Hollywood, FL

June 13-14, 2024

2024 TRANSPORTATION SYMPOSIUM

Target Speed

DeWayne Carver, Brenda Young,
& Mariano Amicarelli

FDOT, Central Office

FDOT

REGENCY 1: Target Speed

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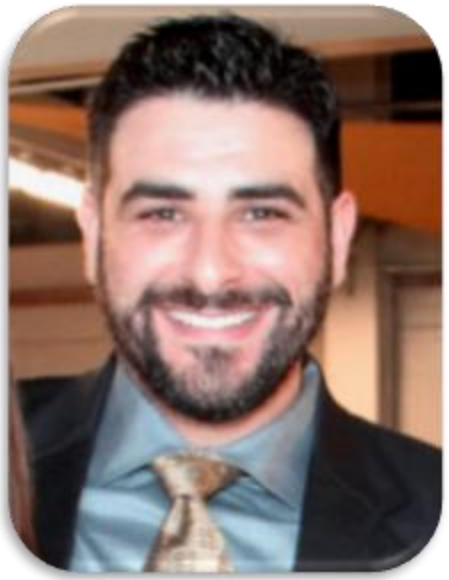

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Audience Q&A Session

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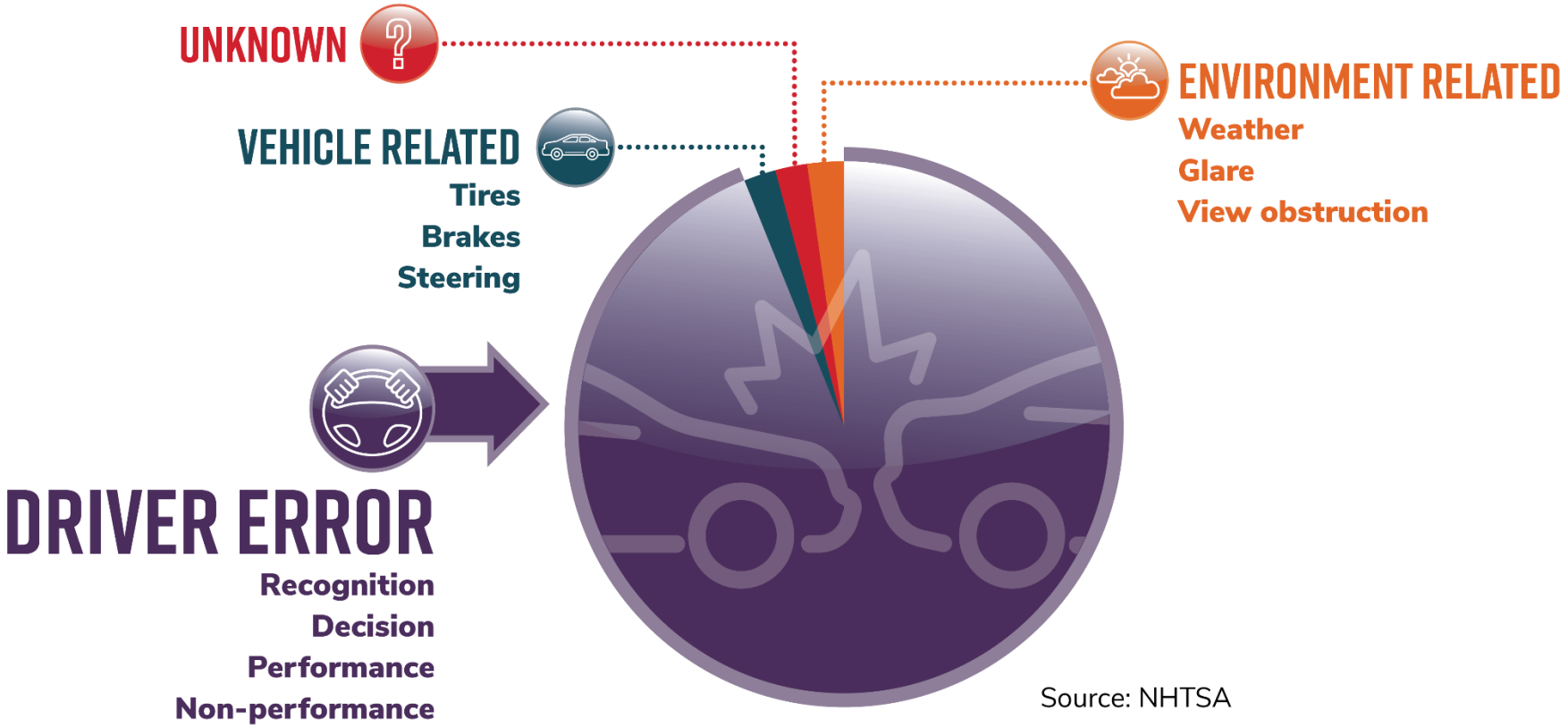
SCHOOL
SPEED
LIMIT
15
7:30 8:30 AM
1:30 4:15 PM
1+31=131
VISAH


