Bicycle Pedestrian Advisory Committee (BPAC) Meeting Summary

Wednesday, March 12, 2025 – 1:30 PM (Special Meeting)

Co-Chairs

Kansas co-chair: Leslie Herring, City of Westwood (present, in-person)
Missouri co-chair: Chuck Soules, City of Smithville (present, in-person)

Members/Alternates & Visitors in Attendance

<u>In-person</u>
Art Gough, citizen
Bailey Waters, City of Kansas City, MO
Brett McCubbin, City of Shawnee
Jan Faidley, City of Roeland Park
John Davis, Clay County
John Pileggi, Kimley-Horn
Kevin Kroll, Toole Design
Marlene Pardo, City of Kansas City, MO
Nick Ward-Bopp, Johnson County PRD
Noel Bennion, City of Riverside
Regan Tokos, City of Kansas City, MO
Riley Mitts, Kimley-Horn

<u>Virtual</u>
Alli Gerth, City of Olathe
Alysen Abel, City of Spring Hill
Andy Fry, WSP
Jenny Kramer, KDOT
Juan Yin, MoDOT
Mira Felzien, KCATA
Nicole Brown, Johnson County DHE
Tod Hueser, City of Olathe

MARC staff in attendance

<u>In-person</u>
Bobby Evans
Cy Splichal
Martin Rivarola
Patrick Trouba

<u>Virtual</u>
Beth Dawson

1) **Welcome and Introductions**
2) **<u>VOTE</u>: Approve the January 8 meeting summary**
   a) Brett McCubbin motioned to approve.
   b) Leslie Herring seconded the motion.
   c) Motion passes.
3) **<u>Presentation</u>: AASHTO Bike Facilities Guide, 5th Ed. (Kevin Kroll, Toole Design)**
   a) Kevin Kroll from Toole Design presented on the 5th Edition of the Guide for the Development of Bicycle Facilities, for which Toole Design was the lead author. The design user for this guide is the "interested but concerned" cyclist. The guide is not intended for designers to design for the minimum standard but instead recognizes a design range with minimums and maximums. Mr. Kroll briefly covered each chapter of the guide. After the presentation, attendees discussed maintenance, intended users, right-of-way availability, specifications for shared use paths and more. *See the attached slides for more details, including additional slides added by the presenter that were not covered in the meeting.*
4) **<u>Presentation</u>: Emmanuel Cleaver II counts and intercept surveys (Bailey Waters, KCMO & Tresa Carter, BikeWalkKC)**
   a) Bailey Waters and Tresa Carter presented on bicycle and pedestrian counts collected before and after a Complete Streets treatment was installed into Emanual Cleaver II Bvld. in Kansas City, MO. They also presented on surveys that were conducted online and with users of the new

infrastructure. This project was funded by a grant from the Kansas City Physical Activity Plan. Bicycle and pedestrian counts increased after the installation and survey results were mostly positive in regard to the new infrastructure. Attendees discussed motor vehicle counts, observing traffic, and more. *Please see the attached slides for more details.*

5) **Presentation/Discussion: Committee structure assessment review (Martin Rivarola, MARC)**
   a) Martin Rivarola reviewed MARC's transportation and air quality committee structure and feedback about it collected previously. He solicited feedback from attendees on the current structure and whether it should be simplified. Attendees discussed different possible ways to consolidate committees and what effects those might have, and more. *Please see the attached slides for more information.*

6) **Presentation/Discussion: Suballocated programming process debrief (Patrick Trouba, MARC)**
   a) Patrick Trouba asked questions of the committee related to how they view the suballocated programming process, as a round of programming was recently completed. Questions related to both the process and the project applications. Attendees discussed the utility of BPAC meetings, consolidating meetings, clarifying details of the process, the format of the application and how it encourages results, and more. *Please see the attached slides for more details.*

7) **Filling BPAC representative seats in other committees**
   a) Patrick Trouba informed the committee that four seats are open for alternates to BPAC's representatives to other committees. Mr. Trouba noted the individuals who would be open to filling those seats, but due to a lack of time and voting committee members, this item was deferred to the next meeting. *Please see the attached slides for more details.*

8) **Roundtable Updates**
   This item was deferred due to a lack of time.

Bicycle/Pedestrian Advisory Committee

March 12, 2025

Please enter your name and organization in the chat window so that we may have an accurate record of attendance

Agenda

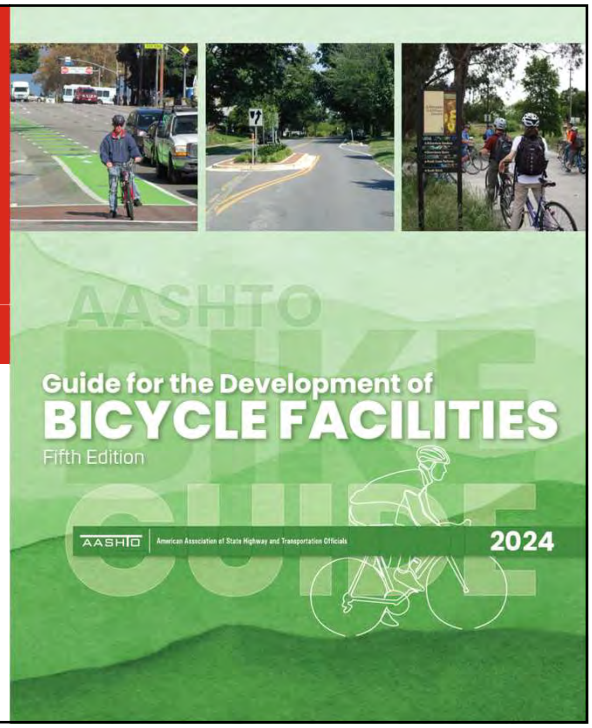
1) Welcome
2) VOTE: Approve the January 8 meeting summary
3) AASHTO Bike Facilities Guide, 5th Ed.
4) Emanuel Cleaver II Blvd. counts and intercept surveys
5) Suballocated programming process debrief
6) Committee structure assessment review
7) Filling BPAC representative seats in other committees
8) Roundtable updates

1

VOTE: Approve the January 8 meeting summary

2

2024 AASHTO Bike Guide 5th Edition



Mid America Regional Council
Bicycle and Pedestrian Advisory Committee
March 12, 2025

Kevin Kroll – Toole Design

TOOLE DESIGN

3

2012 Guide compared to 2024 Guide

2012 Guide	2024 Guide	Notable Changes of 2024 compared to 2012
Chapter 1. Introduction	1. Introduction	REWRITE with new discussion of design range concept
Chapter 3. Bicycle Operation and Safety	2. Bicycle Operation & Safety	REWRITE of former Chapter 3
Chapter 2. Bicycle Planning	3. Bicycle Planning	REWRITE and NEW CONTENT added to former Chapter 2
	4. Facility Selection	NEW CHAPTER with a few items carried from Chapter 2
	5. Elements of Design	NEW CHAPTER with some content pulled from Chapters 4 and 5
Chapter 5. Design of Shared Use Paths	6. Shared Use Paths	REVISION of Chapter 5
	7. Separated Bike Lanes	NEW CHAPTER with new content
	8. Bicycle Boulevards	NEW CHAPTER with new content
Chapter 4. Design of On-Road Facilities	9. Bike Lanes & Shared Lanes	REVISION of Chapter 4
	10. Traffic Signals and Active Warning Devices	NEW CHAPTER with new content
	11. Roundabouts, Interchanges, and Alternative Intersections	NEW CHAPTER with new content
	12. Rural Area Bikeways	NEW CHAPTER with some content pulled from Chapter 4
	13. Structures	NEW CHAPTER with some content pulled from Chapter 5
	14. Wayfinding	NEW CHAPTER with some content pulled from Chapter 4
Chapter 7. Maintenance and Operations	15. Maintenance & Operations	REVISION of chapter 7
Chapter 6. Bicycle Parking Facilities	16. Parking, Bike Share, & End of Trip Facilities	REVISION of chapter 6

TOOLE DESIGN

4

Who should the default design user be?

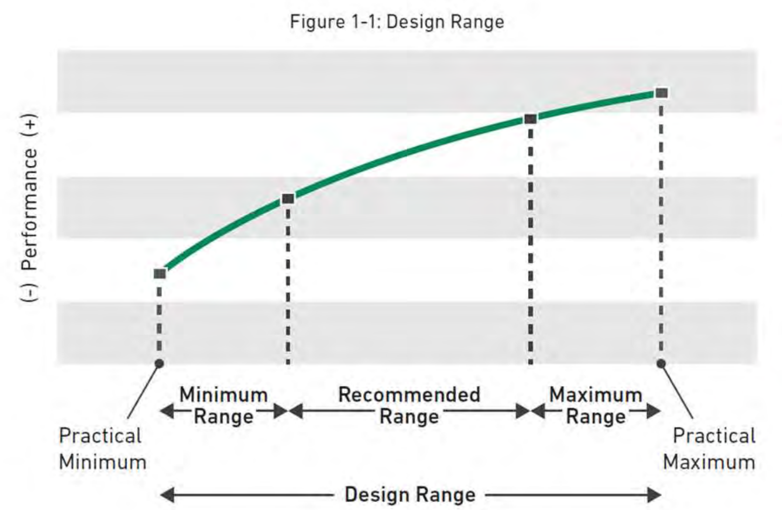
Experienced & Confident Cyclist
AASHTO 1981 - 2012

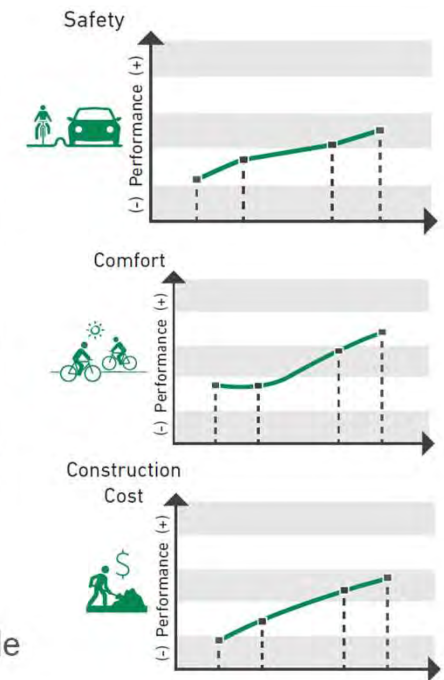
Interested but Concerned Cyclist
AASHTO 2024

TOOLE DESIGN

Chapter 1 – Introduction

1.1 Design Imperative for Bicycle Facilities
1.2 Purpose
1.3 Design Flexibility
1.4 Use of Values in the Guide
1.5 Scope
1.6 Relationship to other Design Guides and Manuals
1.7 Structure of this Guide
1.8 Definitions





TOOLE DESIGN

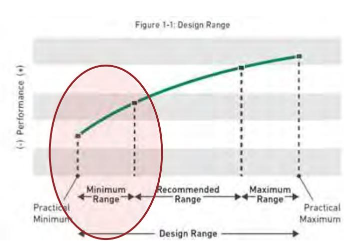
Section 1.4 – Use of Values in the Guide

7

Section 1.4 – Use of Values in the Guide

1.4.1. Minimum Range

The use of **values within the minimum range should be minimized** because they are likely to diminish mobility, safety, and comfort



TOOLE DESIGN

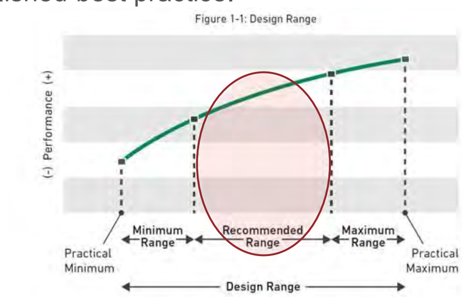
8

Section 1.4 – Use of Values in the Guide

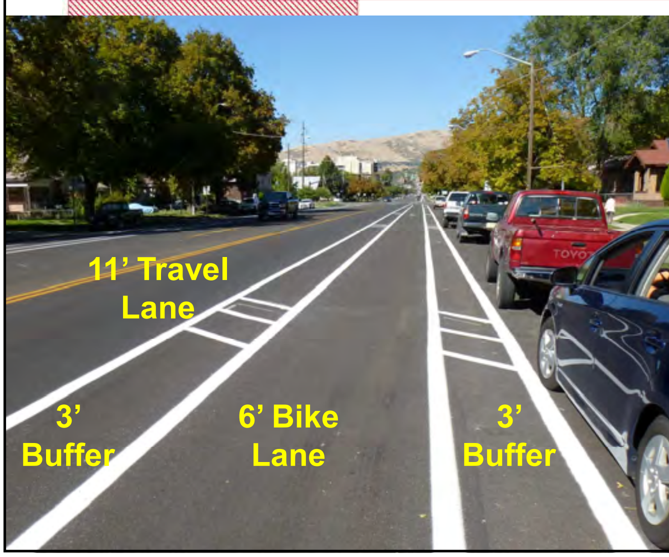
1.4.2. Recommended Values Range

The use of **values within the recommended range should be chosen** to maximize mobility, safety and comfort benefits for bicyclists as well as other users.

These values were determined by research or established best practice.



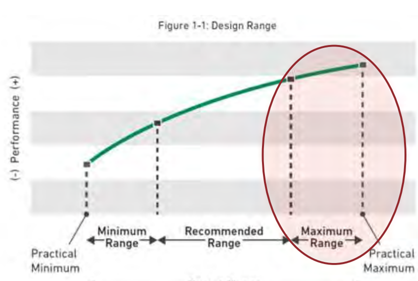
Section 1.4 – Use of Values in the Guide



1.4.3. Maximum Range

The use of **values within the practical maximum range should only be considered when:**

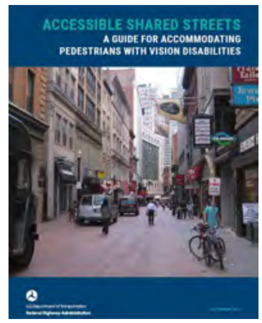
- there are clear benefits to all users and
- bicyclist volumes are high.



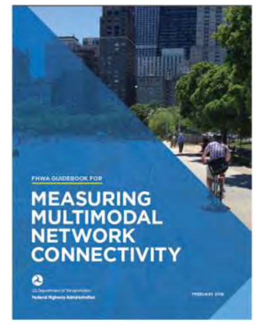
Section 1.6 - Relationship to Other Manuals

FHWA Separated Bike Lane Planning and Design Guide
May 2015

FHWA Achieving Multimodal Networks
August 2016



FHWA Accessible Shared Streets
September 2017



FHWA Measuring Multimodal Network Connectivity
February 2018

TOOLE DESIGN

11

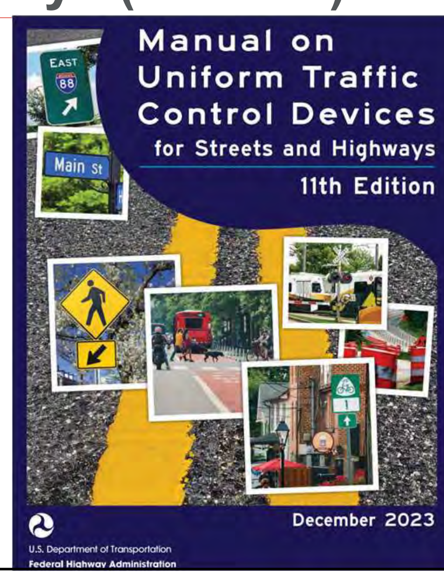
1.6.1. Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)

MUTCD defines design and application of traffic control devices (TCDs).

2024 Bike Guide conforms to 2023 MUTCD

> Includes some TCDs that require experimental approval by FHWA (located at the end of their respective section)

AASHTO expands upon the application of TCDs



TOOLE DESIGN

12

Example

AASHTO | GUIDE FOR THE DEVELOPMENT OF BICYCLE FACILITIES, 5TH EDITION

9.8. Advisory Bicycle Lanes (Experimental)

Advisory bicycle lanes are continuously-dotted bicycle lanes which permit motorists to temporarily enter the bicycle lane, allowing opposing motor vehicle traffic sufficient space to pass (see Figures 9-15 and 9-16). They are an experimental design treatment for streets with lower traffic speeds and volumes where it is not feasible to provide standard-width travel lanes and bicycle lanes. They are designed to improve bicyclist comfort while also providing a traffic calming benefit. This is the same procedure for motorists operating on yield streets where motorists must move to the right side of the road, into unoccupied parking spaces or driveways, to permit oncoming traffic to pass (see Section 8.4.1).

Figure 9-15: Example of an Advisory Bicycle Lane in Alexandria, VA

Where advisory bicycle lanes are installed, they should include bicycle lane signs (R3-17) and bicycle lane symbol pavement markings. The placement of the signs and bicycle lane symbols should follow guidance for bicycle lanes. Experimental approval from FHWA is required to use this traffic control treatment. See Section 1.6.1 for guidance on requests to experiment.

Advisory shoulders are a similar treatment used in locations where sidewalks are not provided. Bicycle symbols are omitted to allow pedestrians to share the shoulder space with bicyclists. Chapter 12 provides design guidance for advisory shoulders.

TOOLE DESIGN

13

13

Chapter 2 - Bicycle Operation and Safety

2.1. Introduction

2.2 Safety of Bikeways and Shared Lanes

2.3. Bicyclist Design User Profiles

2.4. Bicyclist Safety and Performance Characteristics

2.5. Design Vehicle and Bicyclist Operating Criteria

2.6. Operating Principles for Bicyclists

2.7. Guiding Principles for Bicyclist Safety

14

2.2.1. Relationship between Perceived Comfort and Substantive Safety

Research has found a significant relationship between

- how safe and comfortable people feel bicycling,
- whether and how often they bicycle,
- preferences for facility types, and the provision of those facilities.

