



Florida Department of Transportation

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ROADWAY DESIGN BULLETIN 21-08

OFFICE OF ENVIRONMENTAL MANAGEMENT BULLETIN 21-02

(FHWA 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 Specifications 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

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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 revised for consistency throughout **FDM 201**.

REQUIREMENTS

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

2. Add the following sentence to the end of **FDM 201.5.1.1**:

C-D road segments more than one intersection away from a LA facility should be assigned a target speed in accordance with their context classification.

3. Delete the first paragraph of **FDM 201.5.3** and replace with the following:

Select a design speed consistent with the target speed (see FDM 201.5.1), context classification of the roadway and project scope. The design speed used for a RRR project must be no higher than the design speed used in the original design of the highway.

COMMENTARY

Additional information about selection of target speed is found in the **FDOT Context Classification Guide**. The target speed definition was introduced into the **FDOT Speed Zoning Manual** in 2018 and into the **FDM** in 2020. 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. The target speed concept was introduced in the literature for context based design in the 2006 Massachusetts Highway Design Guide and later amplified in the 2010 ITE/CNU Recommended Practice “Designing Walkable Urban Thoroughfares: A Context Sensitive Approach.” It has subsequently been incorporated in related literature from NACTO (National Association of City Transportation Officials) and included in research conducted by the Transportation Research Board (TRB NCHRP 15-76).

BACKGROUND

Context based design speeds were introduced in the first edition of the **FDM** in 2018, using a design speed range for each context classification. While the design speed ranges have proven effective in reducing gross inconsistencies in design speed application (such as putting high speed designs through very low speed environments), the ranges are sometimes too broad to sufficiently address all concerns with speed-related safety. For example, pedestrians and cyclists have a much higher risk of serious injuries or fatalities at speeds above 35mph, yet, 3 of the 5 context classifications where pedestrians are routinely expected include a range of speeds in excess of 35 mph. In some cases, the higher speeds may be appropriate, but in others, a lower speed should be used. The **FDM**, prior to this bulletin, treated all design speeds within the context classification range as equally valid and provided no mechanism to select a suitable single design speed from within the range. Through the use of Speed Management Pilot Projects since 2019, and through the introduction of target speed as part of the project development process in District 1 and District 7, FDOT has achieved a greater understanding of the appropriate application of target speed to influence the selection of the design speed. District 1 has a well-documented process for selecting target speed, and District 7 has been consistently implementing target speed. In fact, all districts have been applying target speed at some level since its introduction in 2020. District 1 recognized that the target speed selection process needs to be multidisciplinary, because appropriate speed selection may be confounded by other speed-related considerations including the 85th percentile operating speed, the current speed limit, land use, the existing design of the roadway, and Program Management considerations. In addition, the Speed Management Pilot Projects also proved the value of an up-front, multidisciplinary effort to

Roadway Design Bulletin 21-08
Use of Target Speed to Select Project Design Speed
Page 3 of 3

select a target speed, prior to beginning project design. Therefore, a multidisciplinary component has been included in the **FDM 201** updates described here.

In addition, two efforts underway at FDOT will benefit from the use of a target speed concept to align design speeds, operating speeds, and contexts. The Vision Zero approach to reducing roadway fatalities and the Vital Few Safety Task Teams both benefit from a better match between context and speed.

Following the October 2020 presentation to Executive Leadership on the Vital Few Safety “Single Best Ideas” for improving safety, the Roadway Design Office was instructed to make target speed a mandatory requirement, rather than an optional or “pilot project” case-by-case approach.

IMPLEMENTATION

The requirements of this bulletin are effective on all on all PD&E projects advertised after January 1, 2022, or sooner at the discretion of the District.

The requirements of this bulletin are effective immediately on all design-bid-build projects for which design development is prior to the Phase I submittal.

The requirements of this bulletin are effective on all design-build projects advertised after January 1, 2022 or sooner at the discretion of the District.

