BICYCLE & PEDESTRIAN ADVISORY COMMITTEE (BPAC)

April 3, 2025 * Ed Ball Building, Room #3112

ABOUT US

The BPAC educates, supports, promotes, & advocates for the needs of pedestrians & bicyclists throughout the City of Jacksonville

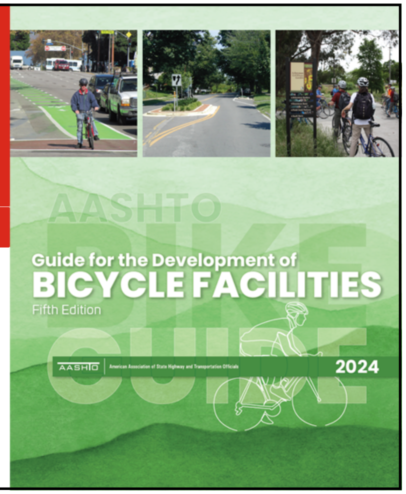
AGENDA

5:30-5:35 PM	Introductions and Adoption of Minutes
5:35-6:05 PM	**AASHTO 2024 Bike Guide Update** Jeremy Chrzan, PE, PTO, Multimodal Design Practice Lead, Toole Design
6:05-6:35 PM	**Introduction to Florida NICA** Jackie Morrison, Event/Race Director, Florida Interscholastic Cycling League (FICL)
6:35-6:45 PM	**Springfield Traffic Calming** Peter Borenstein, BPAC Vice Chair
6:45-6:50 PM	**Ride of Silence with North Florida Bicycle Club** Len Burroughs, North Florida Bicycle Club (NFBC)
6:50-6:55 PM	Discussion / Rapid Fire
6:55-7:00 PM	Wrap Up / Upcoming Events / Announcements / Next Meeting Info
	Adjourn

2024 AASHTO Bike Guide 5th Edition

Jacksonville Bicycle and Pedestrian Advisory Committee Meeting
April 3, 2025

Jeremy Chrzan, PE, PTOE
Multimodal Design Practice Lead



TOOLE DESIGN

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"**Communities across the country are all different**, but the AASHTO Bike Guide allows each of those communities to learn how to **grow, maintain, and operate** their bicycle infrastructure – allowing for **more transportation options for those who cannot or choose not to drive**"

AASHTO Executive Director Jim Tymon

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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 & Side Paths	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

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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

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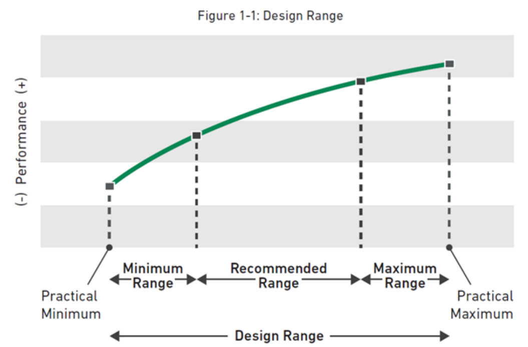

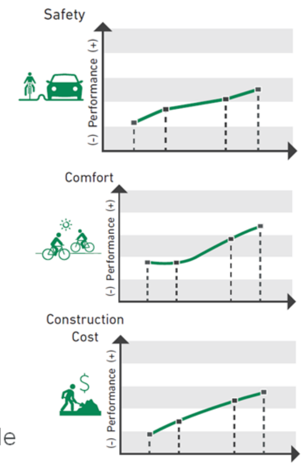

TOOLE DESIGN Section 1.4 – Use of Values in the Guide

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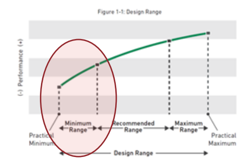
Section 1.4 – Use of Values in the Guide

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



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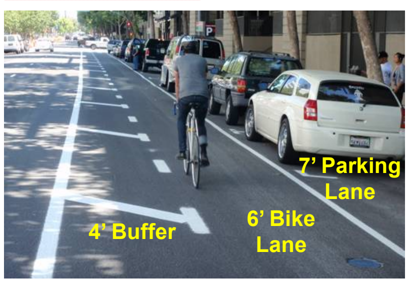
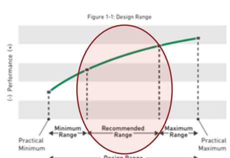
Section 1.4 – Use of Values in the Guide



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.



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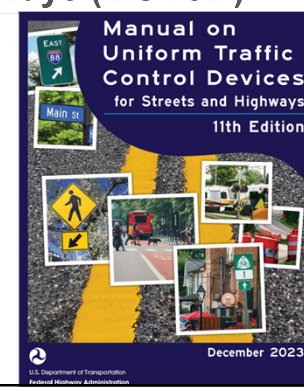
1.6.1. Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)

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



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Experimental

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.

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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

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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)

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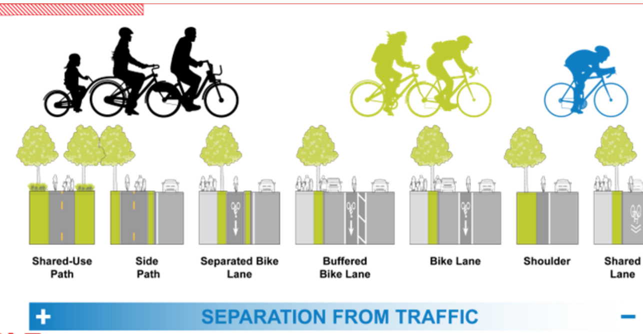
Comfort Increases with Separation



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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)

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2.7. Guiding Principles for Bicyclist Safety

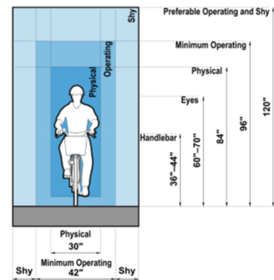

Figure 2-5: Typical Adult Bicyclist Operating Space

- 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)

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Chapter 3: Bicycle Planning

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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

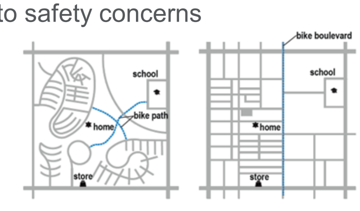

Figure 3-1: Examples of Contrasting Connectivity

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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

Figure 3-3: Example of Bicycle Master Plan Recommendations Map

Table 3-4: Levels of Traffic Stress

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.

