

Complete Streets, Bike Facility Standards, Roundabouts, and Road Diets

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Complete Streets



Florida Department of Transportation

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GOVERNOR

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ANANTH PRASAD, P.E.
SECRETARY

POLICY

Effective: September 17, 2014
Office: Design Director
Topic No.: 000-625-017-a

COMPLETE STREETS

It is the goal of the Department of Transportation to implement a policy that promotes safety, quality of life, and economic development in Florida. To implement this policy, the Department will routinely plan, design, construct, reconstruct and operate a context-sensitive system of "Complete Streets." While maintaining safety and mobility, Complete Streets shall serve the transportation needs of transportation system users of all ages and abilities, including but not limited to:

- Cyclists
- Freight handlers
- Motorists
- Pedestrians
- Transit riders

The Department specifically recognizes Complete Streets are context-sensitive and require transportation system design that considers local land development patterns and built form. The Department will coordinate with local governments, Metropolitan Planning Organizations, transportation agencies and the public, as needed to provide Complete Streets on the State Highway System, including the Strategic Intermodal System.

This *Complete Streets Policy* will be integrated into the Department's internal manuals, guidelines and related documents governing the planning, design, construction and operation of transportation facilities.


Ananth Prasad, P.E.
Secretary



“...Florida has a significant number of bicycle and pedestrian fatalities and serious injuries. It’s unacceptable, and we will not tolerate it.”

“Addressing the issue of bicycle and pedestrian safety requires a comprehensive approach. We have to change the way we design and engineer our roads, we have to improve our education efforts, and clarify our traffic laws...”

FDOT Secretary Jim Boxold











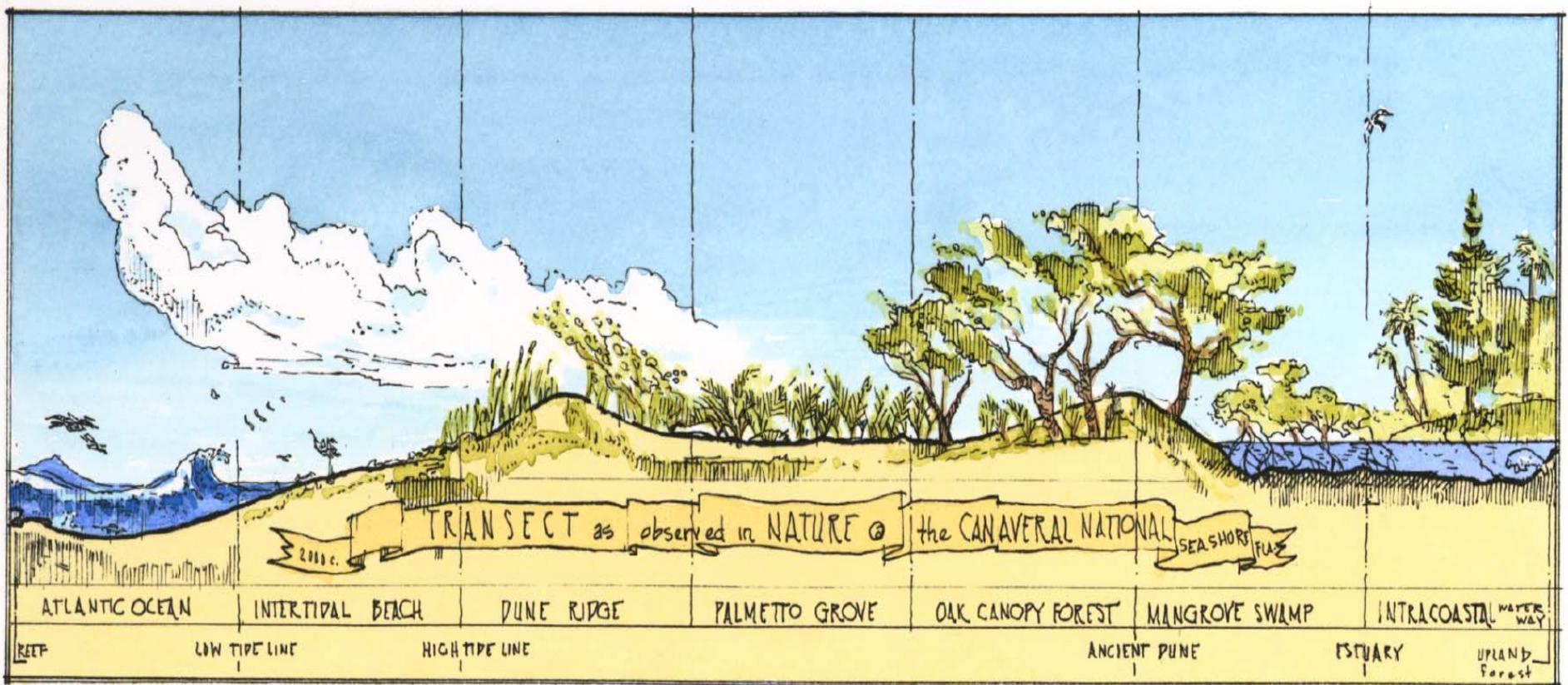






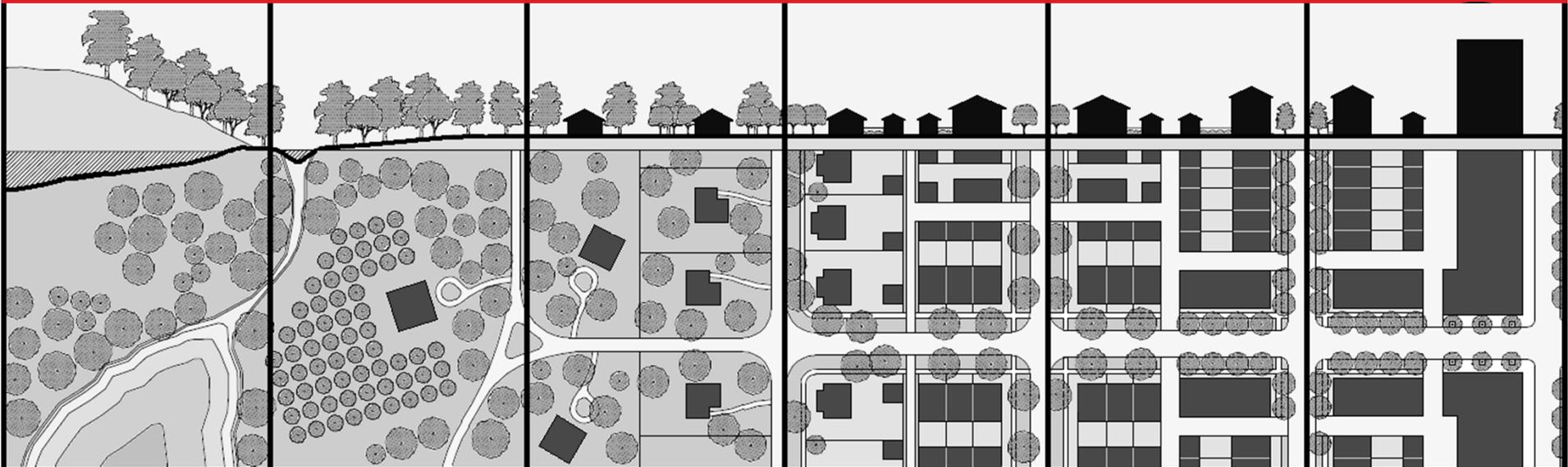
LULU > TR

***PLAN THE LAND USE FIRST
THEN THE TRANSPORTATION***



Title: A natural Transect Illustration

Source: James Wassell

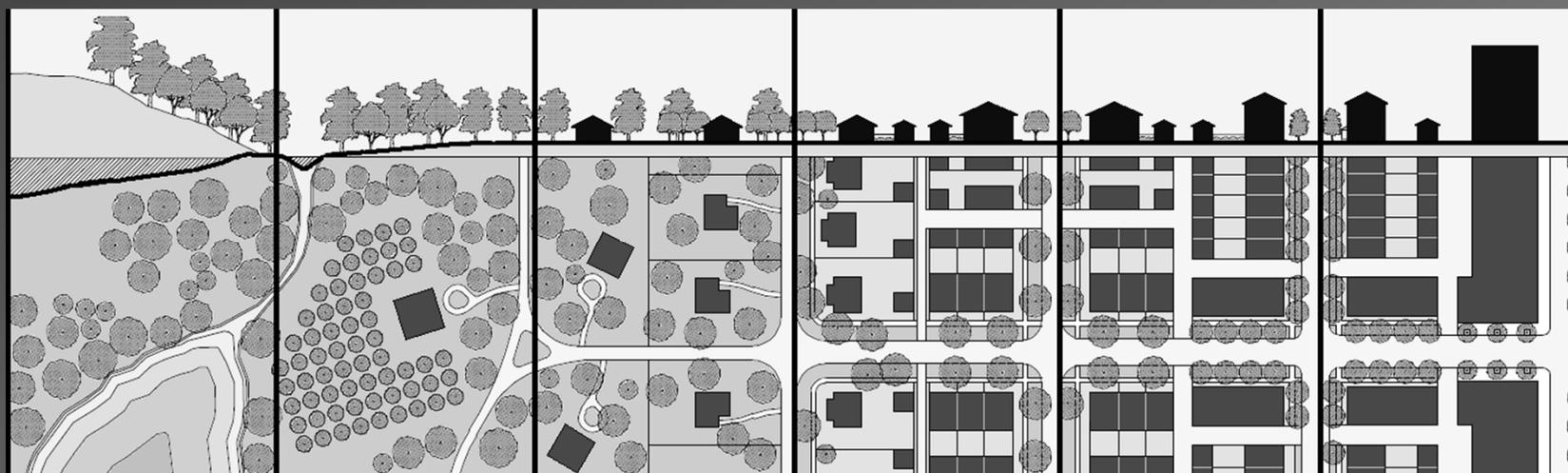


DPZ & Co.



Dover, Kohl & Partners

ZHA, Inc.



T1

T2

T3

T4

T5

T6

Least
Walkable
(least
urban)



Most
Walkable
(most
urban)















Complete Streets — Pedestrians!



Top 10 Walkability Factors – Urban Form



- ∞ 10. Narrow Streets
- ∞ 9. Street Trees
- ∞ 8. Traffic Volumes
- ∞ 7. Sidewalks
- ∞ 6. Interconnected Streets
- ∞ 5. On Street Parking
- ∞ 4. Lower Traffic Speeds
- ∞ 3. Mixed Land Use
- ∞ 2. Buildings Fronting St.
- ∞ 1. Small Block Size!