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Attachments

ATTACHMENT A: Complete Revised Text of FDM 201.5.1

ATTACHMENT A

Page 1 of 4

201.5.1 Design Speed Selection

Design speed should be selected early in the design process and should reflect the target speed (see below). Select a context-appropriate design speed to attain a desired degree of safety, mobility, and efficiency. Where the initial target speed value is not feasible to attain in a single project, the target speed should be as close to the initial target speed values as can be achieved within the constraints of the project. Adjust both the design speed and target speed as appropriate to achieve a single value appropriate to the project. Select design speeds in increments of 5 mph.

Target speed is the highest speed at which vehicles should operate on a thoroughfare in a specific context, consistent with the level of multi-modal activity generated by adjacent land uses, to provide both mobility for motor vehicles and a supportive environment for pedestrians, bicyclists, and public transit users. Determine appropriate target speed for all non-limited access projects where a design speed is also required. The target speed must:

- Be within the range of design speeds for the context classification (see **Table 201.5.1**);
- Reflect the needs of safety, quality of life, and economic development of the corridor;
- Be shown in the Typical Section Package and on the Typical Section sheets with signatures from the District Design Engineer, District Traffic Operations Engineer, and District Intermodal Systems Development Manager; and
- Be established by a team that includes, but is not limited to, Design, Traffic Operations, Safety, Planning, and Program Management offices.

It is expected that initial target speed values may be modified during project scoping to achieve the target speed as additional information is gathered and project scoping decisions are made. See the **FDOT Context Classification Guide** for more information about determining appropriate target speed.

In general, the target speed for C1 and C2 roadways should be on the higher end of the design speed range, with justification provided for lower speeds. In C2T through C6, consider starting with target speeds on the lower end of the range with justification provided for higher speeds.

It is considered a best practice to provide initial target speed values as part of the context classification determination. These initial values can be an effective starting point for the establishment of the target speed. For RRR projects where the initial target speed value is below the existing design speed or Posted Speed Limit, see **FDM 202** for Speed Management techniques to better align the design speed with target speed. In many cases, the design speed and the initial target speed values may both need to be changed to arrive at a target speed appropriate for the project.

ATTACHMENT A

Page 2 of 4

*COMMENTARY: The 85th-percentile observed speed is a starting point when traffic engineers conduct a speed study for setting speed limits (see the **FDOT Speed Zoning Manual** for more information, if desired.) The 85th percentile speed should be considered when selecting the target speed, but the target speed does not have to match the 85th-percentile speed.*

In many cases, speed management is required because the existing 85th-percentile speed is too high for current conditions, so setting target speed equal to the existing 85th-percentile speed would fail to accomplish the speed management objectives. The primary value of knowing the existing 85th percentile speed is to understand the potential magnitude of speed management interventions that may be required to achieve a selected target speed. Large speed reductions of more than 10 mph, for instance, may need to be approached incrementally over several projects, rather than achieved at once on a single project.

The District Design Engineer (DDE) and the District Traffic Operations Engineer (DTOE) jointly approve the selected design and posted speeds. This approval is a declaration that the posted speed will not exceed the selected design speed. This is to be documented on the Typical Section Package as described in **FDM 120.2.3**.

Table 201.5.1 provides an allowable range of mainline design speeds on the State Highway System. **Table 201.5.2** provides the minimum design speeds allowed on ramps.

| |
|---|
| Modification for Non-Conventional Projects: |
| See RFP for design speed and target speed. |

ATTACHMENT A

Page 3 of 4

Table 201.5.1 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: <ol style="list-style-type: none"> (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. | | |

ATTACHMENT A

Page 4 of 4

Table 201.5.2 Ramp Design Speeds

| Ramp Connection Type | Minimum Design Speed (mph) |
|---|----------------------------|
| Loops and Semi-Direct | 30 |
| Outer Cloverleaf | 35 |
| Intermediate Portions of Long Ramps | 40 |
| Direct Connection | 50 |
| <p><u>Express Lane Direct Connections:</u></p> <p>(1) Design speeds higher than the minimum shown above should be used when practical. A design speed of 60 mph is desirable.</p> <p>(2) Design Variations for Design Speed will not be approved for Express Lane Direct Connections with a design speed below 40 mph.</p> | |