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Chapter 4 - Guidance for Choosing a Bikeway Type

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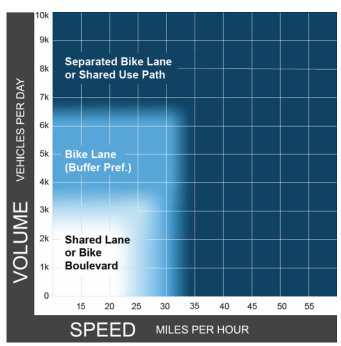
Section 4.3.1 – Streets in Urban, Suburban and Rural Town Contexts

Identifies the **preferred** bikeway type assuming:

Design User = Interested but Concerned bicyclist

Analysis = Level of Traffic Stress



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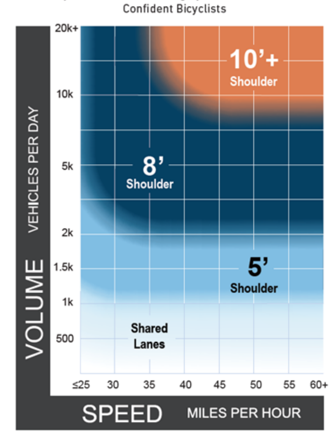
Section 4.3.2 – Rural Roadways

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



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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

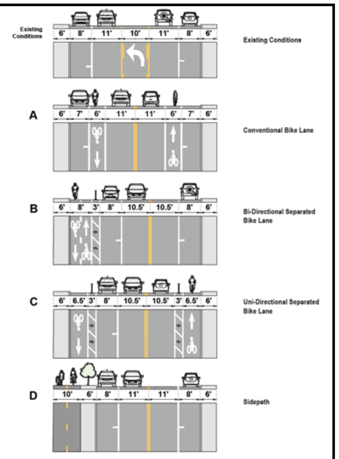

Figure 4-3: Common Bikeway Options within a 48-ft Cross Section

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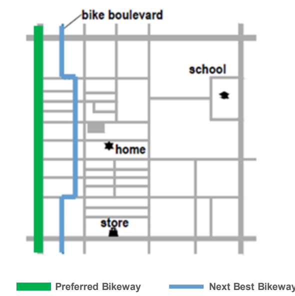
4.5.3. Selecting the Next Best Facility When the Preferred Bikeway Is Not Feasible

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



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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

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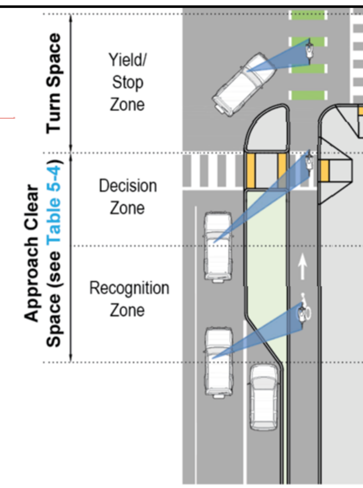
Section 5.4 – Understanding Assignment of Right of Way

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.



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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.

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

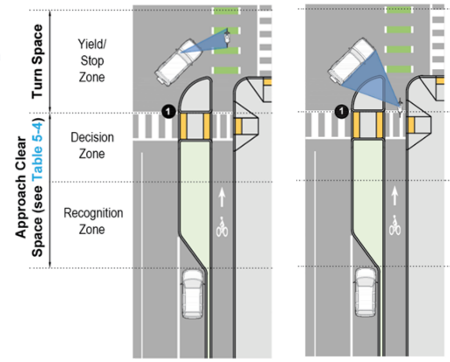
Table 5-4: Recommended Intersection Approach Clear Space by Vehicular Turning Design Speed

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



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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

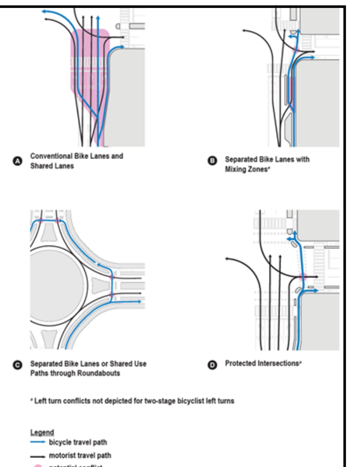

Figure 5-13: Comparison of Bicyclist Exposure to Motor Vehicles at Intersections

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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.

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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

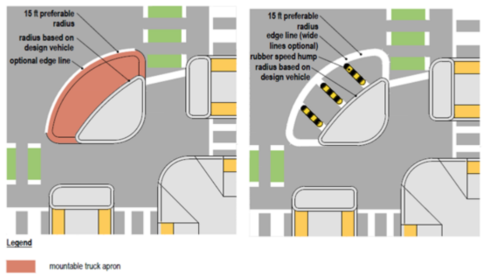

Figure 5-18: Mountable Truck Apron

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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
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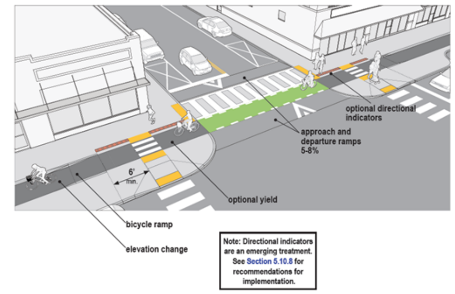

Figure 5-20: Raised Side Street Crossing

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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

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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

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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.