Top 3 Walkability Factors – Pedestrians



- ⌘ 3. Vehicle Speed
- ⌘ 2. Vehicle Speed
- ⌘ 1. Vehicle Speed

Pedestrian Fatalities & Speed

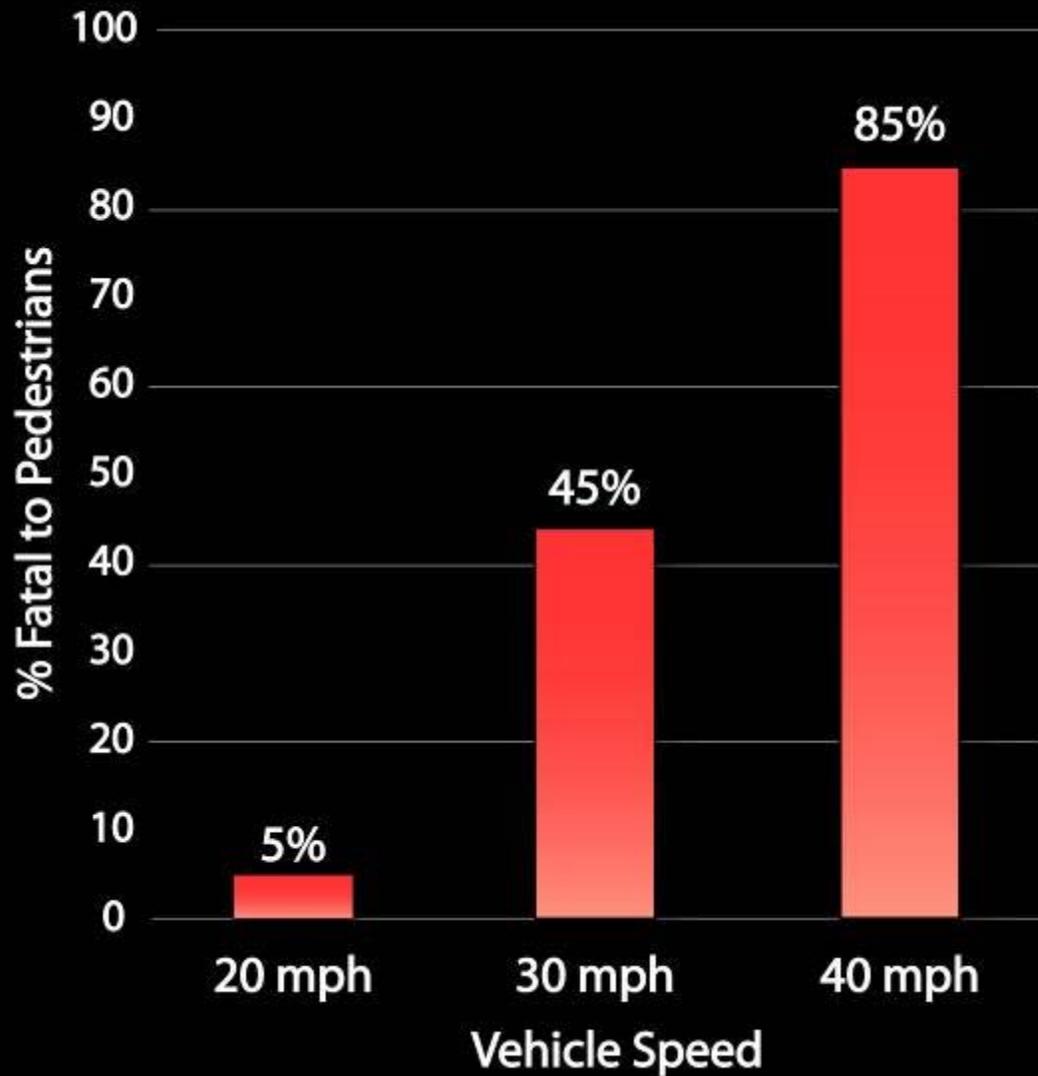


Table 6.4 Design Parameters for Walkable Urban Thoroughfares (continued)

Thoroughfare Design Parameters for Walkable Mixed-Use Areas									
	General Urban (C-4)			Urban Center/Core (C-5/6)					
	Commercial			Residential			Commercial		
	Boulevard [1]	Avenue	Street	Boulevard [1]	Avenue	Street	Boulevard [1]	Avenue	Street
Context									
Building Orientation (entrance orientation)	front	front	front	front	front	front	front	front	front
Maximum Setback [2]	0 ft.	0 ft.	0 ft.	10 ft.	10 ft.	10 ft.	0 ft.	0 ft.	0 ft.
Off-Street Parking Access/Location	rear, side	rear, side	rear, side	rear	rear	rear, side	rear	rear	rear, side
Streetside									
Recommended Streetside Width [3]	19 ft.	16 ft.	16 ft.	21.5 ft.	19.5 ft.	16 ft.	21.5 ft.	19.5 ft.	16 ft.
Minimum sidewalk (throughway) width	8 ft.	6 ft.	6 ft.	10 ft.	9 ft.	6 ft.	10 ft.	9 ft.	6 ft.
Pedestrian Buffers (planting strip exclusive of travel way width) [3]	7 ft. tree well	6 ft. tree well	6 ft. tree well	7 ft. tree well	6 ft. tree well	6 ft. tree well	7 ft. tree well	6 ft. tree well	6 ft. tree well
Street Lighting	For all thoroughfares in all context zones, intersection safety lighting, basic street lighting, and pedestrian-scaled lighting is recommended. See Chapter 8 (Streetside Design Guidelines) and Chapter 10 (Intersection Design Guidelines).								
Traveled Way									
Target Speed (mph)	25-35	25-30 [4]	25	25-35	25-30	25	25-35	25-30 [4]	25
Number of Through Lanes [5]	4-6	2-4	2-4	4-6	2-4	2-4	4-6	2-4	2-4
Lane Width [6]	10-12 ft.	10-11 ft.	10-11 ft.	10-11 ft.	10-11 ft.	10-11 ft.	10-11 ft.	10-11 ft.	10-11 ft.
Parallel On-Street Parking Width [7]	8'	7-8 ft.	7-8 ft.	7 ft.	7 ft.	7 ft.	8 ft.	8 ft.	7-8 ft.
Min. Combined Parking/Bike Lane Width	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.
Horizontal Radius (per AASHTO) [8]	200-510 ft.	200-330 ft.	200 ft.	200-510 ft.	200-330 ft.	200 ft.	200-510 ft.	200-330 ft.	200 ft.
Vertical Alignment	Use AASHTO minimums as a target, but consider combinations of horizontal and vertical per AASHTO Green Book.								
Medians [9]	4-18 ft.	Optional 4-18 ft.	None	4-18 ft.	Optional 4-16 ft.	None	4-18 ft.	Optional 4-18 ft.	None
Bike Lanes (min./preferred width)	5 ft. / 6 ft.	5 ft. / 6 ft.	5 ft. / 6 ft.	5 ft. / 6 ft.	5 ft. / 6 ft.	5 ft. / 6 ft.	5 ft. / 6 ft.	5 ft. / 6 ft.	5 ft. / 6 ft.
Access Management [10]	High	Low-Moderate	Low-Moderate	Moderate	Low-Moderate	Low-Moderate	High	Low-Moderate	Low-Moderate
Typical Traffic Volume Range (ADT) [11]	15,000-50,000	1,500-30,000	1,000-15,000	15,000-30,000	1,500-20,000	500-5,000	15,000-40,000	1,500-30,000	1,000-15,000
Intersections									
Roundabout [12]	Consider urban single-lane roundabouts at intersections on avenues with less than 20,000 entering vehicles per day, and urban double-lane roundabouts at intersections on boulevards and avenues with less than 40,000 entering vehicles per day.								
Curb Return Radii/Curb Extensions and Other Design Elements	Refer to Chapter 10 (Intersection Design Guidelines)								



• Source: ITE/CNU Designing Walkable Urban Thoroughfares



A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	
SHS - Non-SIS																	
Pedestrian Facility Type*	Covered In	Design Stds	Greenbook	Arterial					Collector					TLDC Street***		Freeways	
				Urban			Rural		Urban			Rural		Urban	Urban	Rural	
				T1, T2, District, CSD	T3-Edge	T4-General, T5-Center	T1, T2 Rural	T1, T2 Rural	T1, T2, District, CSD	T3 Edge	T4 General, T5/T6 Center	T1, T2 Rural	T1, T2 Rural	T3 Edge, T4 General, T45/T6 Center	District	Rural	
High Speed Urban/Suburban (50 mph or greater)	Low Speed (40-45 mph)	Very Low Speed (35 mph or less)**	High Speed (60 mph or greater)	Low Speed (55 mph or less)	High Speed Urban/Suburban (50 mph)	Low Speed (40-45 mph)	Very Low Speed (35 mph or less)	High Speed (60 mph or greater)	Low Speed (55 mph or less)	Very Low Speed (35 mph or less)	High Speed (50-70 mph)	High Speed (70 mph)					
5' sidewalks (both sides)	Y	Y	Y	N	Yb	Yb	N	N	N	Yb	Yb	N	N	Yb	N	N	
6' Sidewalks (both sides)	Y	Y	Y	N	Yb	Yb	N	N	N	Yb	Yb	N	N	Yb	N	N	
6' Sidewalks/6' Planting Strips (both sides)	N	N	N	Y	Y	Y	N	N	N	Y	Y	N	N	Y	N	N	
12' reserve areas (future sidewalk/PS)	N	N	N	N	N	N	Y	Y	Y	Y	N	Y	Y	N	N	N	
Shared Use Paths (both sides)	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	
20' Sidewalks (both sides)	N	N	N	N	N	N	N	N	N	N	Y	N	N	Y	N	N	
Low speed right turn pork chops	N	N	N	N	Y	Y	N	N	N	Y	Y	N	N	Y	N	N	
Trees 30' o.c.	N	N	N	N	N	Y	N	N	N	N	Y	N	N	Y	N	N	
Trees 60' or 90' o.c., or opportunistic	N	N	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	N	N	N	

*Does not include signals, markings, etc. See below.
 **This speed or lower is a design exception; 35mph recommended top speed for sharrows
 *** Not an SHS class, but used in TLDC designs

