

Montgomery County Complete Streets Design Guidelines

Overview of Guidelines

montgomeryplanning.org/planning/transportation/complete-streets/



Agenda

- Background
- Process for Developing the Guide
- Overview of the Draft Guide
- Next Steps
- Questions



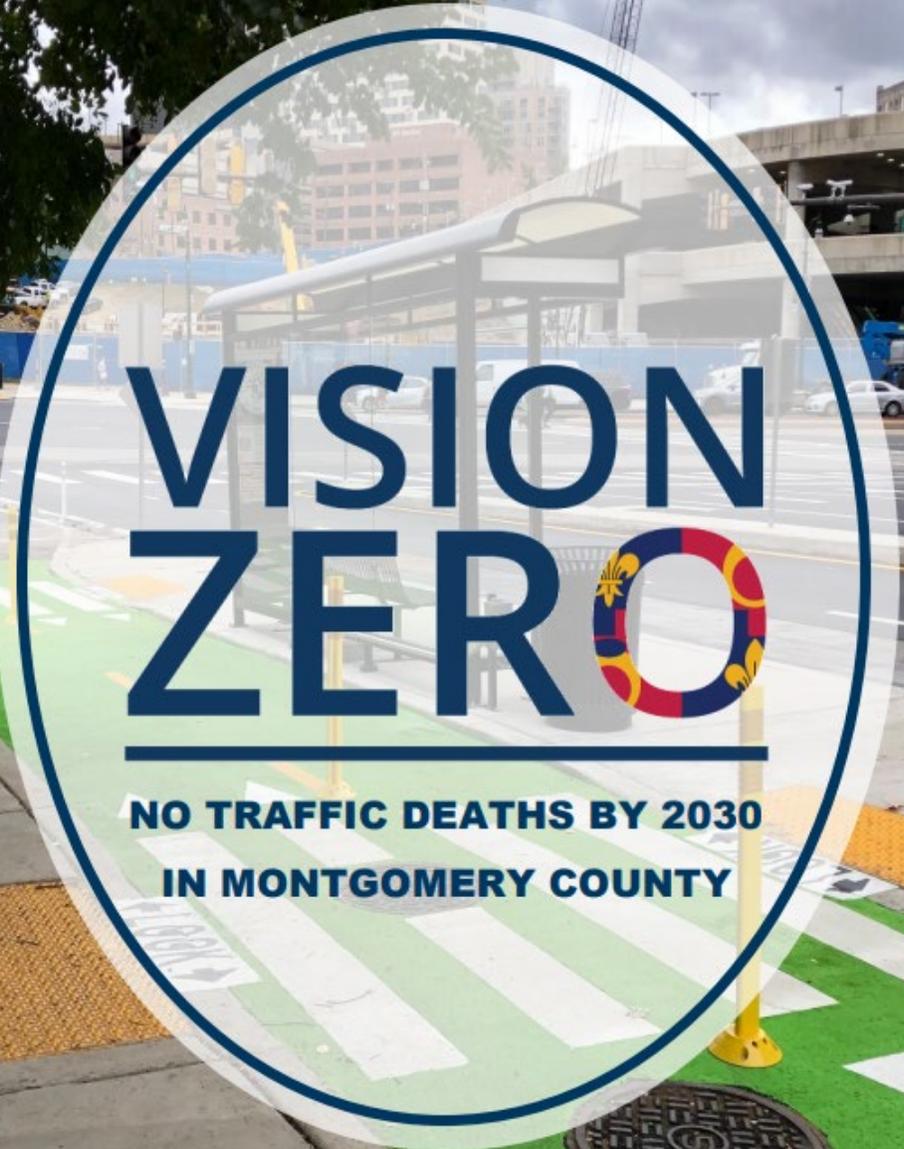
Purpose

To develop a comprehensive guide to street design in Montgomery County, with an emphasis on Complete Streets.



Early Background

- Since the 1990s Maryland has had a history of **Smart Growth** principles, and over time this has continued to be refined.
- The 2008 **Context Sensitive Road Design Standards** established many of the road design principles also adopted under Complete Streets, but despite being intended to be flexible: they quickly became interpreted as rigid standards.
- The 2008 Standards also lacked design guidance for **bikeway infrastructure**, which was rapidly becoming more prevalent throughout the County. The 2018 **Bicycle Master Plan** further reinforced the need for new guidance.
- The County is increasingly **built-out** and starting to shift toward **growing upward**.



**VISION
ZERO**

**NO TRAFFIC DEATHS BY 2030
IN MONTGOMERY COUNTY**

The guide is a
critical component
of implementing the
County's Vision Zero
goal of eliminating
traffic deaths
by 2030

SIGNIFICANCE OF SPEED TO PEDESTRIAN FATALITIES

Hit by a vehicle traveling at

23

MPH

10% risk of death



Hit by a vehicle traveling at

42

MPH

50% risk of death



Hit by a vehicle traveling at

58

MPH

90% risk of death



Source: FHWA. Adapted from USDOT Pedestrian Safety Action Plan

» Vehicle and Pedestrian «

Collision Speed and Survival Percentage

» When a vehicle is traveling at...



» this is the driver's field of vision.¹



» It takes^{2,3} ...



» and pedestrians hit at this speed have a⁴ ...

13% Likelihood of fatality or severe injury



40% Likelihood of fatality or severe injury



73% Likelihood of fatality or severe injury



1 A. Bartmann, W. Spijkers and M. Hess, "Street Environment, Driving Speed and Field of Vision" Vision in Vehicles III (1991).
 W. A. Leaf and David F. Preusser. Literature review on vehicle travel speeds and pedestrian injuries. (Washington, D.C.: U.S. Dept. of Transportation, National Highway Traffic Safety Administration, 1999).
 2 Braking distances do not account for braking reaction time.
 3 AASHTO Green Book—A Policy on Geometric Design of Highways and Streets, 7th Edition. American Association of State and Highway Transportation Officials, 2018.
 4 Tefft, Brian C. Impact speed and a pedestrian's risk of severe injury or death. Accident Analysis & Prevention. 50. 2013.

Context

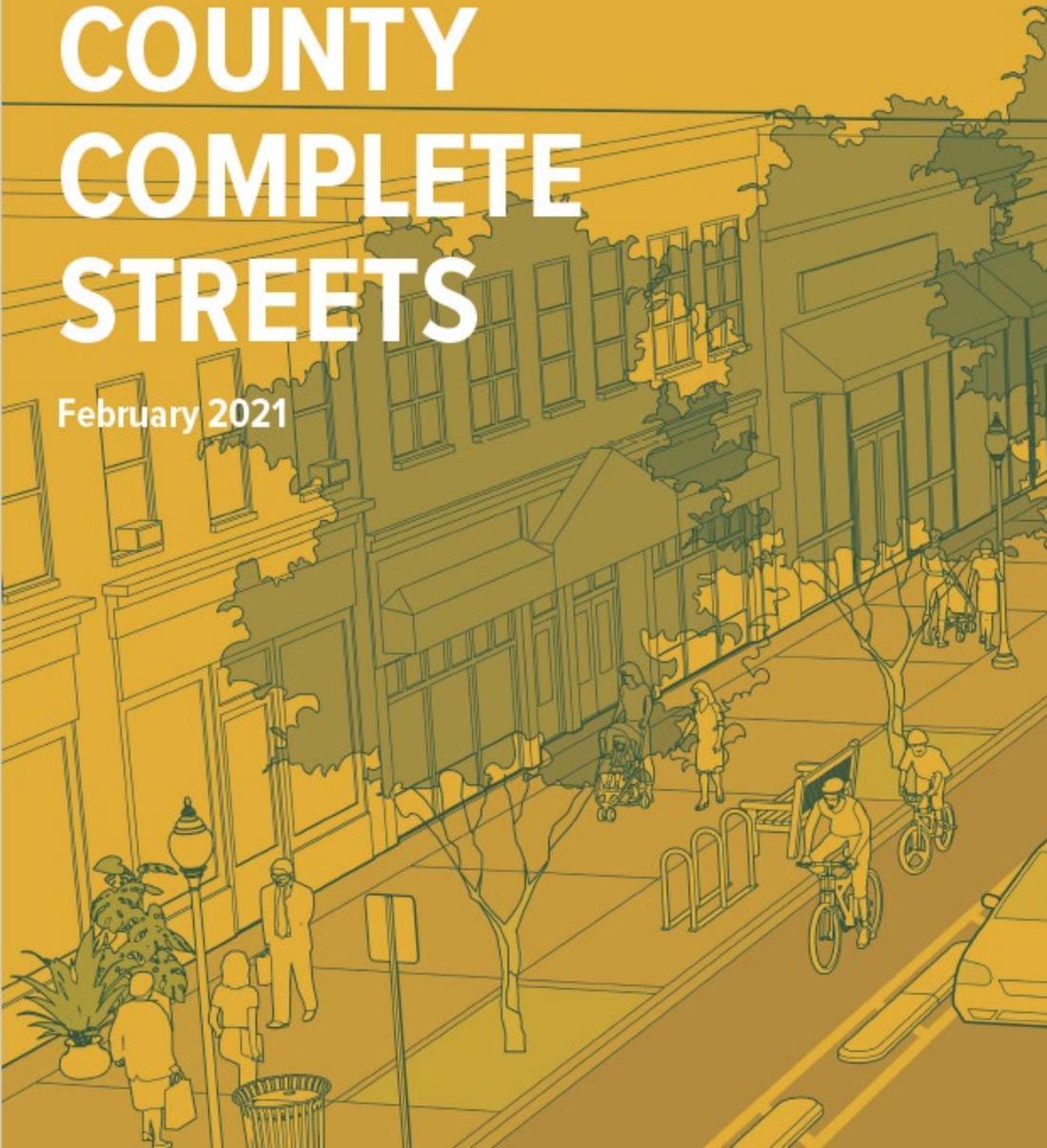
- **Supplements** the Countywide Functional Master Plans, Area Master Plans, and County Design Standards
- **Guides** design of capital improvement and development projects
- Primary emphasis is on **county streets**, though intended as advisory for state-owned roadways
- **Some changes** to Design Standards and County Code are required for consistency with this guidance
- **Who uses this guide?** County staff, developers/design consultants, the public

Process

- Background Research / Precedents
- Annotated Outline
- Guiding Principles
- Technical Work Sessions on Key Topics:
 - Street Types
 - Design Speed
 - Corner Radius, Lane Encroachment, Design Vehicle
 - Lane Widths, EMS Access
- Draft Guidelines
- Public/Planning Board Review/Approval
- County Council Review/Approval of Code Changes
- Final Guidelines

MONTGOMERY COUNTY COMPLETE STREETS

February 2021



- 1 Vision
- 2 Street Types
- 3 Active Zone
- 4 Street Zone
- 5 Bikeways
- 6 Intersections
- 7 Green Streets
- 8 Speed Management
- 9 Implementation

Chapter 1

Vision

Streets are vital to the quality of life for Montgomery County's residents, workers, businesses, and visitors. Montgomery County's Complete Streets Design Guide aims to **create great places** that are supported by safe and efficient transportation systems, which are **equitably shared among diverse communities**. The efficiency of these transportation systems will be enhanced by new guidance for designing **new streets and reconstructing or retrofitting existing streets** following the principles of **Safety, Sustainability** and **Vitality**.

Chapter 2

Street Types

Each new street type prioritizes users and various design elements based on the context and character of the street.

- Based on roadway function *and* built environment
- Changes along segments of a roadway
- Focus is on new roads and reconstruction

In Montgomery County, the Federal functional classification will still be used; however, the context-based street types presented in this guide will serve as an overlay and supplement to the Federal functional classifications.

Transportation/Land Use Context for Complete Streets



Montgomery County Street Types

- Downtown Boulevard
- Downtown Street
- Town Center Boulevard
- Town Center Street
- Boulevard
- Area Connector
- Neighborhood Connector
- Neighborhood Street
- Neighborhood Yield Street
- Industrial Street
- Country Connector
- Country Road
- Controlled Major Highway

A. Downtown Boulevards

These are Montgomery County’s highest intensity streets – with a bustling mix of vehicle traffic, dense development, walking, bicycling, and transit. Downtown Boulevards are located in central business districts and urban centers. Buildings are located close to the street and offer a blend of places to live, work, shop, and visit. Because Downtown Boulevards carry significant vehicle traffic that operates in potential conflict with high numbers of pedestrians and bicyclists, reducing vehicle speeds is essential to safety. Downtown Boulevards are typically located in areas that have specific design requirements for finishes, materials, furnishings, and lighting. Achieving slower speeds will also require a transition area or zone that extends into adjacent Boulevards.

- FZ** Frontage Zone
- SB** Street Buffer
- SW** Sidewalk
- TV** Travel Lane
- PB** Pedestrian-Bike Buffer
- TL** Transit Lane
- BL** Bike Lane
- TB** Transit Buffer

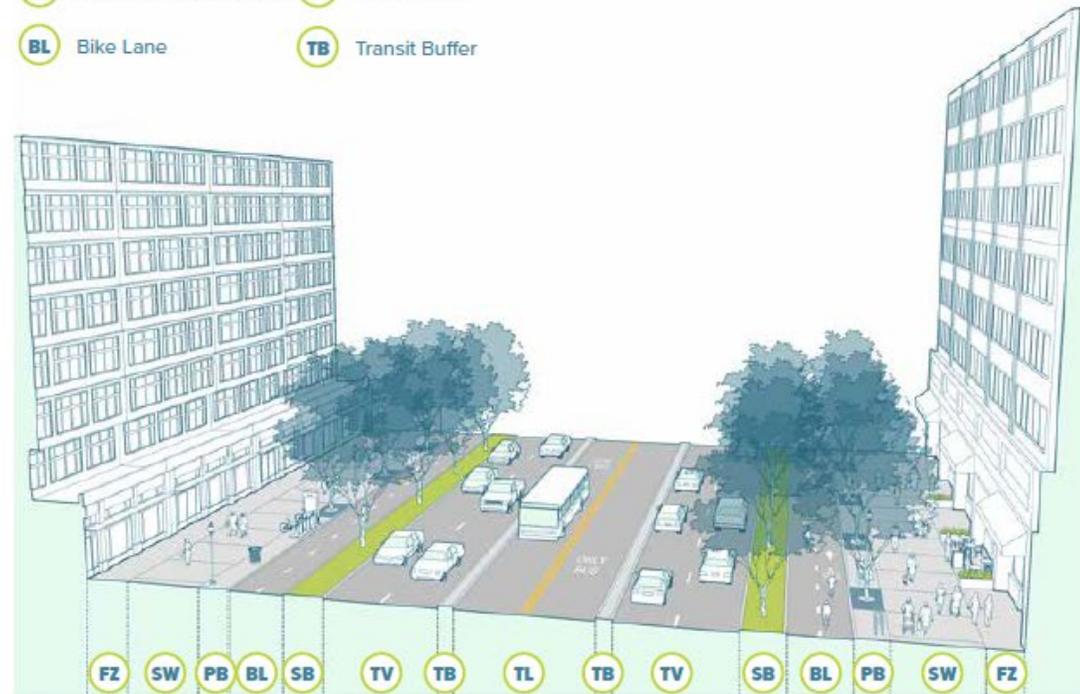


Figure 2-13. Downtown Boulevard

Key Features:

- » **Development intensity:** High-intensity, mixed-use development
- » **Pedestrian and bicycle activity:** High
- » **Vehicle activity:** High
- » **Transit service:** Frequent
- » **On-street parking:** Provided in some locations, where feasible
- » **Other key features:** Street furniture, street trees, wayfinding, and other streetscape features

Downtown Boulevard Examples



Figure 2-14. Georgia Avenue (MD Route 97) in Downtown Wheaton



Figure 2-15. Rockville Pike (MD Route 355) near White Flint



Figure 2-16. Wisconsin Avenue in Downtown Bethesda

Downtown Boulevards – Street Design Parameters and Priorities

Below, Figure 2-18 presents a summary of Corridor Design Parameters to be used for Downtown Boulevards. Figure 2-19 presents a summary of Cross Section Design Parameters to be used for Downtown Boulevards. For ease of reference, a page reference column is provided to orient the user where each subject is covered in more detail.