SLOW
DOWN

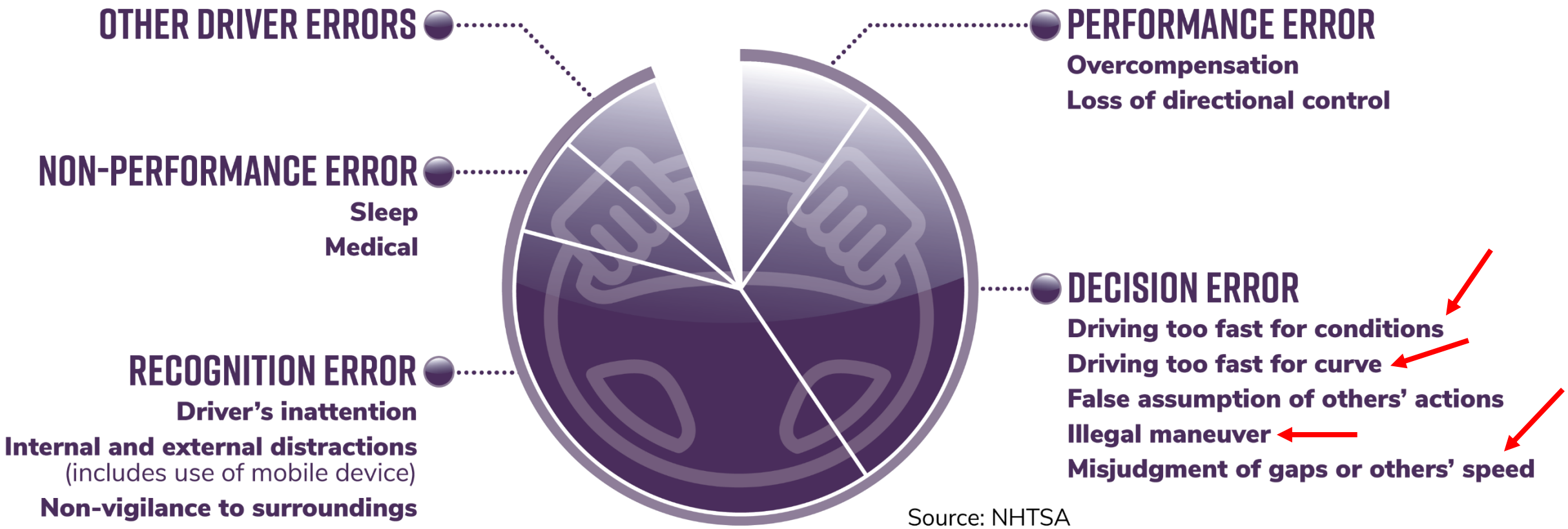
Brenda Young

Our National Safety Challenge



Source: NHTSA

NHTSA National Driver Behavior/Error Details

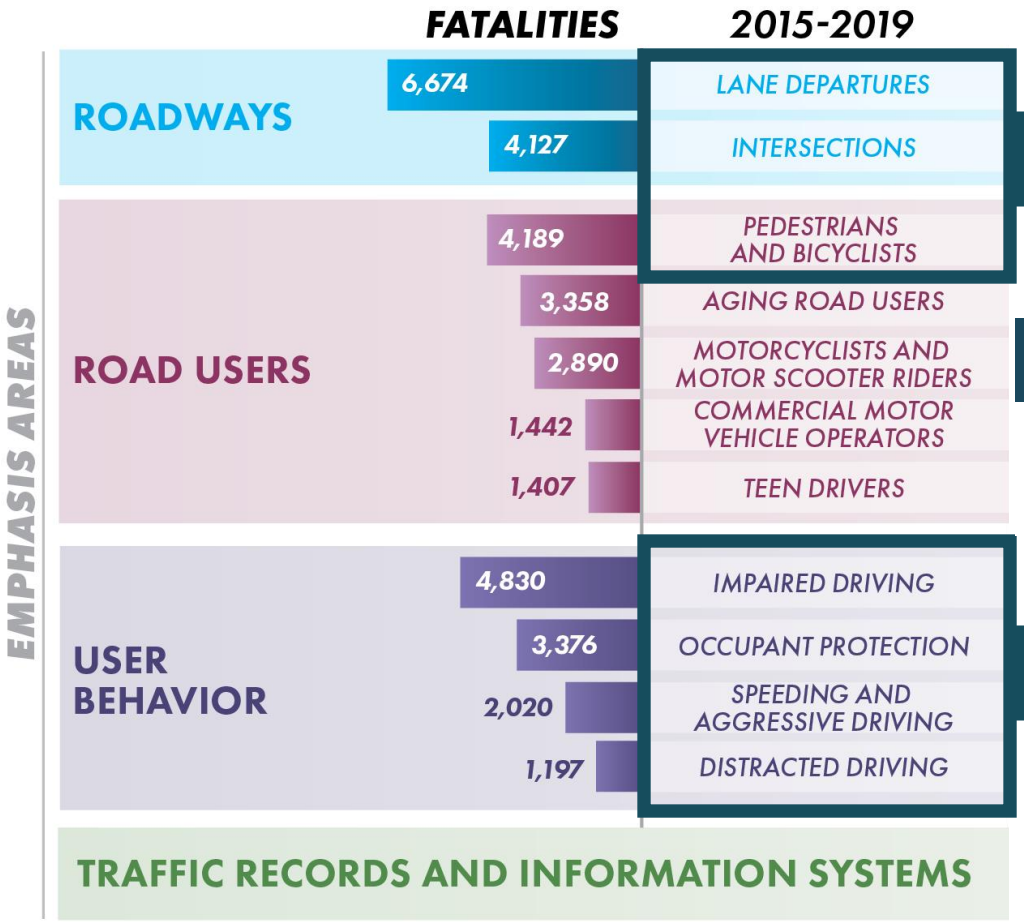


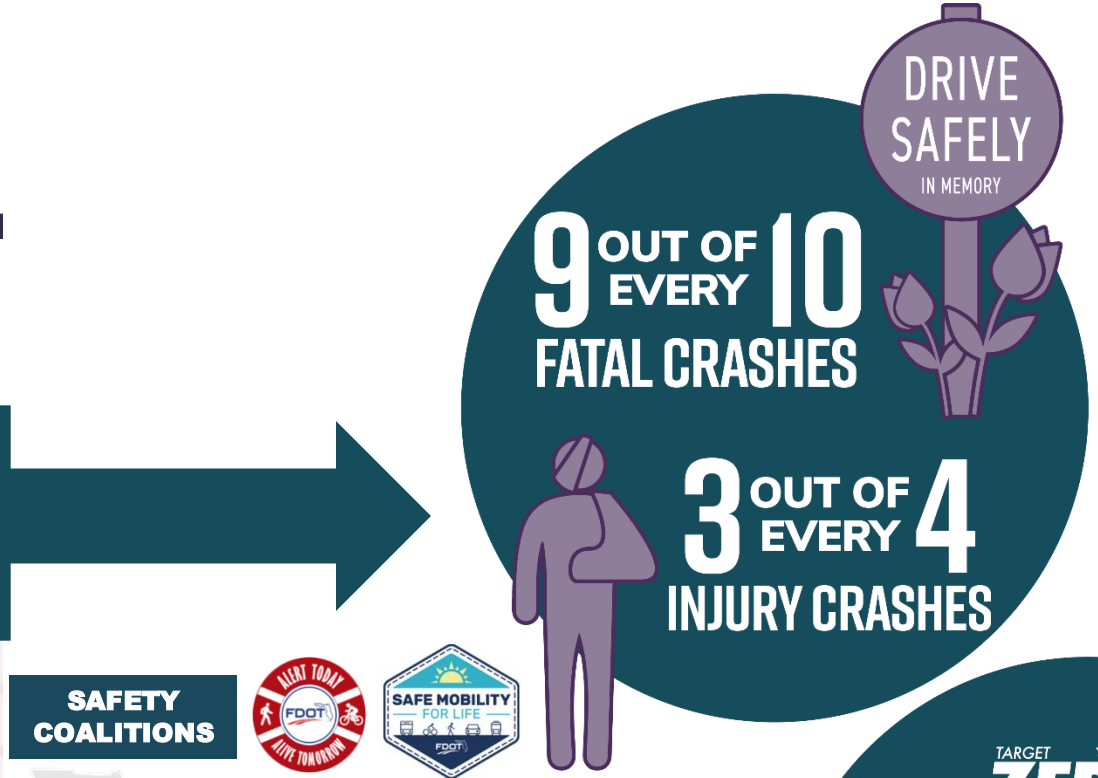
Source: NHTSA

Safe System Approach to Safety

Source: Florida Strategic Highway Safety Plan, 2021

Emphasis Areas





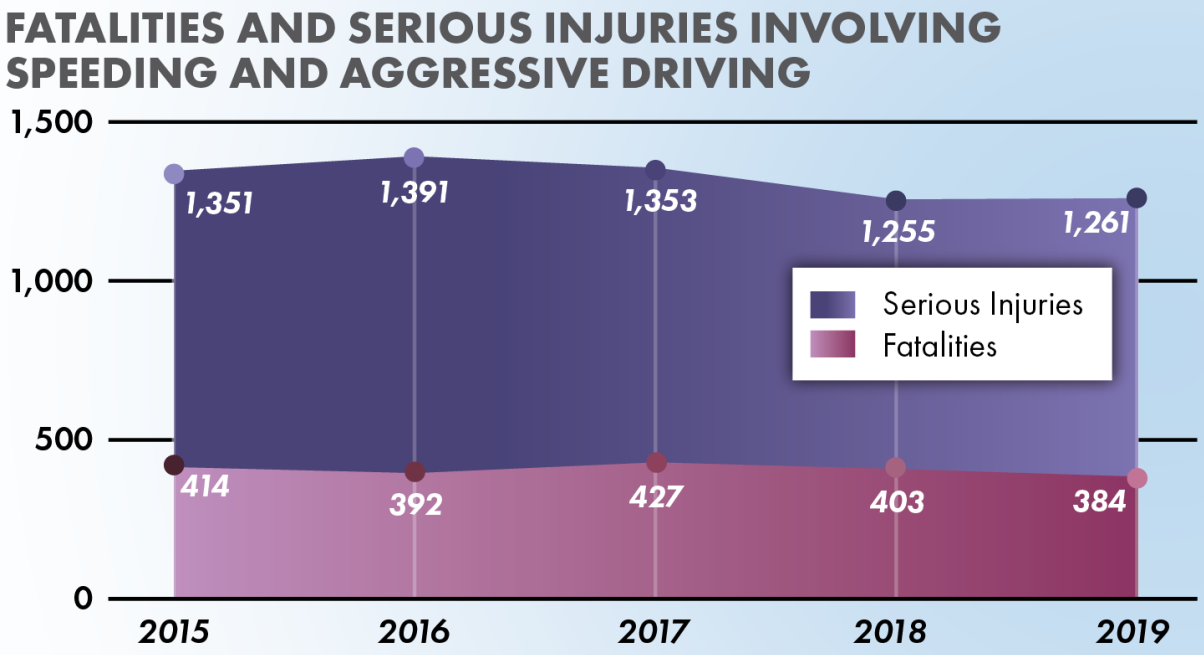
SAFETY COALITIONS

RIDE SMART FLORIDA
TEEN SAFE DRIVING COALITION
FLORIDA IMPAIRED DRIVING COALITION
FLORIDA OCCUPANT PROTECTION COALITION

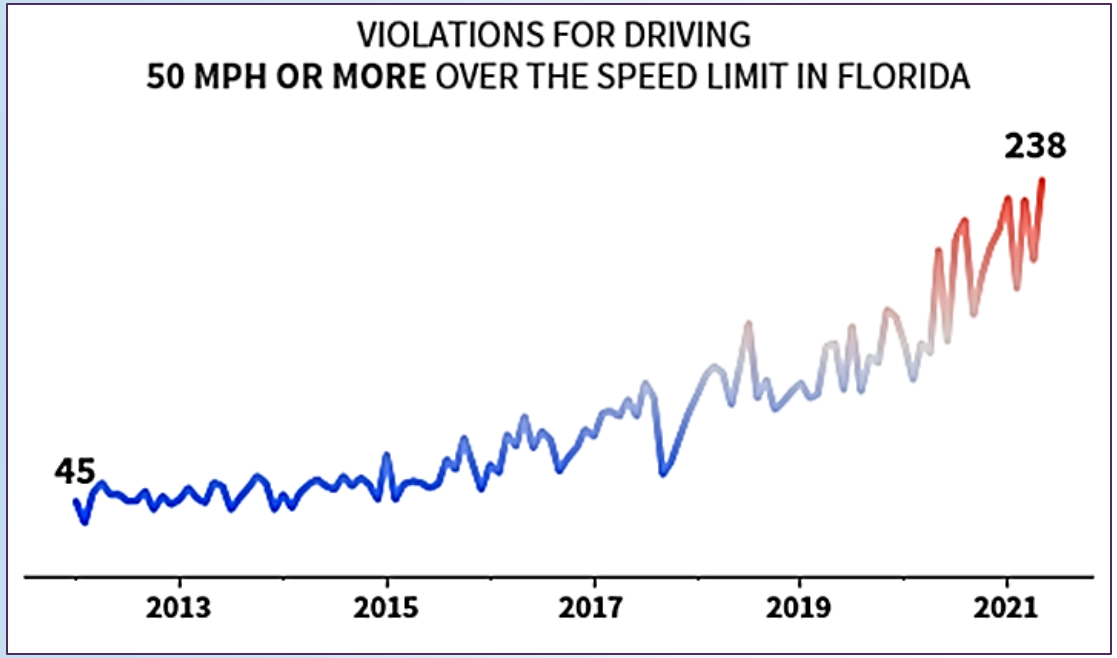
Speeding and Aggressive Driving

TARGET ZERO
FATALITIES & SERIOUS INJURIES

