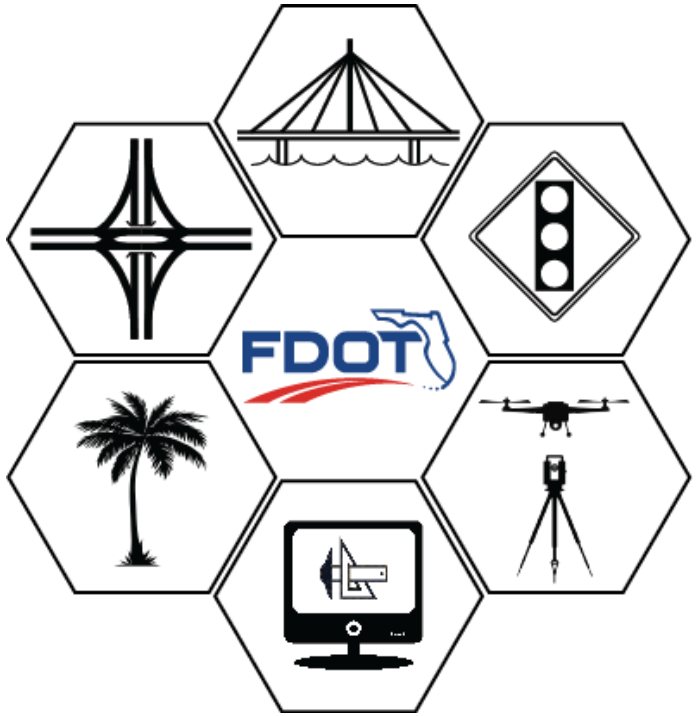


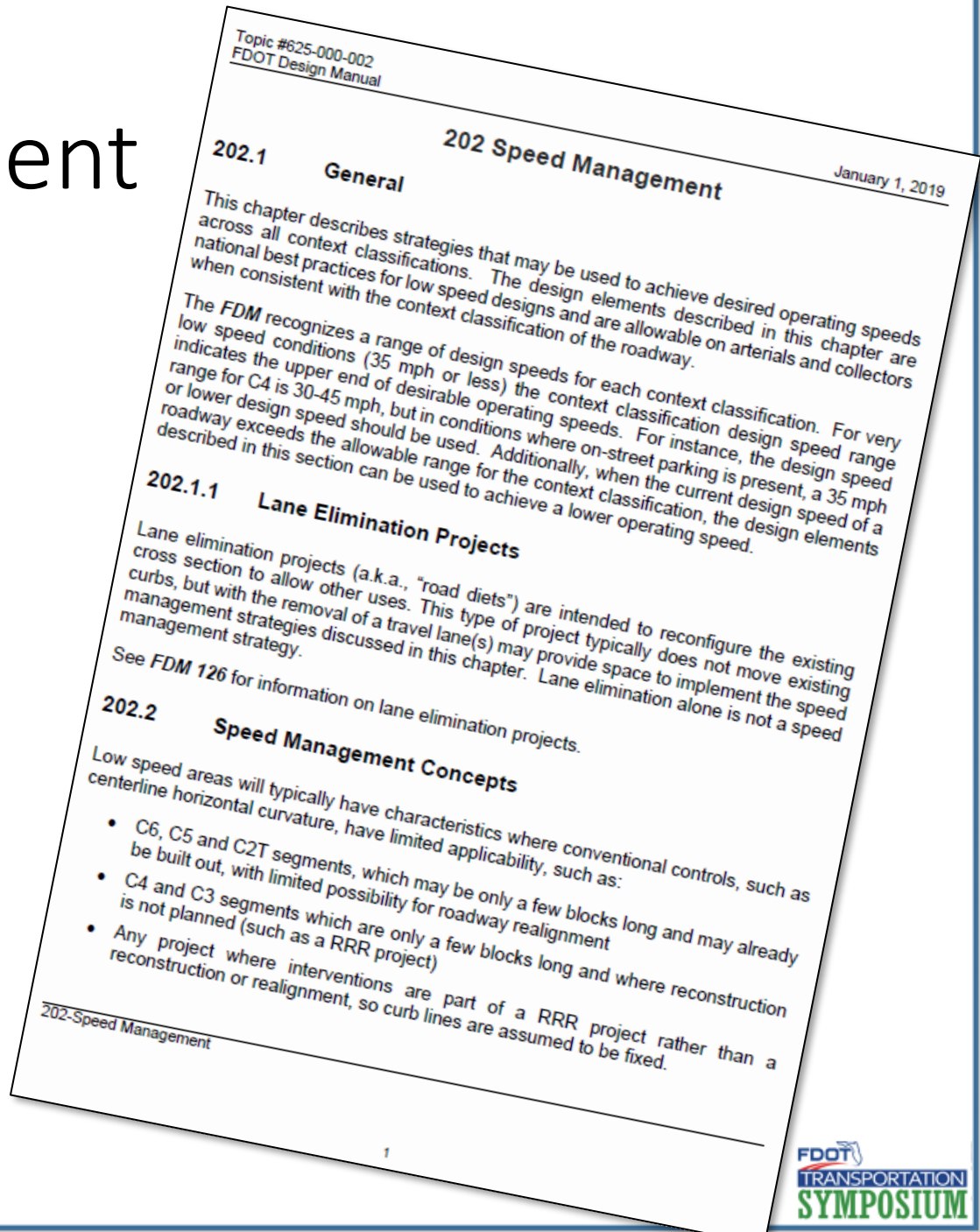
FDOT TRANSPORTATION SYMPOSIUM 2019

Speed Management Techniques FDM 202

DeWayne Carver, AICP

FDM 202 Speed Management

- FDM 202 is new for 2019
- Provides strategies to achieve appropriate speeds in each context classification
- Primarily intended for low speed and very low speed conditions and transition areas
- Very Low Speed is 25 to 35 mph; low speed is 40-45 mph
- Can be used on new construction or RRR, but primarily intended for RRR conditions where re-construction or ROW options are limited.