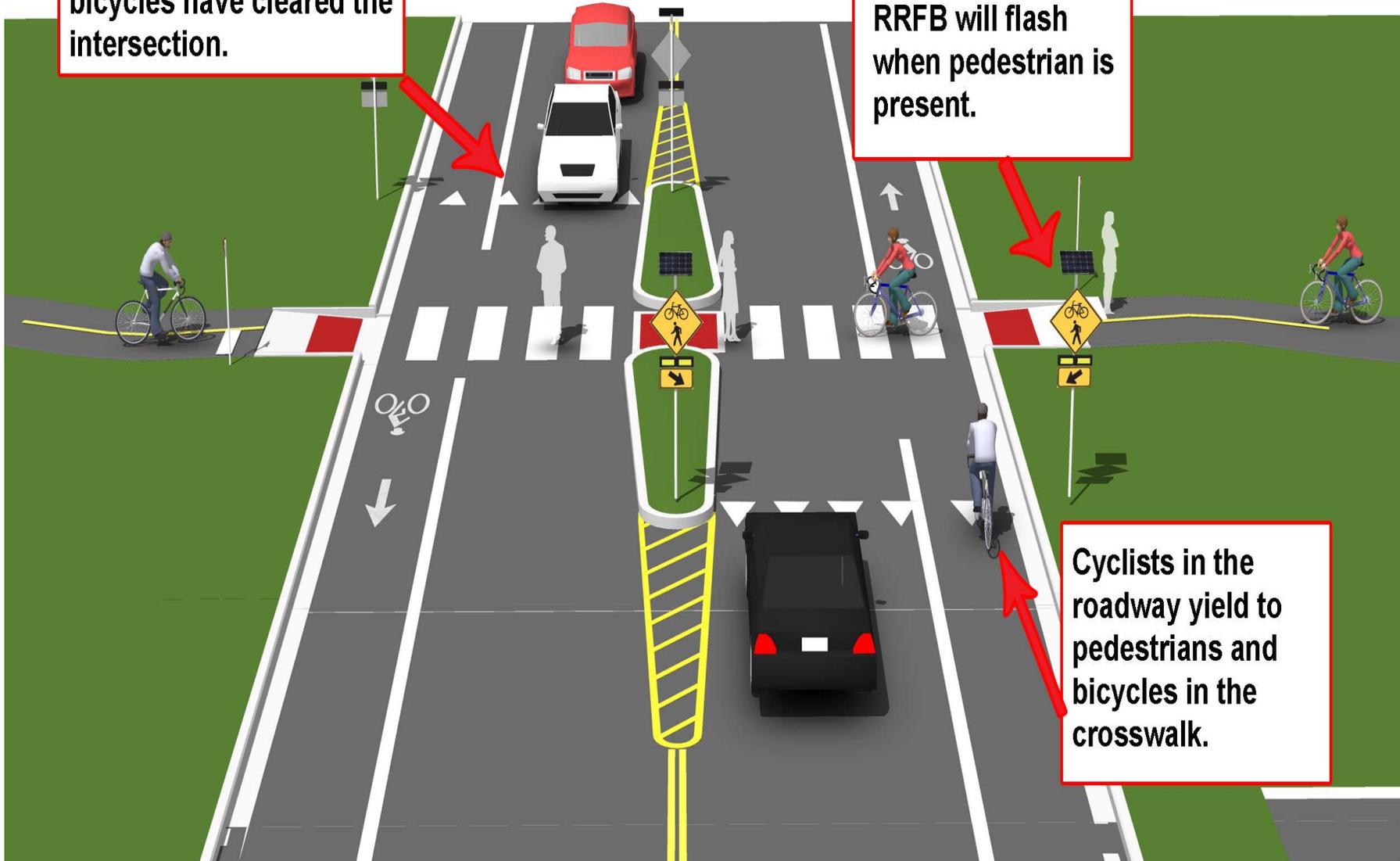
Additional Specifications	Treatment
Condition	
In or within 1 mile of an urban area	Ped heads and countdown signals required at signalized intersections
All legs of signalized intersection where pedestrian facilities are present	Marked crosswalks
Transit or pedestrian facilities across the street	Shall provide pedestrian access to and from pedestrian facilities if only on one side of the street
Long block lengths (>600') in Edge, General or Center Context Zone	Provide midblock crossings no greater than 400' apart to break up long blocks.



Motorists stop behind the advance yield markings until pedestrians and bicycles have cleared the intersection.

RRFB will flash when pedestrian is present.

Cyclists in the roadway yield to pedestrians and bicycles in the crosswalk.









	What Drivers See	What Pedestrians See
1.	  DARK	 Push the button.
2.	  FLASHING	
3.	  STEADY	
4.	  STEADY	 Start crossing.
5.	    ALTERNATING (like RXR) Stop. Then go if clear.	 FLASHING Continue crossing.
6.	  DARK	

Complete Streets...Bicycles!



Florida Bicycle Law



- ∞ Bicycles are considered vehicles when operating on the roadway
- ∞ Must ride in same direction as traffic
- ∞ Bicyclists have “all the rights and responsibilities of pedestrians” when on the sidewalk or a path
- ∞ Must have lights and reflectors at night
- ∞ 3’ clear law
- ∞ Mandatory bike lane law, except when....
- ∞ Must provide for bicycle and pedestrian transportation when planning, designing, and building roads
- ∞ PPM, Design Standards provide criteria and standards – BOTH updated

Typical Bicycle Crash Types



- ☞ 44%- Solo fall
- ☞ 18% - moving motor vehicle
- ☞ 17% - another cyclist
- ☞ 17% - animal, pedestrian, stationary vehicle, other

Common Fall Causes

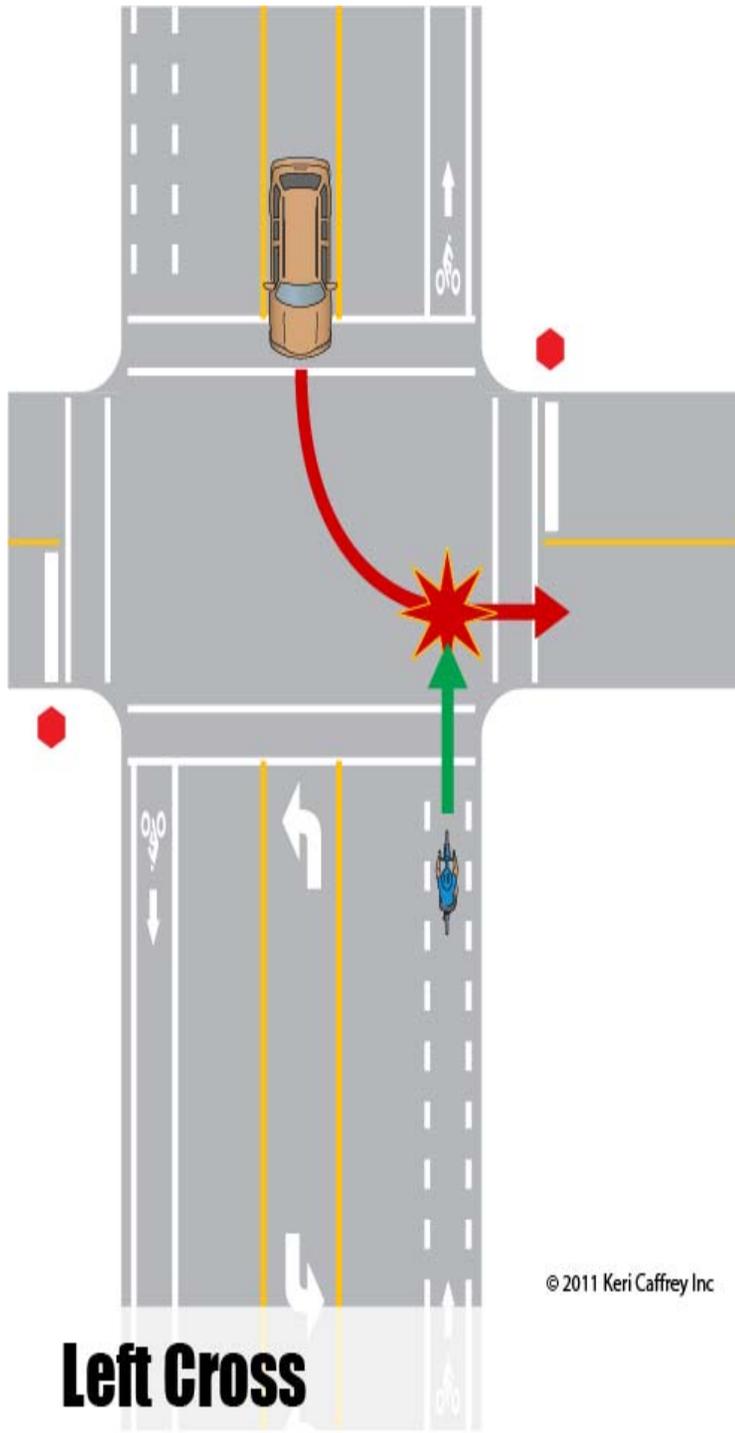


- ∞ Sand or gravel
- ∞ Pavement condition
- ∞ Longitudinal cracks
- ∞ Gutter seams
- ∞ Bollards
- ∞ Drain Grate