NEW Campaign Focus Behaviors

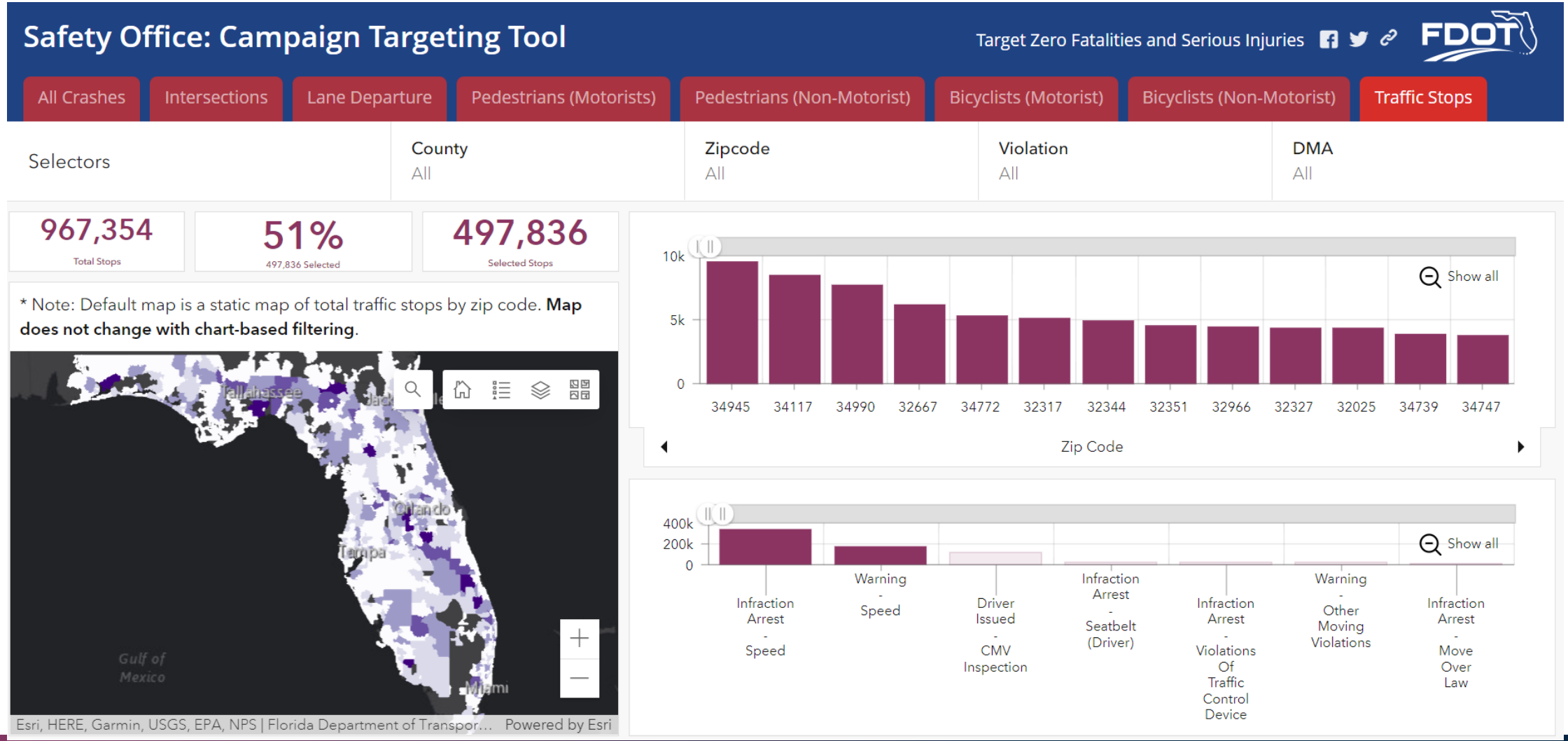


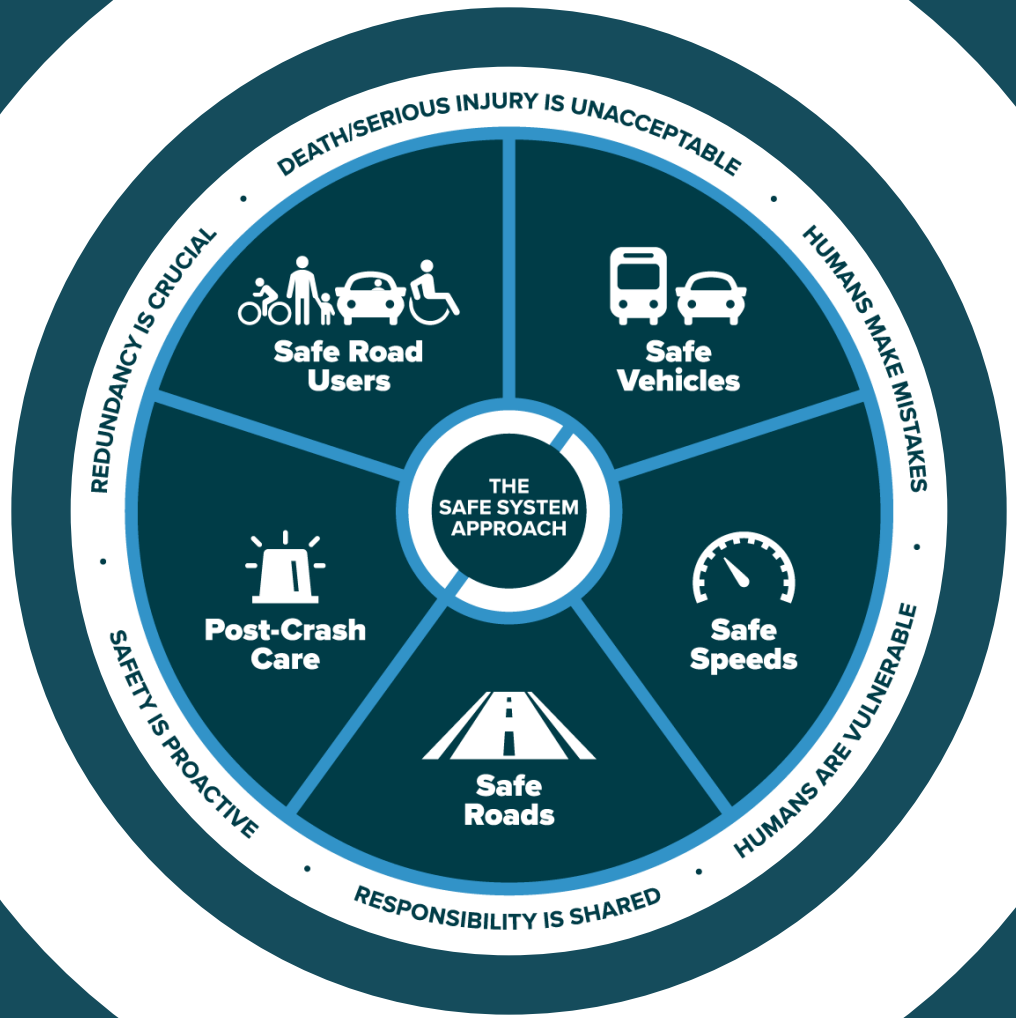
Source: 2021 Florida Strategic Highway Safety Plan



Source: 2021 FLHSMV FHP Joint Media Release

FHP Traffic Stop Data





Speed vs. Speeding

Speed and Survivability

Speed and Driver's Vision

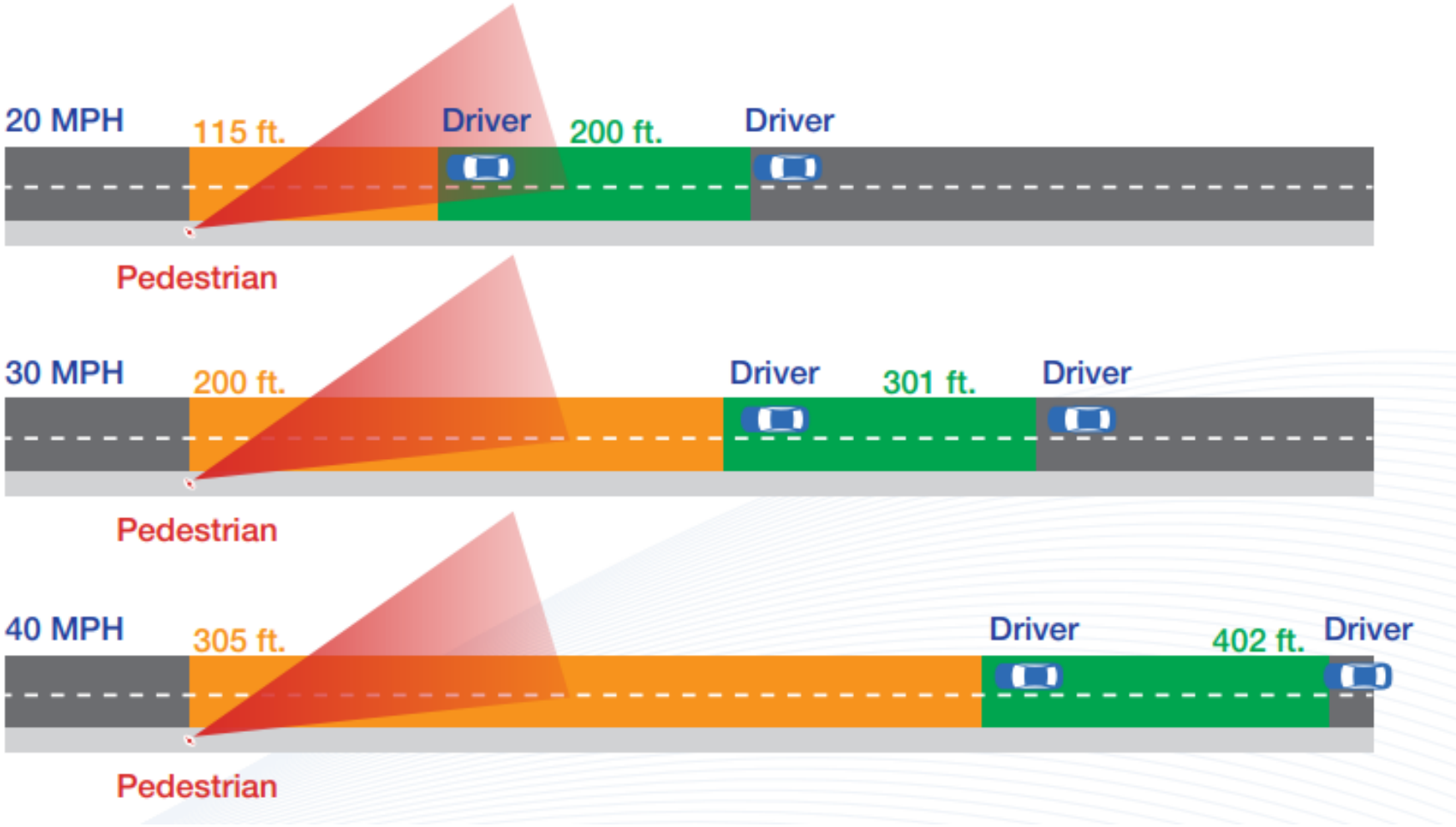
Driver's Peripheral Vision at 10-15 MPH

Driver's Peripheral Vision at 20-25 MPH

Driver's Peripheral Vision at 30-35 MPH

Driver's Peripheral Vision at over 40 MPH

Speed, Distance, and Ability to Stop or Yield



Safe Road Users: Behavior Campaigns for Speeding

SPEEDING/TIME MANAGEMENT

Call to action: Leave early for your trip or arrive late.

$1M October 2022; $1M June 2023

Target Audience: Males, Age 22-27

MEDIA MARKET AREA:

SOUTH FLORIDA

OCTOBER 2022 & JUNE 2023

TOTAL PAID IMPRESSIONS
73,670,866

MEDIA CHANNELS
social media, audio and video streaming, gas pump videos, radio, billboards

WEB PAGE VISITS
63,041

Campaign Webpage

Behavioral Surveys: Long Term Monitoring

400 young male respondents per region **before and after** October and/or June **30-day campaigns**:

Campaign Recall
+
Risk Recognition

- Campaign Recall: 85%
- 15% of respondents identified these behaviors as extremely unlikely to result in a crash or close call