Topic #625-000-002
FDOT Design Manual

202 Speed Management

January 1, 2019

202.1 General

This chapter describes strategies that may be used to achieve desired operating speeds across all context classifications. The design elements described in this chapter are national best practices for low speed designs and are allowable on arterials and collectors when consistent with the context classification of the roadway.

The *FDM* recognizes a range of design speeds for each context classification. For very low speed conditions (35 mph or less) the context classification design speed range indicates the upper end of desirable operating speeds. For instance, the design speed range for C4 is 30-45 mph, but in conditions where on-street parking is present, a 35 mph or lower design speed should be used. Additionally, when the current design speed of a roadway exceeds the allowable range for the context classification, the design elements described in this section can be used to achieve a lower operating speed.

202.1.1 Lane Elimination Projects

Lane elimination projects (a.k.a., "road diets") are intended to reconfigure the existing cross section to allow other uses. This type of project typically does not move existing curbs, but with the removal of a travel lane(s) may provide space to implement the speed management strategies discussed in this chapter. Lane elimination alone is not a speed management strategy.

See *FDM 126* for information on lane elimination projects.

202.2 Speed Management Concepts

Low speed areas will typically have characteristics where conventional controls, such as centerline horizontal curvature, have limited applicability, such as:

- C6, C5 and C2T segments, which may be only a few blocks long and may already be built out, with limited possibility for roadway realignment
- C4 and C3 segments which are only a few blocks long and where reconstruction is not planned (such as a RRR project)
- Any project where interventions are part of a RRR project rather than a reconstruction or realignment, so curb lines are assumed to be fixed.

202-Speed Management

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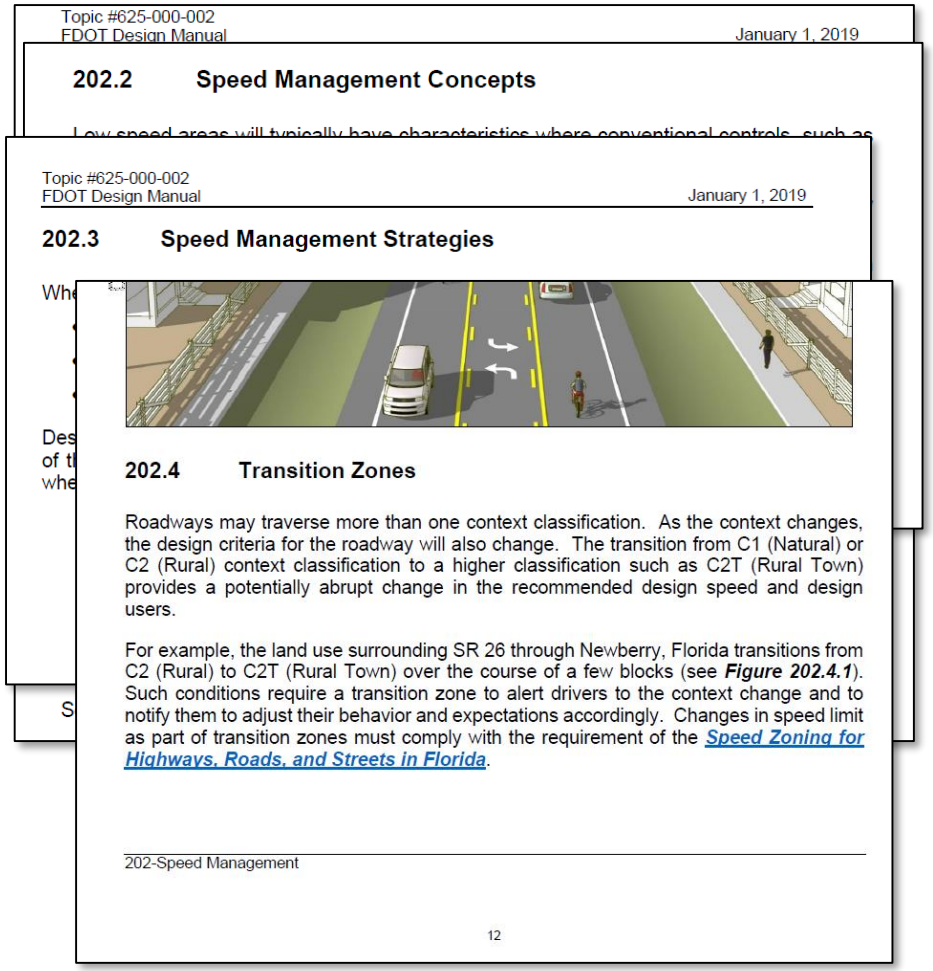
FDOT TRANSPORTATION SYMPOSIUM

FDM 202 Speed Management

- FDM 202 has four sub-sections:
  - 202.1 describes the general intent of the chapter and how it relates to lane elimination
  - 202.2 describes the speed management concepts used to identify strategies in the chapter
  - 202.3 describes each strategy and how to use it
  - 202.4 describes transition zones and how to use these speed management techniques to create effective transition zones



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202.2 Speed Management Concepts

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202.3 Speed Management Strategies

202.4 Transition Zones

Roadways may traverse more than one context classification. As the context changes, the design criteria for the roadway will also change. The transition from C1 (Natural) or C2 (Rural) context classification to a higher classification such as C2T (Rural Town) provides a potentially abrupt change in the recommended design speed and design users.

For example, the land use surrounding SR 26 through Newberry, Florida transitions from C2 (Rural) to C2T (Rural Town) over the course of a few blocks (see ***Figure 202.4.1***). Such conditions require a transition zone to alert drivers to the context change and to notify them to adjust their behavior and expectations accordingly. Changes in speed limit as part of transition zones must comply with the requirement of the ***Speed Zoning for Highways, Roads, and Streets in Florida***.