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6.4.4. Separation of Pedestrians and Bicyclists

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

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

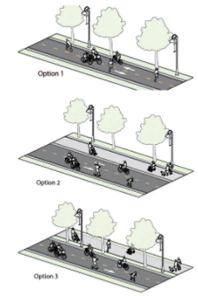

Figure 6-4: Options for Separating Bicyclists and Other Wheeled Users from Pedestrians

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6.6. General Design Considerations

- 6.6.1. Shy Distance, Clearances, and Shoulders

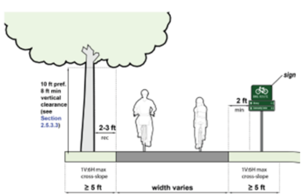

Figure 6-5: Shoulders and Shy Distance on Shared Use Paths

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 6-8: Minimum Length of Crest Vertical Curve Based on Stopping Sight Distance

Minimum Length of Crest Vertical Curve (ft) Based on Stopping Sight Distance														
A	S = Stopping Sight Distance for flat grade (ft)*													
(%)	40	60	80	100	120	140	160	180	200	220	240	260	280	300
2									17	57	97	137	177	217
3						25	65	105	145	185	225	265	307	352
4				9	49	89	129	169	209	253	301	353	409	470
5			7	47	87	127	167	211	261	316	376	441	512	587
6			32	72	112	154	201	254	313	379	451	530	614	705
7		11	51	91	132	179	234	296	366	442	526	618	716	822
8		24	64	104	150	205	267	338	418	505	602	706	819	940
9		35	75	117	169	230	301	381	470	569	677	794	921	1057
10	3	43	84	131	188	256	334	423	522	632	752	883	1023	1175
11	10	50	92	144	207	281	368	465	574	695	827	971	1126	1292
12	16	56	100	157	226	307	401	508	627	758	902	1059	1228	1410
13	21	61	109	170	244	333	434	550	679	821	978	1147	1331	1527
14	25	66	117	183	263	358	468	592	731	885	1053	1236	1433	1645
15	29	70	125	196	282	384	501	634	783	948	1128	1324	1535	1762
16	32	75	134	209	301	409	535	677	836	1011	1203	1412	1638	1880
17	35	80	142	222	320	435	568	719	888	1074	1278	1500	1740	1997
18	37	85	150	235	338	461	602	761	940	1137	1354	1589	1842	2115
19	40	89	159	248	357	486	635	804	992	1201	1429	1677	1945	2232
20	42	94	167	261	376	512	668	846	1044	1264	1504	1765	2047	2350

Shaded area represents S = L. Minimum length of vertical curve = 5 ft

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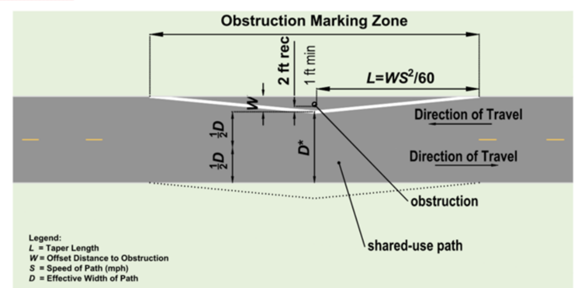
6.6.9.3 Obstruction Markings



Note: Where $D \le 8$ ft, path widening should be considered. Where the path cannot be widened, the center line should not be marked within the limits, L.

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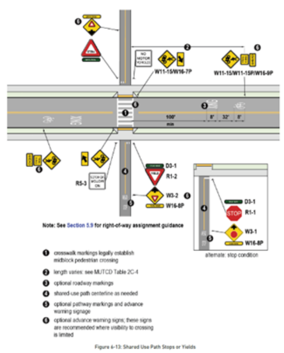
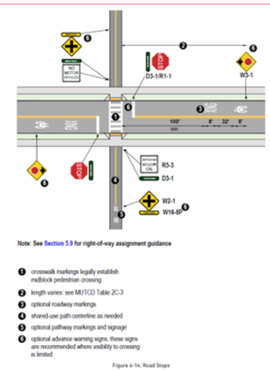
6.7. Shared Use Path Intersections and Transitions





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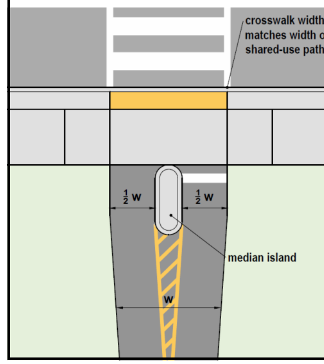
6.7.8 – Restricting Motor Vehicles



Bollards are a last resort

- Post No Motor Vehicle signs
- Use different materials
- **Use a center island at approaches**
- Use targeted enforcement
- Consider flex posts before bollards

- Bollards must be retroreflective
- Must include markings to guide users around bollards

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Chapter 7 – Separated Bike Lanes and Side Paths

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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.

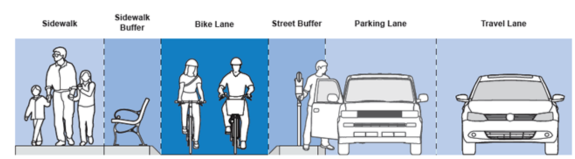

Figure 7-1: Separated Bike Lane Zones

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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

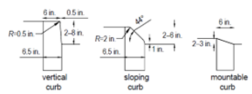

Figure 7-5: Curb Types for Separated Bike Lanes

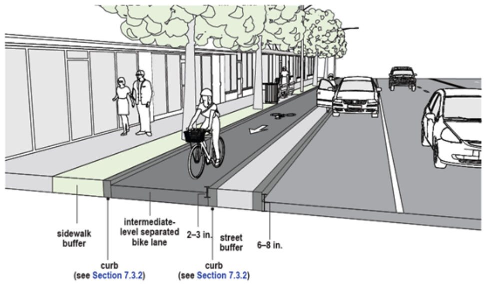

Figure 7-4: Intermediate-Level Separated Bike Lane

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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