Social Norms
+
Perceived Behavioral Control

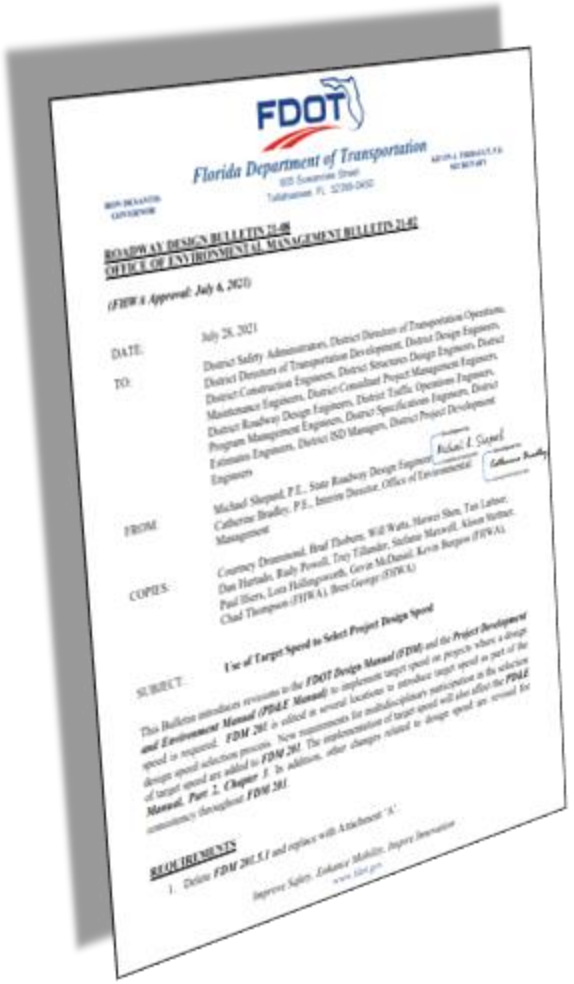
- Younger respondents more likely to believe that it is acceptable to exceed the speed limit to make up for lost time
- More than half of respondents feel they do not have control over anxiety and stress while driving
- Respondents who feel less control over anxiety and stressors while driving, also feel less control over other driving behaviors

Self-Reported Behavior
+
Intent to Change

- 15% exceed the speed limit to make up for lost time on an almost daily or daily basis
- 40% report driving especially close to the car in front of them once a week or more
- Respondents with a larger number of reported crashes were more likely to report exceeding the speed limit

- 35% of respondents have been a driver in a crash in the last 5 years
- 40% have been stopped by law enforcement in the past year (Half of this group has been stopped more than once)

Safe Roads, Safe Speeds: Engineering for Speed


FDOT

Florida Department of Transportation

ROADWAY DESIGN BULLETIN 21-08
OFFICE OF ENVIRONMENTAL MANAGEMENT BULLETIN 21-02

(FDM 1 Approval: July 6, 2021)

DATE: July 28, 2021

TO: District Safety Administrators, District Directors of Transportation Operations, District Directors of Transportation Development, District Design Engineers, District Construction Engineers, District Structures Design Engineers, District Maintenance Engineers, District Consultant Project Management Engineers, District Roadway Design Engineers, District Traffic Operations Engineers, Program Management Engineers, District Specification Engineers, District Estimates Engineers, District ISD Managers, District Project Development Engineers

FROM: Michael Shepard, P.E., State Roadway Design Engineer; Catherine Bradley, P.E., Interim Director, Office of Environmental Management

COPIES: Courtney Drummond, Brad Thoburn, Will Watts, Marcos Bian, Tim Lattner, Dan Hurtado, Rudy Powell, Trey Tillander, Stefanie Maxwell, Alison Stettner, Paul Ehrers, Lora Hollingsworth, Gevie McDaniel, Kevin Bergton (FHWA), Chad Thompson (FHWA), Beau George (FHWA)

SUBJECT: Use of Target Speed to Select Project Design Speed

This Bulletin introduces revisions to the *FDOT Design Manual (FDM)* and the *Project Development and Environment Manual (PD&E Manual)* to implement target speed on projects where a design speed is required. *FDM 201* is edited in several locations to introduce target speed as part of the design speed selection process. New requirements for multidisciplinary participation in the selection of target speed are added to *FDM 201*. The implementation of target speed will also affect the *PD&E Manual, Part 2, Chapter 3*. In addition, other changes related to design speed are screened for consistency throughout *FDM 201*.

REQUIREMENTS

1. Delete *FDM 201.5.1* and replace with Attachment "A".

Improve Safety, Enhance Mobility, Inspire Innovation

Establishment of Target Speed Policy

"This bulletin requires use of the target speed in the consideration of design speed selection, to provide greater application of context-based design principles in support of roadway safety."

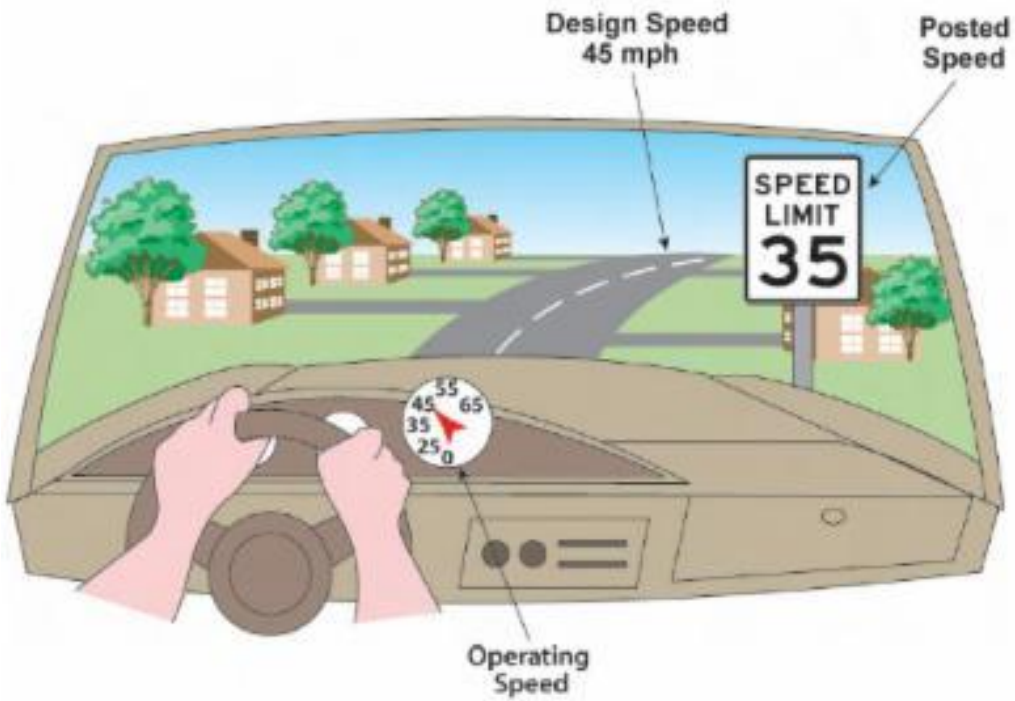
"This Bulletin introduces revisions to the FDOT Design Manual (FDM) and the Project Development and Environment Manual (PD&E Manual) to implement target speed on projects where a design speed is required."

DeWayne Carver

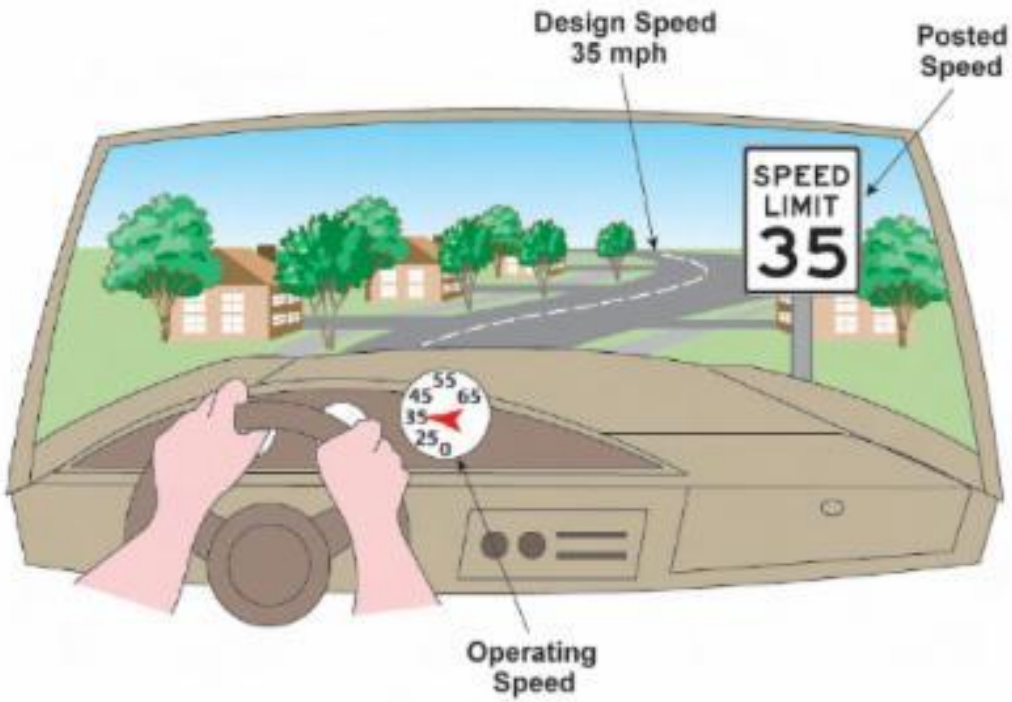
Pop Quiz! What's the Posted Speed?

