



# Federal Register

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**Wednesday,  
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**Part III**

## **Department of Transportation**

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**Federal Highway Administration**

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**23 CFR Parts 634 and 655  
National Standards for Traffic Control  
Devices; the Manual on Uniform Traffic  
Control Devices for Streets and  
Highways; Revision; Proposed Rule**

**DEPARTMENT OF TRANSPORTATION****Federal Highway Administration****23 CFR Parts 634 and 655**

[FHWA Docket No. FHWA-2007-28977]

RIN 2125-AF22

**National Standards for Traffic Control Devices; the Manual on Uniform Traffic Control Devices for Streets and Highways; Revision****AGENCY:** Federal Highway Administration (FHWA), (DOT).**ACTION:** Notice of proposed amendments.

**SUMMARY:** The MUTCD (also referred to as “the Manual”) is incorporated by our regulations, approved by the Federal Highway Administration, and recognized as the national standard for traffic control devices used on all public roads. The purpose of this notice of proposed amendments is to revise standards, guidance, options, and supporting information relating to the traffic control devices in all parts of the MUTCD. The proposed changes are intended to expedite traffic, promote uniformity, improve safety, and incorporate technology advances in traffic control device application. These proposed changes are being designated as the next edition of the MUTCD.

**DATES:** Comments must be received on or before July 31, 2008.

**ADDRESSES:** Mail or hand deliver comments to the U.S. Department of Transportation, Dockets Management Facility, 1200 New Jersey Avenue, SE., Washington, DC 20590, or submit electronically at [www.regulations.gov](http://www.regulations.gov) or fax comments to (202) 493-2251. All comments should include the docket number that appears in the heading of this document. All comments received will be available for examination and copying at the above address from 9 a.m. to 5 p.m., e.t., Monday through Friday, except Federal holidays. Those desiring notification of receipt of comments must include a self-addressed, stamped postcard or may print the acknowledgment page that appears after submitting comments electronically. Anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT’s complete Privacy Act Statement in the **Federal Register** published on April 11, 2000 (Volume

65, Number 70, Page 19477-78) or you may visit <http://dms.dot.gov>.

**FOR FURTHER INFORMATION CONTACT:** Mr. Hari Kalla, Office of Transportation Operations, (202) 366-5915; or Raymond Cuprill, Office of the Chief Counsel (202) 366-0791, Federal Highway Administration, 1200 New Jersey Ave., SE., Washington, DC 20590. Office hours are from 7:45 a.m. to 4:15 p.m., e.t., Monday through Friday, except Federal holidays.

**SUPPLEMENTARY INFORMATION:****Electronic Access and Filing**

You may submit or retrieve comments online through the Federal eRulemaking portal at: [www.regulations.gov](http://www.regulations.gov). Electronic submission and retrieval help and guidelines are available under the help section of the Web site. It is available 24 hours each day, 365 days each year. Please follow the instructions. An electronic copy of this document may also be downloaded from the Office of the Federal Register’s home page at: <http://www.archives.gov> and the Government Printing Office’s Web page at: <http://www.access.gpo.gov/nara>.

**Background**

The text, figures, and tables of a proposed new edition of the MUTCD incorporating proposed changes from the current edition are available for inspection and copying, as prescribed in 49 CFR Part 7, at the FHWA Office of Transportation Operations (HOTO-1), 1200 New Jersey Avenue, SE., Washington, DC 20590. Furthermore, the text, figures, and tables of a proposed new edition of the MUTCD incorporating proposed changes from the current edition are available on the MUTCD Internet Web site <http://mutcd.fhwa.dot.gov>. The proposed text is available in two formats. The first format shows the current MUTCD text with proposed additions in blue underlined text and proposed deletions as red strikeout text, and also includes notes in green boxes to provide helpful explanations where text is proposed to be relocated or where minor edits are proposed. The second format shows a “clean” version of the complete text proposed for the next edition of the MUTCD, with all the proposed changes incorporated. The complete current 2003 edition of the MUTCD with Revision No. 1 incorporated is also available on the same Internet Web site.

This notice of proposed amendments is being issued to provide an opportunity for public comment on the desirability of these proposed amendments to the MUTCD. Based on

the comments received and its own experience, the FHWA may issue a Final Rule concerning the proposed changes included in this notice.

The notice of proposed amendments is being published to address the many advances in technology, research results, and improved traffic and safety management strategies that have occurred since the 2002 initiation of the rulemaking process that led to the 2003 edition of the MUTCD. The FHWA invites comments on these proposed changes to the MUTCD. The FHWA requests that commenters cite the page number and line numbers of the proposed MUTCD text for which each specific comment to the docket about the proposed text is concerned, to help make the FHWA’s docket comment review process more efficient.

A summary of the significant proposed general changes and proposed changes for each of the parts of the MUTCD is included in the following discussion.

*Discussion of Proposed General Amendments to the MUTCD*

1. The FHWA proposes to develop a new cover page for the new edition of the MUTCD that will maintain general consistency with covers of previous editions but with changes to give it a distinctive appearance, to minimize the possibility of confusion by users. Although a new cover page has not yet been developed and is not illustrated in the NPA, the FHWA proposes to include a new cover page design in the edition of the MUTCD published as the Final Rule. The FHWA proposes that the date of the new edition to be identified on the cover and elsewhere within the document will be the year in which the Final Rule is issued.

2. The FHWA proposes to include paragraph numbers for each section, in the margins, for the final page images of the next edition of the MUTCD. Although the page images shown for the NPA do not include paragraph numbers, the FHWA proposes to include them in the edition of the MUTCD published as the Final Rule in order to aid practitioners in referencing the MUTCD, as well as to assist readers of future MUTCD notices of proposed amendments. On the FHWA’s MUTCD Web site at <http://mutcd.fhwa.dot.gov>, along with the proposed MUTCD text, the FHWA has posted sample pages showing four possible methods for paragraph numbering. Interested persons should review the sample pages and provide comments to the docket on the paragraph numbering options.

3. Throughout the MUTCD, the FHWA proposes minor changes in text

and figures for grammatical or style consistency, to improve consistency with related text or figures, to improve clarity, or to correct minor errors. Where the FHWA proposes to add a new chapter within a part of the MUTCD, a new section within a chapter of the MUTCD, or a new item within a listing, the chapters or sections or items that follow the proposed addition would be renumbered or relettered accordingly. All Tables of Contents, Lists of Figures, Lists of Tables, and page headers and footers would be revised as appropriate to reflect the proposed changes.

4. The FHWA proposes, where appropriate, to modify figures and tables to reflect proposed changes in the text and to add figures and tables to illustrate new or revised text.

5. In various sections of the Manual, the FHWA proposes to relocate statements or paragraphs in order to place subject material together in logical order, to provide continuity, or to improve flow. In addition, the FHWA proposes to change the titles of some sections in order to more accurately describe the content of the section.

6. The FHWA proposes to remove the phrase “reasonably safe” throughout the Manual, because it cannot be easily defined, and as a result it is open to too much subjective interpretation. The FHWA proposes that each occurrence of the term either be eliminated or replaced with suitable language that is more appropriate.

7. The FHWA proposes to change the phrase “bicycle trail” to “bikeway” in several places in the Manual. The FHWA proposes this change because the term “bikeway” is a generic term used for any road, street, or shared-use path that is specifically designated for bicycle travel and the term “bicycle trail” is generally used to designate only off-road trails or paths that are typically not constructed to engineering standards or guidelines, and the application of the MUTCD to such bicycle trails would generally be impractical, inappropriate, and inadvisable in some locations.

8. The FHWA proposes to change the references to the book previously titled “Standard Highway Signs” to refer to the current “Standard Highway Signs and Markings.” This change is proposed throughout the MUTCD because the FHWA is changing the title of that book to more accurately reflect its content, which includes information regarding markings.

9. The FHWA has conducted a comprehensive review of all of the sign codes used throughout the Manual, and proposes to revise sign codes in several places in order to provide more

consistency and clarity. As part of this process, the FHWA proposes to revise the term “sign code” to “sign designation” to avoid confusion with other uses of the word “code,” and to use the “a” suffix in sign designations for word message signs that are alternatives to symbol signs, use the “P” suffix for sign designations for plaques, and add “(M)” suffixes for signs that have metric units.

10. In all Parts of the MUTCD where sign images are shown in the figures, the FHWA proposes to add sign images that are already in the Standard Highway Signs and Markings book, but not in the MUTCD, and to update figures to show proposed new signs or changes to existing signs.

11. The FHWA proposes to add information in the MUTCD regarding toll plaza applications, because toll facilities are becoming more common and there is a need to provide more consistent use of signing, signals, and markings in advance of and at toll plazas, in order to enhance safety and convenience for road users. The FHWA proposes to add provisions on toll plaza traffic control devices to Parts 2, 3, and 4 that reflect the results of research study on best practices for traffic control strategies at toll plazas<sup>1</sup> (referred to hereafter as the “Toll Plaza Best Practices and Recommendations Report”) and FHWA’s policy on toll plaza traffic control devices.<sup>2</sup>

12. The FHWA proposes to expand the provisions regarding preferential lanes and add new provisions regarding managed lanes in various Parts of the MUTCD. This proposed information is contained primarily in Parts 2 and 3, and is intended to address specific signing and marking issues associated with electronic toll collection, High Occupancy Toll (HOT) lanes, variable tolls, etc. In addition, the FHWA proposes to eliminate some information regarding preferential lanes that is too specific for the MUTCD because it deals with highway planning and programmatic matters rather than the traffic control devices for preferential lanes.

13. In order to further address the needs of motorcyclists, the FHWA proposes to add information to Parts 2, 3, and 8 regarding traffic control device considerations for motorcyclists.

<sup>1</sup> “State of the Practice and Recommendations on Traffic Control Strategies at Toll Plazas,” June 2006, can be viewed at the following Internet Web site: <http://mutcd.fhwa.dot.gov/rpt/tcstoll/index.htm>.

<sup>2</sup> “Toll Plaza Traffic Control Devices Policy,” dated September 8, 2006, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/policy/tcstollmemo/tcstoll\\_policy.htm](http://mutcd.fhwa.dot.gov/resources/policy/tcstollmemo/tcstoll_policy.htm).

14. The FHWA proposes to change the designations of barricades to Types 1, 2, and 3 to eliminate the use of roman numerals because these are the only devices that are designated by roman numerals and to be consistent with other items such as object marker types. This editorial change would affect the text of several Parts of the MUTCD.

#### *Discussion of Proposed Amendments to the Introduction*

15. The FHWA proposes to revise the first STANDARD statement regarding the locations where the MUTCD applies. The FHWA proposes this change to incorporate recent changes to 23 CFR 655.603(a)<sup>3</sup> that clarify that, for the purpose of MUTCD applicability, the phrase “open to public travel” includes toll roads and roads within shopping centers, parking lots, airports, sports arenas, and other similar business and recreation facilities that are privately owned but where the public is allowed to travel without access restrictions. The FHWA also proposes to modify the wording of 23 CFR 655.603(a) to remove the military base exemption from the MUTCD. The FHWA proposes to apply the provisions in the MUTCD and modify the CFR based on a request from the Military Surface Deployment and Distribution Command to include military bases in order to facilitate motorist safety through conformity and consistency with national standards. The FHWA agrees that many military bases are public and contain public roads that can be freely accessed, and that the use of such roads by military personnel from all over the country makes it especially important for traffic control devices on military bases to be in conformance with the national standards of the MUTCD. As a part of this change, the FHWA proposes to indicate that traffic control devices can be placed by the authority of non-public agencies, and the MUTCD is recognized as the national standard for traffic control devices on public facilities and private property open to public travel, as defined above.

16. In the fourth STANDARD statement, the FHWA proposes to add that substantial conformance of State or other Federal agency MUTCDs or Supplements shall be as defined in 23 CFR 655.603(b)(1), to reflect the

<sup>3</sup> The Federal Register Notice for the Final Rule, dated December 14, 2006, Vol. 71, No. 240, pages 75111–75115, can be viewed at the following Internet Web site: [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2006\\_register&docid=fr14de06-6.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2006_register&docid=fr14de06-6.pdf).

incorporation of the definition of that term into the CFR.<sup>4</sup>

17. In the listing of target phase-in compliance dates, FHWA proposes to include the specific target phase-in compliance date for those items whose dates were determined through previous rulemaking, now that the effective dates are known. In addition, the FHWA proposes target phase-in compliance dates for a number of significant proposed changes in the NPA. The FHWA also proposes to delete from the listing any items for which the target phase-in compliance dates have already passed or will be passed by the date of the publication of the Final Rule resulting from this NPA. It should also be noted that the target phase-in compliance dates define the end of the "phase-in compliance period" as discussed for various items in the remainder of this document.

18. Although not specifically shown in the NPA, the FHWA is considering incorporating the phase-in compliance periods into the body of the MUTCD text throughout the applicable parts and sections in the Final Rule. The FHWA is considering this change because the list of phase-in compliance periods is lengthy, and it might be more convenient and effective for practitioners to have phase-in compliance periods embedded in the text, rather than in a different area of the Manual. The FHWA encourages the public to view the Minnesota State Department of Transportation Web site at <http://www.dot.state.mn.us/trafficeng/otepubl/mutcd/index.html> to view how Minnesota has incorporated the phase-in compliance periods into its State MUTCD text and to provide comments to the docket on whether Minnesota's method is preferable to listing all the phase-in compliance periods in the MUTCD Introduction.

*Discussion of Proposed Amendments to Part 1—General*

19. In Section 1A.03 Design of Traffic Control Devices, the FHWA proposes to delete the STANDARD statement from this section, and place the text in Section 2A.06, because that section more appropriately deals with signs, including their colors and symbols. For the same reason, text in the OPTION statement relating to signs only is also proposed to be relocated to Section 2A.06.

<sup>4</sup> The Federal Register Notice for the Final Rule, dated December 14, 2006, Vol. 71, No. 240, pages 75111–75115, can be viewed at the following Internet Web site: [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2006\\_register&docid=fr14de06-6.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2006_register&docid=fr14de06-6.pdf).

20. In Section 1A.08 Authority for Placement of Traffic Control Devices, the FHWA proposes to add to the GUIDANCE statement that signs and other devices (as explained in a proposed new SUPPORT statement) that do not have any traffic control purpose that are placed with the permission of the public agency or official having jurisdiction, should be located where they will not interfere with, or detract from traffic control devices. The FHWA proposes this change to clarify that there are some signs and devices that are placed within the right-of-way for distinct purposes that are not traffic control devices.

21. In Section 1A.10 Interpretations, Experimentations, Changes, and Interim Approvals, the FHWA proposes to revise the 2nd STANDARD statement to indicate that electronic submittals of requests for interpretation, permission to experiment, interim approvals, or changes are preferred. The FHWA proposes to include the e-mail address for such submittals. As part of this proposed change, the FHWA proposes an OPTION statement that includes the postal address for such requests to be mailed to, in the event that the submitter does not have access to e-mail.

The FHWA also proposes to revise and supplement the language regarding interim approvals for the use of traffic control devices in order to provide additional information about the process and reflect how it has evolved since the 2003 MUTCD.

22. In Section 1A.11 Relation to Other Publications, the FHWA proposes to add four FHWA publications and a publication of the American National Standards Institute (ANSI) to the list of publications in the SUPPORT statement. All of these documents are referenced in other Parts of the MUTCD.

In addition, the FHWA proposes to update the list to reflect current editions of the publications.

The FHWA also proposes to delete existing publication 19, the Institute of Transportation Engineers' (ITE) Recommended Practice titled, "School Trip Safety Program Guidelines" from the list of publications because ITE has rescinded publication of the reference document and the information from this publication is included within the MUTCD text where appropriate.

23. In Section 1A.12 Color Code, the FHWA proposes to add to the STANDARD statement the assignment of the color purple to indicate facilities or lanes that are allowed to be used only by vehicles equipped with electronic toll collection (ETC) transponders. The FHWA proposes this change to readily

identify such facilities or lanes using signs and pavement markings as discussed below in the proposed changes in Parts 2 and 3. Color specifications for signing and marking materials are contained in title 23 of the Code of Federal Regulations, part 655, appendix to subpart F, Tables 1 through 6. The FHWA has reviewed color properties of the purple signing and marking materials available from a variety of manufacturers and proposes to revise the existing daytime color coordinates for purple retroreflective sign material (Table 1), add nighttime color coordinates for purple retroreflective sign material (Table 2), and add daytime and nighttime color coordinates and luminance factors for purple retroreflective marking material (Tables 5, 5A, and 6). The proposed values for purple in the tables are as indicated below (no change is proposed for the existing values for luminance factors for purple as contained in Table 1A):

**TABLE 1.—DAYTIME CHROMATICITY COORDINATES FOR PURPLE RETROREFLECTIVE SIGN MATERIAL**

x	y
Existing 0.300 Proposed 0.302.	Existing 0.064 Proposed 0.064
Existing 0.320 Proposed 0.307.	Existing 0.200 Proposed 0.202
Existing 0.550 Proposed 0.374.	Existing 0.300 Proposed 0.247
Existing 0.600 Proposed 0.457.	Existing 0.202 Proposed 0.136

**TABLE 2.—NIGHTTIME CHROMATICITY COORDINATES FOR PURPLE RETROREFLECTIVE SIGN MATERIAL**

x	y
0.300 .....	0.064
0.307 .....	0.150
0.480 .....	0.245
0.530 .....	0.170

**TABLE 5.—DAYTIME CHROMATICITY COORDINATES FOR PURPLE RETROREFLECTIVE PAVEMENT MARKING MATERIAL**

x	y
0.300 .....	0.064
0.309 .....	0.260
0.362 .....	0.295
0.475 .....	0.144

**TABLE 5A.—DAYTIME LUMINANCE FACTORS FOR PURPLE RETROREFLECTIVE MARKING MATERIAL**

Minimum	Maximum
5 .....	15

**TABLE 6.—NIGHTTIME CHROMATICITY COORDINATES FOR PURPLE RETROREFLECTIVE MARKING MATERIAL**

x	y
0.338 .....	0.380
0.425 .....	0.365
0.470 .....	0.385
0.635 .....	0.221

24. In Section 1A.13 Definitions of Words and Phrases in This Manual, the FHWA proposes to revise the definitions for: “bicycle lane,” “changeable message sign,” “contraflow lane,” “crosswalk,” “flashing,” “highway traffic signal,” “intersection,” “logo,” “occupancy requirement,” “public road,” “raised pavement marker,” “road user,” “roundabout,” “rumble strip,” “sign,” “sign legend,” “speed,” “speed limit,” “speed zone,” “traffic,” and “traffic control device” to better reflect accepted practice and terminologies and for consistency in the usage of these terms in one or more Parts of the MUTCD.

The FHWA also proposes to add definitions for the words “alley,” “average annual daily traffic,” “barrier-separated lane,” “bikeway,” “buffer-separated lane,” “circulatory roadway,” “contiguous lane,” “electronic toll collection,” “flagger,” “gate,” “highway-light rail transit grade crossing,” “hybrid signal,” “managed lane,” “multi-lane,” “open road electronic toll collection,” “opposing traffic,” “pathway,” “pictograph,” “preferential lane,” “private property open to public travel,” “public facility,” “safe-positioned,” “school,” “school zone,” “signing,” “splitter island,” “symbol,” “turn bay,” “warning light,” “worker,” and “yield line” to the list of definitions because they are used in the MUTCD.

25. The FHWA proposes adding a new section following Section 1A.13. The proposed new section is numbered and titled “Section 1A.14 Meanings of Acronyms and Abbreviations in This Manual,” and contains a STANDARD statement with 38 acronyms and abbreviations and their definitions. The remaining section in Chapter 1A would be renumbered accordingly. The FHWA

proposes adding this new section to assist readers with the acronyms and abbreviations used throughout the Manual.

26. In existing Section 1A.14 (new Section 1A.15) Abbreviations Used on Traffic Control Devices, the FHWA proposes to add to the 1st STANDARD statement a paragraph indicating that the abbreviations listed in Table 1A–2 shall be used only on Portable Changeable Message Signs and that when the word messages shown in Table 1A–2 need to be abbreviated on a Portable Changeable Message sign, the abbreviations shown in Table 1A–2 shall be used. The original research<sup>5</sup> on abbreviations was based on the need to shorten words when used on portable changeable message signs due to the limited number of characters available, unlike fixed-message signs. Many of the abbreviations were developed for words that would not otherwise normally be abbreviated on signs, and the intent was not to abbreviate such words on fixed-message signs.

The FHWA also proposes to add to the 2nd GUIDANCE statement a sentence indicating that punctuation marks or other characters that are not letters or numerals should not be used in abbreviations, unless absolutely necessary to avoid confusion.

27. In Table 1A–1 Acceptable Abbreviations, the FHWA proposes to add several additional abbreviations for various terms that are often used on signs or markings and for which a single abbreviation for each is needed to enhance uniformity. The FHWA also proposes to remove several abbreviations from Table 1A–1 that are symbols rather than abbreviations (such as “D” for diesel on general service signs), and to revise several abbreviations based on accepted practice in the specific context of the manner in which fixed messages are developed. The FHWA also proposes to remove from Table 1A–1 some words that should not be abbreviated on static signs or large permanent full-matrix changeable message signs. In concert with these changes to Table 1A–1, the FHWA proposes to revise the title of Table 1A–2 to “Abbreviations That Shall Only Be Used on Portable Changeable Message Signs” and add to Table 1A–2 some of the abbreviations that would be removed from Table 1A–1. The FHWA also proposes to revise

the content of Table 1A–2 to specifically list the abbreviations (some of which can be used only with a prompt word) that are appropriate only for use on portable changeable message signs (PCMS).

*Discussion of Proposed Amendments to Part 2 Signs*

Discussion of Proposed Amendments Within Part 2—General

28. In December 2005, the FHWA published a report on the findings of a synthesis of non-MUTCD traffic signing.<sup>6</sup> The purposes of this synthesis (hereafter referred to as the Sign Synthesis Study) were to collect information on special (non-MUTCD) sign legends, designs, and symbols used by the State DOTs and by selected large cities and counties; to identify commonalities, such as what special conditions are the most common reasons for developing a special sign and what design elements have been most commonly used to communicate the message; and to determine the most likely candidate sign legends and symbols for potential inclusion in future editions of the MUTCD and make recommendations for standardized sign designs. The synthesis found that a considerable number and variety of non-MUTCD signs are in routine use by State and local highway agencies in the U.S. In many cases, jurisdictions have used the flexibility given to them by the MUTCD to develop and install special word message signs to communicate unique traffic regulations or warnings of conditions that are not specifically covered in the MUTCD. In some cases the same word message is used by most or all States to describe a particular condition. However, more often there is considerable variety among the States in the specific words or phrases used to communicate the same basic information to road users. Based on the information gathered in the synthesis, the FHWA believes that additional uniformity is needed for the frequently used signing not currently included in the MUTCD and is proposing to add several new signs throughout the MUTCD to provide road users with a uniform message for commonly encountered conditions. In addition to describing these proposed new signs in the MUTCD text, the FHWA proposes to add images of these proposed signs to applicable figures throughout the MUTCD. A brief discussion of each

<sup>5</sup> Report number FHWA/RD–81/039 “Human Factors Design of Dynamic Displays” by C. L. Dudek and R. D. Huchingson, Final Report, May 1982, is available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. Web site <http://www.ntis.gov>.

<sup>6</sup> “Synthesis of Non-MUTCD Traffic Signing,” FHWA, December 2005, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

proposed new sign is included in the preamble for each appropriate chapter or section.

In some cases the FHWA is proposing new symbol signs that mirror existing Canadian MUTCD<sup>7</sup> standard symbols that have been in longstanding use in that neighboring country. Such symbols were reviewed as a part of the signing synthesis. Canada has moved considerably farther into symbolization of common regulatory, warning, and guide/information messages (sometimes by adopting European symbols) than has the U.S. The synthesis found several well-designed Canadian symbols with intuitively obvious meanings for sign messages for which some or many States are using a non-MUTCD word message sign (often with many variations among States). The FHWA proposes adopting some of these Canadian symbols or close likenesses, with a temporary educational plaque as needed. The FHWA believes that this will improve the harmony of North American signing in view of the North American Free Trade Agreement (NAFTA) and will enhance the convenience and safety of U.S. and international travelers when driving, riding, or walking.

29. The FHWA proposes to move object markers from Part 3 to Part 2, because there has been confusion regarding the location of object markers in the MUTCD, and the FHWA feels that information regarding object markers is best placed in Part 2. Object markers are typically fabricated from retroreflective sheeting mounted on a substrate and installed on a post and thus are more like a sign than a marking, and most public agencies handle object markers as signs rather than markings.

30. The FHWA proposes to delete the recommendation that signs should only be used where justified by engineering studies or judgment from several places in Part 2. The FHWA proposes this change because it is not the intent of the Manual to make all sign device installations subject to engineering oversight. The FHWA understands that most signs are installed by sign crews authorized to make field decisions that are not necessarily reviewed by engineers or covered by policies prepared by engineers. These proposed revisions recognize the current practice of installing signs throughout the country and do not detract from the requirements that engineering studies must be done under engineering supervision for very specific traffic

control decisions. However, at the same time it is not required that an engineer be involved in the decisions for each device at every location.

31. The FHWA proposes to update the existing sign size Tables 2B-1 and 2I-1 (new Table 2K-1) to reflect proposed new signs, deleted signs, and changes to sign sizes. The FHWA proposes to modify Table 2C-2 from its general treatment of warning sign sizes to instead specifically address each sign similarly to the way it is done in Table 2B-1. Additionally, the FHWA proposes to add sign size Tables 2D-1, 2E-1, 2F-1, and 2I-1 to specify the sizes for guide and motorist information signs that have a standardized legend.

In Chapters 2B and 2C, the FHWA proposes to add to the appropriate OPTION statements that the minimum overall sign size may be decreased for signs in alleys with restrictive physical condition and vehicle usage that limits installation of the minimum size sign. The FHWA proposes this change to reflect the results of the FHWA MUTCD Urbanization Needs Survey,<sup>8</sup> which included comments from a number of city traffic engineers that the MUTCD does not adequately address sign sizes and application for alley installations.

32. The FHWA proposes to eliminate the option of all uppercase letters for names of places, streets, and highways, and require that these names be composed of lowercase letters with an initial uppercase letter. The FHWA proposes this change, which affects provisions and figures in various chapters throughout Part 2, based on Older Driver research documented in FHWA reports<sup>9</sup> (referred to hereafter as the "Older Driver handbook") that shows significant legibility and recognition distance benefits versus all uppercase letters for destinations. The FHWA proposes a phase-in compliance period of 15 years for existing signs in

<sup>8</sup> "Urbanizing the MUTCD," by W. Scott Wainwright, 2003, paper no. CB03C184, Compendium of Papers for the 2003 Institute of Transportation Engineers Technical Conference, is available from the Institute of Transportation Engineers (Web site: <http://www.ite.org>). A presentation based on the paper can be viewed at the following Internet Web site: [http://tcd.tamu.edu/Documents/FHWA/MUTCD\\_Urbanization.ppt](http://tcd.tamu.edu/Documents/FHWA/MUTCD_Urbanization.ppt).

<sup>9</sup> "Highway Design Handbook for Older Drivers and Pedestrians," FHWA Report no. FHWA-RD-01-103, May, 2001, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01103/coverfront.htm>. Also see Recommendation II.A(2) in "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians," FHWA Report no. FHWA-RD-01-051, May, 2001, which can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01105/cover.htm>.

<sup>7</sup> The Manual of Uniform Traffic Control Devices for Canada, 4th Edition, is available for purchase from the Transportation Association of Canada, 2323 St. Laurent Boulevard, Ottawa, Ontario K1G 4J8 Canada, Web site <http://www.tac-atc.ca>.

good condition to minimize any impact on State or local highway agencies.

33. In Chapters 2A and 2E, the FHWA also proposes to discourage the use of punctuation, apostrophes, questions marks or other characters on signs that are not letters or numerals unless absolutely necessary to avoid confusion. The FHWA proposes these changes for consistency with a similar proposed change in Section 1A.14 (new Section 1A.15).

#### Discussion of Proposed Amendments Within Chapter 2A

34. In Section 2A.01 Function and Purpose of Signs, the FHWA proposes to clarify the definition of "special purpose road" in item D of the STANDARD statement by deleting the phrase "or that provides local access," because the existing definition is overly broad. FHWA intends to clarify that neighborhood residential streets are not special-purpose roads and signing for such streets should be the same as that for other conventional roads.

35. In Section 2A.06 Design of Signs, the FHWA proposes to relocate a STANDARD paragraph regarding symbols on signs, and its associated OPTION paragraph, from Section 1A.03 to this section. The FHWA proposes this change because Section 2A.06 is the most likely place for a reader to look for information regarding sign design.

In addition, the FHWA proposes to add information regarding the use of e-mail addresses to the last STANDARD and OPTION statements. The use of e-mail addresses on signs is to be the same as Internet Web site addresses. E-mail addresses are just as difficult to read and remember as Internet Web site addresses and constitute the same issues for a driver traveling at highway speeds. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

36. The FHWA proposes to relocate the information in existing Section 2A.07 to proposed new Chapter 2M in order to consolidate all information on changeable message signs into one chapter. The FHWA would renumber the remaining sections accordingly.

37. In existing Section 2A.08 (new Section 2A.07) Retroreflectivity and Illumination, the FHWA proposes to revise the GUIDANCE statement to clarify that overhead sign installations on freeways and expressways should be illuminated unless an engineering study shows that retroreflection will perform effectively without illumination, and that overhead sign installations on conventional or special purpose roads

should be illuminated unless engineering judgment indicates that retroreflection will perform effectively without illumination. The FHWA proposes this change because the current language implies that written documentation (engineering study) is mandatory for the practitioner to decide that illumination is not needed for signs on conventional roads. The FHWA believes that such documentation is not necessary and therefore the FHWA proposes to recommend that engineering judgment be used rather than require an engineering study. Overhead sign installations such as street name signs, lane use signs, and other smaller sign installations on conventional roads generally would not warrant overhead lighting and may be impractical for structural reasons. Many overhead sign installations on conventional roads are on monotube structures that are not designed to support overhead lighting.

The FHWA also proposes to add a paragraph to the last STANDARD statement to prohibit the use of individual LED pixels and groups of LEDs within the background area of a sign, except for the STOP/SLOW paddles used by flaggers and the STOP paddles used by adult crossing guards. The FHWA's intent is to clarify that LEDs are to be used only in the border or in the legend/symbol and not in the background of signs.

38. In existing Section 2A.11 (new Section 2A.10) Sign Colors, the FHWA proposes to add an OPTION statement that allows the use of fluorescent colors when the corresponding color is required. The FHWA proposes this change in order to give jurisdictions the flexibility to use fluorescent colors when they determine that they are needed in order to attract additional attention to the signs. As part of this proposal, FHWA proposes to revise the color specifications in title 23 of the Code of Federal Regulations, part 655, appendix to subpart F, Tables 3, 3A, and 4 to add the fluorescent version of the color red. The color specifications for fluorescent yellow, fluorescent orange and fluorescent pink are already included in 23 CFR 655. The FHWA has reviewed color properties of the fluorescent red signing and materials available from a variety of manufacturers and proposes to add daytime color coordinates and luminance factors for fluorescent red retroreflective sign material (Tables 3 and 3A), and add nighttime color coordinates for fluorescent red retroreflective sign material (Table 4). The proposed values for fluorescent red in the tables are as indicated below:

TABLE 3.—DAYTIME CHROMATICITY COORDINATES FOR FLUORESCENT RED RETROREFLECTIVE SIGN MATERIAL

x	y
0.666 .....	0.334
0.613 .....	0.333
0.671 .....	0.275
0.735 .....	0.265

TABLE 3A.—DAYTIME LUMINANCE FACTORS FOR FLUORESCENT RED RETROREFLECTIVE SIGN MATERIAL

Minimum	Maximum	Y <sub>F</sub>
20 .....	30	15

TABLE 4.—NIGHTTIME CHROMATICITY COORDINATES FOR FLUORESCENT RED RETROREFLECTIVE SIGN MATERIAL

x	y
0.680 .....	0.320
0.645 .....	0.320
0.712 .....	0.253
0.735 .....	0.265

The FHWA has also reviewed the existing daytime color coordinates for fluorescent pink retroreflective sign materials and believes that these coordinates are overly restrictive for current technology. The FHWA proposes to revise the color coordinates in Table 3 for fluorescent pink, to include a fifth pair of x and y coordinates, to better define the color of fluorescent pink sign sheeting material. The proposed values for fluorescent pink in Table 3 are as follows:

TABLE 3.—DAYTIME CHROMATICITY COORDINATES FOR FLUORESCENT PINK RETROREFLECTIVE SIGN MATERIAL

x	y
Exist. 0.450 Prop. 0.600.	Exist. 0.270 Prop. 0.340
Exist. 0.590 Prop. 0.450.	Exist. 0.350 Prop. 0.332
Exist. 0.644 Prop. 0.430.	Exist. 0.290 Prop. 0.275
Exist. 0.563 Prop. 0.536.	Exist. 0.230 Prop. 0.230
Exist.—Prop. 0.644 ...	Exist.;— Prop. 0.290

39. The FHWA proposes to make several changes to Table 2A–4 Common Uses of Sign Colors, to correspond to proposed changes in the text. Specifically, the FHWA proposes to add the color purple for Electronic Toll

Collection signs and to remove the use of the color yellow from school signs. The FHWA also proposes to add additional types of Changeable Message Signs and expand the table to include various legend and background colors for those signs, consistent with the proposed text of proposed new Chapter 2M as discussed below. In addition, the FHWA proposes to note that fluorescent versions of orange, red, and yellow background colors may be used.

40. In existing Section 2A.12 (new Section 2A.11) Dimensions, the FHWA proposes to add new provisions to the STANDARD and GUIDANCE statements regarding the appropriate use of the various columns in the Tables throughout the MUTCD that describe sizes for signs on various classes of roads. The FHWA proposes this new language to clarify how the columns in the sign size tables are intended to be used. The FHWA also proposes adding language in each of the sections throughout the MUTCD that refer to a sign size table, to refer back to this generally applicable text in existing Section 2A.11 (new Section 2A.12), and to delete repetitive text on use of the various columns in the size tables that appears in other sections throughout the MUTCD.

41. In existing Section 2A.13 (new Section 2A.12) Symbols, the FHWA proposes to add a STANDARD statement and a corresponding OPTION statement at the end of the section prohibiting the use of symbols from one type of sign on a different type of sign, except in limited circumstances or as specifically authorized in the MUTCD. The FHWA proposes this change because the colors and shapes of symbols are designed to have a specific impact depending on the intended use of that type of sign. Intermixing symbols from one type of sign to a different type of sign may not have the same impact and may be potentially confusing, and therefore should be specifically prohibited. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

42. In existing Section 2A.14 (new Section 2A.13) Word Messages, the FHWA proposes to revise the first GUIDANCE statement to recommend that the minimum specific ratio for letter height should be 22 mm (1 in) of letter height per 9 m (30 ft) of legibility distance. In conjunction with this proposed change, the FHWA proposes to delete the SUPPORT statement that follows this first GUIDANCE statement. The FHWA proposes these changes in order to be consistent with

recommendations from the Older Driver handbook<sup>10</sup> that sign legibility be based on 20/40 vision. Most States allow drivers with 20/40 corrected vision to obtain driver's licenses, and with the increasing numbers of older drivers the FHWA believes that 20/40 vision should be the basis of letter heights used on signs. This proposed change will generally not impact the design of guide signs because existing MUTCD provisions for guide sign letter heights provide sufficient legibility distances for 20/40 vision in most cases. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies. The sizes of some regulatory and warning signs used in some situations will need to be increased to provide for larger letter sizes. Specific changes to sign sizes resulting from the proposed change in Section 2A.14 are discussed below in the items pertaining to the sign size tables in other Chapters in Part 2 and in certain other Parts of the MUTCD.

43. In existing Section 2A.15 (new Section 2A.14) Sign Borders, the FHWA proposes to clarify the GUIDANCE statement to indicate that the corner and border radii on signs should be concentric with one another. The FHWA proposes this clarification to better facilitate the use of sign fabrication software with inset borders.

44. The FHWA proposes adding a new section following existing Section 2A.15 (new Section 2A.14) Sign Borders. The proposed new section is numbered and titled "Section 2A.15 Enhanced Conspicuity for Standard Signs" and contains an OPTION statement regarding the methods that may be used to enhance the conspicuity of standard regulatory, warning, or guide signs and a STANDARD statement prohibiting the use of strobe lights as a sign conspicuity enhancement method. The various conspicuity enhancement methods proposed reflect widespread and successful practices by State and local agencies. The FHWA proposes this new section to provide improved uniformity of such treatments to benefit road users. The remaining sections in Chapter 2A would be renumbered accordingly.

<sup>10</sup> "Highway Design Handbook for Older Drivers and Pedestrians," FHWA Report no. FHWA-RD-01-103, May, 2001, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01103/coverfront.htm>. Also see recommendation number II.A(1) in "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians," FHWA Report no. FHWA-RD-01-051, May, 2001, which can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01105/cover.htm>.

45. In existing Section 2A.16 Standardization of Location, the FHWA proposes to add to the first GUIDANCE an additional recommended criterion for locating signs where they do not obscure the sight distance to approaching vehicles on a major street for drivers who are stopped on minor-street approaches. The FHWA proposes this change to reflect good engineering practice and improve safety.

The FHWA also proposes to add to the 3rd GUIDANCE statement that the placement of wayfinding and acknowledgment guide signs should have a lower priority than other guide signs. The FHWA proposes this change to clarify the priority of sign type placement, reflecting the proposed addition to the manual of new types of guide signs.

The FHWA also proposes to add a paragraph to the last GUIDANCE statement to provide recommendations on the placement of STOP and YIELD signs at intersections, to clarify that the dimension shown in Figure 2A-3 for the maximum distance of STOP or YIELD signs from the edge of pavement of the intersected roadway is GUIDANCE.

46. In Section 2A.18 Mounting Height, the FHWA proposes to change the first SUPPORT statement to a STANDARD to require that the provisions of this section apply to all signs and object markers, unless specifically stated otherwise elsewhere in the Manual. The FHWA proposes this change to emphasize that the mounting heights in this section are mandatory, particularly as they relate to pedestrian considerations.

The FHWA also proposes to add a SUPPORT statement that refers the reader to Chapter 2L for mounting heights for object markers and clarifies that the minimum heights given in combination with crashworthy supports may not necessarily constitute a crashworthy sign assembly. The FHWA proposes this new text to provide readers with the appropriate references to materials with additional information on mounting heights and crashworthiness.

In addition to reorganizing the text within the STANDARD statements in this section, the FHWA proposes to clarify that mounting heights should be measured vertically from the bottom of the sign to the level of the near edge of the pavement. The FHWA also proposes to add text to clarify that a minimum height of 2.1 m (7 ft) is to be used for signs installed at the side of the road in business, commercial, or residential areas where parking or pedestrian movements are likely to occur, or where the view of the sign might be obstructed,

or where signs are installed above sidewalks. In concert with these changes, the FHWA proposes to add a GUIDANCE statement recommending that a sign not project more than 100 mm (4 in) into a pedestrian facility if the bottom of a secondary sign that is mounted below another sign, is mounted lower than 2.1 m (7 ft). The FHWA proposes these changes in order to make the mounting height language consistent throughout the Manual, and to add language that requires consideration of pedestrian activity in the vicinity of signs, per ADAAG provisions.<sup>11</sup>

Finally, the FHWA proposes to add to the new third STANDARD statement that where large signs are installed on multiple breakaway posts, the clearance from the ground to the bottom of the sign shall be at least 2.1 m (7 ft), in order to provide consistency with other parts of the Manual.

47. In Section 2A.19 Lateral Offset, the FHWA proposes to add a GUIDANCE statement that overhead sign supports and post-mounted sign and object marker supports should not intrude into the usable width of a sidewalk or other pedestrian facility. The FHWA proposes this new text to comply with ADAAG provisions.<sup>12</sup>

#### Discussion of Proposed Amendments Within Chapter 2B

48. In Section 2B.02 Design of Regulatory Signs, the FHWA proposes changing the first SUPPORT statement to a STANDARD statement to clarify that regulatory signs are rectangular unless specifically designated otherwise. As part of this change, the FHWA also proposes adding a reference to the Standard Highway Signs and Markings<sup>13</sup> book for sign design elements.

The FHWA also proposes relocating the first two paragraphs of existing Section 2B.54 to a new OPTION statement in Section 2B.02, because the paragraphs contain information about regulatory word messages and symbols which is more relevant in this section.

49. In Section 2B.03 Size of Regulatory Signs, the FHWA proposes to add a new STANDARD statement at the end of the section that requires that

<sup>11</sup> The Americans With Disabilities Accessibility Guidelines (ADAAG) can be viewed at the following Internet Web site: <http://www.access-board.gov/ada-aba/index.htm>.

<sup>12</sup> The Americans With Disabilities Accessibility Guidelines (ADAAG) can be viewed at the following Internet Web site: <http://www.access-board.gov/ada-aba/index.htm>.

<sup>13</sup> The current edition of "Standard Highway Signs and Markings," FHWA, 2004 Edition, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/ser-shs\\_millennium.htm](http://mutcd.fhwa.dot.gov/ser-shs_millennium.htm).



minimum sizes for certain regulatory signs facing traffic on multi-lane conventional roads shall be as shown on Table 2B-2, and requiring a specific minimum size for STOP signs that face multi-lane approaches. The FHWA proposes this new text and table to provide signs on multi-lane approaches that are more visible and legible to drivers with visual acuity of 20/40. On multi-lane roads, increased legibility distances are also needed due to the potential blockage of signs by other vehicles. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

50. The FHWA proposes to make several changes to Table 2B-1 Regulatory Sign and Plaque Sizes. These proposed changes include adding more sizes in the "Minimum" column for use in low speed environments. The FHWA also proposes to add several more signs and supplemental plaques to the table to correspond with other proposed changes within Part 2.

51. The FHWA proposes to add a new section following Section 2B.03 numbered and titled, "Section 2B.04 Right-of-Way at Intersections." This proposed new section contains information currently contained in Section 2B.05. In addition, the FHWA proposes additional recommendations on the factors that should be considered in establishing intersection control and the use of STOP and YIELD signs. The proposed additional guidance is intended to provide a more logical progression from least restrictive to more restrictive controls.

The FHWA also proposes to include a STANDARD statement that prohibits the use of STOP and YIELD signs in conjunction with other traffic control signal operation, except for the cases specified in the STANDARD. While much of this information is in existing Section 2B.05, the FHWA proposes to add a specific case regarding channelized turn lanes to the list of cases where STOP or YIELD signs can be used, reflecting common practice.

Finally, the FHWA proposes to include requirements for the use of folding STOP signs for traffic signal power outages by adding language to the MUTCD that corresponds to Official Interpretation #2-545.<sup>14</sup>

52. The FHWA proposes to renumber and retitling existing Section 2B.04 to "Section 2B.05 STOP Sign and

Supplemental Plaques." As part of this change, the FHWA proposes to require the use of the ALL-WAY supplemental plaque if all intersection approaches are controlled by STOP signs, to limit the use of the ALL-WAY plaque to only those locations where all intersection approaches are controlled by STOP signs, and to prohibit the use of supplemental plaques with the legend 2-WAY, 3-WAY, 4-WAY, etc. below STOP signs. The FHWA proposes these changes to provide uniformity in the use of supplemental plaques with STOP signs, especially at locations where all approaches are controlled by STOP signs.

The FHWA proposes to add a GUIDANCE statement recommending the use of plaques with appropriate alternate messages, such as TRAFFIC FROM RIGHT DOES NOT STOP, where STOP signs control all but one approach to the intersection. The FHWA proposes this change to encourage the use of these plaques at intersections that need increased driver awareness regarding an unexpected right-of-way control.

Finally, the FHWA proposes to add an OPTION allowing the use of a proposed new EXCEPT RIGHT TURN (R1-10P) plaque mounted below a STOP sign when an engineering study determines that a special combination of geometry and traffic volumes is present that makes it possible for right-turning traffic on the approach to be permitted to enter the intersection without stopping. The FHWA proposes this change to give agencies flexibility in establishing right-of-way controls for such special conditions. The Sign Synthesis Study<sup>15</sup> found that at least 12 States have developed 7 different sign messages for this purpose. The FHWA proposes the uniform use of the simplest, most accurate legend.

53. The FHWA proposes to relocate much of the information in existing Section 2B.05 (new Section 2B.06) STOP Sign Applications to the proposed new Section 2B.04. The FHWA also proposes to add additional language to the remaining GUIDANCE statement that lists conditions under which the use of a STOP sign should be considered. This change would provide agencies with specific and quantitative guidance regarding the use of STOP signs.

54. The FHWA proposes to delete existing Section 2B.06 STOP Sign Placement from the MUTCD, because most of the text in this section is

proposed to be incorporated into Section 2B.10.

55. In Section 2B.09 YIELD Sign Applications, the FHWA proposes to clarify the STANDARD statement by adding that YIELD signs at roundabouts shall be used to control the approach roadways and shall not be used to control the circular roadway. The FHWA proposes this change to provide uniformity in signing at roundabouts and to reflect the prevailing practices of modern roundabout design.

56. The FHWA proposes to retitling Section 2B.10 to "STOP Sign or YIELD Sign Placement" to reflect the relocation of language regarding STOP sign placement from existing Section 2B.06 to this section.

The FHWA proposes to delete the requirement from the first STANDARD statement that YIELD signs be placed on both the left and right sides of approaches to roundabouts with more than one lane and instead make this a recommendation in a GUIDANCE statement near the end of the Section. In concert with this change, the FHWA proposes to add an OPTION allowing similar placement of a YIELD sign on the left-hand side of a single lane roundabout approach if a raised splitter island is available. The FHWA proposes these changes to reflect current practice on signing roundabout approaches and to allow agencies additional flexibility.

The FHWA also proposes to add to the first STANDARD statement that no items other than retroreflective strips on the supports, official traffic control signs, sign installation dates, or several other inventory-type items shall be mounted on the fronts or backs of STOP or YIELD signs or on their supports. In conjunction with this proposed change, the FHWA proposes to clarify the first GUIDANCE statement to indicate that a sign that is mounted back-to-back with a STOP or YIELD sign should stay within the edges of the STOP or YIELD sign, and that if needed, the size of the STOP or YIELD sign should be increased to accomplish this recommendation. The FHWA proposes these changes to clarify the language that resulted in confusion amongst some practitioners regarding the placement of messages on the back of STOP and YIELD signs and to assure that the shape of these critical intersection right-of-way signs can be discerned from the opposite direction of approach. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies. This proposed new phase-in compliance period would supersede the existing phase-in compliance period (for existing

<sup>14</sup> FHWA's Official Interpretation #2-545, April 9, 2004, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interpretations/pdf/2\\_545.pdf](http://mutcd.fhwa.dot.gov/resources/interpretations/pdf/2_545.pdf).

<sup>15</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 18, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis\\_Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis_Final_Dec2005.pdf).

Sections 2B.06 and 2B.10) of 10 years from the effective date of the Final Rule for the 2003 edition, or December 20, 2013.

The FHWA proposes to add a STANDARD statement at the end of the section prohibiting the placement of two STOP signs or two YIELD signs on the same support facing the same direction. The FHWA proposes this change to prohibit this practice, because it is potentially confusing and not an acceptable method of adding emphasis.

57. The FHWA proposes to retitle Section 2B.11 to "Yield Here to Pedestrians Signs and Stop Here for Pedestrians Signs" to reflect additional language that FHWA also proposes to add to this section regarding the use of Stop Here for Pedestrians Signs. The proposed new language would be consistent with similar language proposed in Part 7 regarding the placement of these signs, as well as stop and yield lines. The FHWA proposes adding the Stop Here for Pedestrians sign because some State laws require motorists to come to a full stop for, rather than yield to, pedestrians in a crosswalk.

In addition, the FHWA proposes to add STANDARD and OPTION statements at the end of the section regarding the combination use of Pedestrian Crossing warning (W11-2) signs with the Yield Here to (Stop Here for) Pedestrian (R1-5 series) sign. The FHWA proposes these additions to allow Pedestrian Crossing signs to be mounted overhead but not post-mounted where Yield Here to (Stop Here for) signs have been installed. The FHWA also proposes to allow the use of advance Pedestrian Crossing (W11-2) signs on the approach with AHEAD or distance plaques and In-Street Pedestrian Crossing signs at the crosswalk where Yield Here to (Stop Here for) Pedestrian signs have been installed. The FHWA proposes this new language to be consistent with similar language proposed in Part 7, which is based on FHWA's Official Interpretation #2-566.<sup>16</sup>

58. In Section 2B.12 In-Street and Overhead Pedestrian Crossing Signs, the FHWA proposes to add STANDARD, GUIDANCE and OPTION statements regarding the use of a proposed new Overhead Pedestrian Crossing (R1-9 or R1-9a) sign that may be used to remind road users of laws regarding right-of-way at an unsignalized pedestrian crosswalk. The FHWA proposes to add

this sign based on the Sign Synthesis Study,<sup>17</sup> which revealed that some agencies use an overhead sign, because it is needed in some applications. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies. The FHWA proposes to add this sign to Table 2B-1, Figure 2B-2 and to the appropriate text and figures in Part 7, for consistency.