202-Speed Management

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- FDM 201 Design Controls has a range of design speeds for each context classification
- FDM 202 supports FDM 201 by providing techniques to achieve appropriate speeds within this range
- FDM 202 is based on national best practices
- Lane Elimination projects are treated separately in FDM 126
- The techniques in FDM 202 can also be applied to Lane Elimination Projects

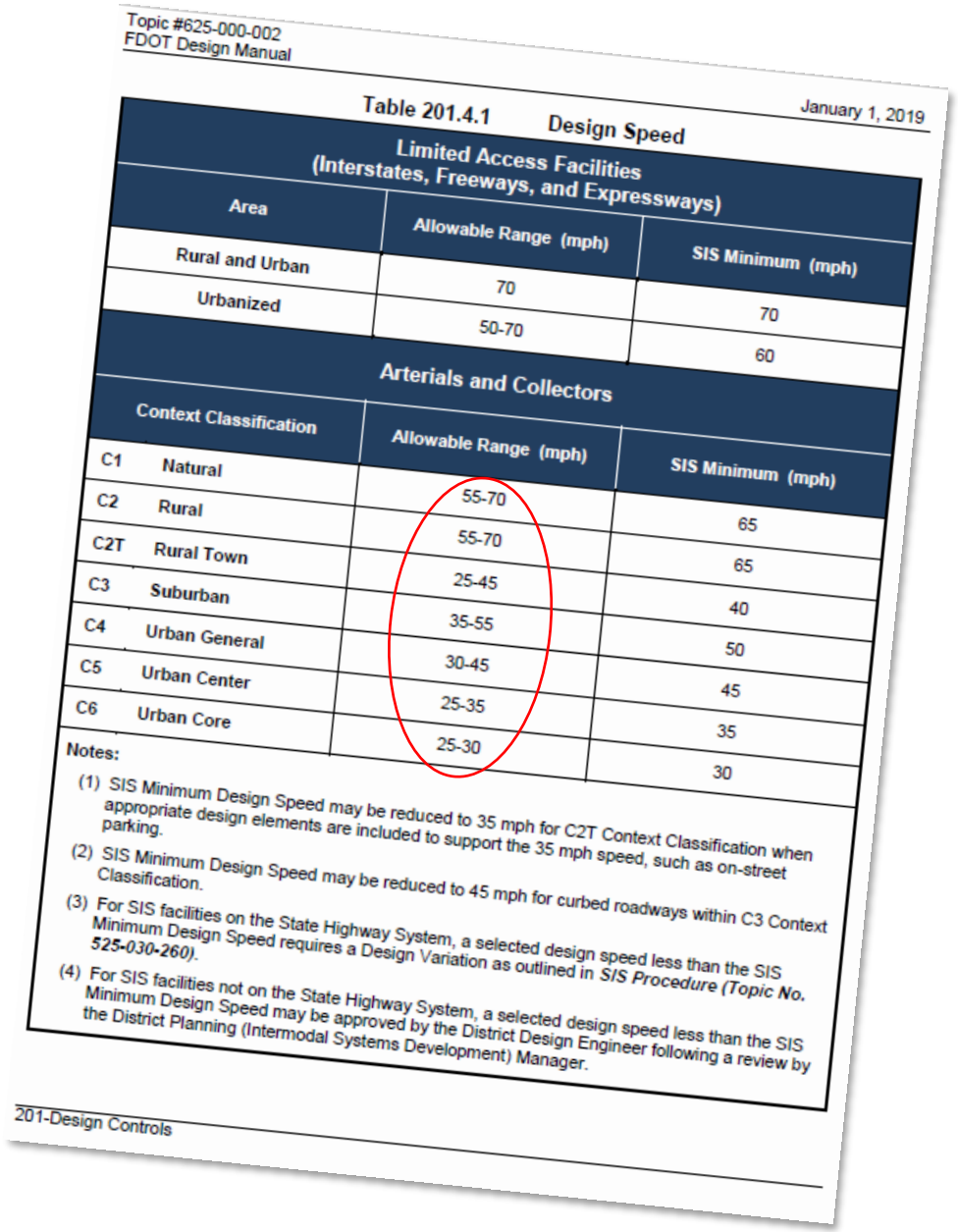

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Table 201.4.1 Design Speed

Limited Access Facilities (Interstates, Freeways, and Expressways)		
Area	Allowable Range (mph)	SIS Minimum (mph)
Rural and Urban	70	70
Urbanized	50-70	60
Arterials and Collectors		
Context Classification	Allowable 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	30-45	45
C5 Urban Center	25-35	35
C6 Urban Core	25-30	30

Notes:

(1) SIS Minimum Design Speed may be reduced to 35 mph for C2T Context Classification when appropriate design elements are included to support the 35 mph speed, such as on-street parking.