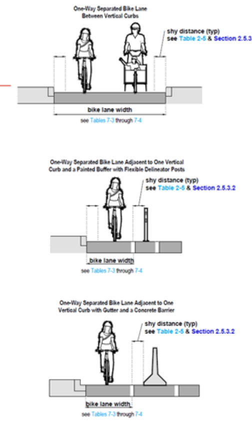

Figure 7-7: Separated Bike Lane Width

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7.7.1. Drainage and Stormwater Management

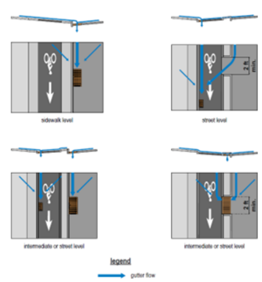

Figure 7-11: Examples of Separated Bike Lane Drainage Options

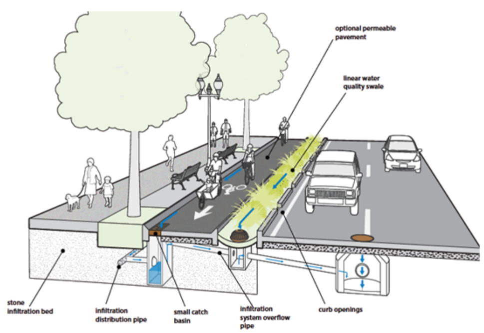

Figure 7-10: Green Stormwater Infrastructure in an Urban Street Context

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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

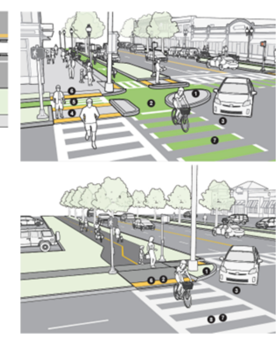
Figure 7-13: Protected Intersection Design for Separated Bike Lanes and Side Paths

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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.

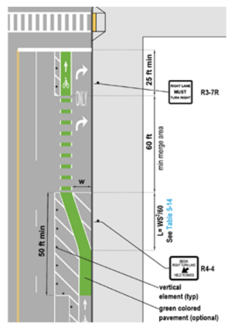

Figure 7-20: Angled Crossing Mixing Zone with Bike Lane

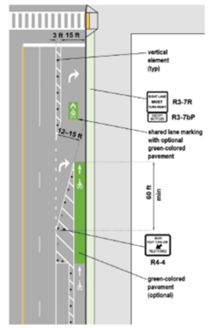

Figure 7-21: Angled Crossing Mixing Zone with Shared Lane

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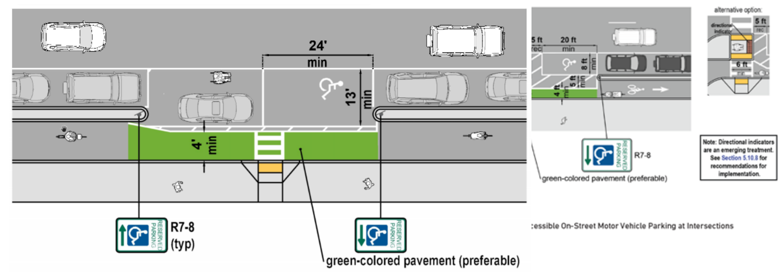
7.9.12.1 Accessible Motor Vehicle Parking



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7.9.14. Transit Stops

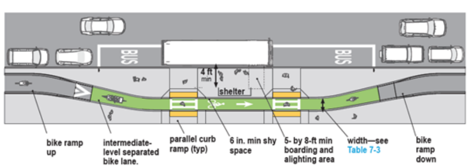

Figure 7-26: Example Configuration: Floating Transit Stop (Mid-Block)

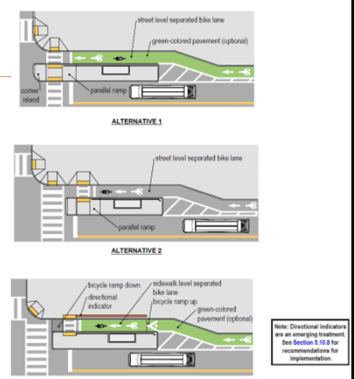

Figure 7-31: Example Configurations: Floating Transit Stop (Near-Side)

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Chapter 8 – Bicycle Boulevard Planning and Design

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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

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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

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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

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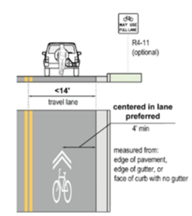
9.3.2. Limited Effectiveness of Wide Outside Lanes

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



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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

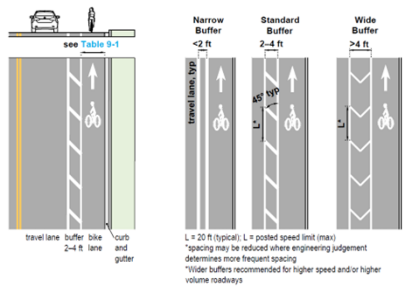

Figure 9-9: Buffer Design Options

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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

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9.12.3. Right Turn Lane Considerations

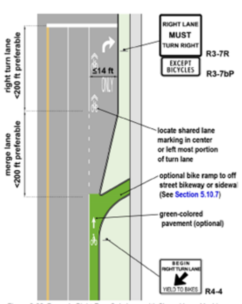

Figure 9-22: Example Right-Turn Only Lane with Shared Lane Markings

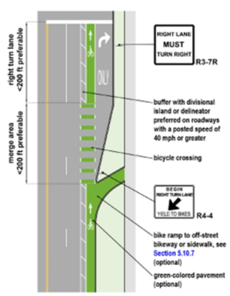

Figure 9-24: Example Bike Lanes on Streets >40 mph or Right-Turn Lanes >200 ft

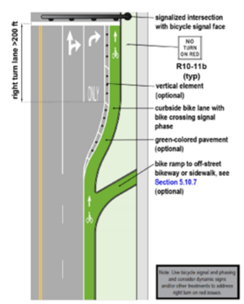

Figure 9-26: Example Bike Lane Approach to a Through-Right and a Right-Turn Only Lane