The FHWA also proposes to insert new GUIDANCE and OPTION statements between the first OPTION and GUIDANCE statements regarding conditions and criteria to be used in determining when In-Street Pedestrian Crossing signs should be used at unsignalized intersections. The FHWA proposes these additional statements to provide for more uniform application of these signs and discourage over-use.

The FHWA also proposes to add a STANDARD statement restricting the placement of the In-Street Pedestrian Crossing sign to the roadway at the crosswalk location on the center line, on a lane line, or on a median island. In concert with this change, the FHWA proposes to add an OPTION statement permitting the W11-2 sign with downward sloping arrow to be post-mounted on the right-hand side of the street if the Pedestrian Crossing (W11-2) warning sign is used in combination with the In-Street Pedestrian Crossing sign. The FHWA proposes this new text to be consistent with similar language proposed in Part 7, which is based on FHWA's Official Interpretation # 7-64(1).<sup>18</sup>

In addition, FHWA proposes to revise the existing first STANDARD statement by specifying that the In-Street Pedestrian Crossing sign shall have a black legend and border on a white background, surrounded by an outer fluorescent yellow-green background area, or by an outer fluorescent yellow background area. FHWA proposes this change to clarify how the sign is to be designed and to allow the alternate color of fluorescent yellow.

The FHWA also proposes to revise the 4th paragraph of this STANDARD statement to indicate that unless an In-Street Pedestrian Crossing sign is placed on a physical island, it is to be designed to bend over and then bounce back to

its normal vertical position when struck by a vehicle. The FHWA proposes this change because while all signs must be crashworthy, these in-street signs need to have special supports to minimize damage to vehicles and injuries to pedestrians if the signs are struck by a passing vehicle. The FHWA proposes a phase-in compliance period of 5 years for existing signs in good condition to minimize any impact on State or local highway agencies.

Finally, the FHWA also proposes to add a STANDARD statement prior to the last OPTION statement that provides requirements on the mounting heights for In-Street Pedestrian Crossing signs. The FHWA proposes this new STANDARD statement to preclude incorrect mounting of this sign when it is on an island.

59. In Section 2B.13 Speed Limit Sign, the FHWA proposes to add to the STANDARD statement that speed zones (other than statutory speed limits) shall only be established on the basis of an engineering study that includes an analysis of the current speed distribution of free-flowing vehicles. The FHWA proposes this change to clarify that consideration is to be given to the free-flow speed when determining altered speed zones, and to clarify that statutorily established speed limits, such as those typically established by State laws setting statewide maximum limits for various classes of roads, do not require an engineering study. The FHWA also proposes adding a new SUPPORT statement to provide additional information about the difference between a statutory speed limit and an altered speed zone.

In addition, the FHWA proposes relocating and incorporating the material from existing Section 2B.18 Location of Speed Limit Signs, to this section. The FHWA proposes this change in order to place material regarding the Speed Limit sign in one section for better clarity and flow.

The FHWA also proposes to add a new OPTION statement that permits the use of several new plaques (R2-5P series) to be mounted with the Speed Limit Sign when a jurisdiction has a policy of installing speed limit signs only on the streets that enter from a jurisdictional boundary or from a higher speed street to indicate that the speed limit is applicable to the entire city, neighborhood, or residential area unless otherwise posted. The FHWA proposes this change to reflect common practice in some urban areas, as documented by the Sign Synthesis Study,<sup>19</sup> and because

<sup>16</sup> FHWA's Official Interpretation #2-566, July 27, 2005, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interpretations/2\\_566.htm](http://mutcd.fhwa.dot.gov/resources/interpretations/2_566.htm).

<sup>17</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 19, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>18</sup> FHWA's Official Interpretation #7-64(1), July 23, 2004, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interpretations/7\\_64.htm](http://mutcd.fhwa.dot.gov/resources/interpretations/7_64.htm).

<sup>19</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, pages 19-20, can be

it is often unnecessary and overly costly to install a speed limit sign on every minor residential street.

The FHWA also proposes adding a new paragraph to the first GUIDANCE statement to recommend that a Reduced Speed Limit Ahead sign be used where the speed limit is being reduced by more than 20 km/h or 10 mph, or where engineering judgment indicates the need for advance notice. The FHWA proposes this change in order to provide consistency with the recommendations contained in Chapter 2C.

60. The FHWA proposes relocating all of the text from existing Section 2B.18 Location of Speed Limit Sign to Section 2B.13 Speed Limit Sign. (See item 59 above.)

61. In existing Section 2B.19 (new Section 2B.18) the FHWA proposes to change the title to "Movement Prohibition Signs" to incorporate the inclusion of the proposed new No Straight Through (R3-27) sign in the GUIDANCE statement in this section. The symbolic No Straight Through sign is most commonly used for traffic restrictions associated with traffic calming programs. The sign is useful at intersections having four approaches, where the through movement to be prohibited is onto a street or road that does not have a "Do Not Enter" condition, such as when 90-degree turns into the roadway are allowed, but the straight ahead movement into the roadway is prohibited. This proposed new sign uses the standard Canadian MUTCD RB-10 sign as the basis of the design. The FHWA proposes to add an illustration of this new sign to Figure 2B-3.

The FHWA also proposes changing the first paragraph of the 2nd OPTION statement regarding the use of Turn Prohibition Signs adjacent to signal heads to a GUIDANCE statement. For conspicuity reasons, these signs should be mounted near the appropriate signal face, and this reflects typical practice. Therefore, the FHWA proposes to change this to a recommended practice rather than an option.

Additionally, the FHWA proposes adding new STANDARD and SUPPORT statements at the end of this section to prohibit the use of No Left Turn, No U-Turn, and combination No U-Turn/No Left Turn signs at roundabouts in order to prohibit drivers from turning left onto the circular roadway of a roundabout. The proposed language also indicates that ONE WAY and/or Roundabout Directional Arrow signs are the

appropriate signs to indicate the travel direction for this condition. The FHWA proposes these changes to provide uniformity in signing at roundabouts and to reduce the possibility of confusion for drivers who intend to turn left by circumnavigating the roundabout.

62. In existing Section 2B.20 (new Section 2B.19) Intersection Lane Control Signs, the FHWA proposes to add to the GUIDANCE statement that overhead lane control signs should be installed over the appropriate lanes on signalized approaches where lane drops, multiple-lane turns with shared through-and-turn lanes, or other lane-use controls that would be unexpected by unfamiliar road users are present. The FHWA proposes this change to be consistent with proposed changes in Part 4 and to enhance safety and efficiency by providing for more effective signing for these potentially confusing situations. The FHWA proposes a phase-in compliance period of 10 years for existing locations to minimize any impact on State or local highway agencies.

The FHWA also proposes to add a paragraph at the end of the OPTION statement regarding the types of arrows that may be used on Intersection Lane Control signs at roundabouts. The FHWA also proposes to add a new figure numbered and titled "Figure 2B-5 Intersection Lane Control Sign Arrow Options for Roundabouts" illustrating the signs. The FHWA proposes to add this information to reflect current practice for roundabout signing and to correspond with similar options proposed for pavement marking arrows on roundabout approaches in Part 3.

63. In existing Section 2B.21 (new Section 2B.20) Mandatory Movement Lane Control Signs, the FHWA proposes to revise the first paragraph of the STANDARD statement to clarify that Mandatory Movement Lane Use Control signs shall indicate only the single vehicle movement that is required from each lane, and to clarify the placement of the signs. The FHWA also proposes to add that where three or more lanes are available to through traffic and Mandatory Movement Lane Control symbol signs are used, these shall be mounted overhead. The FHWA proposes these changes for consistency with existing Section 2B.22 (new Section 2B.21).

The FHWA also proposes to add an OPTION statement at the end of this section describing the optional use of the proposed new BEGIN RIGHT TURN LANE (R3-20R) and BEGIN LEFT TURN LANE (R3-20L) signs at the upstream ends of mandatory turn lanes. The

FHWA proposes this change to give agencies flexibility to use these proposed new signs to designate the beginning of mandatory turn lanes where needed for enforcement purposes.

64. In existing Section 2B.22 (new Section 2B.21) Optional Movement Lane Control Sign, the FHWA proposes to revise the STANDARD statement to clarify that, if used, Optional Movement Lane Control signs shall be located in advance of and/or at the intersection where the lane controls apply. This proposed change also provides consistency with existing Section 2B.21 (new Section 2B.20) regarding placement of Movement Lane Control Signs.

The FHWA also proposes to add a STANDARD statement at the end of the section prohibiting the use of the word message only when more than one movement is permitted from a lane. The FHWA proposes this change to be consistent with other requirements in the MUTCD regarding the use of the term ONLY for lane use.

65. In existing Section 2B.23 (new Section 2B.22) Advance Intersection Lane Control Signs, the FHWA proposes to add a STANDARD at the end of the section prohibiting the overhead placement of Advance Intersection Lane Control (R3-8) signs where the number of lanes available to through traffic on an approach is three or more. In such cases, overhead R3-5 signs are used. The FHWA proposes this change to be consistent with existing Section 2B.20 (new Section 2B.19).

66. The FHWA proposes adding a new section following new Section 2B.22 (existing Section 2B.23). The new section is numbered and titled, "Section 2B.23 RIGHT (LEFT) LANE MUST EXIT Sign." This proposed new section contains an OPTION statement describing the use of this sign for a lane of a freeway or expressway that is approaching a grade-separated interchange where traffic in the lane is required to depart the roadway onto the exit ramp at the next interchange. As documented in the Sign Synthesis Study,<sup>20</sup> at least 12 States currently use this type of regulatory sign for freeway lane drop situations to establish the "must exit" regulation and make it enforceable where warning signs and markings alone have proven ineffective. (The overhead "Exit Only" plaque on

<sup>20</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 22, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis\\_Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis_Final_Dec2005.pdf)

guide signs is yellow and is a warning message.)

67. The FHWA proposes editorial and organizational changes to existing Sections 2B.26 through 2B.28 to improve the consistency and flow of information and improve its usability by readers. These proposed changes involve relocating paragraphs within and between these sections and reorganizing the text into five sections. The sections are numbered and titled, "Section 2B.26 Regulatory Signs for Preferential Lanes—General," "Section 2B.27 Preferential Lanes Vehicle Occupancy Definition Signs," "Section 2B.28 Preferential Lane Periods of Operation Signs," "Section 2B.29 Preferential Lane Ahead Signs," and "Section 2B.30 Preferential Lane Ends Signs." As a part of this change, the FHWA proposes adding STANDARD, GUIDANCE, OPTION, and SUPPORT statements regarding regulatory signing for lanes that are restricted to Electronic Toll Collection only, as a form of preferential lane, to provide consistency in regulatory signing for this increasingly used management strategy, and regarding mounting of preferential lane regulatory signs where lateral clearance is limited, to reflect existing practices. The FHWA also proposes removing text from existing Section 2B.27 regarding the establishment and revision of high occupancy vehicle (HOV) lane operations that is not directly related to traffic control devices but is programmatic in nature, and instead refer to an FHWA program guidance document that contains this information.

68. The FHWA proposes to add several new sign images and to revise several existing sign images in existing Figure 2B-7 (new Figure 2B-8) Examples of Preferential Lane Regulatory Signs that illustrate the various regulatory signs used to designate HOV and bus preferential lanes, to reflect state of the practice for improved conspicuity and legibility of Preferential Lane regulatory signs for HOV Lanes, and to reflect recent FHWA policy guidance on traffic control devices for preferential lane facilities.<sup>21</sup>

69. The FHWA proposes to add two sections that further describe regulatory signing at toll plazas and for managed lanes. The proposed sections are numbered and titled, "Section 2B.31 Regulatory Signs for Toll Plazas" and "Section 2B.32 Regulatory Signs for Managed Lanes and ETC Only Lanes."

<sup>21</sup> This August 3, 2007 FHWA policy memorandum can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/policy/tcdpflmemo/preferen\\_lanes\\_tcd.pdf](http://mutcd.fhwa.dot.gov/resources/policy/tcdpflmemo/preferen_lanes_tcd.pdf).

The FHWA proposes these new sections in order to provide consistency and uniformity in signing practices for these types of facilities, which are becoming increasingly common and for which uniform signing provisions are not currently contained in the MUTCD. The proposed provisions generally reflect available guidance such as the Toll Plaza Best Practices and Recommendations report<sup>22</sup> and various FHWA publications on managed lanes.<sup>23</sup> As a part of these changes, new symbols that denote exact change and attended lanes are proposed for use in toll plaza signing in order to help road users more quickly identify the proper lane(s) to choose for the type of toll payment they will use. A new symbol that denotes that a toll facility's ETC payment system is nationally interoperable with all other ETC payment systems is also proposed for future use as this interoperability is anticipated to become available in the next few years. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

70. The FHWA proposes to add a new section titled, "Section 2B.33 Jughandle Signs." The new section contains SUPPORT, STANDARD, and OPTION statements regarding the use of regulatory signs for jughandles. Regulatory signing for jughandles is critical because the geometry typically requires left turns and U-turns to be made via a right turn, either in advance of or beyond the intersection, and this is contrary to normal driver expectations. The Sign Synthesis Study<sup>24</sup> found that jughandles are currently in common use in at least six States and the FHWA believes that jughandles are likely to see increasing use in the future in more States in order to improve intersection safety and operations. Therefore, in order to provide agencies with uniform signing

<sup>22</sup> "State of the Practice and Recommendations on Traffic Control Strategies at Toll Plazas," June 2006, can be viewed at the following Internet Web site: <http://mutcd.fhwa.dot.gov/rpt/tcstoll/index.htm>.

<sup>23</sup> "Managed Lanes—A Primer," FHWA publication number FHWA-HOP-05-031, can be viewed at the following Internet Web site: [http://www.ops.fhwa.dot.gov/publications/managedlanes\\_primer/managed\\_lanes\\_primer.pdf](http://www.ops.fhwa.dot.gov/publications/managedlanes_primer/managed_lanes_primer.pdf) and "Managed Lanes—A Cross-Cutting Study," FHWA report number FHWA-HOP-05-037, November, 2004, can be viewed at the following Internet Web site: [http://ops.fhwa.dot.gov/freewaygmt/publications/managed\\_lanes/crosscuttingstudy/final3\\_05.pdf](http://ops.fhwa.dot.gov/freewaygmt/publications/managed_lanes/crosscuttingstudy/final3_05.pdf).

<sup>24</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 24, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

practices for several of the most common geometric layouts of jughandles, the FHWA proposes this new section along with several new signs and a figure to illustrate their use. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

71. In existing Section 2B.29 (new section 2B.34) Do Not Pass Sign, the FHWA proposes to introduce a new symbol sign that has been in use and well understood in Europe and Canada (the Canadian MUTCD RB-31 sign) for many decades.<sup>25</sup> The FHWA proposes to add this symbol sign due to the need to reduce the number of word message signs, increase symbolization, and promote better harmony due to globalization and increasing international travel. Because this symbol is new, the FHWA proposes to allow the use of a DO NOT PASS educational plaque with this sign. The FHWA also proposes to allow the optional continued use of the existing word message sign.

72. The FHWA proposes to add two new sections following existing Section 2B.29 (new Section 2B.34). The first new section, numbered and titled, "Section 2B.35 DO NOT PASS WHEN SOLID LINE IS ON YOUR SIDE Sign," contains an OPTION statement describing the use of this word sign. As found by the Sign Synthesis Study,<sup>26</sup> at least five States use signs to remind road users of the meaning of a solid yellow line for no-passing zones, however, there is considerable variety in the wording that is used. The term "Do No Pass" is preferable because that same terminology has been used in the R4-1 sign. "Solid Line" is preferable because it is fewer words and all center lines are yellow, so it is not necessary to state the color of the line. "On Your Side" is simpler and easier to understand than "right of center line" or "in your lane." Therefore, the FHWA proposes that the new sign have a standard message of "Do Not Pass When Solid Line Is On Your Side" in order to provide consistency and uniformity. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good

<sup>25</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 24, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>26</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 24, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

condition to minimize any impact on State or local highway agencies.

73. The second new proposed section is numbered and titled, "Section 2B.36 DO NOT DRIVE ON SHOULDER Sign and DO NOT PASS ON SHOULDER Sign" and contains an OPTION statement regarding the use of these two proposed new signs to inform road users that use of the shoulder as a travel lane or to pass other vehicles is prohibited. The FHWA proposes these two new signs because the Sign Synthesis Study<sup>27</sup> found that at least 19 States are using some version of regulatory sign to prohibit driving, turning, and/or passing on shoulders and the FHWA feels that consistent and uniform messages for these purposes should be provided to road users. The remaining sections would be renumbered accordingly.

74. The FHWA proposes to retitle existing Section 2B.31 (new Section 2B.38) "SLOWER TRAFFIC KEEP RIGHT Sign and KEEP RIGHT EXCEPT TO PASS Sign" and expand the existing OPTION and GUIDANCE statements in this section to add the proposed new KEEP RIGHT EXCEPT TO PASS sign. The Sign Synthesis Study<sup>28</sup> found that at least 19 States use a "Keep Right Except to Pass" sign to legally require vehicles to stay in the right-hand lane of a multi-lane highway except when passing a slower vehicle, and the FHWA feels that a consistent message should be provided to road users.

75. The FHWA proposes to retitle existing Section 2B.32 (new Section 2B.39) to "TRUCKS USE RIGHT LANE Sign" and revise the section to discontinue the use of the TRUCK LANE XXX FEET (R4-6) as a regulatory sign because the message is one of guidance information (distance to the start of the truck lane) rather than regulatory in nature. This is consistent with proposed changes in Chapter 2D that adds a new guide sign with this message. Also, the FHWA proposes to add an OPTION that describes the appropriate optional use of the TRUCKS USE RIGHT LANE sign on multi-lane roadways to reduce unnecessary lane changing.

76. In existing Section 2B.33 (new Section 2B.40) Keep Right and Keep Left Signs, the FHWA proposes to add a new narrow Keep Right (R4-7c) sign that

may be installed on narrow median noses where there is insufficient lateral clearance for a standard width sign. The FHWA proposes this new sign, which is only 12 inches wide rather than the standard 24 inch wide R4-7 sign, to reflect current practice in some States and to provide other agencies with the flexibility to use this sign where applicable.

77. The FHWA proposes adding three new sections following existing Section 2B.33 (new Section 2B.40). The first proposed new section is numbered and titled "Section 2B.41 STAY IN LANE Sign" and contains OPTION and GUIDANCE statements on the use of STAY IN LANE (R4-9) signs and the pavement markings that should be used with them. The second proposed new section is numbered and titled "Section 2B.42 RUNAWAY VEHICLES ONLY Sign" and contains a GUIDANCE statement regarding the use of the RUNAWAY VEHICLES ONLY Sign near truck escape ramp entrances. Both the STAY IN LANE and RUNAWAY VEHICLES ONLY signs are existing signs illustrated in existing Figure 2B-8 (new Figure 2B-13), but not described in the existing text of the MUTCD. The third proposed new section is numbered and titled, "Section 2B.43 Slow Vehicle Turn-Out Signs" and contains SUPPORT, OPTION, and STANDARD statements regarding three proposed new signs that may be used on two-lane highways where physical turn-out areas are provided for the purpose of giving a group of faster vehicles an opportunity to pass a slow-moving vehicle. As documented in the Sign Synthesis Study,<sup>29</sup> at least eight States, mostly in the west, use regulatory signs to legally require slow moving vehicles to use the turnout if a certain number of following vehicles are being impeded. Most of the eight States use similar wording on their signs, but there are some variations. The FHWA proposes a phase-in compliance period of 10 years for the use of Slow Vehicle Turn-Out signs to minimize any impact on State or local highway agencies. The FHWA proposes adding these new signs to provide for uniformity of the message. The remaining sections in Chapter 2B would be renumbered accordingly.

78. In existing Sections 2B.34 and 2B.35 (new Sections 2B.44 and 2B.45), the FHWA proposes to allow lower mounting heights for Do Not Enter and Wrong Way signs as a specific exception when an engineering study indicates

that it would address wrong-way movements at freeway/expressway entrance ramps. The FHWA proposes this exception based on recommendations from the Older Driver handbook<sup>30</sup> and positive experience in several States.

79. In existing Section 2B.36 (new Section 2B.46) Selective Exclusion Signs, the FHWA proposes to change the legend of several existing selective exclusion signs to use the word NO rather than PROHIBITED or EXCLUDED, to simplify the messages and make them easier to read from a distance. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

The FHWA also proposes to add regulatory AUTHORIZED VEHICLES ONLY and FOR OFFICIAL USE ONLY signs to the last OPTION statement to reflect current practice.

80. In existing Figure 2B-18 (new Figure 2B-29) Pedestrian Signs and Plaques, the FHWA proposes to modify the designs of the R10-3, R10-3a through R10-3e, R10-4, R10-4a, and R10-4b to include the Canadian MUTCD standard symbol for pushbuttons (in addition to the words), to begin the symbolization of the "pushbutton" message. The FHWA proposes this change to provide better harmony in North American signing design, which is needed as a result of the increased travel between the US, Canada, and Mexico resulting from NAFTA. The FHWA proposes to use this new pushbutton symbol on several signs throughout the MUTCD.

81. In existing Section 2B.37 (new Section 2B.47) ONE WAY Signs, the FHWA proposes to change the existing GUIDANCE statement to a STANDARD to require, rather than recommend, that ONE WAY signs be placed on the near right, far left, and far right corners of each intersection with the directional roadways of divided highways. The FHWA proposes a phase-in compliance period of 10 years for existing locations to minimize any impact on State or local highway agencies. The FHWA proposes to revise Figures 2B-18 through 2B-20 accordingly. In concert with this proposed change, the FHWA proposes to revise the second paragraph of the OPTION statement to clarify that agencies may omit the use of certain ONE WAY signs at intersections with

<sup>27</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 25, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>28</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 25, can be viewed at the following Internet Web site [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>29</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 25, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>30</sup> "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians," FHWA Report no. FHWA-RD-01-051, May, 2001, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/011105/cover.htm>. Recommendation ILD(4d).

medians less than 9 m (30 ft). The FHWA proposes to require the installation of ONE WAY signs to reflect recommendations from the Older Driver handbook.<sup>31</sup>

The FHWA also proposes to add two new paragraphs to the 2nd STANDARD statement to require two ONE WAY signs for each approach for T-intersections and cross intersections, one near side and one far side. The FHWA proposes this change to reflect recommendations from the Older Driver handbook.<sup>32</sup>

The FHWA also proposes to add new OPTION, GUIDANCE, and SUPPORT statements at the end of the Section regarding the use of ONE WAY signs on central islands of roundabouts. The FHWA proposes to add this text to promote consistency in signing for roundabouts.

82. The FHWA proposes to relocate the information from existing Section 2E.50 to a new section numbered and titled, "Section 2B.48 Wrong-Way Traffic Control at Interchange Ramps." The FHWA proposes this change because these types of signs are regulatory in nature, rather than guide signs. The remaining sections would be renumbered accordingly.

83. In existing Section 2B.38 (new Section 2B.49) Divided Highway Crossing Signs, the FHWA proposes to change the first OPTION statement to a STANDARD and revise the text to require the use of Divided Highway Crossing Signs for all approaches to divided highways in order to encompass recommendations from the Older Driver handbook.<sup>33</sup> As part of this proposed change, the FHWA also proposes to add an OPTION statement to allow the sign to be omitted if the divided road has average annual daily traffic less than 400 vehicles per day and a speed limit of 40 km/h (25 mph) or less.

The FHWA also proposes changing the existing 2nd OPTION statement to a STANDARD in order to require that the Divided Highway Crossing sign be located on the near right corner of the

intersection. As part of this proposed change, the FHWA also proposes to add an OPTION statement to permit the installation of an additional Divided Highway Crossing sign on the left-hand side of the approach to supplement the sign on the near right corner of the intersection. As in the previous item, these proposed changes are to implement recommendations from the Older Driver handbook. The FHWA proposes a phase-in compliance period of 10 years for the revised provisions on the use of Divided Highway Crossing signs at existing locations to minimize any impact on State or local highway agencies.

84. The FHWA proposes adding three new sections following existing Section 2B.38 (new Section 2B.49). The first proposed new section is numbered and titled "Section 2B.50 Roundabout Directional Arrow Signs (R6-4, R6-4a, and R6-4b)" and contains STANDARD, GUIDANCE and OPTION statements on the use of Roundabout Directional Arrow Signs. The second proposed new section is numbered and titled "Section 2B.51 Roundabout Circulation Sign (R6-5P)" and contains GUIDANCE and OPTION statements regarding the use of the Roundabout Circulation Sign at roundabouts and other circular intersections. The third proposed new section is numbered and titled, "Section 2B.52 Examples of Roundabout Signing" and it contains a SUPPORT statement referencing new Figures 2B-24 through 2B-26 that illustrate examples of regulatory and warning signs for roundabouts of various configurations. The proposed new SUPPORT statement also references other areas in the Manual that contain information on guide signing and pavement markings at roundabouts. The remaining sections in Chapter 2B would be renumbered accordingly. The FHWA proposes these new sections in order to add valuable information regarding regulatory and warning signs at roundabouts to the MUTCD. The use of roundabouts has increased over the past 10 years, and it is important that more detailed information on effective signing of roundabouts be included in the Manual in order to have consistency for road users throughout the country. The FHWA proposes a phase-in compliance period of 10 years for existing regulatory signs for roundabouts in good condition to minimize any impact on State or local highway agencies.

85. In existing Section 2B.40 (new Section 2B.54) Design of Parking, Standing, and Stopping Signs, the FHWA proposes several changes to the colors of the borders of parking signs. The FHWA proposes to revise the 2nd

paragraph of the first STANDARD statement to reflect that the Parking Prohibition signs R7-201a, R8-4, and R8-7 shall have a black legend and border on a white background, and the R8-3a sign shall have a black legend and border and a red circle on a white background. The FHWA proposes these changes to reflect the existing designs of these specific signs.

The FHWA also proposes changing the last paragraph of the existing GUIDANCE statement to a STANDARD to require that a VAN ACCESSIBLE plaque be installed below the R7-8 sign where parking spaces that are reserved for persons with disabilities are designated to accommodate wheelchair vans. The FHWA proposes this change to reflect Section 502.6 of the Americans With Disabilities Act.

In addition, the FHWA proposes to add a new STANDARD statement following the (new) 2nd GUIDANCE statement that specifies the required colors of the R7-8, R7-8a, and R7-8b signs, to reflect the existing sign color schemes for these signs as illustrated in existing Figure 2B-16 (new Figure 2B-27).

Finally, the FHWA proposes to add GUIDANCE and STANDARD statements prior to the last OPTION statement regarding the use of proposed new Pay for Parking and Parking Pay Station signs where a fee is charged for parking and a midblock pay station is used instead of individual parking meters. The FHWA proposes to add these signs to reflect current practice in many areas where cities and towns are replacing individual parking space meters with a "pay and display" system. The FHWA proposes a design for the fee station sign that is very similar to a standard European symbol, because the results of the Sign Synthesis Study<sup>34</sup> showed that several U.S. cities are using a sign very similar to the European design.

The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

86. In existing Section 2B.44 (new Section 2B.58) Pedestrian Crossing Signs, the FHWA proposes to add a GUIDANCE statement to recommend that No Pedestrian Crossing Signs be supplemented with detectable guidance, such as grass strips, landscaping, planters, fencing, rails, or barriers in order to provide pedestrians who have

<sup>31</sup> "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians," FHWA Report no. FHWA-RD-01-051, May, 2001, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01105/cover.htm>. Recommendations I.E(4), I.K(2), and I.K(3).

<sup>32</sup> "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians," FHWA Report no. FHWA-RD-01-051, May, 2001, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01105/cover.htm>. Recommendations I.K(4) and I.K(5).

<sup>33</sup> "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians," FHWA Report no. FHWA-RD-01-051, May, 2001, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01105/cover.htm>. Recommendation I.K(1).

<sup>34</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 27, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis\\_Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis_Final_Dec2005.pdf).

visual disabilities with additional guidance as to where not to cross.

87. In existing Section 2B.45 (new Section 2B.59) Traffic Signal Signs, the FHWA proposes to delete the first existing GUIDANCE statement regarding the placement of Traffic Signal signs because locations of signs near signal faces are proposed to be specifically recommended for individual signs where this is appropriate.

To correspond with proposed changes in Chapter 4E requiring that signs for pedestrian pushbuttons clearly indicate which crosswalk signal is actuated by each pedestrian detector, the FHWA proposes to revise the first SUPPORT and OPTION statements in this section and the sign images in existing Figure 2B-18 (new Figure 2B-29). The proposed revisions eliminate the use of the existing R10-1, R10-3 and R10-4 sign designs because these do not identify a specific crosswalk, and therefore do not meet the proposed requirement in Chapter 4E. The FHWA proposes to redesign those signs and revise the text in this section to clarify how to use the R10 series of pushbutton signs appropriately. The FHWA also proposes to add paragraphs to the 2nd OPTION statement regarding the use of a new R10-25 sign, where a pushbutton detector has been installed for pedestrians to activate In-Roadway Warning Lights or flashing beacons, and a new R10-24 sign, where a pushbutton detector has been installed exclusively for bicyclists, to enable bicyclists to actuate a separate bike signal phase or a parallel vehicular green phase at a signalized crossing. Bikes need less time to cross than pedestrians, so the push buttons actuate timing specifically appropriate for bikes, which is an operationally efficient strategy. The FHWA proposes to add both of these new signs to reflect current practice as documented by the Sign Synthesis Study,<sup>35</sup> and to provide consistent and uniform messages for these purposes.

The FHWA also proposes to add a proposed new FOR MORE CROSSING TIME—HOLD BUTTON DOWN FOR 2 SECONDS sign to this section and to illustrate the sign image in existing Figure 2B-18 (new Figure 2B-29). The FHWA proposes to add this sign to correspond with comparable proposed provisions in Chapter 4E.

The FHWA also proposes to add new GUIDANCE and OPTION statements in this section regarding the location of LEFT ON GREEN ARROW ONLY, LEFT

TURN YIELD ON GREEN, and LEFT TURN SIGNAL YIELD ON GREEN signs, independently and with an AT SIGNAL supplemental plaque. The FHWA proposes these new statements based on recommendations from the Older Driver handbook.<sup>36</sup>

In the existing 2nd GUIDANCE statement, the FHWA proposes to add locations where the skew angle of the intersection roadways creates difficulty for older drivers to see traffic approaching from their left, to the list of conditions where consideration should be given to the use of No Turn on Red signs. The FHWA proposes this change based on recommendations from the Older Driver handbook.<sup>37</sup>

The FHWA proposes to add to the (new) 4th OPTION statement information regarding the use of a blank-out sign instead of a NO TURN ON RED sign during certain times of the day or during portions of a signal cycle where a leading pedestrian interval is provided. The FHWA proposes this new text to correspond to other proposed changes in Part 4 regarding the use of these signs. The FHWA also proposes to add information to this OPTION statement regarding the use of a post-mounted NO TURN ON RED EXCEPT FROM RIGHT LANE sign and a NO TURN ON RED FROM THIS LANE (with down arrow) overhead sign that may be used on signalized approaches with more than one right-turn lane.

Finally, to correspond with proposed changes in Part 4 that would add a new Pedestrian Hybrid Signal, the FHWA proposes to add to the last STANDARD statement a paragraph that describes the use of a CROSSWALK STOP ON RED sign that is proposed to be required with pedestrian hybrid signals.

The FHWA proposes a phase-in compliance period of 10 years for the use of proposed new signs and proposed new sign designs at existing locations to minimize any impact on State or local highway agencies.

88. In existing Figure 2B-19 (new Figure 2B-30) Traffic Signal Signs and Plaques, the FHWA proposes to change the design of the TURNING TRAFFIC MUST YIELD TO PEDESTRIANS (R10-15) sign to be a symbolic sign. The FHWA proposes this change to reduce

the number of words, give a more precise symbolized message, and make the sign more conspicuous to road users. The proposed sign design has been in extensive use by the New York City Department of Transportation. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

89. In existing Section 2B.46 (new Section 2B.60) Photo Enforced Signs and Figure 2B-1, the FHWA proposes to replace the existing word message PHOTO ENFORCED (R10-19) plaque with a new symbol plaque for Photo Enforced. The FHWA proposes to retain the existing word message plaque as an alternate. In addition, the FHWA proposes to revise the design of the TRAFFIC LAWS PHOTO ENFORCED (R10-18) sign to add the symbolic camera. The FHWA proposes these changes based on preliminary results of the "Evaluation of Symbol Signs" study.<sup>38</sup>

90. The FHWA proposes to add a new section following existing Section 2B.46 (new Section 2B.60). This new section is numbered and titled, "Section 2B.61 Ramp Metering Signs" and contains a GUIDANCE statement describing the recommended use of proposed new regulatory signs that should accompany ramp control signals. The FHWA proposes to add these new signs because ramp metering signals are used in several States, but there are not standard signs for them in the MUTCD, so States have developed a variety of signs, as documented by the Sign Synthesis Study.<sup>39</sup> In this new Section, the FHWA proposes two new signs, X VEHICLES PER GREEN and X VEHICLES PER GREEN EACH LANE. The FHWA proposes these new signs to provide uniformity in ramp meter signing. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

91. In existing Section 2B.50 (new Section 2B.65) Weigh Station Signs, the FHWA proposes to change the text of the R13-1 sign to "TRUCKS OVER XX TONS MUST ENTER WEIGH STATION—NEXT RIGHT" to reflect that the message is regulatory, rather than guidance. The FHWA proposes a

<sup>36</sup> "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians," FHWA Report no. FHWA-RD-01-051, May, 2001, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01105/cover.htm>. Recommendation LH(4).

<sup>37</sup> "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians," FHWA Report no. FHWA-RD-01-051, May, 2001, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01105/cover.htm>. Recommendations IA(3) and LI(3).

<sup>38</sup> Preliminary results from "Evaluation of Symbol Signs," conducted by Bryan Katz, Gene Hawkins, and Jason Kennedy for the Traffic Control Devices Pooled Fund Study, can be viewed at the following Internet Web site: [http://www.pooledfund.org/documents/TPF-5\\_065/PresSymbolSign.pdf](http://www.pooledfund.org/documents/TPF-5_065/PresSymbolSign.pdf).

<sup>39</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, pages 28-29, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis\\_Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis_Final_Dec2005.pdf).

<sup>35</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 29, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis\\_Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis_Final_Dec2005.pdf).

phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

In addition, in Figure 2B–33, the FHWA proposes to illustrate the customary regulatory sign color of a black legend on a white background, rather than the allowable option of the reverse color pattern, for the TRUCKS OVER XX TONS MUST ENTER WEIGH STATION—NEXT RIGHT sign.

92. The FHWA proposes to add a new section following existing Section 2B.53 (new Section 2B.68). The new section is numbered and titled, “Section 2B.69 Headlight Use Signs” and contains GUIDANCE, SUPPORT, and OPTION statements that describe the use of several proposed new signs that may be used by States that require road users to turn on their vehicle headlights under certain weather conditions. The Sign Synthesis Study<sup>40</sup> found that there is a wide variation in the legends currently being used by States for this purpose. FHWA proposes these new signs to provide increased uniformity of the messages for road users. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

93. The FHWA proposes changing the number and title of existing “Section 2B.54 Other Regulatory Signs” to “Section 2B.70 Miscellaneous Regulatory Signs.” As discussed in item 48 above, the FHWA proposes to relocate the existing OPTION statements from this section to Section 2B.02. The FHWA also proposes to add a new OPTION statement regarding the use of a proposed new FENDER BENDER MOVE VEHICLES FROM TRAVEL LANES sign that agencies may use to inform road users of State laws that require them to move their vehicles to the shoulder if they have been involved in a minor non-injury crash. As an integral part of active incident management programs in many urban areas, an increasing number of States and cities are using signs requiring drivers who have been involved in relatively minor “fender bender” or non-injury crashes to move their vehicles to the shoulder. A variety of sign messages are in use for this purpose, as documented by the Sign Synthesis Study.<sup>41</sup> The FHWA proposes

adding this sign because, with the increasing popularity of these laws and incident management programs, a standardized sign legend is needed. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

#### Discussion of Proposed Amendments Within Chapter 2C—General

94. The FHWA proposes to remove the following word signs from the MUTCD, because related symbol signs have been in use for 35 years, thereby making these word signs obsolete: HILL Sign (W7–1b) in existing Section 2C.12, DIVIDED HIGHWAY (W6–1a) and DIVIDED ROAD (W6–1b) in existing Section 2C.18, DIVIDED HIGHWAY ENDS (W6–2a) and DIVIDED ROAD ENDS (W6–2b) in Section existing 2C.19, STOP AHEAD (W3–1a) and YIELD AHEAD (W3–2a) and SIGNAL AHEAD (W3–3a) in existing Section 2C.29.

#### Discussion of Proposed Amendments Within Chapter 2C—Specific

95. In Section 2C.03 Design of Warning Signs, the FHWA proposes to change the last paragraph of the OPTION to a GUIDANCE statement to recommend, rather than merely allow, a fluorescent yellow-green background for warning signs regarding conditions associated with pedestrians, bicyclists, and playgrounds. Also proposed is a new STANDARD statement that would require that warning conditions associated with school buses and schools have a fluorescent yellow-green background. The FHWA is also proposing to revise similar wording in other sections in Chapter 2C and in Part 7. In the intervening years since the fluorescent yellow-green background color was introduced as an option, most highway agencies have adopted policies to use this color for school warning signs and many have also decided to use it for all warnings associated with pedestrians and bicycles. This predominant usage is due to the enhanced conspicuity provided by fluorescent yellow-green, particularly during dawn and twilight periods. The FHWA proposes these changes in Section 2C.03 to provide more uniformity and consistency in school, pedestrian, and bicycle warning signing. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

*tcd.tamu.edu/documents/rwstc/Signs\_Synthesis-Final\_Dec2005.pdf.*

In place of the existing paragraph in the OPTION statement, the FHWA proposes to add two new paragraphs that describe allowable changes in warning sign sizes and designs. The FHWA proposes these changes to provide agencies with flexibility in designing signs to meet field conditions, such as allowing modifications to be made to the symbols shown on intersection warning signs in order to approximate the geometric configuration of the roadway.

The FHWA also proposes to add a 2nd STANDARD statement that establishes a minimum size for all diamond-shaped warning signs facing traffic on multi-lane conventional roads of 900 mm × 900 mm (36 in × 36 in). This proposal is consistent with other proposed changes as discussed above regarding existing Section 2A.13 (new Section 2A.14) that base sign size dimensions on letter sizes needed for a visual acuity of 20/40, which results in larger sign sizes. On multi-lane roads, increased legibility distances are needed due to the potential blockage of signs by other vehicles.

96. The FHWA proposes to revise Table 2C–2 Warning Sign and Plaque Sizes to incorporate additional sign series and to specify that for several diamond-shaped signs, the minimum size required for signs facing traffic on multi-lane conventional roads is 900 mm × 900 mm (36 in. × 36 in). The FHWA proposes these changes to provide signs on multi-lane approaches that are more visible to drivers with visual acuity of 20/40 and to be consistent with and incorporate other proposed changes in Chapter 2C. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

97. In Section 2C.05 Placement of Warning Signs, the FHWA proposes to revise the SUPPORT and GUIDANCE statements to refer to the use of Perception-Response Time (PRT), rather than Perception, Identification, Emotion, and Volition (PIEV) Time, in determining the placement of warning signs. The older terminology of PIEV Time has been replaced with the current term Perception-Response Time, which has come into common use and is the terminology used in the current American Association of State Highway and Transportation Officials (AASHTO) Policies. The Traffic Control Devices Handbook<sup>42</sup> addresses both terms but

<sup>42</sup>The Traffic Control Devices Handbook, 2001, is available for purchase from the Institute of Transportation Engineers, at the following Internet Web site: <http://www.ite.org>. PIEV and PRT are discussed on pages 34–39.

<sup>40</sup>“Synthesis of Non-MUTCD Traffic Signs,” FHWA, December 2005, page 31, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>41</sup>“Synthesis of Non-MUTCD Traffic Signs,” FHWA, December 2005, page 31, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).



correctly identifies PRT as the terminology now in common use. Accordingly, it is appropriate to update the MUTCD using the common terminology PRT. In addition to proposed changes in Section 2C.05, the FHWA proposes to change the notes for Table 2C-4 by replacing "PIEV time" with "PRT," as well as other changes in the notes and values in Table 2C-4 in order to provide adequate legibility of warning signs for 20/40 visual acuity. The FHWA proposes a phase-in compliance period of 10 years for revised placement of existing signs in good condition to minimize any impact on State or local highway agencies.

98. The FHWA proposes to add a new section after existing Section 2C.05. The new section is numbered and titled, "Section 2C.06 Horizontal Alignment Warning Signs" and contains SUPPORT, STANDARD, and OPTION statements regarding the use of the proposed new Table 2C-5 Horizontal Alignment Sign Selection, in which the FHWA proposes a hierarchal approach to use of these signs and plaques and proposes to define required, recommended, and optional warning signs. The FHWA proposes a standard to make the requirements applicable to freeways, expressways, and functionally classified arterials and collectors over 1,000 average annual daily traffic (AADT) and an option statement allowing their use on other roadways. These road classifications represent higher volume roadways, a larger percentage of unfamiliar drivers, and have the potential to yield the largest safety benefits in reducing crashes due to road users' lack of awareness of a change in horizontal alignment, as documented in a recent National Cooperative Highway Research Program (NCHRP) study.<sup>43</sup>

99. In concert with the changes in the previous item, the FHWA proposes several changes to existing Section 2C.06 (new Section 2C.07) Horizontal Alignment Signs to incorporate the proposed material in new Table 2C-5 and to provide agencies with additional information on the appropriate use of horizontal alignment signs. The FHWA also proposes to add a new Figure 2C-2 to illustrate an example of the use of warning signs for a turn, and to modify existing Figure 2C-7 (new Figure 2C-3) to illustrate horizontal alignment signs for a sharp curve on an exit ramp.

100. The FHWA proposes to relocate existing Section 2C.46 Advisory Speed

Plaque so that it appears earlier in the Chapter as Section 2C.08 because of its predominant application with horizontal alignment warning signs. In addition, the FHWA proposes several revisions to the section to incorporate the proposed new Table 2C-5, and to require that Advisory Speed plaques be used where it is determined to be necessary on the basis of an engineering study that follows established traffic engineering practices.

Finally, the FHWA proposes to add OPTION and GUIDANCE statements at the end of the section describing the use of Advisory Speed plaques at toll plazas. The FHWA proposes this additional information to incorporate toll plaza signing into the MUTCD.

101. In existing Section 2C.10 (new Section 2C.09) Chevron Alignment Sign, the FHWA proposes to change the first sentence of the first OPTION statement to a STANDARD to require the use of the Chevron Alignment sign in accordance with the hierarchy of use as listed in proposed new Table 2C-5, as discussed earlier regarding new Section 2C.06. The FHWA also proposes to add information to the 2nd STANDARD statement regarding the minimum installation height of these signs. The proposed minimum mounting height of 4 feet would be an exception to the normal minimum mounting height for signs, based on established practices. The FHWA also proposes to add a reference in the GUIDANCE statement to proposed new Table 2C-6 Approximate Spacing for Chevron Alignment Signs on Horizontal Curves. The proposed spacing criteria are based on research.<sup>44</sup>

The FHWA also proposes to add a new STANDARD statement at the end of the section clarifying conditions in which the Chevron Alignment sign should not be used. The FHWA proposes this new text to preclude possible misinterpretations of the appropriate use of this sign.

102. In existing Section 2C.07 (new Section 2C.10) Combination Horizontal Alignment/Advisory Speed Signs, the FHWA proposes to amplify the existing STANDARD statement in order to clarify how these signs are to be used.

103. In existing Section 2C.09 (new Section 2C.12) One-Direction Large Arrow Sign, the FHWA proposes to add to the STANDARD statement a prohibition on the use of a One-Direction Large Arrow sign in the central island of a roundabout. The

FHWA proposes this change in conjunction with other proposed changes in Chapters 2B and 2D to provide consistency in signing at roundabouts.

104. In existing Section 2C.11 (new Section 2C.13) Truck Rollover Warning Sign, the FHWA proposes to add a STANDARD statement at the beginning of the section to require the use of the Truck Rollover Warning sign on freeway and expressway ramps in accordance with the proposed new Table 2C-5.

The FHWA also proposes to change the existing first OPTION statement to a GUIDANCE statement to recommend the use of the Truck Rollover Warning sign for appropriate conditions.

105. The FHWA proposes to relocate existing Section 2C.36 so that it appears earlier in the Chapter as new Section 2C.14 to consolidate all sections relating to horizontal alignment in one area of the chapter for ease of reference and consistency. In addition, the FHWA proposes to revise the title of the section to "Advisory Exit and Ramp Speed Signs," as well as the text to remove the optional Curve Speed sign. The Curve Speed sign has had only limited usage and, with the proposed hierarchal approach to warning signs usage for horizontal curves, this sign is no longer needed. The FHWA believes it is desirable to broaden the consistent usage of a few signs providing better driver communications rather than adding potential driver confusion with a mixed application of several signing options.

The FHWA proposes to revise the STANDARD to require that the use of the Advisory Exit Speed and Advisory Ramp Speed signs on freeway and expressway ramps be in accordance with the proposed new Table 2C-5.

In addition, the FHWA proposes several other clarifications throughout the section to aid readers on the placement of advisory speed signs and plaques.

For all of the proposed changes in applications of warning signs and plaques for horizontal curves in new Sections 2C.06 through 2C.14 and in the new Table 2C-5, the FHWA proposes a phase-in compliance period of 10 years for existing horizontal alignment signs in good condition, to minimize any impact on State or local highway agencies.

106. The FHWA proposes to add a new section numbered and titled, "Section 2C.15 Combination Horizontal Alignment/Advisory Exit and Ramp Speed Signs." The FHWA proposes this new sign for optional use where ramp or exit curvature is not apparent to drivers in the deceleration or exit lane

<sup>43</sup> NCHRP Report 500, Volume 7, "A Guide for Reducing Collisions on Horizontal Curves," can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_500v7.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_500v7.pdf).

<sup>44</sup> FHWA/TX-04/0-4052-1, "Simplifying Delineator and Chevron Applications for Horizontal Curves," dated March 2004, can be viewed at the following Internet Web site: <http://tti.tamu.edu/documents/0-4052-1.pdf>.

or where the curvature needs to be specifically identified as being on the ramp rather than on the mainline. The FHWA proposes the design and the use of this sign based on the Sign Synthesis Study,<sup>45</sup> which found that at least four States have developed signs for this purpose, but with varying designs. The FHWA proposes a uniform design for this type of sign, to provide consistency for road users. The remaining sections would be renumbered accordingly.

107. The FHWA proposes to relocate existing Section 2C.13 Truck Escape Ramp Signs to Chapter 2F, to reflect the proposed new classification and design of these signs as general service signs. These signs provide guidance and information messages similar in function to the signs used for weigh stations, chain-up areas, and similar highway features, so it is appropriate for these signs for truck escape ramps to be designed as general service signs.

108. In existing Section 2C.18 (new Section 2C.21) Divided Highway Sign, the FHWA proposes to add a STANDARD that the Divided Highway (W6-1) sign shall not be used instead of a Keep Right (R4-7 series) sign on the nose of a median island. The FHWA proposes this change to reflect accepted signing practices and prevent misuse of the W6-1 sign.

109. In existing Section 2C.19 (new Section 2C.22) Divided Highway Ends Sign (W6-2), the FHWA proposes to revise the existing OPTION statement to a GUIDANCE statement, recommending that the Two-Way Traffic (W6-3) sign should also be used. The FHWA proposes this change in order to be consistent with the existing GUIDANCE in existing Section 2C.34 (new Section 2C.45) that the W6-3 sign should be used for this condition.