Figure 2-18. Corridor Design Parameters for Downtown Boulevards

Design Parameter	Design Guidance	Notes	Page Ref
Target Speed	25 MPH	Presence, proximity, and volume of pedestrians, bicyclists, passenger vehicles, transit vehicles, and commercial vehicles shall be considered when determining an appropriate target speed. State law allows Montgomery County to reduce the posted speed limit to not less than 15 mph after performing an engineering and traffic investigation. Where existing posted speeds are less than the target speed: it is not the intent that these speed limits be raised.	267
Maximum # of Vehicle Through Lanes	6	See Master Plan of Highways and Transitways for number of travel lanes on specific streets, which supersedes this guidance. These are primarily for new roads and when considering road diets.	161
Maximum Spacing for Protected Crossings	400'	Site-specific needs and conditions will dictate actual implementation.	236
Generally Accepted Minimum Spacing for Signalized Intersections	400'	Refers to a full signalized intersection or roundabout. These targets are intended to maintain operations at a level that promotes safe movement by all travel modes. Site-specific needs and conditions, as determined through the regulatory approval process or capital project review, will dictate actual implementation.	236

Figure 2-19. Cross Section Design Parameters and Prioritization for Downtown Boulevards

Design Parameter	Design Guidance	Priority	Notes	Page Ref
Street Zone				
Center Median	Recommended 6'-16'	M	The dimensions shown apply only if a median is provided. Medians may be wider than dimensions provided in some circumstances. The median may be replaced or widened to include left turn lanes at intersections. If the street is planned for a median transitway: transit lane dimensions supersede. Consult MCDOT for detailed info.	163
Dedicated Transitway	Transitway lanes: 13' default, 12' min Transitway buffer: 6' default, 2' min	M	The presence of a dedicated transitway is determined in the Master Plan of Highways and Transitways. If these dimensions vary from those provided in a specific Transitway planning process, those dimensions supersede this document. Dimensions may vary at stations, intersections & other crossing points, and along horizontal curves.	162
Left-Turn Lane	10' default, 9' min	M	Dimensions only apply if a left turn lane is provided.	159
Two-Way Left-Turn Lane	N/A	N/A	Two-Way Left-Turn Lanes are not appropriate along this street type.	159
Inside Travel Lane	10'	N/A	Use the Outside Travel Lane dimension if there is only one lane per direction. Lane width dimensions are intended for typical tangent (straight) sections. Segments with vertical or horizontal curves may require wider pavements per Section 3.3.10 of the AASHTO Green Book.	159

Figure 2-19 (continued)

Design Parameter	Design Guidance	Priority	Notes	Page Ref
Street Zone				
Outside Travel Lane	11'	N/A	Lane width dimensions are intended for typical tangent (straight) sections. Segments with vertical or horizontal curves may require wider pavements per Section 3.3.10 of the AASHTO Green Book. If the outside lane is adjacent to a striped bike lane, the total width (travel lane + bike lane) should be no less than 16'. Guidance also applies to right turn lanes, where needed. Gutter pan is included in Curbside Zone dimensions (below); however, if there is no Curbside Zone, gutter pan is included in these dimensions for the outside travel lane.	159
Curbside Zone	8'	L	Presumes parallel parking if parking is provided, and parking features accessible spaces. Accessible spaces require 13' width per PROWAG requirements. Gutter pan is included in Curbside Zone dimensions. If there is no Curbside Zone, the gutter pan is already included in the Outside Travel Lane width.	151
Active Zone				
Street Buffer	8' default, 6' min	H	In constrained environments, the default Street Buffer width is a higher priority than the default Bikeway width. Where a lane within the Street Zone is converted to a street-level separated bike lane, the Street Buffer may be reduced to 3' only when implemented by MCDOT as an interim bikeway. Where on-street parking is present, a minimum 3' door swing zone is required between the face of curb and any adjacent pedestrian or bicycle facility. To meet PROWAG requirements for accessible parking width (13'), the Street Buffer may need to be reduced to 5'.	122
Bikeway	Two-way SBL on both sides of street. Each SBL: 11' default, 8' min	H	Default bikeway types apply to streets without master planned bikeways. The widths apply to master planned and non-master planned bikeways. If the Bicycle Master Plan recommends something different for a specific street, that supersedes this guidance. Dimensions do not include the street buffer or pedestrian/bicycle buffer (see below). If bikeway is at street level and adjacent to the curb, dimensions include the gutter pan. For corridors designated as Breezeways: the Priority is always High, see additional requirements on pages 197-198 of this Guide, or in the Bicycle Master Plan.	202
Ped / Bike Buffer	6' default, 2' min	M	Provided only if a separated bike lane is provided. These should provide edge detection at minimum on the Bikeway side, and ideally also along the Clear Zone side. Ped/Bike Buffers that are reduced to less than 5' may restrict Street Trees, less than 4' may restrict more substantive street furniture, and less than 3' may restrict most street furniture such that the area may be used as more of an extension of the sidewalk. Consider increasing the Priority to High (H) when reducing beneath a threshold will affect items of particular importance.	181
Sidewalk	15' default, 10' min	H	Using the minimum dimension requires a waiver – consult MCDOT.	130
Frontage Zone	10' default, 0' min	M	Some or all of the frontage zone may occur on private property.	131
Maintenance Buffer	0'	N/A	Structures not part of the roadway design shall not occur in the public ROW. If there is a structure abutting the property line, a maintenance buffer is required even if this table shows a dimension of 0'.	119

Downtown Boulevards – Street Design Features

Figure 2-20 provides a summary of Downtown Boulevard street design features in four different categories and identifies what features are required, recommended, optional, and not permitted. The only design feature specifically not permitted for Downtown Boulevard are traffic diverters.

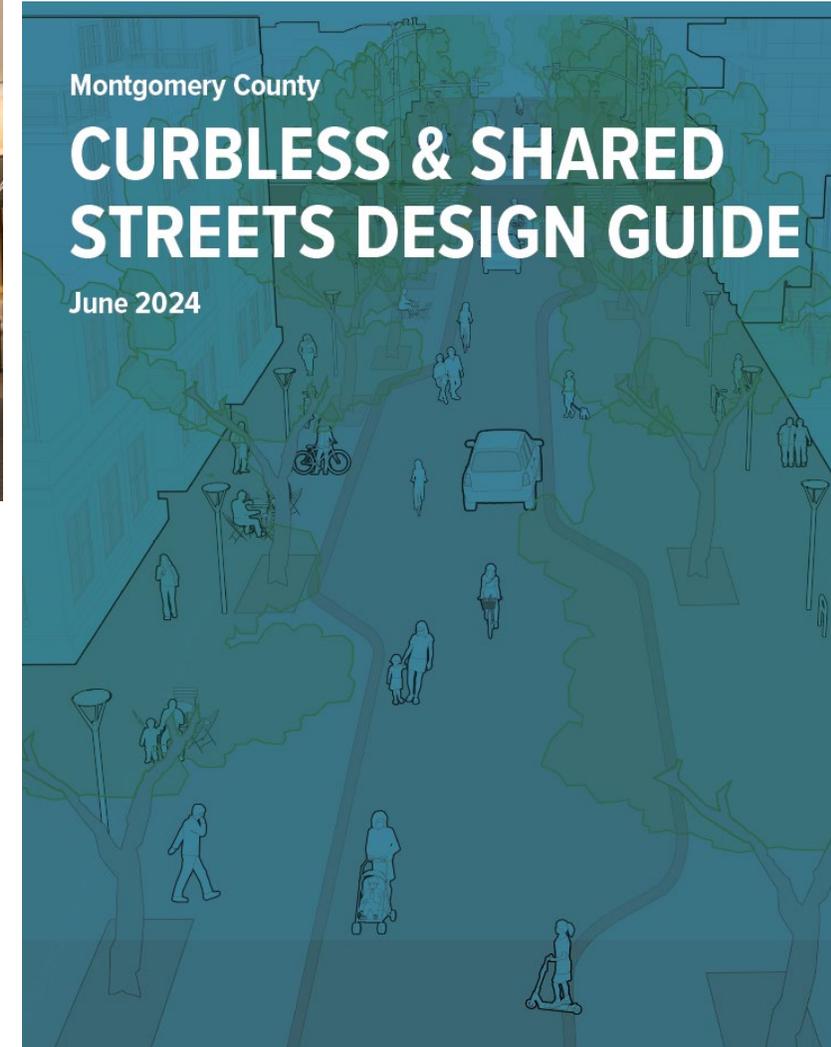
Figure 2-20. Street Design Features for Downtown Boulevards

Legend	■ Required	▲ Recommended (Context-Sensitive)	○ Optional (Context-Sensitive)	x Not Permitted or N/A	* Unless determined otherwise by Planning Board	† Engineering judgement needed – see Chapter 6: Intersections for details	‡ Required at all intersections with existing or planned separated bike lanes, sidepaths, buffered bike lanes or conventional bike lanes.	§ Narrowing lanes down to default dimensions for street type	Page Ref
ACTIVE ZONE	Trees/Landscaping in Buffer	■							254
	Green Infrastructure/Rain Gardens	■							259
	Seating	■							123
	Bicycle Parking	■							124
	Recycling/Trash Receptacles	▲							129
	Plazas/Parklets	▲							155
	Bikeshare Stations/Dockless Parking Hubs (if in bikeshare/dockless service area)	■							125
	Pedestrian-Scale Lighting	■							142
	Pedestrian/Bicycle Wayfinding	▲							133
	Sidewalk-Level Driveways	■							141
INTERSECTIONS	Roundabouts (Modern or Mini)		○ [†]						220
	Crossing Islands		▲						240
	Pedestrian Signals (when traffic signals are present) or Beacons	■							237
	Pedestrian Recall on Signals		▲						243
	Pedestrian Lighting (unless pedestrians are prohibited, e.g., some Controlled Major Highways)	■							143
	Protected Intersections, Bike Boxes, or Two-Stage Queue Boxes	■ [‡]							224
	Bicycle Markings/Facilities (when bikeways are present)	■							226
SPEED MANAGEMENT	Lane Diet		▲ [§]						270
	Road Diet (if volumes meet thresholds for road diet)		○						271
	Speed Humps/Cushions		○						272
	Speed Tables/Raised Crosswalks		○						273
	Raised Intersections		○						273
	Curb Extensions/Bulb Outs		▲						273
	Neckdowns/Chokers		▲						274
	Traffic Diverters		x						274
	Chicanes/Roadway Curvature		▲						275
	Textured Paving Treatment		○						276
STREET ZONE	Green Infrastructure in Median (when median is present)		▲						259
	Street Trees/Landscaping in Median (when median is present)	■							254
	Minimize/Consolidate Driveways	■							141
	Undergrounding Utilities (Master Plan recommendations supersede this guidance)	■							165
	Transit Shelters (where transit routes are present and boarding thresholds are met)		▲						138
	Loading/Pick-up and Drop-off Zones		▲						157
	Accessible Parking		▲						153
	Carshare Parking		▲						154
E/V Charging Stations		▲						154	

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Special Streets

- Alleys
- Curbless Streets
- Shared Streets
- Rustic Roads /
Exceptional Rustic Roads



Street Zones

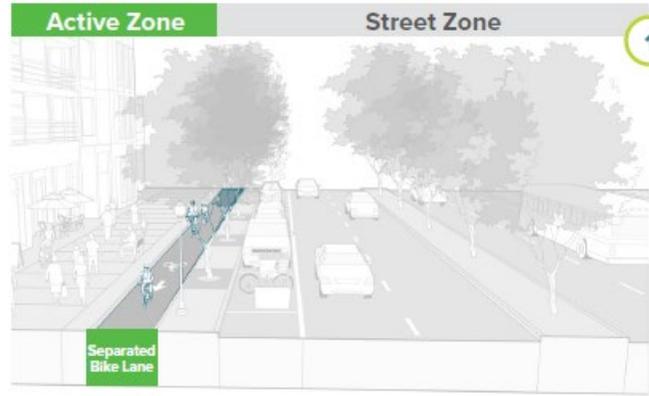
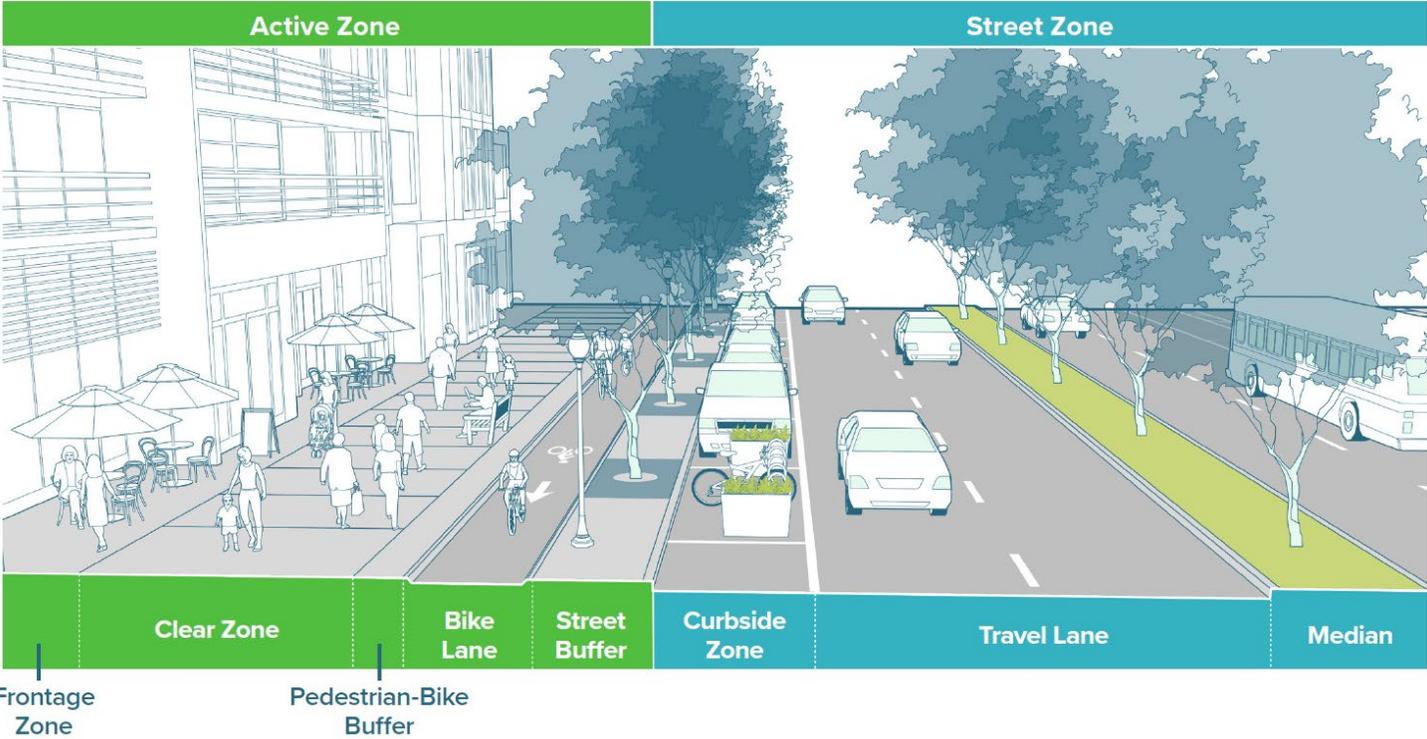


