMITTEE] showing progress made in implementing this policy

Local modifications to section 8

This section should name the specific measurements that will track progress, the reporting body and the duration of time between reports. It should be modified to include a reasonable set of performance measures (potentially as few as two) that will help the community track progress.

Section 9: project selection criteria

The [MUNICIPALITY] recognizes that Complete Street improvements must be phased and implemented over time. The [MUNICIPALITY] will prioritize Complete Streets projects pursued, funded or sponsored by the [MUNICIPALITY] according to the following factors:

- Safety – areas where bicycle and pedestrian facilities are lacking and where there are crashes involving vulnerable road users resulting in fatalities or serious injuries.
- Connectivity – missing segments between established bicycling and walking facilities or missing segments between bicycling and walking facilities and critical destination nodes, such as high-frequency transit stops, commercial centers or employment centers,
- Opportunity – segments that present a unique and time-limited opportunity such as scheduled street resurfacing or street restoration.
- Vulnerable Road Users – areas with higher than typical concentrations of households with children under 18, people aged 65 and over, people of color or people living below the poverty line.

Local modifications to section 9

This section should clearly outline how the community will choose Complete Streets projects for implementation through capital funding and grant applications. This should reflect the community’s overall priorities and could draw upon stated goals from other community plans.

Section 10: implementation

This policy will be implemented with the cooperation of all departments in the [MUNICIPALITY], neighboring jurisdictions, state, regional and federal agencies and, to the greatest extent possible, private developers. The [MUNICIPALITY] will take specific steps to implement this policy, including:

- 1) Integrating this policy into ongoing work by restructuring or revising related procedures, plans, regulations and other processes to accommodate all users on every project, including: [RELATED PROCEDURES, PLANS, REGULATIONS and OTHER PROCESSES]
- 2) Adopting and regularly consulting the DRCOG Regional Complete Streets Toolkit, as well as national and statewide design guidelines that reflect the current state of best practices in multimodal design.
- 3) Offering opportunities for transportation staff, community leaders and the general public to participate in workshops and other training opportunities to build a collecting understanding of the importance of Complete Streets.

Developing and instituting better ways to collect data and measure performance.

Local modifications to section 10

The National Complete Streets Coalition encourages communities to include, at a minimum, a commitment to adopting design guidelines, revising internal procedures, providing education and trainings and tracking performance measures. In addition to these, communities should modify this based on the local needs, capabilities, and priorities.

Maintenance and operations

A strong systemic commitment to maintenance and operations will ensure the longevity, dependability, and quality of Complete Streets. General maintenance, as well as street cleaning and snow clearance, should be considered during the planning and design of Complete Streets.

Local governments should consider designating clear operations and maintenance agreements during the planning and design stages of Complete Streets projects, including funding for maintenance and replacement. Staff should consider existing maintenance capabilities and consider efficient maintenance and operations strategies when advancing Complete Streets projects.

General maintenance - Work with knowledgeable staff and crew to develop proactive strategies, including regular facility inspection, repair, replacement, and clear record-keeping to ensure seasonal maintenance practices are manageable and efficient. Develop strategic assessment, prioritization, and maintenance plans to care for all elements of the public right-of-way. Roadway striping should be considered a key maintenance activity for the safety of users of all modes.

Snow clearance - Adequate snow clearance is critical to maintaining accessible streets and sidewalks. Except in snow emergencies or unusually heavy snowfall, keep bike lanes free of snow and ice. Develop a communication plan to regularly remind property owners that they are responsible for clearing snow and ice from adjacent sidewalks within 24 hours of snow event. Consider a snow clearance plan that aligns clearance with the modal priorities for each street type. Train equipment operators to minimize damage to street design elements.

Use buffers and landscape areas for snow storage. Ensure adjacent pedestrian paths remain clear and that snow does not impede sight lines or block curb ramps at intersections and roadway crossings. People walking and rolling—especially those with physical disabilities—require clear sidewalks, crossings, curb ramps, and transit stops in order to travel. This also pertains to keeping transit stops clear of snow and ice so that people can easily access transit vehicles. People riding bicycles or using other mobility options are more sensitive to snowfall than people driving.

Equipment - Use available plowing equipment (8’ and 9’ blades attached to pickups and landscapers) on travelways that are at least 8’ wide. Local governments can procure special snow plowing equipment for bike lanes narrower than 8’. Consider procuring specialized equipment that can be outfitted with other attachments such as brooms, plow blades, snow throwers, and loaders.



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