110. The FHWA proposes to add a new section following existing Section 2C.19 (new Section 2C.22). The new section is numbered and titled, "Section 2C.23 Freeway or Expressway Ends Signs" and contains OPTION and GUIDANCE statements regarding the use of these proposed new signs. The FHWA proposes these new signs because there are many locations where a freeway or expressway ends by changing to an uncontrolled access highway, and it is important to warn drivers of the end of the freeway or expressway conditions. In other cases, the need for this type of warning may be generated by other conditions not readily apparent to the road user, such

<sup>45</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 43, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

as the need for all traffic to exit the freeway or expressway on exit ramps. The Sign Synthesis Study<sup>46</sup> found that at least 21 States have developed their own standard warning signs for this purpose but with varying legends and designs. The FHWA proposes uniform designs for these signs, to provide consistency for road users. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

111. The FHWA proposes to change the title of existing Section 2C.26 (new Section 2C.30) to "Shoulder and Uneven Lanes Signs" to incorporate a proposed new symbolic Shoulder Drop Off sign and two plaques to warn road users of either a low shoulder or uneven lanes. The FHWA proposes this new sign as a result of the Sign Synthesis Study,<sup>47</sup> which found that symbol signs and/or different word messages are being used in at least 13 States to convey these or similar messages, with a wide variety of legends and symbol designs. The States are not consistent in how these symbol signs are used, with some being used for uneven lanes and some for low shoulder or shoulder drop-off conditions. The Canadian MUTCD prescribes a single standard symbol warning sign (TC-49) for use to warn of either a low shoulder or uneven lanes. The FHWA proposes to adopt the standard Canadian sign to provide a single uniform symbol for these conditions, which are similar in terms of issues for vehicular control, with supplemental educational word message plaques as needed. Adoption of the Canadian symbol will also aid in promoting North American harmony of traffic signing. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

The FHWA also proposes to add a NO SHOULDER sign to the option statement in this section to allow agencies to use a sign of uniform legend, which would warn road users that shoulders do not exist along the roadway. The FHWA proposes this new sign and its design based on the "Sign Synthesis Study,"<sup>48</sup>

<sup>46</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, pages 43-44, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>47</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 37, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>48</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 37, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

which found inconsistencies in the legends of signs currently in use by the States for this purpose.

112. The FHWA proposes to change the title of existing Section 2C.27 (new Section 2C.31) to "Surface Condition Signs" in order to incorporate several additional signs and supplemental plaques into this section. The FHWA proposes to add information regarding the use of supplemental plaques with legends such as ICE, WHEN WET, STEEL DECK and EXCESS OIL with the W8-5 sign to indicate the reason that the slippery conditions might be present.

The FHWA also proposes to add information regarding the existing LOOSE GRAVEL and ROUGH ROAD word signs. These signs and plaques have been illustrated in new Figure 2C-6 and the Standard Highway Signs book but have not previously been discussed in the MUTCD text.

In addition, the FHWA proposes to incorporate the information in existing Section 2C.28 BRIDGE ICES BEFORE ROAD sign into this section in order to maintain cohesiveness of information.

Finally, the FHWA proposes to add a new symbolic Falling Rocks sign and an educational plaque to this section to reflect common practice in many States to warn road users of the frequent possibility of rocks falling (or already fallen) onto the roadway. The Sign Synthesis Study<sup>49</sup> found a lack of consistency in the sign legends or symbols currently in use by the States for this purpose. To provide consistency in sign design, the FHWA proposes to add a symbol sign (along with an educational plaque for use if needed) that may be used to warn road users of falling or fallen rocks, slides, or other similar situations. Although the most common sign currently used in the U.S. is a word sign, Canadian, Mexican, European, and international standards use symbols, all of which are very similar, for this message. The FHWA proposes to adopt the standard Mexican MUTCD symbol, because its design appears to offer the best simplicity and legibility. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

113. The FHWA proposes to add a new section following existing Section 2C.27 (new Section 2C.31). The new

[tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>49</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, pages 37-38, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

section is numbered and titled, "Section 2C.32 Warning Signs and Plaques for Motorcyclists" and contains SUPPORT and OPTION statements regarding the use of two new warning signs and an associated symbolic plaque that may be specifically placed to warn motorcyclists of road surface conditions that would primarily affect them, such as grooved or brick pavement and metal bridge decks. The proposed new signs are based on the results of the Sign Synthesis Study,<sup>50</sup> which found a variety of different messages in use by the States for these purposes. Subsequently, a study<sup>51</sup> evaluated several different motorcycle symbols and arrangements of such symbols both within the primary warning sign and as a supplemental plaque. The study found that the best legibility distance is provided by depicting a motorcycle on a supplementary plaque and that one particular style of motorcycle provides the best comprehension of the intended message. As a result, the FHWA proposes to adopt word message signs with standardized legends of GROOVED PAVEMENT and METAL BRIDGE DECK and a new supplementary plaque featuring a side view of a motorcycle.

The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

114. As discussed above, the FHWA proposes to incorporate all of the information contained in existing Section 2C.28 BRIDGE ICES BEFORE ROAD Sign into new Section 2C.31. The FHWA proposes to title existing Section 2C.28 (new Section 2C.33) "NO CENTER STRIPE Sign," and include an OPTION statement regarding the use of the NO CENTER STRIPE Sign. The FHWA proposes this new language based on a review of the 2003 MUTCD and 2004 SHS that revealed that the MUTCD did not contain language about this existing sign, which has been illustrated in Figure 2C-4.

115. The FHWA proposes to add a new section numbered and titled, "Section 2C.34 Weather Condition Signs" that contains OPTION and STANDARD statements regarding the use of three proposed new signs to warn users of potential adverse weather

conditions. The proposed WATCH FOR FOG, GUSTY WINDS AREA, ROAD MAY FLOOD, and Depth Gauge signs are all based on results of the Sign Synthesis Study<sup>52</sup> that showed that signs for these purposes were in very common use in many parts of the country, but with widely varying legends. The FHWA proposes to add uniform designs for these signs to provide road users with consistent messages. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State and local agencies.

116. The FHWA proposes to add a new section numbered and titled, "Section 2C.36 Advance Ramp Control Signal Signs" that contains OPTION, GUIDANCE, and STANDARD statements regarding the use of two proposed new signs. The FHWA proposes new RAMP METER AHEAD and RAMP METERED WHEN FLASHING signs to provide uniformity of signing at ramp metering locations, especially because the practice of ramp metering continues to grow. The common existing use of these signs is documented in the Sign Synthesis Study<sup>53</sup> and is recommended in the FHWA's Ramp Management and Control Handbook.<sup>54</sup> The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

117. In existing Section 2C.30 (new Section 2C.37), the FHWA proposes to change the title of the section to "Reduced Speed Limit Ahead Signs" to reflect the proposed change of the sign name to be consistent with the Stop Ahead, Yield Ahead, and Signal Ahead warning sign names.

The FHWA proposes revising the GUIDANCE statement to recommend that a Reduced Speed Limit Ahead sign be used where the speed limit is being reduced by more than 20 km/h or 10 mph, or where engineering judgment indicates the need for advance notice. The FHWA believes that reductions in speed limit of more than 10 mph are

unexpected by road users and may require special actions to reduce speed before reaching the start of the lower speed zone, and thus justify the use of a warning sign. The FHWA proposes this change in order to provide consistency for determining where speed reduction signs should be placed. This change corresponds to proposed changes in Section 2B.13.

118. The FHWA proposes adding a new section following existing Section 2C.30 (new Section 2C.37). The new section is numbered and titled "Section 2C.38 DRAWBRIDGE AHEAD Sign (W3-6)" and contains a STANDARD statement and a figure regarding the use of this sign. The FHWA proposes this new Section because existing Section 4I.02 (new Section 4J.02) Design and Location of Moveable Bridge Signals and Gates requires the use of the DRAWBRIDGE AHEAD sign in advance of all drawbridges. Because the W3 series is used for advance warning signs and this sign is required in advance of the condition, it is appropriate to include the text and a figure in Chapter 2C. The remaining sections in Chapter 2C would be renumbered accordingly.

119. In existing Section 2C.31 (new Section 2C.39) Merge Signs, the FHWA proposes to add an OPTION statement at the end of the section to incorporate a proposed new NO MERGE AREA supplemental plaque that may be mounted below an Entering Roadway Merge sign, a Yield Ahead sign, or a YIELD sign to warn road users on an entering roadway or channelized right-turn movement that they will encounter an abrupt merging situation at the end of the ramp or turning roadway. When there are only a few entrance ramps or channelized right turns in an area that do not have acceleration lanes, those few locations do not meet driver expectations. The FHWA proposes this plaque based on the results of the Sign Synthesis Study<sup>55</sup> that indicated some States routinely use this plaque to provide road users with important warning information for these conditions.

120. In existing Section 2C.33 (new Section 2C.41) Lane Ends Signs, the FHWA proposes to add the W4-7 THRU TRAFFIC MERGE RIGHT (LEFT) sign to the OPTION statement to allow the use of this sign, as a supplement to other signs, to warn road users in the right-hand (left-hand) lane that their lane is about to become a mandatory turn or exit lane. The FHWA proposes this

<sup>52</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, pages 38-39, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>53</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 34, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>54</sup> "Ramp Management and Control Handbook," FHWA, January 2006, page 5-29, can be viewed at the following Internet Web site: [http://ops.fhwa.dot.gov/publications/ramp\\_mgmt\\_handbook/manual/manual/pdf/rm\\_handbook.pdf](http://ops.fhwa.dot.gov/publications/ramp_mgmt_handbook/manual/manual/pdf/rm_handbook.pdf).

<sup>55</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 34, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>50</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, pages 39-40, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>51</sup> Preliminary results from "Evaluation of Symbol Signs," conducted by Bryan Katz, Gene Hawkins, and Jason Kennedy for the Traffic Control Devices Pooled Fund Study, can be viewed at the following Internet Web site: [http://www.pooledfund.org/documents/TPF-5\\_065/PresSymbolSign.pdf](http://www.pooledfund.org/documents/TPF-5_065/PresSymbolSign.pdf).

change to be consistent with the current use of that sign in Part 6.

121. The FHWA proposes to add a new section following existing Section 2C.33 (new Section 2C.41). This new section is numbered and titled, "Section 2C.42 RIGHT (LEFT) LANE EXIT ONLY AHEAD Sign." This proposed new section contains OPTION, STANDARD, GUIDANCE, and SUPPORT statements regarding the use of this proposed new sign to provide advance warning of a freeway lane drop. The FHWA proposes to add this sign based on the results of the Sign Synthesis Study<sup>56</sup> that showed several States use a similar warning sign for these conditions, particularly when overhead guide signs are not present on which to use EXIT ONLY plaques. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

122. The FHWA proposes to add two new sections numbered and titled, "Section 2C.43 Toll Road Begins Signs" and "Section 2C.44 Stop Ahead Pay Toll Sign." Both sections include GUIDANCE, OPTION, and STANDARD statements regarding the use of these proposed new signs on toll facilities to provide for consistency and uniformity of signing for these messages and to implement the signing portions of FHWA's "Toll Plaza Traffic Control Devices Policy."<sup>57</sup> The FHWA proposes a phase-in compliance period of 10 years for existing locations to minimize any impact on State or local highway agencies. The remaining sections would be renumbered accordingly.

123. The FHWA proposes to add a new section following existing Section 2C.34 (new Section 2C.45). The new section is numbered and titled, "Section 2C.46 Two-Way Traffic on a Three-Lane Roadway Sign" and contains OPTION and STANDARD statements regarding the use of this proposed new sign for warning of two-way traffic on roads having three through lanes, with one lane in one direction and two lanes in the other direction. The proposed sign is a variant of the existing W6-1 two-way traffic warning sign. The FHWA proposes this new sign for optional use based on the results of the Sign Synthesis Study<sup>58</sup> that indicated that

several States use this type of sign to warn drivers of this condition.

124. The FHWA proposes to relocate the information from existing Section 2C.36 Advisory Exit, Ramp, and Curve Speed Signs, to Section 2C.14 in order to place all horizontal alignment warning signs in the same area of the manual.

125. In existing Section 2C.37 (new Section 2C.48) Intersection Warning Signs, the FHWA proposes to revise the existing OPTION statement to indicate that an educational plaque with a legend such as TRAFFIC CIRCLE or ROUNDABOUT may be mounted below a Circular Intersection symbol sign. The FHWA also proposes to delete from the GUIDANCE statement, the recommendation that Circular Intersection symbol warning signs should be installed on the approach to a YIELD sign controlled roundabout. The FHWA proposes these changes to provide consistency for roundabout signing throughout the MUTCD.

The FHWA also proposes to add new Offset Side Roads and Double Side Roads symbols for use on Intersection Warning Signs to the GUIDANCE statement. The FHWA proposes these new symbols based on the results of the Sign Synthesis Study<sup>59</sup> that showed that variants of the W2-2 sign depicting offset side roads or two closely spaced side roads are used in many States, but the relative distance between the two side roads and the relative stroke widths of the roadways varies significantly. As a result, the FHWA proposes uniform designs.

126. In existing Section 2C.38 (new Section 2C.49) Two-Direction Large Arrow Sign, the FHWA proposes to add to the STANDARD statement that the Two-Direction Large Arrow sign shall not be used in the central island of a roundabout. The FHWA proposes this change in conjunction with other proposed changes in Chapters 2B and 2D to provide consistency in signing at roundabouts.

127. In existing Section 2C.39 (new Section 2C.50) Traffic Signal Signs, the FHWA proposes to add to the STANDARD statement that the provision of flashing yellow arrow signal faces and flashing red arrow signal faces are additional exceptions to the requirement for use of W25-1 or W25-2 signs, consistent with similar

the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>59</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 33, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

proposed changes in Chapter 4D. The FHWA also proposes a clarification to the STANDARD statement that W25-1 and W25-2 signs are to be vertical rectangles, for consistency with existing Table 2C-2 Warning Sign Sizes, which indicates that the W25 series signs are rectangular in shape.

128. In existing Section 2C.40 (new Section 2C.51) Vehicular Traffic Signs and existing Section 2C.41 (new Section 2C.52) Nonvehicular Signs, the FHWA proposes to add OPTION statements regarding the use of Warning Beacons and supplemental WHEN FLASHING plaques to indicate specific periods when the condition or activity is present or is likely to be present. The FHWA proposes these changes to clarify this allowable use, for consistency with existing provisions in Part 4 regarding warning beacons.

129. The FHWA also proposes to add to the first OPTION statement in existing Section 2C.40 (new Section 2C.51) information regarding the use of the Combined Bicycle/Pedestrian sign and the TRAIL XING supplemental plaque. With the increasing mileage of shared-use paths in the U.S., the number of places where shared-use paths, used by both bicyclists and pedestrians, cross a road or highway is also increasing. To provide advance warning of these crossings and to indicate the location of the crossing itself, it is currently necessary to use both the W11-1 (bicycle) and W11-2 (pedestrian) crossing warning signs, mounted together on the same post, or sequentially along the road. The Sign Synthesis Study<sup>60</sup> revealed that several States have developed combination signs to simplify and improve the signing for shared-use path crossings, using either a single sign with combined bicycle and pedestrian symbols or a word message sign with a variety of different legends. The FHWA proposes to add this sign for use to serve this increasing need and to provide a uniform design for consistency. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

130. In existing Section 2C.41 (new Section 2C.52) Nonvehicular Signs, the FHWA proposes to add a new STANDARD statement that requires school signs and their related supplemental plaques to have a fluorescent yellow-green background with a black legend and border to be

<sup>60</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 42, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>56</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 35, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>57</sup> "Policy on Traffic Control Strategies for Toll Plazas," dated October 12, 2006, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/policy/tcstollmemo/tcstoll\\_policy.htm](http://mutcd.fhwa.dot.gov/resources/policy/tcstollmemo/tcstoll_policy.htm).

<sup>58</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 36, can be viewed at

consistent with proposed changes in Chapter 2A and in Part 7. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

The FHWA also proposes to change the 2nd paragraph of the 3rd OPTION statement to a GUIDANCE to recommend, rather than merely permit, the use of fluorescent yellow-green for pedestrian, bicycle, and playground nonvehicular warning signs and their supplemental plaques. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies. These proposed changes are also reflected in existing Section 2C.42 (new Section 2C.53) Playground Sign and in Chapter 2A and Part 7.

131. In Figure 2C-12 Nonvehicular Traffic Signs, the FHWA proposes to add images of new symbolic warning signs for moose, elk/antelope/caribou, wild horses (horse without a rider), burro/donkey, sheep, bighorn sheep, and bears. The MUTCD includes only three signs to warn of the possible crossings of large animals—deer crossing (W11-3), cattle crossing (W11-4), and equestrian crossing (horse with rider, W11-7). The prevalence of other types of large animals that may cross roads (and which may cause significant damage or injury if struck by a vehicle) has caused at least 16 States to develop signs (usually symbolic) for warning of one or more different animal crossings, as documented in the Sign Synthesis Study.<sup>61</sup> The FHWA proposes adding the new signs because these animals all look significantly different from the three existing animal symbols and the existing standard MUTCD signs would not provide an accurate meaning and adequate warning. Also, because there is a lack of consistency in the signs currently being used for this purpose by the States, the FHWA proposes uniform symbol designs for consistency. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

132. The FHWA proposes to add a new section following existing Section 2C.42 (new Section 2C.53). The new section is numbered and titled, “Section 2C.54 NEW TRAFFIC PATTERN AHEAD Sign” and contains OPTION and GUIDANCE statements regarding the use of this sign to provide advance

warning of a change in traffic patterns, such as revised lane usage, roadway geometry, or signal phasing. The FHWA proposes this change to reflect existing practices in many States and numerous local jurisdictions as documented in the Sign Synthesis Study<sup>62</sup> and to provide a uniform legend for this purpose, consistent with similar proposed changes in Part 6. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies. The remaining sections would be renumbered accordingly.

133. The FHWA proposes to add a new section after proposed new Section 2C.54. This new section is numbered and titled, “Section 2C.55 Warning Signs on Median Barriers for Preferential Lanes” and contains OPTION, STANDARD, and GUIDANCE statements regarding the use of warning signs applicable only to preferential lanes on median barriers. The FHWA proposes this new section for consistency with similar existing provisions for preferential lane regulatory signs in Chapter 2B and to reflect existing practices by agencies operating preferential lane facilities. The remaining sections would be renumbered accordingly.

134. The FHWA proposes to relocate the information from existing Section 2C.46 Advisory Speed Plaque, to Section 2C.08 in order to place all horizontal alignment warning signs in the same area of the manual.

135. In existing Section 2C.47 (new Section 2C.59) Supplemental Arrow Plaques, the FHWA proposes to delete the references to the W16-7 downward diagonal arrow plaque, because the W16-7 plaque is not used for the application described in this section. The diagonal downward arrow plaque is only used with Nonvehicular Crossing warning signs and has a different design than the W16-5p and W16-6p plaques, which are the subject of this Section.

136. In existing Section 2C.49 (new Section 2C.61) Advance Street Name Plaque, the FHWA proposes to add a GUIDANCE statement, and an accompanying figure, that recommends the order in which street names should be displayed on an Advance Street Name plaque. The FHWA proposes this change to provide consistency for road users.

137. In existing Section 2C.50 (new Section 2C.62) Cross Traffic Does Not

Stop, the FHWA proposes to add a GUIDANCE statement to recommend that plaques with appropriate alternative messages, such as TRAFFIC FROM LEFT DOES NOT STOP, be used at intersections where STOP signs control all but one approach to the intersection. The FHWA proposes this change to be consistent with proposed changes in Chapter 2B.

138. In existing Section 2C.51 (new Section 2C.63) SHARE THE ROAD Plaque, the FHWA proposes to add a new STANDARD that requires that the SHARE THE ROAD plaque be used only as a supplement to a Vehicular Traffic or Nonvehicular sign. The FHWA proposes this change to provide road users with more clarity on the type of vehicle or nonvehicle that may be present, and because plaques are not intended for independent use.

139. In existing Section 2C.53 (new Section 2C.65) Photo Enforced Plaque, the FHWA proposes replacing the existing “PHOTO ENFORCED” word message plaque with a new symbol plaque designated as W16-10P. The existing word message plaque would be retained as an alternate to the new symbol plaque and its sign number reassigned as W16-10aP. The proposed new symbol plaque is illustrated in Figure 2C-14. The FHWA proposes this change based on preliminary results of the “Evaluation of Symbol Signs” study.<sup>63</sup>

140. The FHWA proposes to add a new section following existing Section 2C.53 (new Section 2C.65). The new section is numbered and titled, “Section 2C.66 METRIC Plaque” at the end of the section. This proposed new section contains a GUIDANCE statement that recommends the use of the METRIC plaque above a Weight Limits sign that shows the load limits in metric units. This plaque is currently illustrated in existing Figure 2B-8 and has a regulatory sign code, even though it has a black legend on a yellow background and is intended to warn road users that the values on the regulatory sign are in metrics. Accordingly, the FHWA proposes redesignating this plaque as a warning plaque and adding text regarding its use to Chapter 2C.

141. Following proposed Section 2C.66, the FHWA also proposes to add a new Section numbered and titled, “Section 2C.67 NEW Plaque” that describes the use of this optional plaque that may be mounted above a regulatory

<sup>61</sup> “Synthesis of Non-MUTCD Traffic Signs,” FHWA, December 2005, pages 41–42, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>62</sup> “Synthesis of Non-MUTCD Traffic Signs,” FHWA, December 2005, page 33, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>63</sup> Preliminary results from “Evaluation of Symbol Signs,” conducted by Bryan Katz, Gene Hawkins, and Jason Kennedy for the Traffic Control Devices Pooled Fund Study, can be viewed at the following Internet Web site: [http://www.pooledfund.org/documents/TPF-5\\_065/PresSymbolSign.pdf](http://www.pooledfund.org/documents/TPF-5_065/PresSymbolSign.pdf).

sign when a new traffic regulation takes effect or above an advance warning sign for a new traffic regulation. The FHWA proposes that the use of this plaque be limited to 6 months after the traffic regulation has been in effect. The FHWA proposes this new plaque based on the Sign Synthesis Study,<sup>64</sup> which showed that some States and Canadian provinces are using similar plaques and signs for this purpose, and to provide a uniform plaque design for consistency. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

142. The FHWA also proposes two additional sections at the end of the Chapter numbered and titled, "Section 2C.68 LAST EXIT BEFORE TOLL Plaque" and "Section 2C.69 Stop Ahead Pay Toll Plaque" that describe the use of these proposed new plaques. The FHWA proposes the use of these plaques to provide for consistency and uniformity of signing for these messages and to implement the signing portions of FHWA's "Toll Plaza Traffic Control Devices Policy."<sup>65</sup> The FHWA proposes a phase-in compliance period of 10 years for existing locations to minimize any impact on State or local highway agencies.

#### Discussion of Proposed Amendments Within Chapter 2D—General

143. In existing Section 2D.28 (new Section 2D.31) Junction Assembly, existing Section 2D.29 (new Section 2D.32) Advance Route Turn Assembly, and existing Section 2D.35 (new Section 2D.42) Location of Destination Signs, the FHWA proposes to revise the requirements and recommendations for the locations of these signs. In new Section 2D.31, the FHWA proposes revising the required distances to recommended distances, and in new Sections 2D.32 and 2D.42, the FHWA proposes adding new recommendations regarding the distances between signs. The FHWA proposes these changes in order to provide more flexibility for the placement of these various signs, particularly as it relates to rural areas, and to indicate that the dimensions shown on Figure 2D-7 are recommendations.

<sup>64</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 33, can be viewed at the following Internet Web site: [http://tc.d.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tc.d.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>65</sup> "Toll Plaza Traffic Control Devices Policy," dated September 8, 2006, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/policy/tcstollmemo/tcstoll\\_policy.htm](http://mutcd.fhwa.dot.gov/resources/policy/tcstollmemo/tcstoll_policy.htm).

#### Discussion of Proposed Amendments Within Chapter 2D—Specific

144. In Section 2D.07 Amount of Legend, the FHWA proposes to revise the GUIDANCE statement to clarify that guide signs should be limited to no more than three lines of destinations, and that action information should be provided on guide signs in addition to the destinations, where appropriate. The FHWA proposes this change to reduce confusion regarding the number of lines on a guide sign and to address the results of recent NCHRP research on driver information overload.<sup>66</sup>

In addition, the FHWA proposes to revise the OPTION statement and add a STANDARD statement regarding the use of pictographs on guide signs. The FHWA proposes these changes in order to incorporate information regarding pictographs in the MUTCD, to reflect FHWA's Official Interpretation numbers 2-540(I)<sup>67</sup> and 2-565(I)<sup>68</sup> and to restrict the maximum size of such pictographs so that they do not detract from the primary legend of the signs.

145. In Section 2D.08 Arrows, the FHWA proposes to make several revisions to this section to clarify the use and design of arrows on guide signs. In the first STANDARD statement, the FHWA proposes to require that down arrows on overhead signs shall always be vertical and positioned directly over the approximate center of the applicable lane. However, the FHWA also proposes to add an OPTION statement that permits diagonal arrows pointing diagonally downward on overhead guide signs only if each arrow is located directly over the center of the lane and only for the purpose of emphasizing a separation of diverging roadways. Some States have installed overhead guide signs with downward slanting arrows that are not centered over the appropriate lanes, but pointing toward the center of a lane, only for the purpose of reducing sign size. The FHWA believes that overhead signs with arrows designed and oriented in this fashion are confusing to drivers because they imply movement out of a lane. The FHWA proposes these changes to prohibit the use of diagonally slanted down arrows on overhead guide signs to

<sup>66</sup> NCHRP Report 488, "Additional Investigations on Driver Information Overload" 2006, page 65, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_488c.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_488c.pdf).

<sup>67</sup> This official interpretation can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interpretations/2\\_540.htm](http://mutcd.fhwa.dot.gov/resources/interpretations/2_540.htm).

<sup>68</sup> This official interpretation can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interpretations/2\\_565.htm](http://mutcd.fhwa.dot.gov/resources/interpretations/2_565.htm).

indicate a specific lane where roadways do not diverge, in order to reduce this confusion and assure consistent sign design practices. In concert with this proposed change, the FHWA proposes to add a paragraph to the STANDARD statement prohibiting the use of more than one down and/or diagonal arrow pointing to the same lane, for the same reasons. The FHWA proposes a phase-in compliance period of 15 years for existing signs in good condition to minimize any impact on State or local highway agencies.

The FHWA also proposes to add an OPTION statement to permit the use of curved-stem arrows that represent the intended driver paths to destinations involving left-turn movements on guide signs on approaches to roundabouts. The FHWA proposes to add a paragraph to the following GUIDANCE statement that references readers to the appropriate sections that describe the principles for such arrows.

Finally, the FHWA proposes to revise Figure 2D-2 and the text of Section 2D.08 to describe and illustrate the various types of arrows used on guide signs, to clarify appropriate arrow use.

146. In Section 2D.11 Design of Route Signs, the FHWA proposes to change the second sentence of the second OPTION statement to a GUIDANCE statement to recommend, rather than just allow, the use of a white square or rectangle behind the Off-Interstate Business Route sign when it is used on a green guide sign. The FHWA proposes this change to enhance the conspicuity of the Off-Interstate Business Route sign in this usage, since the green route sign alone blends into the green guide sign background.

147. In Section 2D.12 Design of Route Sign Auxiliaries, the FHWA proposes to add a GUIDANCE statement clarifying that if a route sign and its auxiliary signs are combined in a single sign, the background color of the sign should be green, and a STANDARD that auxiliary signs shall not be mounted directly to a guide sign. If placed on a green guide sign background, the legends of the auxiliary messages shall be white legend placed directly on the green background. The FHWA proposes these changes to provide consistency for background colors, because background colors currently in use for this application are not consistent across the country and green is the appropriate background color for a directional guide sign, and to preclude mis-application of auxiliary signs on green guide signs.

148. In Section 2D.14 Combination Junction Sign, the FHWA proposes to delete the 2nd paragraph of the OPTION statement that permitted the use of other

designs to accommodate State and county route signs. The FHWA proposes this change, because it was not the intent to allow agencies to use their own unique designs that do not match the design of the M2-2 sign.

149. The FHWA proposes to add a section following Section 2D.22. The new section is numbered and titled, "Section 2D.23 BEGIN Auxiliary Sign" and contains OPTION and STANDARD statements regarding the use of this proposed new sign where a numbered route begins. The FHWA proposes this sign based on the Sign Synthesis Study<sup>69</sup> that revealed that several States use an auxiliary BEGIN sign above the confirming route marker at the start of a route to provide additional helpful information to road users. The remaining sections would be renumbered accordingly.

150. The FHWA proposes to add two new sections following existing Section 2D.23 (new Section 2D.24). The two new sections are numbered and titled, "Section 2D.25 TOLL Auxiliary Sign" and "Section 2D.26 Electronic Toll Collection Only Auxiliary Signs." The Signs Synthesis Study<sup>70</sup> found that some States are using the TOLL auxiliary sign to provide road users useful information that a numbered route is a toll facility. The proposed Electronic Toll Collection Only auxiliary sign would complement and be consistent with signs proposed in Chapters 2B and 2E to inform road users that a highway is restricted to use only by ETC-equipped vehicles. The FHWA also proposes to add a new Figure 2D-5 to illustrate these signs. The FHWA proposes these new signs to provide consistency and uniformity in signing applications for toll facilities. The remaining sections and figures would be renumbered accordingly. The FHWA proposes a phase-in compliance period of 5 years for existing signs in good condition to minimize any impact on State or local highway agencies.

151. In existing Section 2D.26 (new Section 2D.29) Directional Arrow Auxiliary Signs, the FHWA proposes to add that a Directional Arrow auxiliary sign that displays a double-headed arrow shall not be mounted in advance of or at a roundabout. The FHWA proposes this change to eliminate any

possible confusion that would be created by the use of this sign in the proximity of a roundabout, where direct left turns are not allowed.

152. In existing Section 2D.27 (new Section 2D.30) Route Sign Assemblies, the FHWA proposes to add a paragraph to the OPTION statement allowing diagrammatic route sign formats to be used on approaches to roundabouts. The FHWA proposes this change to incorporate signing for roundabouts in the MUTCD.

153. The FHWA proposes to add a new section following existing Section 2D.29 (new Section 2D.32). The new section is numbered and titled, "Section 2D.33 Lane Designation Auxiliary Signs" and contains an OPTION statement regarding the use of these optional signs that may be used as a method to tell road users which lane to get into to travel a particular numbered route and direction. The FHWA also proposes to add an additional illustration in existing Figure 2D-6 to illustrate the use of these auxiliary signs. The FHWA proposes these new signs based on the results of the Sign Synthesis Study,<sup>71</sup> which found that at least seven States use M6 auxiliary signs stating "Left Lane," "Center Lane," or "Right Lane" below route signs in route sign assemblies. This can be an economical alternative to one or more larger green guide signs in certain situations. The remaining sections would be renumbered accordingly.

154. The FHWA proposes to add a new section following existing Section 2D.30 (new Section 2D.34). The new section is numbered and titled, "Section 2D.35 Combination Lane Use/ Destination Overhead Guide Sign" and contains OPTION and GUIDANCE statements, as well as a figure, describing the use of these optional signs. The FHWA proposes this new section, and the associated signs, based on the Sign Synthesis Study.<sup>72</sup> At complex intersections involving multiple turn lanes, multiple destinations, service roads, and/or various constraints often found in urban areas that can limit the ability to use of a series of advance signs, many States have found it necessary to combine regulatory lane use information with destination information onto a single

guide sign or sign assembly, especially to aid unfamiliar drivers in determining which lane or lanes to use for a particular destination. However, there is no consistency or uniformity in the colors used, the sign design layouts, or other aspects of these signs. The FHWA proposes a uniform design for this type of sign, to provide consistency for road users. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

155. In existing Section 2D.32 (new Section 2D.37) Trailblazer Assembly, the FHWA proposes to add a GUIDANCE statement to recommend that if shields or other similar signs are used to provide route guidance in following a trail, they should be designed in accordance with the sizes and other design principles for route signs, such as those described in Sections 2D.10 through 2D.12. The FHWA proposes this change to address situations where route signs used for named trails do not have route numbers.

156. The FHWA proposes adding a new section that is numbered and titled "Section 2D.40 Destination Signs at Roundabouts" and contains a STANDARD, OPTION and SUPPORT statements, as well as figures, regarding the use of Destination Signs at Roundabouts. In particular, the proposed Section includes information regarding Exit destination signs, and associated arrows and diagrammatic signs for roundabouts. The remaining sections and figures in Chapter 2D would be renumbered accordingly.

157. The FHWA also proposes to add a new section numbered and titled, "Section 2D.41 Destination Signs at Jughandles." The FHWA proposes this new section because guide signing in advance of a jughandle, in addition to regulatory signing, which was discussed in Chapter 2B, is critical to advise potential left-turn or U-turn drivers of the need to move to the right and prepare to execute a right turn either before or beyond the intersection in order to reach their destination. The FHWA proposes optional use of diagrammatic-style destination signs for use at jughandles where standard directional guide signs are insufficient. A reference to a proposed new figure in Chapter 2B illustrating both regulatory and guide signs for jughandles would also be added. The remaining sections in Chapter 2D would be renumbered accordingly.

158. In existing Section 2D.38 (new Section 2D.45) Street Name Signs, the FHWA proposes to add a new OPTION statement to allow the use of a route

<sup>69</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 52, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>70</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 52, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>71</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 53, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>72</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, pages 45-46, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

shield on Street Name signs to assist road users who may not otherwise be able to associate the name of the street with the route number. The FHWA proposes to allow the use of these signs based on the results of the Sign Synthesis Study,<sup>73</sup> which showed that several agencies incorporate route shields into Street Name signs on streets that are part of a U.S., State, or county numbered route. Typically route sign assemblies are only provided on intersecting roads that are also numbered routes, and on some very major unnumbered streets within cities. Including a route shield within the Street Name sign provides additional information for traffic on the lesser streets that intersect the numbered route. This is helpful to unfamiliar road users who may be attempting to find their way back to a numbered route and who do not recognize the street name.

159. The FHWA proposes to add a new table numbered and titled, "Table 2D-2 Recommended Minimum Letter Heights on Street Name Signs" that contains information regarding the letter sizes to be used on Street Name signs based on the mounting type, road classification, and speed limit. FHWA proposes to add information in existing Section 2D.38 (new Section 2D.45) related to this new table.

The FHWA also proposes to revise the GUIDANCE to recommend that a pictograph used on a Street Name sign to identify a governmental jurisdiction or other government-approved institution should be positioned to the right, rather than the left, of the street name. The FHWA proposes this change because the name of the street is the primary message on the sign and the pictograph is secondary, and the primary message should be read first by being on the left. The FHWA proposes a phase-in compliance period of 15 years for the placement of the pictograph to the right of the street name sign for existing signs in good condition to minimize any impact on State or local highway agencies.

The FHWA also proposes to add new OPTION, STANDARD, and GUIDANCE statements regarding the use of alternative background colors for Street Name Signs where a highway agency determines that this is necessary to assist road users in determining jurisdictional authority for roads. The FHWA proposes that the only acceptable alternatives to green for the background color of Street Name signs

shall be blue, brown, or black. The FHWA proposes these new statements because the MUTCD has not previously limited the alternate colors, and as a result, there is wide variation in practice among jurisdictions. Sometimes inappropriate colors are being used, because these are colors reserved for other traffic control device messages, or the colors used have poor contrast ratio between legend and background. The FHWA proposes a phase-in compliance period of 15 years for existing street name signs in good condition to minimize any impact on State or local highway agencies. The FHWA also proposes to add to the OPTION to specifically allow the border to be omitted on Street Name signs. The current text of this section implies, but does not specifically state, that the border may be omitted.

160. In existing Section 2D.39 (new Section 2D.46) Advance Street Name Signs, the FHWA proposes to add GUIDANCE statement and a reference to Figure 2C-14 that recommends the order in which street names should be displayed on an Advance Street Name plaque, in order to provide for improved consistency in this type of signing.

161. The FHWA proposes to relocate the information from existing Section 2E.49 to Chapter 2D to become a new section numbered and titled, "Section 2D.47 Signing on Conventional Roads on Approaches to Interchanges." The FHWA proposes this change because the information in this section, and the associated figures, are about guide signing on conventional road approaches to a freeway, rather than signing on a freeway.

In this relocated section, the FHWA proposes to add a STANDARD statement to require, rather than merely recommend, that on multi-lane conventional road approaches to any freeway interchange, guide signs shall be provided to identify which direction of turn is to be made for ramp access and/or which specific lane to use to enter each direction of the freeway. This information is critical for drivers on a multi-lane approach to an interchange because it allows drivers to choose the proper lane in advance and reduces the need to make last-second lane changes close to the entrance ramp. The FHWA believes that the existing GUIDANCE statements are not strong enough for this very important need and that this signing needs to be mandatory. The FHWA proposes a phase-in compliance period of 10 years for existing locations to minimize any impact on State or local highway agencies.

162. The FHWA proposes to relocate the information from existing Section

2E.50 to Chapter 2D to become a new section numbered and titled, "Section 2D.48 Freeway Entrance Signs." The FHWA proposes this change so that all signing on conventional roads at and in advance of interchanges with freeways is located in the same area of the Manual.

163. The FHWA proposes to add a new sign to existing Section 2D.40 (new Section 2D.49) and retitle the section, "Parking Area or Parking Wayfinding Sign." The FHWA proposes to add this new sign, which is a vertical rectangle with a white letter P in a blue circle symbol at the top of the sign and a blue directional arrow at the bottom of the sign. This sign would be an alternative to the existing Parking Area directional sign and would give agencies a consistent parking guide sign to use in community wayfinding programs. This new sign is consistent with the widespread use of the blue background and white P as a parking wayfinding symbol throughout Europe and at many airports and institutional sites in the United States.

164. The FHWA proposes to relocate existing Sections 2D.42 Rest Area Signs, 2D.43 Scenic Area Signs, and 2D.45 General Service Signs to a new Chapter titled, "Chapter 2F General Service Signs" in order to combine information regarding similar type signs in to one area of the Manual.

165. The FHWA proposes to relocate existing Sections 2D.46 Reference Location Signs and Intermediate Reference Location Signs, 2D.47 Traffic Signal Speed Sign, 2D.48 General Information Signs, the first four paragraphs of 2D.49 Signing of Named Highways, and 2D.50 Trail Signs to a new Chapter titled, "Chapter 2I General Information Signs."

166. The FHWA proposes adding a new section numbered and titled "Section 2D.52 Community Wayfinding Signs" that contains SUPPORT, STANDARD, OPTION and GUIDANCE statements, as well as two new figures, regarding the use of community wayfinding guide signs to direct tourists and other road users to key civic, cultural, visitor, and recreational attractions and other destinations within a city or a local urbanized or downtown area. The remaining sections and figures in Chapter 2D would be renumbered accordingly.

Many of the cities currently using community wayfinding signs are using different colors, design layouts, fonts, and arrows, and many of these signs are not well designed to properly serve road users. The FHWA proposes to add this section to provide a uniform set of provisions for design and locations of

<sup>73</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 47, can be viewed at the following Internet Web site: [http://tdl.tamu.edu/documents/rwsc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tdl.tamu.edu/documents/rwsc/Signs_Synthesis-Final_Dec2005.pdf).



these signs based on accepted sign design principles, to achieve consistency for road users. The FHWA proposes a phase-in compliance period of 15 years for existing signs in good condition to minimize any impact on State or local highway agencies.

167. The FHWA proposes to add two new sections numbered and titled, "Section 2D.53 Truck, Passing, or Climbing Lane Signs" and "Section 2D.54 Slow Vehicle Turn-Out Sign." The FHWA proposes to add Section 2D.53 to be consistent with the proposed elimination of regulatory truck lane signs from existing Section 2B.32 (new Section 2B.39). These types of signs convey guidance information, rather than regulation.

The FHWA proposes Section 2D.54 based on the results of the Sign Synthesis Study,<sup>74</sup> which found that these signs are being used by a number of States. See also the discussion of this topic under Chapter 2B above. The FHWA also proposes to add a new Figure 2D-21 to illustrate these signs. The remaining sections and figures in Chapter 2D would be renumbered accordingly. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

#### Discussion of Proposed Amendments Within Chapter 2E

168. In section 2E.01 Scope of Freeway and Expressway Guide Sign Standards, the FHWA proposes to revise the STANDARD statement to clarify that Chapter 2E shall apply to any highway that meets the definition of freeway or expressway facilities. The FHWA proposes this revision to make it clear that not just the Standards, but also the Guidance and Option statements in Chapter 2E apply to freeway and expressway guide signs. This includes STANDARD, SUPPORT, AND OPTION statements that refer to Section 2A.11 Dimensions which clarifies the intended application of the standard sign designs in Table 2E-1.

169. The FHWA proposes to relocate existing Section 2E.24 Guide Sign Classification to appear earlier in the Chapter as Section 2E.03. The FHWA believes that guide sign classification should appear earlier in the chapter, because this section identifies the various groups of freeway/expressway guide signs by name. The remaining

sections would be renumbered accordingly.

170. The FHWA proposes to relocate the existing text of existing Section 2E.08 Memorial Highway Signing to new Section 2I.07. The FHWA also proposes to add a new Section 2E.09 titled Signing of Named Highways with a SUPPORT statement to refer to new Sections 2D.55 and 2I.07, where appropriate information is provided about use of highway names on signing of unnumbered highways and memorial signing of routes, bridges, or highway components.

171. In existing Section 2E.09 (new Section 2E.10) Amount of Legend on Guide Signs, the FHWA proposes to add information to the existing GUIDANCE and OPTION statement, as well as to add a new STANDARD statement regarding the use of pictographs on freeway and expressway guide signs. This information is similar to that proposed in Section 2D.07 Amount of Legend, but maintains the distinct requirements for freeway/expressway lines of legend.

172. In existing Section 2E.18 (new Section 2E.19) Arrows for Interchange Guide Signs, the FHWA proposes to make several revisions to this section to clarify the use and design of arrows on guide signs. The FHWA proposes these changes to be consistent with proposed changes in Chapter 2D as discussed above regarding Section 2D.08. The FHWA proposes a phase-in compliance period of 15 years for existing signs in good condition to minimize any impact on State or local highway agencies.

173. The FHWA proposes significant changes to the first STANDARD and GUIDANCE statements in existing Section 2E.19 (new Section 2E.20) Diagrammatic Signs to specify a specific design for diagrammatic signs for multi-lane exits that have an optional exit lane that also carries the through road and for splits that include an optional lane. The proposed design features an upward arrow per lane and is consistent with the recommendations of the Older Driver handbook.<sup>75</sup> The FHWA believes that the up arrow per lane style of diagrammatic signs, including the appropriate use of EXIT ONLY sign panels, is the clearest and most effective method of displaying to road users the essential information about the proper and allowable lanes to use to reach their destinations with this "option lane" lane use for exits. The existing

diagrammatic sign design that attempts to illustrate optional lane use via dotted lane lines on a single arrow shaft is too subtle to be easily recognized and understood by many road users, especially older drivers. A recent study<sup>76</sup> confirmed that the up arrow per lane diagrammatic design is significantly superior to the existing diagrammatic design or enhancements thereto in terms of providing a longer decision sight distance and higher rates of road user comprehension. Because of the nature of the combination of lane use and geometry, the FHWA believes that the proposed new type of diagrammatic signing should be mandatory for this type of exit. The FHWA also proposes to revise the 2nd STANDARD statement to require the use of diagrammatic signs at certain types of cloverleaf interchanges, where: (1) The outer (non-loop) exit ramp of a cloverleaf is a multi-lane exit having an optional exit lane that also carries the through route, and (2) a cloverleaf interchange that includes a collector-distributor roadway that is accessed from the main roadway by a multi-lane exit having an optional exit lane that also carries the through route. The FHWA proposes these changes for consistency with the general proposed change to require the proposed new style of diagrammatic signs for multi-lane exits that have an optional exit lane that also carries the through route and for splits that include an optional lane. The FHWA proposes a phase-in compliance period of 15 years for existing signs in good condition to minimize any impact on State or local highway agencies.

Finally, the FHWA proposes to add an OPTION statement at the end of the section to permit the use of an EXIT XX km/h (XX MPH) legend at the bottom of a diagrammatic sign to supplement, but not to replace, the exit or ramp advisory speed warning signs where extra emphasis of an especially low advisory ramp speed is needed. The Sign Synthesis Study<sup>77</sup> found that at least four States have found it necessary to use similar advisory speed panels with Exit Direction and/or diagrammatic guide signs to provide even more advance notice and emphasis of a very

<sup>76</sup> "Diagrammatic Sign Study—Preliminary Results," conducted by Gary Golembiewski and Bryan Katz for the Traffic Control Devices Pooled Fund Study, can be viewed at the following Internet Web site: [http://www.pooledfund.org/documents/TPF-5\\_065/PresDiagrammaticSigns.pdf](http://www.pooledfund.org/documents/TPF-5_065/PresDiagrammaticSigns.pdf).

<sup>77</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 51, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis\\_Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis_Final_Dec2005.pdf).

<sup>74</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 46, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis\\_Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis_Final_Dec2005.pdf).

<sup>75</sup> "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians," FHWA Report no. FHWA-RD-01-051, May, 2001, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01105/cover.htm>. Recommendation II.A(3)

low ramp speed, typically because of curvature.

174. In existing Section 2E.20 (new Section 2E.21) Signing for Interchange Lane Drops, the FHWA proposes to change the first GUIDANCE statement to a STANDARD statement to require the use of the EXIT ONLY (down arrow) sign panel on signing of lane drops on all overhead advance guide signs for exits that do not have an "option lane," and to provide design requirements for the bottom portion of Exit Direction signs. The FHWA proposes these requirements to provide consistency with other proposed changes in the Manual, especially related to the use of arrows that are better understood by older drivers. The FHWA believes that, for freeway splits and other interchange configurations that include a lane drop but do not involve "option lanes," the use of down arrows and EXIT ONLY sign panels over each lane on the advance guide signs is the clearest and most effective method of displaying to road users the essential information about the lane drop and about the proper lane(s) to use to reach their destinations. The FHWA also believes that the use of upward diagonal black arrows within an EXIT ONLY panel at the bottom of the Exit Direction signs for such interchanges more clearly reinforces the lane drop while still providing upward diagonal arrows in the direction of the exit. The FHWA proposes a phase-in compliance period of 15 years for existing signs in good condition to minimize any impact on State or local highway agencies.

175. The FHWA proposes to relocate the information from Section 2E.21 Changeable Message Signs to proposed new Chapter 2M, where all information on Changeable Message Signs would be consolidated. The remaining sections would be renumbered accordingly.

176. The FHWA proposes to relocate existing Section 2E.24 Guide Sign Classification to appear earlier in the Chapter as Section 2E.03. The FHWA believes that guide sign classification should appear earlier in the chapter because this section identifies the various groups of freeway/expressway guide signs by name. The remaining sections would be renumbered accordingly.

177. In existing Section 2E.28 (new Section 2E.27) Interchange Exit Numbering, the FHWA proposes to revise the 1st STANDARD statement to require that if suffix letters are used for exit numbering at a multi-exit interchange, the suffix letter shall be included on the exit number plaque and shall be separated from the exit number by a space having a width of at least half

of the height of the suffix letter. The FHWA proposes this change in order to provide practitioners with more direction on the space between the exit number and the suffix than was previously provided in the MUTCD or the Standard Highway Signs and Markings book. This will enhance the legibility of the exit number and help avoid confusion.

In addition, the FHWA proposes to add a paragraph to the 1st STANDARD statement to make it clear that if suffix letters are used for exit numbering, an exit of the same number without a suffix letter cannot be used.

The FHWA also proposes to delete the Option statement and replace it with a new Standard stating that interchange exit numbering shall use the reference location exit numbering method and the consecutive exit numbering method shall not be used. The FHWA proposes this change because only 8 of the 50 States still use consecutive exit numbering and the vast majority of road users now expect reference location exit numbering. The FHWA believes that road users will be best served by nationwide uniformity of exit numbering using the reference location method.

The FHWA also proposes to change the 2nd paragraph of the first GUIDANCE statement to a STANDARD to require that a Left Exit Number (E1-5bP) plaque be used at the top left edge of the sign for numbered exits to the left to alert users that the exit is to the left, which is often not expected. This proposed change also requires that the "LEFT" message be black on a yellow background.

The FHWA proposes these changes for consistency of message to drivers and for consistency with other parts of the manual. The FHWA proposes a phase-in compliance period for the new requirements of new Section 2E.27 of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

178. In existing Section 2E.30 (new Section 2E.29) Advance Guide Signs and in existing Section 2E.33 (new Section 2E.32) Exit Direction Signs, the FHWA proposes to add a STANDARD statement to require that a Left Exit Number (E1-5bP) plaque be used at the top left edge of the sign for numbered exits to the left and that a LEFT (E1-5aP) plaque be added to the top left edge of the sign for non-numbered exits to the left. The FHWA proposes this new text to be consistent with the proposed changes in existing Section 2E.28 (new Section 2E.27). The FHWA proposes a phase-in compliance period of 10 years for existing signs in good

condition to minimize any impact on State or local highway agencies.

The FHWA also proposes to change the first sentence of the OPTION statement to a GUIDANCE to recommend, rather than merely permit, that the word "EXIT" be omitted from the bottom line where interchange exit number plaques are used. The FHWA proposes this change in order to avoid duplication of the EXIT message on the exit number plaque and on the guide sign.