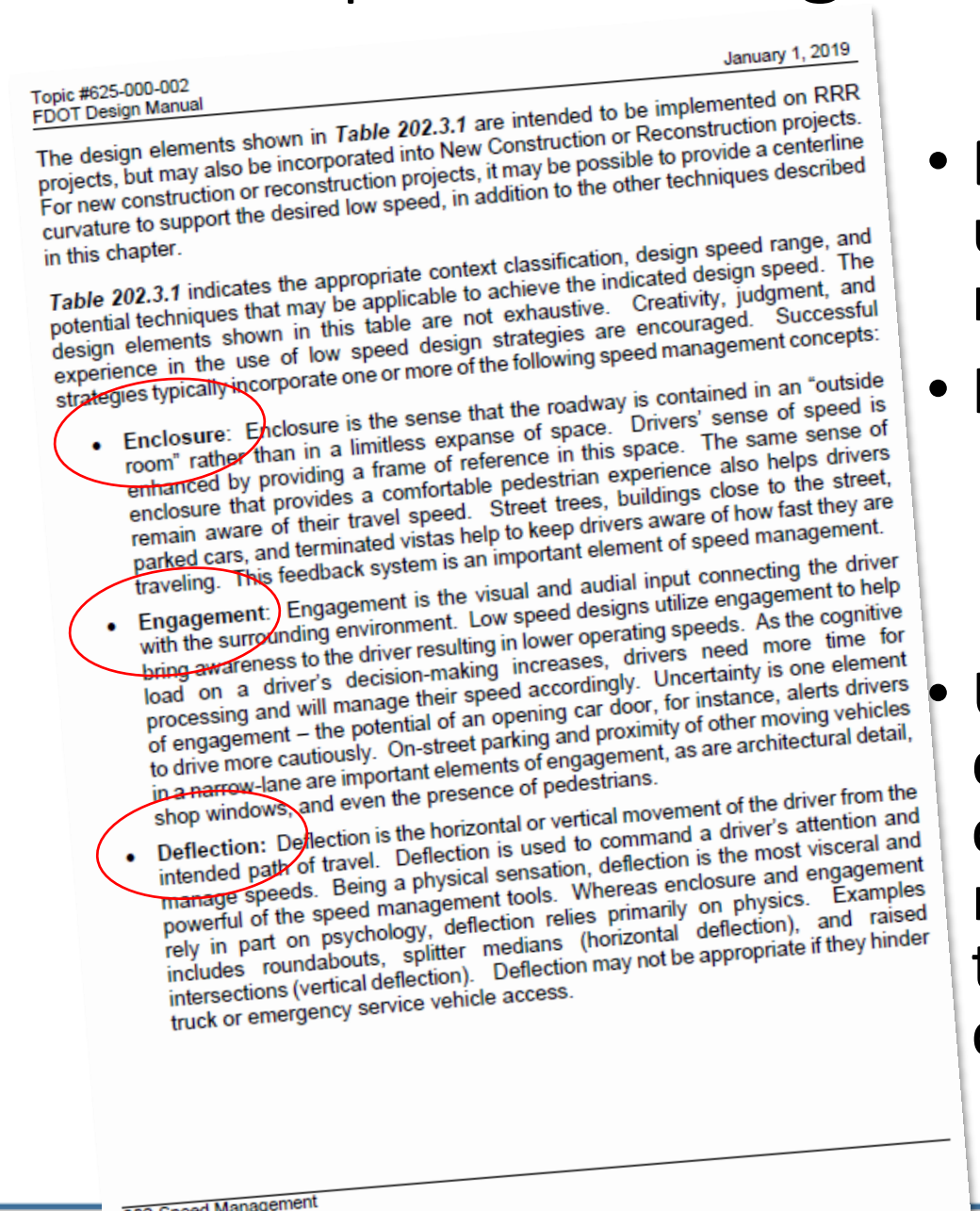
(2) SIS Minimum Design Speed may be reduced to 45 mph for curbed roadways within C3 Context Classification.

(3) For SIS facilities on the State Highway System, a selected design speed less than the SIS Minimum Design Speed requires a Design Variation as outlined in *SIS Procedure (Topic No. 525-030-260)*.

(4) For SIS facilities not on the State Highway System, a selected design speed less than the SIS Minimum Design Speed may be approved by the District Design Engineer following a review by the District Planning (Intermodal Systems Development) Manager.

201-Design Controls

202.2 Speed Management Concepts



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The design elements 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, it may be possible to provide a centerline curvature to support the desired low speed, in addition to the other techniques described in this chapter.

Table 202.3.1 indicates the appropriate context classification, design speed range, and potential techniques that may be applicable to achieve the indicated design speed. The design elements shown in this table are not exhaustive. Creativity, judgment, and experience in the use of low speed design 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, parked cars, 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 designs 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 a narrow 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 tools. Whereas enclosure and engagement rely in part on psychology, deflection relies primarily on physics. Examples includes roundabouts, splitter medians (horizontal deflection), and raised intersections (vertical deflection). Deflection may not be appropriate if they hinder truck or emergency service vehicle access.

- Describes the conceptual underpinnings of speed management
- Introduces the concepts of
  - Enclosure
  - Engagement
  - Deflection
- Using these concepts, designers may be able to create additional speed management techniques to fit specific circumstances