Figure 2-9. Separated Bike Lane

1 Separated bike lanes are in the Active Zone, separated from the Clear Zone (pedestrian space) by a Pedestrian-Bike Buffer and from the Street Zone by a Street Buffer.

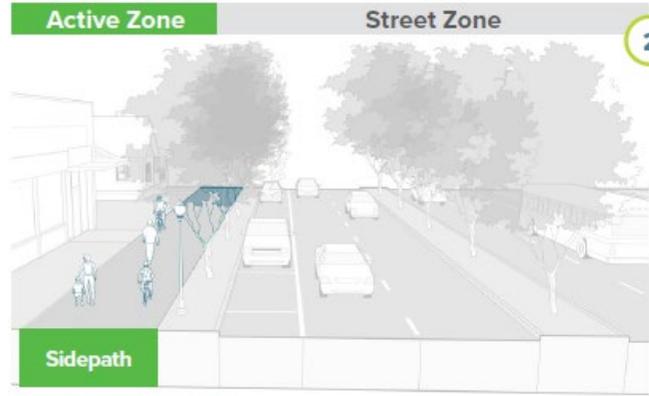


Figure 2-10. Sidepath

2 Sidepaths (which are shared by people bicycling and walking) are in the Active Zone, separated from the adjoining land uses by a Maintenance Buffer and from the Street Zone by a Street Buffer.

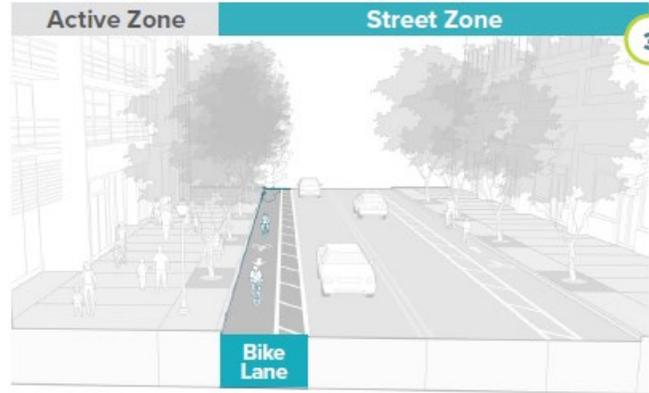
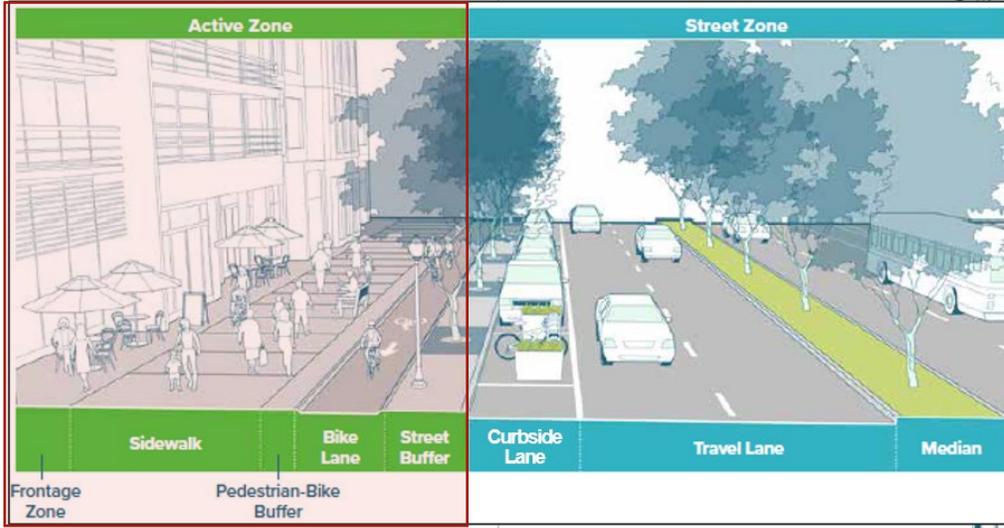


Figure 2-11. On-Street Bike Lane

3 On-Street bike lanes or bikeable shoulders are in the Street Zone, located adjacent to travel lanes or, in some instances, between on-street parking and the curb. The bike lanes can be buffered, conventional, or advisory bike lanes.

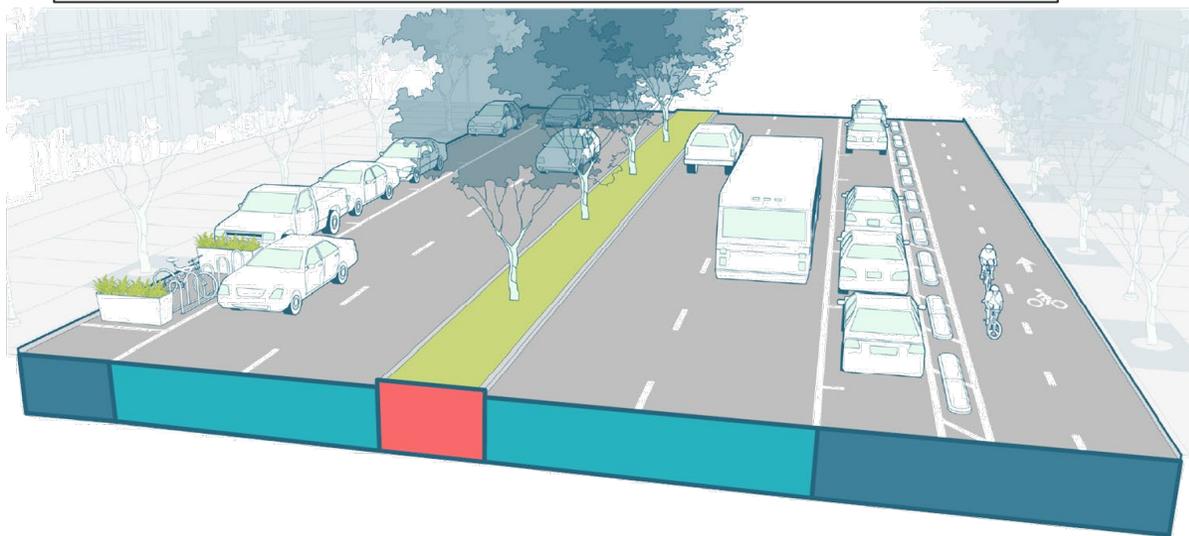
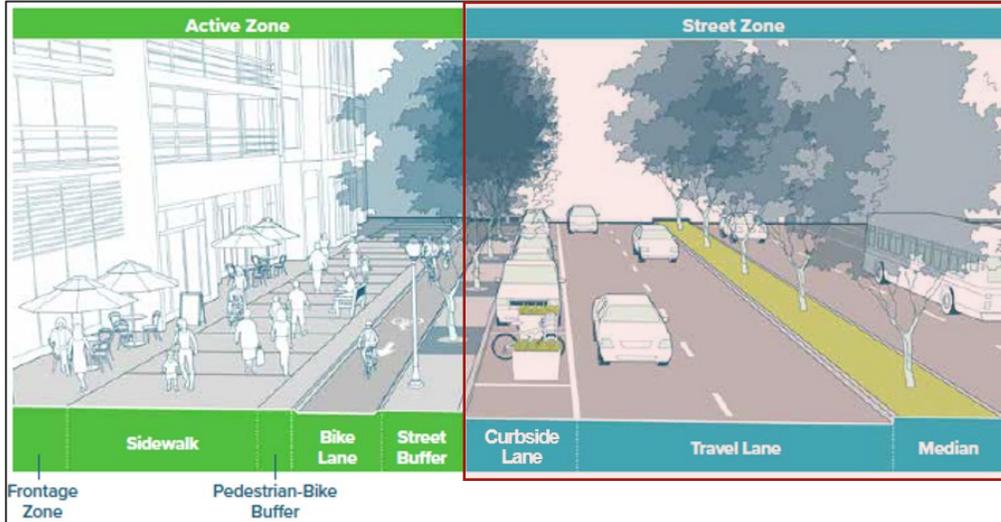
Chapter 3 Active Zone



Street Type	Maintenance Buffer	Frontage Zone	Clear Zone	Street Buffer
Downtown Boulevard	0'	10' default; 0' min	15' default; 10' min	8' default; 6' min
Downtown Street	0'	10' default; 0' min	10' default; 8' min	6'; 11' if shared w/ street parking
Town Center Boulevard	0'	7' default; 0' min	10' default; 8' min	8' default; 6' min
Town Center Street	0'	7' default; 0' min	10' default; 8' min	6'; 11' if shared w/ street parking

Chapter 4

Street Zone



Lane Widths

Street Type	Left Turn Lane (if required)	Two Way Left Turn Lane ³	Inside Travel Lane ¹	Outside Travel Lane (against curb or parking) ²
Downtown Boulevard	10' default, 9' min	N/A	10'	11'
Downtown Street	10' default, 9' min	10'	10'	10.5'
Town Center Boulevard	10'	N/A	10'	11'
Town Center Street	10'	10'	10'	11'
Boulevard	10'	N/A	10'	11'
Area Connector	10'	10'	10'	10.5'
Neighborhood Connector	10'	10'	10'	10.5'
Neighborhood Street	N/A	N/A	10'	10.5'
Neighborhood Yield Street	N/A	N/A	N/A	12'
Industrial Street	11'	11'	11'	11'
Country Connector	11'	N/A	11'	11'
Country Road	10'	N/A	11'	11'
Controlled Major Highway	11'	N/A	11'	12'

1. Includes lane against the centerline on undivided roads. All lane widths in chart are for typical tangent (straight) sections.
2. If the outside lane is adjacent to a bike lane, the combined width (travel lane + bike lane) shall be no less than 16'). These dimensions also serve as guidance for right turn lanes, where needed. Gutter plan is included in Curbside Zone dimensions. If there is no Curbside Zone, gutter pan is included in Outside Travel Lane width.
3. Provided for existing conditions conformity and only for retrofits of four-lane roads to three lanes using a road diet as an allowable treatment. Not encouraged for new roads or reconstruction/widening.
4. On median-divided roadways, the minimum curb-to-curb pavement width is 20'.

Chapter 5 Bikeways

Design Guidance

- Trails
- One & Two-Way Separated Bikeways
- Striped Bikeways
- Bikeable Shoulders
- Shared Roads
- Breezeway Network

Other Considerations

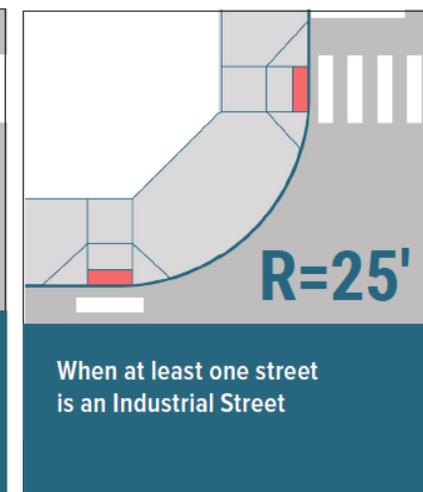
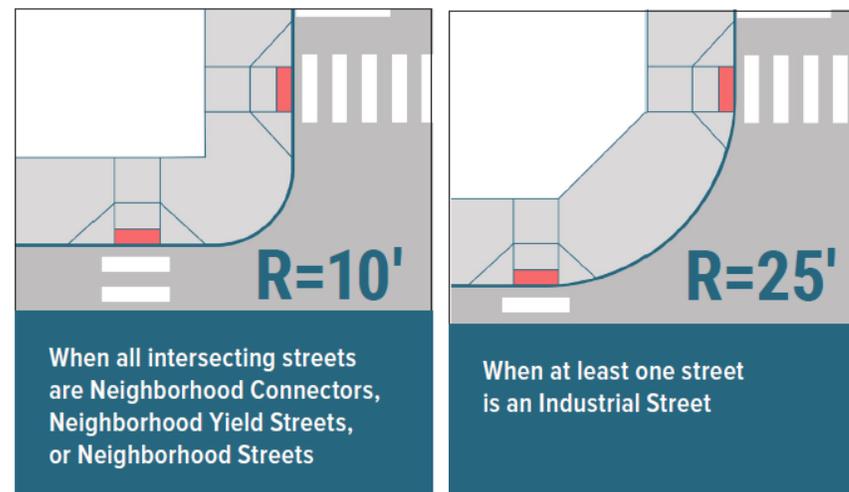
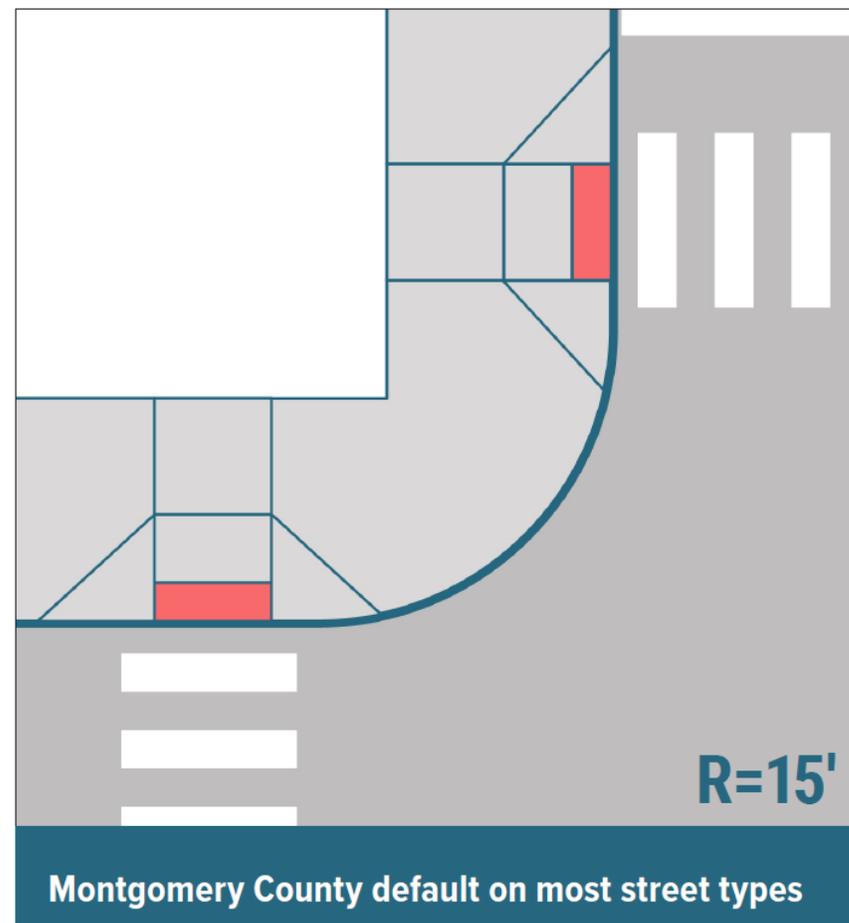
- Shy Zones
- Bicycle Ramps
- Bus Boarding Islands / Floating Facilities
- Green Paint
- Interaction with parking, ADA spaces, and Pickup / Drop-offs