TOOLE DESIGN

2.2.1. Relationship between Perceived Comfort and Substantive Safety

Crashes and near-crash experiences influence perceived bicycling safety and comfort

(Lee et al., 2015; Sanders, 2015; Aldred & Crossweller, 2015)

TOOLE DESIGN

2.3. Bicyclist Design User Profiles

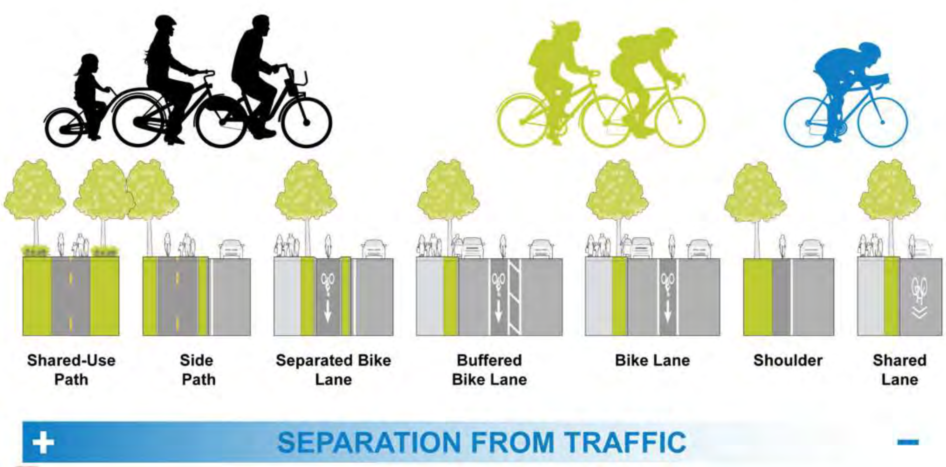
Comfort Typology of Bicyclists

Design User Profile	Non-Bicyclist	Interested but Concerned	Somewhat Confident	Highly Confident
Bicycling Preferences	Uncomfortable bicycling in any condition, have no interest in bicycling, or are physically unable to bicycle.	Often not comfortable with bike lanes; may bike on sidewalks even if bike lanes are provided. Prefer off-street or separate bicycle facilities or quiet or traffic-calmed residential roads. May not bike at all if bicycle facilities do not meet needs for perceived comfort.	Generally prefer more separated facilities, but comfortable riding in bicycle lanes or on paved shoulders if need be.	Comfortable riding with traffic; will use roads without bike lanes.
Percent of Population	31–37%	51–56%	5–9%	4–7%

Figure 2-2: Comfort Typology of Bicyclists (See Chapter 2 References: Dill and McNeill, 2016)

TOOLE DESIGN

Comfort Increases with Separation



TOOLE DESIGN

2.2.2. Safety in Numbers

Bicyclist risk does not increase proportionately to their increased volume, but actually **decreases as the number of bicyclists increases**.

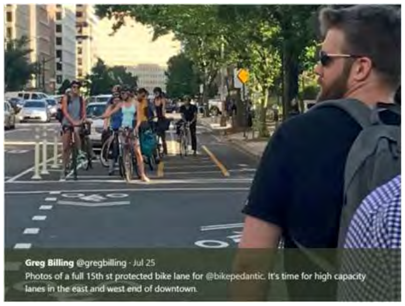
Example
15th Street, NW
Washington DC

Shared Lane

2010: <100 cyclists /day

Separated Bike Lane

2017: 2,500 cyclists /day



TOOLE DESIGN

2.7. Guiding Principles for Bicyclist Safety

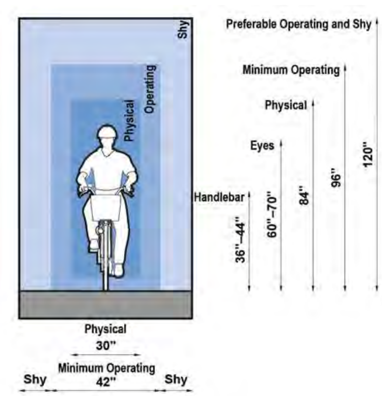


Figure 2-5: Typical Adult Bicyclist Operating Space

- Reduced injury risk compared to standard bike lanes and shared lanes
  (Lusk et al., 2013; Lusk et al., 2011; NYCDOT, 2014; Winters et al., 2013)
- SBL preferred over striped or shared lanes by both cyclists and motorists
  (Monsere et al., 2014; Monsere et al., 2012; Sanders, 2014)
- One-way generally safer than two-way
  (Schepers et al., 2011; Thomas & DeRobertis, 2013)
- Two-way SBLs on one-way roads, preferable on right side
  (Schepers et al., 2011; Zangenehpour et al., 2015)

TOOLE DESIGN

Chapter 3: Bicycle Planning

Bicycle Planning Principles

3.2.1. Safety – reduce frequency and severity of crashes by separating bicyclists from higher speed and volumes of motorists

3.2.2. Comfort – do not deter use due to safety concerns

3.2.3. Connectivity – direct, complete and continuous

3.2.4. Legibility – easy to recognize and intuitive to use

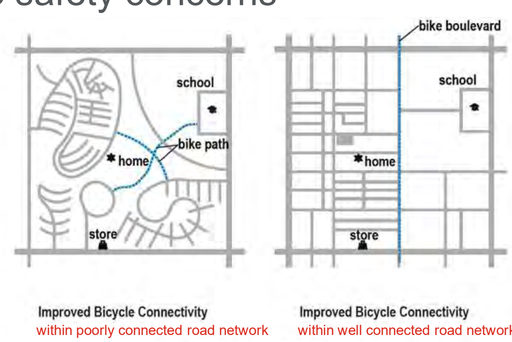


Figure 3-1: Examples of Contrasting Connectivity

TOOLE DESIGN

3.9.2. Quality of Service and Bicycle Level of Service Tools

3.9.2.2 Level of Traffic Stress

objective and quantitative method of classifying road segments and bikeway networks based on how comfortable bicyclists feel

Figure 3-3: Example of Bicycle Master Plan Recommendations Map[29]

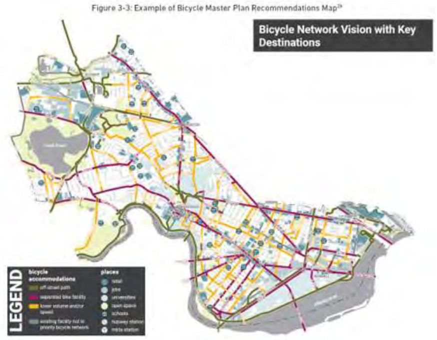


Table 3-4: Levels of Traffic Stress[32]

Levels of Traffic Stress (LTS)	
LTS 1	Presenting little traffic stress and demanding little attention from cyclists, and attractive enough for a relaxing bike ride. Suitable for almost all cyclists, including children trained to safely cross intersections. On links, cyclists are either physically separated from traffic, or are in an exclusive bikeway next to a slow traffic stream with no more than one lane per direction, or are on a shared road where they interact with only occasional motor vehicles (as opposed to a stream of traffic) with a low speed differential. Where cyclists ride alongside a parking lane, they have ample operating space outside the zone into which car doors are opened. Intersections are easy to approach and cross.
LTS 2	Presenting little traffic stress and therefore suitable to most adult cyclists but demanding more attention than might be expected from children. On links, cyclists are either physically separated from traffic, or are in an exclusive bicycling zone next to a well-confined traffic stream with adequate clearance from a parking lane, or are on a shared road where they interact with only occasional motor vehicles (as opposed to a stream of traffic) with a low speed differential. Where a bike lane lies between a through lane and a right-turn lane, it is configured to give cyclists unambiguous priority where motor vehicles cross the bike lane and to keep speeds in the right-turn lane comparable to bicycling speeds. Crossings are not difficult for most adults.
LTS 3	More traffic stress than LTS 2, yet markedly less than the stress of integrating with multilane traffic, and therefore welcome to many people currently riding bikes in American cities. Offering cyclists either an exclusive bikeway next to moderate-speed traffic or shared lanes on streets that are not multilane and have moderately low speed. Crossing may be longer or across higher-speed roads than allowed by LTS 2, but still considered acceptably safe to most adult bicyclists.
LTS 4	A level of stress beyond LTS 3. Bicyclist mix with motor vehicle traffic. Generally uncomfortable for most adults.

TOOLE DESIGN

Chapter 4 - Guidance for Choosing a Bikeway Type

4.1 Introduction

4.2 Project Performance Goals and Objectives

4.3 Selecting the Preferred Bikeway Type

4.4 Strategies to Achieve the Preferred (or Next Best) Design

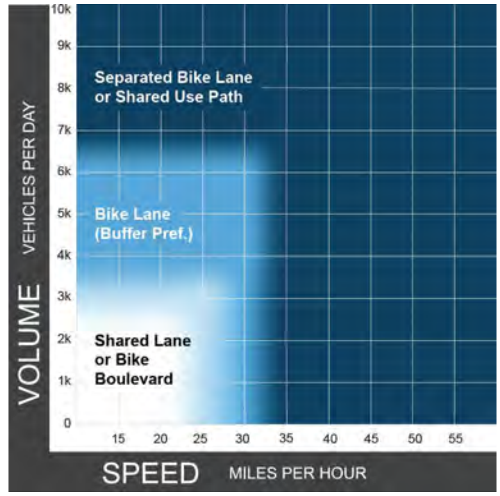
4.5 Evaluating Design Alternatives and Trade-offs to Select a Bikeway

Section 4.3.1 – Streets in Urban, Suburban and Rural Town Contexts

Identifies the **preferred** bikeway type assuming:

Design User = Interested but Concerned bicyclist

Analysis = Level of Traffic Stress



TOOLE DESIGN

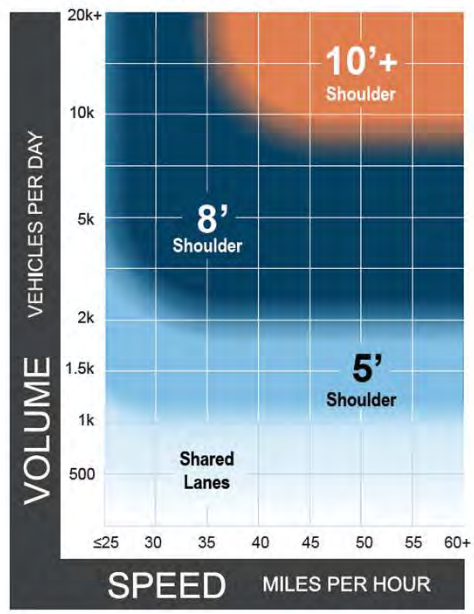
Section 4.3.2 – Rural Roadways

Identifies the **preferred** shoulder width assuming:

Design User = Confident bicyclist

Analysis = Bicycle LOS

Figure 4-2: Preferred Paved Shoulder Widths for Rural Roadways to Accommodate Highly Confident or Somewhat Confident Bicyclists



TOOLE DESIGN

4.4.2. Example Strategies for Constrained Rights-of-Way

4.4.2.1 Traffic Analysis Approach

4.4.2.2 Narrowing Travel Lanes

4.4.2.3 Removing Travel Lanes

4.4.2.4 Reorganizing Street Space

4.4.2.5 Making Changes to On-Street Parking

4.4.2.6 Reducing Bikeway Widths

4.4.2.7 Reducing Motor Vehicle Traffic Volumes and Speeds

4.5.2. Example of Trade-off Considerations Between Common Bikeway Types

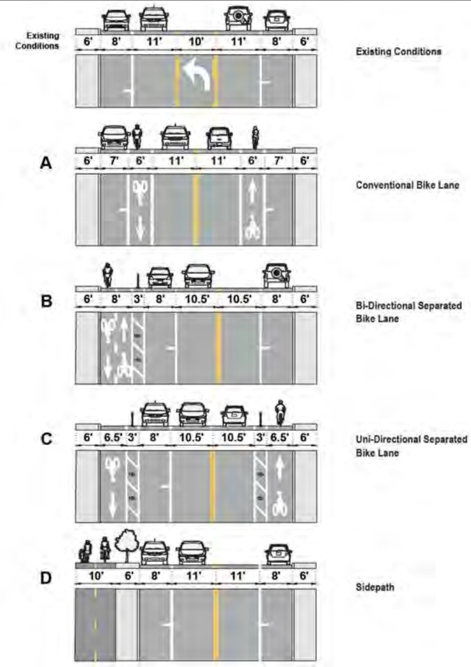


Figure 4-3: Common Bikeway Options within a 48-ft Cross Section

TOOLE DESIGN

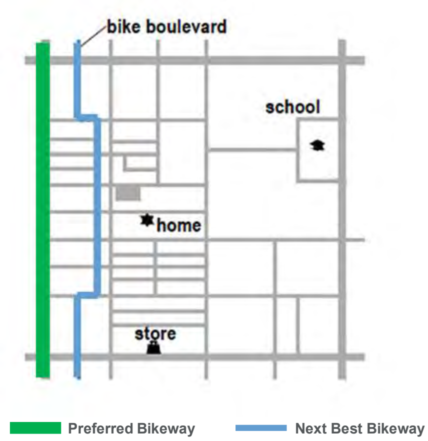
4.5.3. Selecting the Next Best Facility When the Preferred Bikeway Is Not Feasible

Alternative Route

If no other design improvements are feasible, it is necessary to consider alternative parallel routes.

Research indicates that for an alternative low-stress route to be viable, **the increase in trip length should be less than 30 percent**.

Broach, J., Dill, J., and J., Gliebe. Where Do Cyclists Ride? A Route Choice Model Developed with Revealed Preference GPS Data



TOOLE DESIGN

Chapter 5 – Elements of Design

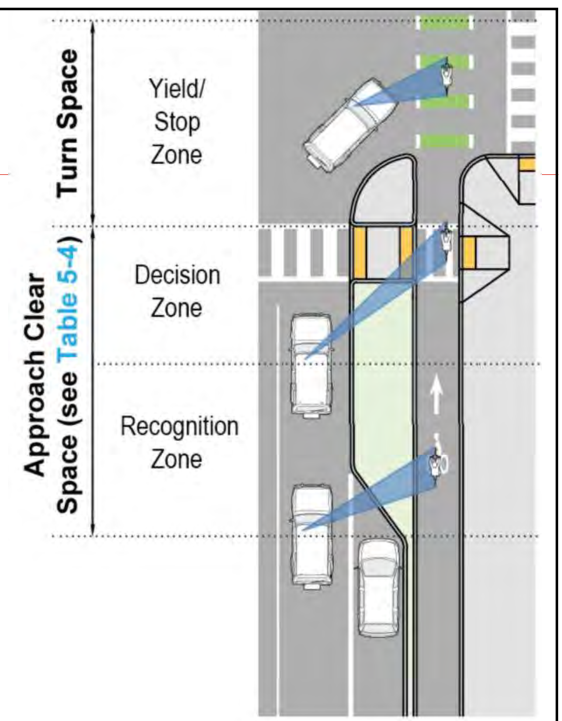
- 5.1 Introduction
- 5.2 Design User
- 5.3 Design Speed
- 5.4 Understanding Assignment of Right of Way
- 5.5 Sight Distance
- 5.6 Surface and Geometric Design Elements
- 5.7 Characteristics of Intersections
- 5.8 Intersection Design Objectives
- 5.9 Evaluating Bicycle and Pedestrian Roadway Crossings
- 5.10 Geometric Design Treatments to Improve Intersection Safety
- 5.11 Warning and Regulatory Traffic Control Devices
- 5.12 Pavement Markings
- 5.13 Bicycle Travel Near Rail Lines
- 5.14 Other Design Features

Section 5.4 – Understanding Assignment of Right of Way

All street users need opportunity for Mutual Identification because:

- Motorists & bicyclists must yield to pedestrians in crosswalks
- Pedestrians cannot suddenly leave the curb if vehicles too close to stop
- Motorists must exercise due care to avoid colliding with bicyclists/peds

The approach to a conflict point is composed of three zones.



TOOLE DESIGN

5.5.2. Stopping Sight Distance

Tables provided for:

- Unexpected Conflict, 2.5 second PRT
- Expected Conflict, 1.5 second PRT

Table 5-2: Minimum Bicyclist Stopping Sight Distance vs. Grades for Various Design Speeds—2.5-Second Reaction Time

Stopping Sight Distance (ft) Based on Speed and Grade for a 2.5-Second Perception-Reaction Time											
Speed (mph)	Grade (Positive indicates ascending)										
	–10%	–8%	–6%	–4%	–2%	0	2%	4%	6%	8%	10%
10				65	61	58	55	53	52	51	50
11				74	69	66	63	61	59	57	56
12				84	78	74	71	68	66	64	62
15			130	118	109	102	97	93	89	86	84
18	246	201	174	156	143	134	126	120	115	111	108
20	296	240	207	185	169	157	148	140	134	129	
25	440	353	300	266	241	222	208	196	187		
30	611	486	411	361	325	298	277	260			

Note: Calculations are assumed under wet conditions.

Table 5-3: Minimum Bicyclist Stopping Sight Distance vs. Grades for Various Design Speeds—1.5-Second Reaction Time

Stopping Sight Distance (ft) Based on Speed and Grade for a 1.5-Second Perception-Reaction Time											
Speed (mph)	Grade (Positive indicates ascending)										
	–10%	–8%	–6%	–4%	–2%	0	2%	4%	6%	8%	10%
10%				50	46	43	41	39	37	36	35
11				58	53	49	47	44	43	41	40
12				66	61	56	53	50	48	46	45
15			108	96	87	80	75	71	67	64	62
18	220	175	148	130	117	107	100	94	89	85	81
20	267	211	178	155	139	128	118	111	105	100	
25	403	316	264	229	204	185	171	159	150		
30	567	442	367	317	281	254	233	216			

Note: Calculations are assumed under wet conditions.