FDOT TRANSPORTATION SYMPOSIUM

Enclosure Examples

Blountstown, D3, US 20

Enclosure Examples

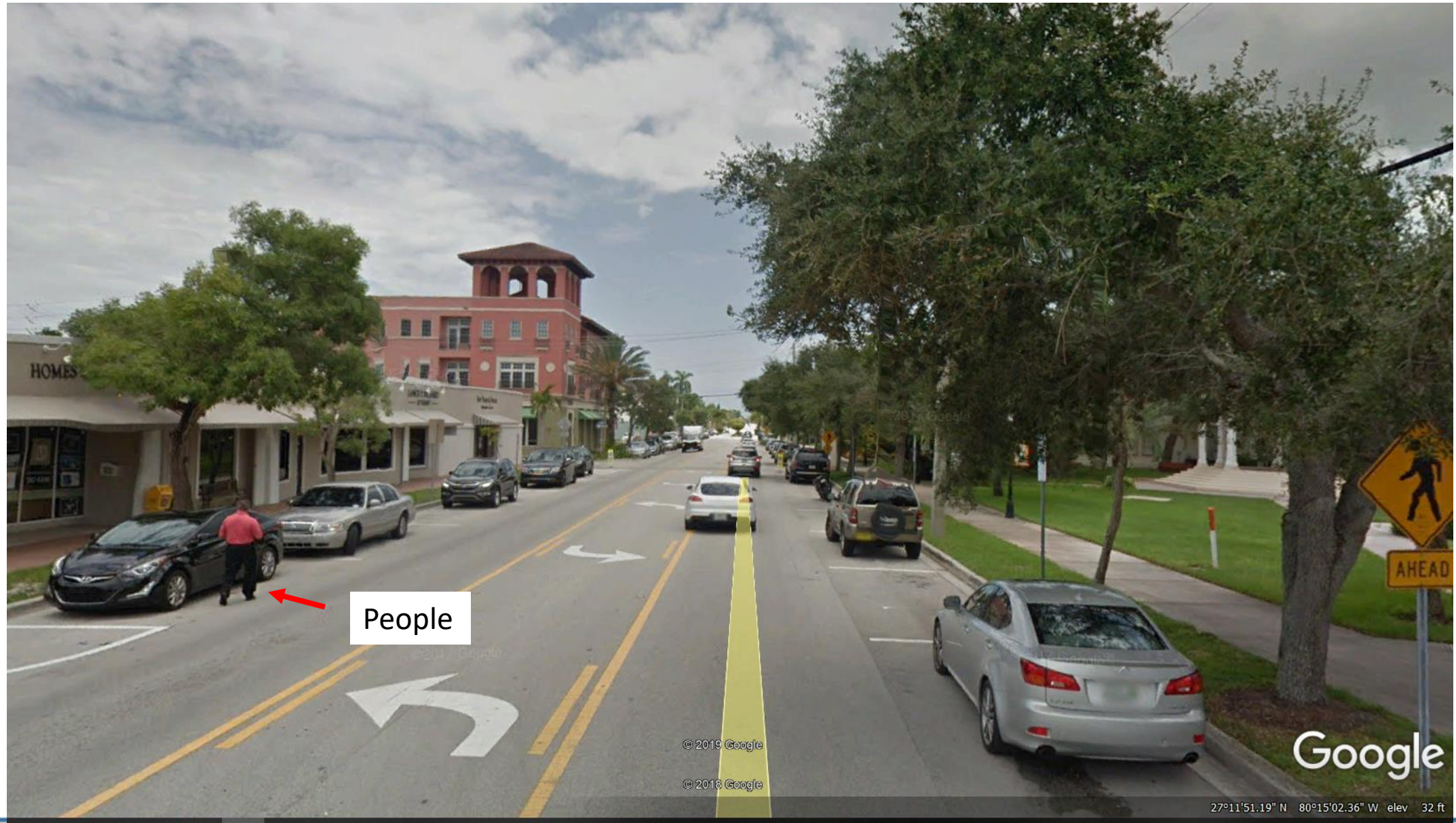
Tallahassee, D3, US 319

Engagement Examples

Stuart, D4, A1A

Engagement Examples

Stuart, D4, A1A



Deflection Examples

Amelia Parkway , D2, A1A

Deflection Examples

Fernandina Beach, D2

Deflection Examples

West Palm Beach, D4, Clematis Street

Deflection Examples

St. Augustine, D2, A1A

202.3 Strategies

- Introduces **Table 202.3.1 Strategies to Achieve Desired Operating Speed**
- When selecting strategies, will need to consider
  - Context Classification
  - Design Speed and Desired Operating Speed
  - Community Vision for the roadway
  - Multimodal needs (including safety needs)
  - Design vehicle and emergency vehicles
  - Access Management needs
- Each strategy in Table 202.3.1 is described further in text

- Start by finding your context classification
- Then find the speed range you want to achieve
- Then look at the appropriate strategies

Table 202.3.1 Strategies to Achieve Desired Operating Speed

Context Classification	Design Speed (mph)	Strategies
C1	55-70	Project-specific; see *FDM 202.4*.
C2	55-70	Project-specific; see *FDM 202.4*.
C2T	40-45	Roundabout, Lane Narrowing, Horizontal Deflection, Speed Feedback Signs, RRFBs and PHBs
	35	Techniques for 40-45 mph … Blocks, Median Islands at …
	3	
	≤	
C3R, C3C	50	
	40	…lection, Speed Feedback Signs,
	3	…lection, Speed Feedback Signs, …B and Hawk, Terminated Vista
C4	40	…lection, Speed Feedback Signs,
	3	…king, Street Trees, Short Blocks, …inated Vista
	3	…dian Islands in Curve Sections, Textured Surface
C5		Roundabout, On-street Parking, Street Trees, Short Blocks, Speed Feedback …nds in Crossings, Road Diet, Bulbouts, RRFB and HAWK,
		…mph plus Chicanes, Median Island in Curve Sections,
		…35 mph plus Vertical Deflection
		…treet Parking, Horizontal Deflection, Street Trees, Median …ections, Road Diet, Bulbouts, Terminated Vista, Textured Surface
	25	Techniques for 30 mph plus vertical deflection

For high-speed conditions, you may be directed to other parts of the FDM

Pro Tip: For great… effectiveness, use… multiple strategies together
- the more, the better
- managing speed can be difficult
- use whatever tools are available.

Lower-speed strategies usually include the higher-speed strategies as well

- Each strategy in the table is further described in part 202.3
- The appropriate FDM location for each strategy's criteria are also indicated
- The text provides guidance on using the strategies for speed management

202.3.1 Roundabouts

Roundabouts are effective as a transition from a higher speed context to a lower speed context. On the State Highway System (SHS), modern roundabouts are standard, but smaller roundabouts (sometimes referred to as "mini-roundabouts") may be appropriate in contexts where operating speeds of 25 mph or less are desired. See ***FDM 213*** for roundabout design criteria.

When used in series, roundabouts can help maintain a low speed condition as an alternative to vertical deflection, stop signs, or traffic signalization. To limit the potential of drivers accelerating between them, spacing should not exceed one-mile on low speed roadway and half-mile on very low speed roadways.