TOOLE DESIGN

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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

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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

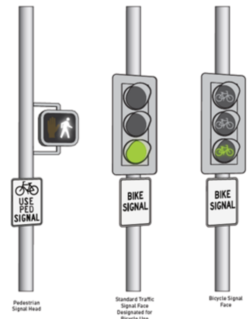

Figure 10-2: Examples of Signal Indication Options for Bicyclists

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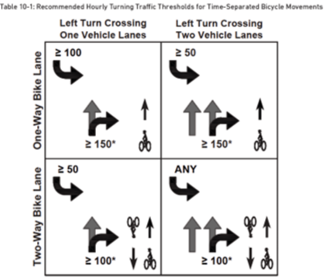
10.3.5. Signal Phasing Schemes for Reducing Conflicts

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



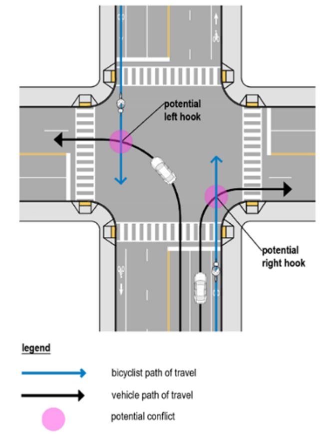


Figure 10-3: Left-Hook and Right-Hook Graphic

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

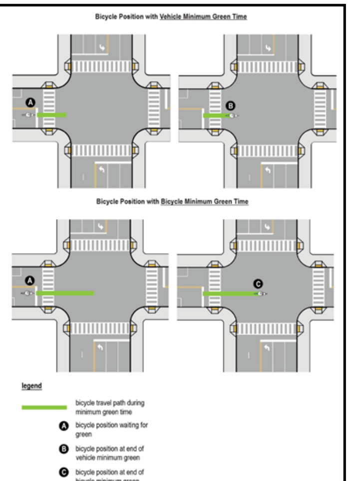
Vehicle Minimum Green

- 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/s^2)
d	=	distance from stop bar to middle of the intersection (ft)
L	=	typical length of a bicycle (6 ft)



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

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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

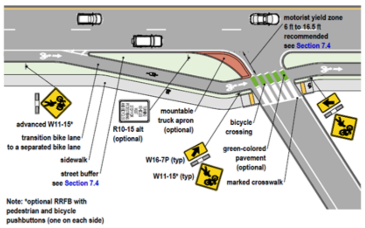

Figure 11-4: Entrance Ramp with Truck Apron and Separated Bike Lane

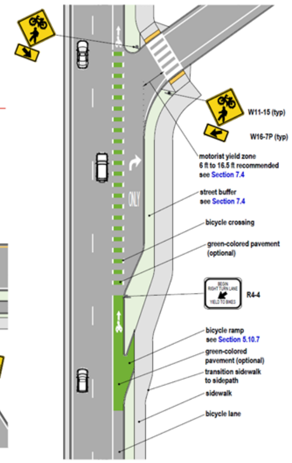

Figure 11-5: Entrance Ramp with Right-Turn Lane, Bike Lane, and Side Path

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11.3.3. Merging and Weaving Areas

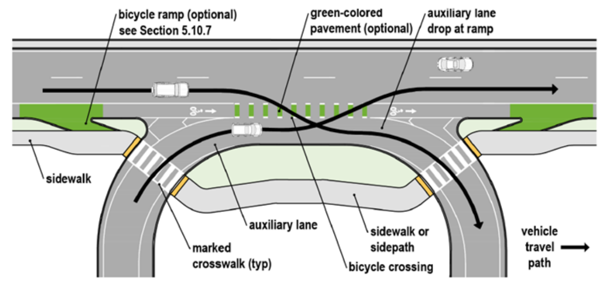

Figure 11-9: Bike Lane Positioned in High-Exposure Weaving Area

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11.8. Channelized Right-Turn Lanes

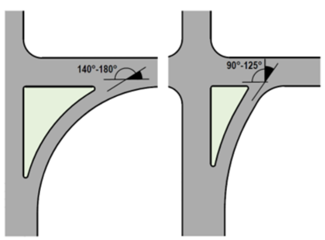

Figure 11-13: Channelized Right-Turn Lane Approach Angles

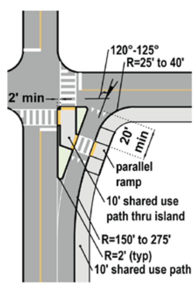

Figure 11-14: Channelized Right-Turn Refuge Island

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Chapter 12 – Rural Area Bikeways and Roadways

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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

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Section 12.3 - Design User Profiles

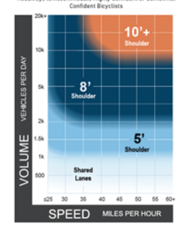
Design User:

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



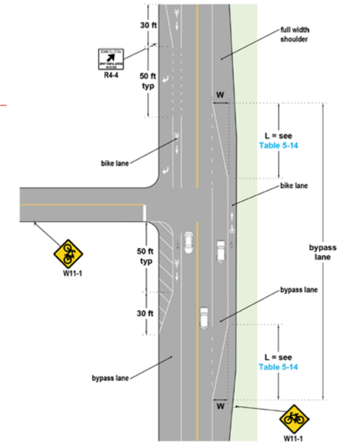


Figure 12-6: Bypass Lane with Paved Shoulder

TOOLE DESIGN

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Chapter 13 – Structures

13.1 Introduction
13.2 General Design Principles for Structures
13.3 Design Details for Bridges
13.4 Design Details for Underpasses
13.5 Options for Retrofitting Existing Structures
13.6 Connections to Nearby Facilities