Street Type	Parameter	Two-Way SBL	One-Way SBL	Sidepath	Buffered Bike Lanes	Conventional Bike Lanes	Advisory Bike Lanes	Bikeable Shoulders
Downtown Boulevard	Bikeway	11' default; 8' min	6.5' default; 5' min	11' default; 8' min	6' default; 4-5' min (2)	6' default; 5' min (3)	6' default; 4-5' min (4)	N/A
	Street Buffer	8' default; 6' min	8' default; 6' min	8' default; 6' min	2' min	N/A	N/A	N/A
Downtown Street	Bikeway	10' default; 8' min	6.5' default; 5' min	10' default; 8' min	6' default; 4-5' min (2)	6' default; 5' min (3)	6' default; 4-5' min (4)	N/A
	Street Buffer	6' (1)	6' (1)	6' (1)	2' min	N/A	N/A	N/A
Town Center Boulevard	Bikeway	11' default; 8' min	6.5' default; 5' min	11' default; 8' min	6' default; 4-5' min (2)	6' default; 5' min (3)	6' default; 4-5' min (4)	N/A
	Street Buffer	8' default; 6' min	8' default; 6' min	8' default; 6' min	2' min	N/A	N/A	N/A
Town Center Street	Bikeway	10' default; 8' min	6.5' default; 5' min	10' default; 8' min	6' default; 4-5' min (2)	6' default; 5' min (3)	6' default; 4-5' min (4)	N/A
	Street Buffer	6' (1)	6' (1)	6' (1)	2' min	N/A	N/A	N/A
Boulevard	Bikeway	11' default; 8' min	6.5' default; 5' min	11' default; 8' min	6' default; 4-5' min (2)	6' default; 5' min (3)	6' default; 4-5' min (4)	N/A
	Street Buffer	8' default; 6' min	8' default; 6' min	8' default; 6' min	2' min	N/A	N/A	N/A
Area Connector	Bikeway	10' default; 8' min	6.5' default; 5' min	10' default; 8' min	6' default; 4-5' min (2)	6' default; 5' min (3)	6' default; 4-5' min (4)	N/A
	Street Buffer	6'	6'	6'	2' min	N/A	N/A	N/A
Neighborhood Connector	Bikeway	10' default; 8' min	6.5' default; 5' min	10' default; 8' min	6' default; 4-5' min (2)	6' default; 5' min (3)	6' default; 4-5' min (4)	N/A
	Street Buffer	6'	6'	6'	2' min	N/A	N/A	N/A
Neighborhood Street	Bikeway	10' default; 8' min	6.5' default; 5' min	10' default; 8' min	6' default; 4-5' min (2)	6' default; 5' min (3)	6' default; 4-5' min (4)	N/A
	Street Buffer	6'	6'	6'	2' min	N/A	N/A	N/A
Neighborhood Yield Street	Bikeway	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Street Buffer	6'	6'	6'	2' min	N/A	N/A	N/A
Industrial Street	Bikeway	10' default; 8' min	6.5' default; 5' min	10' default; 8' min	6' default; 4-5' min (2)	6' default; 5' min (3)	6' default; 4-5' min (4)	N/A
	Street Buffer	6'	6'	6'	2' min	N/A	N/A	N/A
Country Connector	Bikeway	N/A	N/A	10' default; 8' min	6' default; 4-5' min (2)	6' default; 5' min (3)	6' default; 4-5' min (4)	6'
	Street Buffer	N/A	N/A	10'	2' min	N/A	N/A	N/A
Country Road	Bikeway	N/A	N/A	10' default; 8' min	6' default; 4-5' min (2)	6' default; 5' min (3)	6' default; 4-5' min (4)	5'
	Street Buffer	N/A	N/A	8' default; 6' min	2' min	N/A	N/A	N/A
Controlled Major Highway	Bikeway	N/A	N/A	11' default; 8' min	N/A	N/A	N/A	N/A
	Street Buffer	N/A	N/A	As wide as possible (10' min)	N/A	N/A	N/A	N/A

Chapter 6

Intersections

- Access Management
- Geometric Design Guidance
- Design Vehicles vs Control Vehicles
- Encroachment
- Mitigating Conflicts
- Intersection Features
- Roundabouts and Mini Roundabouts
- Curb Ramps
- Bikeways at Intersections
- Transit at Intersections
- Pedestrian Design Elements
- Channelized Right Turn Lanes



Chapter 6

Intersections

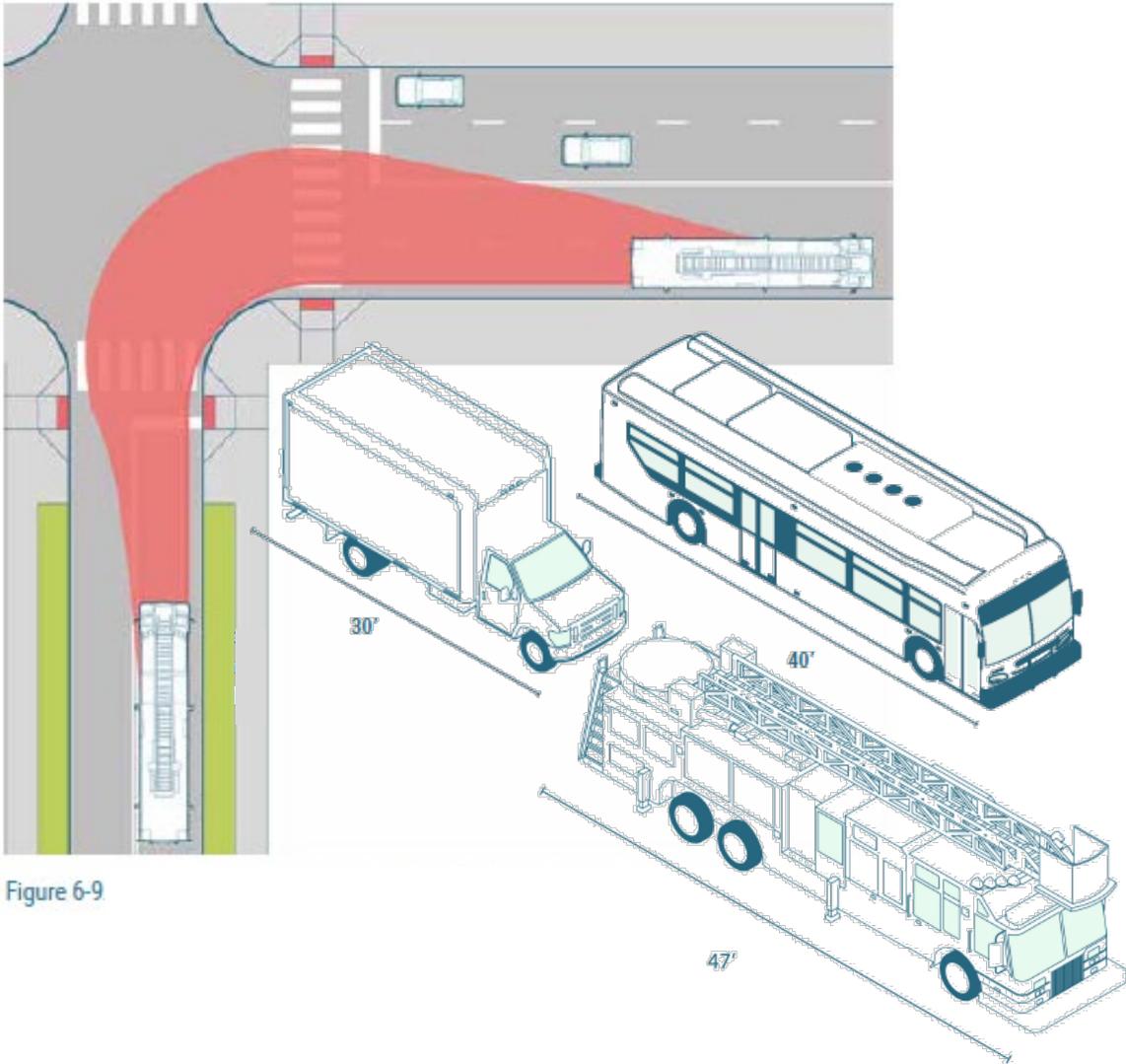
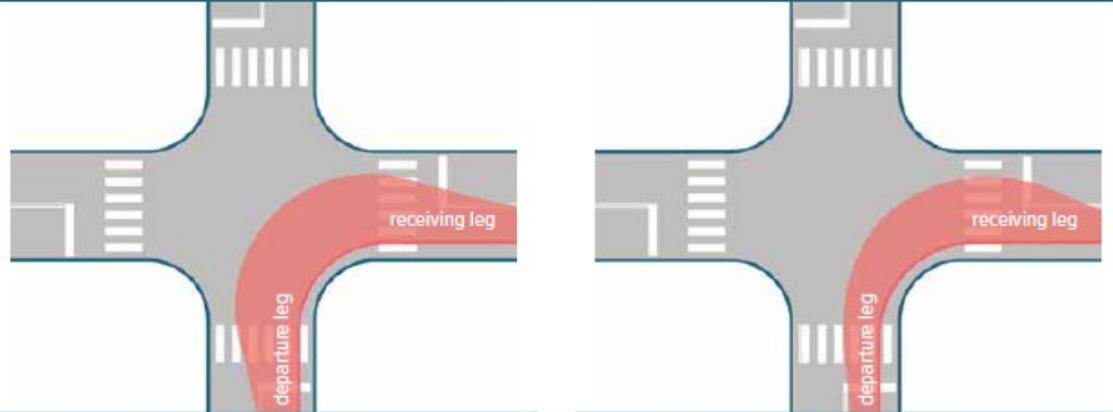


Figure 6-9

Type A Streets: Neighborhood Connectors, Neighborhood Streets, Neighborhood Yield Streets, Country Connectors, Country Roads

Type B Streets: Downtown Boulevards, Downtown Streets, Boulevards, Town Center Boulevards, Town Center Streets, Industrial Streets



Full Encroachment (2-lane roads)

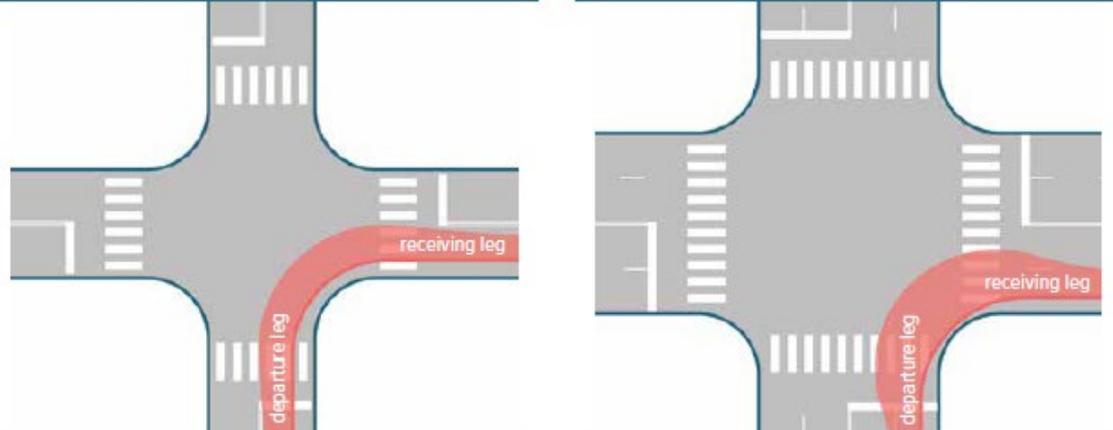
Vehicles encroach upon opposing lane in both the departure and receiving leg of the intersection. Allowable:

- By large vehicles (e.g., school bus, transit bus) where all intersecting streets are Type A streets

Receiving Lane Encroachment (2-lane roads)

Vehicles encroach upon opposing lanes in receiving leg only. Allowable:

- By large vehicles where the receiving leg is a Type A street and the departure leg is a Type B Street



No Encroachment (2-lane roads)

- Required for a typical passenger vehicle on all street types
- Desired by larger vehicles where all legs are Type B streets (except control vehicle – see next section)

Multilane Roads

Vehicles encroach upon non-opposing (same direction) lanes of both the departure and receiving leg of the intersection. Allowable by larger vehicles on all applicable street types.