202.3.2 On-Street Parking

In addition to providing parking supply and separating pedestrians from the travel lane, on-street parking can be used to manage speeds when the parking lane is located directly adjacent to the travel lane. For best effect, the parking lane should be of the standard size for the type of parking used (parallel or reverse angle), and the travel lane should be of the minimum width that will accommodate the design vehicle. Effective speed management can be achieved by maximizing the engagement between the parking lane and the travel lane. Where parking is used for speed management, avoid the following:

- installing a bicycle lane between the parking lane and the travel lane
- travel lanes wider than 11 feet.

See ***FDM 210.2.3*** for on-street parking design criteria.

202.3.3 Chicanes

A chicane is a very low speed treatment using deflection of the roadway centerline to achieve horizontal deflection within existing curb. Chicanes place vertical barriers (e.g., curbs, on-street parking) to require vehicle operators to make frequent horizontal movements. To be effective, the chicane deflection should be the width of a parking lane or no less than half of the travel lane width. Transition distance between chicanes is typically 100 feet or more.

An example of a chicane strategy is the placement of on-street parking on alternating sides of the street. This alternating on-street parking pattern may be placed from one block to the next, or within a single block (depending on block length and transition distances). This creates a centerline shift, as illustrated in ***Figure 202.3.1***.

- Some strategies include a conceptual graphic
- Some strategies also require coordination with the District Traffic Operations Engineer
- Be sure to read each description completely

Figure 202.3.3 Concept Sketch- Add a Midblock Crossing to Long Block

202.3.8 Vertical Deflection

Like horizontal deflection, vertical deflection is a well-proven technique for speed management. Speed tables and raised intersections may be considered only for design speed 25 mph or less. High levels of engagement with local public works and emergency services is required when vertical deflection is proposed.

202.3.9 Speed Feedback Signs

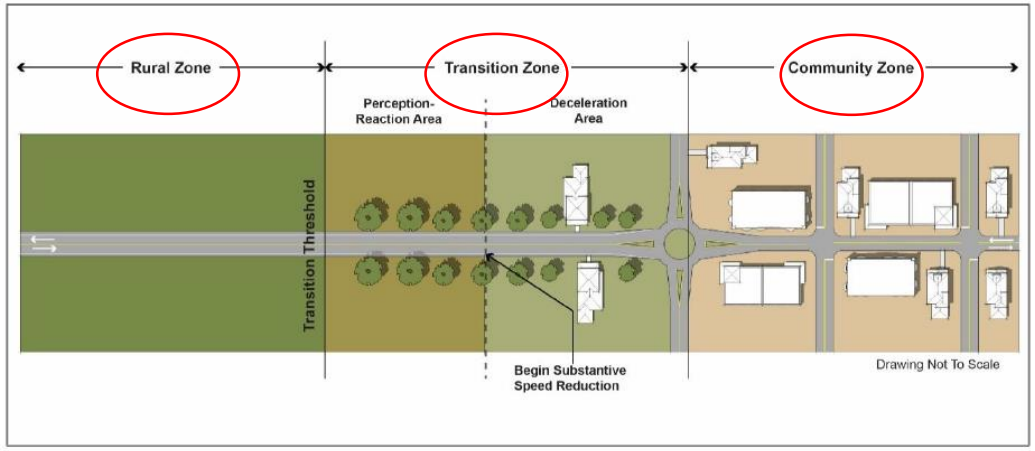
Speed feedback signs are a traffic operations strategy that is effective in helping to enforce school zone speed limits. However, this strategy may also require active participation by law enforcement.

The signs provide immediate feedback to drivers when the speed limit is exceeded, which may help to reduce unintentional speeding. They are most effective at managing operating speeds for short distances (about 1,000 feet) following the sign and when combined with other measures such as high emphasis crosswalk markings and median islands. Speed feedback signs should be used only when other physical design interventions are not feasible or appropriate for the location or site conditions. Coordinate with the District Traffic Operations Engineer on the use of this device.