179. In existing Section 2E.33 (new Section 2E.32) Exit Direction Signs, the FHWA proposes to add requirements to the 2nd STANDARD statement regarding the use of diagrammatic signs and the use of plaques with these signs for left exits. The FHWA proposes this new text to be consistent with other proposed changes in the manual regarding diagrammatic signs and plaques for left exits. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

Finally, the FHWA proposes to add a paragraph to the last existing OPTION statement to permit the use of an EXIT XX km/h (XX MPH) legend at the bottom of the Exit Direction sign to supplement, but not to replace, the exit or ramp advisory speed warning signs where extra emphasis of an especially low advisory ramp speed is needed. This may be done by adding an EXIT XX km/h (XX MPH) sign panel to the face of the Exit Direction sign near the bottom of the sign or by making the EXIT XX km/h (XX MPH) message a part of the Exit Direction sign. The Sign Synthesis Study<sup>78</sup> found that at least four States have found it necessary to use similar advisory speed panels with Exit Direction signs to provide even more advance notice and emphasis of a very low ramp speed, typically because of curvature.

180. In existing Section 2E.34 (new Section 2E.33) Exit Gore Signs, the FHWA proposes to revise the STANDARD statement to clarify that the space between the exit number and the suffix letter on an Exit Gore Sign shall be the width of at least half of the height of the suffix letter. This proposed change correlates to a similar proposed change in existing Section 2E.28 (new Section 2E.27) Interchange Exit Numbering.

The FHWA also proposes to add a paragraph to the OPTION statement

<sup>78</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 51, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

allowing the use of Type 1 object markers on sign supports below the Exit Gore sign to improve the visibility of the gore for exiting drivers. The FHWA proposes this change based on recommendations from the Older Driver handbook.<sup>79</sup>

Finally, the FHWA proposes to add an OPTION paragraph allowing the use of a vertical rectangular shaped Exit Gore sign for certain narrow gore areas, and an OPTION paragraph allowing the use of an Exit Number (E5-1bP) plaque above existing Exit Gore (E5-1) signs only when non-numbered exits are converted to numbered exits, and a STANDARD paragraph requiring the use of the Exit Gore (E5-1a) sign when replacement of existing assemblies of the E5-1 and E5-1bP signs becomes necessary. The FHWA proposes these changes to provide for more uniform design of Exit Gore signs.

181. In existing Section 2E.41 (new Section 2E.40), Freeway-to-Freeway Interchange, the FHWA proposes to add a STANDARD statement requiring the use the word "LEFT" at splits where the off-route movement is to the left, and the use of diagrammatic signs for freeway splits with an option lane and for multi-lane freeway-to-freeway exits having an option lane. The FHWA proposes these changes to be consistent with other proposed changes in the Manual. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

182. In Section 2E.45 (new Section 2E.44) Diamond Interchange, the FHWA proposes removing the second sentence of the first STANDARD statement regarding the prohibition of cardinal initials on exit numbers. This sentence is not applicable for a diamond interchange, because they have a single exit ramp. Existing Section 2E.28 (new Section 2E.27) Interchange Exit Numbering already contains a prohibition on the use of cardinal directions as the suffix of exit numbers.

183. The FHWA proposes to move the information from existing Section 2E.49 (new Section 2E.48) Signing on Conventional Road Approaches and Connecting Roadways to Section 2D.47, and leave a SUPPORT statement to refer readers to the appropriate section. The FHWA proposes this change because the section and figures are about guide signing on conventional road

approaches to a freeway, and therefore, are more appropriate for Chapter 2D.

184. The FHWA proposes to move a majority of the information from existing Section 2E.50 (new Section 2E.49) Wrong-Way Traffic Control at Interchange Ramps to Section 2B.48, and leave a SUPPORT statement to refer readers to the appropriate section. The FHWA proposes this change because the section and figure relate more to regulatory signs than guide signs, and therefore, are more appropriate for Chapter 2B.

185. The FHWA proposes to relocate existing Sections 2E.51 General Service Signs, 2E.52 Rest and Scenic Area Signs, Section 2E.53 Tourist Information and Welcome Center Signs, Section 2E.56 Radio Information Signing, and 2E.57 Carpool and Rideshare Signing to a new Chapter titled, "Chapter 2F General Service Signs."

186. The FHWA proposes to relocate existing Sections 2E.54 Reference Location Signs and Enhanced Reference Location Signs and 2E.55 Miscellaneous Guide Signs to a new Chapter titled, "Chapter 2I General Information Signs."

187. The FHWA proposes to split existing Section 2E.59 into four sections and substantially edit the material. The resulting sections would be numbered and titled, "Section 2E.51 Preferential Lane Guide Signs—General," "Section 2E.52 Guide Signs for Initial Entry Points to Preferential Lanes," "Section 2E.53 Guide Signs for Intermediate Entry Points to Preferential Lanes," and "Section 2E.54 Guide Signs for Exits From Preferential Lanes to General Purpose Lanes or Directly to Another Highway." The FHWA proposes this reorganization of material to improve consistency and understanding by grouping like material together. In conjunction with these changes, the FHWA proposes a variety of changes in the technical provisions, sign designs, and figures for preferential lane guide signing, to reflect the state of practice and for enhanced sign conspicuity and legibility and to reflect recent FHWA policy guidance regarding traffic control devices for preferential lane facilities.<sup>80</sup> The FHWA also proposes new information in these sections to incorporate new provisions regarding managed lanes and lanes reserved only for vehicles equipped for Electronic Toll Collection, which are forms of preferential lanes. With the increasing use of these types of preferential lanes and the continuing emphasis on

congestion management, the FHWA believes it is important for the state of the practice for signing of such lanes, based on recent policy and guidance document,<sup>81</sup> to be incorporated into the MUTCD to enhance signing uniformity. The remaining sections would be renumbered accordingly. The FHWA proposes a phase-in compliance period of 10 years for existing preferential lane signing in good condition to minimize any impact on State or local highway agencies.

188. The FHWA also proposes to add six new sections to Chapter 2E that describe the design and application of signs at conventional toll facilities and for ETC facilities. The proposed new sections are numbered and titled, "Section 2E.55 Toll Facility and Toll Plaza Guide Signs—General," "Section 2E.56 Advance Signs for Conventional Toll Plazas," "Section 2E.57 Advance Signs for Toll Plazas on Diverging Alignments From Open Road ETC Only Lanes," "Section 2E.58 Toll Plaza Canopy Signs," "Section 2E.59 Guide Signs for Entrances to ETC-Only Facilities," and "Section 2E.60 ETC Program Information Signs." The FHWA proposes these new sections and the associated text and figures to implement the recommendations of the Toll Plaza Best Practices and Recommendations report<sup>82</sup> and to reflect the state of the practice for electronic toll collection signing. The FHWA proposes a phase-in compliance period of 10 years for existing signs for toll facility and toll plaza signing to minimize any impact on State or local highway agencies.

As a part of these changes, the FHWA proposes to adopt new symbols to denote exact change and attended lanes, for use in toll plaza signing. The FHWA believes that symbols for these messages will help road users to more quickly identify the proper lane(s) to choose for the type of toll payment they will use. The proposed symbols are similar to those already in use for these purposes on some toll facilities in the U.S. as well as in Europe and Asia, and the FHWA also believes that such symbols will also aid in understanding by international travelers.

The FHWA also proposes a new symbol to be reserved for use when a toll facility's ETC payment system is nationally interoperable with all other ETC payment systems. Although such

<sup>79</sup> "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians," FHWA Report no. FHWA-RD-01-051, May, 2001, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/011105/cover.htm>. Recommendation II.A(4b).

<sup>80</sup> The FHWA's August 3, 2007 policy memorandum can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/policy/tcdpflmemo/preferen\\_lanes\\_tcd.pdf](http://mutcd.fhwa.dot.gov/resources/policy/tcdpflmemo/preferen_lanes_tcd.pdf).

<sup>81</sup> Available FHWA guidance and handbooks on preferential lanes and managed lanes can be viewed at the following Internet Web site: <http://ops.fhwa.dot.gov/freewaymgmt/hov.htm>.

<sup>82</sup> "State of the Practice and Recommendations on Traffic Control Strategies at Toll Plazas," June 2006, can be viewed at the following Internet Web site: <http://mutcd.fhwa.dot.gov/rpt/tcstoll/index.htm>.

national interoperability is not yet available, toll operators are actively working on developing interoperability so that, for example, an EZ-Pass transponder will work on a California toll facility's FasTrak ETC payment system. When this interoperability becomes available in the future, it will take a number of years thereafter for all toll operators to transition to it and, during that transition period, there will be a need for signing to indicate to road users that a particular toll facility's payment system is nationally interoperable. The FHWA believes that it is in the best interest of uniformity, safety, and road user convenience for a standard symbol to be adopted prior to the transition period so that it is available when needed.

189. Finally, the FHWA proposes a new section numbered and titled, "Section 2E.61 Guide Signs for Managed Lanes" to provide SUPPORT, STANDARD, and GUIDANCE information related to guide signing for managed lanes with operational strategies such as tolls, vehicle occupancy requirements, and vehicle type restrictions that are variable and put into effect on a real-time basis to respond to changing conditions. The FHWA proposes this new section and the associated material for consistency with other proposed provisions regarding signing for preferential lanes and electronic toll collection, and to reflect the state of the practice in managed lanes as documented in FHWA publications regarding managed lanes.<sup>83</sup> The FHWA proposes a phase-in compliance period of 10 years for the new provisions for guide signs for managed lanes to minimize any impact on State or local highway agencies.

#### Discussion of Proposed Amendments Within Chapters 2F Through 2M

190. The FHWA proposes to add a new chapter numbered and titled, "Chapter 2F General Service Signs." This proposed new chapter contains several sections that the FHWA proposes to relocate from Chapters 2D and 2E in order to group similar sign types in the same area of the Manual.

191. The FHWA proposes to add a new section numbered and titled, "Section 2F.01 Sizes of General Service

Signs" and a new Table 2F-1 to indicate the sizes of the General Service signs and plaques. Proposed Sections 2F.02 General Service Signs for Conventional Roads and 2F.03 General Service Signs for Freeways and Expressways contain information in existing Sections 2D.45 and 2E.51, respectively.

192. In existing Section 2E.51 (new Section 2F.03) the FHWA proposes to change the design of the D9-16 Truck Parking general services sign as illustrated in Figure 2F-1. A recent study<sup>84</sup> tested several symbols for this message and found that the message can be successfully symbolized. The FHWA proposes to adopt the symbol that was found to be the easiest to comprehend and which provides the greatest legibility distance. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

193. The FHWA proposes to add a new section numbered and titled, "Section 2F.04 Interstate Oasis Signing" that contains SUPPORT, OPTION, STANDARD, and GUIDANCE statements regarding signing for facilities that have been designated by the State within which they are located as having met the eligibility criteria of FHWA's Interstate Oasis Policy.<sup>85</sup> The language of this proposed new section is based on the signing provisions of the Interstate Oasis Policy. The FHWA also proposes the adoption of a unique symbol for use on separate Interstate Oasis signs in conjunction with the word message. Preliminary human factors testing indicates that the proposed symbol provides optimum comprehension, conspicuity, and legibility. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

194. The FHWA proposes to combine the text from existing Sections 2D.42, 2D.43 and 2E.52 to create a new section numbered and titled, "Section 2F.05 Rest Area and Other Roadside Area Signs" so that similar information is located all in one area.

In conjunction with this change, the FHWA proposes changes to the text that would be relocated from Sections 2D.42

and 2D.43 to clarify the types of signs to be used at Rest Areas and at Scenic and Other Roadside Areas. Existing Section 2D.42 can be misinterpreted as meaning that restrooms are required in order to use the Parking Area, Roadside Table, Roadside Park, and Picnic Area signs, which was not FHWA's intent. Restrooms are only required at locations designated as Rest Areas. The FHWA also proposes to change the accompanying figures, accordingly.

The FHWA proposes to add two paragraphs to the OPTION statement at the end of the section to allow the use of the telecommunications devices for the deaf (TDD) Symbol Sign and the wireless Internet services (Wi-Fi) Symbol Sign to supplement advance guide signs for rest areas if such amenities are available. The FHWA proposes to add the TDD symbol based on the results of the Sign Synthesis Study<sup>86</sup> that showed that several States are using a similar sign, and because this sign design is specified by the Americans With Disabilities Act for use to indicate facilities that are equipped with TDD. The FHWA proposes the Wi-Fi symbol sign because many rest areas are being equipped with wireless Internet service for road users visiting these areas and many States are using word message or symbol signs to indicate the availability of this service in the rest area. The FHWA believes that a uniform symbol is needed for this rapidly expanding signing practice and preliminary human factors testing<sup>87</sup> indicates that the proposed symbol provides optimum comprehension, conspicuity, and legibility. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

195. The FHWA proposes to relocate the information from existing Section 2E.53 to become new section 2F.06 Tourist Information and Welcome Center Signs. The FHWA proposes this change, because the material is more in keeping with the content of proposed Chapter 2F. Additionally, the FHWA proposes to revise the design of the D9-10 Tourist Information general service sign as illustrated in Figure 2F-1. A

<sup>83</sup> "Managed Lanes—A Primer," FHWA publication number FHWA-HOP-05-031, can be viewed at the following Internet Web site: [http://www.ops.fhwa.dot.gov/publications/managelanes\\_primer/managed\\_lanes\\_primer.pdf](http://www.ops.fhwa.dot.gov/publications/managelanes_primer/managed_lanes_primer.pdf) and "Managed Lanes—A Cross-Cutting Study," FHWA report number FHWA-HOP-05-037, November, 2004, can be viewed at the following Internet Web site: [http://ops.fhwa.dot.gov/freewaygmt/publications/managed\\_lanes/crosscuttingstudy/final3\\_05.pdf](http://ops.fhwa.dot.gov/freewaygmt/publications/managed_lanes/crosscuttingstudy/final3_05.pdf).

<sup>84</sup> Preliminary results from "Evaluation of Symbol Signs," conducted by Bryan Katz, Gene Hawkins, and Jason Kennedy for the Traffic Control Devices Pooled Fund Study, can be viewed at the following Internet Web site: [http://www.pooledfund.org/documents/TPF-5\\_065/PresSymbolSign.pdf](http://www.pooledfund.org/documents/TPF-5_065/PresSymbolSign.pdf).

<sup>85</sup> FHWA's Interstate Oasis Policy, dated October 18, 2006, can be viewed at the following Internet Web site: [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2006\\_register&docid=E6-17367](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2006_register&docid=E6-17367).

<sup>86</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, page 48, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>87</sup> Preliminary results from "Evaluation of Symbol Signs," conducted by Bryan Katz, Gene Hawkins, and Jason Kennedy for the Traffic Control Devices Pooled Fund Study, can be viewed at the following Internet Web site: [http://www.pooledfund.org/documents/TPF-5\\_065/PresSymbolSign.pdf](http://www.pooledfund.org/documents/TPF-5_065/PresSymbolSign.pdf).

recent study<sup>88</sup> found that the meaning of the existing “question mark” symbol for this service is poorly understood by road users. The abbreviation “INFO” was fully understood by 96 percent of the participants in the human factors testing. Further, the FHWA believes that the term INFO is understandable in most languages. Although the legibility distance of the tested version of “INFO” was less than that of the existing symbol, the FHWA proposes a design featuring larger and bolder letters to provide legibility that is expected to be comparable to the existing symbol.

196. The proposed new Section 2F.07 Radio Information Signing contains information from existing Section 2E.56. In the last OPTION statement, the FHWA proposes to revise the legend of the D12-4 sign to use the word “CALL” rather than “DIAL” to be consistent with the D12-2 and D12-5 signs, and to reflect current terminology.

197. The FHWA proposes to add a new section numbered and titled, “Section 2F.08 TRAVEL INFO CALL 511 Sign” that incorporates text from existing Section 2D.45 associated with this sign.

198. The FHWA proposes to relocate the information from existing Section 2E.57 to become new Section 2F.09 Carpool and Ridesharing Signing. The FHWA proposes this change, because this material is more in keeping with the content in proposed Chapter 2F.

199. The FHWA proposes to add two new sections at the end of the chapter numbered and titled, “Section 2F.10 Brake Check Area Signs” and “Section 2F.11 Chain Up Area Signs.” The FHWA proposes to add these new signs based on the results of the Sign Synthesis Study<sup>89</sup> that revealed that some States use signs for these specific purposes. Some States provide off-road areas (on the shoulder or in a physically separated rest area type of roadway) for drivers to install and remove tire chains during winter weather conditions. Some States also provide similar areas for trucks and other vehicles to check their brakes in advance of the start of a long downhill grade. The FHWA believes these types of areas are similar in some ways and could be considered motorist services and should be consistent in color and legend. The FHWA proposes

a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

200. The FHWA proposes to relocate the information from existing Section 2C.13 to become a new section numbered and titled, “Section 2F.12 Truck Escape Ramp Signs.” The FHWA proposes this change to clarify that these types of signs convey information on a form of motorist service (similar to rest areas, brake check areas, etc.), rather than warnings. The FHWA also proposes to relocate the illustrations of these signs from Chapter 2C to Chapter 2F and change the color scheme of the signs to white legend on a blue background. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

201. In existing Section 2F.02 (new Section 2G.02) Application, the FHWA proposes to revise the STANDARD statement to indicate that service types are allowed to appear on up to two signs, rather than just one. The FHWA proposes this change to reflect FHWA’s Interim Approval (IA-9) to Display More than Six Specific Service Logo Panels for a Type of Service, dated September 21, 2006,<sup>90</sup> which allows for up to two specific service signs containing up to 12 logos for a given type of service. As part of this change, the FHWA proposes to add a paragraph to the GUIDANCE statement indicating that when a service type is displayed on two signs, the signs for that service type should follow one another in succession.

202. In existing Section 2F.03 (new Section 2G.03) Logos and Logo Sign Panels, the FHWA proposes to add to the GUIDANCE statement that the letter heights for word message logos should have the minimum letter heights stated in Section 2G.05. The FHWA proposes this change to recommend letter heights that provide enhanced legibility for older drivers.

The FHWA also proposes to add OPTION, STANDARD, GUIDANCE, and SUPPORT statements to this section regarding the use and design of supplemental messages within the logo sign panel. The FHWA proposes this new text to incorporate messages, such as DIESEL and 24 HOURS, that are helpful to road users. As part of this proposed change, the FHWA proposes to add a new symbol called the “RV

Friendly” symbol that may be used by businesses that are designed with facilities to accommodate the on-site movement and parking of recreational vehicles. The proposed language was developed based on the conditions listed in Interim Approval IA-8, dated September 6, 2005,<sup>91</sup> as well as additional criteria deemed necessary, such as alternate RV Friendly symbol design and placement, and the need for an engineering study to demonstrate that a U-turn can be made by RVs, if U-turns are needed to access the RV Friendly site desiring to be signed as such.

As part of this proposed change, the FHWA proposes to include a new OPTION for the use of the supplemental message OASIS within the logo panel of a business that has been designated as an Interstate Oasis facility. The FHWA includes this proposed additional supplemental message to reflect the Interstate Oasis Program and Policy that was published in the **Federal Register** on October 18, 2002.<sup>92</sup>

Finally, the FHWA proposes to add OPTION and GUIDANCE statements at the end of the section regarding the use of dual logo panels (two smaller logos on the same panel) on Specific Service signs. The FHWA bases this proposal on the results of experimentation and research in Texas,<sup>93</sup> which found that mixing food and gas logos in a dual logo panel did not significantly impact the effectiveness. To minimize the potential for information overload and to maximize the legibility of specific service signs, the FHWA proposes that dual logos should be used on specific service signs only when the two businesses are under the same roof, all available logo panels are already in use, and there is no room for additional logos. The FHWA also proposes that dual logo panels be limited to two food businesses or one food and one gas business. The recommended maximum number of dual logo panels used on any one specific service sign is two.

The FHWA proposes a phase-in compliance period of 15 years for the new provisions of new Section 2G.03 for

<sup>91</sup> Interim Approval IA-8 can be viewed at: [http://mutcd.fhwa.dot.gov/res-interim\\_approvals.htm](http://mutcd.fhwa.dot.gov/res-interim_approvals.htm).

<sup>92</sup> The Interstate Oasis Program and Policy can be viewed at: <http://mutcd.fhwa.dot.gov/res-policy.htm>.

<sup>93</sup> “Effects of Adding Dual-Logo Panels to Specific Service Signs: A Human Factors Study,” by H. Gene Hawkins and Elisabeth R. Rose, 2005, published in Transportation Research Record number 1918, is available for purchase from the Transportation Research Board at the following internet Web site: <http://www.trb.org>. A brief summary of the research results can be viewed at the following Internet Web site: <http://pubsindex.trb.org/document/view/default.asp?lbid=772254>.

<sup>88</sup> Preliminary results from “Evaluation of Symbol Signs,” conducted by Bryan Katz, Gene Hawkins, and Jason Kennedy for the Traffic Control Devices Pooled Fund Study, can be viewed at the following Internet Web site: [http://www.pooledfund.org/documents/TPF-5\\_065/PresSymbolSign.pdf](http://www.pooledfund.org/documents/TPF-5_065/PresSymbolSign.pdf).

<sup>89</sup> “Synthesis of Non-MUTCD Traffic Signs,” FHWA, December 2005, pages 46-47, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>90</sup> FHWA’s Interim Approval IA-9, dated September 21, 2006, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interim\\_approval/pdf/ia\\_9\\_logopanel.pdf](http://mutcd.fhwa.dot.gov/resources/interim_approval/pdf/ia_9_logopanel.pdf).

existing signs in good condition to minimize any impact on State or local highway agencies.

203. In existing Section 2F.04 (new Section 2G.04) Number and Size of Signs and Logo Sign Panels, the FHWA proposes to add OPTION and STANDARD statements to permit the use of, and provide the associated requirements for, additional logo sign panels of the same specific service type when more than six businesses of a specific service type are eligible for logo sign panels at the same interchange. The FHWA proposes to include this information, based on Interim Approval (IA-9) to Display More than Six Specific Service Logo Panels for a Type of Service, dated September 21, 2006.<sup>94</sup>

204. In existing Section 2F.05 (new Section 2G.05) Size of Lettering, the FHWA proposes to add standards for minimum letter heights for logo sign panels consisting only of word legends that are displayed on the mainlines of freeways and expressways and on conventional roads and ramps. The FHWA proposes these minimum letter heights to provide letter heights that will enhance legibility for older drivers. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

205. In existing Section 2F.08 (new Section 2G.08) Double-Exit Interchanges, the FHWA proposes to add a new GUIDANCE statement to recommend that where a service type is displayed on two Specific Service signs at a double-exit interchange, one of the signs should display the logo panels for the service type of the businesses that are accessible from one of the two exits and the other sign should display the logo panels for the service type of the businesses that are accessible from the other exit. The FHWA proposes this change to provide consistency in logo signing for double-exit interchanges when a service type is displayed on two signs.

206. The FHWA proposes to add a new section after existing Section 2F.08 (new Section 2G.08). The new section is numbered and titled, "Section 2G.09 Specific Service Trailblazer Signs" and contains SUPPORT, STANDARD, GUIDANCE, and OPTION statements regarding these guide signs that are required along crossroads for facilities that have logo panels displayed along the main roadway and ramp, and that

require additional vehicle maneuvers to reach. The FHWA proposes this new section and an associated new figure to enhance the uniformity of this signing practice which is being used by many States.

207. In existing Section 2F.09 (new Section 2G.10) Signs at Intersections, the FHWA proposes to relocate the first paragraph of the existing OPTION statement to the 2nd STANDARD statement in order to clarify that the type of service and the action message or the directional arrow shall all be on the same line directly above the business logo panel or below the logo sign panel.

208. The FHWA proposes to add a new chapter numbered and titled, "Chapter 2I General Information Signs." This proposed new chapter contains several sections that the FHWA proposes to relocate from Chapters 2D and 2E in order to group similar sign types in the same area of the Manual.

209. The FHWA proposes to add a new Section 2I.01 Sizes of General Information Signs and a new Table 2I-1 to indicate sizes of General Information signs. Proposed new Sections 2I.02 Reference Location Signs and Intermediate Reference Location Signs, 2I.03 Enhanced Reference Location Signs, 2I.04 Traffic Signal Speed Sign, 2I.05 General Information Signs, 2I.06 Miscellaneous Information Signs, 2I.07 Memorial Signing, and 2I.08 Trail Signs, contain information in existing Sections 2D.46, 2E.54, 2D.47, 2D.48, 2E.55, 2D.49 and 2D.50, respectively.

210. In existing Section 2D.47 (new Section 2I.04) Traffic Signal Speed Sign, the FHWA proposes to add a paragraph to the OPTION statement allowing a changeable message element for the numerals of the Traffic Signal Speed sign to be displayed if different system progression speeds are set for different times of the day. The FHWA also proposes to allow a blank-out version of the Traffic Signal Speed sign to be used to display the message only during the times when the system is operated in coordinated mode. The FHWA proposes this change to provide agencies with flexibility to provide for different speeds at different times of day. The FHWA also proposes to revise the STANDARD statement to increase the minimum size of the Traffic Signal Speed sign from 300 × 450 mm (12 × 18 in) to 600 × 900 mm (24 × 36 in) to provide for suitable letter sizes.

211. In existing Section 2E.55 (new Section 2I.06) the FHWA proposes to replace the phrase "Miscellaneous Guide Signs" with "Miscellaneous Information Signs" in the title, in the

text of the section, and in the associated figure, to reflect the relocation of this section into proposed new Chapter 2I.

212. The FHWA proposes to add a new section numbered and titled, "Section 2I.07 Memorial Signing." This proposed new section is comprised of text pertaining to memorial signs, which is relocated from existing sections 2D.49 and 2E.08. The FHWA proposes to revise several statements within the section in order to make the information in this section regarding memorial signing consistent with existing Section 2D.49 Signing of Named Highways (new Section 2D.55).

213. In existing Section 2D.50 (new Section 2I.08) Trail Signs, the FHWA proposes to add a STANDARD statement prohibiting the use of trail signs on freeways or expressways. The FHWA proposes this restriction because trail designations are not appropriate for freeways and expressways and should be confined to conventional roads.

214. The FHWA proposes to add a new section numbered and titled, "Section 2I.09 Acknowledgement Signs." This proposed new section contains SUPPORT, GUIDANCE, STANDARD, and OPTION statements regarding the placement and design of the signs that can be used as a way of recognizing a company, business, or volunteer group that provides a highway-related service. The FHWA bases the proposed information on the policy memo "Optional Use of Acknowledgment Signs on Highway Rights-of-Way," dated August 10, 2005.<sup>95</sup> The FHWA proposes a phase-in compliance period of 10 years for the new provisions for acknowledgement signs for existing signs in good condition to minimize any impact on State or local highway agencies.

215. In existing Section 2H.04 (new Section 2J.04) General Design Requirements for Recreational and Cultural Interest Area Symbol Guide Signs, the FHWA proposes to replace the entire set of recreational and cultural area symbol signs with a new, updated, and expanded set of signs, based on the National Park Service's updated Uniguide Standards Manual,<sup>96</sup> plus a few United States Forest Service standard symbol signs for activities not covered in the Uniguide standards. As a result, the FHWA proposes to revise existing Table 2H-1 (new Table 2J-1) to reflect the new set of signs, as well as

<sup>94</sup> FHWA's Interim Approval IA-9, dated September 21, 2006, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interim\\_approval/pdf/ia\\_9\\_logopanel.pdf](http://mutcd.fhwa.dot.gov/resources/interim_approval/pdf/ia_9_logopanel.pdf).

<sup>95</sup> FHWA's Policy Memo can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/res-mem\\_ack.htm](http://mutcd.fhwa.dot.gov/res-mem_ack.htm).

<sup>96</sup> Information about the National Park Service's Uniguide Standards Manual can be obtained at the following Internet Web site: <http://www.nps.gov/hfc/acquisition/uniguide.htm>.

figures within Chapter 2I that show recreational and cultural signs. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

216. In existing Section 2H.07 (new Section 2J.07) Use of Prohibitive Slash, the FHWA proposes to clarify the STANDARD statement to indicate recreational and cultural interest area symbol signs for prohibited activities and items are only to be used within a recreational or cultural interest area when a standard regulatory sign for such a prohibition is not provided in Chapter 2B. The FHWA also proposes that for recreational and cultural interest area prohibitory signs only, the red diagonal slash is to be placed behind the symbol, rather than over it in, consistent with National Park Service standards.

217. In existing Section 2H.08 (new Section 2J.08) Placement of Recreational and Cultural Interest Area Symbol Signs, the FHWA proposes to add an OPTION statement allowing the symbol on the Wildlife Viewing Area sign to be placed to the left or right of the legend, and the arrow to be placed below the symbol. The FHWA proposes the new binoculars symbol to denote wildlife viewing areas based on the Sign Synthesis Study,<sup>97</sup> which revealed that several States and the National Park Service were already using this symbol in this manner to design an effective guide sign.

218. In existing Section 2H.09 (new Section 2J.09) Destination Guide Signs, the FHWA proposes to delete the first sentence of the 2nd STANDARD statement restricting the use of white on brown destination guide signs on linear parkway-type highways that primarily function as arterial connectors. This proposed change is the result of an amended memorandum of understanding that was signed in 2006 by the National Park Service and the FHWA.<sup>98</sup>

219. In existing Section 2I.03 (new Section 2K.03), Evacuation Route Signs, the FHWA proposes to reorganize the paragraphs to provide a more logical flow. The FHWA also proposes to include information in the first STANDARD statement regarding the design of the proposed Tsunami Evacuation Route sign. The FHWA bases the proposed design on a symbol

currently being used in all Pacific Coast States.

The FHWA also proposes to clarify the use of Advance Turn Arrow (M5 series) and Directional Arrow (M6 series) auxiliary signs with Evacuation Route signs in the first STANDARD and OPTION statements.

220. In existing Section 2I.08 (new Section 2K.08) Emergency Aid Center Signs, the FHWA proposes to add an OPTION statement allowing the use of a fluorescent pink background color when Emergency Aid Center signs are used in an incident situation, such as during the aftermath of a nuclear or biological attack. The FHWA proposes this change, because EM-6 Series signs may be useful for incident situations.

221. In existing Section 2I.09 (new Section 2K.09) Shelter Directional Signs, the FHWA proposes to add an OPTION statement allowing the use of a fluorescent pink background color when Shelter Direction signs are used in an incident situation, such as during the aftermath of a nuclear or biological attack. The FHWA proposes this change, because EM-7 Series signs may be useful for incident situations.

222. The FHWA proposes to add a new chapter numbered and titled, "Chapter 2L Object Markers, Barricades, and Gates." This proposed new chapter contains existing Sections 3C.01 through 3C.04, which are related to object markers and existing Section 3F.01 on barricades. The FHWA proposes this new chapter to group these devices in the same area of the Manual.

223. In existing Section 3C.02 (new Section 2L.02) Object Markers for Obstructions Within the Roadway, the FHWA proposes to add an OPTION statement to clarify that Type 1 or Type 3 markers may be installed on the nose of a median island at an intersection to provide additional emphasis. The FHWA proposes this new statement to clarify that the application is permitted.

224. In existing Section 3C.03 (new Section 2L.03) Object Markers for Obstructions Adjacent to the Roadway, the FHWA proposes to revise the STANDARD statement to specify that Type 2 or Type 3 object markers are to be used for obstructions not actually within the roadway and to restrict the use of Type 1 and Type 4 object markers for such applications.

225. In existing Section 3C.04 (new Section 2L.04) Object Markers for Ends of Roadways, the FHWA proposes to add to the first STANDARD statement that if an object marker is used to mark the end of a roadway, a Type 4 object marker shall be used. The FHWA proposes this change to provide clarity

that the Type 4 object marker is the only type of object marker to be used to mark the end of a roadway.

226. The FHWA proposes adding a new Section 2L.06 Gates, containing provisions regarding the design and use of gates for a variety for traffic control purposes beyond the most common use at highway-rail grade crossings. The FHWA proposes this new section in order to provide for enhanced uniformity of gates, as they are used in a wide variety of applications.

227. The FHWA proposes to add a new Chapter numbered and titled, "Chapter 2M Changeable Message Signs." This new chapter contains information from existing Sections 2A.07 and 2E.21 as well as additional new information, organized into seven sections regarding Changeable Message Signs, specifically regarding the description, application, legibility and visibility, design characteristics, message length and units of information, installation, and display of travel times on Changeable Message Signs. The FHWA proposes this change to consolidate all information about changeable message signs into one location in the Manual and to reflect the recommendations of extensive research on changeable message sign legibility, messaging, and operations conducted over a period of many years by the Texas Transportation Institute.<sup>99</sup> The FHWA proposes a phase-in compliance period of 10 years for the new provisions for Changeable Message Signs for existing signs in good condition to minimize any impact on State or local highway agencies.

#### *Discussion of Proposed Amendments to Part 3—Pavement Markings*

##### *Discussion of Proposed Amendments Within Part 3—General*

228. The FHWA proposes to remove references to the blue raised pavement marker from Part 3. Blue raised pavement markers have been used to mark the locations of fire hydrants for emergency response personnel and are not intended to communicate a traffic control message to the general public. Consistent with the proposed changes in Section 1A.08 as described in item 20 above, blue raised pavement markers would not be considered traffic control devices and therefore the FHWA believes that requirements for design and application of such markers should not be included in the MUTCD.

<sup>99</sup> Information on the many research projects on changeable message signs conducted by the Texas Transportation Institute (TTI) can be accessed via TTI's Internet Web site at: <http://tti.tamu.edu/>.

<sup>97</sup> "Synthesis of Non-MUTCD Traffic Signs," FHWA, December 2005, can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>98</sup> This Memorandum of Understanding can be viewed at the following Internet Web site: <http://mutcd.fhwa.dot.gov/res-policy.htm>.

229. The FHWA proposes to add information to allow the use of appropriate route shield pavement marking symbols (including appropriate colors) to assist in guiding road users to their destinations. The use of the red, white, and blue Interstate shield marking was authorized by FHWA in Official Interpretation # 3-162(I).<sup>100</sup> The FHWA also proposes to add a new figure to illustrate these route shield pavement markings.

230. In several sections within Part 3, the FHWA proposes to add new language to clarify that dotted lane lines, rather than broken lane lines, are to be used for non-continuing lanes, including acceleration lanes, deceleration lanes, auxiliary lanes, and lane drops. The FHWA also proposes to revise the various existing figures in Chapter 3B that illustrate these conditions to reflect the proposed changes. The FHWA proposes these changes to avoid confusing road users regarding the function of these lanes and to improve safety and operations. As documented in NCHRP Synthesis 356,<sup>101</sup> a number of States and other jurisdictions currently follow this practice, which is also the standard practice in Europe and most other developed countries. The FHWA believes that the existing use of a normal broken lane line for these non-continuing lanes does not adequately inform road users of the lack of lane continuity ahead and that standardized use of dotted lane lines for non-continuing lanes will better serve this important purpose in enhancing safety and uniformity.

231. The FHWA proposes to relocate Chapter 3C Object Markers and Section 3F.01 Barricades to Part 2 because readers of the MUTCD have difficulty finding object markers in the MUTCD and because most jurisdictions treat these devices as signs for purposes of inventory and policy. The FHWA proposes to place the information on object markers and barricades in a new Chapter titled, "Chapter 2L Object Markers and Barricades."

232. The FHWA proposes to add OPTION statements in various sections within Part 3 to allow use of retroreflective or internally illuminated raised pavement markers in the roadway

immediately adjacent to curbed noses of raised medians and curbs of islands, or on top of such curbs. This is an effective practice commonly used to aid road users in identifying these channelizing features at night. The FHWA proposes this optional use based on recommendations from the Older Driver handbook.<sup>102</sup>

233. The FHWA proposes to include arrows in the list of items that are to be designed in accordance with the Pavement Markings chapter of the Standard Highway Signs and Markings book.

#### Discussion of Proposed Amendments Within Chapter 3A

234. In Section 3A.01 Functions and Limitations, the FHWA proposes relocating the last paragraph of the SUPPORT statement, which pertains to the general functions of longitudinal lines, to a STANDARD statement in Section 3A.05, because that section deals specifically with longitudinal pavement markings. See item 237 below for additional information.

235. In Section 3A.03 Materials, the FHWA proposes to add information to the SUPPORT statement regarding marking systems that consist of clumps or droplets of material with visible open spaces of bare pavement between the material droplets. The FHWA proposes this new text in order to clarify that this type of marking system is suitable for use if it meets other marking requirements of the highway agency. This also reflects FHWA's Official Interpretation #3-196(I), dated July 19, 2006.<sup>103</sup>

236. In Section 3A.04 Colors, the FHWA proposes to revise the 3rd paragraph of the STANDARD statement to include red delineators, for consistency with Chapter 3D and to clarify that the application of red raised pavement markers and delineators is for one-way roadways and ramps and for truck escape ramps, because red is not intended to be used for these devices on undivided highways, except in the special case of truck escape ramps as provided in existing Section 3D.03.

In addition, the FHWA proposes to add a new 6th paragraph to the STANDARD statement explaining the use of purple markings to supplement lane line or edge line markings for toll

plaza approach lanes that are to be used only by vehicles that are equipped with ETC transponders. The FHWA proposes this new STANDARD paragraph to be consistent with other proposed changes in the MUTCD regarding the use of the color purple to readily identify lanes that are to be used by vehicles equipped with ETC transponders. (See item 23.)

237. In Section 3A.05, the FHWA proposes to change the title to "Functions, Widths, and Patterns of Longitudinal Pavement Markings," and to incorporate into a STANDARD statement the information regarding the general function of longitudinal lines from the SUPPPORT statement in existing Section 3A.01. The FHWA proposes changing the classification of this text to a STANDARD for consistency with requirements in other sections in Part 3 and to appropriately reflect how this text has been applied.

The FHWA also proposes to change the OPTION statement regarding the lengths of line segments and gaps used for dotted lines to a GUIDANCE statement in order to encourage increased consistency in the dimensions for dotted lines based on their function. The recommended dimensions reflect the most common practice as documented in NCHRP Synthesis 356.<sup>104</sup>

238. The FHWA proposes to add a new section following Section 3A.05. The new section is numbered and titled, "Section 3A.06 Definitions Relating to Pavement Markings" and contains a STANDARD statement that defines the terms "neutral area," "physical gore," and "theoretical gore." The FHWA proposes this new section to provide definitions of these terms, because they are used throughout Part 3 to describe the use and application of pavement markings.

#### Discussion of Proposed Amendments Within Chapter 3B

239. In Section 3B.01 Yellow Center Line Pavement Markings and Warrants, the FHWA proposes to add a paragraph to the 2nd STANDARD statement to specifically prohibit the use of a single solid yellow line as a center line marking on a two-way roadway. A single solid yellow center line marking has not been allowed by the MUTCD but some agencies have improperly used it because of the lack of a specific prohibition statement.

The FHWA also proposes to add a SUPPORT statement after the first

<sup>100</sup> FHWA's Official Interpretation #3-162(I), dated January 28, 2004, can be viewed at the following Internet Web site: <http://mutcd.fhwa.dot.gov/documents/pdf/3-162-I-VA-S.pdf>.

<sup>101</sup> NCHRP Synthesis 356, "Pavement Markings—Design and Typical Layout Details," 2006, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_syn\\_356.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_356.pdf).

<sup>102</sup> "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians," FHWA Report no. FHWA-RD-01-051, May, 2001, can be viewed at the following Internet Web site: <http://www.tfhr.gov/humanfac/01105/cover.htm>. Recommendations #I.C(2), I.C(4f), and I.F(2).

<sup>103</sup> FHWA's Official Interpretation #3-196(I), dated July 19, 2006, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interpretations/3\\_196.htm](http://mutcd.fhwa.dot.gov/resources/interpretations/3_196.htm).

<sup>104</sup> NCHRP Synthesis 356, "Pavement Markings—Design and Typical Layout Details," 2006, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_syn\\_356.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_356.pdf).



GUIDANCE statement that references sections of the Uniform Vehicle Code that contain information regarding left turns across center line no-passing zone markings and paved medians. The information was contained in the 1988 MUTCD, and the lack of this information in the 2000 and 2003 editions of the MUTCD has generated the need to provide this in the next edition.

240. In Section 3B.02 No-Passing Zone Pavement Markings and Warrants, the FHWA proposes to add a paragraph to the first SUPPORT statement that describes that the values of passing sight distances shown in Table 3B-1 are for operational use in marking no-passing zones and are less than the values used for geometric design of highways. The FHWA proposes this in order to provide clarity and avoid confusion between operational use of markings and geometric design.

The FHWA also proposes to add language to the last paragraph of the 3rd STANDARD statement specifying that for this application a buffer zone shall be a flush median island formed by two sets of double yellow center line markings, in order to clarify how to appropriately mark a buffer zone and to correspond with the existing illustration in Figure 3B-5.

The FHWA also proposes to add an OPTION statement immediately following the 3rd STANDARD statement permitting the use of yellow diagonal markings in the neutral area between the two sets of no-passing zone markings, reflecting common practice for discouraging travel in that area.

241. In Section 3B.03 Other Yellow Longitudinal Pavement Markings, the FHWA proposes to change the first OPTION statement to a GUIDANCE in order to recommend for certain conditions, rather than just permit, the use of arrows with two-way left turn lanes. The FHWA proposes this change as a result of the NCHRP Synthesis 356<sup>105</sup> which highlighted a variety of marking issues for which additional uniformity could be provided to aid road users. The synthesis found that the use of arrows in two-way left-turn lanes at the start of the lane and at other locations along the lane as needed is the predominant practice. The FHWA also reflects this proposed change in Figures that contain arrows in two-way left turn lanes.

242. In Section 3B.04 White Lane Line Pavement Markings and Warrants, the

<sup>105</sup> NCHRP Synthesis 356, "Pavement Markings—Design and Typical Layout Details," 2006, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_syn\\_356.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_356.pdf).

FHWA proposes to relocate the last GUIDANCE statement to become the first GUIDANCE statement (currently the last GUIDANCE statement) and to clarify that the lane line marking requirements do not apply to reversible lanes, for which the existing text of Part 3 requires the use a different color and pattern of markings.

The FHWA also proposes to add requirements to the STANDARD statement to specify that dotted lines are required for acceleration, deceleration, and auxiliary lanes. The FHWA proposes a phase-in compliance period of 5 years for existing pavement markings in good condition to minimize any impact on State or local highway agencies.

243. In Section 3B.05 Other White Longitudinal Pavement Markings, the FHWA proposes to revise the 3rd STANDARD statement to clarify the requirements for channelizing lines in gore areas alongside the ramp and through lanes for exit ramps and for entrance ramps. As part of this change, the FHWA proposes to change the first existing GUIDANCE statement to a STANDARD, to require, rather than recommend, the beginning and ending points of the channelizing lines, in order to improve uniformity in application and to reflect the predominant practice as documented in NCHRP Synthesis 356.<sup>106</sup> The FHWA proposes a phase-in compliance period of 5 years for existing pavement markings in good condition to minimize any impact on State or local highway agencies. The FHWA proposes to illustrate the proposed changes in Figure 3B-8.

The FHWA also proposes to add text to the 2nd OPTION statement permitting the use of white retroreflective or internally illuminated raised pavement markers to supplement channelizing lines and optional chevron markings at exit ramp and entrance ramps for enhanced nighttime visibility, to reflect recommendations from the Older Driver handbook.<sup>107</sup>

244. In Section 3B.07 Warrants for Use of Edge Lines, the FHWA proposes to add to the OPTION statement that if a bicycle lane is marked on the outside portion of a traveled way, the edge line that would mark the outside edge of the

<sup>106</sup> NCHRP Synthesis 356, "Pavement Markings—Design and Typical Layout Details," 2006, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_syn\\_356.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_356.pdf).

<sup>107</sup> "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians," FHWA Report no. FHWA-RD-01-051, May, 2001, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01105/cover.htm>. Recommendation II.A(4a).

bicycle lane may be omitted, because the lane line separating the motor vehicle lane from the bicycle lane can serve the purpose of the edge line.

245. In Section 3B.08 Extensions Through Intersections or Interchanges, the FHWA proposes to revise the first GUIDANCE statement to add locations where offset left turn lanes might cause driver confusion to the listing of examples where dotted lines extensions should be used, to reflect recommendations from the Older Driver handbook.<sup>108</sup> FHWA also proposes to add dimensions of the line segments and gaps for the dotted line extension markings in order to provide consistency in the application and for consistency with the provisions of Section 3A.05.

246. In Section 3B.09 Lane-Reduction Transition Markings, the FHWA proposes to add an OPTION statement after the STANDARD statement that exempts agencies from the requirement to place edge lines and/or delineators along low-speed urban roadways where curbs clearly define the roadway edge in a lane reduction transition if supported by engineering judgment. The FHWA also proposes revising the 2nd paragraph of the 2nd GUIDANCE statement to reference the proposed exemption of low-speed roadways from the use of edge line markings. The FHWA proposes these changes because on low-speed urban roadways, curbs often provide adequate delineation of change of alignment of road edge.

The FHWA also proposes to revise the 2nd GUIDANCE statement to recommend that a dotted lane line be used approaching a lane reduction, consistent with the proposed use of dotted lane lines for other conditions in which a lane does not continue ahead. The FHWA proposes a phase-in compliance period of 5 years for existing pavement markings in good condition to minimize any impact on State or local highway agencies.

247. In Section 3B.10 Approach Markings for Obstructions, the FHWA proposes to revise the first STANDARD statement to clearly indicate that toll booths at toll plazas are fixed obstructions that shall be marked according to the requirements of this section. The FHWA proposes this change based on the recommendations

<sup>108</sup> "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians," FHWA Report no. FHWA-RD-01-051, May, 2001, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01105/cover.htm>. Recommendation I.E(4d).

of the Toll Plazas Best Practices and Recommendations Report.<sup>109</sup>

In addition, the FHWA proposes to change the first OPTION statement to a GUIDANCE statement to recommend, rather than just permit, that where observed speeds exceed posted or statutory speed limits, longer tapers should be used. This is consistent with text already contained in the first GUIDANCE statement in Section 3B.09.

248. In Section 3B.11 Raised Pavement Markers, the FHWA proposes to modify the first STANDARD statement to specify that the height of a raised pavement marker is not to exceed approximately 25 mm (1 in) above the road surface, rather than specifying a minimum height, in order to clarify that tubular markers and other similar devices that might be placed on or in the roadway are not raised pavement markers.

The FHWA also proposes to add STANDARD and SUPPORT statements that clarify that internally illuminated raised pavement markers shall be steadily illuminated and shall not be flashed, and that flashing raised pavement markers are considered to be In-Roadway Lights, consistent with Part 4.

Additionally, the FHWA proposes to add a GUIDANCE statement near the end of the section that recommends consideration of the use of more closely spaced retroreflective pavement markers where additional emphasis is needed. This proposed statement incorporates FHWA Interpretation 3–176(I)<sup>110</sup> into the Manual and is consistent with recommendations from the Older Driver handbook.<sup>111</sup>

249. In Section 3B.12 Raised Pavement Markers as Vehicle Positioning Guides with Other Longitudinal Markings, the FHWA proposes to change the SUPPORT statement to a GUIDANCE in order to recommend, rather than just permit, that the spacing of raised pavement markers used as positioning guides for typical conditions should be 2N, where N equals the length of one line segment plus one gap. The FHWA proposes this

change to reflect typical practice and to provide enhanced uniformity.

250. In Section 3B.13 Raised Pavement Markers Supplementing Other Markings, the FHWA also proposes to add a paragraph to the OPTION statement that provides for the use of supplemental retroreflective or internally illuminated raised pavement markers on horizontal curves to improve drivers' visibility of curves. The FHWA proposes this new text based on recommendations of the Older Driver handbook.<sup>112</sup>

251. In Section 3B.14 Raised Pavement Markers Substituting for Pavement Markings, the FHWA proposes to change the GUIDANCE statement to a STANDARD requiring that the color of raised pavement markers shall simulate the color of the markings for which they substitute, in order to assure uniformity of markings colors.

252. In Section 3B.15 Transverse Markings, the FHWA proposes to add arrows and speed reduction markings (which are proposed new types of markings, as discussed in item 257 below) to the list of transverse markings in the STANDARD statement that shall be white in order to provide clarity and provide uniformity in applications.

253. The FHWA proposes several changes to Section 3B.16 Stop and Yield Lines, as well as to Section 7C.04 Stop and Yield Signs (in Part 7 Traffic Controls for School Areas) to clarify the intended use of stop and yield lines. In Section 3B.16, the FHWA proposes to add requirements to the first STANDARD statement regarding the use of STOP and YIELD lines, specifically as they relate to locations where YIELD (R1–2) signs or Yield Here to Pedestrians (R1–5 or R1–5a) signs are used. The FHWA proposes these changes to assure that stop lines are not misused to indicate a yield condition or vice versa. The FHWA proposes a phase-in compliance period of 5 years for existing pavement markings in good condition to minimize any impact on State or local highway agencies. As part of the proposed changes, the FHWA proposes to require that stop lines shall not be used at locations on uncontrolled approaches where drivers are required by State law to yield to pedestrians. The FHWA proposes this change in accordance with FHWA's Official

Interpretation #3–201(I), dated January 10, 2007.<sup>113</sup>

The FHWA also proposes to add a STANDARD statement that requires the use of Yield Here to Pedestrian (R1–5 and R1–5a) signs at a crosswalk that crosses an uncontrolled multi-lane approach when a yield line is used, for consistency with the existing requirement in existing Section 2B.11.