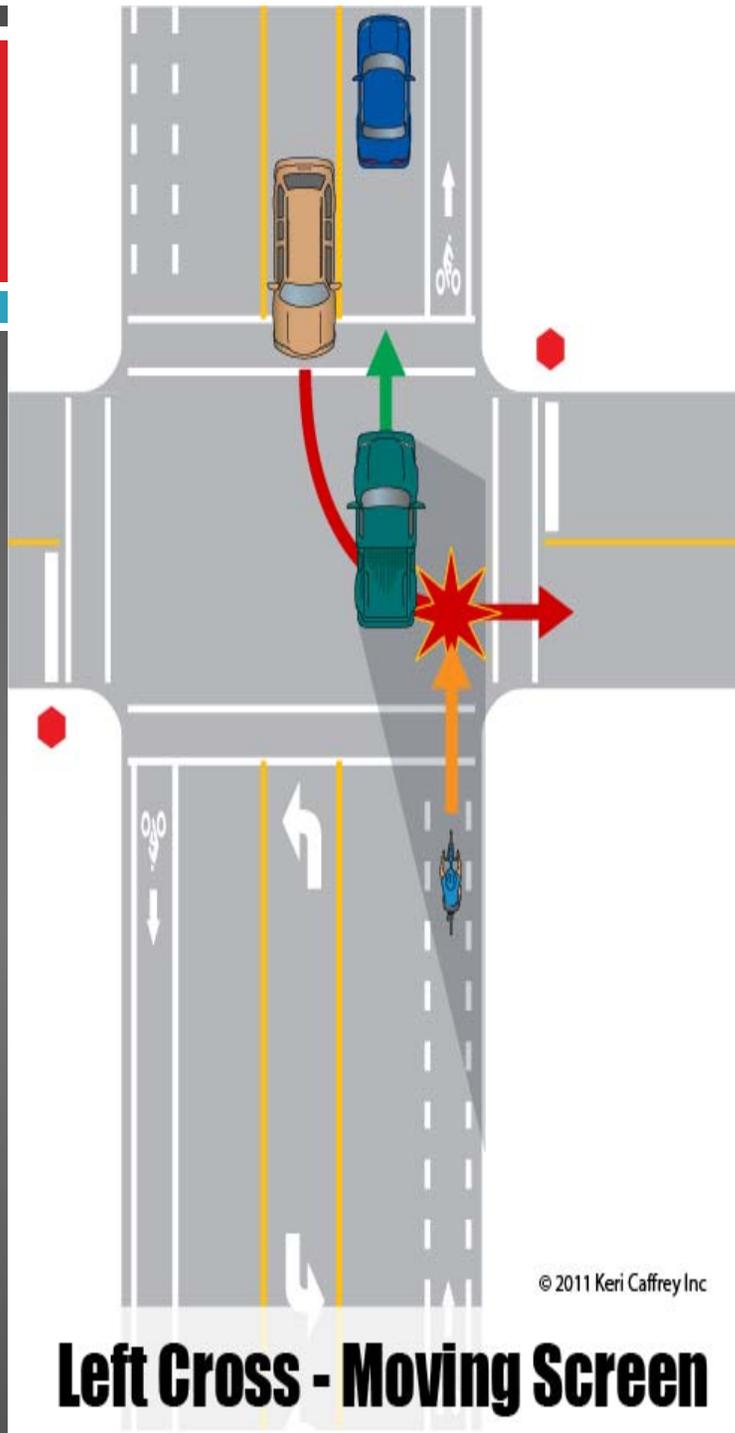
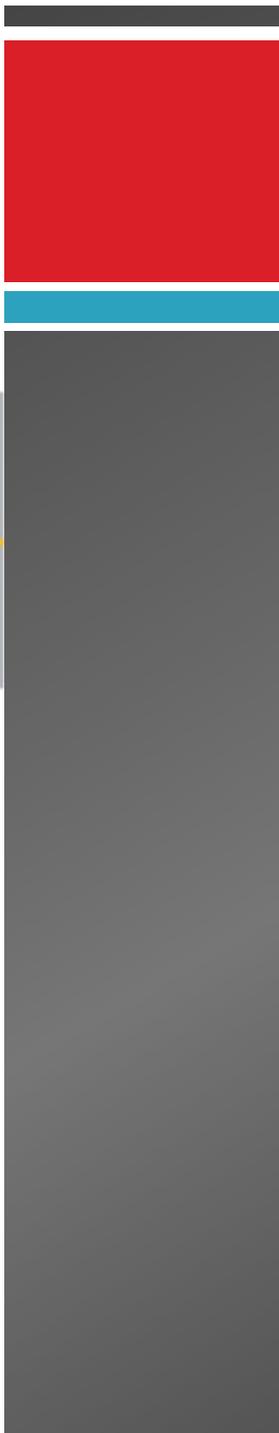
Motor Vehicle Crash Types



- ∞ Left Cross
- ∞ Right Hook
- ∞ Drive Out
- ∞ Sideswipe/ Rear Overtaking
- ∞ Dooring