TOOLE DESIGN

5.5.4.1 Sight Distance and Approach Clear Space for Bikeways at Roadway Intersections

- **Turning Motorist Yields to (or Stops for) Through Bicyclists:** When a through moving bicyclist that arrives or will arrive at the crossing prior to a turning motorist, the motorist must stop or yield.
- **Through Bicyclist Yields to (or Stops for) Turning Motorist:** When a turning motorist arrives or will arrive at the crossing prior to a through moving bicyclist, the bicyclist must stop or yield.
- **User with Right-of-Way Yields to (or Stops for) Another User:** Sometimes the user with the right-of-way will instead yield the right-of-way.
- **APPROACH CLEAR SPACE ALLOWS THIS TO FUNCTION!**

TOOLE DESIGN

5.5.4.1.1 Case S – Right-Turning Motorist Across Separated Bike Lane or Side Path

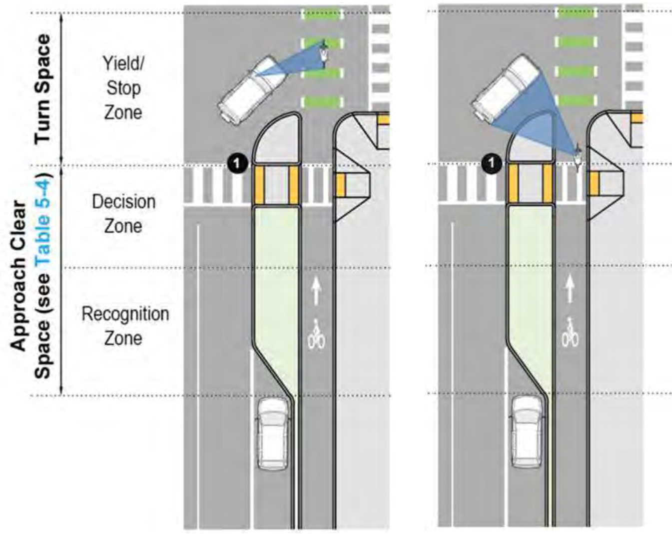
Table 5-4: Recommended Intersection Approach Clear Space by Vehicular Turning Design Speed

Effective Vehicle Turning Radius	Vehicular Turning Speed	Recommended Approach Clear Space
<18 ft	<10 mph[a]	20 ft
18 ft	10 mph	40 ft
25 ft	15 mph	50 ft
30 ft	20 mph	60 ft
>30 ft	25 mph	70 ft

[a] Most low-volume driveways and alleys

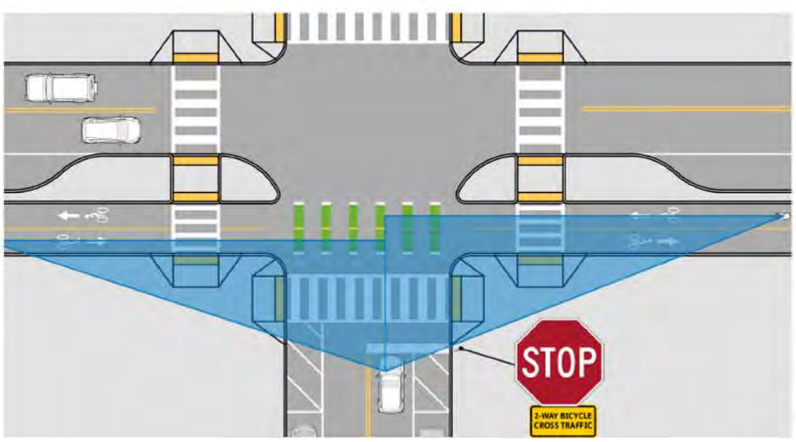
legend

line of sight



TOOLE DESIGN

5.5.4.1.3 Case U1 – Through Motorist Crossing of a Separated Bike Lane or Shared Use Path



at a minimum the **provision of stopping sight distance for bicyclists** (Section 5.5.2) **should be provided** to allow a bicyclist to slow or stop if a vehicle encroaches into the separated bike lane or side path

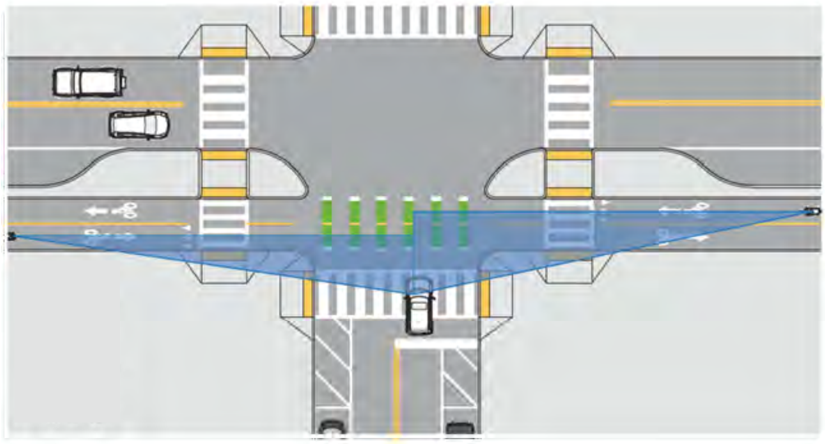
legend

Case U1 sight triangles

Figure 5-3: Intersection Sight Distance: Case U1

TOOLE DESIGN

7.9.5 Case U1 – Multistep Variant



Chapter 7 sight distance

- Driver looks for pedestrians, then moves forward
- Driver looks for bicyclists, then moves forward
- Driver looks for other motorists, then proceeds

legend

Case U1 sight triangles

AASHTO *Green Book* Case B sight triangles

TOOLE DESIGN

5.5.4.1.3.3 U3 – Mid-Block Shared Use Path Crossing of an Uncontrolled Roadway

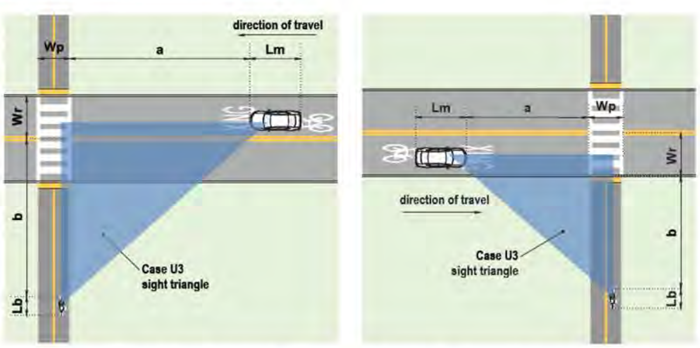


Figure 5-5: Sight Triangle for Uncontrolled Mid-Block Path Crossing of an Uncontrolled Roadway: Case U3

Table 5-8: Length of Path and Roadway Sight Triangle for Uncontrolled Crossings: Case U3

Length of Path and Roadway Sight Triangle (ft) - Case U3						
Bike Speed (mph)	Roadway Speed (mph)					
	15	20	25	30	35	40
10	96 / 58	128 / 59	160 / 63	192 / 68	224 / 74	255 / 81
11	97 / 64	129 / 65	162 / 69	194 / 75	226 / 82	258 / 89
12	98 / 70	131 / 70	164 / 75	197 / 82	230 / 89	262 / 97
15	105 / 87	140 / 88	174 / 94	209 / 102	244 / 111	279 / 122
18	112 / 105	150 / 106	187 / 113	225 / 122	262 / 134	300 / 146
20	118 / 116	157 / 117	197 / 125	236 / 136	275 / 149	315 / 162
25	133 / 145	178 / 147	222 / 156	266 / 170	311 / 186	355 / 203
30	149 / 174	199 / 176	249 / 188	298 / 204	348 / 223	398 / 244

a / b: a = sight distance (ft) along roadway; b = sight distance (ft) along path

Assumptions: Bicycle reaction time = 1.5 seconds
Width of path = 10 ft to 11 ft
Width of road lane = 11 ft to 12 ft
Length of bicycle = 6 ft
Length of motor vehicle = 18 ft
Grade = –2 percent to +2 percent

TOOLE DESIGN

5.5.4.3 Sight Distance at Horizontal Curves

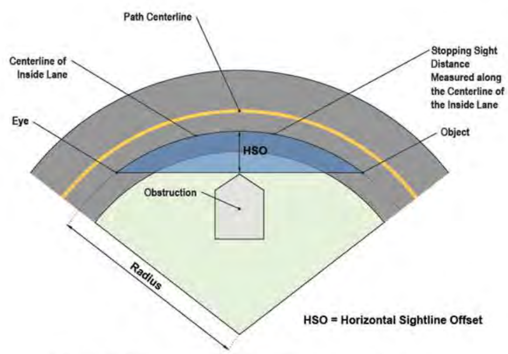


Figure 5-10: Diagram Illustrating Components for Determining Horizontal Sightline Offset

Table 5-11: Horizontal Sightline Offset Look-Up

Minimum Lateral Clearance (Horizontal Sightline Offset or HSO) for Horizontal Curves (ft)														
R (ft)	S = Stopping Sight Distance (ft)													
	40	60	80	100	120	140	160	180	200	220	240	260	280	300
25	7.6	15.9												
50	3.9	8.7	15.2	23.0	31.9	41.5								
75	2.7	5.9	10.4	16.1	22.8	30.4	38.8	47.8	57.4	67.2				
100		4.5	7.9	12.2	17.5	23.5	30.3	37.8	46.0	54.6	63.8	73.3	83.0	92.9
125		3.6	6.3	9.9	14.1	19.1	24.7	31.0	37.9	45.4	53.3	61.7	70.6	79.7
150		3.0	5.3	8.3	11.8	16.0	20.8	26.2	32.1	38.6	45.5	52.9	60.7	69.0
175		2.6	4.6	7.1	10.2	13.8	18.0	22.6	27.8	33.5	39.6	46.1	53.1	60.5
200			4.0	6.2	8.9	12.1	15.8	19.9	24.5	29.5	34.9	40.8	47.0	53.7
225			3.5	5.5	8.0	10.8	14.1	17.8	21.9	26.4	31.3	36.5	42.2	48.2
250			3.2	5.0	7.2	9.7	12.7	16.0	19.7	23.8	28.3	33.1	38.2	43.7
275			2.9	4.5	6.5	8.9	11.6	14.6	18.0	21.7	25.8	30.2	34.9	39.9
300			2.7	4.2	6.0	8.1	10.6	13.4	16.5	19.9	23.7	27.7	32.1	36.7
350				3.6	5.1	7.0	9.1	11.5	14.2	17.1	20.4	23.9	27.6	31.7
400				3.1	4.5	6.1	8.0	10.1	12.4	15.0	17.9	20.9	24.3	27.8
450				2.8	4.0	5.4	7.1	9.0	11.1	13.4	15.9	18.7	21.6	24.8
500				2.5	3.6	4.9	6.4	8.1	10.0	12.1	14.3	16.8	19.5	22.3
600					3.0	4.1	5.3	6.7	8.3	10.1	12.0	14.0	16.3	18.7
700					2.6	3.5	4.6	5.8	7.1	8.6	10.3	12.0	14.0	16.0
800						3.1	4.0	5.1	6.2	7.6	9.0	10.5	12.2	14.0
900						2.7	3.6	4.5	5.6	6.7	8.0	9.4	10.9	12.5
1000							3.2	4.0	5.0	6.0	7.2	8.4	9.8	11.2

Table 5-12: Horizontal Sightline Offset for Horizontal Curves Equation

Horizontal Sight Line Offset for Horizontal Curves Equation

$$HSO = R\left[1 - \cos\left(\frac{28.65S}{R}\right)\right]$$

$$S = \frac{R}{28.65}\left[\cos^{-1}\left(\frac{R - HSO}{R}\right)\right]$$

Where:

S	=	stopping sight distance (ft)
R	=	radius of centerline of lane (ft)
HSO	=	horizontal sightline offset, distance from centerline of lane to obstruction (ft)

Note: Angle is expressed in degrees.

TOOLE DESIGN

5.8. Intersection Design Objectives

5.8.1. Minimize Exposure to Conflicts

5.8.2. Reduce Speeds at Conflict Points

5.8.3. Communicate Right-of-Way Priority

5.8.4. Providing Adequate Sight Distance

5.8.5. Transitions to Other Facilities

5.8.6. Accommodating Persons with Disabilities

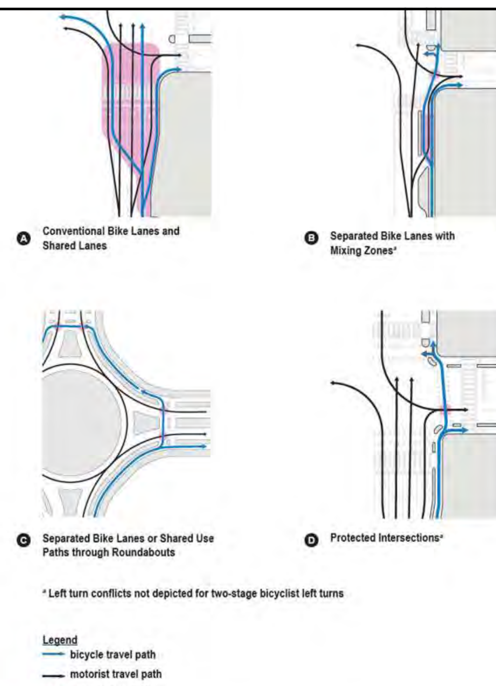


Figure 5-13: Comparison of Bicyclist Exposure to Motor Vehicles at Intersections

TOOLE DESIGN

5.9.2. Evaluations of Uncontrolled Roadway Approaches to Bicycle Crossings

5.9.2.1 Factors That Impact Motorist Yielding Rates

5.9.2.2.1 Recommended Crossing Opportunities

Table 5-14: Recommended Minimum Range of Hourly Crossing Opportunities

	Major Street Crossings (opportunities per hour)
Recommended	≥120
Practical Minimum	60 to <120

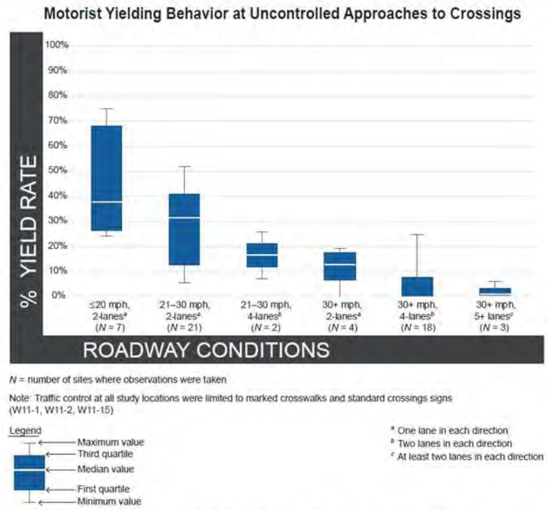


Figure 5-14: Motorist Yielding at Uncontrolled Crossings Based on Roadway Characteristics

TOOLE DESIGN

5.9.2.3 Apply Countermeasures to Improve Yielding

Tier 1: Signing & Markings

Tier 2: RRFB & Geometric Improvements

Tier 3: PHB, Signal, or Grade Separation

Table 5-15: Uncontrolled Crossing Evaluation

Uncontrolled Crossing Countermeasure Evaluation Table

Roadway Type	Vehicle ADT < 9,000			Vehicle ADT 9,000 - 12,000			Vehicle ADT 12,000 - 15,000			Vehicle ADT > 15,000		
Number of Travel Lanes and Median Type	Speed Limit (mph)											
	≤30	35	40≥[a]	≤30	35	40≥[a]	≤30	35	40≥	≤30	35	40≥
2 Lanes[b]	1	1	2	1	1	2	1	1	3	1	2	3
3 Lanes with Raised Median[b]	1	1	2	1	1	2	1	2	3	2	2	3
3 Lanes without Raised Median[b,c]	1	1	2	1	2	2	2	3	3	2	3	3
4 Lanes with Raised Median[c,d]	1	1	2	1	2	2	2	3	3	3	3	3
4+ Lanes without Raised Median	1	2	3	2	2	2	3	3	3	3	3	3

Notes:
[a] Where the speed limit exceeds 40 mph, Tier 3 should be considered.
[b] 1 lane in each direction.
[c] Raised medians must be at least 6 ft wide to serve pedestrians. See Figure 2-4 for different bicycle lengths to serve bicyclists. Where median width is less than these values, review category of 4+ lanes without raised median.
[d] 2 lanes in each direction.

TOOLE DESIGN

Section 5.10 – Geometric Design Treatments to Improve Intersection Safety

5.10.1 Medians and Pedestrian Refuge Islands; Hardened Centerlines

5.10.2 Curb Extensions

5.10.3 Curb Radius

5.10.4 Mountable Truck Aprons

5.10.5 Raised Crossings

5.10.6 Multiple Threat Crossing Treatments

5.10.7 Bike Ramps

5.10.8 Directional Indicators

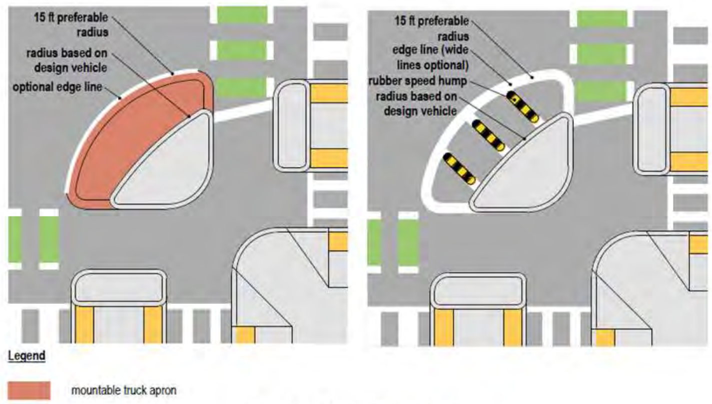


Figure 5-18: Mountable Truck Apron

TOOLE DESIGN

Curb Radius Decisions vs Design Vehicle

Section 5.10 – Geometric Design Treatments to Improve Intersection Safety

5.10.1 Medians and Pedestrian Refuge Islands; Hardened Centerlines

5.10.2 Curb Extensions

5.10.3 Curb Radius

5.10.4 Mountable Truck Aprons

5.10.5 Raised Crossings

5.10.6 Multiple Threat Crossing Treatments

5.10.7 Bike Ramps

5.10.8 Directional Indicators

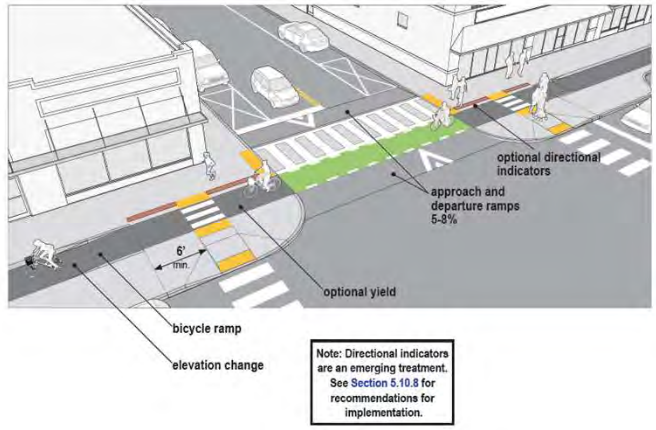
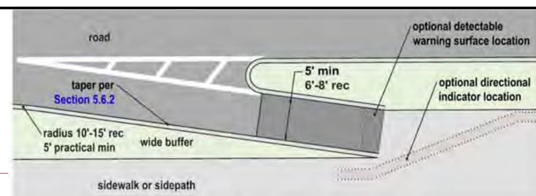


Figure 5-20: Raised Side Street Crossing

TOOLE DESIGN

Section 5.10 – Geometric Design Treatments to Improve Intersection Safety



Detail 1—Preferred bicycle ramp alignment with wide sidewalk buffer

5.10.1 Medians and Pedestrian Refuge Islands; Hardened Centerlines

5.10.2 Curb Extensions

5.10.3 Curb Radius

5.10.4 Mountable Truck Aprons

5.10.5 Raised Crossings

5.10.6 Multiple Threat Crossing Treatments

5.10.7 Bike Ramps

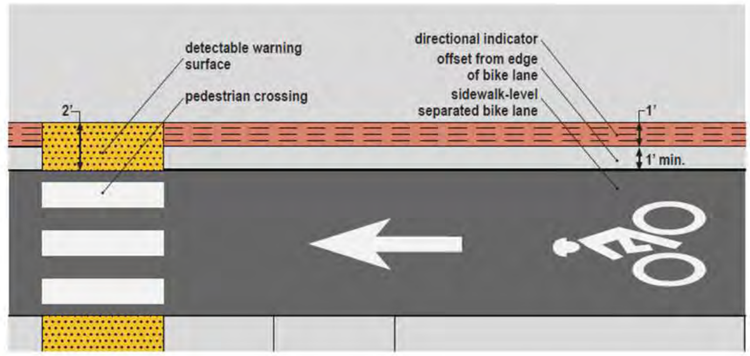
5.10.8 Directional Indicators

TOOLE DESIGN

5.10.8 Directional Indicators

Per ISO 23599 the width of the directional indicator (DI) can vary based on use:

- If perpendicular to the pedestrian path of travel (for example to direct a pedestrian towards a mid-block crossing or transit stop), it must be a minimum width of 2 ft to be detectable.
- If parallel to the pedestrian path of travel, it can be as narrow as 1 ft.
- At some locations (such as near intersections) pedestrian paths may interact with directional indicators both parallel and perpendicular, and in these situations the wider width should be used.