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13.2. General Design Principles for Structures

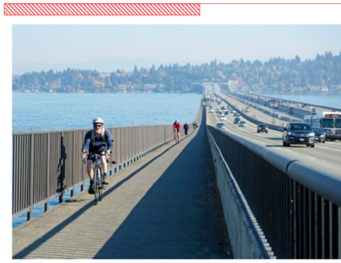

Figure 13-1: Bikeway along the Interstate 90 Bridge over Lake Washington, WA

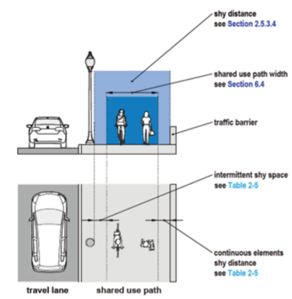

Figure 13-5: Horizontal Clearances for Shared Use Paths on Bridges Along Roads

TOOLE DESIGN

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Chapter 14 – Wayfinding Systems for Bicyclists

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14.6. Bicycle Wayfinding Sign Assemblies

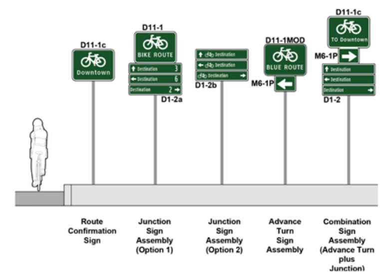

Figure 14-4: Examples of Confirmation, Decision, and Turn Sign Assemblies

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

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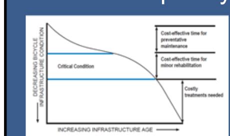
Chapter 15 – Maintenance and Operations



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

72

Thank you!
Questions?

Jeremy Chrzan, PE, PTOE
Multimodal Design Practice Lead
jchrzan@tooledesign.com

TOOLE DESIGN

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FLORIDA
INTERSCHOLASTIC
CYCLING LEAGUE

PRESENTS: DIRT TOUR

FL NICA

ALL THE "DIRT" ON NICA

NICA IS NOT JUST ABOUT BIKES...

NICA is about creating lifelong cyclists and redefining youth sports. By fostering inclusivity and empowerment, NICA transforms how kids grow and perceive the world. We're building a community where everyone rides... cultivating resilience, confidence, and passion.

ALL THE "DIRT" ON NICA

FLORIDA INTERSCHOLASTIC CYCLING LEAGUE

32 LEAGUES ACROSS THE US. OUR PROGRAMMING COVERS MORE THAN 70% OF THE US POPULATION.

FL NICA

A NONPROFIT 501(C)(3) ORGANIZATION GOVERNED BY NICA

ABOUT NICA

VISION

Every youth is empowered to be part of a thriving and engaged cycling community.

MISSION

We build strong minds, bodies, character, and communities through cycling.

CORE VALUES

These drive everything we do

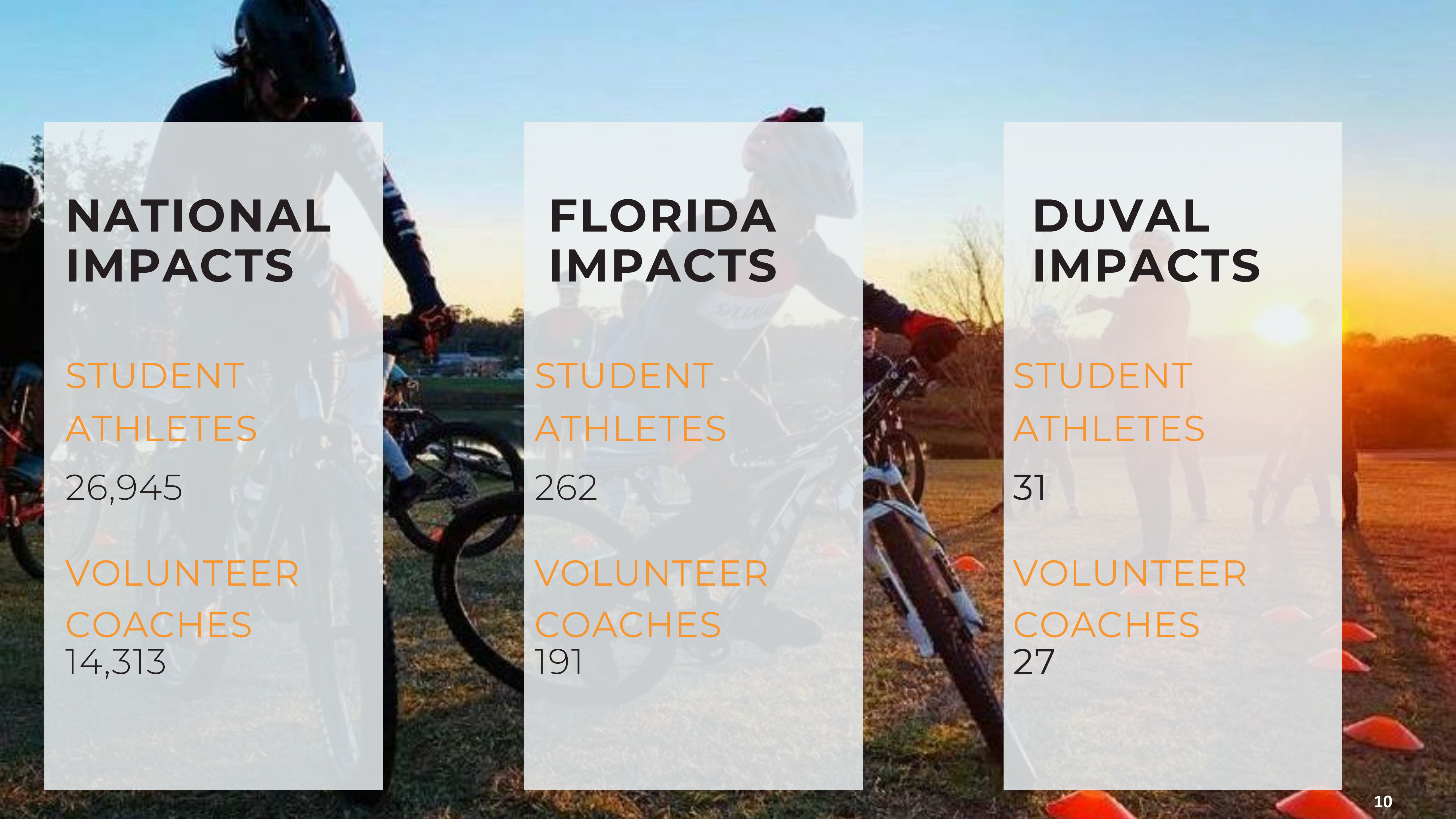
Fun! Inclusivity! Equity! Respect! Community!