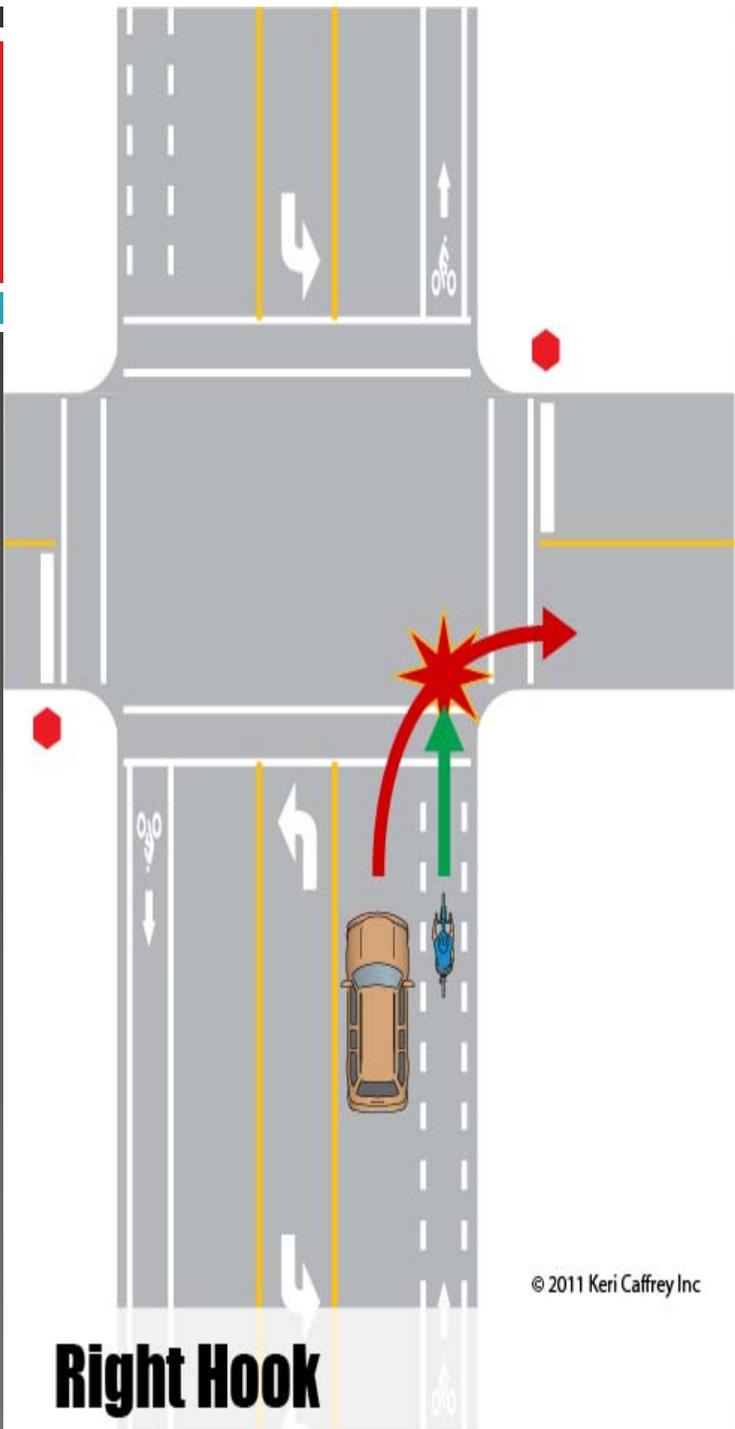


Left Cross

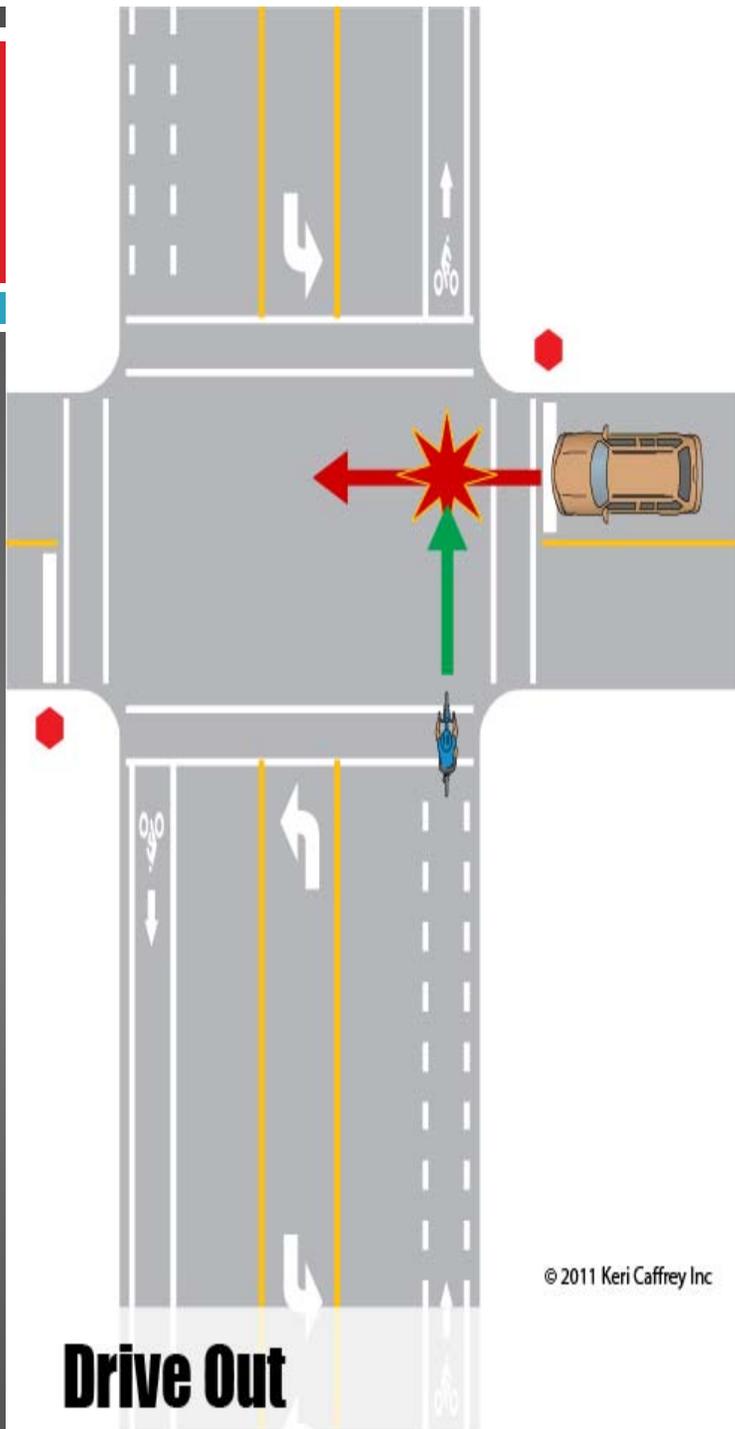


Left Cross - Moving Screen



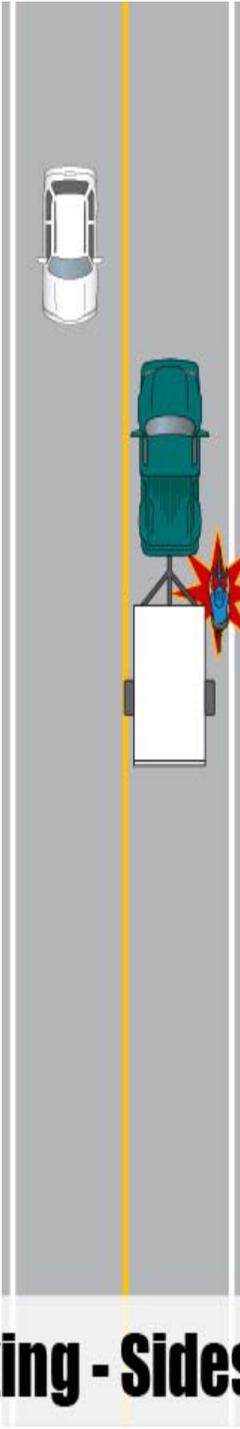


Right Hook



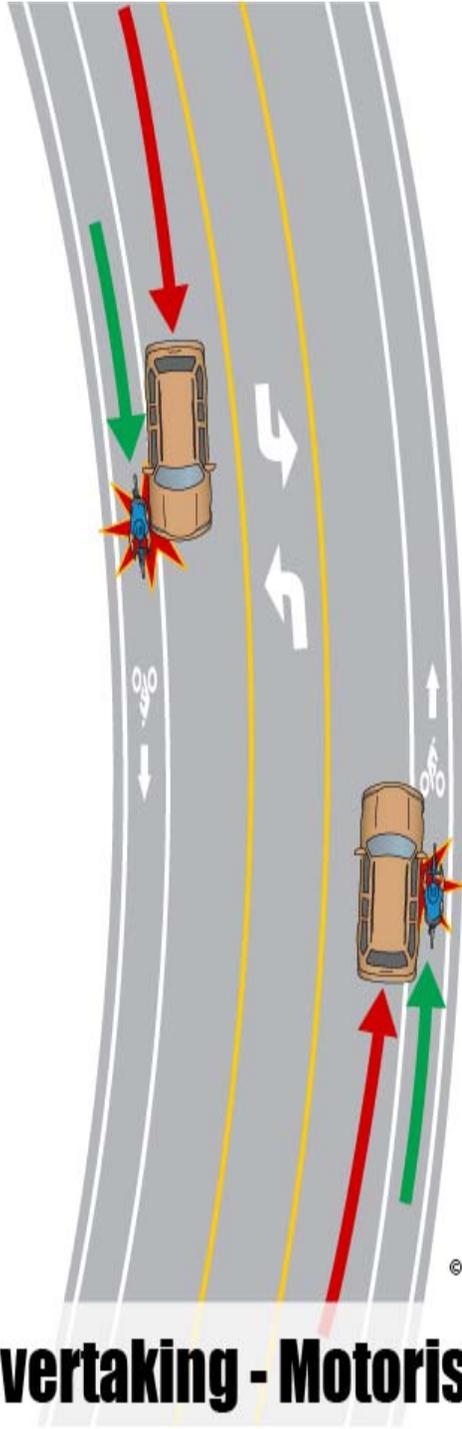
Drive Out





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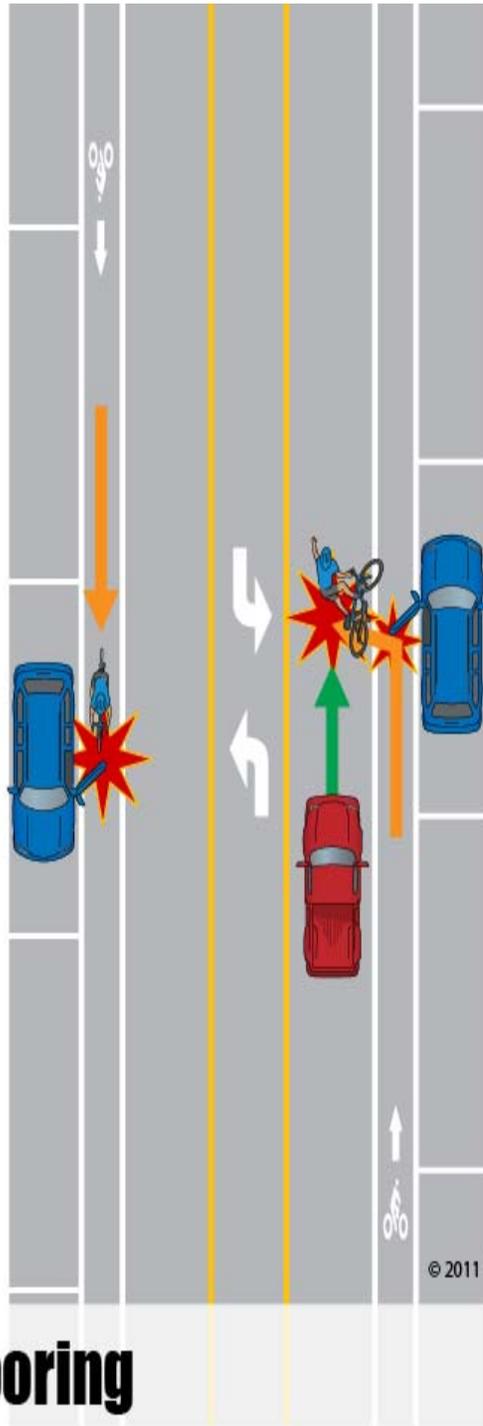
Overtaking - Sideswipe



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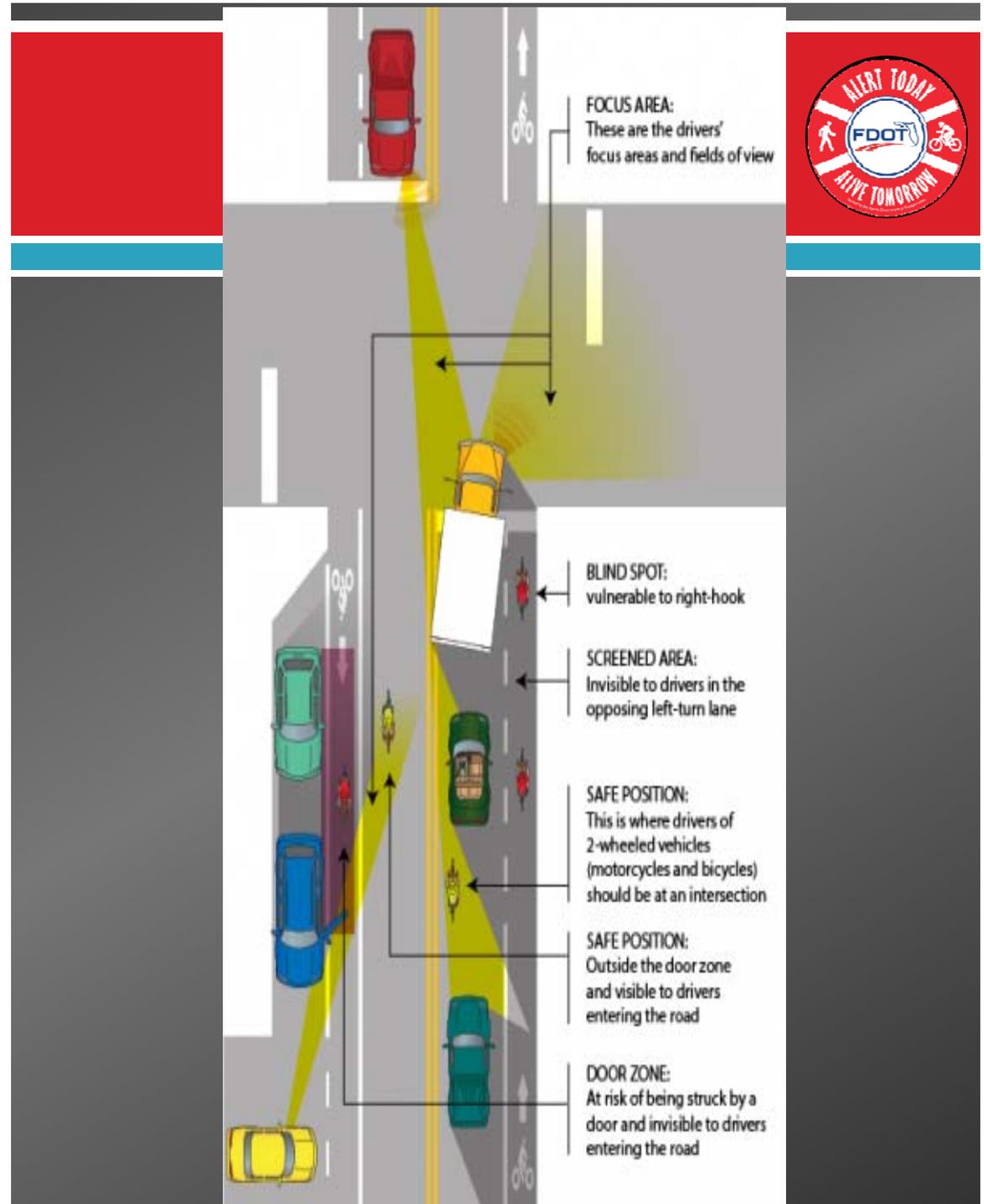
Overtaking - Motorist Drift





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Dooring



Edge Riding Behavior



- ∞ Sets up many of these crash types (including sideswipes and rear-overtaking)
- ∞ Must be avoided or discouraged in facilities design
- ∞ Need to encourage either lane control, or provide sufficient space to avoid edge riding pitfalls

Revised Guidance



- ∞ Shared Lane Marking Placement
- ∞ Bicycle lane minimum and recommended widths
- ∞ Recommended width based on travel speed
- ∞ New facility type – Buffered Bike Lane
- ∞ New flexibility on travel lane widths – 11' acceptable in most conditions now