Note: Directional indicators are an emerging treatment. See Section 5.10.8 for recommendations for implementation.

Figure 5-24: Sidewalk-Level Separated Bike Lane with Directional Indicator

TOOLE DESIGN

5.11.5. Turning Vehicles Yield to Pedestrians/Bicyclists Signs

The use of the sign should be limited to the following:

- Crossings where turning motor vehicle volumes exceed 50 vehicles/hour.
- Locations where there is a documented problem with motorists failing to yield.
- Locations with inadequate sight lines and other mitigations are not feasible.
- New installations of left side bicycle lanes or two-way bikeways where counterflow bicycle travel may be unexpected.

A TURNING VEHICLES YIELD TO (or STOP FOR) BICYCLISTS (OR PEDESTRIANS) sign (R10-15 series) that uses a bicycle and pedestrian symbol is an experimental design. Experimental approval from FHWA is required to use this traffic control device (see Figure 5-29). See Section 1.6.1 for guidance on requests to experiment.

Note: The use of this treatment requires a Request to Experiment from FHWA. (See Section 1.6.1)

Figure 5-29: Turning Vehicles Yield to (or Stop for) Bicyclists Signs

TOOLE DESIGN

5.12 Pavement Markings

5.12.7.2 Bicycle Crossings with Parallel Pedestrian Crossings

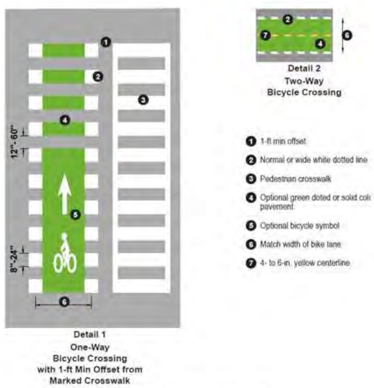
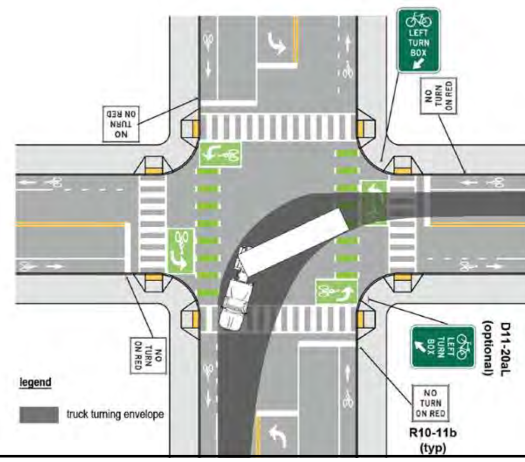


Figure 5-35: Bicycle Crossing Pavement Markings

5.12.9. Two-Stage Bicycle Turn Box



TOOLE DESIGN

Chapter 6 – Shared Use Paths

6.1 Introduction
6.2 Shared Use Path Users
6.3 Side Path Considerations
6.4 Path Width Considerations
6.5 Design Speed
6.6 General Design Considerations
6.7 Shared Use Path Intersections and Transitions
6.8 Design Considerations to Promote Personal Security
6.9 Shared Use Path Entrance and Wayside Amenities

Chapter 6
SUP Width (Two-way)

6.4.3. Recommended Shared Use Path Widths

Table 6-3: Recommended Shared Use Path Widths* to Achieve SUP LOS "C"

Shared Use Path Operating Widths and Operational Lanes*					
SUPLOS "C" Peak Hour Volumes	Recommended Operational Lanes	Practical Minimum	Recommended Lower Limit	Recommended Upper Limit	Practical Maximum
150 to 300	2	8 ft	10 ft	12 ft	13 ft
300 to 500	3	11 ft	12 ft	15 ft	16 ft
500 to >600	4	15 ft	16 ft	20 ft	None

*Typical Mode Split is 55% adult bicyclists, 20% pedestrians, 10% runners, 10% in-line skaters, and 5% child bicyclists

11' wide provides three (3) operational lanes

TOOLE DESIGN

6.4.2. Shared Use Path Level of Service

Table 6-1: Shared Use Path Operating Conditions Based on Level of Service Criteria

Shared Use Path Level of Service (SUPLOS) and Operating Conditions	
SUPLOS	Peak Operating Conditions
A. Excellent	A significant ability to absorb more users across all modes is available.
B. Good	A moderate ability to absorb more users across all modes is available.
C. Fair	Path is close to functional capacity with minimal ability to absorb more users.
D. Poor	Path is at its functional capacity. Additional users will create operational and safety problems.
E. Very Poor	Path operating beyond its functional capacity resulting in conflicts and people avoiding the path.
F. Failing	Path operating beyond functional capacity resulting in significant conflicts and people avoiding the path.

Table 6-2: Shared Use Path Level of Service Look-Up Table, Typical Mode Split

Shared Use Path Level of Service Look-Up Table, Typical Mode Split*										
Shared Use Path Peak Hour Volume	Shared Use Path Width (ft)									
	8	10	11	12	14	15	16	18	20	≤ 25
50	B	B	B	B	B	A	A	A	A	A
100	D	C	B	B	B	A	A	A	A	A
150	D	C	B	B	B	A	B	A	A	A
200	D	D	C	B	B	A	B	A	A	A
300	E	D	C	C	C	B	B	B	B	A
400	F	E	D	D	C	C	C	B	B	A
500	F	F	D	D	D	C	C	C	C	A
600	F	F	E	E	E	D	D	C	C	A
800	F	F	F	F	F	E	E	E	E	A
1,000	F	F	F	F	F	E	F	F	F	A
≥ 1,200	F	F	F	F	F	F	F	F	F	A

*Assumptions:

1. Mode split is 55 percent adult bicyclists, 20 percent pedestrians, 10 percent runners, 10 percent in-line skaters, and 5 percent child bicyclists.
2. An equal number of trail users travel in each direction (the model uses a 50 percent–50 percent directional split).
3. Trail volume represents the actual number of users counted in the field (the model adjusts this volume based on a peak hour factor of 0.85).
4. Trail has a centerline.

TOOLE DESIGN

6.4.4. Separation of Pedestrians and Bicyclists

6.4.4.1 Land Use Considerations Where Separation is Desirable

6.4.4.2 Volume Thresholds Where Separation is Desirable

Should be considered when:

- Level of Service is projected to be at or below level "C."
- Pedestrians can reasonably be anticipated to be 30% or more of the volume

6.4.4.3 Separation Strategies

6.4.4.4 Accessibility Considerations

Figure 6-3: Burke-Gilman Shared Use Path (2008) and Separated Paths (2021), Seattle, WA

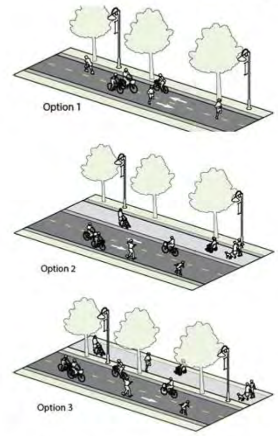


Figure 6-4: Options for Separating Bicyclists and Other Wheeled Users from Pedestrians

TOOLE DESIGN

6.6. General Design Considerations

6.6.1. Shy Distance, Clearances, and Shoulders

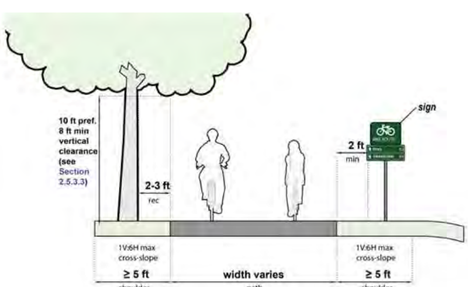


Figure 6-5: Shoulders and Shy Distance on Shared Use Paths

6.6.3. Horizontal Alignment

Table 6-5: Minimum Radii for Horizontal Curves at 20-Degree Lean Angles

Design Speed (mph)	Minimum Radii (ft) for Horizontal Curves at 20-Degree Lean Angles
8	12
10	18
12	27
14	36
16	47
18	60
20	74
25	115
30	166

6.6.4. Vertical Alignment

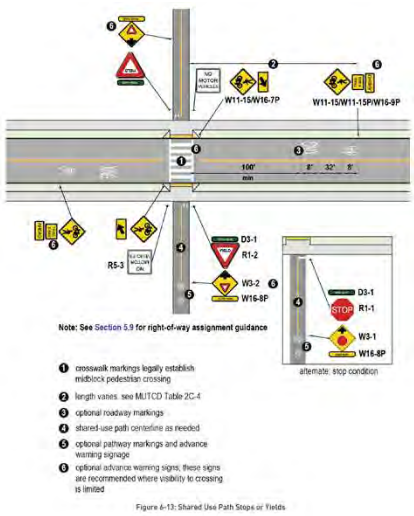
Table 6-7: Length of Crest Vertical Curve to Provide Sight Distance Equations

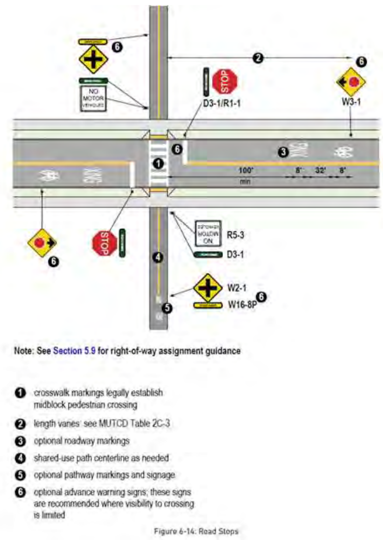
Length of Crest Vertical Curve to Provide Sight Equations		
when $S > L$		$L = 2S - \frac{200(\sqrt{h_1}+\sqrt{h_2})^2}{A}$
when $S < L$		$L = \frac{AS^2}{100(\sqrt{2h_1}+\sqrt{2h_2})^2}$
where:		
L	=	minimum length of vertical curve (ft)
A	=	algebraic grade difference (percent)
S	=	stopping sight distance for flat grade (ft)*
h_1	=	eye height (3.83 ft for a typical recumbent bicyclist)
h_2	=	object height (0 ft)

*See Tables 6-2 and 6-3

TOOLE DESIGN

6.7. Shared Use Path Intersections and Transitions





TOOLE DESIGN

Chapter 7 – Separated Bike Lanes and Side Paths

7.2. General Design Considerations

The cross section of a separated bike lane comprises three distinct zones (see Figure 7-1):

1. **Bike lane**—The bike lane is the space in which the bicyclist operates. It is located between the street buffer and the sidewalk buffer.
2. **Street buffer**—The street buffer separates the bike lane or side path from motor vehicle traffic.
3. **Sidewalk buffer**—The sidewalk buffer separates the bike lane from the sidewalk.

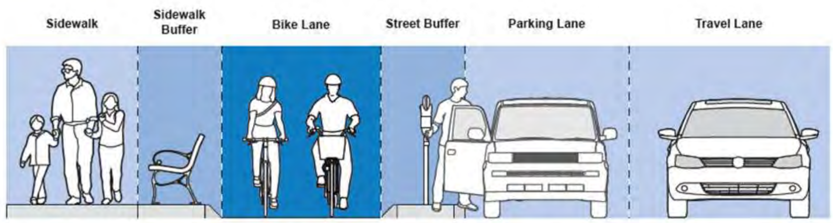


Figure 7-1: Separated Bike Lane Zones

TOOLE DESIGN

7.2.2.3 Intermediate-Level Separated Bike Lanes

curb reveal of 2-3 in. below sidewalk elevation is recommended to"

- provide vertical separation to the adjacent sidewalk, and
- provide a detectable edge for pedestrians with vision disabilities

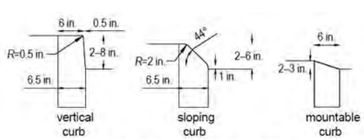


Figure 7-5: Curb Types for Separated Bike Lanes

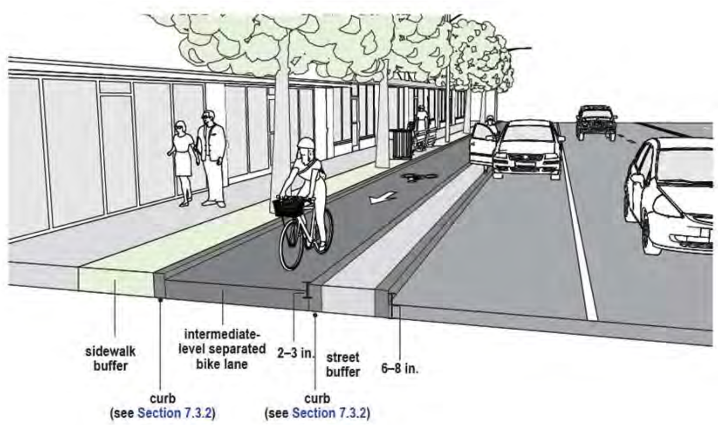


Figure 7-4: Intermediate-Level Separated Bike Lane

TOOLE DESIGN

Section 7.3.4 – SBL Width (One-way)

Table 7-3: One-Way Separated Bike Lane Widths Based on Existing or Anticipated Volumes

Peak Hour Directional Bicyclist Volume	One-Way Separated Bike Lane Width (ft) Recommended Values		
	Between Vertical Curbs without Gutter	Adjacent to One Vertical Curb	Between Sloped Curb, at Sidewalk Level, or Adjacent to Curb with Gutter
<150	6.5–8.5	6–8	5.5–7.5
150–750	8.5–10	8–9.5	7.5–9
>750	≥10	≥9.5	≥9
Practical Minimum*	4.5	4	4

*Peak Hour Directional Bicyclist Volume not applicable

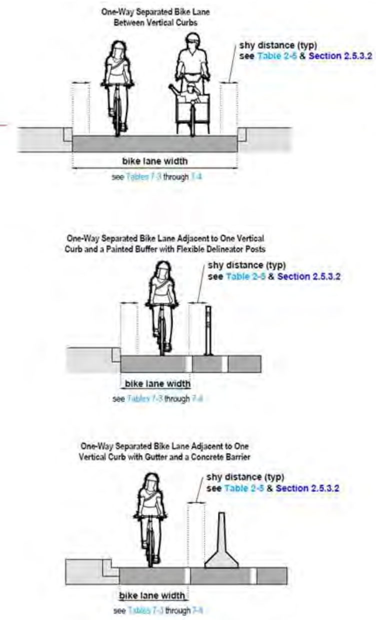


Figure 7-7: Separated Bike Lane Width

TOOLE DESIGN

7.7.1. Drainage and Stormwater Management

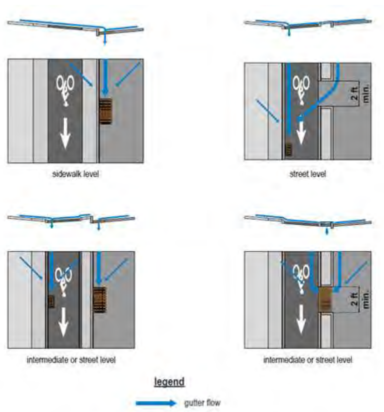


Figure 7-11: Examples of Separated Bike Lane Drainage Options

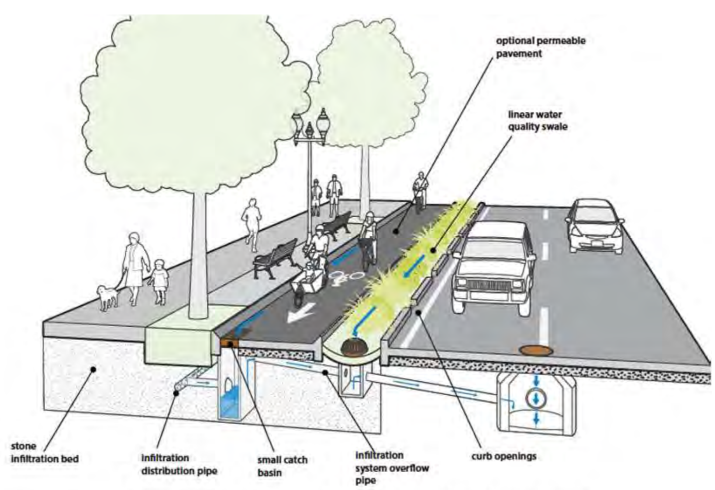
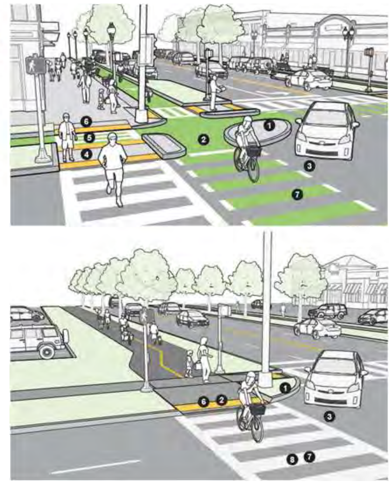


Figure 7-10: Green Stormwater Infrastructure in an Urban Street Context

TOOLE DESIGN

7.9. Separated Bike Lane and Side Path Intersection Design

- 7.9.1. Minimizing Exposure to Conflicts
- 7.9.2. Reducing Speeds at Conflict Points
- 7.9.3. Transitions between Elevations
- 7.9.4. Right-of-Way Priority
- 7.9.5. Sight Distance
- 7.9.6. Restricting Motor Vehicles



1 corner island
2 forward bicycle queuing area
3 motorist yield zone
4 pedestrian refuge island
5 pedestrian crossing of the separated bike lane
6 pedestrian curb ramp
7 bicycle crossing of travel lanes
8 pedestrian crossing of travel lanes

Figure 7-13: Protected Intersection Design for Separated Bike Lanes and Side Paths

TOOLE DESIGN

7.9.7.1 Corner Island

Benefits:

- forward bicycle queuing area
- space for turning vehicles to wait
- reduces crossing distances
- reduces motorist turning speeds
- can reduce bicyclist speeds by adding deflection to the bike lane or side path

Figure 7-15: Corner Island with Flexible Delineator Posts (Source: Carl Sundstrom, PE, Office of Bicycle and Pedestrian Programs, New York City Department of Transportation)

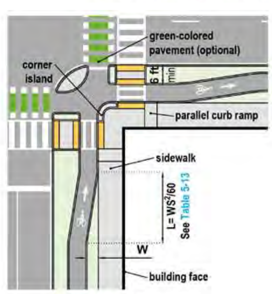


Figure 7-18: Bend-Out Example

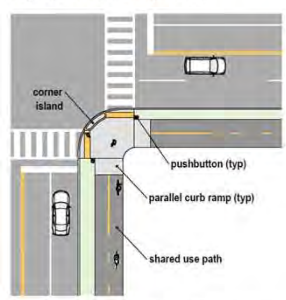


Figure 7-17: Side Path Curb Ramps at Constrained Intersection

TOOLE DESIGN

7.9.9. Intersection Design with Mixing Zones

Reduce speeds of motor vehicles entering the merge point to 20 mph or less:

- Minimize the length of the merge area
- Locate the merge point as close as practical to the intersection.
- Minimize the length of the storage portion of the turn lane.
- Provide a buffer and physical separation (e.g., flexible delineator posts) from the adjacent through lane after the merge area, if feasible.
- Highlight the conflict area with a green-colored pavement and dotted bike lane markings (see Figure 7-20), as necessary, or shared lane markings (see Figure 7-21).
- Raise the elevation of the turn lane at the start of the mixing zone.