The FHWA proposes to add a GUIDANCE statement to clarify that Yield Lines and Yield Here to Pedestrian signs should not be used in advance of crosswalks that cross an approach or departure from a roundabout. The FHWA proposes this change because yield lines and signs for the crosswalk would be too close to the yield lines and signs at the entry to the circulatory roadway and could be confusing to road users.

The FHWA also proposes to add OPTION and SUPPORT statements that describe the use of staggered Stop and Yield lines. Longitudinally offsetting the stop lines and yield lines on a multi-lane approach is a common practice that improves drivers' view of pedestrians, improves sight distance for turning vehicles, and increases the turning radius for left-turning vehicles.

254. The FHWA proposes adding a new section following Section 3B.16 Stop and Yield Lines. The proposed new section is numbered and titled "Section 3B.17 Do Not Block Intersection Markings" and contains OPTION and STANDARD statements regarding use of markings to indicate that the intersection is not to be blocked. The remaining sections in Chapter 3B would be renumbered accordingly. Do Not Block Intersection Markings are being used more widely across the country to improve traffic flow through intersections. Uniformity in the use and type of markings is needed to minimize road user confusion. The FHWA proposes a phase-in compliance period of 5 years for existing pavement markings in good condition to minimize any impact on State or local highway agencies.

255. In existing Section 3B.17 (new Section 3B.18) Crosswalk Markings, the FHWA proposes adding a paragraph to the first GUIDANCE statement that recommends that crosswalk markings should be located so that the curb ramps are within the extension of the crosswalk markings, to be consistent with provisions in ADAAG<sup>114</sup> and to

<sup>109</sup> "State of the Practice and Recommendations on Traffic Control Strategies at Toll Plazas," June 2006, can be viewed at the following Internet Web site: <http://mutcd.fhwa.dot.gov/rpt/tcstoll/index.htm>.

<sup>110</sup> FHWA Official Interpretation #3–176(I), dated January 21, 2005, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interpretations/3\\_176.htm](http://mutcd.fhwa.dot.gov/resources/interpretations/3_176.htm).

<sup>111</sup> "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians," FHWA Report no. FHWA–RD–01–051, May 2001, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01105/cover.htm>. Recommendation III.A(2).

<sup>112</sup> "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians," FHWA Report no. FHWA–RD–01–051, May, 2001 can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01105/cover.htm>. Recommendation III.A(2).

<sup>113</sup> FHWA Official Interpretation #3–201(I), dated January 10, 2007, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interpretations/3\\_201.htm](http://mutcd.fhwa.dot.gov/resources/interpretations/3_201.htm).

<sup>114</sup> The Americans With Disabilities Accessibility Guidelines (ADAAG) can be viewed at the

provide more consistency for pedestrians as they negotiate the crosswalk and curb ramps.

The FHWA also proposes several additional changes to the first GUIDANCE statement to reflect the findings of FHWA report, "Safety Effects of Marked versus Unmarked Crosswalks at Uncontrolled Locations."<sup>115</sup> The proposed changes include deleting some of the requirements for the specific placement of crosswalk markings and adding recommendations regarding the placement of crosswalk markings across uncontrolled approaches based on engineering judgment and engineering studies.

The FHWA also proposes to add a SUPPORT statement at the end of the section that incorporates information regarding detectable warning surfaces that mark boundaries between pedestrian and vehicular ways where there is no raised curb. The proposed language would be added to the Manual in response to requests from the U.S. Access Board, based on ADAAG.<sup>116</sup> There has been a notable amount of confusion among many highway agencies regarding the proper use of detectable warning surfaces and where to find the proper information.

256. In existing Section 3B.19 (new Section 3B.20), the FHWA proposes to incorporate the word "arrow" in several places in the section to reflect that, although arrows are often not thought of as symbols, the provisions of this section are intended to apply to arrows. As part of this change, the FHWA proposes to title the Section, "Pavement Word, Symbol, and Arrow Markings."

The FHWA also proposes to move the 2nd paragraph of the existing 2nd OPTION statement to a new GUIDANCE statement in order to recommend, rather than just permit, that the International Symbol of Accessibility parking space marking should be placed in each parking space designated for use by persons with disabilities, for consistency with the provisions of the Americans With Disabilities Act.

The FHWA also proposes to add a new GUIDANCE statement that describes the use and placement of lane-use arrows in lanes designated for the

exclusive use of a turning movement and in turn bays, in lanes from which movements are allowed that are contrary to the normal rules of the road, and where opposing offset channelized left-turn lanes exist. The FHWA proposes this new language to reflect common practice and provide for increased uniformity, as highlighted in the NCHRP Synthesis 356.<sup>117</sup> The FHWA proposes a phase-in compliance period of 5 years for existing locations to minimize any impact on State or local highway agencies.

In addition, the FHWA proposes to add a GUIDANCE statement that recommends the use of ONLY word markings to supplement the required arrow markings where through lanes approaching an intersection become mandatory turn lanes. The FHWA proposes a phase-in compliance period of 5 years for existing locations to minimize any impact on State or local highway agencies.

The FHWA also proposes revising the existing 3rd GUIDANCE statement to add that where through lanes become mandatory turn or exit lanes, markings and signs should be placed well in advance of the turn or exit to provide additional advance warning to drivers. The FHWA proposes these changes to reflect the predominant practice, as documented by NCHRP Synthesis 356,<sup>118</sup> and to enhance safety at these potentially confusing locations.

The FHWA proposes to add a STANDARD statement near the end of the section to clarify that the ONLY word marking is not to be used for lanes with more than one movement. The FHWA proposes this change to prevent road user confusion.

Finally, the FHWA proposes to expand the existing 4th GUIDANCE statement to recommend that lane reduction arrow markings be used on roadways with a speed limit of 70 km/h (45 mph) or above, and to recommend that they be used on roadways with lower speed limits when determined to be appropriate based on engineering judgment. The existing MUTCD allows the use of lane reduction arrow markings in an OPTION statement, however, based on the information in NCHRP Synthesis 356<sup>119</sup> the FHWA

believes that, for enhanced safety, they should be recommended on high-speed roads in order to provide a clear indication that the lane reduction transition is occurring. The FHWA proposes a phase-in compliance period of 5 years for existing locations to minimize any impact on State or local highway agencies.

257. The FHWA proposes to add a new section following existing Section 3B.20 (new Section 3B.21). The new section is numbered and titled, "Section 3B.22 Speed Reduction Markings" and contains SUPPORT, STANDARD, and GUIDANCE statements regarding these proposed transverse markings that may be placed on the roadway within a lane in a pattern to give drivers the impression that their speed is increasing. The FHWA proposes this new section to reflect the Traffic Control Devices Pooled Fund Study on speed reduction markings,<sup>120</sup> which found that these markings can be effective in reducing speeds at certain locations, and to provide a standardized design for such markings in order to provide uniformity. The FHWA proposes a phase-in compliance period of 5 years for existing speed reduction pavement markings in good condition to minimize any impact on State or local highway agencies.

258. In existing Section 3B.22 (new Section 3B.24) Preferential Lane Word and Symbol Markings, the FHWA proposes to add information regarding markings to be used for ETC preferential lanes to the STANDARD statement, for consistency with other related proposed changes in Parts 2 and 3 regarding ETC only lanes. As a part of this change, the FHWA also proposes to add new GUIDANCE regarding the use of preferential lane symbol and word markings at key decision points on a preferential lane, to reflect a recent FHWA policy memorandum.<sup>121</sup> The FHWA proposes a phase-in compliance period of 5 years for existing locations to minimize any impact on State or local highway agencies.

259. The FHWA proposes to edit, expand, and reorganize existing Section 3B.23 (new Section 3B.25) Preferential

following Internet Web site: <http://www.access-board.gov/ada-aba/index.htm>.

<sup>115</sup> "Safety Effects of Marked versus Unmarked Crosswalks at Uncontrolled Locations," FHWA report #HRT-04-100, Charles Zegeer, et al., September 2005, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/safety/pubs/04100/04100.pdf>.

<sup>116</sup> The Americans With Disabilities Accessibility Guidelines (ADAAG) can be viewed at the following Internet Web site: <http://www.access-board.gov/ada-aba/index.htm>.

<sup>117</sup> NCHRP Synthesis 356, "Pavement Markings—Design and Typical Layout Details," 2006, pages 7–13, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_syn\\_356.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_356.pdf).

<sup>118</sup> NCHRP Synthesis 356, "Pavement Markings—Design and Typical Layout Details," 2006, pages 6–7, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_syn\\_356.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_356.pdf).

<sup>119</sup> NCHRP Synthesis 356, "Pavement Markings—Design and Typical Layout Details," 2006, page 32,

can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_syn\\_356.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_356.pdf).

<sup>120</sup> "Pavement Markings for Speed Reduction," December 2004, prepared by Bryan J. Katz for the Traffic Control Devices Pooled Fund Study, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/safety/pubs/04100/04100.pdf>.

<sup>121</sup> The FHWA's August 3, 2007 policy memorandum on "Traffic Control Devices for Preferential Lane Facilities" can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/policy/tcdplfmemo/preferen\\_lanes\\_tcd.pdf](http://mutcd.fhwa.dot.gov/resources/policy/tcdplfmemo/preferen_lanes_tcd.pdf).

Lane Longitudinal Markings for Motor Vehicles. The proposed changes in this section correspond to comparable sections on preferential lanes in Chapters 2B and 2E. The resulting proposed changes in this section include expanding the first STANDARD statement to include longitudinal pavement markings for buffer-separated left-hand and right-hand side preferential lanes, and expanding the 2nd STANDARD statement to include markings for counter-flow preferential lanes on divided highways. The FHWA proposes a phase-in compliance period of 5 years for existing pavement markings in good condition to minimize any impact on State or local highway agencies. These proposed changes reflect typical existing practices for the marking of preferential lanes, as documented in various FHWA guidance and handbooks.<sup>122</sup>

The FHWA also proposes to add new GUIDANCE regarding the use of dotted line markings at direct exits from preferential lane facilities, to reduce the chances of unintended exit maneuvers, reflecting a recent FHWA policy memorandum.<sup>123</sup>

260. To illustrate the proposed changes to existing Section 3B.23 (new Section 3B.25), and to clarify their use, the FHWA proposes to add more examples to Figures 3B-31 through 3B-34 to show the required longitudinal markings for buffer-separated preferential lanes and counter-flow preferential lanes.

261. The FHWA proposes adding a new section following existing Section 3B.23 (new Section 3B.25). The proposed new section is numbered and titled "Section 3B.26 Chevron and Diagonal Crosshatching Markings" and contains OPTION, STANDARD, and GUIDANCE statements on the use of markings intended to discourage travel on certain paved areas. In this new section, the FHWA proposes to eliminate the optional use of diagonal markings in gore areas and require chevron markings because gores separate traffic flowing in the same direction and diagonal crosshatching is inappropriate for that condition. The FHWA proposes a phase-in compliance period of 5 years for existing pavement markings in good condition to minimize

any impact on State or local highway agencies. The remaining sections in Chapter 3B would be renumbered accordingly.

262. The FHWA proposes deleting existing Section 3B.24 Markings for Roundabout Intersections and existing Section 3B.25 Markings for Other Circular Intersections because information from those sections has been edited and expanded, and is now included in proposed new Chapter 3C (see item 266 below).

263. In existing Section 3B.26 (new Section 3B.27) Speed Hump Markings, the FHWA proposes to revise the STANDARD to more clearly state that if speed hump markings are to be used on a speed hump or a speed table, the only markings that shall be used are those shown in Figures 3B.35 and 3B.36. Because the existing MUTCD language is not prescriptive, a wide variety of marking patterns are being used for speed humps and the FHWA believes that additional uniformity is needed to enhance safety. The FHWA proposes a phase-in compliance period of 5 years for existing pavement markings in good condition to minimize any impact on State or local highway agencies.

264. In existing Section 3B.27 (new Section 3B.28) Advance Speed Hump Markings, the FHWA proposes to revise STANDARD to more clearly specify that if advance speed hump markings are used, the only markings that shall be used are those shown in Fig 3B-37. Because the existing MUTCD language is not prescriptive, a wide variety of marking patterns are being used for advance speed hump markings and the FHWA believes that additional uniformity is needed to enhance safety. The FHWA proposes a phase-in compliance period of 5 years for existing pavement markings in good condition to minimize any impact on State or local highway agencies.

265. The FHWA proposes adding a new section following existing Section 3B.27 (new Section 3B.28). The new section is numbered and titled, "Section 3B.29 Markings for Toll Plazas" and contains SUPPORT, STANDARD, GUIDANCE, and OPTION statements for the use of pavement markings at toll plazas. The FHWA proposes this new section in the MUTCD to reflect the recommendations of the Toll Plazas Best Practices and Recommendations report<sup>124</sup> and to provide uniformity in pavement markings at toll plazas because toll plazas have not been

included in previous editions of the MUTCD. The FHWA proposes a phase-in compliance period of 5 years for existing locations for the recommendations on the use of solid lane lines and the requirements for the design of optional purple markings in this new section.

#### Discussion of Proposed Amendments Within Chapters 3C through 3H

266. As discussed in item 231 above, the FHWA proposes to move object markers, contained in existing Chapter 3C, to Part 2. The FHWA proposes to title Chapter 3C, "Roundabout Markings." This proposed new chapter contains 7 sections that describe pavement markings at roundabouts, including lane lines, edge lines, yield lines, crosswalk markings, and pavement word, arrow, and symbol markings. The chapter also includes a variety of proposed new figures that illustrate examples of markings for roundabouts of various geometric and lane-use configurations. The FHWA proposes these changes to reflect the state of the practice for roundabout markings, especially for multi-lane roundabouts, the safe and efficient operation of which necessitates specific markings to enable road users to choose the proper lane before entering the roundabout. The FHWA solicits comments on whether it is necessary for all the proposed new figures illustrating roundabout markings to be added to the MUTCD or whether some of those illustrations should be placed in other documents for reference, such as an updated version of the Roundabouts Guide. The FHWA proposes a phase-in compliance period of 5 years for changes from the existing requirements and guidance for existing pavement markings in good condition to minimize any impact on State or local highway agencies.

267. In Section 3D.03 Delineator Application, in the first STANDARD statement, the FHWA proposes to delete the exemption of routes that have substantial portions with large sections of tangent alignments from those locations where single delineators shall be provided on freeways and expressways. The FHWA proposes this change because the terms "substantial portions" and "large sections" cannot be adequately defined.

The FHWA also proposes to add a new STANDARD statement indicating that delineators on the left-hand side of a two-way roadway shall be white. This corresponds to the existing requirement that delineator color shall match the color of the edge line, but clarifies the

<sup>122</sup> Available FHWA guidance and handbooks on preferential lanes can be viewed at the following Internet Web site: <http://ops.fhwa.dot.gov/freewaymgmt/hov.htm>.

<sup>123</sup> The FHWA's August 3, 2007 policy memorandum on "Traffic Control Devices for Preferential Lane Facilities" can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/policy/tcdplfmemo/preferen\\_lanes\\_tcd.pdf](http://mutcd.fhwa.dot.gov/resources/policy/tcdplfmemo/preferen_lanes_tcd.pdf).

<sup>124</sup> "State of the Practice and Recommendations on Traffic Control Strategies at Toll Plazas," June 2006, can be viewed at the following Internet Web site: <http://mutcd.fhwa.dot.gov/rpt/tcstoll/index.htm>.

intent for this situation, which has been misinterpreted by some agencies.

Finally, the FHWA proposes to add a new paragraph to the first GUIDANCE statement to recommend that delineators should be used wherever guardrail or other longitudinal barriers are present in order to provide for consistency in application. Guardrail and barriers are typically close to the roadway and delineation on these features helps road users be aware of the potential to collide with them during conditions of darkness. The proposed new paragraph reflects existing common practice. The FHWA proposes a phase-in compliance period of 10 years for delineators on existing guardrail or existing longitudinal barriers to minimize any impact on State or local highway agencies.

268. In Section 3D.04 Delineator Placement and Spacing, the FHWA proposes adding an OPTION at the end of the section to allow delineators of an appropriate color to be mounted on the face of or on top of guardrails or other longitudinal barriers in a closely-spaced manner such that they form a continuous or nearly continuous ribbon of delineation. This OPTION is proposed because this application is becoming more widely used for special conditions and aids in improving safety and visibility.

269. The FHWA proposes several revisions to Chapter 3E Colored Pavements, Section 3E.01 General, in order to provide for a more logical flow, to better emphasize traffic control device and non-traffic control device colored pavements, and to reflect FHWA's Interpretation 3-169(I)<sup>125</sup> on non-retroreflective colored pavements. The resulting language classifies as a traffic control device any retroreflective colored pavement between crosswalk lines and non-retroreflective colored pavement between crosswalk lines that is intended to communicate a regulatory or warning message.

270. As discussed in item 231 above, the FHWA proposes to move the discussion of barricades to Part 2. As a result, the title of chapter 3F would be "Channelizing Devices."

271. In existing section 3F.02 (new Section 3F.01) Channelizing Devices, the FHWA proposes to modify the STANDARD statement so that it is consistent with Section 6F.59 Cones. Rather than repeating much of the information that is already contained in Section 6F.59, the FHWA proposes to

delete the last four paragraphs of the STANDARD statement and replace them with a reference to the retroreflectivity requirements in Sections 6F.58 to 6F.60.

In addition, the FHWA proposes to add to the STANDARD statement that the color of the reflective bands on channelizing devices shall be white, except for bands on channelizing devices that are used to separate traffic flows in opposing directions, which shall be yellow. The FHWA proposes this change to correspond with the "color code" for markings.

272. In Section 3G.01 General (Chapter 3G Islands), the FHWA proposes to add the purpose of toll collection to the definition of island for traffic control purposes. The FHWA proposes this change because toll collection is a unique type of island.

273. In Section 3G.02 Approach-End Treatment, the FHWA proposes to change the first OPTION statement to a SUPPORT statement because bars and buttons projecting above the pavement surface in the neutral area between approach-end markings are not considered traffic control devices, and therefore are not regulated by the MUTCD. In concert with this change, the FHWA proposes to delete the last GUIDANCE statement and the first paragraph of the last OPTION statement.

274. In Section 3G.03 Island Marking Application, the FHWA proposes changing the 2nd paragraph of the STANDARD statement to a GUIDANCE statement because it is not always practical or necessary for a jurisdiction to include chevron or diagonal hatching in the triangular neutral area for all islands, especially small triangular channelizing islands at intersections.

275. The FHWA proposes adding a new section at the end of Chapter 3G. The proposed new section is numbered and titled "Section 3G.07 Pedestrian Islands and Medians" and contains SUPPORT statements on the purpose of pedestrian islands and medians as well as the placement of detectable warnings at curb ramps. The information proposed within this section is included in order to assist practitioners with meeting the provisions of ADAAG.<sup>126</sup>

276. The FHWA proposes to add a new Chapter at the end of Part 3. The proposed new chapter is numbered and titled, "Chapter 3H Rumble Strip Markings" and contains two sections that describe the use of marking in conjunction with longitudinal and transverse rumble strips. Rumble strips

have been in use for many years and numerous agencies are considering increased usage as part of their strategic highway safety plans. The proposed chapter is intended to address the use of markings in combination with rumble strips.

#### *Discussion of Proposed Amendments to Part 4 Highway Traffic Signals*

##### Discussion of Proposed Amendments Within Part 4—General

277. The FHWA proposes to reorganize Part 4 to improve the continuity and flow of information regarding the application of highway traffic signals in the MUTCD. Various paragraphs and sections would be relocated throughout the part, and the proposed new organization is reflected in the descriptions below.

278. The FHWA proposes to replace the word "shown" when referring to signal indications with the word "displayed" throughout Part 4. The FHWA also proposes to remove several references to "lenses" being "illuminated" and replace these with references to "signal indications" being "displayed." The FHWA proposes these changes to provide for consistency in terminology and because many newer signal optical units do not include lenses.

##### Discussion of Proposed Amendments Within Chapter 4A

279. In Section 4A.02 Definitions Relating to Highway Traffic Signals, the FHWA proposes to remove "signals at toll plazas" from the list of items that are not included as "highway traffic signals" in its definition. The FHWA proposes this change as a result of the recommendations in the Toll Plaza Best Practices and Recommendations Report<sup>127</sup> that indicated that signals at toll plazas have properties that are similar to some other special uses of highway traffic signals, and therefore should be included in the definition. Also, the FHWA is proposing to add a new Chapter 4K that provides for the application of highway traffic signals at toll plazas.

The FHWA also proposes to add definitions for "Hybrid Signal" and "Pedestrian Hybrid Signal" to provide clarity to the difference between normal traffic control signals and Pedestrian Hybrid Signals and Emergency Hybrid Signals, both of which are proposed for addition to the MUTCD in Part 4.

<sup>127</sup> "State of the Practice and Recommendations on Traffic Control Strategies at Toll Plazas," June 2006, can be viewed at the following Internet Web site: <http://mutcd.fhwa.dot.gov/rpt/tcstoll/index.htm>.

<sup>125</sup> FHWA's Official Interpretation 3-169(I), dated September 1, 2004, can be viewed at the following Internet Web site: <http://mutcd.fhwa.dot.gov/documents/pdf/3-169-I-FL-S.pdf>.

<sup>126</sup> The Americans With Disabilities Accessibility Guidelines (ADAAG) can be viewed at the following Internet Web site: <http://www.access-board.gov/ada-aba/index.htm>.

The FHWA proposes to add several items to the definition of "Intersection," consistent with the proposed revised definition in Section 1A.12. The FHWA proposes to add that two roadways separated by 9 meters (30 feet) or more shall be separate intersections; however, if no stopping point is designated between the two roadways in the median, the two intersections and the median between them shall be one intersection. The FHWA also proposes to clarify that any part of any vehicle legally beyond a stopping point is legally in the intersection, and a vehicle will remain in the intersection until the rear of the vehicle has cleared the intersection or crosswalk. The FHWA proposes these changes to more clearly define an intersection with respect to roadways divided by a median, particularly as this relates to signal design and operation.

Additionally, the FHWA proposes to revise the definition for "Permissive Mode" to include flashing YELLOW ARROW and flashing RED ARROW indications for permissive phases, as well as circular green. The flashing YELLOW ARROW and flashing RED ARROW are described in more detail in subsequent items below.

Finally, the FHWA proposes to revise the definitions of "Signal Face" and "Signal Head" to clarify that a signal face is an assembly of one or more signal sections, and that a signal head is an assembly of one or more signal faces. The FHWA proposes this change to clarify the meanings because they are often misstated.

#### Discussion of Proposed Amendments Within Chapter 4B

280. In Section 4B.02 Basis of Installation or Removal of Traffic Control Signals, the FHWA proposes to change the OPTION statement (with the exception of the last sentence of item E) to a GUIDANCE to recommend the steps that should be taken to remove a traffic control signal from operation, rather than merely permit steps to be taken. As part of this proposed change, the FHWA proposes to remove the suggested sign legend "TRAFFIC SIGNAL UNDER STUDY FOR REMOVAL" from item C, because the legend for this sign should be based on applicable circumstances for the individual intersection, and therefore a standard message should not be included in the MUTCD.

The FHWA proposes to add to the remaining OPTION statement that only items A and B of the GUIDANCE statement need to be completed for temporary traffic control signals, because items C through E do not apply to those locations. The FHWA also adds

to the remaining OPTION statement that controller cabinets may remain in place after removal of traffic signal heads if the jurisdiction desires to continue analysis of the traffic signal removal.

281. In Section 4B.04 Alternatives to Traffic Control Signals, the FHWA proposes to add two items to the list of less restrictive alternatives that should be considered before a traffic control signal is installed. Proposed item H discusses revising the geometrics at the intersection to add pedestrian median refuge islands and/or curb extensions. Proposed item L discusses the use of a pedestrian hybrid signal or in-roadway warning lights if pedestrian safety is a major concern at a location. The remaining items would be renumbered accordingly. The FHWA proposes adding these items because they are viable potential alternatives to a new traffic control signal.

282. In Section 4B.05 Adequate Roadway Capacity, the FHWA proposes adding a paragraph to the GUIDANCE statement clarifying that additional methods for increasing roadway capacity that do not involve widening a signalized intersection should be carefully evaluated. Such methods could include revising pavement markings and lane-use assignments where appropriate. The FHWA proposes this change to clarify that lower-cost options should be considered to increase roadway capacity and operational efficiency at signalized intersections.

#### Discussion of Proposed Amendments Within Chapter 4C

283. In Section 4C.01 Studies and Factors for Justifying Traffic Control Signals, the FHWA proposes adding a new Warrant 9, "Intersection Near a Highway-Rail Grade Crossing" to the list of warrants. This proposed warrant is described in more detail in item 287 below.

The FHWA proposes adding a second paragraph to the first OPTION statement allowing any four sequential 15-minute periods to be considered as 1 hour in signal warrants that require conditions to be present for a certain number of hours in order to be satisfied, if the separate 1-hour periods used in the analysis do not overlap each other and both the major and minor street volumes are for the same specific 1-hour periods. The FHWA proposes this change to clarify that the 1-hour periods of peak traffic volumes may not necessarily correspond to 60 minutes starting at the :00 hour on the clock.

284. In Section 4C.04 Warrant 3, Peak Hour, the FHWA proposes adding to the OPTION statement that a traffic signal

justified only under this warrant may be operated in flash-mode during the hours when the warrant is not met. The FHWA also proposes a GUIDANCE statement recommending that the signal be traffic-actuated. The FHWA proposes a phase-in compliance period of 15 years for this GUIDANCE statement for existing signals in good condition to minimize any impact on State or local highway agencies. The FHWA proposes these changes to encourage efficient operational strategies, because a traffic signal justified only under the Peak Hour warrant may have very low traffic volumes during much of the day. This language is similar to existing provisions in Sections 4C.05 (Pedestrian Volume Warrant) and 4C.06 (School Crossing Warrant).

285. In Section 4C.05 Warrant 4, Pedestrian Volume, the FHWA proposes to change in the STANDARD the criteria that are to be met in an engineering study for a traffic signal to be considered. The FHWA proposes to replace the existing two criteria with two new criteria based on vehicular and pedestrian volumes, and to require that only one of the criteria be met. The proposed criteria, and the associated volume curves, are derived from other vehicle-based traffic signal warrants and supplemented with data gathered during a TCRP/NCHRP study.<sup>128</sup> Similar to other traffic signal warrants, the FHWA proposes to add an OPTION statement following the criteria, allowing the use of different volume curves based on the posted or statutory speed limit or the 85th-percentile speed, or the location of the intersection. The FHWA also proposes to revise the OPTION to reduce the required pedestrian volumes for this warrant by as much as 50 percent if the 15th-percentile crossing speed of pedestrians is less than 1.1 m/sec (3.5 ft/sec). The FHWA proposes these changes to reflect the recommendations of the joint TCRP/NCHRP study that adjustments are needed in the existing pedestrian volume warrant. The net effect of the proposed revisions is as follows: (a) The pedestrian warrant will be slightly easier to meet with lower pedestrian volumes on streets with high vehicle volumes, and (b) the pedestrian warrant will be slightly more difficult to meet on streets with low vehicle volumes.

286. In Section 4C.05 Warrant 4, Pedestrian Volume, and Section 4C.06 Warrant 5, School Crossing, the FHWA

<sup>128</sup> "Improving Pedestrian Safety at Unsignalized Pedestrian Crossings," TCRP Report 112/NCHRP Report 562, Transportation Research Board, 2006, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_562.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_562.pdf).

proposes adding recommendations to the GUIDANCE statement that a traffic signal installed based on the pedestrian warrant or school crossing warrant only should also control the side street or driveway. When a traffic control signal is installed at an intersection with stop signs on the minor street to assist pedestrians in crossing the major street, minor street traffic can cross and turn left into the major street after stopping during the display of the green on the major street. This violates driver expectancies and compromises the meaning and effectiveness of the green signal indication. The FHWA believes that, even if the volume of traffic on the minor street is low when a signal is justified based on Warrant 4, it is in the best interest of traffic safety that the minor street be signalized also rather than stop sign controlled. The FHWA proposes a phase-in compliance period of 15 years for existing signals in good condition to minimize any impact on State or local highway agencies.

287. The FHWA proposes adding a new section following Section 4C.09. The proposed new section is numbered and titled "Section 4C.10 Warrant 9, Intersection Near a Highway-Rail Grade Crossing" and contains SUPPORT, STANDARD, GUIDANCE and OPTION statements describing the new warrant, which is intended for use in locations where none of the other eight signal warrants are met, but the proximity of the intersection to a highway-rail grade crossing is the principal reason to consider installing a traffic control signal. The FHWA proposes adding this new warrant, because some stop-controlled approaches to intersections near highway-rail grade crossings contain a stop line, which is closer to the track than the length of a large vehicle, and sight distances may preclude the vehicle from waiting on the approach side of the grade crossing before entering the intersection. Many of these intersections do not meet one of the other warrants in the MUTCD because those warrants use minimum volume thresholds for considering the installation of a traffic signal and not the proximity of a highway-rail grade crossing. The proposed warrant is based on recommendations from an NCHRP research project.<sup>129</sup>

<sup>129</sup> Information about "Highway Traffic Signal Warrant for Intersections Near Highway-Rail Grade Crossings," NCHRP Project 03-76A, can be viewed at the following Internet Web site: <http://www.trb.org/trbnet/projectdisplay.asp?projectid=830>.

#### Discussion of Proposed Amendments Within Chapter 4D—General

288. The FHWA proposes a significant reorganization of Chapter 4D so that similar subjects are grouped together in adjacent sections, or combined into single sections within the Chapter. In addition, the FHWA proposes to add the use of flashing yellow and flashing red arrows in Part 4, which affects many sections within Chapter 4D.

289. The FHWA also proposes to add the use of a flashing yellow arrow indication as an optional alternative to a circular green for permissive left-turn and right-turn movements throughout Part 4, which affects many sections within Chapter 4D. The proposed text throughout Chapter 4D incorporates Interim Approval IA-10, dated March 20, 2006, for flashing yellow arrows during permissive turn intervals.<sup>130</sup> The Interim Approval and the subsequent proposed text in the MUTCD are based on research contained in NCHRP Report 493.<sup>131</sup> The research found that the flashing yellow arrow is the best overall alternative to the circular green as the permissive signal display for a left-turn movement, has a high level of understanding and correct response by left-turn drivers and a lower fail-critical rate than the circular green, and the flashing yellow arrow display in a separate signal face for the left-turn movement offers more versatility in field application. It is capable of being operated in any of the various modes of left-turn operation by time of day, and is easily programmed to avoid the "yellow trap" associated with some permissive turns at the end of the circular green display. The application of flashing yellow arrow indications for right-turn movements is a logical extension of use for left-turns and will provide jurisdictions with a useful tool to effectively control a wide variety of situations involving right turns.

290. The FHWA also proposes to add information in several places in this chapter regarding the use of U-turn arrow indications to reflect the increasing use of U-turn arrows.

<sup>130</sup> FHWA's Interim Approval #IA-10, dated March 20, 2006, can be found at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interim\\_approval/pdf/ia-10\\_flashyellowarrow.pdf](http://mutcd.fhwa.dot.gov/resources/interim_approval/pdf/ia-10_flashyellowarrow.pdf).

<sup>131</sup> NCHRP Report 493, "Evaluation of Traffic Signal Displays for Protected/ Permissive Left-Turn Control," 2003, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_493.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_493.pdf).

#### Discussion of Proposed Amendments Within Chapter 4D—Specific

291. In Section 4D.01 General, the FHWA proposes to add a SUPPORT statement between the first and second paragraphs of the STANDARD statement to clarify the meaning of a seasonal shutdown. The FHWA proposes to add this information to incorporate clarifications into the MUTCD per Official Interpretation #4-288, dated April 27, 2005.<sup>132</sup>

The FHWA proposes to relocate a paragraph regarding coordination of traffic control signals within 800 m (0.5 mi) of one another from existing Section 4D.14 and add it to the GUIDANCE statement. The FHWA also proposes to add that coordination for such traffic signals should be considered where a jurisdictional boundary or a boundary between different signal systems falls in between them. The FHWA proposes this change to encourage jurisdictions to coordinate traffic signal timing plans across jurisdictional or system boundaries. In concert with this proposed change, the FHWA proposes to add a new SUPPORT statement at the end of this section that contains information regarding traffic signal coordination that was previously in Section 4D.14.

292. In Section 4D.03 Provisions for Pedestrians, the FHWA proposes to change the OPTION statement to a GUIDANCE to recommend, rather than merely permit, the use of No Pedestrian Crossing signs at traffic control signal locations where it is necessary or desirable to prohibit certain pedestrian movements, where such movements are not physically prevented by other means. The FHWA proposes this change because if the pedestrian movement is to be prohibited, a prohibitory sign should be used.

293. The FHWA proposes to relocate and retitle existing Section 4D.18 to "Section 4D.04 Signal Indications—Design, Illumination, Color, and Shape." The FHWA proposes to revise the first STANDARD statement, which states that letters or numbers shall not be displayed as part of a vehicular signal indication. The FHWA proposes to specifically prohibit vehicular countdown displays because countdown indications on vehicular signal indications and similar methods of attempting to indicate a "pre-yellow" warning, such as a flashing green interval, have been found to lengthen

<sup>132</sup> FHWA's Official Interpretation 4-288, dated April 27, 2005, can be found at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interpretations/pdf/4\\_288.pdf](http://mutcd.fhwa.dot.gov/resources/interpretations/pdf/4_288.pdf).

the “dilemma zone” and thereby result in increased crash rates.<sup>133</sup>

The FHWA also proposes to provide an exception to the prohibition on lettering for toll plaza signals (which is proposed for addition to the MUTCD, see item 347 below) because the Toll Plaza Best Practices and Recommendations Report<sup>134</sup> indicates that lettered messages on toll plaza signals are useful for toll operations and, with the extremely low speeds in a toll plaza stopped lane environment, such messages do not significantly detract from the signal indications.

The FHWA also proposes to add in the first STANDARD statement that strobes or other flashing displays within or adjacent to red signal indications shall not be used. The FHWA proposes this change to clarify that strobes within traffic signals are not approved traffic control devices and to be consistent with FHWA Official Interpretation 4–263.<sup>135</sup> Although FHWA allowed experimentation with strobes in red traffic signals in the mid-1980s, the FHWA made a determination in 1990 not to approve any further experimentations with strobe lights in traffic signals, and to terminate all then-current experimentations with these devices. As stated in the Official Interpretation, research conducted as part of the experimentation process showed inconsistent benefits and some significant disbenefits to the use of strobes and similar flashing displays. Any strobes operating within red traffic signals are not in accordance with the MUTCD and they are not under any approved experimentation. The FHWA proposes a phase-in compliance period of 5 years for removing strobes from existing locations to minimize any impact on State or local highway agencies.

Finally, the FHWA proposes to relocate information regarding arrows from existing Section 4D.16 to the first STANDARD statement, and to add an item D to require that U-turn arrows, if used, be pointed in a manner that directs the driver through the turn. The FHWA proposes this change in order to

provide U-turn signal arrow indications for use on signalized approaches where left turns are prohibited or not physically possible but U-turns are allowed and need to be positively controlled with a protected signal phase. In such cases, left-turn arrows are not appropriate.

294. To better organize the information by subject matter, and to add clarity, the FHWA proposes to add several sections following Section 4D.04. The proposed new sections are numbered and titled “Section 4D.05 Size of Vehicular Signal Indications,” “Section 4D.06 Positions of Signal Indications Within a Signal Face—General,” “Section 4D.07 Positions of Signal Indications Within a Vertical Signal Face,” and “Section 4D.08 Positions of Signal Indications Within a Horizontal Signal Face.” Much of the information in these proposed new sections is contained in existing sections within Chapter 4D, but the text is revised to pertain to the subject of each particular section. Significant additional changes to the sections are described in items 295 and 296 below.

295. In new Section 4D.05 Size of Vehicular Signal Indications, the FHWA proposes modifying the STANDARD to require 300 mm (12 in) signal indications for all new signal installations. As part of this proposed change, the FHWA proposes to allow existing 200 mm (8 in) signal indications to be retained for the remainder of their useful life, to minimize any impact on State or local highway agencies. The FHWA proposes to revise the following OPTION statement to allow the use of 200 mm (8 in) signal indications under three specific circumstances where such use could be advantageous. The FHWA proposes these changes to reflect the predominant current signal design practice, to reflect the results of studies<sup>136</sup> that have shown the significant safety benefits of using 300 mm (12 in) indications, and to make signal indications more visible to elderly drivers.

296. In Section 4D.06 Positions of Signal Indications Within a Signal Face—General, the FHWA proposes adding to the STANDARD statement

that unless otherwise stated for a particular application, if a vertical signal face contains a cluster(s), the face shall have at least three vertical positions. The FHWA proposes this change because road users who are color vision deficient identify the illuminated color by its position relative to the other signal sections.

The FHWA also proposes to add requirements to the STANDARD statement for the position of U-turn arrow signal sections in a signal face. The FHWA proposes this change to accommodate the new U-turn arrows as described previously in item 290.

297. The FHWA also proposes adding several new figures that illustrate positioning and arrangements of signal sections in left turn signal faces (Figures 4D–5 to 4D–11) and right turn signal faces (Figures 4D–12 to 4D–17). The FHWA proposes these new figures in order to enhance understanding and correct application of the relatively complex requirements and options for turn signals.

298. In existing Section 4D.04 (new Section 4D.09) Meaning of Vehicular Signal Indications, the FHWA proposes to add to item A(1) of the STANDARD statement a requirement that vehicular traffic turning left yield the right-of-way to other vehicles approaching from the opposite direction so closely as to constitute an immediate hazard. The FHWA proposes this change to conform the MUTCD to the Uniform Vehicle Code and to laws in many States.

The FHWA also proposes to separate existing item B(1) of the STANDARD statement into two items to more clearly indicate the meaning of a steady circular yellow and a steady yellow arrow to vehicular traffic. As part of this change, the FHWA proposes to add that a steady circular yellow signal indication warns that the related flashing arrow movement is being terminated. The FHWA proposes this change to provide consistency with the proposed addition of the applications of flashing yellow arrows and flashing red arrows.

The FHWA proposes to revise item C(1) of the STANDARD statement to clarify that where permitted, vehicles making a right turn or a left turn from a one-way street onto another one-way street when a steady circular red indication is displayed shall be governed by the rules applicable to making a stop at a STOP sign. The FHWA proposes this change to clarify the right of way rules for turning after stopping on a circular red indication. The FHWA also proposes a revision to item C(2) related to a steady red arrow signal indication that is similar in nature but reflects the different

<sup>133</sup> “Safety Evaluation of a Flashing-Green Light in a Traffic Signal,” by D. Mahalel and D.M. Zaidel, Traffic Engineering + Control magazine, February, 1985, pages 79–81, is available for purchase from Hemming Information Services, 32 Vauxhall Bridge Road, London, SW1V 2SS, England, Web site: <http://www.tecmagazine.com/>.

<sup>134</sup> “State of the Practice and Recommendations on Traffic Control Strategies at Toll Plazas,” June 2006, can be viewed at the following Internet Web site: <http://mutcd.fhwa.dot.gov/rpt/tcstoll/index.htm>.

<sup>135</sup> FHWA’s Official Interpretation 4–263, dated July 2, 2003, can be found at the following Internet Web site: <http://mutcd.fhwa.dot.gov/documents/pdf/4-263-1-FL-s.pdf>.

<sup>136</sup> These studies are summarized and documented in the FHWA report “Making Intersections Safer: A Toolbox of Engineering Countermeasures to reduce Red-Light Running,” pages 22–23, which can be viewed at the following Internet Web site: <http://safety.fhwa.dot.gov/intersections/docs/rhrbook.pdf> and in “Signalized Intersections: Informational Guide”, FHWA publication number FHWA–HRT–04–091, August 2004, page 283, which can be viewed at the following Internet Web site: <http://www.tfhrc.gov/safety/pubs/04091/>.



requirements for turning on a red arrows versus on a circular red.

The FHWA proposes to delete the information from existing item D of the STANDARD statement and instead describe the meanings of flashing yellow signal indications in a new item E and flashing red signal indications in a new item F to more specifically clarify their meanings to vehicular traffic, to pedestrians, and when displayed as a beacon. The FHWA proposes to state in new item D that a flashing green indication has no meaning and shall not be used.

In new item E of the STANDARD statement, the FHWA proposes to add an item 2 that describes the use of flashing yellow arrow indications for permissive turning movements in the direction of the arrow. The FHWA proposes this change to allow agencies to use the flashing yellow arrow, as an option to the steady circular green indication, for intersections with permitted turning phases. The effectiveness of the flashing yellow arrow for this purpose has been demonstrated as reported in NCHRP Report 493.<sup>137</sup>

299. In existing Section 4D.05 (new Section 4D.10) Application of Steady Signal Indications, the FHWA proposes to modify item A(2) in the first STANDARD to exclude the use of a circular red signal indication with a green arrow indication when it is physically impossible for traffic to go straight through the intersection, such as on the stem of a T-intersection. The FHWA proposes this change to provide for additional consistency and uniformity of signal displays for the stems of T-intersections.

The FHWA proposes to modify item E(3) in the first STANDARD to permit the use of a steady yellow arrow indication to terminate a flashing yellow arrow or a flashing left-turn red arrow controlling a permissive left-turn phase. The FHWA proposes this change to provide consistency with the proposed addition of the flashing yellow arrow indication for permissive left turns. As documented in NCHRP Report 493,<sup>138</sup> the steady yellow arrow was found to be successful as the change interval display following the flashing yellow arrow permissive interval. A subsequent study

<sup>137</sup> NCHRP Report 493, "Evaluation of Traffic Signal Displays for Protected/ Permissive Left-Turn Control," 2003, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_493.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_493.pdf).

<sup>138</sup> NCHRP Report 493, "Evaluation of Traffic Signal Displays for Protected/ Permissive Left-Turn Control," 2003, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_493.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_493.pdf).

by the University of Wisconsin<sup>139</sup> found no evidence to suggest that the flashing yellow arrow permissive indication negatively affects drivers' understanding of the steady yellow change interval indication. No problems with this display have been reported to FHWA by the dozens of highway agencies that have implemented the flashing yellow arrow at several hundred intersections under experimentation or interim approval.

The FHWA proposes to add new STANDARD and GUIDANCE statements at the end of this section that contain new material related to the proposed addition of the flashing yellow arrow and flashing left-turn red arrow, as well as information previously contained in portions of existing Sections 4D.08 and 4D.09, along with minor edits.

In addition, the FHWA proposes to restrict the displays of several combinations of arrow signal indications of different colors pointing in the same direction on any one signal face or as a result of the combination of displays from multiple signal faces on an approach. The FHWA proposes this change to avoid displaying conflicting or confusing information to road users.

300. To better organize the information by subject matter, and to add clarity, the FHWA proposes to add several sections related to signal faces following Section 4D.10. The proposed new sections are numbered and titled "Section 4D.11 Number of Signal Faces on an Approach," "Section 4D.12 Visibility, Aiming, and Shielding of Signal Faces," "Section 4D.13 Lateral Positioning of Signal Faces," "Section 4D.14 Longitudinal Positioning of Signal Faces," "Section 4D.15 Mounting Height of Signal Faces," and "Section 4D.16 Lateral Offset (Clearance) of Signal Faces." Much of the information in these proposed new sections is contained in existing sections within Chapter 4D, but the text is revised to pertain to the subject of each particular section. Significant additional changes to the sections are described in items 301 through 305 below.

301. In new Section 4D.11 Number of Signal Faces on an Approach, the FHWA proposes revising item A of the STANDARD statement to clarify that two signal faces are required for a straight-through movement if such movement exists at a location, even if it

<sup>139</sup> An abstract and summary of "An Evaluation of Driver Comprehension of Solid Yellow Indications Resulting from Implementation of Flashing Yellow Arrow," 2007, by Michael A. Knodler, David A. Noyce, Kent C. Kacir, and Chris L. Brehmer, can be viewed at the following Internet Web site: <http://pubsindex.trb.org/document/view/default.asp?lbid=802137>.

is not the major movement, and to require two signal faces for the major signalized turning movement if no straight-through movement exists, such as on the stem of a T-intersection. The FHWA proposes these changes to ensure that the straight-through movement, or major signalized turning movement in absence of a straight-through movement, contain redundant signal faces in case of one of the signal faces fails, and to incorporate the FHWA's Official Interpretation number 4-295(I).<sup>140</sup>

The FHWA also proposes adding an OPTION to allow a single section GREEN ARROW signal to be used when there is never a conflicting movement at an intersection. This single section signal may be used for a through movement at a T-intersection if appropriate geometrics and signing are placed according to an engineering study, to allow for free-flow of traffic where there are no conflicting movements. The FHWA proposes this change to incorporate Official Interpretation 4-255(I) into the MUTCD.<sup>141</sup>

The FHWA proposes to add a GUIDANCE statement at the end of the section that outlines the recommendations for providing and locating signal faces at intersections where the posted or statutory speed limit or the 85th-percentile speed on an approach exceeds 60 km/h (40 mph). As documented in the FHWA reports "Making Intersections Safer: A Toolbox of Engineering Countermeasures to Reduce Red-Light Running"<sup>142</sup> and "Signalized Intersections: Informational Guide,"<sup>143</sup> numerous studies have found significant safety benefits from locating signal faces overhead rather than at the roadside, providing one overhead signal face per through lane when there is more than one through lane, providing supplemental near-side and/or far-side post-mounted faces for added visibility, and including backplates on the signal faces. Additionally, two recent studies, by the

<sup>140</sup> FHWA's Official Interpretation 4-295(I), dated October 19, 2005, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interpretations/4\\_297.htm](http://mutcd.fhwa.dot.gov/resources/interpretations/4_297.htm).

<sup>141</sup> FHWA's Official Interpretation 4-255(I), dated February 19, 2003, can be viewed at the following Internet Web site: <http://mutcd.fhwa.dot.gov/documents/pdf/4-255-I-NE-s.pdf>.

<sup>142</sup> Pages 17-27 of this report can be viewed at the following Internet Web site: <http://safety.fhwa.dot.gov/intersections/docs/rlrbook.pdf>.

<sup>143</sup> "Signalized Intersections: Informational Guide", FHWA publication number FHWA-HRT-04-091, August 2004, pages 73-75 and 281-282, can be viewed at the following Internet Web site: <http://www.tfrc.gov/safety/pubs/04091/>.

URS Corporation<sup>144</sup> and by Bradley University<sup>145</sup> found that reconfiguring diagonal signal spans to “box” spans or mast arm layouts with far-side signal face locations produced significant reductions in the number of red light violations and entries into the intersection late in the yellow change interval. The FHWA proposes the addition of this GUIDANCE to reflect modern signal design practices and to enhance the safety of signalized intersections along higher-speed roadways, where the potential benefits are greatest. For the same reasons, the FHWA also proposes that these recommendations should be considered as well as for any major urban or suburban arterial street with four or more lanes. The FHWA proposes a phase-in compliance period of 15 years for existing signals in good condition to minimize any impact on State or local highway agencies.

302. In place of existing Figure 4D-3 Typical Arrangements of Signal Lenses in Signal Faces, the FHWA proposes to add several new figures showing typical arrangements of signal sections in signal faces and typical lateral positioning of signal faces for several different conditions, including U-turn arrows, non-turning, and turning situations. The proposed new figures include Figures 4D-1, 4D-2, and 4D-6 through 4D-18. The FHWA believes that these new figures will assist users of the Manual in understanding and applying the relatively complex provisions, especially regarding turning movements.

303. In new Section 4D.12 Visibility, Aiming, and Shielding of Signal Faces, the FHWA proposes to revise the 4th paragraph of the first GUIDANCE statement, which was relocated from existing Section 4D.17, to add that signal backplates should be used on all of the signal faces that face an approach with a posted or statutory speed limit or where the 85th-percentile speed on the approach exceeds 60 km/hr (40 mph), and that signal backplates should be considered when the speeds are 60 km/hr (40 mph) or less. The FHWA proposes this change to reflect modern signal design practices to enhance safety

<sup>144</sup> Details on this study, “Far-Side Signals vs. Diagonal Span Behavioral Research,” project number 12937724, February 2006, can be obtained from URS Corporation, 3950 Sparks Drive SE, Grand Rapids, MI 49546-2420.

<sup>145</sup> Evaluation of Signal Mounting Configurations at Urban Signalized Intersections in Michigan and Illinois” by Kerrie L. Schattler, Matthew T. Christ, Deborah McAvoy, and Collette M. Glauber, August 1, 2007, may be obtained from the Department of Civil Engineering and Construction, Bradley University, 1501 West Bradley Avenue, Peoria, IL 61625.

by increasing the visibility of signal faces on higher-speed approaches, especially for older drivers, to reflect safety studies as documented in the FHWA reports “Signalized Intersection: Informational Guide”<sup>146</sup> and “Making Intersections Safer: Toolbox of Engineering Countermeasures to Reduce Red Light Running,”<sup>147</sup> as well as recommendations from the Older Driver handbook<sup>148</sup>. The FHWA proposes a phase-in compliance period of 15 years for existing signals in good condition to minimize any impact on State or local highway agencies.