Revised Index 17347

6201		Junction Slab at Drainage Inlet Openings			DGN-6201
		SIGNING AND MARKING	Roadway Contact		
11200	DSR	Multi-Column Ground Sign	IDS-11200		
11300		Steel Overhead Sign Structures			
11310		Cantilever Sign Structure	IDS-11310	CEL-11310	
11320		Span Sign Structure	IDS-11320	CEL-11320	
11860	DSR	Single Column Ground Signs	IDS-11860		
11861		Single Column Cantilever Ground Mounted Sign			
11862	DSR	Roadside Flashing Beacon Assembly			
11870		Single Post Bridge Mounted Sign Support	IDS-11870		DGN-11870
11871		Single Post Median Barrier Mounted Sign Support	IDS-11871		
13417	DSR	Mounting Exit Number Panels to Highway Signs			
17302	DSR	Typical Sections for Placement of Single & Multi-Column Signs			
17328		Typical Signing for Truck Weigh and Inspection Stations			
17344		School Sign			
17345		Intersection Markings			
17346	DSR	Intersection Marking Areas			
17347	DSR	Intersection Markings			
17349		Traffic Controls for Street Terminations			
17350		Signing for Motorist Services			
17351		Welcome Center Signing			
17352		Typical Placement of Reflective Pavement Markers			
17354		Tourist Oriented Directional Signs			
17355		Special Sign Details			
17356		Span Wire Mounted Sign Details			
17357		Bridge Weight Restrictions			
17359		Rural Narrow Bridge Treatment			
		ROADWAY LIGHTING	Roadway Contact		
17500		Conventional Lighting			
17501		Highway Lighting General Notes			
17502		High Mast Lighting	IDS-17502		





Office of Design

Office of Design / Design Standards / Design Standards Revisions 2015

Design Standards Revisions 2015



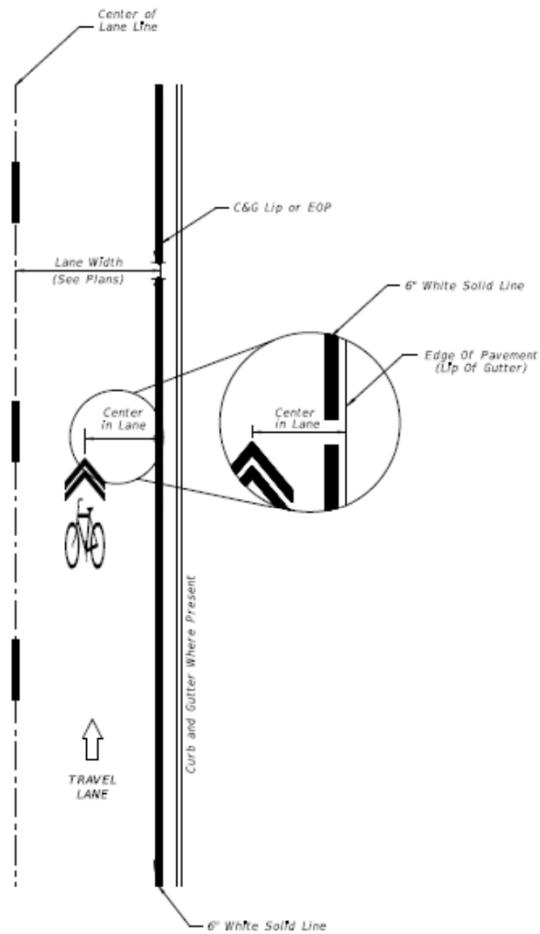
n/a = Non Applicable

n/c = No Change

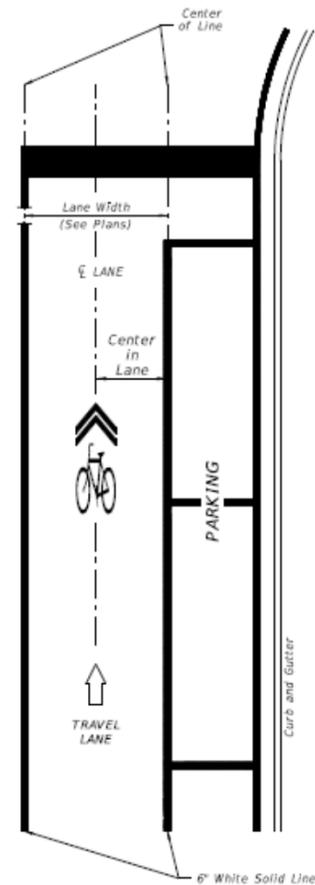
Index Number	Revised Sheets	Index Title	Design Information				
			Instructions for Design Standards (IDS)	Data Table Cell Library	Borderless DGNs	Associated Design Bulletin	
	(PDF)		(ZIP)	(ZIP) Terms of Use	(PDF)		
412	1 of 5	Low Profile Barriers	N/A	N/A	N/A	RDB14-18	
501	N/A	Geosynthetic Reinforced Soils	IDS-00501	N/A	N/A	RDB14-15	
519	1 of 1	Rumble Striping	IDS-00519	N/A	N/A	RDB15-03	
600	1-12 of 12	General Information for Traffic Control Through Zones	N/A	N/A	N/A	RDB14-18	
603	1-2 of 2	Two-Lane Two-Way Work Within the Travel Way	N/A	N/A	N/A		
11200	3 of 3	Multi-Column Ground Signs	N/A	N/A	N/A		
11860	4 of 8	Single Column Ground Signs	N/A	N/A	N/A		
11862	1-7 of 7	Roadside Flashing Beacon Assembly	N/A	N/A	N/A		
13417	1 of 1	Mounting Exit Numbers Panels to Highway Signs	N/A	N/A	N/A		
17302	1 of 1	Typical Sections for Placement of Single & Multi-Column Signs	N/A	N/A	N/A		
17346	1-2 and 13-14 of 14	Special Marking Areas	N/A	N/A	N/A		RDB15-02
17347	1-5 of 5	Bicycle Markings	IDS-17347	N/A	N/A		RDB14-17
17727	2 of 2	Signal Cable & Span Wire Installation Detail	N/A	N/A	N/A		RDB14-18
17841	1 of 1	Cabinet Installation Details	N/A	N/A	N/A		



Shared Lane Markings



SCENARIO #1
LANE WIDTH \leq 14'



SCENARIO #2
ADJACENT TO PARKING



R4-11

Bicycle Lanes

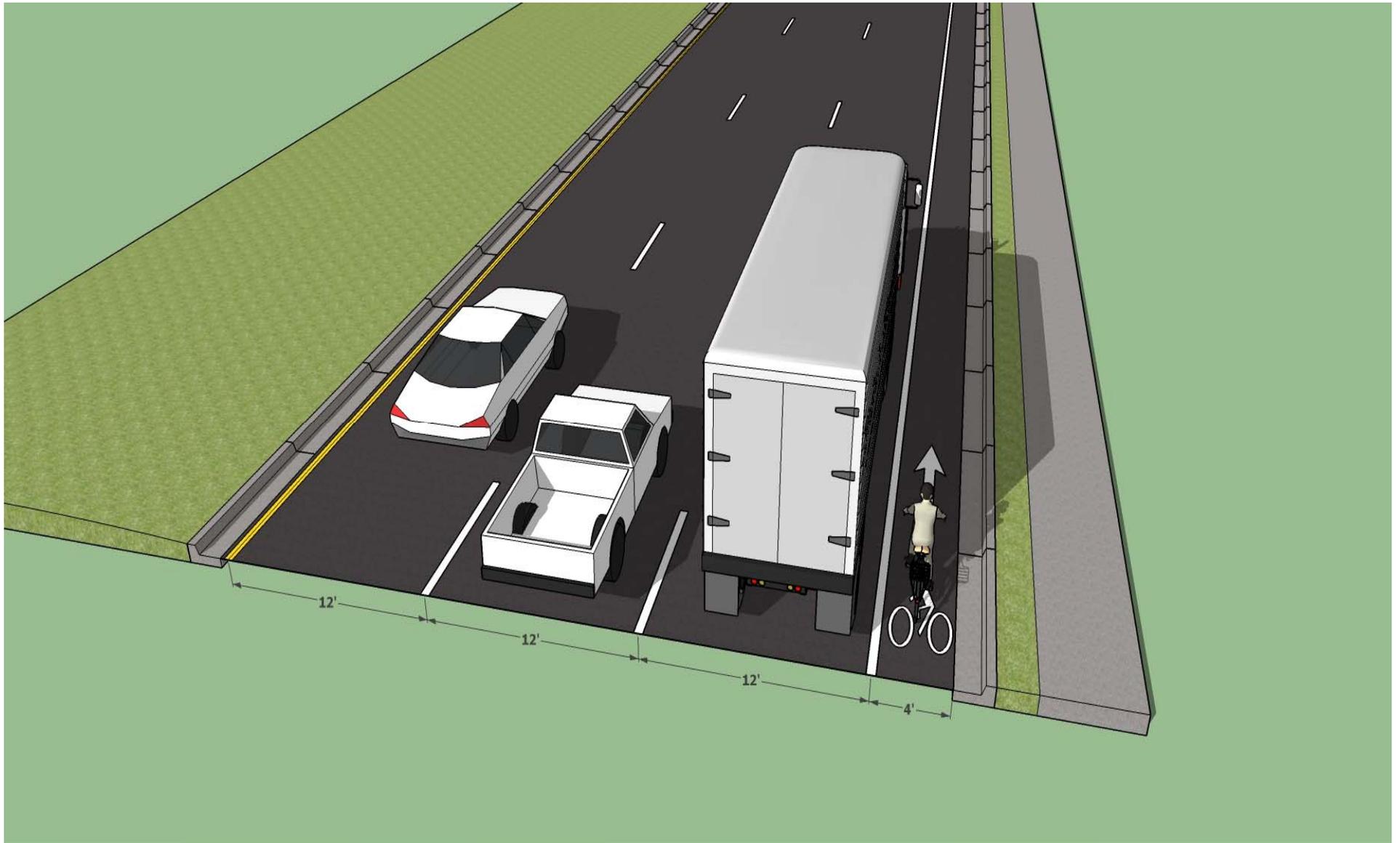


- ∞ 7' buffered bike lane proposed new standard on urban arterials
- ∞ 6' allowed for RRR projects (restriping)
- ∞ 5' and 4' allowed by exception (still meet AASHTO minimum)