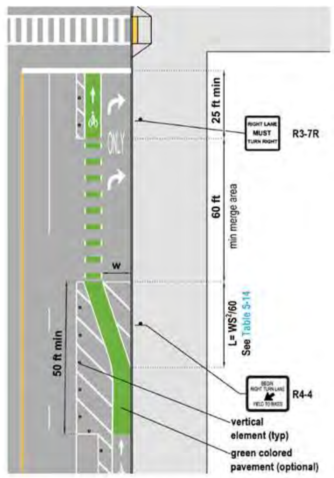


Figure 7-20: Angled Crossing Mixing Zone with Bike Lane

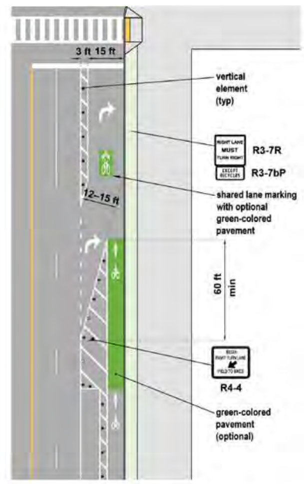
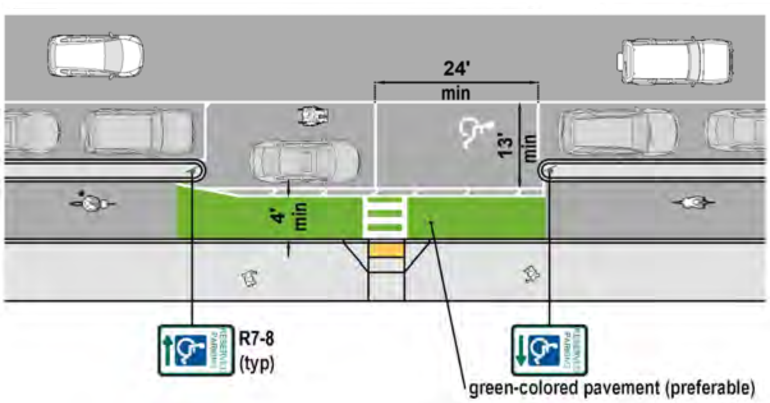
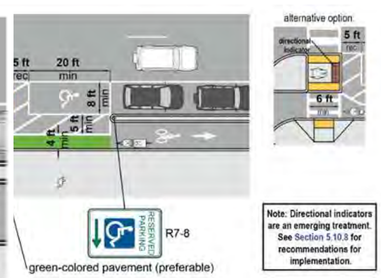


Figure 7-21: Angled Crossing Mixing Zone with Shared Lane

TOOLE DESIGN

7.9.12.1 Accessible Motor Vehicle Parking





:essible On-Street Motor Vehicle Parking at Intersections

TOOLE DESIGN

7.9.14. Transit Stops

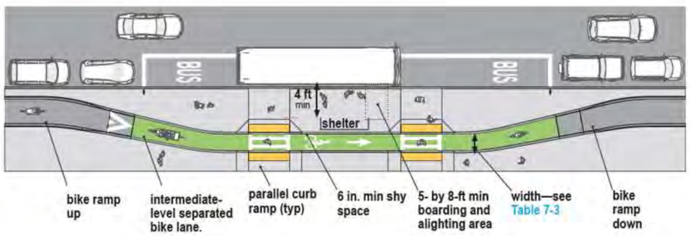


Figure 7-26: Example Configuration: Floating Transit Stop (Mid-Block)

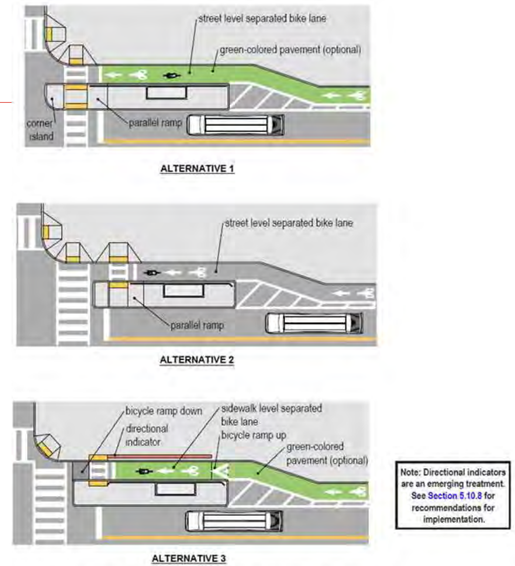


Figure 7-31: Example Configurations: Floating Transit Stop (Near-Side)

TOOLE DESIGN

7.10. Transitions between Facilities

In general, it is preferable for a transition from a separated bike lane to a standard bicycle lane or shared lane to occur on the far side of the intersection.

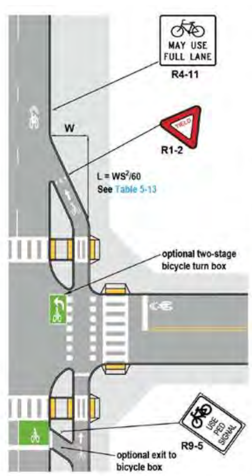


Figure 7-32: Transition to Shared Lane

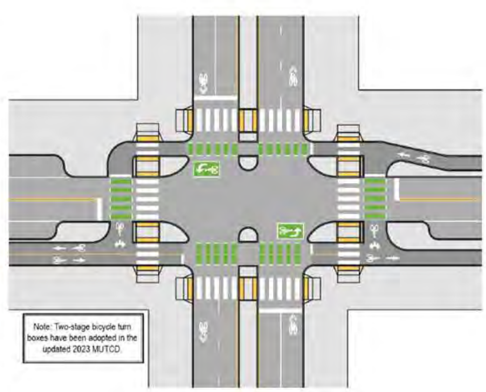


Figure 7-35: Transition from One-Way to Two-Way Separated Bike Lanes at Protected Intersection

TOOLE DESIGN

7.11. Raised Bike Lanes

Table 7-5: Raised Bike Lane Widths

Raised Bike Lane Widths				
Bike Lane Context	Practical Minimum (ft)	Recommended Lower Limit (ft)	Recommended Upper Limit (ft)[2]	Practical Maximum (ft)[2]
Intermediate level or sidewalk level raised bike lane[1]	5	6.5	8	10

[1]Raised bike lane widths are exclusive of the gutter unless the gutter is integrated into the full widths of the bike lane.
[2]Separated bike lane with a street buffer may be preferable to a curb-attached, wide raised bike lane.

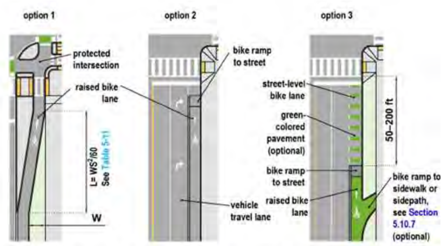


Figure 7-40: Raised Bike Lane Transitions at Intersections

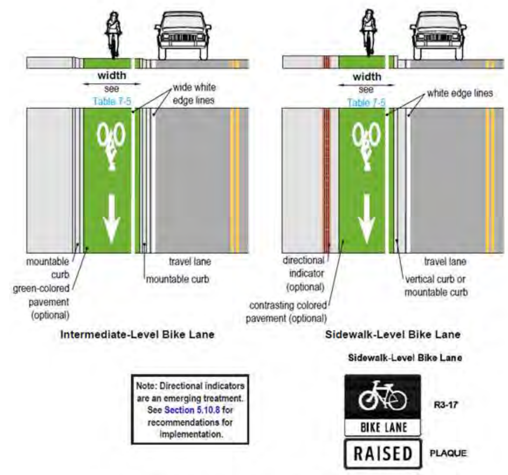


Figure 7-39: Intermediate-Level and Sidewalk-Level Raised Bike Lanes

TOOLE DESIGN

Chapter 8 – Bicycle Boulevard Planning and Design

8.1 Introduction

8.2 Bicycle Boulevard Principles

8.3 Bicycle Boulevard Minimum Design Elements

8.4 Traffic Calming Strategies (Speed Management)

8.5 Traffic Diversion Strategies (Volume Management)

8.6 Traffic Control for Minor Street Crossings

8.7 Traffic Control for Major Street Crossings

Section 8.2 – Bicycle Boulevard Principles

Bicycle Boulevards are not just signed bike routes.

Principles that set them apart from local streets include:

- 8.2.1. Manage motorized through traffic volumes and speeds
- 8.2.2. Prioritize right-of-way at local street crossings
- 8.2.3. Provide safe and convenient crossings at major streets

Minimize Motorized Through Traffic Volumes and Speed Differential			
	Hourly Traffic Volume	Daily Traffic Volume	Speed
Preferred	50 vehicles/hr	1,000 ADT	15 mph
Acceptable	75 vehicles/hr	2,000 ADT	20 mph
Maximum	100 vehicles/hr	3,000 ADT	25 mph

Major Street Crossings (opportunities per hour)	
Preferred	120
Minimum	60

TOOLE DESIGN

8.4. Traffic Calming Strategies (speed management)

Figure 8-5: Example of a Chicane Treatment on a Two-Way Street Created by a Median and Curb Extensions

Figure 8-6: Example of a Chicane Treatment Created by Alternating Parking from One Side of the Street to the Other

TOOLE DESIGN

8.5. Traffic Calming Strategies (volume management)

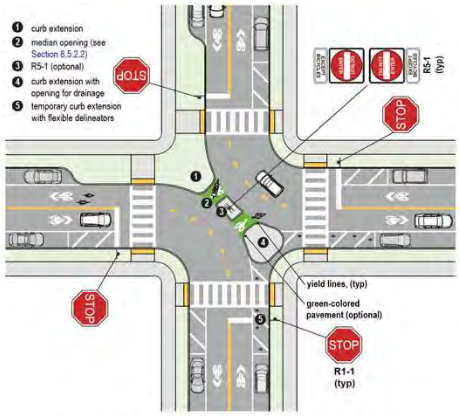


Figure 8-12: Example of a Median Used to Create a Diagonal Diverter at Intersection of Two Local Streets

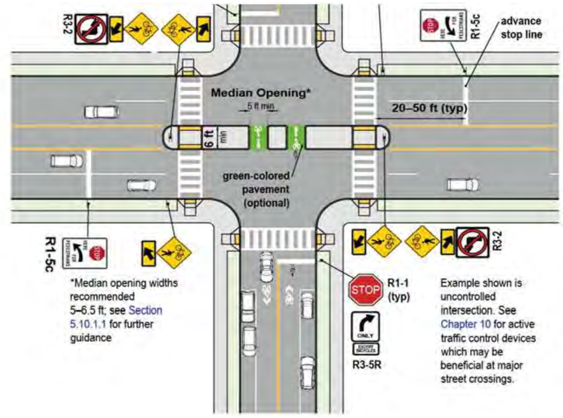


Figure 8-11: Example of a Median Used to Divert Traffic at a Major Street Crossing

TOOLE DESIGN

69

8.7. Traffic Controls for Major Street Crossings

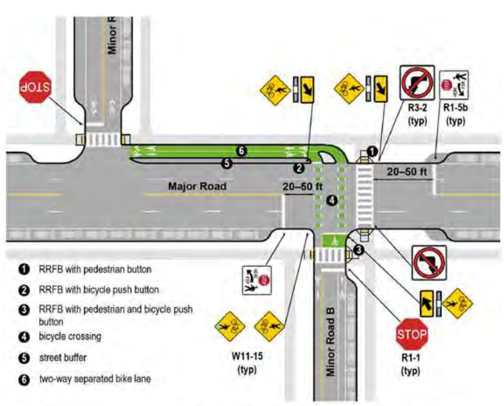


Figure 8-15: Example of Connecting Offset Bicycle Boulevard Segments Using a Two-Way Separated Bike Lane

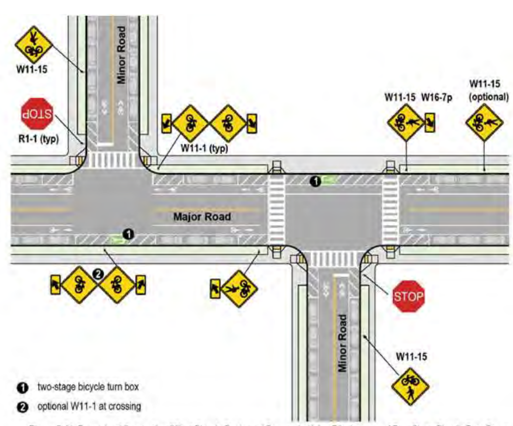


Figure 8-14: Example of Connecting Offset Bicycle Boulevard Segments Using Bike Lanes and Two-Stage Bicycle Turn Boxes

TOOLE DESIGN

70

Chapter 9 – Shared Lanes and Bicycle Lanes

- 9.1 Introduction
- 9.2 Design User Profile Considerations
- 9.3 Shared Lanes and Shared Roadways
- 9.4 Bicycle Lane Considerations
- 9.5 Buffered Bicycle Lanes
- 9.6 Bicycle Lane Considerations Adjacent To Parking and Loading
- 9.7 Bicycle Lane Considerations at Bus Stops
- 9.8 Advisory Bicycle Lanes (Experimental)
- 9.9 Bicycle Lanes on One-Way Streets
- 9.10 Bicycle Lanes on One Side of Two-Way Streets
- 9.11 Counterflow Bicycle Lanes
- 9.12 Bicycle Lanes at Intersections, Driveways, and Alleys

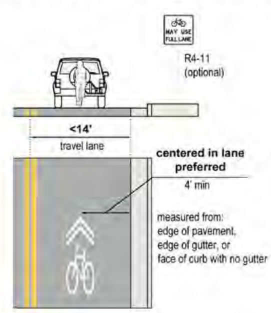
9.3.2. Limited Effectiveness of Wide Outside Lanes

Figure 9-1: Shared Lane Conditions (Rural Context, Suburban Context, Urban Context)

Rural Roadway

Suburban Arterial

Figure 9-3: Shared Lane Marking Lateral Placement in Travel Lanes < 14 Feet Without Parking



TOOLE DESIGN

9.4.1. Bicycle Lane Widths

Table 9-1: One-Way Standard Bicycle Lane Widths

One-Way Standard Bike Lane Widths				
Bike Lane Context	Practical Minimum (ft)	Recommended Lower Limit (ft)	Recommended Upper Limit (ft)	Practical Maximum (ft)
Adjacent to edge of Pavement	4[1]	5	7	8[3]
Adjacent to curb (exclusive of gutter)	5[1]	6	7	8[3]
Between through lanes and turn lanes[2]	5[1]	6	7	8[3]
Between buffers	4	5	7	8[3]
Adjacent to parking	5	6	7	8[3]
To allow occasional passing or side-by-side bicycling[4]	6.5	8[3]	10[3]	11[3]

Notes

[1]Shoulders should be provided in lieu of narrow bicycle lanes to avoid confusion below the practical minimum width.

[2]Buffers are desirable where bicycle lanes are located between through lanes and turn lanes, especially as motorist speeds exceed 30 mph.

[3]Buffered bike lanes or separated bike lanes should be considered in lieu of wider bicycle lanes to avoid confusion with a parking or travel lane.

[4]A minimum of 6.5 ft is necessary for occasional passing and 8 ft or more for comfortable side-by-side bicycling.