Figure 6-8. Explanation of vehicle encroachment

Protected Crossings and Signals

Street Type	Maximum Protected Crossing Spacing*	Generally Accepted Minimum Signal Spacing**
Downtown Boulevard	400'	400'
Downtown Street	400'	400'
Town Center Boulevard	600'	600'
Town Center Street	400'	400'
Boulevard	800' - 1600'	1300'
Area Connector	600'-1200'	1300'
Neighborhood Connector	600'-1200'	1300'
Neighborhood Street	N/A	N/A
Neighborhood Yield Street	N/A	N/A
Industrial Street	800'	800'
Country Connector	1300'-2700'	2700'
Country Road	1300'-2700'	2700'
Controlled Major Highway	1300'	2700'

* On streets with operating speeds of 30 mph or higher, “protected” crossings include full signal, PHB, all-way stop control, or grade-separated crossing. Figures are targets — engineering judgement is needed to determine the ultimate placement and spacing between signals, with a focus on sight lines. Where ranges are provided, the lower end of the range is recommended in commercial areas, on BRT corridors, and near schools (or similar destinations).

** Refers to a full signalized intersection or roundabout. Engineering judgement is needed to determine the ultimate placement and spacing between signals.

Figure 6-31. Pedestrian crossing distance and intersection spacing by street type

Chapter 7

Green Streets



Urban Forestry

- Tree/Plant Selection
- Tree Spacing and Clearances
- Street Trees and Landscaping
- Soil Panels and Structural Soil
- Tree and Landscape Maintenance



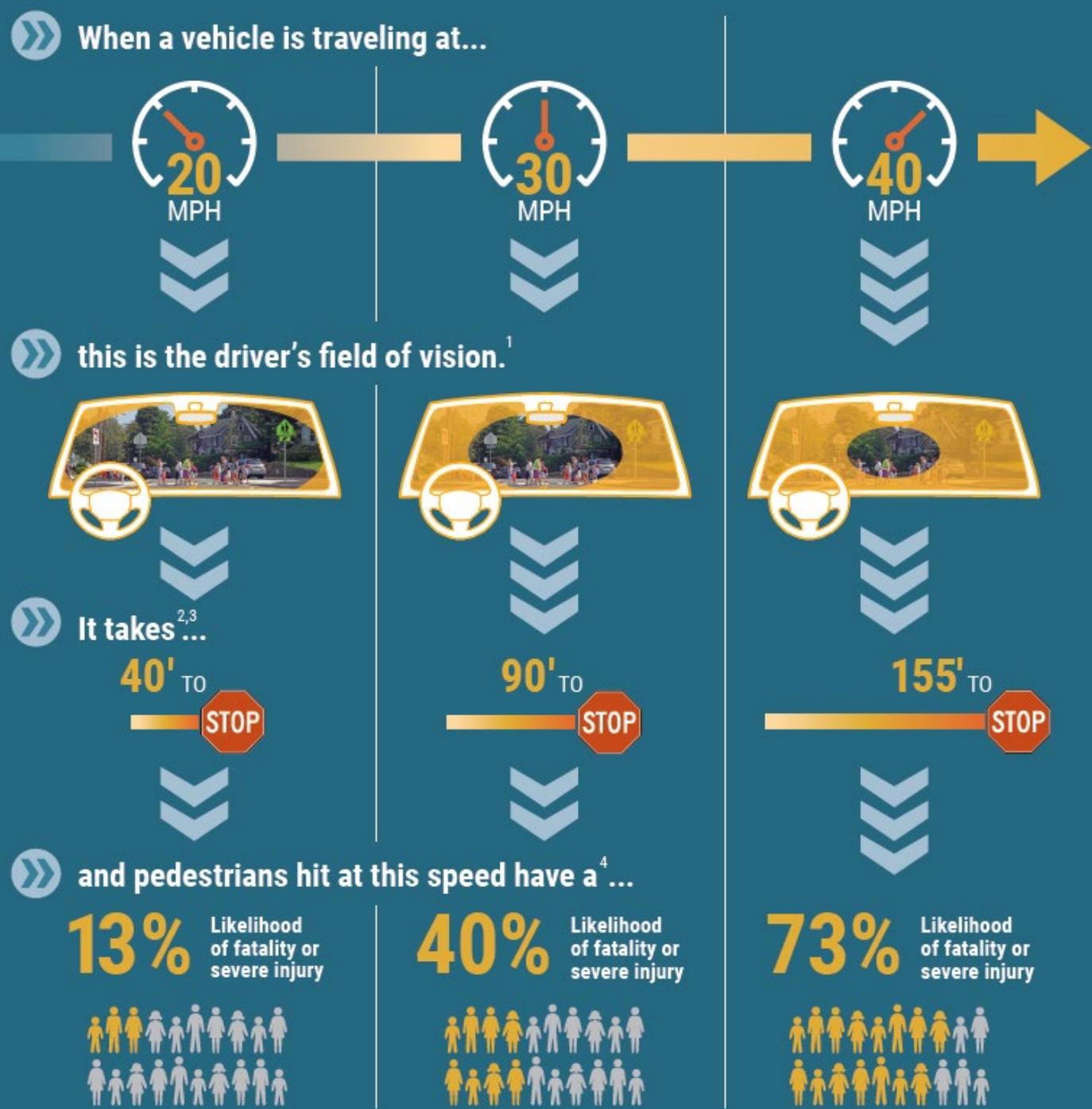
Stormwater Management

- Opportunities and Constraints
- Incorporating BMPs into Street Design
- Maintenance



Chapter 8 Speed Management

- Design Speed, Target Speed, and Posted Speed
- Strategies for Achieving Target Speed
- Retrofitting Arterials for Lower Speed



Target Speeds

MONTGOMERY COUNTY COMPLETE STREETS

»» Vehicle and Pedestrian Collision Speed and Survival Percentage ««

»» When a vehicle is traveling at...



»» this is the driver's field of vision.¹



»» It takes...^{2,3}



»» and pedestrians hit at this speed have a⁴...



1 A. Bartmann, W. Spijkers and M. Hass, "Street Environment, Driving Speed and Field of Vision" Vision in Vehicles III (1991).
 W. A. Leaf and David F. Preusser, Literature review on vehicle travel speeds and pedestrian injuries. (Washington, D.C.: U.S. Dept. of Transportation, National Highway Traffic Safety Administration, 1999).
 2 Braking distances do not account for braking reaction time.
 3 AASHTO Green Book—A Policy on Geometric Design of Highways and Streets, 7th Edition. American Association of State and Highway Transportation Officials, 2018.
 4 Tefft, Brian C. Impact speed and a pedestrian's risk of severe injury or death. Accident Analysis & Prevention, 50, 2013.

Figure 8-1. Relationship between speed and crash survival for people walking

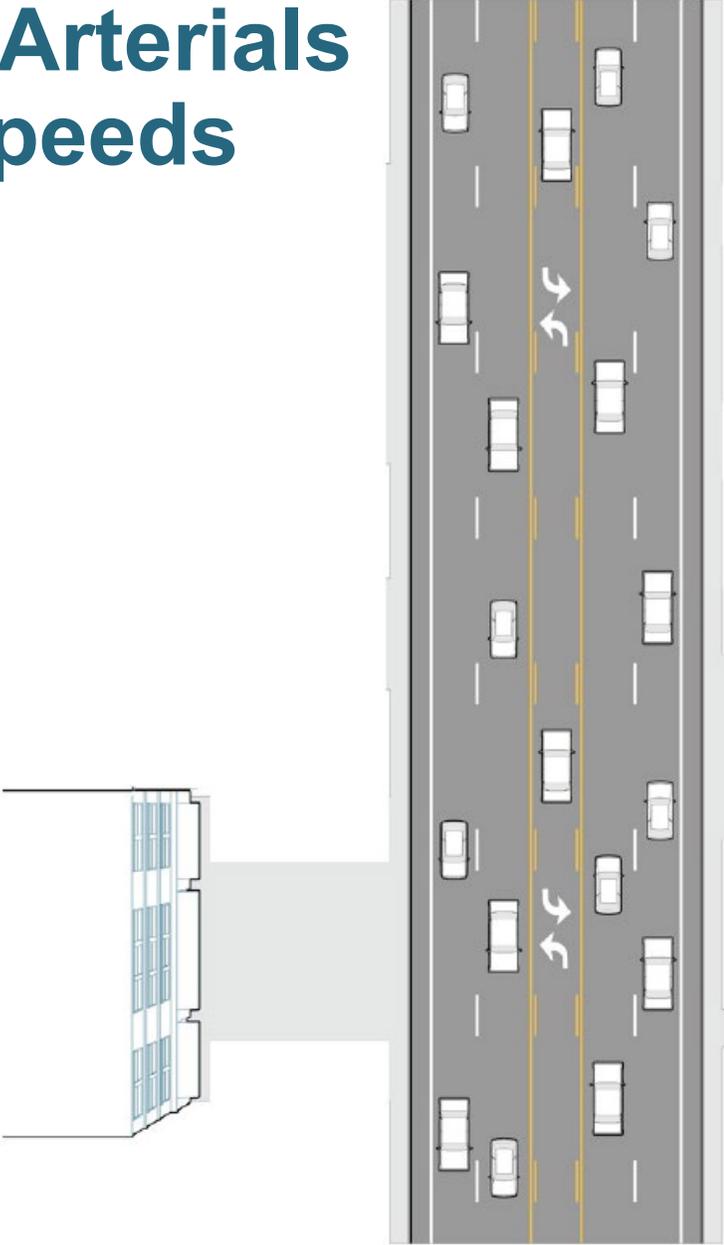
Street Type	Target Speed (mph)
Downtown Boulevard	25
Downtown Street	20
Town Center Boulevard	25
Town Center Street	25
Boulevard	35
Area Connector	25
Neighborhood Connector	20
Neighborhood Street	20
Neighborhood Yield Street	20
Rustic and Exceptional Rustic Roads	30
Industrial Street	25
Country Connector	40
Country Road	20 - 35
Controlled Major Highway	45 - 55

Speed Management

		Downtown Boulevard	Downtown Street	Town Center Boulevard	Town Center Street	Boulevard	Area Connector	Neighborhood Connector	Neighborhood Street	Neighborhood Yield Street	Industrial Street	Country Connector	Country Road	Controlled Major Highway	Page Reference
ROAD NARROWING	Road Diet (if volumes meet thresholds for road diet)	○	○	○	○	○	×	×	×	×	○	○	○	○	271
	Lane Diet	▲ (see default dimensions for street type)													270
VERTICAL MEASURES	Speed Humps/Cushions	○	○	○	○	×	○	○	○	○	○	×	×	×	272
	Speed Tables/ Raised Crosswalks	○	▲	○	▲	×	○	○	○	○	○	×	×	×	273
	Raised Intersections	○	▲	○	▲	×	○	○	○	○	○	×	×	×	273
HORIZONTAL MEASURES	Curb Extensions/ Bulb Outs	▲	▲	▲	▲	▲	▲	▲	○	○	▲	○	○	○	273
	Neckdowns/Chokers	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	○	○	○	274
	Roundabouts	○ (engineering judgement needed, see Section 6.9)													
	Crossing Islands	▲	▲	▲	▲	▲	▲	▲	○	○	▲	○	○	▲	240
	Traffic Diverters	×	×	×	×	×	×	×	○	○	○	×	×	×	274
Chicanes/ Roadway Curvature	▲	○	▲	○	○	○	○	○	○	○	○	○	×	275	
SURFACE	Textured Paving Treatment	○	○	○	○	○	○	○	○	○	○	×	×	×	276
ENCLOSURE	Sense of Enclosure (e.g., via street trees, landscaping, buildings, medians, etc.)	■	■	■	■	■	■	■	■	■	■	○	○	○	276