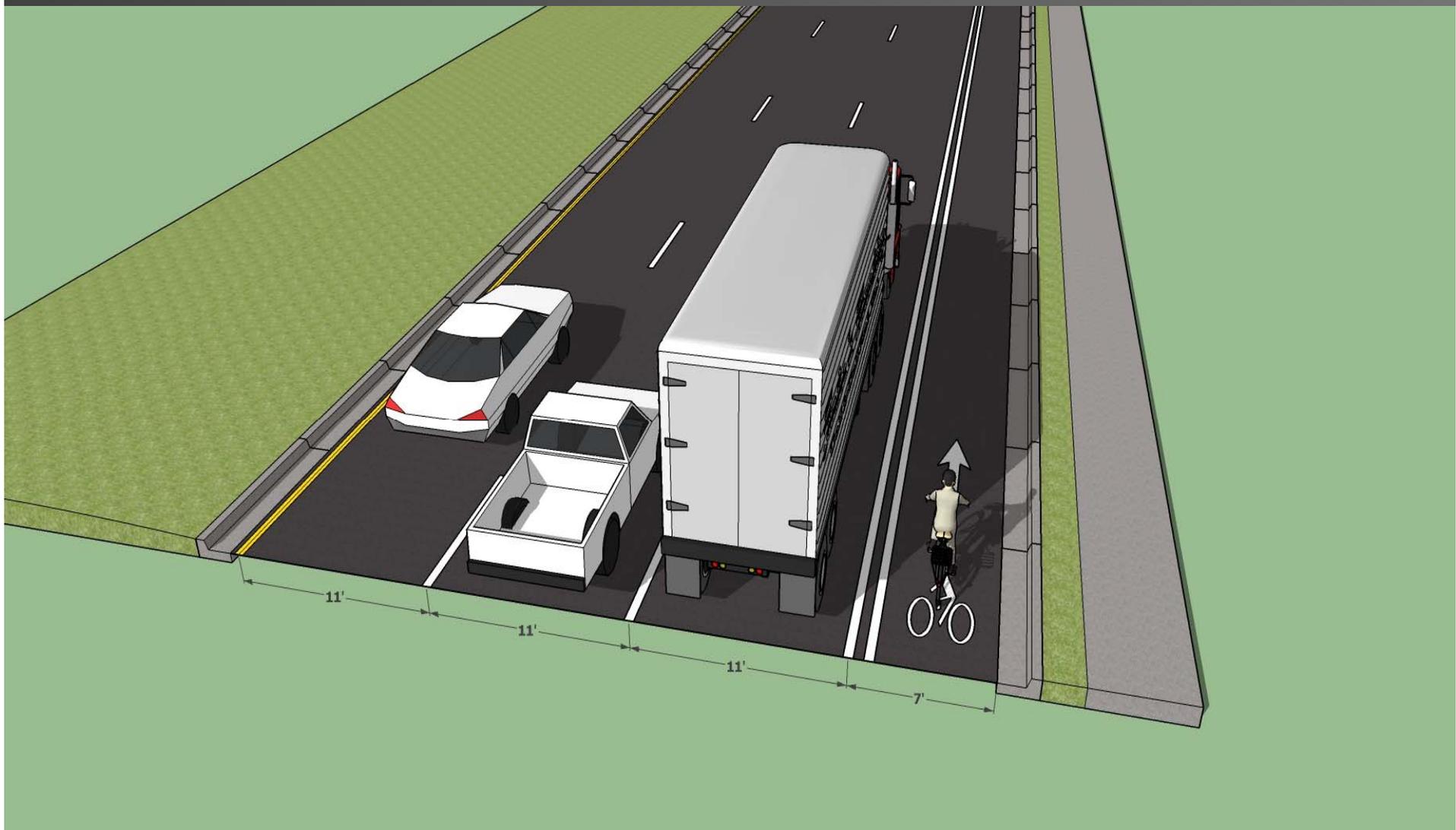
Lane Width Flexibility

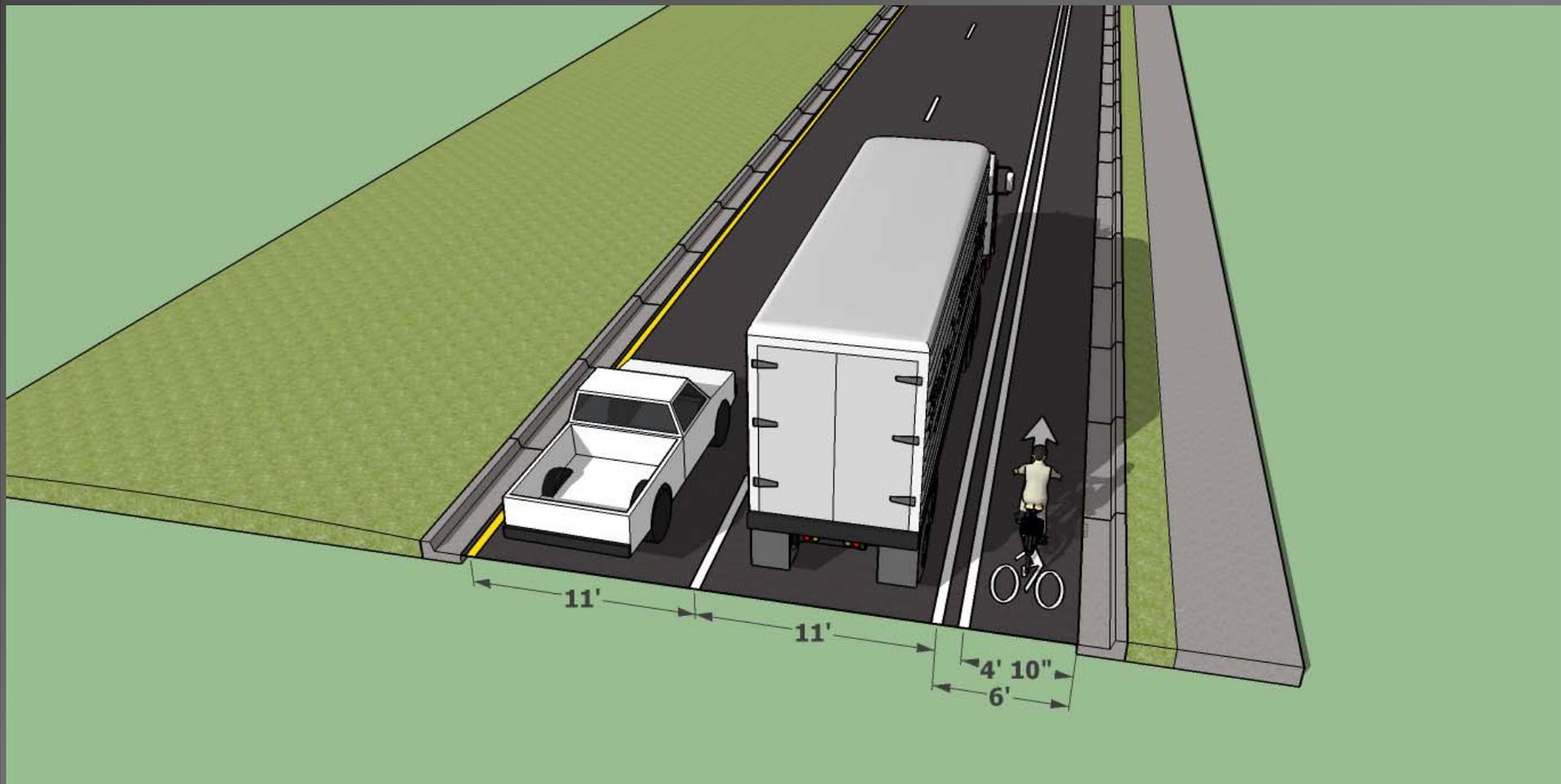


- ⌘ Retrofit existing roads for narrower travel lanes and wider bike lanes
- ⌘ Allows more options for bike lane applications



Current Standard – Max Travel Lane Width, Minimum Bicycle Lane Width

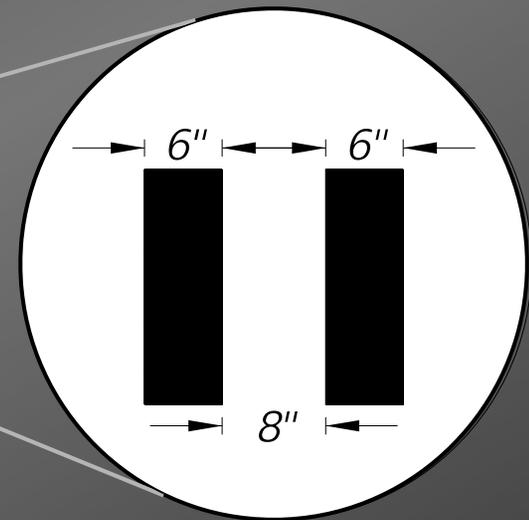
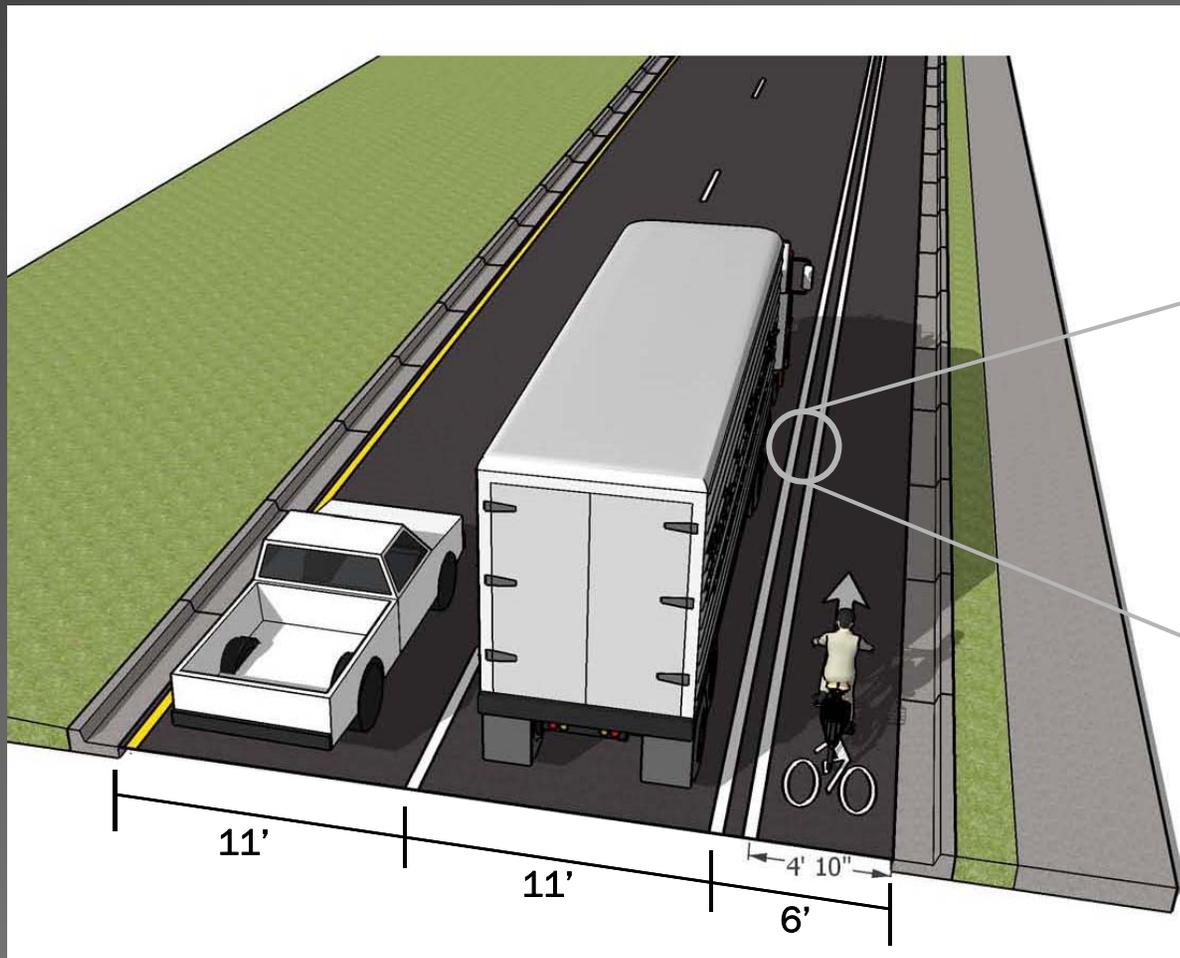