9.5. Buffered Bicycle Lanes

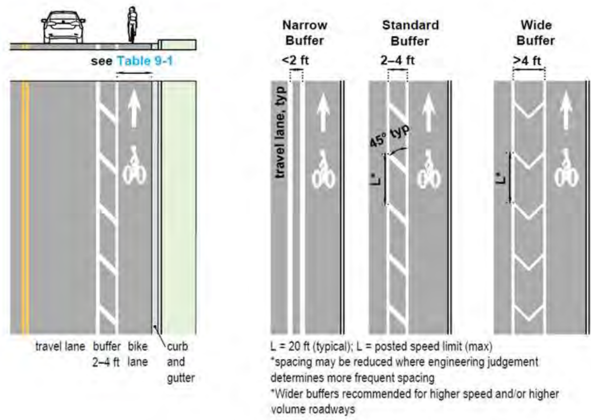


Figure 9-9: Buffer Design Options

TOOLE DESIGN

9.6.4. Bicycle Lanes Adjacent to Parallel Parking and Loading

9.6.4.1 Minimum Width Bike Lane Considerations

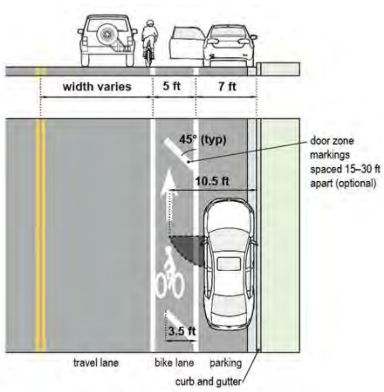


Figure 9-10: Constrained Bike Lane Adjacent to Parking Example

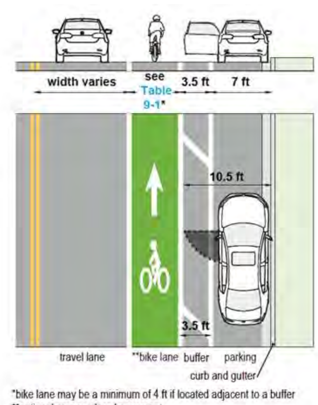


Figure 9-11: Bike Lane with a Door Zone Buffer adjacent to Parking

TOOLE DESIGN

9.8. Advisory Bicycle Lanes (Experimental)

Advisory bicycle lanes are continuously-dotted bicycle lanes which permit motorists to temporarily enter the bicycle lane, allowing opposing motor vehicle traffic sufficient space to pass (see Figures 9-15 and 9-16). They are an experimental design treatment for streets with lower traffic speeds and volumes where it is not feasible to provide standard-width travel lanes and bicycle lanes. They are designed to improve bicyclist comfort while also providing a traffic calming benefit. This is the same procedure for motorists operating on yield streets where motorists must move to the right side of the road, into unoccupied parking spaces or driveways, to permit oncoming traffic to pass (see Section 8.4.1).

Figure 9-15: Example of an Advisory Bicycle Lane in Alexandria, VA

Groundbreaking to include experimental treatments to guide practitioners on emerging concepts

TOOLE DESIGN

9.12.3. Right Turn Lane Considerations

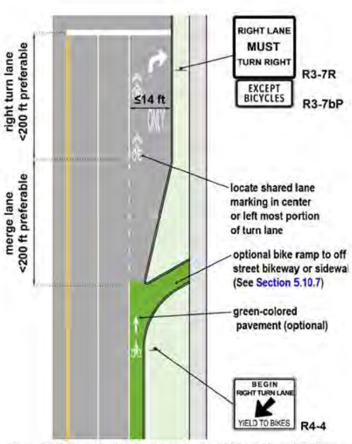


Figure 9-22: Example Right-Turn Only Lane with Shared Lane Markings

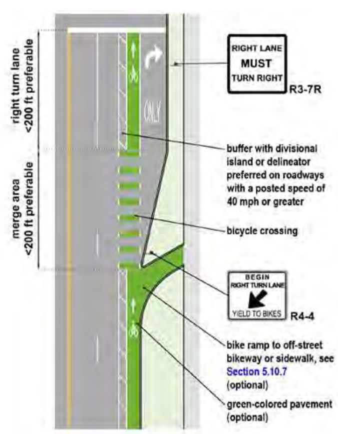


Figure 9-24: Example Bike Lanes on Streets >40 mph or Right-Turn Lanes >200 ft

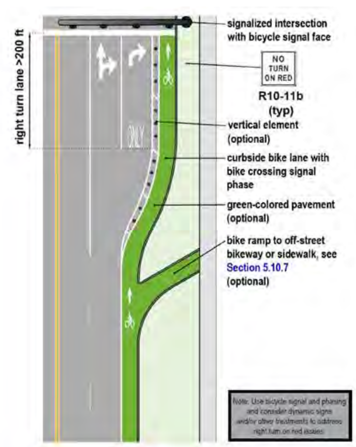


Figure 9-26: Example Bike Lane Approach to a Through-Right and a Right-Turn Only Lane

TOOLE DESIGN

Chapter 10 – Traffic Signals and Pedestrian Hybrid Beacons

10.1 Introduction

10.2 Design Guidance for Traffic Signal Control

10.3 Traffic Signal Phasing for Managing or Reducing Conflicts

10.4 Traffic Signal Timing for Bicyclists

10.5 Bicycle Signal Design Consideration

10.6 Detection for Bicycles

10.7 Design Guidance for Pedestrian Hybrid Beacons

10.8 Toucan Crossings with Traffic Signals

10.2.4. Traffic Signal Indication Options for Bicyclists

Bike signal head warrant:

- Leading or protected phasing
- Contra-flow movements
- Signal heads beyond cone of vision

Bike signal head application:

- Can only be used without conflicting vehicle turns

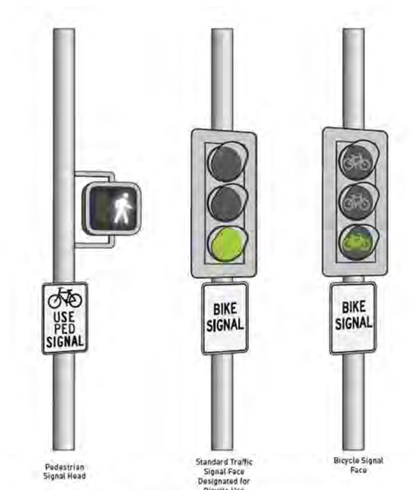


Figure 10-2: Examples of Signal Indication Options for Bicyclists

TOOLE DESIGN

10.3.5. Signal Phasing Schemes for Reducing Conflicts

Table 10-1: Recommended Hourly Turning Traffic Thresholds for Time-Separated Bicycle Movements

	Left Turn Crossing One Vehicle Lanes	Left Turn Crossing Two Vehicle Lanes
One-Way Bike Lane	≥ 100; ≥ 150*	≥ 50; ≥ 150*
Two-Way Bike Lane	≥ 50; ≥ 100*	ANY; ≥ 100*

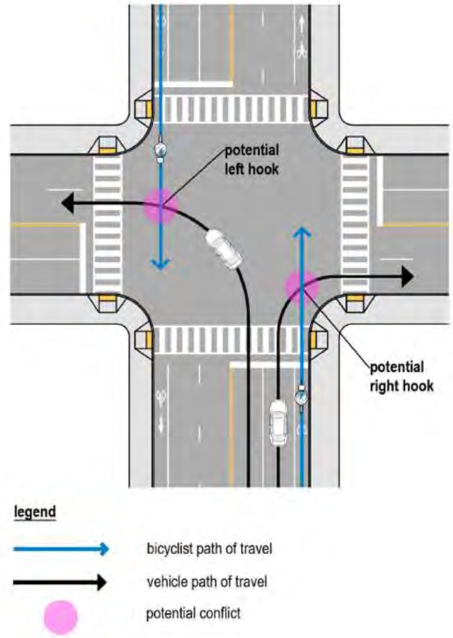


Figure 10-3: Left-Hook and Right-Hook Graphic

TOOLE DESIGN

10.6. Detection for Bicycles
10.6.1.1 Pushbuttons for Bicyclists

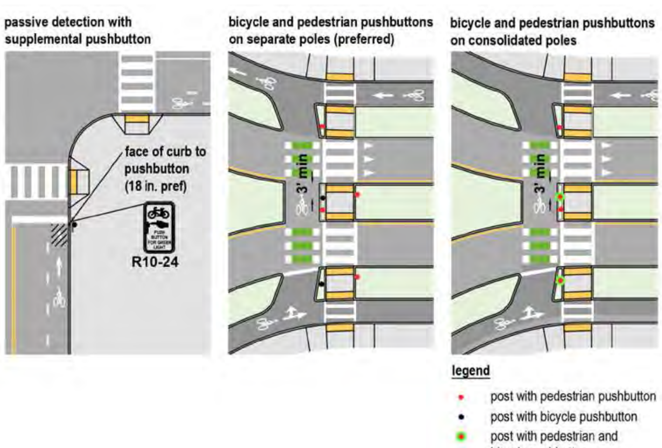


Figure 10-12: Pushbutton Locations

Figure 10-13: Example of Curbside Bicycle Pushbutton

DESIGN

10.4.1. Green Time, Change Interval and Clearance Intervals for Bicyclists

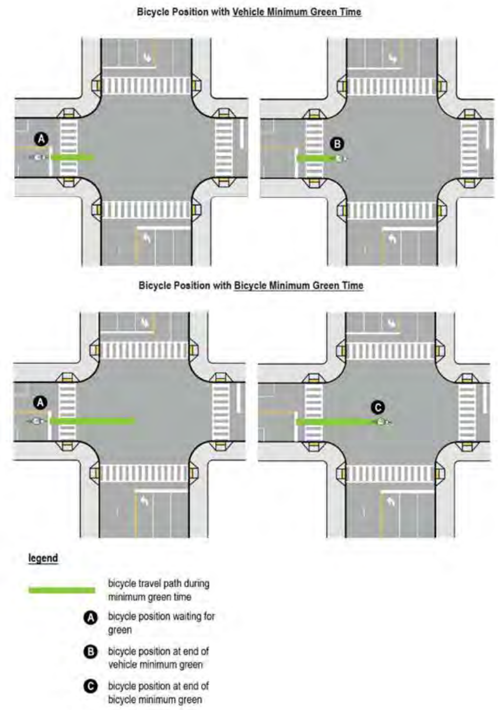
Vehicle Minimum Green

- vs -

Bicycle Minimum Green

Table 10-2: Bicycle Minimum Green Time Equation

Bicycle Minimum Green Time Equation		
$G_{min} = t + \frac{1.47v}{2a} + \frac{d+L}{1.47v}$		
Where:		
G_{min}	=	bicycle minimum green time (s)
v	=	attained bicycle crossing speed (assumed 8 mph)
t	=	perception reaction time (generally 1.5 s)
a	=	bicycle acceleration (assumed 2.5 ft/s²)
d	=	distance from stop bar to middle of the intersection (ft)
L	=	typical length of a bicycle (6 ft)



TOOLE DESIGN

Chapter 11: Bicycle Facility Design at Interchanges, Alternative Intersections, and Roundabouts

11.3. Exit and Entrance Ramps

- On-road and off-road options
- Bike ramp to access to sidewalk
- Sidewalk becomes shared use path
- Perpendicular crossings

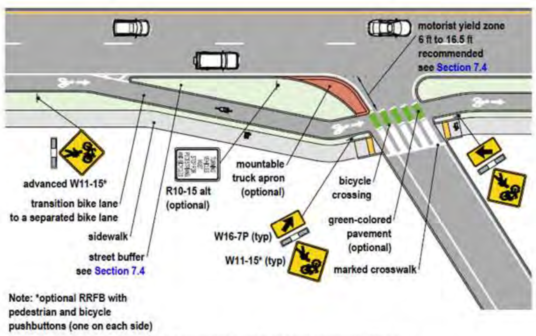


Figure 11-4: Entrance Ramp with Truck Apron and Separated Bike Lane

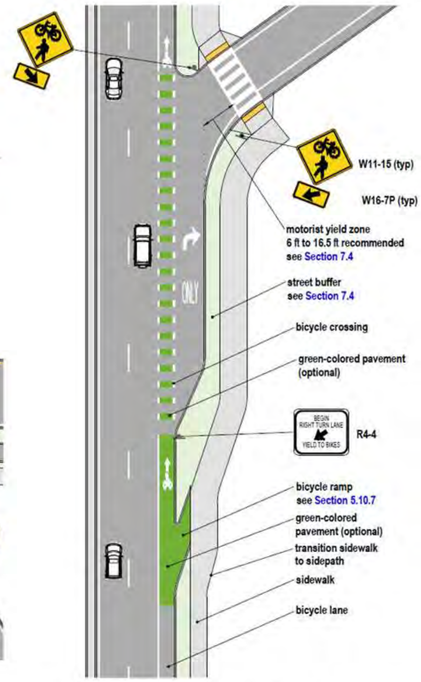


Figure 11-5: Entrance Ramp with Right-Turn Lane, Bike Lane, and Side Path

TOOLE DESIGN

11.3.3. Merging and Weaving Areas

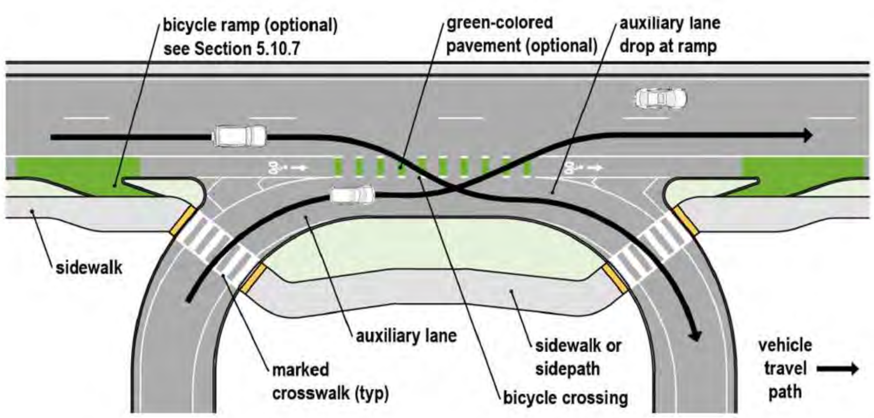


Figure 11-9: Bike Lane Positioned in High-Exposure Weaving Area

TOOLE DESIGN

11.7. Conflicts between Bicyclists and Pedestrians in Shared Space

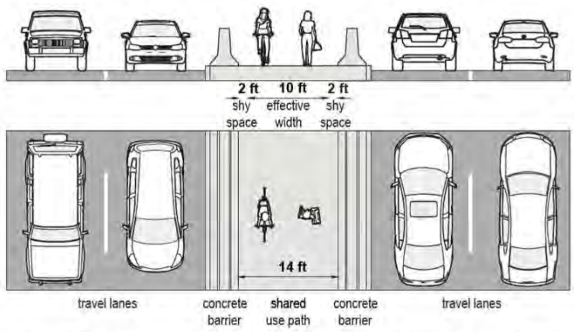


Figure 11-11: Constrained Median Shared Use Path (10 ft wide) with Concrete Barrier Buffers

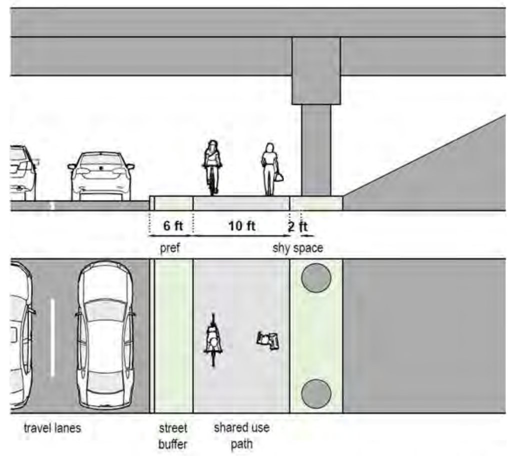


Figure 11-12: Side Path between Travel Lanes and Bridge Piers with Preferred Buffers

TOOLE DESIGN

85

11.8. Channelized Right-Turn Lanes

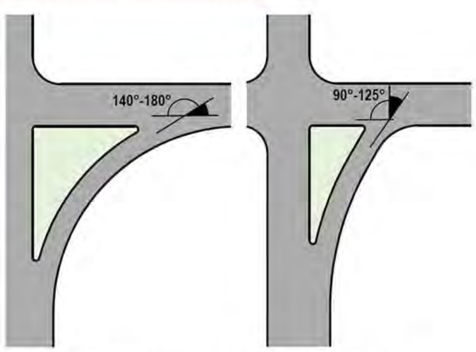


Figure 11-13: Channelized Right-Turn Lane Approach Angles

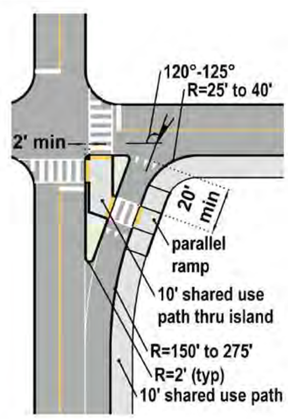


Figure 11-14: Channelized Right-Turn Refuge Island

TOOLE DESIGN

86

11.10. Roundabouts

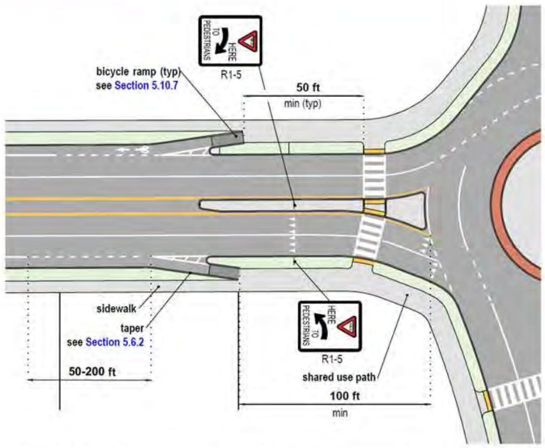


Figure 11-16: Typical Layout of Bike Lane Transitions to Shared Use Path at Multilane Roundabout with Bike Ramps

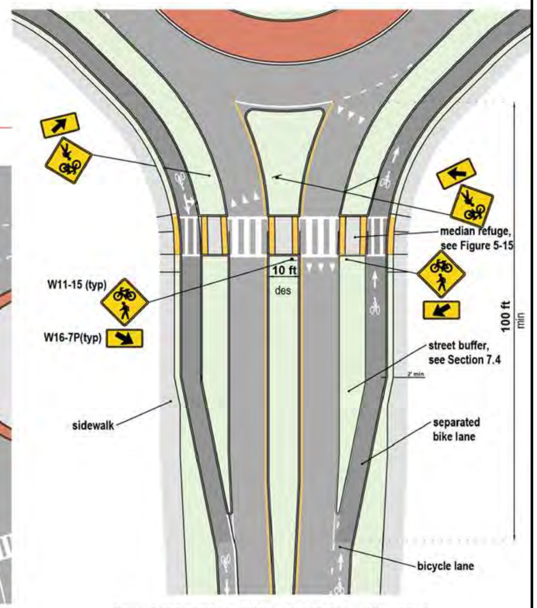


Figure 11-17: Typical Layout of Separated Bike Lanes at Roundabout

TOOLE DESIGN

Chapter 12 – Rural Area Bikeways and Roadways

12.4.3.2 Widths of Paved Shoulders

Table 12-1: Paved Shoulder Widths for Bicycling (see Chapter 12 References: FHWA, 2016b)

Paved Shoulder Widths Exclusive of Rumble Strips[i] for Bicycling				
Design Year Average Daily Traffic (ADT) and Posted Speed (MPH) Thresholds	Practical Minimum[ii]	Recommended Range		Practical Maximum
		Lower Limit[ii]	Upper Limit	
< 2,000; all speeds	2 ft	3 ft	5 ft[ii]	10 ft
2,000 - 6,000; all speeds	2 ft	4 ft	6 ft[ii]	10 ft
6,000 - 10,000; all speeds	4 ft	6 ft	8 ft[ii]	10 ft
> 10,000; ≤ 35 mph	5 ft	6 ft	8 ft[iii]	12 ft[iii]
> 10,000; > 40 mph[iv]	5 ft	6 ft	10 ft[iii]	12 ft[iii]

Notes
[i]See Section 12.5.1 for rumble strip design considerations.
[ii]Where roadside barriers, walls, or other vertical elements are present, they should be offset a minimum of 2 ft from the outer edge of the rideable shoulder to provide minimum shy distance to bicyclists (see Section 2.5.3.2.)
[iii]Where >10 percent of traffic consists of trucks.
[iv]Shared use paths are preferred.