Figure 8-3. Appropriate speed management measures by street type

Retrofitting Arterials for Lower Speeds



Existing

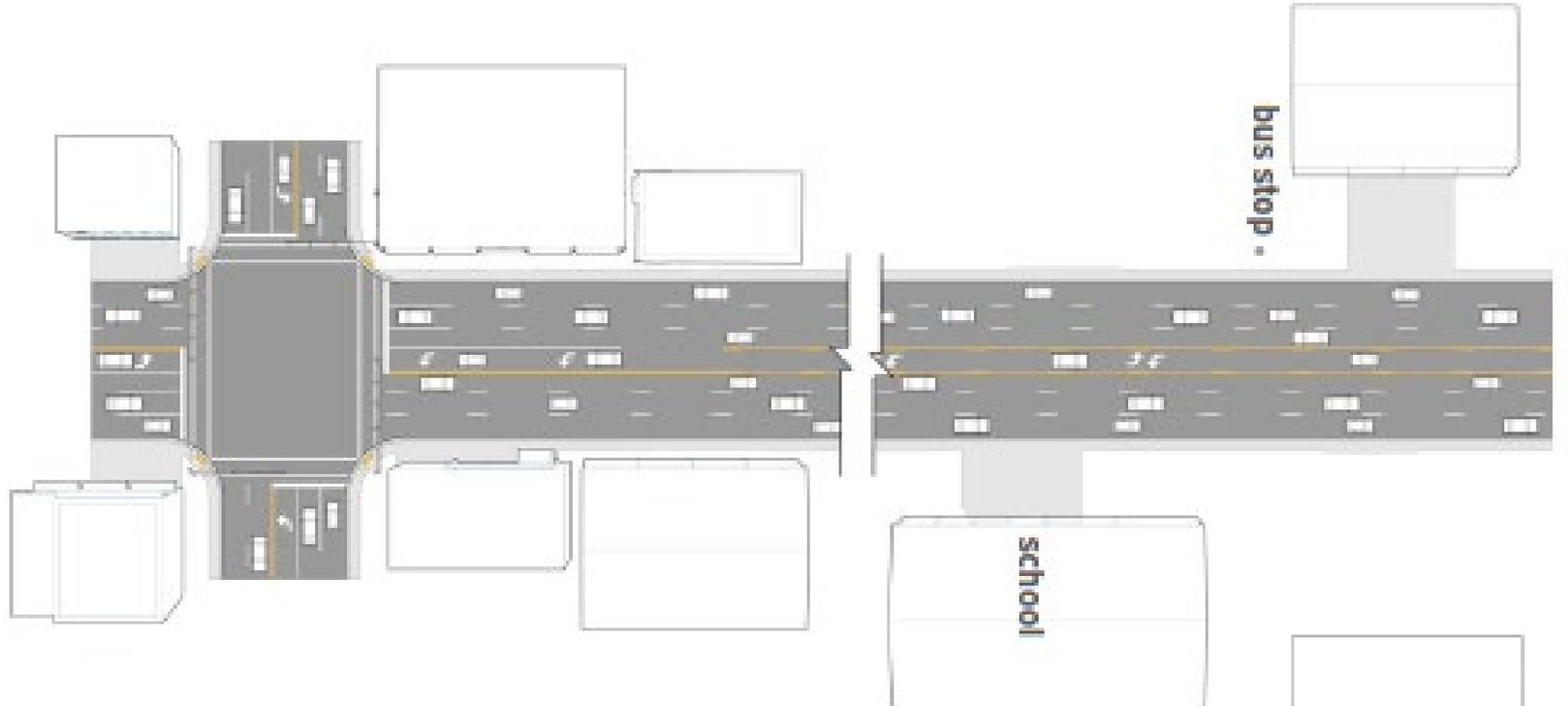


Proposed

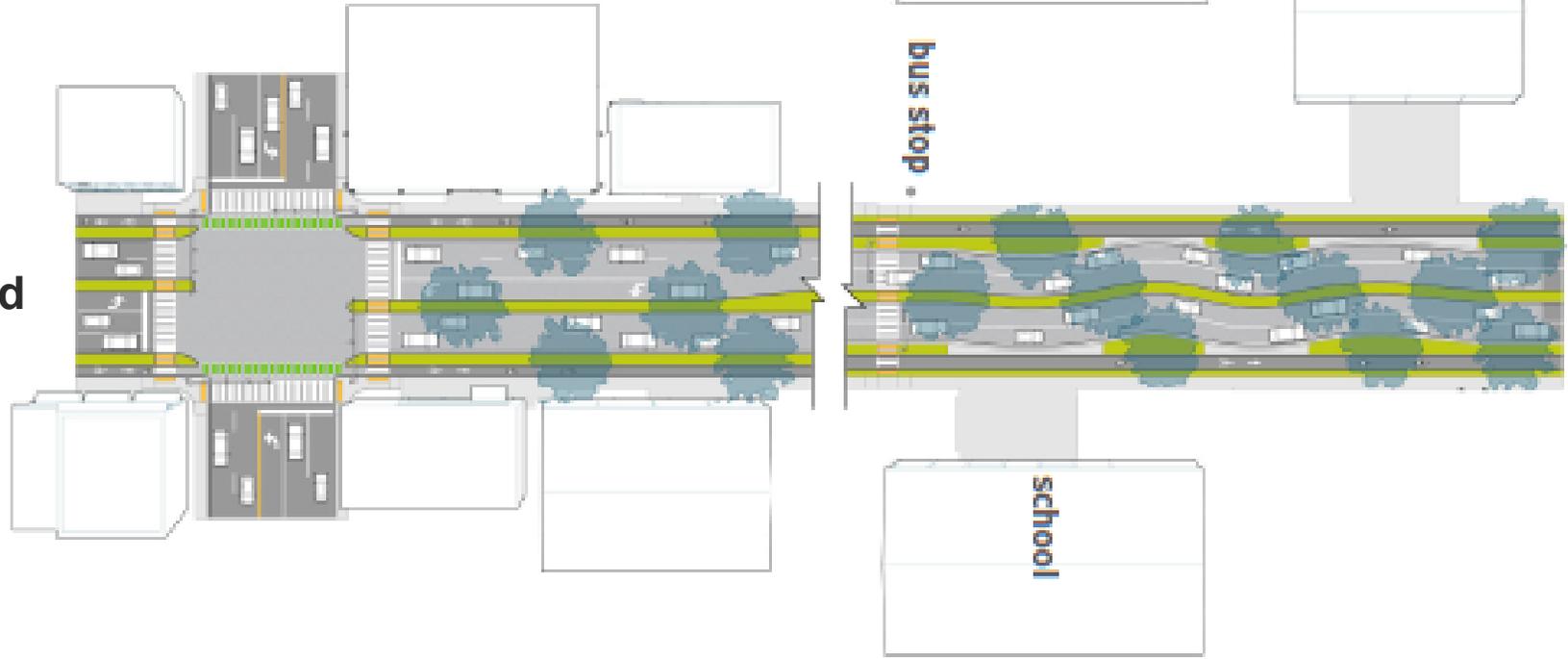
Retrofitting Arterials for Lower Speeds



Existing



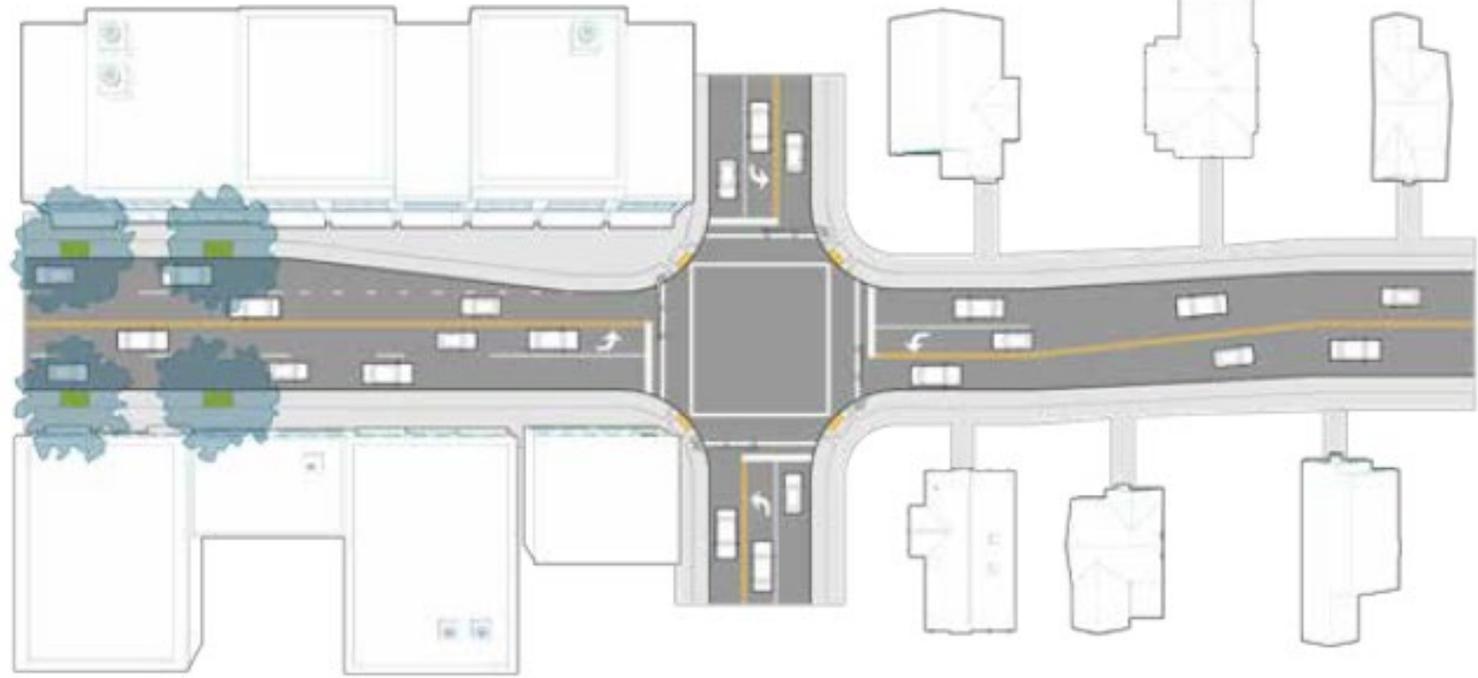
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Retrofitting Arterials for Lower Speeds



Existing

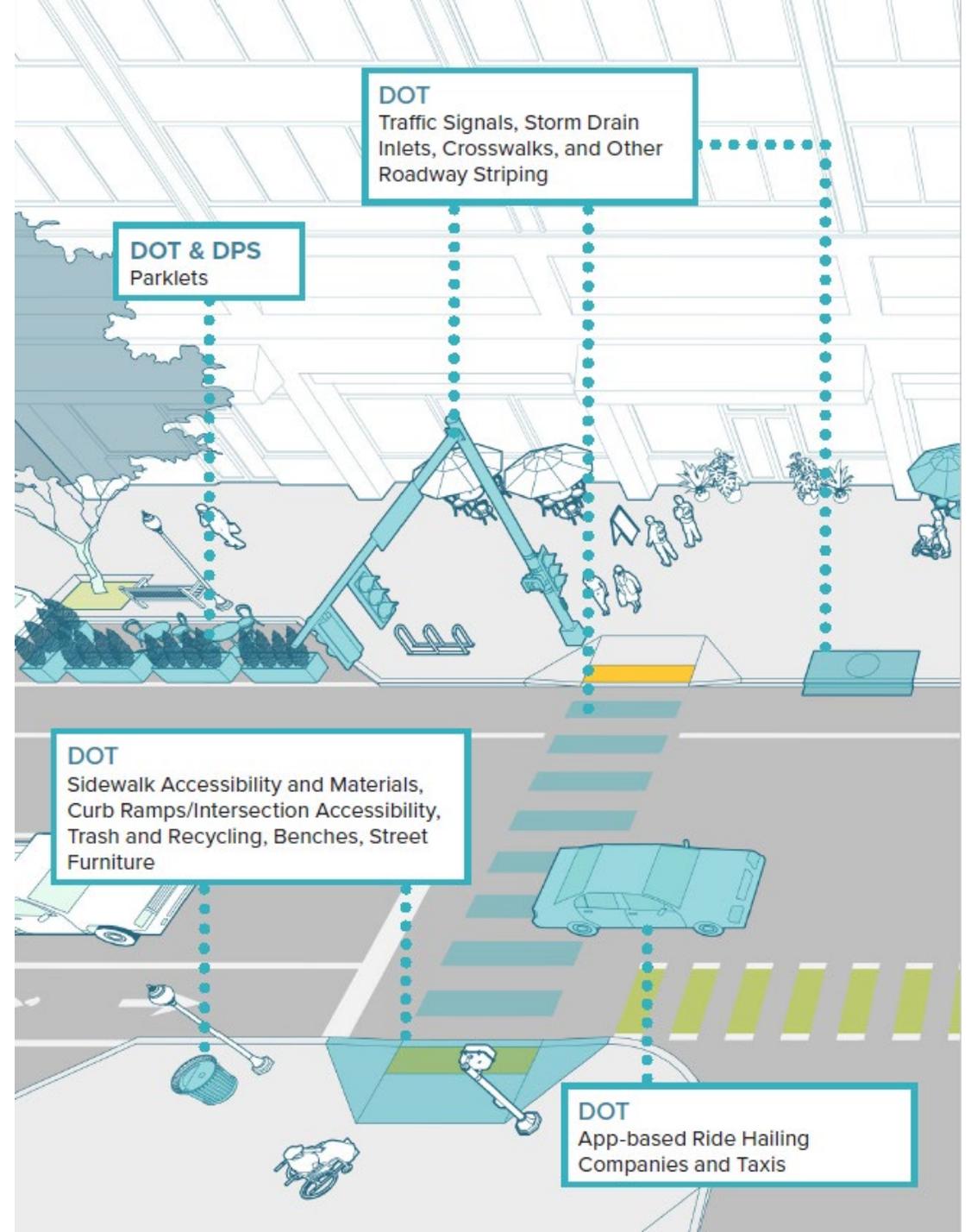


Proposed



Chapter 9 Implementation

- Agency Responsibilities on Streets
- Project Development Process
- Permits and Approvals
- Design Exceptions



Public Sector Road Projects



Master Plan of Highways and Transitways

- Classifies each street based on traffic volume and function
- Establishes minimum master-planned right-of-way
- Identifies transit priority streets
- Identifies planned Bus Rapid Transit (BRT) station locations
- Recommends number of lanes and target speed



Master Plans and Sector Plans

- Defines land use and urban form
- May include local streetscape guidelines



Bicycle Master Plan

- Recommends bikeways for specific roads



Review and Briefings

- Review from the Montgomery County Council Transportation, Infrastructure, Energy and Environment (T&E) Committee
- Briefing with the Montgomery County Planning Board



Facility Planning / 35% Design at DOT

- Identify stakeholders and review agencies
- Collect background traffic and environmental data
- Public outreach, in the form of community meetings and written feedback
- Develop concept plans, DOT selects a preferred option to move forward
- Detailed surveying and site investigation (soil conditions, environmental impacts, noise impacts)
- Detailed engineering (horizontal and vertical alignment, right-of-way requirements, structures, intersection design, Stormwater Management Concept approval)
- Construction sequencing, costs, and scheduling
- **35% design is enough detail to provide an accurate cost estimate and schedule and allows the project to receive final design and construction funding**

Private Sector Road Projects



Master Plan of Highways and Transitways

- Classifies each street based on traffic volume and function
- Establishes minimum master-planned right-of-way
- Identifies transit priority streets
- Identifies-planned Bus Rapid Transit (BRT) station locations
- Recommends number of lanes and target speed



Master Plans and Sector Plans

- Defines land use and urban form
- May include local streetscape guidelines



Bicycle Master Plan

- Recommends bikeways on specific streets



Preliminary Plan, Site Plan, or Administrative Subdivision Plan (Depending on the project)

- Applicants submit a detailed plan of development with the location of streets and newly created lots and parcels
- Planning staff performs an Adequate Public Facilities finding to determine if the existing transportation network can handle the proposed development, and may recommend changes
- Public outreach, in the form of a community meeting and written feedback to the Planning Board
- Preliminary Plans go to the Development Review Committee



Planning Board Hearing and Approval



Sketch Plan

- Applicants submit an illustrative plan or model of their development, including the location of streets, buildings, and open spaces
- Public outreach, in the form of a pre-submission community meeting and written feedback to the Planning Board
- Sketch plans go to the Development Review Committee for review by planning staff, Department of Transportation (DOT), Department of Permitting Services (DPS), Department of Environmental Protection (DEP), Department of Public Works (DPW), Maryland DOT State Highway Administration (MDOT SHA), and local utilities (WSSC, Pepco, Washington Gas)