Urban Arterial Lane Widths



4-Lane Divided: Buffered Bike Lane Option



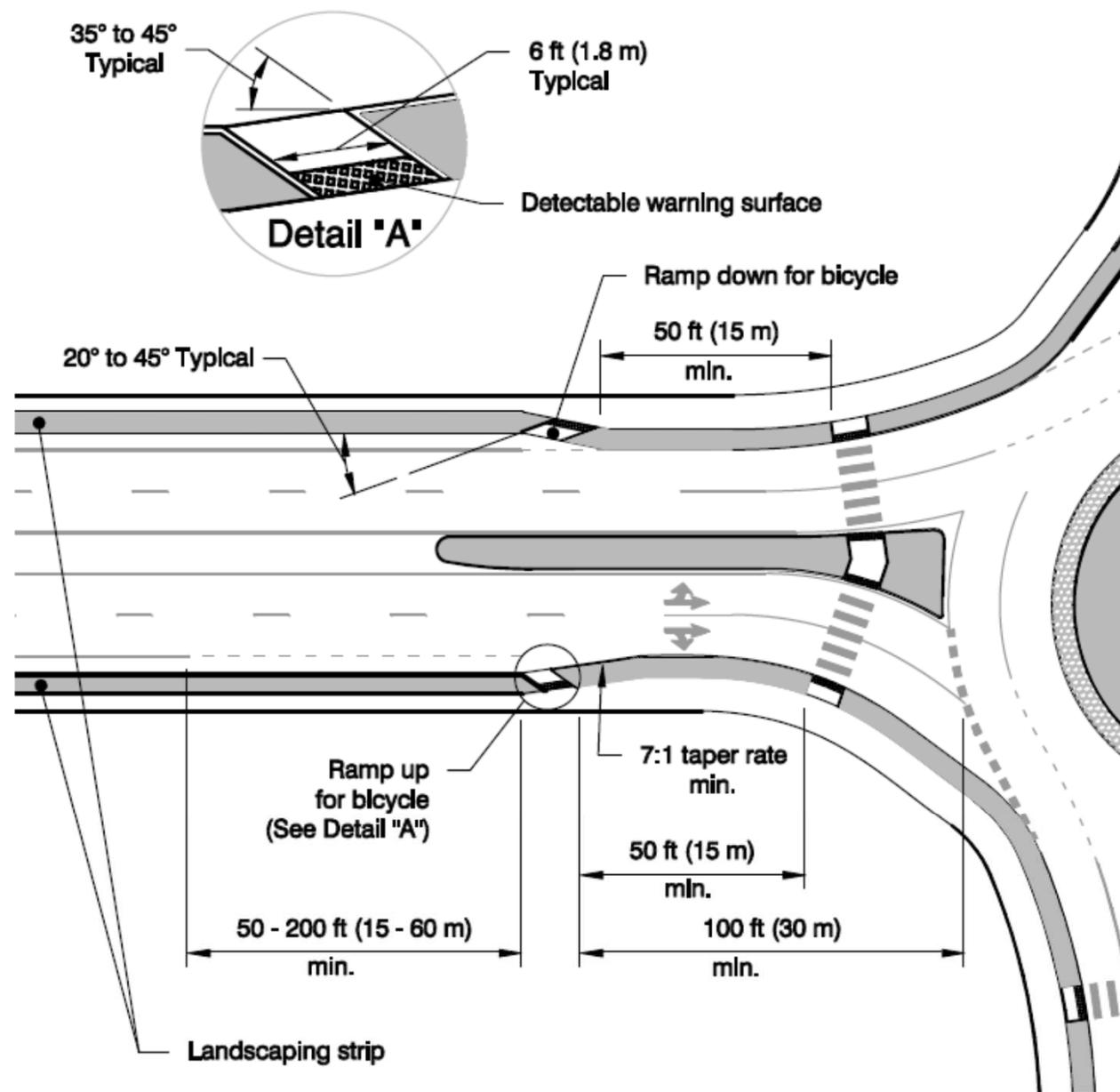
Roundabouts



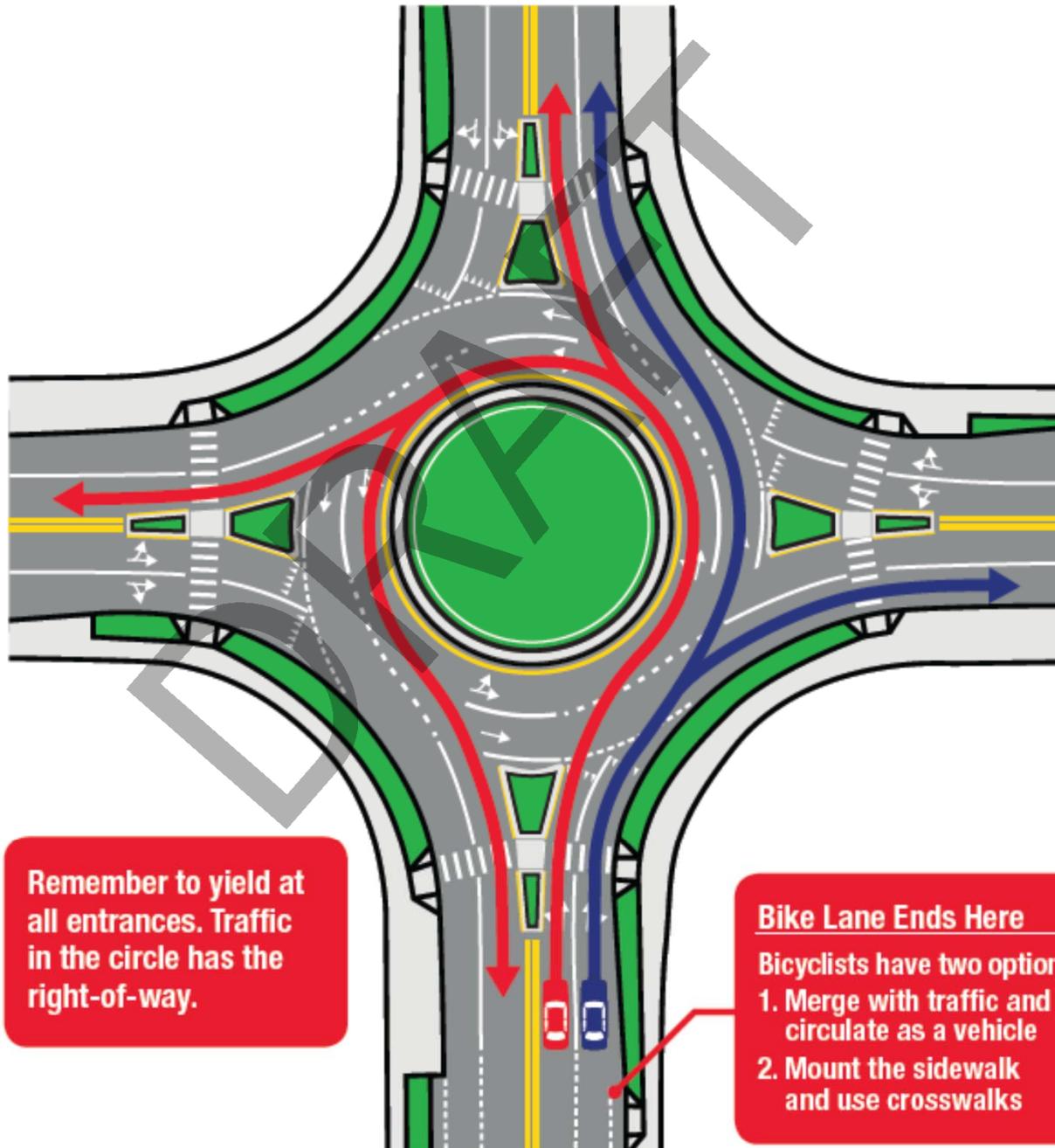
- ∞ NCHRP 672
- ∞ Forthcoming screening tool
- ∞ 2 in work program in each district
- ∞ How about bikes?

Roundabouts: An Informational Guide

Exhibit 6-67
Possible Treatments
for Bicycles



Navigating a Modern Roundabout



Remember to yield at all entrances. Traffic in the circle has the right-of-way.

Bike Lane Ends Here

Bicyclists have two options:

1. Merge with traffic and circulate as a vehicle
2. Mount the sidewalk and use crosswalks

Roundabout



Motorist

- Determine which way you want to go in a roundabout
- Keep right at the island and slow down
- Watch for bicyclists; allow them to merge into the entry lane
- Watch for pedestrians crossing the entrance and yield right-of-way



Pedestrian

- Stay on the sidewalk and cross at designated crosswalks
- Do not enter the island



Bicyclist

- Merge with traffic in the entry lane or use the sidewalk
- If riding with traffic, use your intended path

Road Diets



- ⌘ 4L to 3L
- ⌘ 6L to 4L
- ⌘ FHWA Road Diet Guide
- ⌘ FDOT Lane Elimination Guidance
- ⌘ <http://www.dot.state.fl.us/planning/statistics/mobilitymeasures/mpm-products.shtm>



STATEWIDE LANE ELIMINATION GUIDANCE



FLORIDA DEPARTMENT
OF TRANSPORTATION
TRANSPORTATION
STATISTICS OFFICE

DECEMBER 2014