Figure 12-3: Shoulder Widening on Uphill Section of Roadway to Accommodate Bicycling

TOOLE DESIGN

Section 12.3 - Design User Profiles

Design User:

Between Towns & Villages

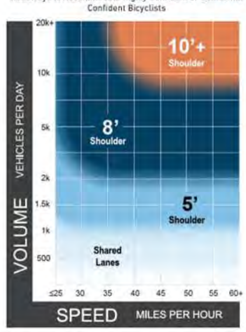
- *Highly Confident*

In Towns & Villages

- *Interested but Concerned*

Figure 12-10: Sidepath along a Rural Road

Figure 4-2: Preferred Paved Shoulder Widths for Rural Roadways to Accommodate Highly Confident or Somewhat Confident Bicyclists



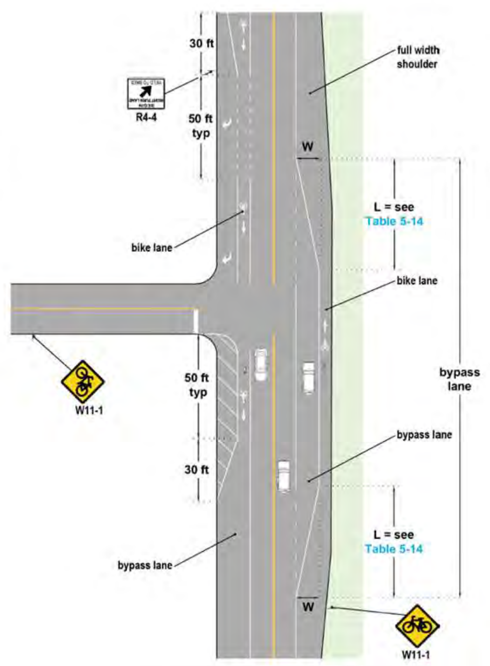


Figure 12-6: Bypass Lane with Paved Shoulder

TOOLE DESIGN

12.4.4. Advisory Shoulders (Experimental)

12.4.4. Advisory Shoulders (Experimental)

Similar to advisory bike lanes (see Section 9.8), advisory shoulders are an experimental design treatment for roads with lower traffic speeds and volumes where it is not feasible to provide standard bike lanes or shoulders for bicycle travel. When motor vehicles traveling in opposite directions meet, motorists may need to enter the advisory shoulder to create sufficient space to pass (see Figure 12-7). Experimental approval from FHWA is required to use this traffic control treatment. Where sidewalks are not present and it is desired for pedestrians to walk within the advisory shoulders, the advisory shoulder should be accessible to and usable by individuals with disabilities (see Section 1.6.3). See Section 1.6.1 for guidance on requests to experiment. See Section 9.8 and the FHWA Small Town and Rural Multimodal Networks Guide (see Chapter 12 References: FHWA, 2016b) for additional design guidance.

Note: The use of this treatment requires a Request to Experiment from FHWA. (See Section 1.6.1)

Figure 12-7: Example of Advisory Shoulders in Hanover, NH

Advisory shoulders may be considered in rural contexts on roads with the following characteristics:

Advisory shoulders may be considered in rural contexts on roads with the following characteristics:

- Low operating speeds
  - < 25 mph preferable
  - < 35 mph maximum
- Low to moderate motor vehicle volumes
  - < 3,000 vehicles/day preferable
  - < 6,000 vehicles/day maximum
- Infrequent heavy vehicles
- Adequate passing sight distance for motorists
- Regular bicycle traffic

If an advisory shoulder is being considered on a low-volume roadway with operating speeds above 35 mph, traffic calming treatments should be implemented to promote operating speeds at or below 35 mph.

TOOLE DESIGN

12.5.1. Rumble Strip Placement and Design

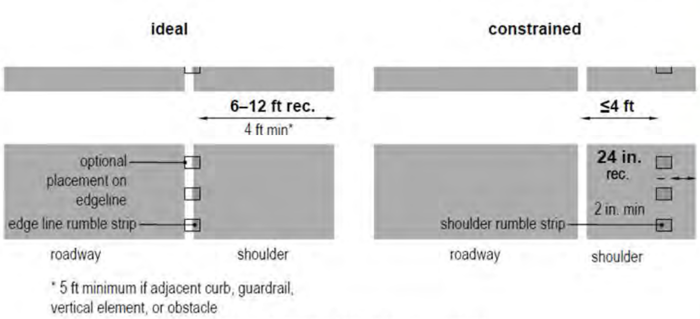
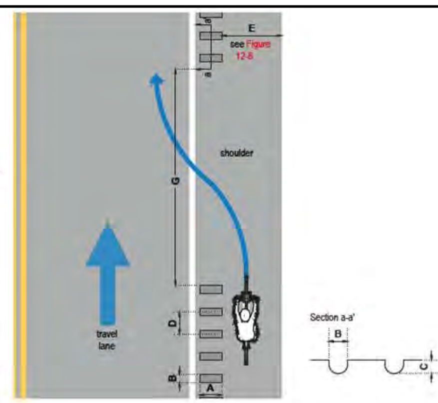


Figure 12-8: Rumble Strip Placement Options



Definitions	
Length (A)	Dimension of rumble strip measured lateral to the travel lane
Width (B)	Dimension of rumble strip measured parallel to the travel lane
Depth (C)	Vertical distance measured from top of pavement surface to bottom of a rumble strip pattern
Spacing (D)	Dimension between rumble strip patterns
Clear Path (E)	Distance from outside (for example, right) edge of rumble strip to oustide edge of paved shoulder
Gap (G)	Distance measured parallel to roadway, between groups of rumble strip patterns

*Note: Figure not to scale.

Figure 12-9: Rumble Strip Minimum Gap Illustration

TOOLE DESIGN

Chapter 13 – Structures

13.2. General Design Principles for Structures

Figure 13-1: Bikeway along the Interstate 90 Bridge over Lake Washington, WA

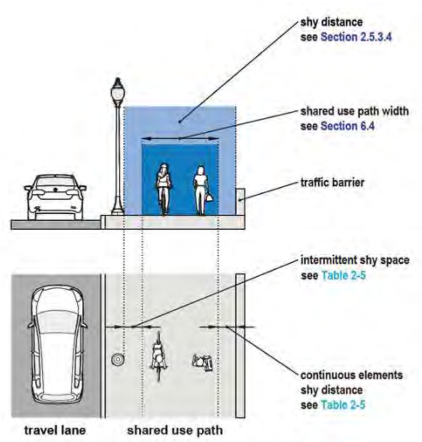


Figure 13-5: Horizontal Clearances for Shared Use Paths on Bridges Along Roads

TOOLE DESIGN

Chapter 14 – Wayfinding Systems for Bicyclists

95

14.6. Bicycle Wayfinding Sign Assemblies

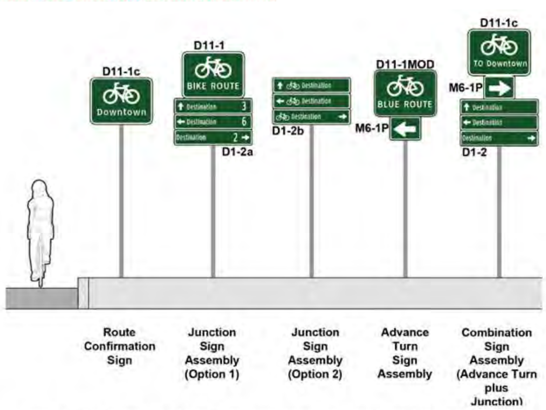


Figure 14-4: Examples of Confirmation, Decision, and Turn Sign Assemblies

Table 14-1: Mileage Rounding Guidelines

Mileage Rounding Guidelines	
Distance (mi)	Guideline
< 0.2	Do not include mileage; blocks are appropriate, if necessary
0.2 - 5.0	Round mileage to the nearest tenth of a mile
> 5.0	Round mileage to the nearest whole mile

Figure 14-7: Example of Community Wayfinding

TOOLE DESIGN

96

Chapter 15 – Maintenance and Operations

15.2. Maintenance Policy and Programs

Figure 15-1: Examples of Debris, Faded Markings, and Snow Clearing

Figure 15-4: Fog Sealing a Shared Use Path

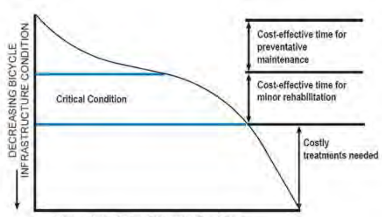


Figure 15-2: Bicycle Infrastructure Life Cycle

Table 15-1: Maintenance Equipment Types

Maintenance Equipment Types				
Type of Equipment	Corresponding Design Vehicle[a]	Width (ft)[b]	Height (ft)	Uses
3-Axle Single Unit Truck	SU-40	8	11-13	highway snow plowing, heavy construction, emergency vehicles
2-Axle Single Unit Truck	SU-30	8	11-13	ambulance, snow plowing, construction, routine maintenance
Pickup Truck	N/A	6-8	6-7	snow plowing, routine maintenance, law enforcement
Typical Skid-Steer Loader	N/A	5.5	6.5	snow plowing, routine maintenance, sweeping
Specialty Equipment	N/A	Varies by manufacturer		Varies

[a] For detailed information on vehicle geometry and turning radius, refer to Chapter 2 of AASHTO's *A Policy on Geometric Design of Highways and Streets* (See Chapter 15 References: AASHTO, 2018).
[b] Width of attachments such as sweeper brooms or snowplow blades may exceed the width of the vehicle.

TOOLE DESIGN

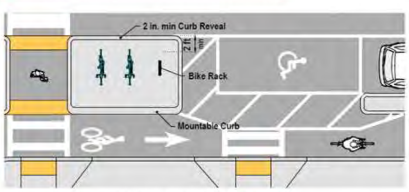
Chapter 16 – Bicycle Parking, Bike Share Siting, and End of Trip Facilities

MUTCD D4-3

Figure 16-1: Directional Signage for Bicycle Parking

16.3. Short-Term Parking

16.3.4. Example Designs with Unique Considerations



Bike Parking on Raised Median Adjacent to Accessible Car Parking Space

Figure 16-2: On-Street Bicycle Corrals

Note:
Locking point of a single bicycle on the rack

Figure 16-6: Examples of Recommended and Not Recommended Racks

Table 16-1: Sample Short-Term Bicycle Parking Quantity Requirements

Short-Term Parking Quantities		
Types of Activity	Sample Bicycle Parking Quantities[a]	
	Most Contexts	Urbanized or High Bicycle Mode Share Areas
Multi-unit residential dwellings	0.05 spaces per bedroom	0.10 spaces per bedroom
Libraries and government buildings	One space per 10,000 square ft of floor area	One space per 8,000 square ft of floor area
Church, theatres, stadiums, parks, beaches	Spaces for 2 percent of maximum expected attendance	Spaces for 5 percent of maximum expected attendance
Schools (K-12)	One space per 20 students	1.5 spaces per 20 students
Colleges and universities	One space per 10 students of planned capacity	One space per 10 students of planned capacity
Rail or bus terminals and stations and airports	Spaces for 1.5 percent of a.m. peak passengers	Spaces for 2 percent of a.m. peak passengers
Retail- groceries	One space per 2,000 ft^2 of floor area	One space per 2,000 ft^2 of floor area
Retail- general	One space per 5,000 ft^2 of floor area	One space per 5,000 ft^2 of floor area
Office	One space per 20,000 ft^2 of floor area	One space per 20,000 ft^2 of floor area

[a] A minimum of two bike parking spots is recommended in all cases

Adapted from Anderson et al. (2010); see Chapter 16 References.

TOOLE DESIGN

Takeaways

1. First time - default design user is **interested but concerned**
2. First time - **research** citations to back it up
3. First time - underscores **importance of comfort**
4. First time – **emerging practices** covered (beyond MUTCD, beyond PROWAG)

TOOLE DESIGN

101

Questions?

TOOLE DESIGN

102

MULTIMODAL COUNTS

Cleaver Blvd Complete Streets

March 2025 / MARC BPAC

Bailey Waters, P.E. / KCMO
Tresa Carter, AICP / BikeWalkKC

103

Project Background

- Made possible thanks to funding from the Kansas City Physical Activity Plan
- Project part of the Infrastructure Sector of the KCPA
- Plan Supports efforts related to Kansas City MO's Vision
- Zero Conducted pre- and post-counts on Cleaver Blvd using Miovision cameras (quantitative data)
- Evaluated noise conditions pre- and post-implementation
- Volunteers facilitated intercept surveys, survey also made available online (qualitative data)

104

Kansas City Physical Activity Plan

What is the Kansas City Physical Activity Plan?
Vision: to foster a culture of physically active lifestyles in the region &Goal: to create safe and equitable opportunities to live an active lifestyle in our region

Three Overarching Priorities:
1) increase local funding
2) ongoing review of physical activity metrics
3) regularly distribute a KC physical activity report card

Plan Organization: **10 sectors increase opportunities for physical activity in all aspects of an individual's life (healthy schools, early childhood, infrastructure, parks &recreation, faith-based, healthcare, sport, mass media, business &industry, and public health**

105

General Observations

1 Drivers being Drivers
Driving behavior slow to change; speeding; not yielding to peds; using center L-turn lane for passing; going right on red when prohibited

2 Positive Perspectives
Overall sentiment about PBLs and midblock crossings are positive from bike/ped user perspective

3 Need More Connections
Bikers esp. want to see PBL continued to Plaza; more N/S connections (Rockhill, Oak, etc.)

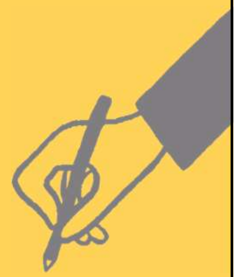
4 Signal Operations Matter
Drivers tend to behave better turning when given a dedicated lane AND a long enough signal phase

5 Non-commuters using facilities
Users during observation time were not just using the crosswalks and mobility lanes to commute, but also for leisure

106

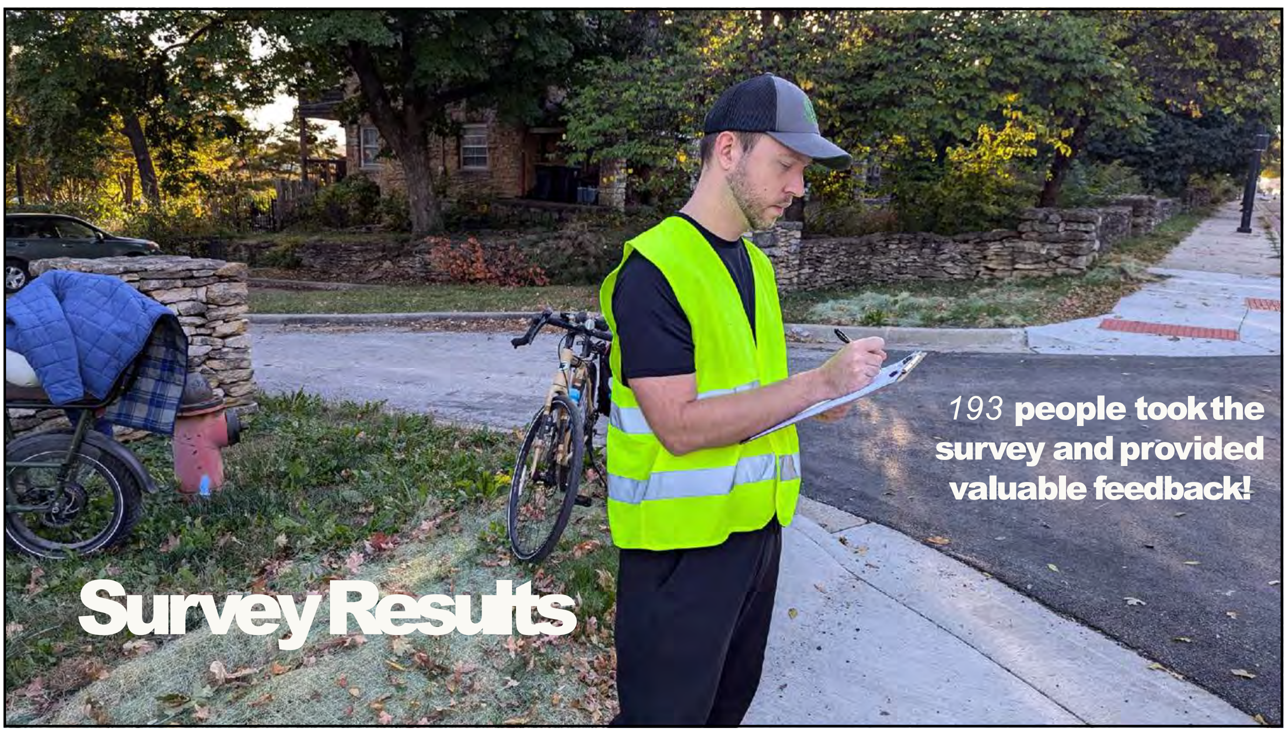
Surveys - In Person and Online

- Online survey available for 5 weeks
- Intercept surveys conducted on October 17 in the morning and afternoon
- Survey goal: understand how new infrastructure made people feel and if it changed their decision making