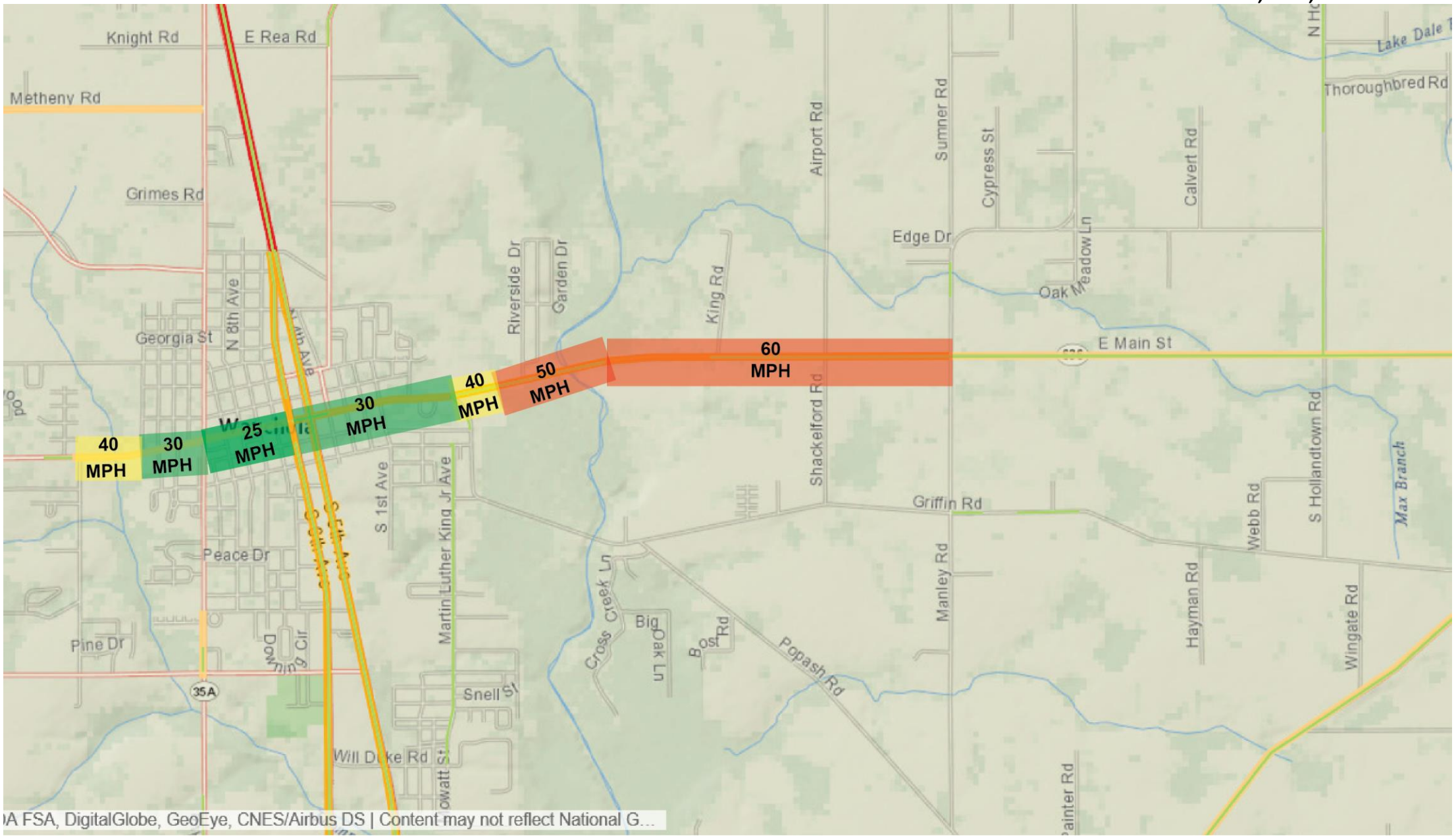
202.4 Transition Zones

- Provides strategies to transition from one speed to another, such as between high speed and low speed or very low speed context classifications
- Includes graphics of transition zones
  - Rural Zone
  - Transition Zone
  - Community Zone
- Directs designer back to part 202.3 for descriptions of recommended strategies

Figure 202.4.2 Transition Zone from C1/C2 to C2T Context Classification



Wauchula, D1, SR 636



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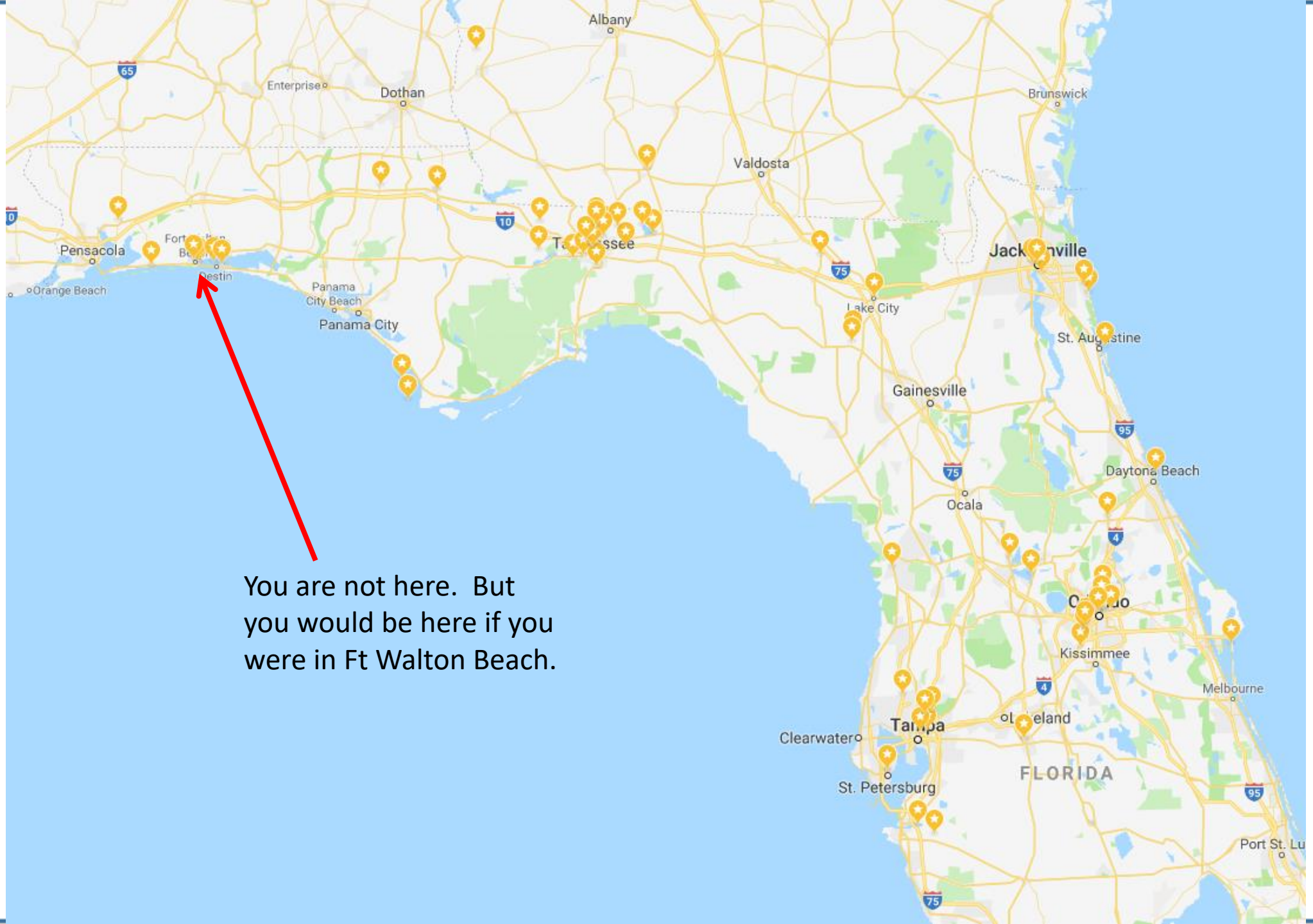