The FHWA also proposes to add an OPTION statement allowing the use of yellow retroreflective strips along the perimeter of a signal face backplate. The FHWA proposes this change to increase the conspicuity of the signal face at night, and to add language to the MUTCD in accordance with Interim Approval IA-1, dated February 2, 2004.<sup>149</sup>

304. In new Section 4D.13 Lateral Positioning of Signal Faces, the FHWA proposes adding a STANDARD requiring that overhead-mounted turn signal faces of certain types for exclusive turn lanes shall be located directly over the turn lane. The FHWA proposes this change to ensure that drivers associate the proper turn signal face with the exclusive turn lane and because the research documented in NCHRP Report 493<sup>150</sup> found that this location produced the best driver understanding and correct behavior. The FHWA proposes a phase-in compliance period of 15 years for existing signals in good condition to minimize any impact on State or local highway agencies.

As part of this proposed change in the preceding paragraph, the FHWA proposes to add a GUIDANCE statement that on an approach with an exclusive

<sup>146</sup> “Signalized Intersections: Informational Guide”, FHWA publication number FHWA-HRT-04-091, August 2004, pages 288-290, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/safety/pubs/04091/>.

<sup>147</sup> Page 26 of this report can be viewed at the following Internet Web site: <http://safety.fhwa.dot.gov/intersections/docs/rlrbook.pdf>.

<sup>148</sup> “Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians,” FHWA Report no. FHWA-RD-01-051, May, 2001, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01105/cover.htm>. Recommendation #I.N(3)

<sup>149</sup> The Interim Approval for Use of Retroreflective Border on Signal Backplates, number IA-1, dated February 6, 2004, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/pdfs/ia\\_retroborder.pdf](http://mutcd.fhwa.dot.gov/pdfs/ia_retroborder.pdf).

<sup>150</sup> NCHRP Report 493, “Evaluation of Traffic Signal Displays for Protected/Permissive Left-Turn Control,” 2003, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_493.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_493.pdf).

left-turn lane(s) and opposing vehicular traffic where a circular green signal indication is used for permissive left turns, signal faces containing a circular green signal indication should not be post-mounted on the far side median or located overhead above an exclusive left-turn lane or the extension of the lane. The FHWA proposes this change because NCHRP Report 493<sup>151</sup> found that the circular green permissive left-turn indication is confusing to some left-turn drivers who assume it provides right of way during the permissive interval. The FHWA believes that placement of the circular green indication directly above or in line with an exclusive left-turn lane exacerbates the safety issues with this display. Research<sup>152</sup> found that displaying a circular green signal indication in a separate signal face directly over an exclusive left-turn lane led to a higher left-turn crash rate than “shared” displays placed over the lane line between the left-turn lane and the adjacent through lane or to the right of that line. Placing the signal display over the lane line or to the right of it helps to promote the idea that the signal display with the circular green indication is being shared by the left-turn and through lanes. This can help reduce the infrequent but very dangerous occurrence of the circular green permissive indication being misunderstood as a protected “go” indication by left-turn drivers. The FHWA clarifies that this proposed recommendation would apply only to new or reconstructed intersections. The FHWA also proposes similar wording in proposed new Sections 4D.18 and 4D.20.

Finally, the FHWA proposes adding a STANDARD repeating the existing requirement in existing Section 4D.15 (new Section 4D.10) prohibiting the use of left-turn arrows in near-right signal faces and prohibiting the use of right-turn arrows in far-left signal faces when supplemental post-mounted signal faces are used. The FHWA proposes this change for additional emphasis and to ensure consistency.

305. In new Section 4D.15 Mounting Height of Signal Faces, the FHWA proposes to revise the 2nd and 3rd paragraphs of the STANDARD statement

<sup>151</sup> NCHRP Report 493, “Evaluation of Traffic Signal Displays for Protected/Permissive Left-Turn Control,” 2003, page 57, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_493.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_493.pdf).

<sup>152</sup> “An Evaluation of Permissive Left-Turn Signal Phasing,” by Kenneth R. Agent, ITE Journal, Vol. 51, No. 12, December, 1981, pages 16-20, may be obtained from the Institute of Transportation Engineers (Web site: <http://www.ite.org>).

to apply the height requirements for signal housings to any portion of a highway that can be used by motor vehicles. Because a shoulder is not included in the definition of roadway, the FHWA proposes this change to ensure that any portion of the highway on which motor vehicles may travel is subject to the appropriate height requirements.

306. To better organize the information by subject matter, and to add clarity, the FHWA proposes to add several sections related to signal indications for turn movements following new Section 4D.16. The FHWA proposes to renumber and retitle existing Section 4D.06 to be "Section 4D.17 Signal Indications for Left-Turn Movements—General." Proposed new Sections 4D.18 through 4D.20 describe the use of specific signal indications and signal faces for the permissive only mode, the protected only mode, and the protected/permissive mode left-turn movements, respectively. The FHWA proposes to renumber and retitle existing Section 4D.07 to be "Section 4D.21 Signal Indications for Right-Turn Movements—General." Proposed new Sections 4D.22 through 4D.24 describe the various modes of signalized right-turn movements in the same order as the left turns. In addition to adding new material related to the proposed addition of the flashing yellow arrow and flashing red arrow, the FHWA proposes several editorial changes within each new section to ensure that the text pertains to the subject of the particular section. The FHWA proposes to allow the use of flashing red arrow for permissive turn movements only in certain unusual circumstances where an engineering study determines that each successive vehicle must come to a full stop before making the turn permissively. The FHWA also proposes to add Figures 4D–6 through 4D–12 and Figures 4D–13 through 4D–18 to illustrate positioning and typical signal faces for each of the modes of left-turn and right-turn phasing, respectively. Significant additional changes to the sections are described in items 307 through 314 below.

307. In new Section 4D.17 Signal Indications for Left-Turn Movements—General, the FHWA proposes adding a STANDARD statement specifying the requirements for signal indications on the opposing approach and for conflicting pedestrian movements during permissive and protected left-turn movements. The FHWA proposes this addition for consistency with other requirements in Part 4. The FHWA also proposes to prohibit the use of a protected-only mode left-turn phase

which begins or ends at a different time than the adjacent through movements unless an exclusive left turn lane is provided. The FHWA proposes this change because, without an exclusive left-turn lane, the operation of a protected-only mode left-turn phase forces left-turning vehicles to await the display of the protected green arrow while stopped in a lane used by through vehicles, causing many approaching through vehicles to abruptly change lanes to avoid delays, and this can result in inefficient operations and rear-end and sideswipe type crashes.<sup>153</sup> If an exclusive left-turn lane is not present and protected only mode is needed for the left-turn movement, "split-phasing," in which the protected left-turn movement always begins and ends at the same times in the signal cycle as the adjacent through movement, can be used. The FHWA proposes a phase-in compliance period of 10 years for existing signals in good condition to minimize any impact on State or local highway agencies.

The FHWA also proposes adding an OPTION to allow the use of static signs to inform drivers that left-turn arrows will not be available at certain times of the day. The FHWA proposes this change to give agencies an option to inform motorists of the presence of a variable mode left turn signal.

308. In new Section 4D.18 Signal Indications for Permissive Only Mode Left-Turn Movements, the FHWA proposes adding STANDARD statements for the use of flashing yellow arrow and flashing red arrow as permissive left turn signals. The FHWA proposes this change as part of the addition of flashing yellow arrow and flashing red arrow options for signaling permissive left-turns.

309. In new Section 4D.19 Signal Indications for Protected Only Mode Left-Turn Movements, the FHWA proposes to eliminate the STANDARD allowing the use of protected-only mode signal faces with the combination of circular red, left-turn yellow arrow, and left-turn green arrow. The FHWA proposes this change to enhance uniformity by requiring States and municipal agencies to use a left-turn red arrow instead of a circular red for protected-only mode left-turn signals. Red arrow signal indications have been in use for over 35 years, are extensively implemented for protected turn movements in the majority of States, are well understood by road users, present

an unequivocal message regarding what movement is prohibited when the red indication is displayed, and eliminate the need for the use of a supplemental R10–10 LEFT TURN SIGNAL sign. The FHWA proposes a phase-in compliance period of 15 years for existing signals in good condition to minimize any impact on State or local highway agencies.

310. In new Section 4D.20 Signal Indications for Protected/Permissive Mode Left-Turn Movements, the FHWA proposes adding STANDARD statements for the use of flashing yellow arrow and flashing red arrow signal indications for protected/permissive left-turn movements. The FHWA also proposes adding a GUIDANCE statement that recommends against using "separate" signal faces for protected/permissive left-turn movements, since they include the display of a circular green indication that is located to the left of the lane line separating the left-turn lane from the adjacent through lane(s).

311. In new Section 4D.21 Signal Indications for Right-Turn Movements—General, the FHWA proposes adding a STANDARD statement specifying the requirements for left-turn signal indications on the opposing approach and for conflicting pedestrian movements during permissive and protected right-turn movements. The FHWA proposes this addition for consistency with other requirements in Part 4. The FHWA also proposes to prohibit the use of a protected-only mode right-turn phase which begins or ends at a different time than the adjacent through movements unless an exclusive right turn lane is provided. Similar to item 307 above for left-turns, the FHWA proposes this change because, without an exclusive right-turn lane, the operation of a protected-only mode right-turn phase forces right-turning vehicles to await the display of the protected green arrow while stopped in a lane used by through vehicles, causing many approaching through vehicles to abruptly change lanes to avoid delays, and this can result in inefficient operations and rear-end and sideswipe type crashes. The FHWA proposes a phase-in compliance period of 10 years for existing signals in good condition to minimize any impact on State or local highway agencies.

The FHWA also proposes adding an OPTION to allow the use of static or changeable message signs to inform drivers that right-turn arrows will not be available at certain times of the day. The FHWA proposes this change to give agencies an option to inform motorists of the presence of a variable mode right turn signal.

<sup>153</sup> "Signalized Intersections: Informational Guide", FHWA publication number FHWA-HRT-04-091, August 2004, page 307, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/safety/pubs/04091/>.

312. In new Section 4D.22 Signal Indications for Permissive Only Mode Right-Turn Movements, the FHWA proposes adding STANDARD statements for the use of flashing yellow arrow and flashing red arrow as permissive right turn signals. The FHWA proposes this change as part of the addition of flashing yellow arrow and flashing red arrow options for signaling permissive right-turns.

313. In new Section 4D.23 Signal Indications for Protected-Only Mode Right-Turn Movements, the FHWA proposes to retain the provision currently located in existing Section 4D.07 that allows the use of protected-only mode right-turn signal faces with the combination of circular red, right-turn yellow arrow, and right-turn green arrow. Although the use of circular red indications for protected-only mode left-turns is proposed for elimination in item 309 above, the FHWA believes that circular red should be retained for use with protected-only mode right-turn movements because of the different meanings of the circular red and the right-turn red arrow signal indications regarding right-turn-on-red after stop. Circular red would be used in a protected-only mode right turn signal face if it is intended to allow right turns on red after stopping. The FHWA also proposes adding STANDARD statements for the use of flashing yellow arrow and flashing red arrow signal indications for protected only mode right-turn movements.

314. In new Section 4D.24 Signal Indications for Protected/Permissive Mode Right-Turn Movements, the FHWA proposes adding STANDARD statements for the use of flashing yellow arrow and flashing red arrow signal indications for protected/permissive right-turn movements. The FHWA also proposes adding a STANDARD statement that prohibits the use of "separate" signal faces for protected/permissive right-turn movements, since they offer no benefits when compared to a shared signal face.

315. The FHWA proposes to add a new section numbered and titled, "Section 4D.25 Signal Indications for Approaches With Shared Left-Turn/Right-Turn Lanes and No Through Movement." This new section contains SUPPORT, STANDARD and OPTION statements regarding this type of lane that is shared by left-turn and right-turn movements, which is sometimes provided on an approach that has no through movement, such as the stem of a T-intersection or where the opposite approach is a one-way roadway in the opposing direction. The FHWA proposes this change to provide explicit

information regarding shared left-turn/right-turn lanes, which has not previously been included in the MUTCD, and to enhance uniformity of displays for this application. The FHWA proposes a phase-in compliance period of 15 years for existing signals in good condition to minimize any impact on State or local highway agencies.

316. In existing Section 4D.10 (new Section 4D.26) Yellow Change and Red Clearance Intervals, the FHWA proposes to revise the first STANDARD regarding yellow change intervals to account for the proposed introduction of the flashing yellow arrow and flashing red arrow for permissive turn phases.

The FHWA also proposes to change the first OPTION statement to a GUIDANCE, to recommend, rather than merely permit, a yellow change interval to be followed by a red clearance interval to provide additional time before conflicting movements are released, when indicated by the application of engineering practices as discussed below. The FHWA proposes this change based on safety studies indicating the positive effect on safety of providing a red clearance interval and surveys indicating that use of a red clearance interval is a predominant practice by jurisdictions, as documented in the FHWA report "Making Intersections Safer: Toolbox of Engineering Countermeasures to Reduce Red Light Running."<sup>154</sup> The FHWA proposes a phase-in compliance period of 5 years for existing signals in good condition to minimize any impact on State or local highway agencies.

The FHWA also proposes to revise the second STANDARD statement to indicate that the durations of the yellow change interval and, when used, the red clearance interval, shall be determined using engineering practices, and to add a new SUPPORT statement to indicate that engineering practices for determining the durations of these intervals can be found in two Institute of Transportation Engineers publications. The FHWA proposes these changes to enhance safety at signalized intersections by requiring that accepted engineering methods be used to determine the durations of these critical intervals rather than random or "rule of thumb" settings, and by recommending the provision of a red clearance interval when such accepted engineering practices indicate such interval is needed. As documented in the FHWA report "Signalized Intersections:

Informational Guide,"<sup>155</sup> a variety of studies from 1985 through 2002 have found significant safety benefits from using accepted engineering practices to determine the durations of yellow and red clearance intervals. Recent safety studies<sup>156</sup> have further documented significant major reductions in crashes when jurisdictions have revised the durations of the yellow change and red clearance intervals using the accepted engineering practices.

The FHWA also proposes a new STANDARD statement that requires that the duration of the yellow change intervals and red clearance intervals be within the technical capabilities of the signal controller, and be consistent from cycle to cycle in the same timing plan. The FHWA proposes this change to accommodate the inherent limitations of some older mechanical controllers but provide for consistency of interval timing.

Finally, the FHWA proposes a new STANDARD statement at the end of the section that prohibits the use at a signalized location of flashing green indications, countdown vehicular signals, or similar displays intended to provide a "pre-yellow warning" interval. Flashing beacons on advance warning signs on the approach to a signalized location would be exempted from the prohibition. The FHWA proposes this change to clarify the MUTCD consistent with FHWA Official Interpretation # 4-246.<sup>157</sup>

317. In existing Section 4D.13 (new Section 4D.27) Preemption and Priority Control of Traffic Control Signals, the FHWA proposes to add a GUIDANCE statement recommending that agencies provide back-up power supplies for signals with railroad preemption or that are coordinated with flashing light signal systems, with the exception of traffic control signals interconnected with light rail transit systems. The FHWA proposes this change to ensure that the primary functions of the

<sup>155</sup> "Signalized Intersections: Informational Guide", FHWA publication number FHWA-HRT-04-091, August 2004, pages 209-211, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/safety/pubs/04091/>.

<sup>156</sup> NCHRP Research Results Digest 299, November 2005, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rrd\\_299.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rrd_299.pdf). This digest includes data from the study "Changes in Crash Risk Following Retiming of the Traffic Signal Change Intervals," by R.A. Retting, J.F. Chapline, and A.F. Williams, as published in *Accident Analysis and Prevention*, Volume 34, number 2, pages 215-220, available from Pergamon Press, Oxford, NY.

<sup>157</sup> Official Interpretation 4-246 can be viewed at the following Internet Web site: <http://mutcd.fhwa.dot.gov/documents/pdf/4-246-I-NY-S.pdf>

<sup>154</sup> Pages 35-36 of this report can be viewed at the following Internet Web site: <http://safety.fhwa.dot.gov/intersections/docs/lrbbook.pdf>.

interconnected signal systems still function in a safe manner in the event of a power failure, and for consistency with similar proposed GUIDANCE in Part 8. The FHWA proposes a phase-in compliance period of 10 years for existing signals in good condition to minimize any impact on State or local highway agencies.

In addition, the FHWA proposes to add an OPTION allowing light rail transit signal indications to control preemption or priority control movements for public transit buses in “queue jumper” lanes or bus rapid transit in semi-exclusive or mixed-use alignments. The FHWA proposes this change to incorporate clarification into the MUTCD consistent with FHWA Official Interpretation #10–59(I) and #10–66(I), to provide additional flexibility to agencies seeking to reduce driver confusion with traffic signals intended to control only mass transit vehicles.<sup>158</sup>

318. Following new Section 4D.27, the FHWA proposes to add several sections related to the flashing operation of traffic signals. The proposed sections are numbered and titled, “Section 4D.28 Flashing Operation of Traffic Control Signals—General,” “Section 4D.29 Flashing Operation—Transition Into Flashing Mode,” “Section 4D.30 Flashing Operation—Signal Indications During Flashing Mode,” and “Section 4D.31 Flashing Operation—Transition Out of Flashing Mode.” While much of this information is contained in existing sections of the MUTCD, the FHWA proposes to edit, add new information, and better organize the material to provide clarity on the flashing operation of traffic signals, including how to transition into and out of flashing mode. Significant additional changes to existing material are described in items 319 through 322 below.

319. In Section 4D.28 Flashing Operation of Traffic Control Signals—General, the FHWA proposes to add an OPTION allowing traffic control signals to be operated in flashing mode on a scheduled basis during one or more periods of the day. The FHWA proposes this change because more efficient operations may be achieved if the signal is set to flashing mode when steady mode (stop and go) operation is not needed. This change is consistent with a similar proposed change in Section 4C.04 discussed in item 284 above.

<sup>158</sup> FHWA’s Official Interpretations 10–59(I), dated April 16, 2003, and 10–66(I), dated October 6, 2006, can be viewed at the following Internet Web sites: [http://mutcd.fhwa.dot.gov/resources/interpretations/10\\_59.htm](http://mutcd.fhwa.dot.gov/resources/interpretations/10_59.htm) and [http://mutcd.fhwa.dot.gov/resources/interpretations/10\\_66.htm](http://mutcd.fhwa.dot.gov/resources/interpretations/10_66.htm).

320. In Section 4D.29 Flashing Operation—Transition into Flashing Mode, the FHWA proposes to add information to the STANDARD for terminating the flashing yellow arrow signal indication when entering flashing mode. The FHWA proposes this change as part of the proposed addition of the flashing yellow arrow indication for permissive turns.

321. In Section 4D.30 Flashing Operation—Signal Indications During Flashing Mode, the FHWA proposes to include a paragraph in the STANDARD statement that prohibits green signal indications from being displayed when a traffic control signal is operated in the flashing mode, except for single-section green arrow signal indications as noted elsewhere in the section. The FHWA proposes this paragraph to clarify proper displays during flashing mode.

The FHWA also proposes to revise the STANDARD to allow a signal face consisting of entirely arrow indications to flash a yellow arrow indication if it is intended that turns are to be permitted after yielding, without a full stop required, during flashing mode. The FHWA proposes this change to provide clarity that this application is allowed.

322. In Section 4D.31 Flashing Operation—Transition Out of the Flashing Mode, the FHWA proposes to add a STANDARD requiring that no steady green or flashing yellow indication shall be terminated and immediately followed by a steady red indication without first displaying a steady yellow indication. The FHWA proposes this change to ensure that road users receive adequate warning of the onset of the red indication when the signal is transitioning from flashing mode to steady mode.

323. As part of the restructuring of Chapter 4D, the FHWA proposes to renumber and revise the titles of existing Sections 4D.20, 4D.19, and 4D.21 to be “Section 4D.32 Temporary and Portable Traffic Control Signals,” “Section 4D.33 Lateral Offset of Signal Supports and Cabinets,” and “Section 4D.34 Use of Signs at Signalized Locations,” respectively.

324. In new Section 4D.34 Use of Signs at Signalized Locations, the FHWA proposes to add to the GUIDANCE statement a recommendation to use overhead lane-control signs where lane-drops, multiple-lane turns, shared through and turn lanes, or other lane-use regulations that may be unexpected by unfamiliar road users are present. The FHWA proposes this change to enhance safety by providing road users with highly visible notice of the appropriate lane-

use regulations before approaching an intersection where these unusual and unexpected conditions exist. This change also reflects safety studies as documented in the FHWA report “Signalized Intersections: Informational Guide”<sup>159</sup> and recommendations from the Older Driver handbook.<sup>160</sup> The FHWA proposes a phase-in compliance period of 10 years for existing locations to minimize any impact on State or local highway agencies.

325. The FHWA proposes adding a new section following Section 4D.34. The proposed new section is numbered and titled “Section 4D.35 Use of Pavement Markings at Signalized Locations,” and contains paragraphs relocated from Section 4D.01.

#### Discussion of Proposed Amendments Within Chapter 4E

326. In Section 4E.02 Meaning of Pedestrian Signal Head Indications, the FHWA proposes to revise item B of the STANDARD that defines the meaning of the flashing UPRAISED HAND pedestrian signal indication. First, the FHWA proposes to allow pedestrians that enter the intersection on a steady WALKING PERSON indication to proceed to the far side of the traveled way unless otherwise directed by signs or signals to proceed only to a median or pedestrian refuge area. The FHWA proposes this change to allow pedestrians to cross an entire divided highway and not have to stop at the median if the signal has been timed to provide sufficient time for pedestrians to cross the entire highway. In cases where the signal timing only provides enough time for pedestrians to cross to the median, signs or signals are required to be provided to direct pedestrians accordingly. The FHWA also proposes changes in Section 4E.10 (see item 336 below) for consistency with this change. In addition, the FHWA proposes to allow pedestrians to enter the intersection when a countdown pedestrian signal indication is shown with the flashing UPRAISED HAND if they are able to travel to the far side of the traveled way or to a median by the time a conflicting vehicular movement is allowed to proceed. The FHWA proposes this change because many pedestrians walk faster than the walking

<sup>159</sup> “Signalized Intersections: Informational Guide”, FHWA publication number FHWA–HRT–04–091, August 2004, pages 292–293, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/safety/pubs/04091/>.

<sup>160</sup> “Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians,” FHWA Report no. FHWA–RD–01–051, May, 2001, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01105/cover.htm>. Recommendation I.M(1).

speeds used to calculate the length of the pedestrian change interval; therefore, many pedestrians are easily able to begin their crossing after the flashing UPRAISED HAND and countdown period has started and complete their crossing during the displayed countdown period and the additional buffer period of vehicular yellow and red clearance intervals. As a result, pedestrians should be permitted to make their own determination of whether or not they have sufficient time to begin and complete their crossing during the remaining pedestrian clearance time. Some jurisdictions using pedestrian countdown signals, such as Salt Lake City, Utah, have adopted laws and ordinances similar to the FHWA's proposal.<sup>161</sup> The FHWA acknowledges that this change will require a coordinated change to the Uniform Vehicle Code.

327. In Section 4E.03 Application of Pedestrian Signal Heads, the FHWA proposes to add a 2nd STANDARD statement at the end of the section to explicitly require a steady or flashing red signal indication to be shown to any conflicting vehicular movement perpendicular to a crosswalk with an associated pedestrian signal head displaying either a steady WALKING PERSON or flashing UPRAISED HAND indication. The FHWA proposes this addition to reflect sound engineering practice.

328. In Section 4E.04 Size, Design, and Illumination of Pedestrian Signal Head Indications, the FHWA proposes to revise the first STANDARD statement to allow the use of a one-section pedestrian signal head with the WALKING PERSON and UPRAISED HAND symbols overlaid upon each other or side by side. The FHWA proposes this change to reflect Official Interpretation #4-303,<sup>162</sup> dated February 3, 2006, which clarified that: "As long as the [signal head] properly displays the individual upraised hand and walking person indications, visible as distinctly separate indications meeting all other requirements (color, shape, luminous intensity, etc.), the light sources comprising the indications may be overlaid on each other or they may be side-by-side." The FHWA proposes to change Figure 4E-1 Typical

Pedestrian Signal Indications to reflect this change.

The FHWA also proposes to add a paragraph to the GUIDANCE statement recommending that some form of automatic dimming be used to reduce the brilliance of the pedestrian signal indication if the indication is so bright as to cause excessive glare in nighttime conditions. The FHWA proposes this new recommendation to avoid glare conditions, which can reduce the visibility of the indications at night, similar to the existing GUIDANCE for vehicular signal indications in Chapter 4D.

329. Both the Rehabilitation Act of 1973 (Section 504) and the Americans With Disabilities Act of 1990 require that facilities, programs and services be accessible to persons with disabilities. The FHWA proposes changes to Sections 4E.06, 4E.08, and 4E.09 of MUTCD regarding communication of pedestrian signal information to pedestrians with vision, vision and hearing, or cognitive disabilities to reflect research<sup>163</sup> conducted under NCHRP 3-62, Accessible Pedestrian Signals, and a 5-year project on Blind Pedestrians' Access to Complex Intersections sponsored by the National Institutes of Health, National Eye Institute, that has demonstrated that certain techniques most accurately communicate information. The proposed changes also result in making accessible pedestrian detectors easy to locate and actuate by persons with visual or mobility impairments. Significant proposed changes to existing material are described in item 330 and items 332 through 335 below.

330. In Section 4E.06 Accessible Pedestrian Signals, the FHWA proposes to change the second STANDARD to require both audible and vibrotactile walk indications, and to add requirements on how audible and vibrotactile walk indications are to be provided. The FHWA proposes that audible indications shall not be provided during the pedestrian change interval because research<sup>164</sup> has found that visually disabled pedestrians need to concentrate on the sounds of traffic movement while they are crossing and audible indications of the flashing UPRAISED HAND interval would be distracting from that task. The FHWA proposes a phase-in compliance period of 10 years for existing signals in good

condition to minimize any impact on State or local highway agencies.

The FHWA also proposes to change the existing 4th GUIDANCE statement regarding the loudness of audible pedestrian walk signals to a STANDARD. The new STANDARD bases the loudness of an audible pedestrian walk signal on the ambient sound level and provides for louder volume adjustment in response to an extended pushbutton press. The FHWA proposes these changes to allow the audible pedestrian walk signals to be heard over the ambient sound level, and to allow pedestrians with hearing impairments to receive a louder audible walk signal. The FHWA also proposes to add to this STANDARD that an accessible walk signal shall have the same duration as the pedestrian walk signal unless the pedestrian signal rests in the walk phase and add subsequent GUIDANCE regarding the recommended duration and operation of the accessible walk signal if the pedestrian signal rests in the walk phase. The FHWA proposes this change to clarify that the duration of accessible walk signals is dependent on whether the signal controller is set to rest in walk or steady don't walk in the absence of conflicting demands.

Following the new STANDARD statement, the FHWA proposes to add new GUIDANCE, OPTION, and SUPPORT statements regarding the duration, tone, and speech messages of audible walk indications in order to clarify their use and application.

The FHWA proposes to modify the existing 4th STANDARD to require that speech walk messages only be used where it is technically infeasible to install two accessible pedestrian signals at one corner with the minimum required separation. The STANDARD also contains requirements for what information is allowed in speech messages. The FHWA also proposes a GUIDANCE statement that recommends that the speech messages not state or imply a command. The FHWA proposes these changes to clarify when and under what circumstances speech walk messages are to be used. The FHWA proposes a phase-in compliance period of 10 years for existing signals in good condition to minimize any impact on State or local highway agencies.

The FHWA proposes deleting the existing last SUPPORT, STANDARD, and GUIDANCE statements from this section and replacing them with information regarding the use of audible beaconing as an additional feature that may be provided as a result of an extended pushbutton press. The FHWA proposes adding this information, because while they can be valuable,

<sup>161</sup> Salt Lake City ordinance 12.32.055, Pedestrian Signal Indications, can be viewed at the following Internet Web site: <http://66.113.195.234/UT/Salt%20Lake%20City/1100800000007000.htm>.

<sup>162</sup> Official Interpretation #4-303 can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interpretations/pdf/4\\_303.pdf](http://mutcd.fhwa.dot.gov/resources/interpretations/pdf/4_303.pdf).

<sup>163</sup> Research reports on this topic can be viewed at the U.S. Access Board's Internet Web site at: <http://www.access-board.gov/research/aps.htm>.

<sup>164</sup> Research reports on this topic can be viewed at the U.S. Access Board's Internet Web site at: <http://www.access-board.gov/research/aps.htm>.

activating audible beaconing features at multiple crosswalks at the same intersection can be confusing to visually disabled pedestrians, and therefore audible beaconing should be activated only when needed.

331. In Section 4E.07 Countdown Pedestrian Signals, the FHWA proposes changing the option of using pedestrian countdown displays to a requirement for new installations of pedestrian signals. The proposed STANDARD requires the use of countdown displays at all pedestrian signals except where the duration of the pedestrian change interval is less than 3 seconds. The FHWA proposes a phase-in compliance period of 10 years for the addition of pedestrian countdown displays to existing pedestrian signals in good condition to minimize any impact on State or local highway agencies. The FHWA proposes this change to provide enhanced pedestrian safety because a multi-year research project involving crash data for hundreds of locations in San Francisco<sup>165</sup> showed significant overall safety benefits and substantial reductions in the number of pedestrian-vehicle crashes when countdown signals are used, as compared to locations that did not have the countdowns.

In addition, the FHWA proposes a new STANDARD after the first paragraph of the GUIDANCE that requires that a pedestrian countdown signal be dark when the duration of the green interval for a concurrent vehicular movement has intentionally been set to continue beyond the end of the pedestrian change interval. The FHWA proposes this change to ensure consistency with normal pedestrian signal operations, which requires the countdown display to be dark whenever the steady UPRaised HAND is displayed.

332. In Section 4E.08 Pedestrian Detectors, the FHWA proposes changing the first GUIDANCE statement regarding the location of a pedestrian pushbutton to a STANDARD and adding criteria that are to be met for the location of pushbuttons. The FHWA proposes to add GUIDANCE and OPTION statements that contain additional information for locations where constraints make meeting some of the criteria impractical. The FHWA proposes these changes to make pedestrian pushbuttons more accessible to disabled pedestrians and to

pedestrians in general. The FHWA proposes a phase-in compliance period of 15 years for existing signals in good condition to minimize any impact on State or local highway agencies.

In addition, the FHWA proposes modifying the existing first STANDARD statement to require accessible pedestrian pushbuttons mounted on the same pole to be provided with the accessible features described in Section 4E.09 of the MUTCD. The FHWA also proposes to change the following GUIDANCE statement to a STANDARD to require that the positioning of the pushbuttons and legends on the signs clearly indicate which crosswalk signal is activated by which pushbutton. The FHWA proposes these changes to eliminate ambiguity regarding which pushbutton a pedestrian must activate to cross a particular street. The FHWA also proposes to add to the existing last STANDARD statement that a when a pilot light is used at an accessible pedestrian signal location, each actuation shall be accompanied by the speech message "wait." The FHWA proposes this change to ensure that the activation confirmation is available to pedestrians with impaired vision.

Finally, the FHWA proposes to add a STANDARD statement at the end of the section requiring a FOR MORE CROSSING TIME: HOLD BUTTON DOWN FOR 2 SECONDS (R10-32P) sign if additional crossing time is provided by means of an extended pushbutton press. The FHWA proposes this change to ensure that pedestrians receive instructions of the use of this feature and are made aware of the feature's existence.

With the exception of the 15 year period proposed for the new requirements regarding locations of pedestrian pushbuttons, for the other new or revised provisions in Section 4E.08, the FHWA proposes a phase-in compliance period of 10 years for existing signals in good condition to minimize any impact on State or local highway agencies.

333. In Section 4E.09 Accessible Pedestrian Signal Detectors, the FHWA proposes to modify the second STANDARD to require pushbutton locator tones at accessible pedestrian signals. As part of this change, the FHWA proposes to change the following GUIDANCE statement regarding locator tones to a STANDARD. The FHWA proposes this change consistent with item 330 above. In addition, the FHWA proposes to change the first paragraph of the existing first GUIDANCE statement regarding tactile arrows to a STANDARD, and relocate it within the section. The FHWA proposes modifying

the remainder of the GUIDANCE statement to reduce redundancy.

The FHWA proposes to add a STANDARD that requires locator tones, tactile arrows, speech walk messages, and a speech pushbutton informational message when two accessible pedestrian pushbuttons are placed on the same pole. Additionally, if the clearance time is sufficient to only cross to the median of a divided highway, an accessible pedestrian detector shall be provided on the median. The FHWA proposes these changes consistent with item 332 above.

The FHWA also proposes to add a paragraph to the existing 3rd OPTION statement allowing the use of an extended pushbutton press to activate additional accessible features at a pedestrian crosswalk. The FHWA proposes to follow this new paragraph with a new STANDARD statement that sets requirements for the amount of time a pushbutton shall be pressed to activate the extra features.

Finally, the FHWA proposes to add a STANDARD statement at the end of the section requiring that speech pushbutton information messages only play when the walk interval is not timing. Requirements regarding the content of these messages are also contained in this new STANDARD. The FHWA proposes this change to promote uniformity in the content of speech messages.

For the new or revised provisions of Section 4E.09, the FHWA proposes a phase-in compliance period of 10 years for existing signals in good condition to minimize any impact on State or local highway agencies.

334. The FHWA also proposes to revise existing Figure 4E-2 to show a general layout of recommended pushbutton locations. The FHWA proposes to add a new Figure numbered and titled, "Figure 4E-3 Typical Pushbutton Locations" that shows 8 examples of pushbutton locations for various sidewalk, ramp, and corner configurations. The FHWA proposes these additional figures to help clarify appropriate locations under different geometric conditions.

335. In Section 4E.10 Pedestrian Intervals and Signal Phases, the FHWA proposes to revise the first STANDARD to require the steady UPRaised HAND indication to be displayed during the yellow change interval and the red clearance interval if used as part of the pedestrian clearance time. The FHWA proposes this change to be consistent with the proposed change in Section 4E.07 to require countdown pedestrian signal displays. The FHWA proposes a phase-in compliance period of 10 years for existing signals in good condition to

<sup>165</sup> "Pedestrian Countdown Signals: Experience With an Extensive Pilot Installation," by Markowitz, Sciortino, Fleck, and Yee, published in ITE Journal, January 2006, pages 43-48, is available from the Institute of Transportation Engineers at the following Internet Web site: <http://www.ite.org>.

minimize any impact on State or local highway agencies.

The FHWA also proposes to revise the first GUIDANCE statement for calculating pedestrian clearance times to use slower walking speeds, except where extended pushbutton presses or passive pedestrian detection has been installed for slower pedestrians to request additional crossing time as noted in the OPTION. Another proposed GUIDANCE statement notes that a lower speed should be considered if significant numbers of pedestrians in wheelchairs or slower pedestrians are present. The FHWA proposes these changes to provide enhanced pedestrian safety, based on recent research<sup>166</sup> regarding pedestrian walking speeds.

In addition, based on the same research, the FHWA proposes to add a GUIDANCE statement recommending that the total of the walk phase and pedestrian clearance time should be long enough to allow a pedestrian to walk from the pedestrian detector to the opposite edge of the traveled way at a speed of 0.9 meters (3 feet) per second. The FHWA proposes this change to ensure that slower pedestrians can be accommodated at longer crosswalks if they start crossing at the beginning of the walk phase.

For the changes in recommended walking speeds and method of determining pedestrian timing, the FHWA proposes a phase-in compliance period of 5 years for existing signals in good condition to minimize any impact on State or local highway agencies.

The FHWA also proposes to change the last existing GUIDANCE to a STANDARD to require, rather than merely recommend, that median-mounted pedestrian signals, signing, and pushbuttons (if actuated) be provided when the pedestrian clearance time is sufficient only for crossing from the curb or shoulder to a median of sufficient width for a pedestrian to wait. The FHWA proposes this change to assure that pedestrians who must wait on a median or island are provided the means to actuate a pedestrian phase to complete the second half of their crossing. The FHWA proposes a phase-in compliance period of 10 years for existing signals in good condition to

minimize any impact on State or local highway agencies.

The FHWA proposes to add an OPTION statement that allows a leading pedestrian interval when a high volume of pedestrians and turning vehicles are present. As indicated in the FHWA report "Signalized Intersections: Informational Guide,"<sup>167</sup> several studies have demonstrated that leading pedestrian intervals can significantly reduce conflicts for pedestrians. The FHWA also proposes to add a GUIDANCE statement that gives a recommended minimum length of the leading pedestrian interval, reflecting recommendations from the Older Driver handbook,<sup>168</sup> and the traffic control devices that should be used to prevent turning vehicles from crossing the path of pedestrians during this leading interval.

Finally, the FHWA proposes an OPTION statement that permits the green time for the concurrent vehicular movement to be set longer than the pedestrian change interval to allow vehicles to complete turns after the pedestrian phase. The FHWA proposes these changes to include this application in the MUTCD that is used by many jurisdictions, and recommended by the Older Driver handbook<sup>169</sup> to reduce conflicts between pedestrians and turning motor vehicles.

#### Discussion of Proposed Amendments Within Chapters 4F through 4L

336. The FHWA proposes to add a new Chapter to Part 4, numbered and titled, "Chapter 4F Pedestrian Hybrid Signals." The proposed new chapter would have three sections that describe the application, design, and operation of pedestrian hybrid signals. A pedestrian hybrid signal is a special type of hybrid signal used to warn and control traffic at an unsignalized location to assist pedestrians in crossing a street or highway at a marked crosswalk. A pedestrian hybrid signal contains a circular yellow signal indication centered below two circular red signal indications, and shall be dark except when activated. The remaining Chapters

in Part 4 would be re-lettered accordingly. The FHWA proposes this addition to give agencies additional flexibility by providing an alternative method for control of pedestrian crosswalks that has been found by research<sup>170</sup> to be highly effective. This type of device has been used successfully for many years in Tucson, Arizona, where it is known as a "HAWK Signal." This type of device offers significant benefits for providing enhanced safety of pedestrian crossings where normal traffic control signals would not be warranted. The FHWA proposes a phase-in compliance period of 10 years for existing signals in good condition to minimize any impact on State or local highway agencies.

337. As part of this new Chapter, the FHWA proposes to add three new figures. Proposed Figures 4F-1 and 4F-2 contain guidelines for the justification of installation of pedestrian hybrid signals on low speed and high speed roadways, respectively. Proposed Figure 4F-3 shows the proposed sequence of intervals for a pedestrian hybrid signal.

338. The FHWA proposes changing the title of existing Chapter 4F (new Chapter 4G) to "Traffic Control Signals and Hybrid Signals for Emergency Vehicle Access" to reflect the proposed addition of hybrid signals to this chapter.

339. In existing Section 4F.01 (new Section 4G.01) Application of Emergency-Vehicle Traffic Control Signals and Hybrid Signals, the FHWA proposes adding a paragraph to the OPTION statement to allow an emergency-vehicle hybrid signal to be installed in place of an emergency-vehicle traffic control signal under the conditions described in Section 4G.04. The FHWA proposes this change to accommodate emergency-vehicle hybrid signals as proposed to be added as described below.

340. The FHWA proposes adding a new section following existing Section 4F.03 (new Section 4G.03). The proposed new section is numbered and titled "Section 4G.04 Emergency-Vehicle Hybrid Signals" and contains STANDARDS for this type of traffic signal which will be used in conjunction with signs to warn and control traffic at an unsignalized location where emergency vehicles enter or cross the street or highway. An emergency-vehicle hybrid signal contains a circular yellow signal

<sup>166</sup> Pedestrian walking speed research was included in "Improving Pedestrian Safety at Unsignalized Pedestrian Crossings," TCRP Report 112/NCHRP Report 562, Transportation Research Board, 2006, which can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_562.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_562.pdf). Also see the article "The Continuing Evolution of Pedestrian Walking Speed Assumptions," by LaPlante and Kaeser, ITE Journal, September 2004, pages 32-40, available from the Institute of Transportation Engineers, Web site: <http://www.ite.org>.

<sup>167</sup> "Signalized Intersections: Informational Guide", FHWA publication number FHWA-HRT-04-091, August 2004, pages 197-198, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/safety/pubs/04091/>.

<sup>168</sup> "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians," FHWA Report no. FHWA-RD-01-051, May, 2001, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01105/cover.htm>. Recommendation LP(6).

<sup>169</sup> This 2001 report can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01105/01-051.pdf>.

<sup>170</sup> "Improving Pedestrian Safety at Unsignalized Pedestrian Crossings," TCRP Report 112/NCHRP Report 562, Transportation Research Board, 2006, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_562.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_562.pdf).



indication centered below two circular red signal indications, and shall be dark except when activated. The FHWA had proposed the addition of a somewhat similar device, the Emergency Beacon, for the 2003 edition of the MUTCD but decided not to include it in the Final Rule due to various concerns about some details of the device's design and operational features and alleged insufficient experience with the device. Since that time, additional experience has been gained with this type of device and the current proposal to add the Emergency-Vehicle Hybrid Signal is revised from the previous proposal to address the earlier design and operational issues. The FHWA believes that hybrid signals provide an effective, alternative method to control traffic at some locations where emergency vehicles enter and cross roadways. The FHWA proposes a phase-in compliance period of 10 years for existing signals in good condition to minimize any impact on State or local highway agencies.

341. The FHWA proposes to add a new Figure 4G-1 that illustrates the Emergency-Vehicle Hybrid Signal.

342. In existing Section 4H.01 (new Section 4I.01) Application of Freeway Entrance Ramp Control Signals, the FHWA proposes to delete unnecessary descriptive language and instead add a SUPPORT statement referring the reader to FHWA's "Ramp Management and Control Handbook"<sup>171</sup> for information on conditions that might justify freeway entrance ramp control signals. The FHWA proposes this change because this publication, which was released after the 2003 MUTCD was published, is the appropriate place for the information rather than in the MUTCD.

343. In existing Section 4H.02 (new Section 4I.02) Design of Freeway Entrance Ramp Control Signals, the FHWA proposes to clarify the STANDARD by requiring the use of at least two signal faces per ramp on a single lane ramp or a multiple lane ramp where green signal indications are always displayed simultaneously. On a ramp with multiple lanes where the green signal indications are not always displayed simultaneously, (as is the case in some staggered-release ramp metering situations in which one lane receives the green while the other lane is stopped and then the other lane receives the green while the first lane is stopped), the FHWA proposes to require two signal faces per lane or group of

lanes. The FHWA proposes this change to incorporate Official Interpretation #4-294(I)<sup>172</sup> into the MUTCD, which ensures that each separately controlled lane or group of lanes has at least two signal faces displayed. The FHWA proposes a phase-in compliance period of 10 years for existing signals in good condition to minimize any impact on State or local highway agencies.

The FHWA also proposes to add an OPTION to allow ramp control signals to control some, but not all lanes on a ramp. The FHWA proposes this change to reflect the current practice in many jurisdictions of providing HOV bypass lanes on ramps. Also, the FHWA proposes to add text to allow the two required signal faces to be mounted on the side of the roadway on the same pole when only one lane is controlled. The second signal face may be mounted lower than the normal mounting height. The FHWA proposes this change to incorporate existing practice in many ramp metering systems, designed to avoid motorist confusion that could arise if a signal were mounted on the side of the ramp where the lane is not controlled by the signal, due to the standard lateral separation requirements.

Finally, the FHWA proposes to add a GUIDANCE statement recommending that appropriate regulatory signs such as ONE VEHICLE PER GREEN should be installed adjacent to the signal face, and that special measures should be considered for freeway to freeway ramps. The FHWA proposes these changes to reflect the current practices in most jurisdictions that operate ramp metering systems.

344. The FHWA proposes adding a new section following new Section 4I.02. The proposed new section is numbered and titled "Section 4I.03 Operation of Freeway Entrance Ramp Control Signals" and contains GUIDANCE recommending that the operational strategies for ramp control signals should be determined prior to their installation, and that a RAMP METERED WHEN FLASHING (W3-7) sign with a warning beacon should be used for a ramp meter that is only used during certain portions of the day. The FHWA proposes these changes to ensure that a proper operating strategy has been developed and that road users are alerted to the presence and operation of part time ramp meters.

345. In existing Section 4I.02 (new Section 4J.02) Design and Location of

Movable Bridge Signals and Gates, the FHWA proposes to revise the first STANDARD to require the use of 300 mm (12 in) diameter signal indications on all new movable bridge signals, and remove the option of using 200 mm (8 in) signal indications. The FHWA proposes this change to maintain consistency with the proposed changes in new Section 4D.05 that require the use of 300 mm (12 in) diameter signal indications for new signal faces. The FHWA also proposes to revise the STANDARD statement to require that a stop line be installed on signalized approaches to a movable span to indicate the point behind which vehicles are required to stop. The FHWA proposes this change to be consistent with other proposed changes throughout the MUTCD that require a stop line.

The FHWA also proposes to revise the 4th paragraph of the existing 2nd STANDARD to indicate that the stripes on movable bridge warning gates shall be vertical. The FHWA proposes this change to be consistent with other proposed changes in Parts 8 and 10 and the new Section 2L.06 that require vertical, rather than diagonal, stripes on warning gates. The FHWA proposes a phase-in compliance period of 10 years to minimize any impact on State or local highway agencies.

346. In existing Section 4I.03 (new Section 4J.03) Operation of Movable Bridge Signals and Gates, the FHWA proposes to add to the GUIDANCE statement that traffic signals on adjacent streets or highways that are interconnected with drawbridge control should be preempted by the operation of the movable bridge in accordance with Section 4D.27. The FHWA proposes to add this language to ensure proper preemption when appropriate.

347. The FHWA proposes to add a new chapter to Part 4 titled, "Chapter 4K Toll Plaza Traffic Signals." The remaining chapters would be relettered accordingly. This new chapter includes OPTION, STANDARD, GUIDANCE, and SUPPORT statements for traffic control signals in toll plazas. Items such as the number and size of signal faces, the phases which may be displayed, and the applications of toll plaza traffic signals to toll plaza operations are discussed in this chapter. The FHWA proposes this addition as a result of the recommendations in the Toll Plaza Best Practices and Recommendations Report<sup>173</sup> and to provide additional

<sup>171</sup> "Ramp Management and Control Handbook," dated January 2006, FHWA Publication # FHWA-HOP-06-001 can be viewed at the following Internet Web site: [http://ops.fhwa.dot.gov/publications/ramp\\_mgmt\\_handbook/manual/manual/default.htm](http://ops.fhwa.dot.gov/publications/ramp_mgmt_handbook/manual/manual/default.htm).

<sup>172</sup> Official Interpretation # 4-294(I), dated September 30, 2005, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interpretations/pdf/4\\_294.pdf](http://mutcd.fhwa.dot.gov/resources/interpretations/pdf/4_294.pdf).

<sup>173</sup> "State of the Practice and Recommendations on Traffic Control Strategies at Toll Plazas," June 2006, can be viewed at the following Internet Web

consistency and uniformity of such displays for road users. The FHWA proposes a phase-in compliance period of 10 years for existing signals in good condition to minimize any impact on State or local highway agencies.

348. In existing Section 4K.02 (new Section 4L.02) Intersection Control Beacon, the FHWA proposes to add to the STANDARD statement that that two horizontally aligned red signal indications shall be flashed simultaneously, and two vertically aligned red signal indications shall be flashed alternately. The FHWA proposes this change to avoid horizontally aligned red signal indications in an intersection control beacon from being confused with highway-rail grade crossing flashing-light signals, and to be consistent with the existing requirement for stop beacons in existing Section 4K.05 (new Section 4L.05).

349. In existing Section 4K.03 (new Section 4L.03) Warning Beacon, the FHWA proposes to add an item to the SUPPORT statement to add the typical use of Warning Beacons in conjunction with a regulatory or warning sign that includes the phrase WHEN FLASHING in its legend to indicate that the regulation is in effect or that the condition is present only at certain times.

The FHWA also proposes to add to the GUIDANCE statement that warning beacons used on toll plaza canopies to call attention to signs denoting electronic toll collection lanes should be distinctly separate from lane-use control signals. The FHWA proposes this change as a result of the Toll Plazas Best Practices and Recommendations Report<sup>174</sup> and to reflect the new standard requiring a lane-use control signal above all non-open-road electronic toll collection lanes. The FHWA proposes a phase-in compliance period of 10 years to minimize any impact on State or local highway agencies.

In addition, the FHWA proposes to add to the OPTION statement that Warning Beacons that are activated by bicycles and pedestrians may be used as appropriate to provide additional warning to approaching vehicles. The FHWA proposes this change to clarify the allowable use of pedestrian-actuated

site: <http://mutcd.fhwa.dot.gov/rpt/tcstoll/index.htm>.