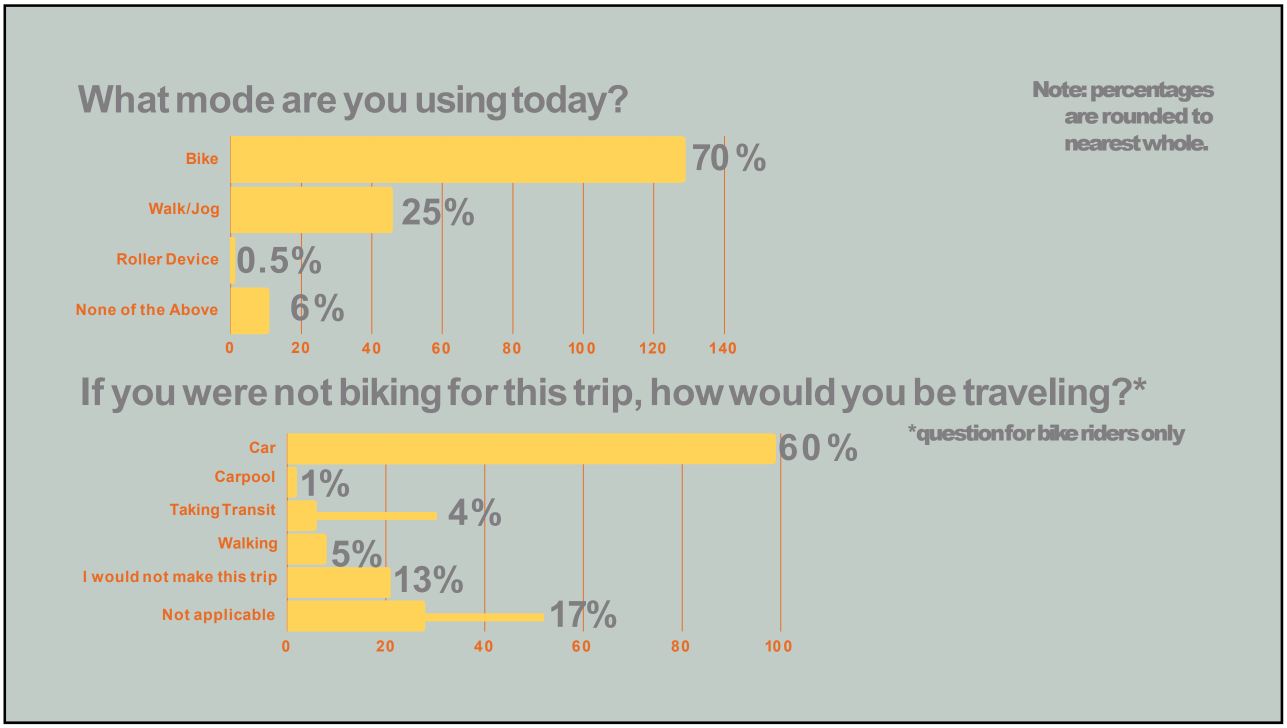


41 surveys taken in person
152 taken online

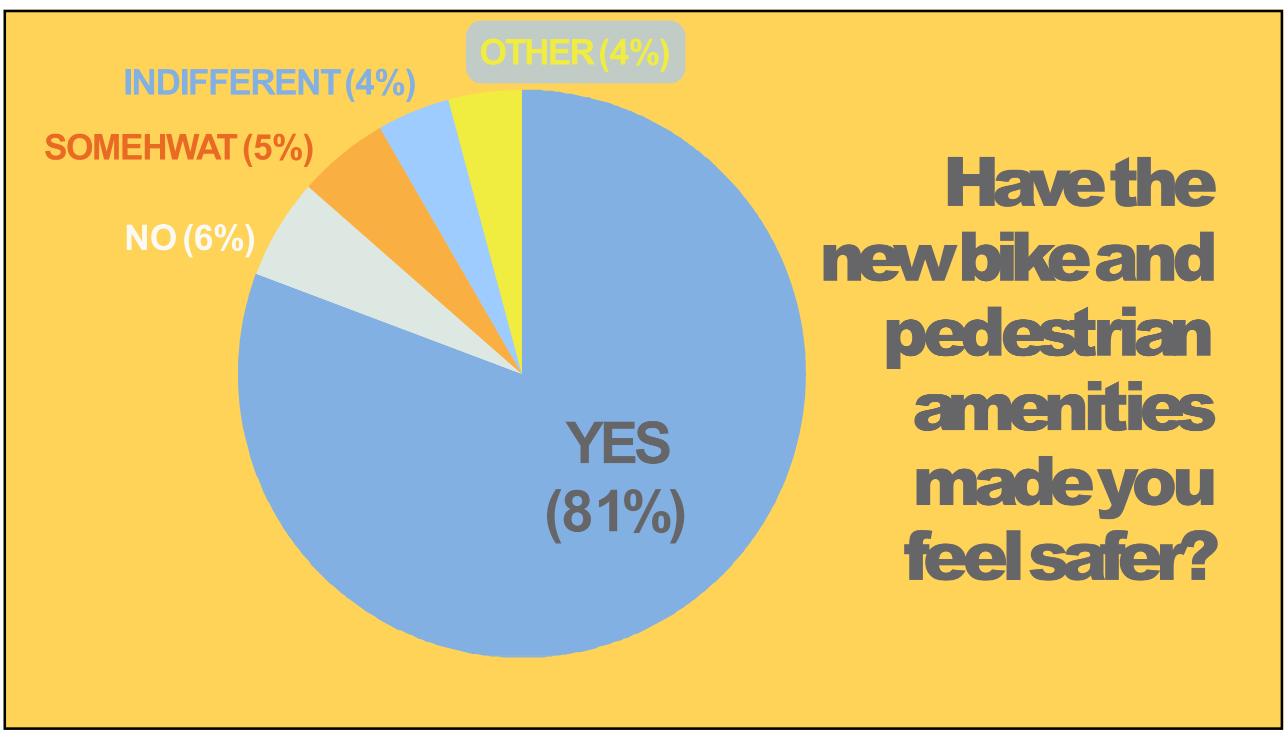
107



108


What mode are you using today?
Note: percentages are rounded to nearest whole.
Bike
70 %
Walk/Jog
25%
Roller Device
0.5%
None of the Above
6 %
0
20
40
60
80
100
120
140
If you were not biking for this trip, how would you be traveling?*
*question for bike riders only
Car
60 %
Carpool
1%
Taking Transit
4%
Walking
5%
I would not make this trip
13%
Not applicable
17%
0
20
40
60
80
100

109


OTHER (4%)
INDIFFERENT (4%)
SOMEHWAT (5%)
NO (6%)
YES (81%)
Have the new bike and pedestrian amenities made you feel safer?

110

General Comments

"I'm looking forward to seeing more pedestrian and bike amenities in the future."

"They're great!"

"I greatly appreciate that this is a PROTECTED bike lane! Paint is not infrastructure."

"I wish there was more of them."

"Very thankful that KC is taking action on vision zero."

"I've gone from actively avoiding the street to feeling like it's a lovely addition to my walk to and from work."

"Why did we wait so long?"

"Ugly, litter filled, waste of taxpayer money."

"The full concrete protection here is great and looks lovely. But I'd take Gillham style quick-builds over this if it means we can stretch $ further and build more of them."

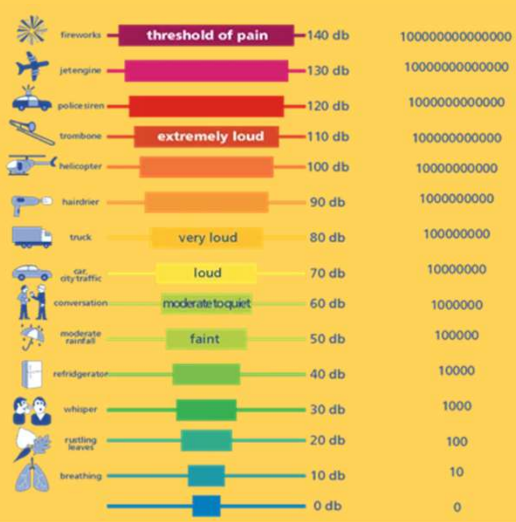
111

Noise Readings

PRE

79

dB



POST

74

dB

112

Multimodal Counts

NOTE: data presented represents one day of multimodal counts along Cleaver Blvd at Rockhill Rd and Oak St.

Walking and biking numbers along Cleaver Blvd more than DOUBLED after the new bike and pedestrian amenities were installed!

113

Oak Street

PRE COUNTS: 5-16-2023

Oak Street	Southbound	Westbound	Northbound	Eastbound	Total
Bicycles	21	6	33	3	**63**
Pedestrians	3	47	88	39	**177**

POST COUNTS - 10-9-2024

Oak Street	Southbound	Westbound	Northbound	Eastbound	Total
Bicycles	44	29	43	23	**139**
Pedestrians	93	88	133	70	**384**

NOTE: Historical weather data indicates both pre- and post-count dates were mild temperatures. The weather was in the mid 60s with no day time precipitation.

114

Rockhill Road

PRE COUNTS: 5-16-2023					
Rockhill Road	**Southbound**	**Westbound**	**Northbound**	**Eastbound**	**Total**
Bicycles - Total	13	12	8	9	**42**
Pedestrians	57	24	30	17	**128**

POST COUNTS - 10-9-2024					
Rockhill Road	**Southbound**	**Westbound**	**Northbound**	**Eastbound**	**Total**
Bicycles - Total	16	29	38	27	**110**
Pedstrians	106	147	42	33	**328**

NOTE: Historical weather data indicates both pre- and post-count dates were mild temperatures. The weather was in the mid 60s with no day time precipitation.

115

Next Steps

01 **Share Results with City Hall**
Share with KCPA groups to spread regionally

02 **Repeat Counts in One Year**
Continue to observe and count behavior in future years

03 **Build More Protected Infrastructure**
Use data to advocate for more infrastructure

116

THANK YOU FOR MAKING OUR STREETS SAFER!

Item #__

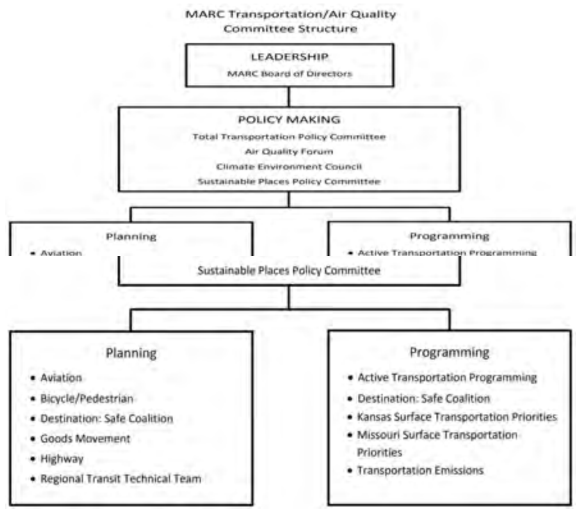
MARC Transportation Committee Process & Structure Assessment

MARC Committee Process & Structure Assessment

MARC
MID-AMERICA REGIONAL COUNCIL

Current Committee Structure

- Policy Committee
  - TTPC provides policy level input to MARC's Board
- Planning Modal Committees
  - Planning / Technical support on focus area for committee
  - Long range planning
  - Forum for broader engagement in MARC transportation work
- Programming Committees
  - Mainly provide guidance on award of federal funds to projects



119

MARC Committee Process & Structure Assessment

MARC
MID-AMERICA REGIONAL COUNCIL

Issues to address

- Feedback received by MARC:
  - Committee process can be overly complex and burdensome
  - Committee process requires extensive staff time for member agencies to track, attend and participate
- Significant membership overlap between various committees, which leads to a series of duplicative presentations to committee members

120

MARC Committee Process & Structure Assessment

Issues to address

- Committee membership/voting may not closely correlate with regional population distribution
- Attendance at committee meetings can be low
- Hybrid-nature of meetings leads to decreased participation (virtual attendees)
- Difficult to provide workplan for substantive business before committees

121

MARC Committee Process & Structure Assessment

Benefits and disadvantages of current structure

- Pros
  - Opportunity for networking amongst community peers
  - Open, transparent, community-driven (bottom up) decision-making
  - Focused attention on areas of interest for diversity of committee
- Cons
  - Complex and time-intensive process, requires extensive staff resources to support and participate
  - Dispersal of programming responsibilities leads to need stagger programming committees in specific timelines
  - Low participation and engagement for some planning modal committees

122

MARC Committee Process & Structure Assessment

Peer MPO committee process & structure review

- Generally, peer MPO's are organized and rely on support of fewer # of committees
- Many peer MPO's are organized with combination of single planning advisory / technical / programming committees
- In many instances, programming recommendations are generated by MPO staff and vetted by a policy board (TTPC-equivalent)

MARC Committee Process & Structure Assessment

Peer MPO committee process & structure review

MPO	Metropolitan Area, State	Lead Transportation Policy Committee	# of Policy Committee	# of planning advisory committees	# programming committees	# of Transportation committees
Maricopa Association of Governments (MAG)	Phoenix, AZ	Transportation Policy Committee	3	4	13	20
MARC	Kansas City Mo / KS	TTPC	4	7	5	16
Metro Council	Minneapolis MN, WI	Committee of the Whole	3	10	2	15
DVRPC	Philadelphia PA / NJ	DVRPC Board	1	8	2	11
SACOG	Sacramento CA	Transportation Committee	6	4	N/A	10
Atlanta Regional Commission	Atlanta GA	ARC Board	2	6	1	9
Southeast Michigan COG	Detroit MI	General Assembly	2	5	2	9
East West Gateway COG	St. Louis MO / IL	Executive Advisory Committee	1	6	2	9
Wasatch Front	Salt Lake City, UT	Transportation Coordinating Committee (Trans Com)	4	2	N/A	6

MARC Committee Process & Structure Assessment

MARC
MID-AMERICA REGIONAL COUNCIL

Discussion & next steps

- MARC will facilitate conversations with regional leadership to discuss:
  - Is simplification of committee structure desired?
  - Is there interest in more predictable, substantive, full body of work for various committees?
- Recommendations anticipated by summer of 2025

125

MARC
MID-AMERICA REGIONAL COUNCIL

Suballocated programming process debrief

Process-Related Questions

- Does it require excessive time to participate in # of meetings between various committees?
- Do overlapping committee memberships lead to redundant informational presentations & discussions shared at various meetings?

126

Suballocated programming process debrief

Process-Related Questions

- Do you value **pros** of current committee structure:
    - Opportunities for networking
    - Bottom-up decision making
    - Focused attention on different funding programs
- Are **cons** of current committee structure overly burdensome?
    - Time-intensive and requires extensive staff support
    - Need to stagger programming committees in specific timelines
    - Low participation and engagement from some planning modal committees

127

Suballocated programming process debrief

Application-Related Questions

- What kind of issues did you have?
- Does combining different funding sources into one application work?
- TEC and ATPC: did it help to split the funding sources into different committees?
- What do you think about the two-phase application structure?
- Do planning committees have enough of a role?
- How can we ask better environment-related questions?
- Was there information you wanted that you couldn't find?

128

BPAC representation in other committees

- BPAC has representation as a committee on other MARC committees
- All primary voting member seats are filled, but the members need alternates
- Alternates attend a meeting in place of a voting member who cannot attend. Alternates who substitute for voting members may vote.

129

BPAC representation in other committees

Committee	Abbr.	Member	Alternate
Active Transportation Programming Committee	ATPC	Nicole Brown	**Vacant**
Missouri STP Priorities Committee	MO-STP	Noel Bennion	**Vacant**
Kansas STP Priorities Committee	KS-STP	Nick Ward-Bopp	**Vacant**
Transportation Emissions Committee	TEC	Eric Rogers	**Vacant**

130

MARC
MID-AMERICA REGIONAL COUNCIL

	MEMBERS		ALTERNATES	
	Name	Affiliation	Name	Affiliation
TTPC (6)	Chuck Soules (Co-Chair)	City of Smithville	*Vacant*	
	Leslie Herring (Co-Chair)	City of Westwood, KS	*Vacant*	
	Wes Minder	Platte County	*Vacant*	
	Mary Jaegar	City of Olathe, KS	Beth Wright	City of Olathe, KS
	AJ Herrmann	City of Kansas City, MO	*Vacant*	
	Vacant		*Vacant*	
Federal (ex-officio, non-voting) (3)	David LaRoche	FHWA-KS Division	*Vacant*	
	Cecelie Cochran	FHWA-MO Division	Dan Weitkamp	FHWA-MO Division
	Vacant	Region VII	*Vacant*	
State DOT (2)	Jenny Kramer	KDOT	Allison Smith	KDOT
	Krystal Jolly	MoDOT	Katie Jardieu	MoDOT
City/County Technical Staff (4)	Noel Bennion	City of Riverside Capital Projects & Parks	Brittanie Propes	City of Parkville Parks & Recreation
	Marlene Pardo	City of Kansas City, MO	Regan Tokos	City of Kansas City, MO
	Brett McCubbin	City of Shawnee Parks & Recreation	Michael Park, P.E.	City of Lee's Summit Public Works
	Nick Ward-Bopp	Johnson County Parks & Recreation District	Rodney Riffle	Johnson County Parks & Recreation District
Others (8)	Eric Rogers	Bike Walk KC	Michael Kelley	Bike Walk KC
	Tod Hueser	City of Olathe, KS	*Vacant*	
	Kendra Burgess	The Whole Person	*Vacant*	
	Jan Faidley	Councilmember Roeland Park, First Suburbs Coalition	*Vacant*	
	Vacant		*Vacant*	
	Nicole Brown	Johnson County Health & Environment Dept.	Michael Brooks	University Health - Truman Medical Center
	Mira Felzien	KCATA	Bryce Shields	KCATA
	Brian Anderson	American Discovery Trail - Kansas	Brad Winfrey	Children's Mercy Hospital
	Highlighted names are pending TTPC co-chair approval			

131

MARC
MID-AMERICA REGIONAL COUNCIL

Roundtable updates

132

MARC
MID-AMERICA REGIONAL COUNCIL

Adjournment

Next meeting: May 14, 2025