Pop Quiz! What's the Posted Speed?

Speed Management Aligns Look with Intent



Conventional Design



Using Desired Operating Speed

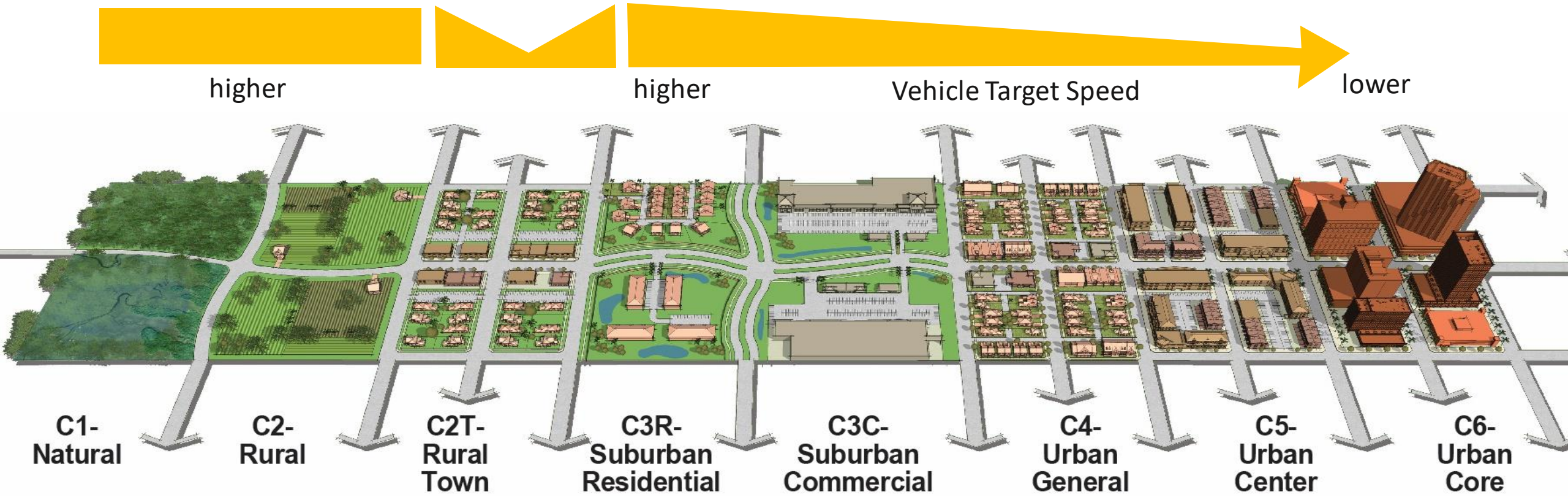
Source: NJDOT and PennDOT Smart Transportation Guidebook

Design speed Selected speed used to determine roadway geometric elements

Target speed
Highest speed at which vehicles should operate in a specific context

Operating speed
Speed at which drivers are observed traveling

Posted speed limit
Established by methods described in the Speed Zoning Manual



Design Speed by Context Classification

Chapter 3
Context Based Speeds

Vehicle speed concepts can be classified into four types:

Design speed—the selected speed used to determine various geometric elements of the roadway.[1]

Posted speed limit—established by methods described in the Speed Zoning for Highways, Roads, and Streets in Florida Manual. This manual is adopted by Rule 14-15.012, F.A.C.

Operating speed—the speed at which drivers are observed traveling during free flow conditions.[2]

Target speed—the highest speed at which vehicles should operate in a specific context, consistent with the level of multimodal activity generated by adjacent land uses, to provide both mobility for motor vehicles and a supportive environment for pedestrians, bicyclists, and public transit users.[3]

Target speeds should be within the design speed range provided in the *FDM* for each context classification, as shown in **Table 8**. Ideally, the target speed, design speed, and posted speed are all the same where speeds are 45 mph or less. When these speeds are different, it can result in inconsistent driver expectation about the intended operating speed. The concept of target speed is to identify a desired operating speed and develop design strategies and elements that reinforce operating speed. Design speed and posted speed may take time to change and may need to be changed over the course of several projects.

The target speed is influenced by context classification and should be selected to provide for both the safety and mobility needs of all anticipated users.

TABLE 8 FDOT CONTEXT-BASED DESIGN SPEEDS FOR ARTERIALS AND COLLECTORS

CONTEXT CLASSIFICATION	ALLOWABLE DESIGN SPEED RANGE (MPH)	SIS MINIMUM (MPH)
C1 Natural	55-70	65
C2 Rural	55-70	65
C2T Rural Town	25-45	40
C3 Suburban	35-55	50
C4 Urban General	25-45	45
C5 Urban Center	25-35	35
C6 Urban Core	25-30	30

1 American Association of State Highway and Transportation Officials, A Policy on Geometric Design of Highways and Streets, 6th Edition, 2011
2 American Association of State Highway and Transportation Officials, A Policy on Geometric Design of Highways and Streets, 6th Edition, 2011
3 FDOT Design Manual, 2021.