<sup>174</sup> "State of the Practice and Recommendations on Traffic Control Strategies at Toll Plazas," June 2006, can be viewed at the following Internet Web site: <http://mutcd.fhwa.dot.gov/rpt/tcstoll/index.htm>.

beacons, per FHWA Official Interpretation # 4-269.<sup>175</sup>

Finally, the FHWA proposes to add an OPTION statement allowing Warning Beacons mounted on toll plaza islands, on toll plaza impact attenuators, and on toll booth ramparts to be mounted at a height which is appropriate for viewing in the toll plaza context, even if that height is lower than the normal minimum height above the pavement. The FHWA proposes this change as a result of the recommendations in the Toll Plaza Best Practices and Recommendations Report.<sup>176</sup>

350. In existing Section 4K.05 (new Section 4L.05) Stop Beacon, the FHWA proposes to add to the STANDARD that a Stop Beacon shall be used only to supplement a STOP sign, a DO NOT ENTER sign, or a WRONG WAY sign. The FHWA proposes this addition to reflect the meaning of a flashing red indication and for consistency with existing Section 4K.03 (new Section 4L.03). As part of this proposed change, the FHWA proposes to add to the last paragraph of the STANDARD that the mounting height range for the bottom of the signal housing or a Stop Beacon also applies to the top of a DO NOT ENTER sign or a WRONG WAY sign, in addition to a STOP sign.

351. In existing Section 4J.01 (new Section 4M.01) Application of Lane-Use Control Signals, the FHWA proposes to add a STANDARD statement requiring lane-use control signals to indicate lane open/lane closed status at toll plazas in lanes that are not Open Road electronic toll collection lanes. The FHWA also proposes an OPTION statement that allows the use of these signals in Open Road electronic toll collection lanes. The FHWA proposes these changes as a result of the recommendations in the Toll Plaza Best Practices and Recommendations Report.<sup>177</sup> Although some toll facilities use red-yellow-green traffic signal indications to indicate lane open/lane closed status, this is an antiquated and non-conforming practice because for several decades the MUTCD has required the use of standard red X and downward-pointing green arrow lane-use control signal indications for

<sup>175</sup> FHWA Official Interpretation # 4-269, dated June 3, 2004, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interpretations/pdf/4\\_269.pdf](http://mutcd.fhwa.dot.gov/resources/interpretations/pdf/4_269.pdf).

<sup>176</sup> "State of the Practice and Recommendations on Traffic Control Strategies at Toll Plazas," June 2006, can be viewed at the following Internet Web site: <http://mutcd.fhwa.dot.gov/rpt/tcstoll/index.htm>.

<sup>177</sup> "State of the Practice and Recommendations on Traffic Control Strategies at Toll Plazas," June 2006, can be viewed at the following Internet Web site: <http://mutcd.fhwa.dot.gov/rpt/tcstoll/index.htm>.

this specific purpose. The FHWA proposes a 10-year phase-in compliance period for this requirement for existing toll plazas to minimize any impacts on State or local highway agencies.

352. In existing Section 4J.03 (new Section 4M.03) Design of Lane-Use Control Signals, the FHWA proposes to add an Option to the existing STANDARD that requires that the bottom of the signal housing of any lane-use control signal face be at least 4.6 m (15 ft) above the pavement. The proposed OPTION would allow the signal to be mounted lower above a toll plaza lane. If the toll plaza canopy has a lower vertical clearance above the roadway than 4.6 m (15 ft), that clearance controls the height of vehicles that can use the lane and thus the lane-use control signal can be mounted below a height of 4.6 m (15 ft) as long as it is not lower than the bottom of the canopy. The FHWA proposes this change as a result of the recommendations in the Toll Plaza Best Practices and Recommendations Report.<sup>178</sup>

353. In existing Section 4L.01 (new Section 4N.01) Application of In-Roadway Lights, the FHWA proposes to add to the STANDARD statement that In-Roadway Lights shall only be used for applications described in this chapter. The FHWA also proposes to add to the STANDARD that In-Roadway Lights be flashed and not steadily illuminated. The FHWA proposes these changes to preclude the use of In-Roadway Lights for any purpose not included in this chapter because such uses have not yet been sufficiently tested to confirm their effectiveness and because steadily illuminated lights could be confused with internally illuminated raised pavement markings.

354. In Section 4L.02 (new Section 4N.02) In-Roadway Warning Lights at Crosswalks, the FHWA proposes to revise the GUIDANCE statement to account for the lower pedestrian walking speeds proposed elsewhere in Part 4 and to ensure consistency in walking speeds used to calculate pedestrian intervals. The FHWA also proposes to add a STANDARD statement that if pedestrian pushbuttons are used to actuate the In-Roadway Lights, a PUSH BUTTON TO TURN ON WARNING LIGHTS sign shall be mounted adjacent to or integral with each pedestrian pushbutton. The FHWA proposes this change to direct users on how to activate the In-Roadway Lights.

<sup>178</sup> "State of the Practice and Recommendations on Traffic Control Strategies at Toll Plazas," June 2006, can be viewed at the following Internet Web site: <http://mutcd.fhwa.dot.gov/rpt/tcstoll/index.htm>.

The FHWA also proposes to add a STANDARD statement requiring median-mounted pedestrian detectors when the period of operation is sufficient for crossing only from a curb or shoulder to the median of a divided highway. The FHWA proposes this change to ensure that pedestrians who only cross to the median can actuate the In-Roadway Lights to warn motorists for the remainder of their crossing, and for consistency with similar proposed changes in Section 4E.10.

The FHWA proposes a phase-in compliance period of 10 years for existing In-Roadway Lights in good condition to minimize any impact on State or local highway agencies.

*Discussion of Proposed Amendments to Part 5 Traffic Control Devices for Low-Volume Roads*

355. In Section 5A.01 Function, the FHWA proposes to change item B of the STANDARD statement to prohibit classifying a residential street in a neighborhood as a low-volume road for the purposes of Part 5 of the MUTCD. The FHWA proposes this change to provide consistency with item A of the STANDARD which states that low-volume roads shall be facilities lying outside the built-up area of Cities, towns, and communities.

356. In Section 5C.04 Stop Ahead and Yield Ahead Signs, the FHWA proposes to delete the OPTION statement that allows word message signs to be used as an alternative to symbol signs. The FHWA proposes this change because the use of word message Stop Ahead and Yield Ahead signs are no longer permitted. This corresponds with a proposed change in Chapter 2C.

357. In Section 5C.07 Hill Sign, the FHWA proposes to delete the 2nd paragraph of the OPTION statement that permits confining the use of the Hill sign on low-volume roads to roads where commercial or recreational vehicles are anticipated. The FHWA proposes this change to emphasize that the use of the Hill sign should be based on the results of an engineering study of vehicles and road characteristics, as stated in the first paragraph of the OPTION statement.

358. The FHWA proposes to relocate existing Section 5E.05 Object Markers to Chapter 5C. The section will be numbered and titled "Section 5C.14 Object Markers and Barricades." The FHWA proposes this change in order to locate the subject material with other sections in Part 5 that deal with signs. This change coincides with the proposed relocation of object markers and barricades from Part 3 to Part 2 of the MUTCD.

359. In Section 5F.02 Highway-Rail Grade Crossing (Crossbuck) Sign and Number of Tracks Plaque, the FHWA proposes to revise the 3rd paragraph of the STANDARD statement to clarify that the measurement for the strip of retroreflective material that is to be placed on each support is to be from the Crossbuck sign or the Number of Tracks sign to within 0.6 m (2 ft) above the ground. The FHWA proposes this change to be consistent with similar proposed changes in Parts 8 and 10.

360. In Section 5F.03 Highway-Rail Grade Crossing Advance Warning Signs, the FHWA proposes several changes to the section to reflect that a supplemental plaque describing the type of traffic control at a highway-rail grade crossing shall be used on all low-volume roads in advance of every crossing. The FHWA proposes these changes to be consistent with similar proposed changes in Parts 8 and 10.

361. In Section 5F.04 STOP and YIELD Signs, the FHWA proposes several changes to the section regarding the use and application of STOP signs or YIELD signs at highway-rail grade crossings. The FHWA proposes these changes to be consistent with similar proposed changes in Parts 8 and 10 (see more detailed discussions below).

*Discussion of Proposed Amendments to Part 6 Temporary Traffic Control*

*Discussion of Proposed Amendments Within Part 6—General*

362. The FHWA proposes to revise the Code of Federal Regulations to delete 23 CFR Part 634 regarding Worker Visibility. The FHWA proposes this change in order to incorporate those provisions into the MUTCD, which is applicable to all public roads. As such, 23 CFR Part 634 would no longer be needed because its requirements would be incorporated into the MUTCD, and therefore, applicable to all roads open to public travel in accordance with 23 CFR Part 655, not just Federal-aid highways.

363. The FHWA proposes to revise the first SUPPORT statement in Chapter 6A to indicate that the acronym "TTC," meaning Temporary Traffic Control, applies to all of Part 6. In conjunction, the FHWA would delete the first SUPPORT statement from the remaining Chapters in Part 6 because it is repetitive.

364. The FHWA proposes to revise the first STANDARD statement in Chapter 6A to indicate that the needs and control of all road users through a TTC zone apply to all public facilities and on private property open to public travel, in addition to highways. The FHWA proposes this change to

incorporate FHWA's Final Rule to 23 CFR Part 655, dated December 14, 2006, which provided clarification on the meaning of roads "open to public travel."<sup>179</sup> The FHWA would delete the first STANDARD statement from the remaining Chapters in Part 6 because it repeats this information, which is not necessary.

365. The FHWA proposes to update the figures throughout Part 6 to reflect proposed new or revised signs in Part 2 that are applicable to Temporary Traffic Control Zones.

*Discussion of Proposed Amendments Within Chapters 6A through 6E*

366. In Section 6B.01 Fundamental Principles of Temporary Traffic Control, the FHWA proposes to clarify items F and G of the second GUIDANCE statement to indicate that it is on high-volume streets and highways that roadway occupancy should be scheduled during off-peak hours and that if significant impacts to roadway operations are anticipated, early coordination should occur with officials having jurisdiction over the affected streets and providing emergency services. The FHWA proposes these changes to provide agencies with more flexibility in allowing roadway occupancy, particularly for work on local residential streets and other low volume streets where temporary traffic control does not cause a problem during peak hours and to encourage communication.

367. In Section 6C.04 Advance Warning Area, the FHWA proposes to add information regarding sign spacing to the end of the GUIDANCE statement, as well as add a new SUPPORT statement. The FHWA proposes these changes to reinforce that the distances contained in Table 6C-1 are for guidance purposes and should be considered minimum, and that the recommended distances should be increased based on field conditions.

368. In Section 6C.08 Tapers, the FHWA proposes to add to the last GUIDANCE statement that the length of a short taper should be a minimum of 15 m (50 ft). In addition, the FHWA proposes to add that a downstream taper with a length of approximately 30 m (100 ft) should be used to guide traffic back into their original lane. The FHWA proposes these changes to provide practitioners with more information

<sup>179</sup> The Federal Register Notice for the Final Rule, dated December 14, 2006, (Volume 65, Number 70, Page 75111-75115) can be viewed at the following Internet Web site: [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2006\\_register&docid=fr14de06-6.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2006_register&docid=fr14de06-6.pdf).

regarding taper lengths. In particular, this proposed change provides a minimum length for a “short taper,” because no length had been provided in the past, and to reflect the use of a “downstream taper” as has been shown in various existing figures in Part 6.

369. In Table 6C-3 Taper Length Criteria for Temporary Traffic Control Zones, the FHWA proposes to add a minimum taper length for one-lane, two-way traffic tapers. The existing table contained only a maximum length, and the FHWA believes that it is important to also state a minimum length. In concert with this change, the FHWA proposes to add minimum taper lengths to existing Figures 6H-10, 6H-11, 6H-12, 6H-18 and 6H-27 (new Figures 6I-10, 6I-11, 6I-12, 6I-18 and 6I-27).

370. In Section 6C.10 One-Lane, Two-Way Traffic Control, the FHWA proposes to add an OPTION statement that explicitly allows for the movement of traffic through a one-lane, two-way constriction to be self-regulating, provided that the work space is short, on a low-volume street or road, and that road users from both directions are able to see the traffic approaching from the opposite direction through and beyond the work site. The FHWA proposes this change to provide practitioners with more flexibility on low-volume, low-speed roads.

371. In Section 6C.11 Flagger Method of One-Lane, Two-Way Traffic Control, the FHWA proposes to add to the first GUIDANCE statement that traffic should be controlled by a flagger at each end of a constricted section of roadway, unless a one-lane, two-way TTC zone is short enough to allow a flagger to see from one end of the zone to the other. The FHWA proposes this change to emphasize that the preferred method of flagger control is to use two flaggers.

372. The FHWA proposes relocating the information from existing Section 6F.54 regarding the PILOT CAR FOLLOW ME Sign and flaggers in activity areas where a pilot car is being used, to Section 6C.13 Pilot Car Method of One-Lane, Two-Way Traffic Control. The FHWA proposes this change because the information is specific to pilot cars, which are covered in Section 6C.13.

373. The FHWA proposes to relocate several paragraphs related to accessible pedestrian facilities from Section 6D.01 Pedestrian Considerations to Section 6D.02 Accessibility Considerations, in order to consolidate related information into one section.

374. In Section 6D.01 Pedestrian Considerations, the FHWA proposes to add to the existing 2nd STANDARD

statement that accessibility and detectability shall be maintained along an alternate pedestrian route if a TTC zone affects an accessible and detectable pedestrian facility. The FHWA proposes this change to reflect the provisions of ADAAG.<sup>180</sup> Although this requirement is already included in Section 6G.11, the FHWA adds it to this section because it is a pedestrian consideration, and therefore, consistent with the content of this section. As part of this proposed change, the FHWA proposes to delete the first sentence of the 3rd GUIDANCE statement, which conflicts with the proposed STANDARD.

In addition, the FHWA proposes to delete the 3rd STANDARD statement regarding the requirement for TTC devices to be crashworthy because that requirement is covered in other sections and does not need to be repeated here.

375. In Section 6D.03 Worker Safety Considerations, the FHWA proposes to delete item B in the GUIDANCE statement because it would be superseded by new statements that the FHWA proposes adding later in the section. The FHWA proposes adding a new STANDARD statement to incorporate into the MUTCD the provisions of 23 CFR Part 634 regarding the use of high-visibility safety apparel by workers within the public right-of-way that were published in the **Federal Register** on November 24, 2006.<sup>181</sup> The FHWA also proposes adding a new first paragraph to the existing OPTION statement that allows first responders and law enforcement personnel to use safety apparel meeting a newly developed American National Standards Institute (ANSI) standard for “public safety vests” because this type of vest will better meet the special needs of these personnel. The FHWA proposes a phase-in compliance period of 2 years for worker apparel on non-Federal-aid highways to minimize any impact on State or local highway agencies. A compliance date of November 24, 2008 has already been established for worker apparel on Federal-aid highways as a result of 23 CFR Part 634.

376. In Section 6E.02 High-Visibility Safety Apparel, the FHWA proposes to make several changes regarding the use of high-visibility safety apparel by flaggers during daytime and nighttime

activity, as well as law by enforcement personnel within a TTC zone, to reflect the provisions of 23 CFR Part 634 that were published in the **Federal Register** on November 24, 2006.<sup>182</sup> The FHWA also proposes adding a new OPTION statement that allows first responders and law enforcement personnel to use safety apparel meeting a newly developed ANSI standard for “public safety vests” because this type of vest will better meet their special needs. The FHWA proposes a phase-in compliance period of 2 years for worker apparel on non-Federal-aid highways to minimize any impact on state or local highway agencies. A compliance date of November 24, 2008 has already been established for worker apparel on Federal-aid highways as a result of 23 CFR Part 634.

377. In Section 6E.03 Hand-Signaling Devices, the FHWA proposes to change the first SUPPORT statement to a STANDARD, and modify the text to require that flaggers use a STOP/SLOW paddle, a red flag, or an Automated Flagger Assistance Device to control road users through TTC zones. The FHWA proposes this change in order to require that one of the three listed devices be used, and to explicitly delete ‘hand signaling’ from the list of permitted methods to control traffic. See item 379 below for additional discussion.

The FHWA also proposes to add SUPPORT and GUIDANCE statements prior to the first OPTION statement to clarify that it is optimal to place a STOP/SLOW paddle on a rigid staff, with minimum length of 2.1 m (7 ft), in order to display a STOP or SLOW message that is stable and high enough to be seen by approaching or stopped traffic. The FHWA proposes the new language to add clarity to the use of the staff because the STOP/SLOW paddle is shown on a staff in existing Figure 6E-1, however, there is no language in the existing text regarding the use of the staff.

378. The FHWA proposes to add three new sections following Section 6E.03. The first new section is numbered and titled, “Section 6E.04 Automated Flagger Assistance Devices.” This new section contains SUPPORT, STANDARD, GUIDANCE, and OPTION statements describing the use of Automated Flagger Assistance Devices (AFADs). AFADs are optional devices

<sup>180</sup> The Americans With Disabilities Accessibility Guidelines (ADAAG) can be viewed at the following Internet Web site: <http://www.access-board.gov/ada-aba/index.htm>.

<sup>181</sup> The Federal Registrar Notice for the Final Rule, dated November 24, 2006 (Volume 71, Number 226, Page 67792-67800) can be viewed at the following Internet Web site: [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2006\\_register&docid=E6-19910.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2006_register&docid=E6-19910.pdf).

<sup>182</sup> The Federal Registrar Notice for the Final Rule, dated November 24, 2006 (Volume 71, Number 226, Page 67792-67800) can be viewed at the following Internet Web site: [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2006\\_register&docid=E6-19910.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2006_register&docid=E6-19910.pdf).

that enable a flagger(s) to be positioned out of the lane of traffic and are used to control road users through temporary traffic control zones. The second new section is numbered and titled, "Section 6E.05 STOP/SLOW Automated Flagger Assistance Devices" and contains STANDARD, OPTION, and GUIDANCE statements describing the use of a remotely controlled STOP/SLOW sign on either a trailer or a movable cart system and a gate arm. The third new section is numbered and titled, "Section 6E.06 Red/Yellow Lens Automated Flagger Assistance Devices" and contains STANDARD, OPTION, and GUIDANCE statements describing the use of remotely controlled red and yellow lenses and a gate arm. The remaining sections in this chapter would be renumbered accordingly. The FHWA proposes to incorporate the AFAD into the MUTCD based on FHWA's revised Interim Approval, dated January 28, 2005.<sup>183</sup> The FHWA proposes a phase-in compliance period of 5 years for existing Automated Flagger Assistance Devices in good condition to minimize any impact on State or local highway agencies.

379. In existing Section 6E.04 (new Section 6E.07) Flagger Procedures, the FHWA proposes to add to the first STANDARD statement that flaggers shall use a STOP/SLOW paddle, flag or an AFAD to control road users, and that the use of hand movements alone is prohibited. The FHWA proposes this additional language to protect the safety of workers and road users and to reinforce that hand movements alone are not an acceptable flagging method.

380. The FHWA also proposes to relocate GUIDANCE and OPTION statements from existing Section 6E.05 to the end of new Section 6E.07 because they reference flagger procedures more than flagger stations.

381. In existing Section 6E.05 (new Section 6E.08) Flagger Stations, the FHWA proposes to add to the GUIDANCE statement that an escape route for flaggers should be identified. The FHWA proposes this text in order to emphasize the need to provide flaggers with a way to avoid an errant vehicle.

#### Discussion of Proposed Amendments Within Chapter 6F

382. In Table 6F-1 Sizes of Temporary Control Signs, the FHWA proposes to change the minimum size of the TO ONCOMING TRAFFIC (R1-2aP) sign to 600 mm x 450 mm (24 in x 18

in) to be consistent with the same sign in Part 2.

The FHWA also proposes to revise the sizes of certain signs listed in Table 6F-1 to incorporate sizes that are more legible for drivers with 20/40 visual acuity. This is consistent with similar proposed changes in sign sizes in Part 2.

383. In Section 6F.02 General Characteristics of Signs, the FHWA proposes to revise the first OPTION statement to delete fluorescent red-orange and fluorescent yellow-orange from the alternative colors for orange. The FHWA proposes this change to be consistent with a similar change in Part 2, and because there are no separate color specifications for these colors, as they are both contained within the single color specification for fluorescent orange.

384. The FHWA proposes adding a new section following Section 6F.11 STAY IN LANE. The proposed new section is numbered and titled "Section 6F.12 Work Zone and Higher Fines Signs and Plaques." This proposed new section contains an OPTION statement describing the use of the WORK ZONE plaque above a Speed Limit Sign to emphasize that a reduced speed limit is in effect within a TTC zone and the FINES HIGHER, FINES DOUBLED, and \$XX FINE plaques that may be mounted below the Speed Limit sign if increased fines are imposed for traffic violations within the TTC zone, as well as the associated signs that may be used to mark the beginning and ends of these zones. The remaining sections in Chapter 6F would be renumbered accordingly.

385. In existing Section 6F.15 (new Section 6F.16) Warning Sign Function, Design, and Application, the FHWA proposes to delete the 2nd STANDARD statement and the first three paragraphs of the 3rd OPTION statement, because they provide sign size information that is already contained in Section 6F.02.

386. In Section 6F.16 (new Section 6F.17) Position of Advance Warning Signs, the FHWA proposes to add a paragraph to the first GUIDANCE statement recommending that the ROAD WORK sign be the first advance warning sign encountered by road users when multiple advance warning signs are needed on an approach to a TTC. The FHWA proposes this new language to reflect current practice in which the first sign encountered in advance of a TTC is the most generic sign.

387. In Figure 6F-4 Warning Signs in Temporary Traffic Control Zones, the FHWA proposes to add the STREET WORK, WORKERS, and FRESH OIL word signs to the list of optional word

message signs listed next to the asterisk at the bottom of the page. The FHWA proposes this change to provide practitioners with the flexibility to use various word message signs in advance of various types of temporary traffic control zones.

388. The FHWA proposes adding a new section following existing Section 6F.28 (new Section 6F.29) EXIT OPEN, EXIT CLOSED, EXIT ONLY Signs. The proposed new section is numbered and titled "Section 6F.30 NEW TRAFFIC PATTERN AHEAD Sign (W23-2)" and contains an OPTION statement describing the use of the NEW TRAFFIC PATTERN AHEAD sign to provide advance warning of a change in traffic patterns, such as revised lane usage, roadway geometry, or signal phasing. The FHWA proposes a phase-in compliance period of 5 years for existing signs in good condition to minimize any impact on State or local highway agencies. The remaining sections in Chapter 6F would be renumbered accordingly. The FHWA proposes this change to reflect current practice in many States and numerous local jurisdictions as documented in the Sign Synthesis Study<sup>184</sup> and to provide a uniform legend for this purpose.

389. In existing Section 6F.29 (new Section 6F.31) Flagger Sign, the FHWA proposes to add an OPTION to allow Flagger signs to remain displayed to road users for up to 15 minutes when flagging operations are not occurring under certain circumstances. The FHWA proposes this change to reflect Official Interpretation #6-200(I), which was issued on September 22, 2004.<sup>185</sup>

390. In existing Section 6F.42 (new Section 6F.44) Shoulder Signs, the FHWA proposes to revise the GUIDANCE statement to include the proposed new symbol version of the Shoulder Drop Off sign and the supplemental plaque to warn road users of a low shoulder to be consistent with this proposed new sign in Chapter 2C.

391. In existing Section 6F.43 (new Section 6F.45) UNEVEN LANES Sign, the FHWA proposes to add an OPTION statement to permit the use of the proposed new Shoulder Drop Off symbol sign with an UNEVEN LANES supplemental plaque instead of the UNEVEN LANES word sign. The FHWA proposes this change to be consistent with proposed changes in Chapter 2C.

<sup>184</sup> 184 This December 2005 publication (FHWA-HOP-06-074) can be viewed at the following Internet Web site: [http://tcd.tamu.edu/documents/rwstc/Signs\\_Synthesis-Final\\_Dec2005.pdf](http://tcd.tamu.edu/documents/rwstc/Signs_Synthesis-Final_Dec2005.pdf).

<sup>185</sup> FHWA Official Interpretation # 6-200, dated September 22, 2004, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interpretations/pdf/6\\_200.pdf](http://mutcd.fhwa.dot.gov/resources/interpretations/pdf/6_200.pdf).

<sup>183</sup> The Revised Interim Approval notice can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/pdfs/ia\\_afads012705.pdf](http://mutcd.fhwa.dot.gov/pdfs/ia_afads012705.pdf).

392. The FHWA proposes adding a new section following existing Section 6F.44 (new Section 6F.46) NO CENTER STRIPE Sign. The proposed new section is numbered and titled "Section 6F.47 Reverse Curve Signs (W1-4 Series)" and contains OPTION and STANDARD statements describing the use of the Reverse Curve signs to give road users advance notice of a lane shift. The remaining sections in Chapter 6F would be renumbered accordingly. The FHWA proposes this change to allow for the use of "single reverse curve" signs similar to those already allowed in existing Section 6F.45 for "double reverse curve" signs.

393. The FHWA proposes relocating the information from existing Section 6F.54 PILOT CAR FOLLOW ME Sign (G20-4), to Section 6C.13 because the information is related specifically to pilot cars, which are covered in Section 6C.13. The remaining sections in Chapter 6F would be renumbered accordingly.

394. In existing Section 6F.55 (new Section 6F.57) Portable Changeable Message Signs, the FHWA proposes to change the first STANDARD statement to a SUPPORT, as well as to add additional information because this statement just provides information, rather than requirements.

The FHWA also proposes to change the 2nd paragraph of the first GUIDANCE statement to a STANDARD in order to require that Portable Changeable Message signs comply with specific chapters and tables in the MUTCD.

The FHWA proposes to revise the last 2 paragraphs of the first GUIDANCE statement to clarify the recommendations for messages and phases. As part of these changes, the FHWA proposes to change the recommended display time for message phases, to expand the recommendations for message lengths and phases and to delete the OPTION statement.

The FHWA also proposes to revise the last GUIDANCE statement to clarify that Portable Changeable Message signs should be placed off the shoulder of the roadway and behind a traffic barrier, if practical. The FHWA also proposes to add additional recommendations regarding the use of Portable Changeable Message signs in temporary traffic control zones.

In addition, the FHWA proposes to add a new STANDARD statement in the middle of the first GUIDANCE statement that describes the requirements for the number of phases and number of lines, placement of messages within each line, techniques for message display and interaction between signs if more than

one is simultaneously visible to road users.

The FHWA proposes a phase-in compliance period of 5 years for the new requirements for existing Portable Changeable Message Signs in good condition to minimize any impact on State or local highway agencies.

The FHWA proposes all of the changes in this section to be consistent with the proposed changes for permanent Changeable Message signs as proposed in new Chapter 2M, but with differences to suit the special nature of Portable Changeable Message Signs. These changes are based on extensive research on changeable message sign legibility, messaging, and operations conducted over a period of many years by the Texas Transportation Institute.<sup>186</sup>

395. In Figure 6F-6 Advance Warning Arrow Display Specifications, the FHWA proposes to add an Alternating Diamond display as one of the options for a Flashing Caution display. This type of display has been found effective by experimentation in Utah.<sup>187</sup>

396. In existing Section 6F.58 (new Section 6F.60) Channelizing Devices, the FHWA proposes to add to the first STANDARD statement that all channelizing devices shall be crashworthy. As part of this change, the FHWA proposes to delete from the first GUIDANCE statement the recommendation that channelizing devices be crashworthy because it would conflict with the proposed STANDARD. The FHWA proposes these changes to increase the safety of workers and road users and to be consistent with other crashworthiness requirements throughout Part 6.

The FHWA also proposes to revise the 2nd paragraph of the 2nd STANDARD statement to simplify the requirements for the placement of channelizing devices for channelizing pedestrians. As part of the revisions, the FHWA proposes to change the minimum required height of channelizing devices from 900 mm (36 in) to 800 mm (32 in) to reflect predominant practice. The FHWA also proposes to delete the existing 3rd STANDARD statement because it is repetitive.

The FHWA proposes to add to the first GUIDANCE that where multiple channelizing devices are aligned to form

a continuous pedestrian channelizer, connection points should be smooth to optimize long-cane and hand trailing. The FHWA proposes this additional language to provide practitioners with recommendations that will enable visually impaired pedestrians to traverse channelized areas more easily.

In addition, the FHWA proposes adding two new STANDARD statements and an OPTION statement in the middle of this section describing the use of warning lights on channelizing devices. Many different types of lighting methods are currently being used, including flashing, steady-burn, and sequential. Some lighting methods do not provide roadway users with the appropriate message and some are confusing. Therefore, the FHWA proposes this language to provide uniformity in the types of lighting methods used.

397. In Figure 6F-7 Channelizing Devices, the FHWA proposes to specify that the 900 mm (36 in) height of the Direction Indicator Barricade is a minimum height. The "MIN" was inadvertently missing in the 2003 MUTCD.

398. In existing Section 6F.60 (new Section 6F.62) Tubular Markers, the FHWA proposes to revise the 3rd paragraph of the first STANDARD to clarify the requirements for reflectorization bands on tubular markers that are less than 1050 mm (42 in) in height as well as for tubular markers that are 1050 mm (42 in) or more in height. The FHWA proposes this language in order to provide more clarity on the width and spacing of reflectorization bands for bands on tubular markers of different heights.

399. In existing Section 6F.61 (new Section 6F.63) Vertical Panels, the FHWA proposes to add to the 2nd paragraph of the first STANDARD statement a requirement that clearance between the bottom of a vertical panel and the roadway shall be a maximum of 300 mm (12 in). The FHWA proposes the change to provide consistency between Figure 6F-7 and the text.

The FHWA also proposes to change the first OPTION statement to a STANDARD to require, rather than merely permit, a panel stripe width of 100 mm (4 in) to be used where the height of the reflective material on a vertical panel is 900 mm (36 in) or less. The FHWA proposes this change to reflect predominant practice and encourage uniformity.

400. In existing Section 6F.62 (new Section 6F.64) Drums, the FHWA proposes changing the first sentence of the second GUIDANCE paragraph to a STANDARD statement to prohibit

<sup>186</sup> Information on the many research projects on changeable message signs conducted by the Texas Transportation Institute (TTI) can be accessed via TTI's Internet Web site at: <http://tti.tamu.edu/>.

<sup>187</sup> "Dancing Diamonds in Highway Work Zones: Evaluation of Arrow Panel Caution Displays," Utah Department of Transportation Report number UT-02.13, dated June 2002, by Saito and Turley, can be viewed at the following Internet Web site: <http://www.dot.state.ut.us/download.php/tid=297/UT-02.13.pdf>.

weighting drums with sand, water, or any material to the extent that would make them hazardous to road users or workers when struck. As part of this change, the FHWA also proposes deleting the remaining sentence of this GUIDANCE statement because drums shall have closed tops (per the last sentence of the first STANDARD statement), which should keep large amounts of water out of the device, therefore, reducing the effects of freezing.

401. In existing Section 6F.63 (new Section 6F.65) Type 1, 2, or 3 Barricades, the FHWA proposes to add a new STANDARD after the 4th paragraph of the first GUIDANCE statement requiring continuous detectable bottom and top rails with no gaps on barricades that are used to channelize pedestrians. In addition, the FHWA proposes to add an OPTION statement following the proposed STANDARD that provides the ability to facilitate drainage between the bottom rail and the ground surface.

402. In existing Section 6F.64 (new Section 6F.66) Direction Indicator Barricades, the FHWA proposes to delete the first Guidance statement because it conflicts with the proposed requirement in existing Section 6F.58 (new Sections 6F.60) that all channelizing devices shall be crashworthy, as discussed in item number 396 above.

403. In existing Section 6F.65 (new Section 6F.67) Temporary Traffic Barriers as Channelizing Devices, the FHWA proposes to change the first paragraph of the GUIDANCE to a STANDARD in order to prohibit, rather than discourage, the use of temporary traffic barriers for a merging taper, except in low-speed urban areas. The FHWA proposes this change to provide consistency on the use of temporary traffic barriers within this section.

The FHWA also proposes to add a STANDARD statement at the end of the section requiring that temporary traffic barriers used to channelize pedestrians meet specific criteria that aid pedestrians with visual disabilities, to be consistent with requirements elsewhere in Part 6.

404. The FHWA proposes retitling existing Section 6F.66 (new Section 6F.68) to "Longitudinal Channelizing Devices," to provide for devices for this purpose other than just barricades. The FHWA also proposes to change the first GUIDANCE statement to a STANDARD in order to require that, if longitudinal channelizing devices are used singly as Type 1, 2, or 3 barricades, they must comply with design and placement characteristics established for the

devices in Chapter 6F. The FHWA proposes this change to be consistent with provisions elsewhere in Chapter 6F.

The FHWA also proposes to delete the second paragraph of the first OPTION statement, so as to no longer permit longitudinal channelizing devices to be filled with water as ballast. The FHWA proposes this change to provide consistency throughout Part 6 because the FHWA proposes to no longer allow water to be used as ballast for any channelizing devices.

405. The FHWA proposes to add a new section following existing Section 6F.67 (new Section 6F.69), numbered and titled, "Section 6F.70 Temporary Lane Separators." This new section contains OPTION, STANDARD, and GUIDANCE statements regarding the use of these optional devices that may be used to channelize road users, to divide opposing vehicular traffic lanes, or divide lanes when two or more lanes are open in the same direction, and to provide continuous pedestrian channelization. The FHWA proposes these changes to reflect existing successful practices. The FHWA proposes a phase-in compliance period of 5 years for existing devices in good condition to minimize any impact on State or local highway agencies.

406. In existing Section 6F.69 (new Section 6F.72) Temporary Raised Islands, the FHWA proposes to change the recommended width of temporary raised islands in the GUIDANCE statement from 450 mm (18 in) to 300 mm (12 in). The FHWA proposes this change to facilitate the use of existing devices that have been successfully used in many applications.

407. The FHWA proposes to make several revisions to existing Section 6F.71 (new Section 6F.74) Pavement Markings, and existing Section 6F.72 (new Section 6F.75), retitled, "Temporary Markings" to clarify, reduce redundancy, and organize the text in a more logical order. The proposed changes include differentiating the usage of pavement markings in long-term stationary temporary traffic control zones from those used in intermediate-term and shorter temporary traffic control zones. The FHWA proposes to clarify that temporary broken line segments can be shorter than those required for normal permanent broken line markings but that temporary no-passing zone markings must meet the normal standards for permanent markings.

408. In existing Section 6F.73 (new Section 6F.76) retitled "Temporary Raised Pavement Markers," the FHWA proposes to add OPTION, STANDARD,

and GUIDANCE statements at the beginning and end of the section to provide more information regarding the color, patterns, and spacing of raised pavement markers in temporary traffic control zones. The proposed changes repeat certain requirements and recommendations from Part 3 and also provide for optional use of temporary short-term (usually no longer than 14 days) use of a less expensive pattern of raised pavement markers to substitute for a broken line marking.

409. The FHWA proposes to delete existing Section 6F.76 Floodlights, because floodlights are not traffic control devices and it is not appropriate for the MUTCD to have regulatory language regarding their design or use. The remaining sections would be renumbered accordingly.

410. The FHWA proposes to delete existing Section 6F.77 Flashing Warning Beacons, because the material is already covered in Chapter 4K and does not need to be repeated in Part 6.

411. The FHWA proposes to delete existing Section 6F.79 Steady-Burn Electric Lamps, because the FHWA believes that most jurisdictions are using other types of warning lights, therefore, making steady-burn electric lamps obsolete.

412. The FHWA proposes to delete the 3rd STANDARD in Section 6F.80 Temporary Traffic Control Signals, because the prohibition against supports for temporary traffic control devices encroaching into pedestrian access routes is covered elsewhere in Part 6 and does not need to be repeated.

In addition, the FHWA proposes adding a new STANDARD at the end of the section requiring temporary traffic signals placed within 60 m (200 ft) of a highway-rail grade crossing or a highway-light rail transit grade crossing to have preemption unless arrangements are made to prevent traffic from queuing across the tracks. The FHWA proposes this change to protect road users from conflicts with rail crossings in TTC zones and to be consistent with provisions in Parts 4 and 8.

413. In Section 6F.81 Temporary Traffic Barriers, the FHWA proposes to add in the STANDARD that temporary traffic barriers, including their end treatments, shall be crashworthy in order to correspond with similar requirements for other roadside devices. The FHWA also proposes to add several paragraphs to the end of the 2nd SUPPORT statement regarding the use of movable barriers, and describing their use in existing Figures 6H-45 and 6H-34 (new Figures 6I-45 and 6I-34). The FHWA proposes to add this text in Chapter 6F and delete existing Section

6G.18 Movable Barriers, so that the information is contained in one location.

414. The FHWA proposes to delete existing Sections 6F.82 Crash Cushions and 6F.83 Vehicle Arresting Systems, because neither crash cushions nor vehicle arresting systems are traffic control devices and it is not appropriate for the MUTCD to have regulatory language regarding their design or use. The FHWA believes that adequate and appropriate guidance on crash cushions and vehicle arresting systems is readily available in a variety of FHWA, AASHTO, ITE, and industry publications and Web sites, such as the FHWA Office of Safety's Roadway Departure Web site ([http://safety.fhwa.dot.gov/roadway\\_dept/](http://safety.fhwa.dot.gov/roadway_dept/)). The remaining sections would be renumbered accordingly.

415. In existing Section 6F.84 (new Section 6F.82) Rumble Strips, the FHWA proposes to add to the STANDARD statement that black and orange are acceptable colors for transverse rumble strips in TTC zones. The FHWA proposes this change to reflect research showing that in addition to white, the colors black and orange work well in TTC zones.<sup>188</sup>

416. The FHWA proposes to delete Section 6F.85 Screens, because glare screens are not traffic control devices and it is not appropriate for the MUTCD to have regulatory language regarding their design or use. The FHWA believes that adequate and appropriate guidance on glare screens is readily available in a variety of FHWA, AASHTO, ITE, and industry publications and Web sites, such as the FHWA Office of Safety's Roadway Departure Web site ([http://safety.fhwa.dot.gov/roadway\\_dept/](http://safety.fhwa.dot.gov/roadway_dept/)). The remaining sections would be renumbered accordingly.

417. The FHWA proposes to delete Section 6F.86 Future and Experimental Devices, because such devices are already covered in Part 1.

#### Discussion of Proposed Amendments Within Chapters 6G Through 6I

418. In Section 6G.01 Typical Applications, the FHWA proposes to add a new GUIDANCE statement recommending that a TTC plan should be developed for all planned special events and approved by the highway agencies having jurisdiction. The FHWA proposes this change to help assure that proper traffic controls are installed

when planned special events, such as parades, street fairs, farmers' markets, etc. impact traffic, and to respond to a National Transportation Safety Board (NTSB) report on this subject.<sup>189</sup>

419. In Section 6G.11 Work Within the Traveled Way of Urban Streets, the FHWA proposes to relocate the first sentence of the STANDARD statement to Section 6D.01 because the information about maintaining accessibility and detectability along pedestrian routes is most appropriately covered in Section 6D.01.

420. In Section 6G.12 Work Within the Traveled Way of Multi-Lane, Nonaccess Controlled Highways, the FHWA proposes to reference existing Section 6F.65 (new Section 6F.67) Temporary Traffic Barriers as Channelization Devices in the first GUIDANCE statement, and delete the 2nd STANDARD statement and the first paragraph of the 2nd SUPPORT statement. The FHWA proposes this change to eliminate unnecessary repetition regarding temporary traffic barriers.

421. As discussed in item 413 above, the FHWA proposes to delete existing Section 6G.18 Movable Barriers and place all information regarding movable barriers in Section 6F.81.

422. The FHWA proposes to reverse the order of existing Chapters 6H and 6I so that Chapter 6H would be Control of Traffic Through Traffic Incident Management Areas and Chapter 6I would be Typical Applications. The FHWA proposes this change so that the numerous Typical Application diagrams will be at the end of Part 6 and to enhance the position within Part 6 of the text and figures on incident management.

423. In existing Section 6I.01 (new Section 6H.01) General, the FHWA proposes to add to the STANDARD statement that the Incident Command System (ICS) as required by the National Incident Management System (NIMS) shall be implemented in traffic incident management areas. The FHWA proposes this language per The Department of Homeland Security and Presidential Directives (DHSPD) #5 and #8,<sup>190</sup> which require the adoption of the National Incident Management System and the

Incident Command System by all Federal, State, tribal and local governments. These two systems are required for all planned and unplanned incidents in the United States.

The FHWA also proposes to add to the 2nd paragraph of the GUIDANCE statement that all on-scene responders and news media personnel should wear high-visibility apparel. The FHWA proposes this text to incorporate into the MUTCD the provisions of 23 CFR Part 634 regarding high-visibility apparel, as discussed in Section 6D.03 (item 375) above.

424. In existing Sections 6I.02 (new Section 6H.02) Major Traffic Incidents and 6I.03 (new Section 6H.03) Intermediate Traffic Incidents, the FHWA proposes to add OPTION statements near the end of the sections explaining the use of light sticks at incidents. The FHWA proposes these changes to reflect the increasingly common use of light sticks by emergency responders as a more convenient and effective device than flares.

425. In existing Section 6H.01 (new Section 6I.01) Typical Applications, the FHWA proposes changing the Typical Applications to reflect the proposed changes to all parts of the MUTCD with particular reference to proposed Part 6 text and figure changes.

In addition, the FHWA proposes to add clarification to the existing second SUPPORT statement that except for the notes to the typical applications (which are clearly classified using headings as being STANDARD, GUIDANCE, OPTION, or SUPPORT), the information presented in the typical applications can generally be regarded as Guidance. The FHWA proposes this change to provide additional information about the nature of the information in the Typical Application illustrations.

Additionally, the FHWA proposes the following changes to the notes to the figures of typical applications:

a. Notes for existing Figure 6H-4 (new Figure 6I-4): The FHWA proposes adding a new item 4 allowing stationary signs to be omitted if the work is mobile because the use of such signs is often not practical with mobile operations. The FHWA also proposes adding a new item 9 in the STANDARD statement stating that vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies, and that sign legends shall be covered or turned from view when work is not in progress, for consistency with similar provisions in the notes for existing Figure 6H-17 (new Figure 6I-17).

<sup>189</sup> NTSB Report HAR-04/04, "Rear End Collision and Subsequent Vehicle Intrusion into Pedestrian Space at Certified Farmers' Market, Santa Monica, California, July 16, 2003", dated August 3, 2004, can be viewed at the following Internet Web site: <http://ntsb.gov/publictn/2004/HAR0404.pdf>.

<sup>190</sup> The Department of Homeland Security and Presidential Directives (DHSPD) #5 and 8 can be viewed at Internet Web site addresses: <http://www.whitehouse.gov/news/releases/2003/02/20030228-9.html> and <http://www.whitehouse.gov/news/releases/2003/12/20031217-6.html>.

<sup>188</sup> Report No. K-TRAN: KY-02-3 "Guidelines for the Application of Removable Rumble Strips," August 2006 can be viewed at the following Internet Web site: <http://www.ksdot.org/idmws/DocContent.dll?Library=PublicDocs-dt00mx38&ID=003717523&Page=1>.



b. Notes for existing Figures 6H–5, 6H–34, and 6H–36 (new Figures 6I–5, 6I–34, and 6I–36): The FHWA proposes revising the STANDARD statement to indicate that temporary traffic barriers shall comply with the provisions of Section 6F.81. The FHWA proposes this revision to provide users with clear, consistent requirements for the use of temporary traffic barriers.

c. In existing Figures 6H–12 and 6H–14 (new Figures 6I–12 and 6I–14), the FHWA proposes to clarify that the dimension between the nearest signal face for each approach and the stop line should be 45 m (150 ft) for 200 mm (8 in) signal indications and 55 m (180 ft) for 300 mm (12 in) signal indications, for consistency with provisions of Part 4.

d. Also in existing Figure 6H–14 (new Figure 6I–14), the FHWA proposes to delete the NO PASSING ZONE pennant signs and the DO NOT PASS signs because they have been illustrated in an incorrect location and they are not necessary.

e. Notes for existing Figure 6H–16 (new Figure 6I–16): The FHWA proposes to add a new item 1 to the GUIDANCE statement indicating that all lanes should be a minimum of 3 m (10 ft) in width to be consistent with guidance in other applications. The FHWA also proposes deleting existing item 2 regarding spacing of channelizing devices because that information is covered elsewhere in the Manual and does not need to be repeated here.

f. Notes for existing Figures 6H–31 and 6H–36 (new Figures 6I–31 and 6I–36): The FHWA proposes to add to the STANDARD statement to describe the use of the Reverse Curve signs. The FHWA proposes this change to be consistent with the proposed new section numbered and titled “Section 6F.47 Reverse Curve Signs.” As part of this change, the FHWA also proposes deleting existing items in the OPTION statements regarding the ALL LANES THRU supplemental plaque because the reverse curve signs graphically indicate that message.

g. Notes for existing Figures 6H–37, 6H–38, 6H–39, 6H–42 and 6H–44 (new Figures 6I–37, 6I–38, 6I–39, 6I–42 and 6I–44): The FHWA proposes adding a STANDARD note that requires an arrow panel be used on all freeway lane closures, and that a separate arrow panel be used for each closed lane when more than one freeway lane is closed. The FHWA believes that an arrow panel is essential for safety at all lane closures on freeways due to the high speeds. The FHWA proposes a phase-in compliance period of 2 years for these arrow board requirements at existing locations to

minimize any impact on State or local highway agencies.

h. Notes for existing Figure 6H–38 (new Figure 6I–38): The FHWA also proposes to add a STANDARD note that requires that temporary traffic barriers comply with the provisions and requirements in Section 6F.81. The FHWA proposes this change for consistency with provisions elsewhere in Part 6.

i. In existing Figure 6H–38 (new Figure 6I–38), the FHWA proposes to change the dimension label for the single row of channelizing devices in advance of the traffic split from 30 m (100 ft) “MAX” to “MIN” to reflect that the distance labeled is the minimum distance, not the maximum distance. The dimension was inadvertently mislabeled in the 2003 MUTCD.

j. Notes for existing Figure 6H–41 (new Figure 6I–41): The FHWA proposes adding to item 3 the recommendation that channelizing devices should be placed to physically close the ramp when an exit is closed. The FHWA proposes this change to reflect existing practice, and provide for positive closure instead of just relying on a sign.

#### *Discussion of Proposed Amendments to Part 7 Traffic Controls for School Areas*

##### *Discussion of Proposed Amendments Within Part 7—General*

426. The FHWA proposes to change the name of the S1–1 sign from “School Advance Warning” to “School” sign throughout Part 7 and in Table 7B–1. The FHWA proposes this change in order to simplify the name of the S1–1 sign and to provide flexibility in the sign’s application and use of the sign with other signs and plaques to form a sign assembly.

427. The FHWA also proposes changing the name of the “School Crosswalk Warning Assembly” to “School Crossing Assembly” to simplify its name and to provide additional flexibility in its usage.

428. In Section 7A.04 Scope, the FHWA proposes to relocate the existing OPTION statement to Section 7B.03 because the positioning of in-roadway signs is more consistent with the subject of that section.

429. The FHWA proposes to delete Sections 7A.05 through 7A.10 because the subjects of those sections are already covered in other parts of the Manual. In their place, the FHWA proposes to add a paragraph to the SUPPORT statement to Section 7A.04 providing cross references to the appropriate sections. In addition, the FHWA proposes to add that provisions discussed in Part 3 are

applicable in school areas. The FHWA proposes these changes to reduce redundancy in the Manual.

430. The FHWA proposes to add a new section numbered and titled, “Section 7A.05 Grade-Separated School Crossings” that contains a SUPPORT statement regarding the use of grade-separated crossings for school pedestrian traffic. Much of the information in this proposed new section was previously covered in existing Chapter 7F Grade Separated Crossings, which the FHWA proposes to delete. The FHWA proposes these changes because grade-separated crossings are not traffic control devices regulated by the MUTCD.

431. In Section 7B.01 Size of School Signs, the FHWA proposes to delete from the second paragraph of the STANDARD statement the phrase “on public roads, streets, and highways” because 23 CFR 655.603<sup>191</sup> now makes the MUTCD apply to more than just public roads and thus makes this phrase inaccurate.

432. In Section 7B.03 Position of Signs, the FHWA proposes to relocate an OPTION statement from Section 7A.04 to this section regarding the use of in-roadway signs because the information is more consistent with the subject of this section.