Planning Board Hearing and Approval



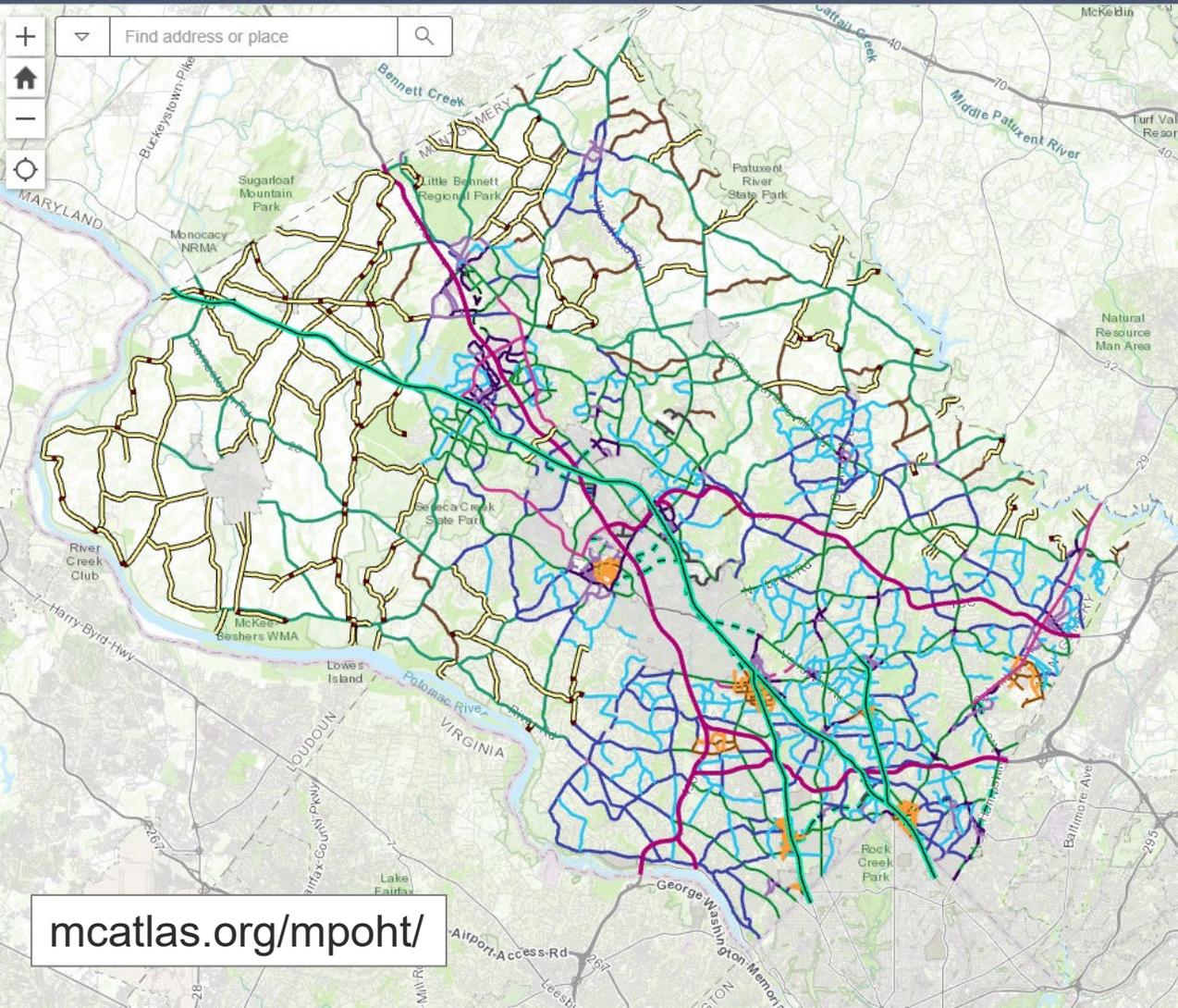
Record Plat with lots, parcels, and new public rights-of-way



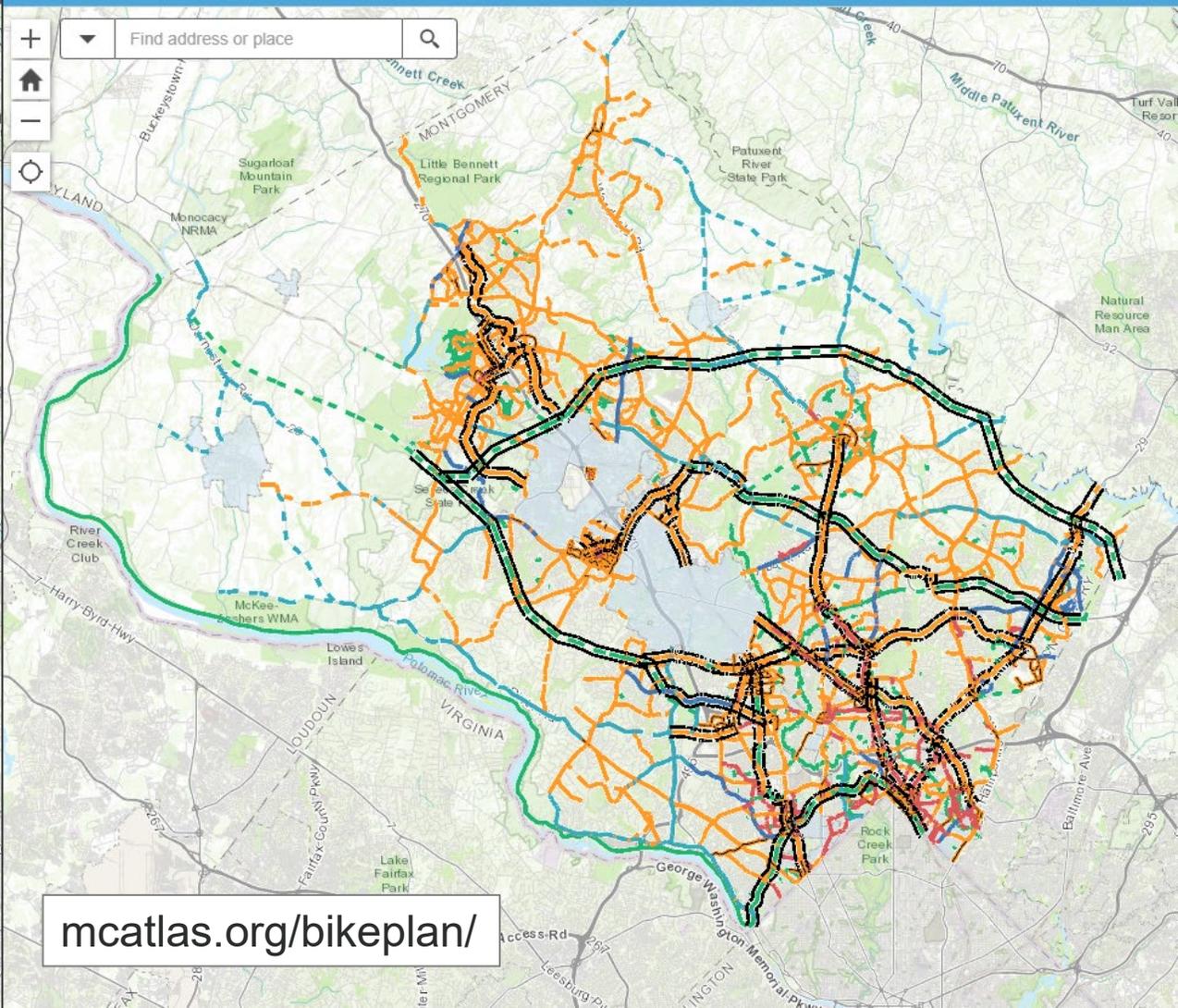
Construction

Using the Guide

Master Plan of Highways and Transitways

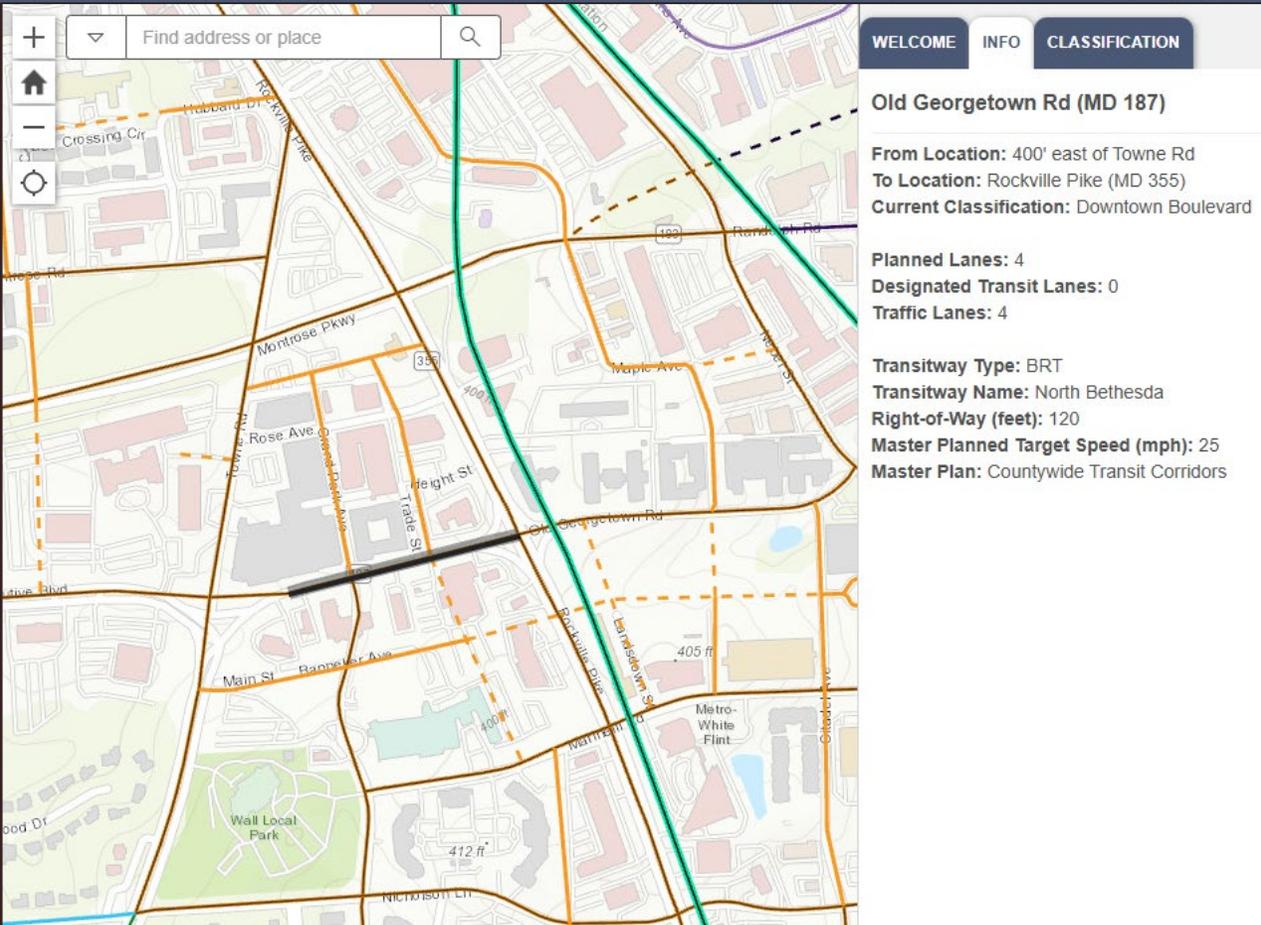


THE BICYCLE MASTER PLAN APPROVED BICYCLE NETWORK



Using the Guide

Master Plan of Highways and Transitways



Find address or place

WELCOME INFO CLASSIFICATION

Old Georgetown Rd (MD 187)

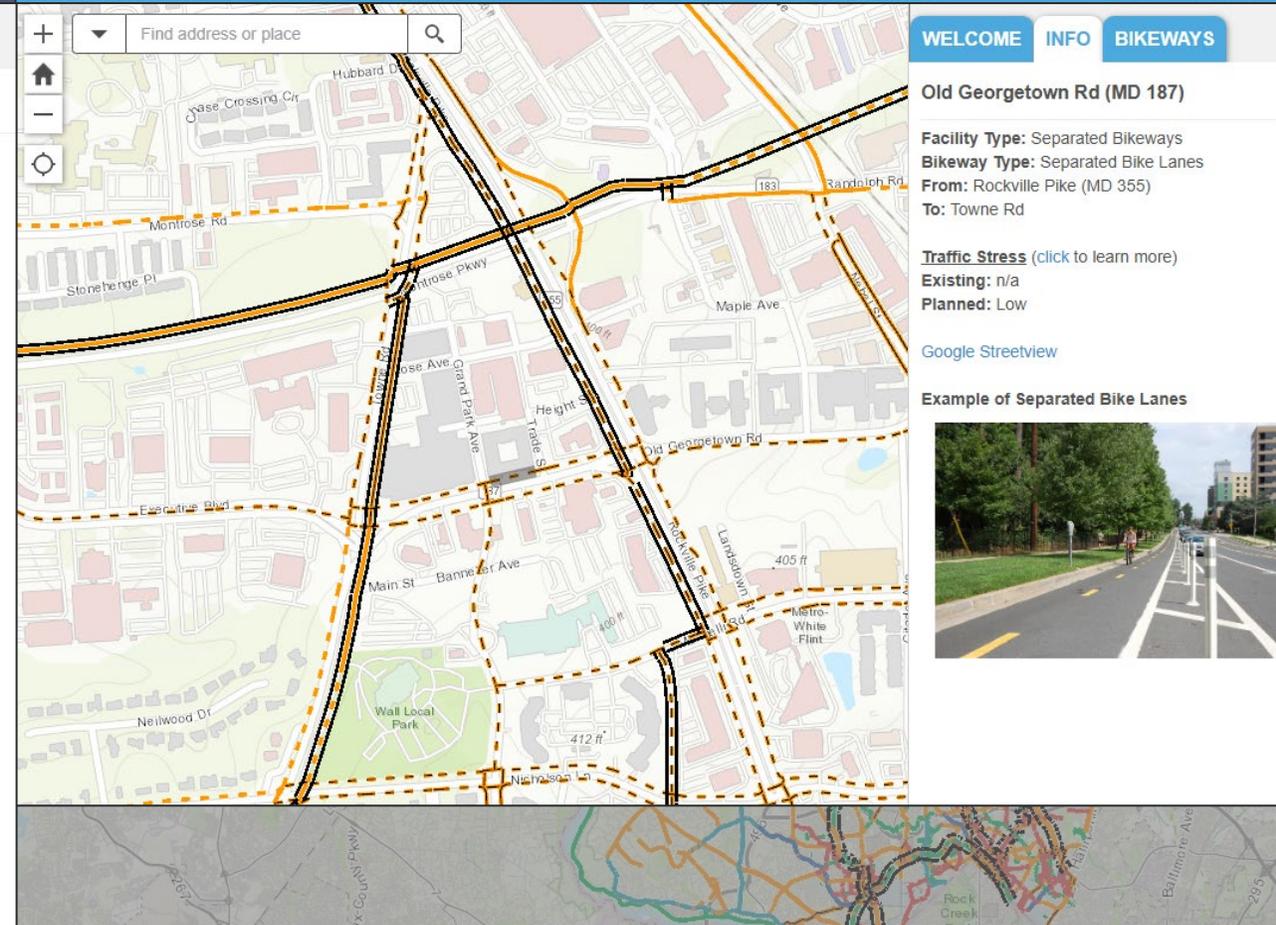
From Location: 400' east of Towne Rd
To Location: Rockville Pike (MD 355)
Current Classification: Downtown Boulevard

Planned Lanes: 4
Designated Transit Lanes: 0
Traffic Lanes: 4

Transitway Type: BRT
Transitway Name: North Bethesda
Right-of-Way (feet): 120
Master Planned Target Speed (mph): 25
Master Plan: Countywide Transit Corridors

mcatlas.org/mpoht/

THE BICYCLE MASTER PLAN APPROVED BICYCLE NETWORK



Find address or place

WELCOME INFO BIKEWAYS

Old Georgetown Rd (MD 187)

Facility Type: Separated Bikeways
Bikeway Type: Separated Bike Lanes
From: Rockville Pike (MD 355)
To: Towne Rd

Traffic Stress (click to learn more)
Existing: n/a
Planned: Low

[Google Streetview](#)

Example of Separated Bike Lanes



mcatlas.org/bikeplan/

Using the Guide

Downtown Boulevards – Street Design Parameters and Priorities

Below, Figure 2-18 presents a summary of Corridor Design Parameters to be used for Downtown Boulevards. Figure 2-19 presents a summary of Cross Section Design Parameters to be used for Downtown Boulevards. For ease of reference, a page reference column is provided to orient the user where each subject is covered in more detail.