STEPS TO DETERMINING TARGET SPEED

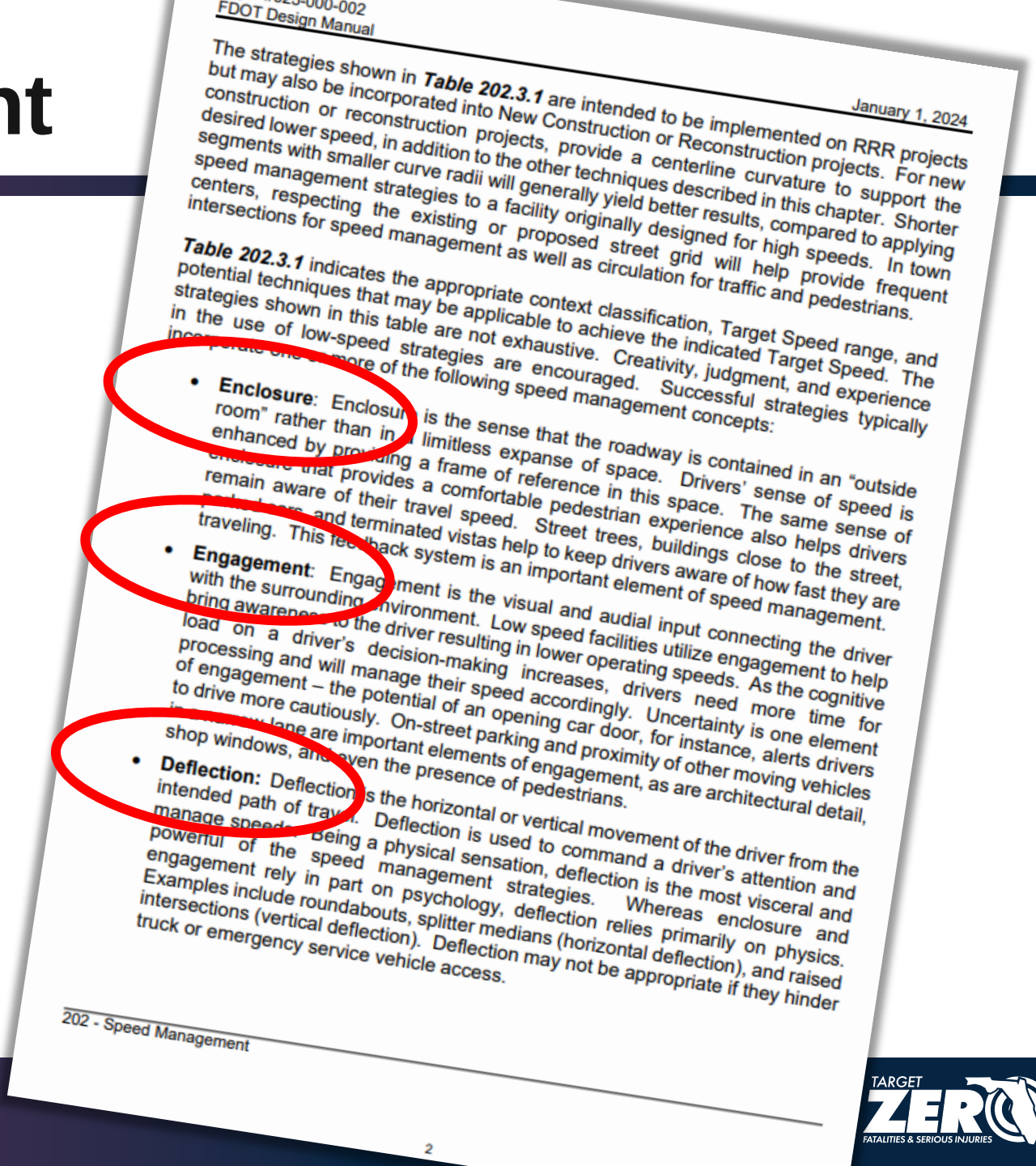
1. **DETERMINE *FDM* CONSISTENCY:** Identify context classification, current design and posted speed, SIS designation, and ***FDM*** design speed range
2. **IDENTIFY STARTING POINT FOR TARGET SPEED:**

In C1 and C2, start at the high end of the design speed range and **justify reduction**.

In C2T, C3R, C3C, C4, C5, and C6 start at the low end of the design speed range and **justify increase**.

Speed Management

- Enclosure
- Engagement
- Deflection



FDOT Design Manual

January 1, 2024

The strategies shown in ***Table 202.3.1*** are intended to be implemented on RRR projects but may also be incorporated into New Construction or Reconstruction projects. For new construction or reconstruction projects, provide a centerline curvature to support the desired lower speed, in addition to the other techniques described in this chapter. Shorter segments with smaller curve radii will generally yield better results, compared to applying speed management strategies to a facility originally designed for high speeds. In town centers, respecting the existing or proposed street grid will help provide frequent intersections for speed management as well as circulation for traffic and pedestrians.

Table 202.3.1 indicates the appropriate context classification, Target Speed range, and potential techniques that may be applicable to achieve the indicated Target Speed. The strategies shown in this table are not exhaustive. Creativity, judgment, and experience in the use of low-speed strategies are encouraged. Successful strategies typically incorporate one or more of the following speed management concepts:

- **Enclosure**: Enclosure is the sense that the roadway is contained in an "outside room" rather than in a limitless expanse of space. Drivers' sense of speed is enhanced by providing a frame of reference in this space. The same sense of enclosure that provides a comfortable pedestrian experience also helps drivers remain aware of their travel speed. Street trees, buildings close to the street, pedestrians, and terminated vistas help to keep drivers aware of how fast they are traveling. This feedback system is an important element of speed management.
- **Engagement**: Engagement is the visual and audial input connecting the driver with the surrounding environment. Low speed facilities utilize engagement to help bring awareness to the driver resulting in lower operating speeds. As the cognitive load on a driver's decision-making increases, drivers need more time for processing and will manage their speed accordingly. Uncertainty is one element of engagement – the potential of an opening car door, for instance, alerts drivers to drive more cautiously. On-street parking and proximity of other moving vehicles in the travel lane are important elements of engagement, as are architectural detail, shop windows, and even the presence of pedestrians.
- **Deflection:** Deflection is the horizontal or vertical movement of the driver from the intended path of travel. Deflection is used to command a driver's attention and manage speeds. Being a physical sensation, deflection is the most visceral and powerful of the speed management strategies. Whereas enclosure and engagement rely in part on psychology, deflection relies primarily on physics. Examples include roundabouts, splitter medians (horizontal deflection), and raised intersections (vertical deflection). Deflection may not be appropriate if they hinder truck or emergency service vehicle access.

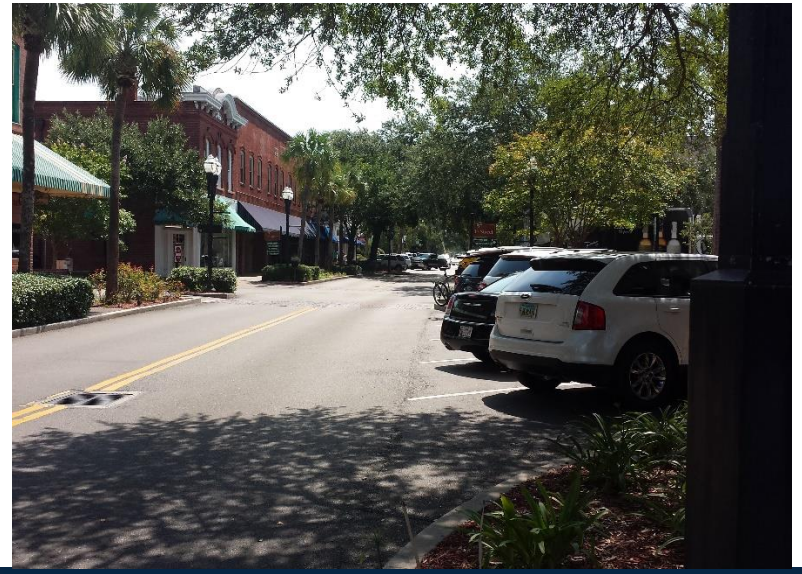
202 - Speed Management

2

Speed Management

- Enclosure
- Engagement
- Deflection

To be used in conjunction



Speed Categories

- Very low-speed (25 mph - 35 mph)
- Low-speed (40 mph – 45 mph)
- ~~High-speed (50 mph and greater)~~
- Stay in your ~~lane~~ category

Mariano Amicarelli

Approach to Setting Speed Limits

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What has historically triggered a posted speed limit re-evaluation in your jurisdiction? Select your top two options.

ⓘ Start presenting to display the poll results on this slide.

Historical Approach to Setting Speed Limits

Vehicles

- Reliable
- Safe
- Fast

All Road Users

- Reliable
- Safe
- Efficient

What does the MUTCD say regarding setting speed limits?

2009 MUTCD *Section 2B.13*

Standard:

Speed zones (other than statutory speed limits) **shall** only be established on the basis of an engineering study that has been performed in accordance with traffic engineering practices. The engineering study **shall** include an analysis of the **current speed distribution of free-flowing vehicles**.

MUTCD 11th Edition *Section 2B.21*

Standard:

Speed zones (other than statutory speed limits) **shall** only be established on the basis of an engineering study that has been performed in accordance with traffic engineering practices. The engineering study **shall consider the roadway context**.