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Putting it all together - downtown Fort Walton Beach

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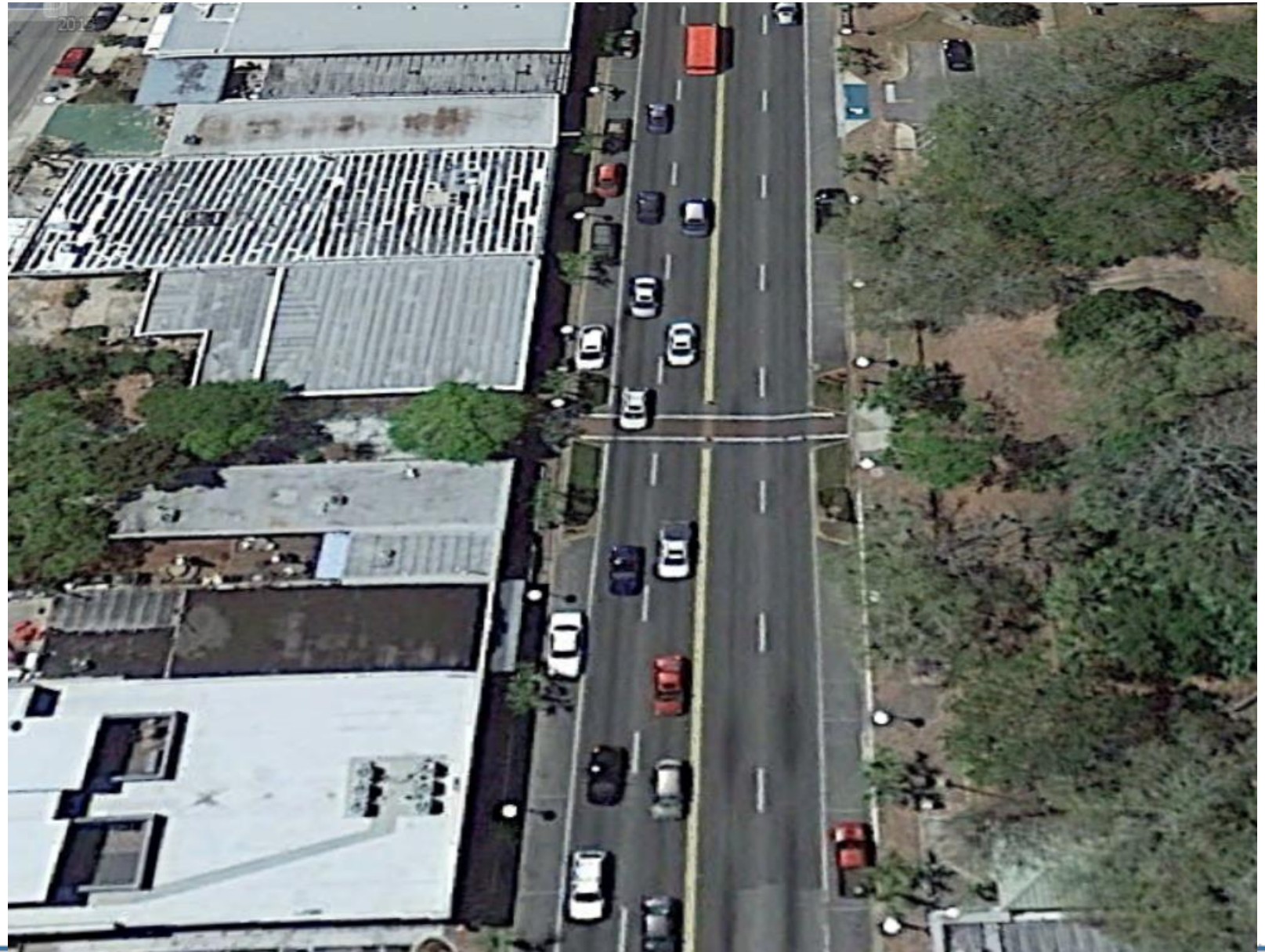
Example - downtown Fort Walton Beach



Example - downtown Fort Walton Beach

Example - downtown Fort Walton Beach

Example - downtown Fort Walton Beach

Example - downtown Fort Walton Beach

Design Speed Sub-range – C4 30-45 mph

30 mph

- Established older urban areas
- New very walkable urban areas (tight block structure, etc.)
- Areas directly adjacent to higher context class
- Minor arterials
- Ex. Midtown

35 mph

- Transitioning urban areas (adjacent to higher context class)
- Edge conditions adjacent to lower context classifications
- Areas where urban form and network are less-developed
- Minor/Major arterials
- Ex. W Tennessee Dewey to Ocala

40-45 mph

- Transition to lower context classifications
- Long-distance routes with limited land use support
- Major arterials
- Ex. W Tennessee Ocala to Capital Circle

Design Speed Sub-range – C3 35-55 mph

35 mph

- Areas directly adjacent to higher context class
- C4 Future Classification
- “Beach Areas”
- Transitions to lower speed areas
- Minor arterials

40-45 mph

- Classic C3 Suburban
- Residential monocultures
- C3 Future Context Classifcation
- Minor/Major arterials

50-55 mph

- Transition to lower context classifications
- Transition to higher speeds
- Major arterials

Questions?

- For more information, contact

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