Figure 2-18. Corridor Design Parameters for Downtown Boulevards

Design Parameter	Design Guidance	Notes	Page Ref
Target Speed	25 MPH	Presence, proximity, and volume of pedestrians, bicyclists, passenger vehicles, transit vehicles, and commercial vehicles shall be considered when determining an appropriate target speed. State law allows Montgomery County to reduce the posted speed limit to not less than 15 mph after performing an engineering and traffic investigation. Where existing posted speeds are less than the target speed: it is not the intent that these speed limits be raised.	267
Maximum # of Vehicle Through Lanes	6	See Master Plan of Highways and Transitways for number of travel lanes on specific streets, which supersedes this guidance. These are primarily for new roads and when considering road diets.	161
Maximum Spacing for Protected Crossings	400'	Site-specific needs and conditions will dictate actual implementation.	236
Generally Accepted Minimum Spacing for Signalized Intersections	400'	Refers to a full signalized intersection or roundabout. These targets are intended to maintain operations at a level that promotes safe movement by all travel modes. Site-specific needs and conditions, as determined through the regulatory approval process or capital project review, will dictate actual implementation.	236

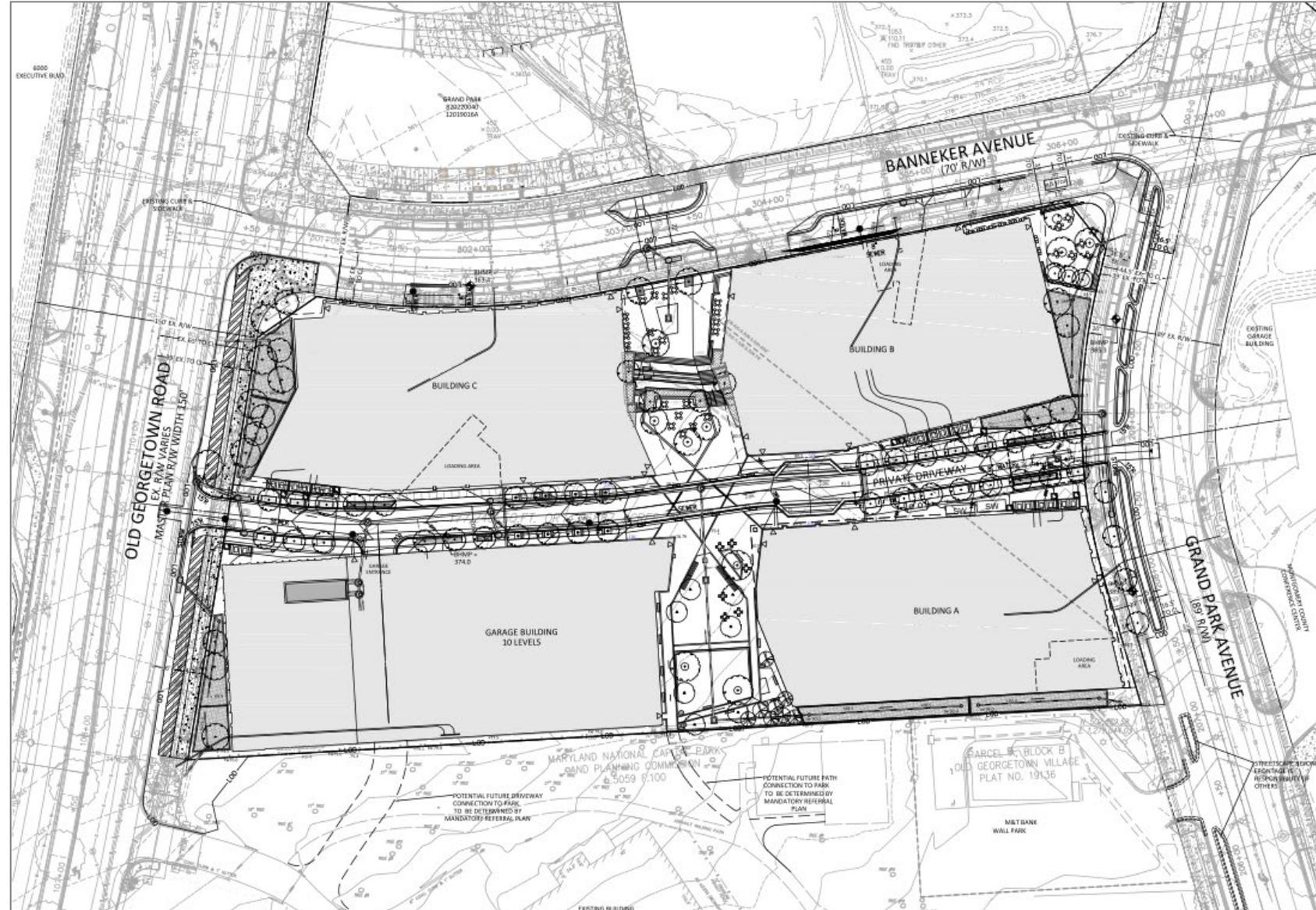
Figure 2-19. Cross Section Design Parameters and Prioritization for Downtown Boulevards

Design Parameter	Design Guidance	Priority	Notes	Page Ref
Street Zone				
Center Median	Recommended 6'-16'	M	The dimensions shown apply only if a median is provided. Medians may be wider than dimensions provided in some circumstances. The median may be replaced or widened to include left turn lanes at intersections. If the street is planned for a median transitway: transit lane dimensions supersede. Consult MCDOT for detailed info.	163
Dedicated Transitway	Transitway lanes: 13' default, 12' min Transitway buffer: 6' default, 2' min	M	The presence of a dedicated transitway is determined in the Master Plan of Highways and Transitways. If these dimensions vary from those provided in a specific Transitway planning process, those dimensions supersede this document. Dimensions may vary at stations, intersections & other crossing points, and along horizontal curves.	162
Left-Turn Lane	10' default, 9' min	M	Dimensions only apply if a left turn lane is provided.	159
Two-Way Left-Turn Lane	N/A	N/A	Two-Way Left-Turn Lanes are not appropriate along this street type.	159
Inside Travel Lane	10'	N/A	Use the Outside Travel Lane dimension if there is only one lane per direction. Lane width dimensions are intended for typical tangent (straight) sections. Segments with vertical or horizontal curves may require wider pavements per Section 3.3.10 of the AASHTO Green Book.	159

Figure 2-19 (continued)

Design Parameter	Design Guidance	Priority	Notes	Page Ref
Street Zone				
Outside Travel Lane	11'	N/A	Lane width dimensions are intended for typical tangent (straight) sections. Segments with vertical or horizontal curves may require wider pavements per Section 3.3.10 of the AASHTO Green Book. If the outside lane is adjacent to a striped bike lane, the total width (travel lane + bike lane) should be no less than 16'. Guidance also applies to right turn lanes, where needed. Gutter pan is included in Curbside Zone dimensions (below); however, if there is no Curbside Zone, gutter pan is included in these dimensions for the outside travel lane.	159
Curbside Zone	8'	L	Presumes parallel parking if parking is provided, and parking features accessible spaces. Accessible spaces require 13' width per PROWAG requirements. Gutter pan is included in Curbside Zone dimensions. If there is no Curbside Zone, the gutter pan is already included in the Outside Travel Lane width.	151
Active Zone				
Street Buffer	8' default, 6' min	H	In constrained environments, the default Street Buffer width is a higher priority than the default Bikeway width. Where a lane within the Street Zone is converted to a street-level separated bike lane, the Street Buffer may be reduced to 3' only when implemented by MCDOT as an interim bikeway. Where on-street parking is present, a minimum 3' door swing zone is required between the face of curb and any adjacent pedestrian or bicycle facility. To meet PROWAG requirements for accessible parking width (13'), the Street Buffer may need to be reduced to 5'.	122
Bikeway	Two-way SBL on both sides of street. Each SBL: 11' default, 8' min	H	Default bikeway types apply to streets without master planned bikeways. The widths apply to master planned and non-master planned bikeways. If the Bicycle Master Plan recommends something different for a specific street, that supersedes this guidance. Dimensions do not include the street buffer or pedestrian/bicycle buffer (see below). If bikeway is at street level and adjacent to the curb, dimensions include the gutter pan. For corridors designated as Breezeways: the Priority is always High, see additional requirements on pages 197-198 of this Guide, or in the Bicycle Master Plan.	202
Ped / Bike Buffer	6' default, 2' min	M	Provided only if a separated bike lane is provided. These should provide edge detection at minimum on the Bikeway side, and ideally also along the Clear Zone side. Ped/Bike Buffers that are reduced to less than 5' may restrict Street Trees, less than 4' may restrict more substantive street furniture, and less than 3' may restrict most street furniture such that the area may be used as more of an extension of the sidewalk. Consider increasing the Priority to High (H) when reducing beneath a threshold will affect items of particular importance.	181
Sidewalk	15' default, 10' min	H	Using the minimum dimension requires a waiver – consult MCDOT.	130
Frontage Zone	10' default, 0' min	M	Some or all of the frontage zone may occur on private property.	131
Maintenance Buffer	0'	N/A	Structures not part of the roadway design shall not occur in the public ROW. If there is a structure abutting the property line, a maintenance buffer is required even if this table shows a dimension of 0'.	119

Using the Guide

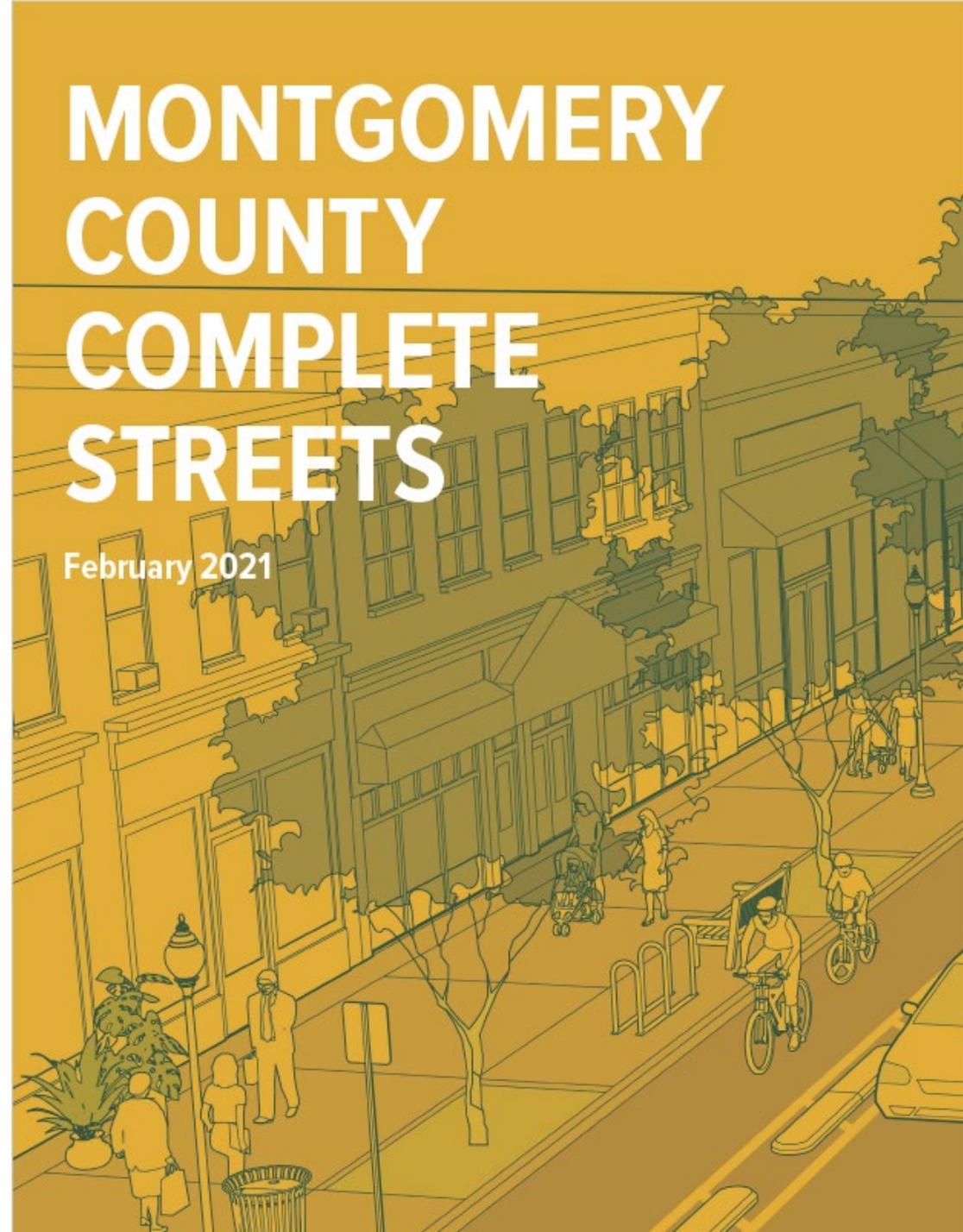


Next Steps

- **Creation of Version 1.3 – this is a living document**
 - Add Growth Corridors
 - Add Curbless & Shared Streets
 - Internal Private Streets
 - Access Management
 - Accessible Design
 - Floating Facility Design
- Curbside Management Guide - Ongoing
- Green Streets – Beginning Summer 2026

Lessons Learned

- Don't need to get it perfect
- Political support & public buy-in
- Interagency support
- Long-term costs & benefits
- Private development implementation
- Communications & website upkeep



Complete Streets Design Guide:

montgomeryplanning.org/planning/transportation/complete-streets/

Curbless & Shared Streets Design Guide:

montgomeryplanning.org/planning/transportation/shared-streets-design-guide/

Questions?



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