MUTCD Guidance on the use of 85th Percentile Speeds

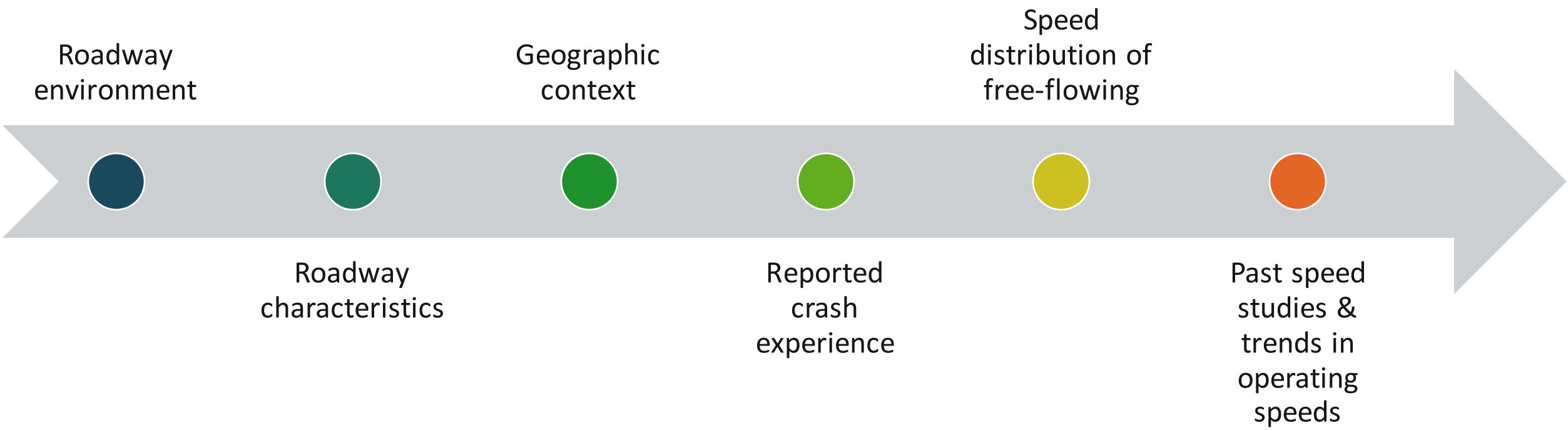
Guidance:

On urban and suburban arterials, and on rural arterials that serve as main streets through developed areas of communities, the 85th-percentile speed **should not** be used to set speed limits without consideration of all factors described in Paragraph 7 of this Section.

MUTCD 11th Edition *Section 2B.21* Engineering Study Factors

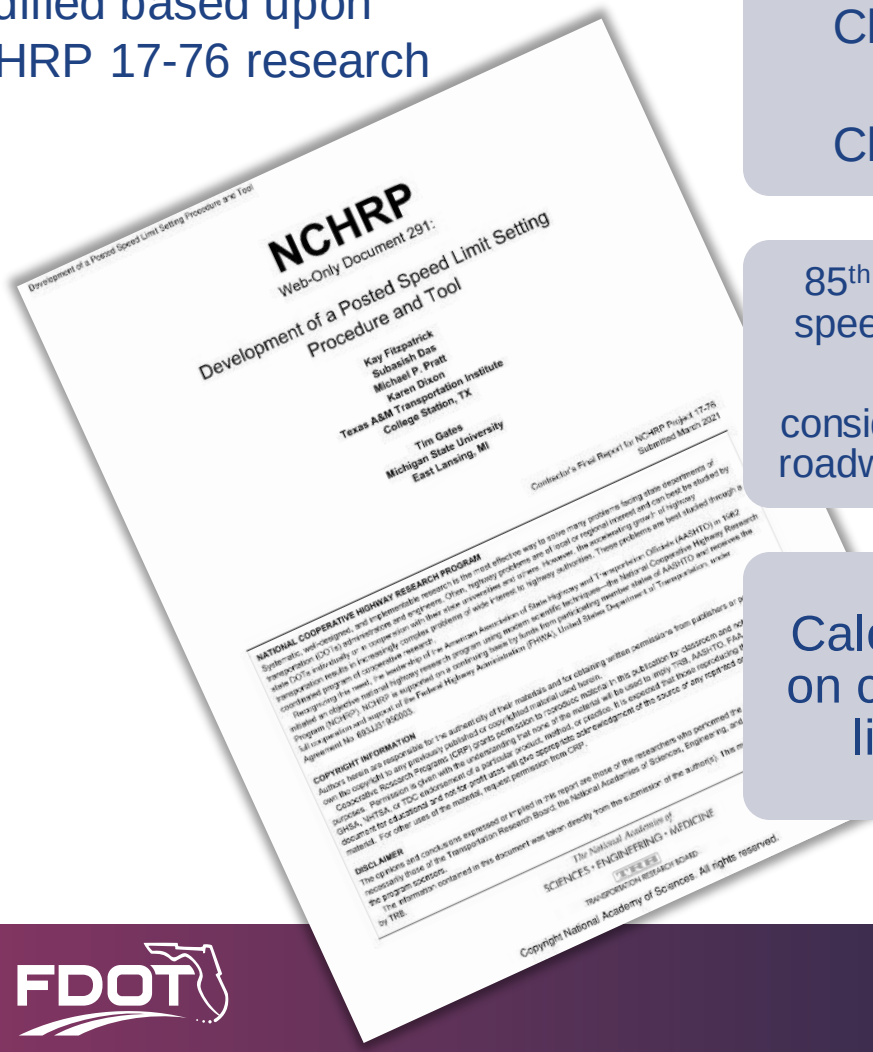
Guidance:

Consider the following factors when conducting an engineering study to establish or reevaluate speed limits (*Paragraph 7*)



Proposed *Speed Zoning Manual* Changes

- Speed Zoning Manual modified based upon NCHRP 17-76 research



FDOT Context Classifications

Functional Classifications

→ Roadway Context and Type

85th & 50th percentile speeds, 10-mph pace

Crash risk consideration based on roadway characteristics

→ Speed Distribution

→ Safety

Calculated based on considerations listed above

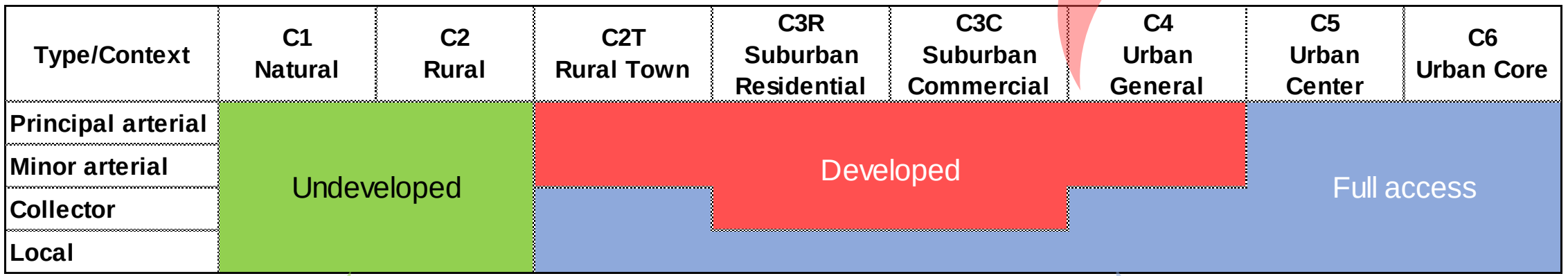
→ Suggested Speed Limit

Proposed *Speed Zoning Manual* Changes

Required for all speed limit setting groups:

- Context Classification
- Roadway Type (Functional Classification)
- Crash data
- Operating speeds (50th, 85th, and 10-mph pace)
- Site Characteristics

13 Site Characteristics
Closest 50th
Rounded-Down 85th
Closest 85th



8 Site Characteristics
Closest 50th
Rounded-Down 85th
Closest 85th

12 Site Characteristics
Rounded-Down 50th
Closest 50th

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What happens when the Suggested Speed Limit reflects higher speeds than the posted speed limit?

ⓘ Start presenting to display the poll results on this slide.

- How do you tie the Suggested Speed Limit results to
  - Target Speed
  - Speed Management
- What happens if the suggested speed limit is higher than the **posted speed**?
- What happens if the suggested speed limit is lower than the **posted speed** but higher than the **target speed**?

Tying into an example…

- What happens if the posted speed limit and the design speed are 45 mph on a C4 arterial roadway and the spot speed study shows:
  - 85th percentile speed – 50 mph
  - 50th percentile speed – 45 mph
  - Suggested speed limit is – 45 mph
  - Target speed is – 40 mph

FDOT Safety Message

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Thank You!