The Florida Interscholastic Cycling League:

FL NICA

FLORIDA MISSION

- Fills a niche for students whose needs aren’t met by traditional school sports
- Gets kids outside
- Welcomes & supports diversity in ability, ethnicity, gender, orientation, and skill level
- Promotes trail maintenance & stewardship
- Improves focus and academic performance
- Promotes health & fitness in teens & their families



NATIONAL IMPACTS

STUDENT ATHLETES

26,945

VOLUNTEER COACHES

14,313

FLORIDA IMPACTS

STUDENT ATHLETES

262

VOLUNTEER COACHES

191

DUVAL IMPACTS

STUDENT ATHLETES

31

VOLUNTEER COACHES

27

TYPES OF TEAMS

It only takes one kid and one coach to start a team!

OFFICIAL SCHOOL CLUB

Comprised of full-time students representing a single school School approval required Club can use school mascot and name

COMPOSITE TEAM

Comprised of full-time students from more than one school Designed to be accommodating & easy to form

INDEPENDENT SCHOOL TEAM

Students representing a single school No school approval required Creates its own name and mascot, or uses school mascot with approval

WHO PARTICIPATES?

- STUDENT-ATHLETES **GRADES 6-12** AND AGES 10 -19 YEARS
- BOYS AND GIRLS COMPETE SEPARATELY

CATEGORIES S OF COMPETITION
JV-3
JV-2
JV-1
VARSITY
MIDDLE SCHOOL (BY GRADE LEVEL)

NO BENCH WARMERS

- INDIVIDUAL SCORING FOR MIDDLE SCHOOL & HIGH SCHOOL
- END OF SEASON TEAM SCORING

FL NICA

THE SEASON

September:: Coaches Retreat

October 15: Registration and beginning of pre-season - teams meet informally

December 1: In-Season - teams meet regularly for practice and conditioning

February-May: Event Race Weekends!

6 weekend-long events

Every event includes competitive and non-competitive riding options

RACE COURSES

- 3-5 MILE LOOP/LAP MULTIPLE LAPS
- RACES 45-90 MINUTES DEPENDING ON CATEGORY
- 200 FT OF ELEVATION GAIN/LAP
- WIDE STARTS WITH SAFE PASSING
- BEGINNER FRIENDLY!
- LARGE TEAM PIT AREA

WHAT WE DO

There is more than racing

NICA GRIT IS:

National initiative to **recruit and retain more female student athletes, coaches and volunteers** across NICA programming. Goal is to increase NICA's overall participation rate to 33% female participation - both coaches and student-athletes!

GIRLS RIDING TOGETHER

WHAT WE DO

There is more than racing

TEEN TRAIL CORPS…

The **Teen Trail Corps (TTC)** program **teaches youth a healthy respect for work, nature, and the importance of giving back through trail stewardship**. Giving back to our community through bike related advocacy is an important activity that all recreational groups using outdoor resources have a responsibility to maintain. TTC gives youth an opportunity to participate in the work that goes on behind the scenes of a great trail.

NICA
TEEN TRAIL CORPS

WHAT WE DO

There is more than racing

NICA ADVENTURE…CHALLENGE BY CHOICE

NICA Adventure helps our s**tudent-athletes build relationships and interpersonal skills that will serve them beyond their time with NICA.** As NICA continues to grow and fulfill its mission the intentional integration of NICA Adventure into our leagues and at practice will help us continue to get #morekidsonbikes and more importantly, inspire them to #stayonbikesforlife.

- Our focus is on youth development Every student-
- athlete matters There are no
- team tryouts There is no bench
- Student-athletes are encouraged
- -- but not required -- to race Non-racing team members may
- still participate in practices, team rides and attend race events

#MOREKIDSONBIKES

FL NICA

WHAT'S NEXT?

How to get

WEBSITE

Florida Interscholastic Cycling League

FloridaMTB.org

EMAIL ADDRESS

Jackie@FloridaMTB.or
g

FOLLOW US!

Springfield Traffic Calming

Peter Borenstein, BPAC Vice-Chair

Ride of Silence – May 14

- Worldwide event
- Silent procession to honor bicyclists who have been killed or injured on our roadways
- North Florida Bicycle Club organizing local ride

Ride Information:

- Wednesday, May 14 @ 6:00PM
- 3827 San Jose Park Dr
- No cost
- Members & non-members welcome
- Use App to register
- Helmets required!

Discussion / Rapid Fire Topics

Group/All

Upcoming Events

Group/All

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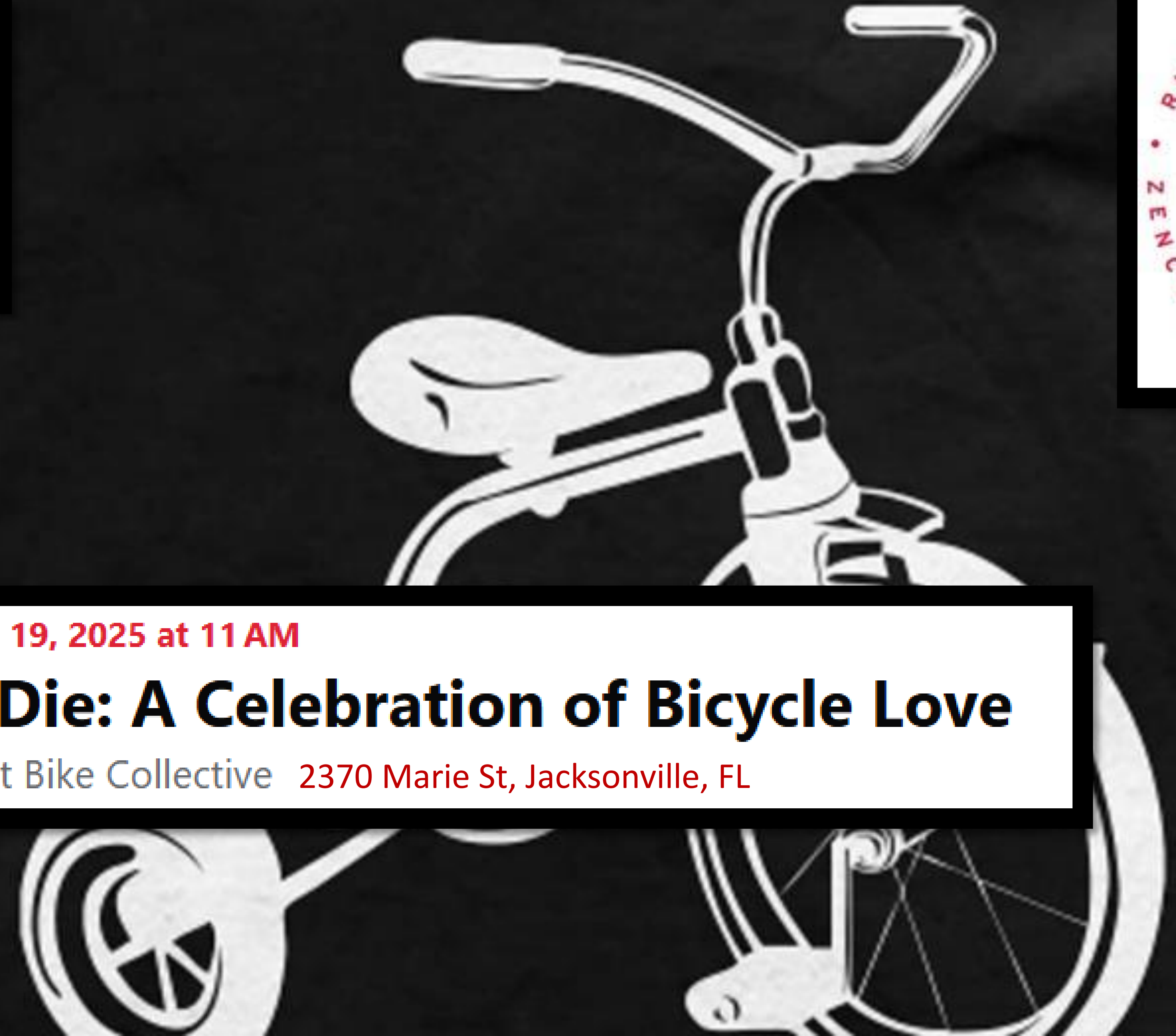
Saturday, April 19, 2025 at 11 AM

Ride or Die: A Celebration of Bicycle Love

The Honey Pot Bike Collective 2370 Marie St, Jacksonville, FL



RIVERSIDE • JAX, FL • 904.619.0496 • ZENCOG.COM

zen cog BICYCLE COMPANY

Saturday,
April 26th
10 a.m. - 2 p.m.

1124 W. Duval St.
Jacksonville, FL 32204

GROUNDWORK JACKSONVILLE INVITES YOU

Celebrate Trails Day

Meet at the LaVilla Link Butterfly Garden for an afternoon of family fun on the Emerald Trail and celebrate the nationwide opening of trails

Program made possible with support from the Urban and Community Forestry Program of the USDA Forest Service

EMERALD TRAIL

BAPTIST HEALTH | Wolfson Children's Hospital

GROUNDWORK JACKSONVILLE

EMERALD TRAIL COMMUNITY MEETING

Segment 4: Brentwood - Phoenix - Springfield

Saturday April 5th | 11 - 1 PM

Emerald Station | 2320 N. Liberty Street 32206

GROUNDWORK JACKSONVILLE

EMERALD TRAIL

National Association of City Transportation Officials

Designing Cities 2025

The annual NACTO Designing Cities Conference brings together over 1,000 people passionate about advancing the state of transportation in North American cities—engineers, planners, government agency leaders, elected officials, advocates, and other transportation professionals of all career levels.

2025 host: The District Department of Transportation

May 29-31, 2025

Washington, D.C.

FDOT DISTRICT 2

SAVE THE DATE

Grants, Growth, & Best Practices

April 29, 2025

From 9:00 AM To 3:00 PM

Suwannee County Fairgrounds
1302 11th St
Live Oak, FL

North Florida Transportation Planning Summit

FDOT District 2 will be diving into topics including State grants, planning for growth, emergency repair best practices, and much more!

Amy Roberson, CPM
Planning and Environmental Management Office
Phone: (386) 961-7793
Email: Amy.Roberson@dot.state.fl.us

David Tyler, PE, AICP
Planning and Environmental Management Office
Phone: (386) 961-7842
Email: David.Tyler@dot.state.fl.us

Scan For More Information

JACKSONVILLE BICYCLE & PEDESTRIAN ADVISORY COMMITTEE


JACKSONVILLE
BICYCLE & PEDESTRIAN ADVISORY COMMITTEE
NEXT MEETING
ADJOURN