433. In Section 7B.07 Sign Color for School Warning Signs, the FHWA proposes to revise this section to make the use of fluorescent yellow-green as the background color for all school warning signs and plaques a STANDARD rather than an option. The FHWA proposes to revise the STANDARD statement accordingly, and to delete the associated OPTION and GUIDANCE statements. The FHWA proposes a phase-in compliance period of 10 years for existing school warning signs and plaques in good condition to minimize any impact on State or local highway agencies. The FHWA proposes these changes because the use of fluorescent yellow-green has become predominant practice in most jurisdictions. Fluorescent yellow-green provides enhanced conspicuity for these critical signs, especially in dusk and dawn periods, and the FHWA believes that uniform use of this background color for all school warning signs and plaques will enhance safety and road user recognition. The FHWA proposes to revise the background color of school warning signs and plaques in the figures throughout Part 7 to reflect this proposed change.

434. The FHWA proposes to delete existing Section 7B.08 School Advance

<sup>191</sup> See fn. 3 for more information.

Warning Assembly, and replace it with three new sections numbered and titled, "Section 7B.08 School Sign," "Section 7B.09 School Area or School Zone Sign," and "Section 7B.10 School Advance Crossing Assembly." The remaining sections in Chapter 7B would be renumbered accordingly. As discussed in item 426 above, the FHWA proposes this change in order to provide flexibility in the sign's application and use of the sign with other signs and plaques to form a sign assembly.

435. The FHWA proposes to revise Section 7B.08 to include one SUPPORT statement that describes three specific applications for the School (S1-1) sign. As part of this new SUPPORT, the FHWA proposes to add a new figure numbered and titled, "Figure 7B-2 Example of Signing for a School Zone," that illustrates the use of the School (S1-1) sign and the Fines Higher (R2-6P) plaque. The remaining figures in Chapter 7B would be renumbered accordingly. Proposed new Sections 7B.09 through 7B.11 contain additional STANDARD and OPTION statements for each of the three uses of the S1-1 sign.

436. In proposed Section 7B.09 School Area or School Zone Sign and Section 7B.10 School Advance Crossing Assembly, the FHWA proposes to add an OPTION statement that permits the use of a supplemental arrow plaque on a School (S1-1) sign in locations where a school area/zone or school crosswalk that is located on a cross street less than 38 m (125 ft) from the edge of a street or highway. The FHWA proposes these changes to provide jurisdictions with flexibility for installing signs where there is not sufficient distance for advance signing.

437. In existing Section 7B.09 (new Section 7B.11) School Crossing Assembly, the FHWA proposes to add to the OPTION statement that when used at a school crossing, the In-Street Pedestrian sign may use the schoolchildren symbol (as found on the S1-1 sign), rather than the single pedestrian symbol. The FHWA proposes this change to incorporate Official Interpretation #7-65(I), which was issued on September 6, 2004.<sup>192</sup> The FHWA proposes to show these optional sign designs in existing Figure 7B-4 (new Figure 7B-5).

The FHWA also proposes to add to the OPTION statement to allow the use of the proposed new Overhead Pedestrian Crossing sign (discussed in Chapter 2B) sign at school crossings and

to add a complementary restriction to the last STANDARD statement prohibiting the use of this sign at signalized crossings. The FHWA proposes these changes to allow appropriate use of this overhead sign to enhance the safety of school crossings.

438. In existing Section 7B.10 (new Section 7B.12) SCHOOL BUS STOP AHEAD Sign, the FHWA proposes revising the GUIDANCE statement by removing the specific distance of 150 m (500 ft) that a stopped school bus should be visible to road users, and in its place inserting a reference to distances given in Table 2C-4. The FHWA proposes this change because Table 2C-4 provides more detailed information about proper placement of warning signs.

439. In existing Figure 7B-1 School Area Signs, the FHWA proposes to replace the existing School Bus Stop Ahead (S3-1) word message sign with a symbol sign. The FHWA proposes this new sign based on positive experiences in West Virginia, where a symbol sign for this message has been used for 25 to 30 years<sup>193</sup> and in Canada, where it has also been used since the 1970s. The FHWA proposes to use a symbol that is similar to the Canadian MUTCD<sup>194</sup> standard WC-9 symbol. The proposed symbol features a school bus with a depiction of red flashing lights, a bus-mounted STOP sign, and students getting on or off the bus. A recent study<sup>195</sup> found that the proposed symbol sign was better understood than the existing word message sign and that the symbol provides comparable legibility distance. The FHWA believes that the replacement of selected word message signs with well-designed symbol signs will improve safety in view of increasing globalization and non-English speaking road users in the United States. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to

<sup>193</sup> For additional information on West Virginia's successful experience with this symbol sign, contact Mr. Ray Lewis, Staff Engineer—Traffic Research and Special Projects Traffic Engineering Division, West Virginia DOT, Division of Highways, phone: 304-558-8912, email: [rlewis@dot.state.wv.us](mailto:rlewis@dot.state.wv.us).

<sup>194</sup> The Manual of Uniform Traffic Control Devices for Canada, 4th Edition, is available for purchase from the Transportation Association of Canada, 2323 St. Laurent Boulevard, Ottawa, Ontario K1G 4J8 Canada, Web site <http://www.tac-atc.ca>.

<sup>195</sup> Preliminary results from "Evaluations of Symbol Signs," conducted by Bryan Katz, Gene Hawkins, and Jason Kennedy for the Traffic Control Devices Pooled Fund Study, can be viewed at the following Internet Web site: [http://www.pooledfund.org/documents/TPF-5\\_065/PresSymbolSign.pdf](http://www.pooledfund.org/documents/TPF-5_065/PresSymbolSign.pdf).

minimize any impact on State or local highway agencies.

The FHWA also proposes to revise the illustration in Figure 7B-1 to clarify that the S4-1 (time) and S4-6 (Monday-Friday) plaques may be used together, but other combinations of plaques are not allowed.

440. The FHWA proposes to add a new Section following existing Section 7B.10 (new Section 7B.13), numbered and titled, "Section 7B.13 SCHOOL BUS TURN AHEAD Sign (S3-2)." This new section contains an OPTION statement about the use of this proposed new sign that can be installed in advance of locations where there is a school bus turn around on a roadway at a location not visible to approaching users for a distance as determined in Table 2C-4. The remaining sections in Chapter 7B would be renumbered accordingly. The FHWA also proposes to add a new Figure 7B-1 Illustrating the proposed sign. The FHWA proposes this new sign to provide a standard sign for applications that fit this need. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

441. In existing Section 7B.11 (new Section 7B.14) School Speed Limit Assembly, the FHWA proposes to change the first paragraph of the 2nd OPTION statement to a STANDARD to require, rather than merely permit, fluorescent yellow-green pixels to be used when the "SCHOOL" message is displayed on a changeable message sign for a school speed limit. The FHWA proposes this change to be consistent with other proposed changes that require fluorescent yellow-green to be the standard color for school zone warning signs.

442. In existing Section 7B.12 (new Section 7B.15), the FHWA proposes to change the name of the "Reduced Speed School Zone Ahead" sign to "Reduced School Speed Limit Ahead" sign to be consistent with the Stop Ahead, Yield Ahead, and Signal Ahead sign names and to be consistent with the proposed change in the name of the similar warning sign in Chapter 2C.

443. In existing Section 7B.13 (new Section 7B.16) END SCHOOL ZONE Sign, the FHWA proposes to revise the STANDARD to clarify that the end of a designated school zone shall be marked with both an END SCHOOL ZONE sign and a Speed Limit sign for the section of highway that follows. The FHWA proposes this change to be consistent with proposed changes to Section 7B.08. It is important and sometimes legally necessary to mark the end points of designated school zones. The use of a

<sup>192</sup> FHWA's Official Interpretation 7-65(I), dated September 6, 2004, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/interpretations/pdf/7\\_65.pdf](http://mutcd.fhwa.dot.gov/resources/interpretations/pdf/7_65.pdf).

Speed Limit sign showing the speed limit for the following section of highway is required by existing section 2B.13. The FHWA also proposes to modify figures in Chapter 7B to reflect these proposed changes. The FHWA proposes a phase-in compliance period of 10 years for installation of END SCHOOL ZONE signs at existing locations to minimize any impact on state or local highway agencies.

444. In Section 7C.03 Crosswalk Markings, the FHWA proposes to add a 5th paragraph to the first GUIDANCE statement recommending that warning signs be installed for marked crosswalks at nonintersection locations, and adequate visibility be provided by implementing parking prohibitions. The FHWA proposes this change to be consistent with a similar proposed change in existing Section 3B.17 (new Section 3B.18).

In addition, the FHWA proposes to add to the 2nd GUIDANCE statement, a recommendation that the spacing between diagonal or longitudinal lines should not exceed 2.5 times the line width. The FHWA proposes this change to be consistent with existing text in Section 3B.17.

445. In Section 7C.04 Stop and Yield Lines, the FHWA proposes to incorporate several changes to be consistent with proposed changes to Section 3B.16 with the same title. See item 262 for more information.

446. In Section 7C.05 Curb Markings for Parking Regulations, the FHWA proposes to add to the OPTION statement that curb markings without word markings or signs may be used to convey a general prohibition by statute of parking within a specified distance of a STOP sign, driveway, fire hydrant, or crosswalk. The proposed text is already contained in existing Section 3B.21 (new Section 3B.22), and the FHWA believes it is important to restate it in Section 7C.05 for emphasis and consistency.

447. In Section 7C.06 Pavement Word and Symbol Markings, the FHWA proposes to revise this section to provide consistency with Section 3B.19 (new Section 3B.20).

448. The FHWA proposes to delete existing Chapter 7D Signals because it is a small chapter whose only purpose is to provide reference to Part 4 and Section 4C.06. The FHWA proposes to incorporate the references in Section 7A.04 instead. The FHWA would reletter the remaining chapters accordingly.

449. In existing Section 7E.01 (new Section 7D.01) Types of Crossing Supervision, the FHWA proposes to delete the reference document, "Civilian

Guards for School Crossings" from the 2nd paragraph of the SUPPORT statement because Northwestern University is phasing out such publications and it will not be available in the future.

450. In existing Section 7E.03 (new Section 7D.03) Qualifications of Adult Crossing Guards, the FHWA proposes to revise the GUIDANCE statement to indicate that the list represents the minimum qualifications of adult crossing guards. In addition, the FHWA proposes to add three additional qualifications (new items C, D, and E) that are similar to applicable provisions in Section 6E.01 for flaggers.

451. In existing Section 7E.04 (new Section 7D.04) Uniform of Adult Crossing Guards and Student Patrols, the FHWA proposes to delete "and Student Patrols" from the title of the section and to delete the second paragraph of the STANDARD statement, which relates to the apparel worn by student patrols. The FHWA believes that student patrols do not control vehicular traffic and provisions relating to student patrols are not appropriate for the MUTCD. The FHWA also proposes to delete the first GUIDANCE statement because most adult crossing guards do not wear a uniform. In addition, as part of proposed changes to the STANDARD statement, the GUIDANCE statement is no longer necessary. The FHWA proposes to revise the STANDARD statement to reflect that law enforcement officers performing school crossing supervision shall use high-visibility safety apparel labeled as ANSI 107–2004. The FHWA proposes these changes to incorporate into the MUTCD the provisions of 23 CFR Part 634 that were published in the **Federal Register** on November 24, 2006.<sup>196</sup> As part of these proposed changes, the FHWA proposes to delete the second GUIDANCE statement because it is superseded by the new proposed statements discussed above. The FHWA proposes a phase-in compliance period of 2 years for crossing guard apparel on non-Federal-aid highways to minimize any impact on state or local highway agencies. A compliance date of November 24, 2008, has already been established for worker apparel on Federal-aid highways as a result of 23 CFR Part 634.

452. In existing Section 7E.05 (new Section 7D.05) Operating Procedures for

Adult Crossing Guards, the FHWA proposes to change the GUIDANCE statement to a STANDARD, thereby making all of the paragraphs requirements, rather than recommendations. Because the safety of school children is paramount, it is important that adult crossing guards follow specific requirements when controlling traffic for the purpose of assisting school children.

453. The FHWA proposes to delete existing Section 7E.06 Uniformed Law Enforcement Officers, because the information is covered in existing Section 7E.01 (new Section 7D.01). The remaining sections would be renumbered accordingly.

454. The FHWA proposes to delete existing Sections 7E.07, 7E.08, and 7E.09 because these sections pertain to student patrols. The FHWA believes that student patrols do not control vehicular traffic and provisions relating to student patrols are not appropriate for the MUTCD. The FHWA believes that adequate and appropriate guidance on student patrols is readily available from other sources, such as the American Automobile Association's "School Safety Patrol Operations Manual."<sup>197</sup>

455. The FHWA proposes to delete existing Chapter 7F Grade Separated Crossings, because the information from that chapter is to be covered by the proposed changes to Section 7A.05. (See item 430 above.)

#### *Discussion of Proposed Amendments to Part 8 Traffic Controls for Highway-Rail Grade Crossings*

456. In Section 8A.01 Introduction, the FHWA proposes to add the following definitions: "Constant Warning Time Train Detection," "Diagnostic Team," "Locomotive Horn," "Pathway-Rail Grade Crossing," "Quiet Zone," "Station Crossing," and "Wayside Horn." The FHWA proposes adding these definitions because these words are used in Part 8 and have not previously been defined.

457. The FHWA proposes to add a new section following existing Section 8A.04. The new section is numbered and titled, "Section 8A.05 Illumination at Highway-Rail Grade Crossings" and contains information previously included in existing Chapter 8C. The FHWA proposes to change the designation of the text in this section to SUPPORT because illumination is not a traffic control device and thus should not be regulated by GUIDANCE and OPTION language. The FHWA believes

<sup>196</sup> The **Federal Register** Notice was published in the **Federal Register** on November 24, 2006 (Volume 71, Number 226, Page 67792–67800) and can be viewed at the following Internet Web site: [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2006\\_register&docid=E6-19910.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2006_register&docid=E6-19910.pdf).

<sup>197</sup> This 2004 publication can be viewed at the following Internet Web site: <http://www.aaa.com/aaa/049/PublicAffairs/SSPManual.pdf>.

that adequate and appropriate guidance on illumination of highway-rail grade crossings is readily available from other sources, such as the ANSI's Practice for Roadway Lighting RP-8, available from the Illuminating Engineering Society of North America.<sup>198</sup>

458. The FHWA proposes to make several changes throughout Chapter 8B Signs and Markings, to require that a YIELD sign or STOP sign be installed at all passive highway-rail grade crossings, except where train crews always provide flagging of the crossing to road users. The FHWA proposes this change to incorporate information from FHWA's Policy Memorandum, "Guidance for Use of YIELD or STOP Signs with the Crossbuck Sign at Passive Highway-Rail Grade Crossings,"<sup>199</sup> dated March 17, 2006, into the MUTCD. The FHWA proposes to strengthen the language to a STANDARD in the MUTCD from the informational guidance contained in the policy memo, to require, rather than recommend, the use of YIELD or STOP signs in conjunction with the Crossbuck sign at all passive crossings except where train crews always provide flagging to road users. While the Crossbuck sign is in fact a regulatory sign that requires vehicles to yield to trains and stop if necessary, recent research<sup>200</sup> indicates insufficient road user understanding of and compliance with that regulatory requirement when just the Crossbuck sign is present at passive crossings. The FHWA proposes a phase-in compliance period of 5 years for existing locations to minimize any impact on State or local highway agencies.

459. The FHWA proposes to revise existing Figures 8B-1 and 8B-6, and to add a new figure, numbered and titled, "Figure 8B-2 Highway-Rail Grade Crossings (Crossbuck) Regulatory Signs with Separate Posts" to reflect the proposed requirement to install a YIELD sign or STOP sign at all passive highway rail-grade crossings, except where train crews always provide flagging of the crossing to road users. The remaining

existing Figures in Chapter 8B would be renumbered accordingly.

460. In Section 8B.03 Highway-Rail Grade Crossing (Crossbuck) Sign and Number of Tracks Plaque, the FHWA proposes to add an OPTION statement that allows the Crossbuck sign to have reflectorized red lettering, rather than the standard black lettering, at non-signalized crossings. The FHWA proposes this change to emphasize that the Crossbuck assigns the right-of-way to rail traffic at a highway-rail grade crossing.

The FHWA also proposes to revise the 3rd paragraph of the 3rd STANDARD statement, and the associated figure, to indicate that measurement for the retroreflective strip that is placed on the front and back of the support for the Crossbuck or Number of Tracks sign is to be from the ground, rather than the roadway. The FHWA proposes this change because there may be some cases where the ground level at the base of the sign is higher than the edge of the roadway.

461. The FHWA proposes to relocate and retitle existing Section 8B.08 to be, "Section 8B.04 Use and Meaning of STOP or YIELD Signs at Passive Highway-Rail Grade Crossings." The FHWA proposes replacing all of the existing text with new text that describes the use of STOP and YIELD Signs at passive highway-rail grade crossings, as proposed in item 458 above.

462. The FHWA also proposes to add a new section numbered and titled, "Section 8B.05 Crossbuck Assemblies with YIELD Signs or STOP Signs at Passive Highway-Rail Grade Crossings" to provide information on the use of the Crossbuck Assemblies as proposed in item 458 above. The remaining sections would be renumbered accordingly.

463. In existing Section 8B.04 (new Section 8B.06) Highway-Rail Grade Crossing Advance Warning Signs, the FHWA proposes to add to the first STANDARD statement a requirement that a supplemental plaque describing the type of traffic control at the highway-rail grade crossing shall be used with the Highway-Rail Grade Crossing Advance Warning sign (W10-1). As part of this proposed change, the FHWA proposes to require the use of a No Signal (W10-10P) supplemental plaque in advance of a crossing that does not have active traffic control devices, and the use of a new Signal Ahead (W10-16P) plaque in advance of a crossing that does have active traffic control devices. The FHWA proposes a phase-in compliance period of 5 years for existing locations to minimize any impact on State or local highway

agencies. The FHWA proposes to add the new Signal Ahead (W10-16P) plaque to existing Figure 8B-2 (new Figure 8B-3) and Table 8B-1.

In addition, the FHWA proposes to add at the end of the 1st STANDARD statement that a Yield Ahead or a Stop Ahead Advance Warning Sign shall also be installed if criteria are met, along with information regarding the distance between signs in advance of a highway-rail grade crossing, to emphasize existing requirements in Part 2.

The FHWA proposes these changes to improve safety by providing road users with additional information regarding traffic control devices at highway-rail grade crossings, as recommended by recent research.<sup>201</sup> Because of these proposed changes, the FHWA proposes to delete existing Section 8B.15 because the information from that section would be included in the revisions to Section 8B.04.

In concert with the above proposed changes, the FHWA proposes to add to the 2nd STANDARD statement a requirement that a supplemental plaque describing the type of traffic control at a highway-rail grade crossing also be used with W10-2, W10-3, and W10-4 warning signs where the distance between the railroad tracks and a parallel highway is less than 30 m (100 ft). In these situations, the distance to the tracks does not allow for the use of a W10-1 sign, but the additional information provided by the supplemental plaques is just as important.

464. In existing Section 8B.10 (new Section 8B.11) STOP HERE WHEN FLASHING Sign, the FHWA proposes to add a new sign designated R8-10a. This proposed sign is similar in design and size to the existing R10-6a sign. The FHWA proposes this new sign in order to provide a 600 mm × 750 mm (24 in. × 30 in.) alternate to the R8-10 sign. The FHWA proposes to add both the proposed new R8-10a sign and the existing R10-6a signs to Table 8B-1.

465. The FHWA proposes to rewrite existing Section 8B.12 (new Section 8B.13) Emergency Notification Sign in its entirety. The proposed text includes STANDARD statements that specify the minimum amount of information to be placed on Emergency Notification signs, sign placement, and the proposed sign color of a white legend and border on a blue background. The proposed new

<sup>198</sup> Information on obtaining this publication can be viewed on the following Internet Web site: <https://www.iesna.org/>.

<sup>199</sup> FHWA's Policy Memorandum, "Guidance for Use of YIELD or STOP Signs with the Crossbuck Sign at Passive Highway-Rail Grade Crossings," dated March 17, 2006, can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/resources/policy/yieldstop\\_guidememo/yieldstop\\_policy.htm](http://mutcd.fhwa.dot.gov/resources/policy/yieldstop_guidememo/yieldstop_policy.htm)

<sup>200</sup> National Cooperative Highway Research Report 470 titled "Traffic Control Devices for Passive Railroad-Highway Grade Crossings," Transportation Research Board, 2002, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_470-a.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_470-a.pdf).

<sup>201</sup> National Cooperative Highway Research Report 470 titled "Traffic Control Devices for Passive Railroad-Highway Grade Crossings," Transportation Research Board, 2002, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_470-a.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_470-a.pdf).

text includes an OPTION statement that allows similar information to be displayed on the enclosure for signal apparatus at crossings that are equipped with active traffic control devices. The proposed new text also includes a GUIDANCE statement with additional information on sign retroreflectivity, sign placement, and sign size. To illustrate the proposed change, FHWA would revise Figure 8B-4 and Table 8B-1 accordingly. The FHWA proposes these changes to simplify the requirements for these signs and to assure that the appropriate information is displayed on these valuable signs that provide information to roadway users in the event of an emergency or signal malfunction requiring notification to the railroad. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

466. The FHWA proposes to delete existing Section 8B.15 because the information from this section is included in the proposed revisions to Section 8B.04. See item 461 above.

467. The FHWA proposes to revise Section 8B.16 LOOK Sign to indicate that the LOOK sign may be mounted on a separate sign post (rather than to give the option of mounting it as a supplemental plaque on the Crossbuck sign) in the immediate vicinity of the highway-rail grade crossing on the railroad right-of-way. The FHWA proposes this change because other proposed changes require other signs to be placed on the Crossbuck assembly and there would be insufficient space for the LOOK sign.

468. In Section 8B.21 Stop Lines, the FHWA proposes to add a STANDARD statement requiring the use of stop lines on paved roadways at highway-rail grade crossings that are equipped with active control devices. This requirement is currently implied by STANDARD language in Section 8B.20 and illustrated in Figure 8B-6. The FHWA proposes to add this specific requirement in Section 8B.21 for clarification and because the stop line provides road users with a clear indication of the point behind which they are required to stop when the traffic control devices are activated.

469. The FHWA proposes to delete existing Chapter 8C Illumination, and place the information from this Section in a new Section numbered and titled, "Section 8A.05 Illumination at Highway-Rail Grade Crossings." See item 457 above. The remaining Chapters in Part 8 would be relettered accordingly.

470. In existing Section 8D.03 (new Section 8C.03) Flashing-Light Signals, Overhead Structures, the FHWA proposes to add to the STANDARD statement that except as noted in this section, flashing-light signals mounted overhead shall comply with the applicable provisions of new Section 8C.02. The FHWA proposes this change to clarify that the requirement in existing Section 8D.02 (new Section 8C.02) for back-to-back pairs of flashing-light signals on each side of the tracks when there is highway traffic in both directions applies also to overhead mounted flashing light signals.

471. In existing Section 8D.04 (new Section 8C.04) Automatic Gates, the FHWA proposes to revise the 4th paragraph of the STANDARD statement to indicate that the stripes on gate arms shall be vertical, rather than 45-degree diagonal. The FHWA would change the stripes on Figures 8C-1, 10D-3, and 10D-4 accordingly. The diagonal stripes tend to encourage road users to drive around the gates because diagonal stripes are used on other devices such as barricades, object markers, etc. to indicate the direction in which road users are expected to change their path of travel. The FHWA proposes a phase-in compliance period of 10 years for existing stripes on gate arms in good condition to minimize any impact on State or local highway agencies or railroad companies.

472. The FHWA proposes to add a new section after existing Section 8D.05 (new Section 8C.05) numbered and titled, "Section 8C.06 Wayside Horn Systems." This new section contains OPTION, STANDARD, and GUIDANCE statements regarding the use of wayside horn systems to provide directional audible warning at highway-rail grade crossings pursuant to the Interim Approval for the Use of Wayside Horn Systems, issued August 2, 2004.<sup>202</sup> The Interim Approval and proposed MUTCD text support the Final Rule adopted by Federal Railroad Administration mandating the sounding of locomotive horns at highway-rail grade crossings (49 CFR part 222).<sup>203</sup> The FHWA would renumber the remaining sections in this chapter accordingly. The FHWA proposes a phase-in compliance period of 5 years for existing locations to

minimize any impact on State or local highway agencies.

473. In existing Section 8D.07 (new Section 8C.08) Traffic Control Signals at or Near Highway-Rail Grade Crossings, the FHWA proposes to add a 3rd paragraph to the GUIDANCE statement recommending that back-up power be supplied to traffic control signals that have railroad preemption or that are coordinated with flashing-light signal systems at a highway-rail grade crossing. The FHWA proposes to add this recommendation because railroad flashing-light signals are typically provided with standby power supply to ensure their operation during power outages and it is important that traffic signals at or near the crossings also be provided with standby power during power outages to help prevent vehicles from queuing on approaches crossing tracks. The FHWA proposes a phase-in compliance period of 10 years for existing locations to minimize any impact on State or local highway agencies.

In addition, the FHWA proposes to add a 4th paragraph to the GUIDANCE statement to conform with Section 8A.01, which states that the highway agency or authority with jurisdiction and the regulatory agency with statutory authority jointly determine the need and selection of devices at a highway-rail grade crossing. In conjunction with that proposed change, the FHWA proposes to add to the 2nd STANDARD statement to clarify that the timing parameters must be furnished by the jurisdiction so that the railroad will be able to design the train detection circuitry. The FHWA proposes these changes, because railroads often do not have the expertise or the authority to determine the preemption operation and timing of the traffic signals.

Finally, the FHWA proposes to add to the last SUPPORT statement to provide a cross-reference to the proposed new Section 4C.10, which describes the Intersection Near a Highway-Rail Grade Crossing signal warrant that is intended for use at a location where the proximity to the intersection of a highway-rail grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic control signal.

474. The FHWA proposes to add a new section following existing Section 8D.07 (new Section 8C.08) numbered and titled, "Section 8C.09 Highway-Rail Grade Crossing(s) Within or In Close Proximity to Roundabouts, Traffic Circles, or Circular Intersections." This new section contains SUPPORT, STANDARD, and GUIDANCE

<sup>202</sup> The Interim Approval can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/res-ia\\_waysidehorns.htm](http://mutcd.fhwa.dot.gov/res-ia_waysidehorns.htm).

<sup>203</sup> The Federal Register Notice was published on December 18, 2003, (Volume 68, Number 243, Page 70586-70687) and can be viewed at the following Internet Web site: [http://www.fra.dot.gov/downloads/Safety/train\\_horn\\_rule/fed\\_reg\\_trainhorns\\_final.pdf](http://www.fra.dot.gov/downloads/Safety/train_horn_rule/fed_reg_trainhorns_final.pdf).

statements that clarify the need for active traffic control devices where highway-rail grade crossings are within or in close proximity to roundabouts, traffic circles or circular intersections. The FHWA proposes a phase-in compliance period of 5 years for traffic control devices in good condition at existing locations to minimize any impact on State or local highway agencies.

475. The FHWA proposes to add a new Chapter titled, "Chapter 8D Quiet Zone Treatments at Highway-Rail Grade Crossings." The purpose of this new Chapter is to add language to support and directly refer to the Final Rule adopted by Federal Railroad Administration regarding quiet zones established in conjunction with restrictions on train horns at certain highway-rail grade crossings (49 CFR Part 222).<sup>204</sup>

476. The FHWA proposes to add a new Chapter titled, "Chapter 8E Pathway-Rail Grade Crossings." The purpose of this new Chapter is to provide information for traffic control devices used at pathway-rail grade crossings. Shared-use paths and other similar facilities often cross railroad tracks and it is important that suitable traffic control devices be used to provide for safe and effective operation of such crossings. The FHWA proposes a phase-in compliance period of 5 years for existing locations to minimize any impact on State or local highway agencies.

#### *Discussion of Proposed Amendments to Part 9 Traffic Controls for Bicycle Facilities*

477. In Section 9A.03 Definitions Relating to Bicycles, the FHWA proposes to change the definition of "bicycle lane" to indicate that a bicycle lane is to be designated by pavement markings, and that signs may be used to supplement the markings designating a bicycle lane, but they are not required. The FHWA proposes this change to be consistent with proposed changes in Sections 1A.13 and 9B.04. The FHWA also proposes to delete the second sentence of the definition of "Designed Bicycle Route" and relocate this text to existing Section 9B.20 (new Section 9B.21) where it is more appropriate.

478. In Section 9B.01 Application and Placement of Signs, the FHWA proposes to revise the STANDARD statement to indicate that no portion of a sign or its

support shall be placed less than 0.6 m (2 ft) laterally from the near edge of the path, or less than 2.4 m (8 ft) vertically over the entire width of the shared-use path. As part of this change, the FHWA proposes to remove the requirement that signs be placed a maximum of 1.8 m (6 ft) from the near edge of a path. The FHWA proposes this change to be more consistent with Part 2 and in response to feedback from practitioners that the existing MUTCD standards for sign height and offset can restrict the ability of agencies to effectively install signs on many shared-use path locations. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies. The FHWA also proposes to modify Figure 9B-1 to illustrate the proposed minimum vertical offset information for overhead mounted signs.

In addition, the FHWA proposes to add to the GUIDANCE statement that the clearance for overhead signs on shared-use paths should be adjusted to accommodate path users requiring more clearance, such as equestrians or typical maintenance or emergency vehicles.

479. In Section 9B.04, retitled Bike Lane Signs and Plaques, the FHWA proposes to revise the STANDARD and GUIDANCE statements to clarify that Bike Lane signs are not required along bicycle lanes, and to give recommendations on the placement of Bike Lane signs and plaques when they are used. Whether the presence or absence of the Bicycle Lane sign provides a clearly measurable benefit in indicating a designated bicycle lane has not been conclusively demonstrated. Amending the MUTCD to make the use of Bicycle Lane signs with marked bicycle lanes a recommended, rather than a mandatory, condition would provide flexibility for jurisdictions that do not desire to use the Bicycle Lane sign, without restricting the ability of jurisdictions that prefer to use the signs to continue to do so. These changes are consistent with proposed changes to the definition of "bicycle lane" as discussed in item 477 above.

480. The FHWA proposes to add a new section following Section 9B.05 numbered and titled, "Section 9B.06 Bicycles May Use Full Lane Sign (R4-11)." This Section includes OPTION and SUPPORT statements regarding the use of this proposed new sign, which is illustrated in Figure 9B-2. The FHWA proposes this new sign, and accompanying text and figure, to provide jurisdictions with a consistent sign design, along with application information, for locations where it is important to inform road users that the

travel lanes are too narrow for bicyclists and motor vehicles to operate side by side. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

481. The FHWA proposes to change the title of existing Section 9B.08 (new Section 9B.09) to "Selective Exclusion Signs" and add new text regarding the exclusion of various designated types of traffic from using particular roadways or facilities. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies. As part of the change, the FHWA proposes to add No Skaters (R9-13) and No Equestrians (R9-14) signs to the text and to Figure 9B-2.

482. In existing Section 9B.10 (new Section 9B.11) Bicycle Regulatory Signs, the FHWA proposes to add information about three proposed new signs for bicycle pushbuttons, consistent with similar proposed text in Chapter 2B.

483. In existing Section 9B.17 (new Section 9B.18), which the FHWA proposes to retitle, "Bicycle Warning and Combined Bicycle/Pedestrian Signs," the FHWA proposes to add an OPTION statement permitting the use of the proposed new Combined Bicycle/Pedestrian (W11-15) sign where both bicyclists and pedestrians might be crossing the roadway, such as at an intersection with a shared-use path. Further discussion of this proposed sign can be found above in the discussion of existing Section 2C.40 (new Section 2C.51). The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

The FHWA proposes to permit a TRAIL XING (W11-15P) supplemental plaque to be mounted below the W11-15 sign. The FHWA also proposes to illustrate this configuration in Figure 9B-3. The FHWA proposes these changes to be consistent with Chapter 2C.

484. In existing Section 9B.18 (new Section 9B.19) Other Bicycle Warning Signs, the FHWA proposes to change the legend on the W5-4a sign from "BIKEWAY NARROWS" to "PATH NARROWS." The FHWA proposes this change because shared-use paths are the only bikeway type on which the W5-4a sign is used, therefore, use on other types of bikeways would be inappropriate or confusing, and should not be encouraged. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on

<sup>204</sup> The Federal Register Notice was published on December 18, 2003 (Volume 68, Number 243, Page 70586-70687) and can be viewed at the following Internet Web site: [http://www.fra.dot.gov/downloads/Safety/train\\_horn\\_rule/fed\\_reg\\_trainhorns\\_final.pdf](http://www.fra.dot.gov/downloads/Safety/train_horn_rule/fed_reg_trainhorns_final.pdf).

State or local highway agencies. In conjunction with the proposed change in the text, FHWA proposes to make the appropriate change in Table 9B-1.

485. In existing Section 9B.19 (new Section 9B.20), the FHWA proposes to retitle the section "Bicycle Guide Signs" and add several new signs, along with information on their use. The FHWA proposes these changes to provide flexibility and potentially reduce costs for signing bicycle routes in urban areas where multiple routes intersect or overlap. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies. Along with additional text regarding the use of the proposed new Alternative Bike Route Guide (D11-1c) and Bicycle Destination signs (D1-1b, D1-1c, D1-2b, D1-2c, D1-3b, and D1-3c), the FHWA proposes adding the various new signs to Table 9B-1 and Figure 9B-4.

486. In existing Section 9B.20 (new Section 9B.21) Bicycle Route Signs, the FHWA proposes to add a new Bicycle Route (M1-8a) sign that retains the clear, simple, and uniform design of the M1-8 sign, but provides an area near the top of the panel to include a pictograph or words that are associated with the route or with the agency that has jurisdiction over the route. There has been a significant amount of interest in allowing agencies to develop unique or distinctive route number signs for bicycle routes, in much the same way that States use distinctive M1-5 signs for State highways. However, this could lead to route sign designs that are unclear and non-uniform. As a result, the FHWA proposes the new M1-8a sign to provide a clear, uniform sign. The M1-8 sign would continue to remain in the MUTCD for use when agencies do not wish to use a distinctive pictograph, symbol, or wording. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies.

In addition, the FHWA proposes to change the existing 2nd OPTION statement to a GUIDANCE to recommend, rather than merely permit, a U.S. Bicycle Route number designation be requested from AASHTO for a designated bicycle route that extends through two or more States. The FHWA also proposes to add this GUIDANCE the text relocated from the definition of "designated bicycle route" in Section 9A.03 regarding continuous routing of bicycle routes, as discussed above in item 478.

Finally, the FHWA proposes to revise the design of the U.S. Bike Route Sign

in Figure 9B-4 so that a larger bicycle is shown on the top part of the sign with a smaller number below it. The reason for the change is to present an immediate impression of a "bicycle numbered route" rather than a "highway numbered route which can also be used by bicyclists" and to provide consistency with AASHTO's recommended design for the sign.

487. The FHWA proposes to change the title of existing Section 9B.21 (new Section 9B.22) to "Bicycle Route Sign Auxiliary Plaques" and to revise the content of the section considerably. As part of the changes, the FHWA proposes to revise the size and design of the M4-11 BEGIN plaque to be consistent with similar M4 series auxiliary signs in Part 9. The FHWA also proposes to delete the M4-12 and M4-13 plaques from this section and Figure 9B-4 because these duplicate the M4-6 and M4-5 auxiliary signs. In addition, FHWA proposes to delete the M7 series arrow plaques from this section and Figure 9B-4 because these duplicate the proposed new sizes of the M5 and M6 auxiliary signs. The FHWA also proposes to add 300 mm x 150 mm (12 in x 6 in) sizes for selected M3 and M4 series auxiliary signs, and add 300 mm x 225 mm (12 in x 9 in) sizes for all M5 and M6 series auxiliary signs, and to refer to these smaller sizes in this section, Table 9B-1, and Figure 9B-4. These smaller sizes will be suitable for use with M1-8, M1-8a, and M1-9 signs. These proposed changes will ensure that route auxiliary designations are consistent between Part 2 and Part 9.

488. The FHWA proposes to replace existing Figure 9B-6 with a new Figure 9B-6 titled, "Example of Bicycle Guide Signing" that illustrates an example of guide signing for bicycles, including the Bicycle Destination signs.

489. The FHWA proposes to add three new sections following existing Section 9B.22 (new Section 9B.23) Bicycle Parking Area Sign. The first proposed new section is numbered and titled, "Section 9B.24 Reference Location Signs and Intermediate Reference Location Signs" and contains information regarding the use of the signs on shared-use paths. Reference Location signs (formerly called mileposts) have been defined in Chapter 2D of the MUTCD since 1971, and have proven extraordinarily valuable for traveler information, maintenance and operations, emergency response, and numerous other applications. The linear nature of many shared-use paths would seem to also naturally lend itself to the application of Reference Location signs. However, the use and design of such signs has not yet been explicitly

addressed in Part 9 of the MUTCD. Defining a standard and uniform design could provide more uniform traveler guidance, reduce the proliferation of non-standard reference location signs, and encourage the use of these signs where desirable and appropriate. The proposed signs would be proportionately sized for the lower operating speeds of shared-use paths, using a 150 mm (6 in) wide panel with 113 mm (4.5 in) numerals. The proposed text is adapted directly from existing Section 2D.46 defining the use of these signs for conventional roadways. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies. In addition to revising the text, the FHWA proposes to revise Figure 9B-4 and Table 9B-1 to include the use of these signs.

490. The second proposed new section is numbered and titled, "Section 9B.25 Mode-Specific Guide Signs for Shared-Use Paths" and contains information regarding the use of signs to guide different types of users to separate pathways where they are available. Currently, the Manual provides tools only to prohibit user types, not to show which user types are permitted. As a result, jurisdictions are commonly installing varied, non-standard mode permission signs. The proposed changes are intended to provide clarity and uniformity for mode-specific guide signs on shared-use paths by adding five new signs to the MUTCD. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies. In addition to adding the new signs to Figure 9B-4 and Table 9B-1, the FHWA proposes to add Figure 9B-8 "Example of Mode-Specific Guide Signs on Shared-Use Paths" to illustrate the use of the proposed signs.

491. The third proposed new section is numbered and titled, "Section 9B.26 Object Markers." The FHWA proposes to relocate the text and figures from Section 9C.03 to this section, to be consistent with a similar proposed move of object markers from Part 3 to Part 2.

492. In Section 9C.03 Marking Patterns and Colors on Shared-Use Paths, the FHWA proposes to relocate the last five paragraphs to new Section 9B.26 as discussed in item 491 above.

493. In Section 9C.04 Markings for Bicycle Lanes, the FHWA proposes several changes in this Section to correspond with proposed changes to the definition of "bicycle lane" in Section 1A.13 (item 477 above) and

signs and plaques for bike lanes in Section 9B.04.

In addition, the FHWA proposes to expand the last STANDARD statement to include “other circular intersections” as locations where bicycle lanes are prohibited. The FHWA proposes this additional language to clarify that in addition to being prohibited on the circular roadway of a roundabout, bicycle lanes are not to be provided on the circular roadway of other circular intersections.

494. The FHWA proposes to add a new section at the end of Chapter 9C numbered and titled, “Section 9C.07 Shared Lane Marking.” This new section contains OPTION, GUIDANCE, and STANDARD statements regarding the use of a proposed new Shared Lane Marking. This proposed new pavement marking indicates the legal and appropriate bicyclist line of travel, and cues motorists to pass with sufficient clearance, and is based on field research conducted in San Francisco, California.<sup>205</sup> The purpose of this proposed new marking is to reduce the number and severity of bicycle-vehicular crashes, particularly crashes involving bicycles colliding with suddenly opened doors of parked vehicles. The FHWA proposes a phase-in compliance period of 5 years for existing pavement markings in good condition to minimize any impact on State or local highway agencies. In addition to the text, the FHWA proposes to illustrate the appropriate use of the marking in a new figure, titled, “Figure 9C-9 Shared Lane Marking.”

#### *Discussion of Proposed Amendments to Part 10 Traffic Controls for Highway-Light Rail Grade Crossings*

495. The FHWA proposes to add a new section following existing Section 10A.04. The new section is numbered and titled, “Section 10A.05 Illumination at Highway-Light Rail Transit Crossings” and contains information previously included in existing Section 10C.22. The FHWA proposes to change the designation of the text in this section to SUPPORT because illumination is not a traffic control device and thus should not be regulated by GUIDANCE and OPTION language. A similar change is proposed in Part 8—see item 457 above.

496. In Section 10B.01 Introduction, the FHWA proposes to add to the STANDARD and OPTION statements that Crossbuck Assemblies are also appropriate traffic control devices at highway-light rail transit grade crossings in semi-exclusive alignments, if an engineering study indicates that their use would be adequate. The FHWA also proposes to add to the last SUPPORT statement that Section 8B.04 and Figures 8B-1, 8B-2, and 8B-6 contain information regarding the use and placement of Crossbuck Assemblies. The FHWA proposes these changes for consistency with changes in Part 8 as discussed in item 458 above.

497. In Section 10C.02, which the FHWA proposes to re-title “Use of Crossbuck Assemblies at Passive Highway-Light Rail Transit Grade Crossings,” the FHWA proposes to add an OPTION that allows the Crossbuck sign to have reflectorized red lettering, rather than the standard black lettering, at non-signalized crossings. The FHWA proposes this change to emphasize that the Crossbuck assigns the right-of-way to LRT traffic at a highway-light rail transit grade crossing.

The FHWA also proposes to delete the requirement that Crossbuck signs be used on each highway approach to every highway-light rail transit grade crossing on a semi-exclusive alignment from the STANDARD statement. The FHWA proposes this change to reflect standard practice with most light rail transit agencies in the U.S. Crossbuck signs are not typically used at crossings controlled by traffic signals, particularly in downtown areas. Crossings within highway-highway intersections in urban areas with train speeds of 60 km/h (35 mph) or less are typically controlled by traffic signals and Crossbuck signs are not used. Crossbuck signs are not appropriate for light rail transit crossings in downtown areas or at intersections controlled by traffic signals, since they are believed to be ineffective and create sign clutter. The FHWA proposes to revise the OPTION statement to allow the use of Crossbuck Assemblies (described in Section 8D.05) on semiexclusive alignments, to allow agencies the flexibility to use the Crossbuck sign if they choose to do so for certain situations.

The FHWA also proposes to revise the 3rd paragraph of the second STANDARD statement to clarify that the strip of reflective material that is required on Crossbuck Assembly supports shall be vertical and placed on the back of the support from the bottom of the Crossbuck sign to within 0.6 m (2 ft) above the ground. In conjunction with this change, the FHWA clarifies

that on Crossbuck Assemblies where the YIELD or STOP sign is installed on a separate support, or is omitted in accordance with Section 8B.04, a vertical strip of retroreflective white material, not less than 50 mm (2 in) in width, shall be used on the front of the Crossbuck Assembly support from the bottom of the Crossbuck sign or Number of Tracks sign to within 0.6 m (2 ft) above the ground. The FHWA proposes these changes to clarify the types of reflective strips to be used, how they are to be measured, and when they are to be used.

498. The FHWA proposes to revise Section 10C.03 LOOK Sign to indicate that the LOOK sign may be mounted on a separate sign post (rather than to give the option of mounting it as a supplemental plaque on the Crossbuck sign) in the immediate vicinity of the highway-light rail grade crossing on the railroad right-of-way. The FHWA proposes this change because other proposed changes require other signs to be placed on the Crossbuck assembly and there would be insufficient space for the LOOK sign.

499. The FHWA proposes to change the title of Section 10C.04 to “Use of STOP or YIELD Signs without Crossbuck Signs at Highway-Light Rail Transit Grade Crossings” to reflect proposed changes to this section that clarify when it is appropriate to use only STOP or YIELD signs, without the Crossbuck Sign. As part of the proposed changes, FHWA proposes to delete the OPTION statement allowing a STOP or YIELD sign to be installed on the Crossbuck post, because this is proposed to be covered in Sections 10B.01 and 10C.02.

500. In existing Section 10C.08 STOP HERE WHEN FLASHING Sign (renumbered Section 10C.07 because the order of Sections 10C.07 and 10C.08 is proposed to be reversed to follow the same order as they are in Part 8), the FHWA proposes to add a new sign designated R8-10a. This proposed sign is similar in design and size to the existing R10-6a sign. The FHWA proposes this new sign in order to provide a 600 mm × 900 mm (24 in × 30 in) alternate to the R8-10 sign. The FHWA proposes to add both the proposed new R8-10a sign and the existing R10-6a signs to Table 8B-1.

501. In Section 10C.15 Highway-Rail Grade Crossing Advance Warning Signs, the FHWA proposes to add to the first STANDARD statement a requirement that a supplemental plaque describing the type of traffic control at the highway-light rail grade crossing shall be used with the Highway-Rail Grade Crossing Advance Warning sign (W10-

<sup>205</sup> “San Francisco’s Shared Lane Pavement Markings: Improving Bicycle Safety,” Final Report, February 2004, prepared for the City of San Francisco Department of Traffic and Parking by Alta Planning and Design can be viewed at the following Internet Web site: [http://www.sfnta.com/cms/uploadedfiles/dpt/bike/Bike\\_Plan/Shared%20Lane%20Marking%20Full%20Report-052404.pdf](http://www.sfnta.com/cms/uploadedfiles/dpt/bike/Bike_Plan/Shared%20Lane%20Marking%20Full%20Report-052404.pdf).



1). As part of this proposed change, the FHWA proposes to require the use of a No Signal (W10-10P) supplemental plaque in advance of a crossing that does not have active traffic control devices, and the use of a new Signal Ahead (W10-16P) plaque in advance of a crossing that does have active traffic control devices. The FHWA proposes a phase-in compliance period of 5 years for the use of these supplemental plaques at existing locations to minimize any impact on State or local highway agencies.

In addition, the FHWA proposes to add at the end of the 1st STANDARD that a Yield Ahead or a Stop Ahead Advance Warning Sign shall also be installed if criteria are met, along with information regarding the distance between signs in advance of a highway-light rail grade crossing, to emphasize existing requirements in Part 2.

The FHWA proposes these changes to improve safety by providing road users with additional information regarding traffic control devices at highway-rail grade crossings as recommended by recent research.<sup>206</sup>

502. In Figure 10C-4 Warning Signs and Light Rail Station Sign, the FHWA proposes to revise the symbol shown on the W10-7 sign to utilize the same symbol of a light rail vehicle as that used on the I-12 sign. The light rail vehicle symbol on the existing W10-7 sign was an inadvertent error that the FHWA proposes to correct so that the symbols will be consistent. The FHWA also proposes to add the No Signal (W10-10P) and Active Control (W10-16P) plaques to this figure.

503. The FHWA proposes to rewrite Section 10C.21 Emergency Notification Sign in its entirety. These proposed changes are very similar to those proposed in existing Section 8B.12 (new Section 8B.13) in item 465 above. The proposed text includes STANDARD statements that specify the minimum amount of information to be placed on Emergency Notification signs, sign placement, and the proposed sign color of a white legend and border on a blue background. The proposed new text includes an OPTION statement that allows similar information to be displayed on the enclosure for signal apparatus at crossings that are equipped with active traffic control devices. The proposed new text also includes a GUIDANCE statement with additional

information on sign retroreflectivity, sign placement, and sign size. The FHWA proposes a phase-in compliance period of 10 years for existing signs in good condition to minimize any impact on State or local highway agencies. To illustrate the proposed change, FHWA would revise Figure 10C-4. The FHWA proposes these changes to simplify the requirements for these signs and to assure that the appropriate information is displayed on these valuable signs that provide information to roadway users in the event of an emergency or signal malfunction requiring notification to the railroad LRT agency.

504. The FHWA proposes to delete existing Section 10C.22 Illumination at Highway-Light Rail Transit Crossings, and place the information from this Section in a new Section numbered and titled, "Section 10A.05 Illumination at Highway-Light Rail Grade Crossings." The remaining sections would be renumbered accordingly. See item 495 above.

505. In existing Section 10C.24 (new Section 10C.23) Stop Lines, the FHWA proposes to add a STANDARD statement requiring the use of stop lines on paved roadways at highway-light rail transit grade crossings that are equipped with active control devices. This requirement is currently implied by STANDARD language in Section 10C.22 and illustrated in Figure 10C-2. The FHWA proposes to add this specific requirement in Section 10C.24 for clarification and because the stop line provides road users with a clear indication of the point behind which they are required to stop when the traffic control devices are activated.

506. In Section 10D.01 Introduction, the FHWA proposes to change the OPTION statement to a STANDARD statement, which will require audible devices to the provided and operated in conjunction with flashing-light signals or traffic control signals where they are operated at a crossing that is used by pedestrians. The FHWA proposes this change because light rail transit vehicles are often nearly silent, and blind pedestrians cannot see flashing lights. Requiring the use of an audible warning device would assure that information about the approach of a light rail transit vehicle is available to persons with visual disabilities. The FHWA proposes a phase-in compliance period of 5 years for existing locations to minimize any impact on State or local highway agencies.

507. The FHWA proposes to add a new section after existing Section 10D.04 numbered and titled, "Section 10D.05 Wayside Horn Systems." This new section contains OPTION,

STANDARD, and GUIDANCE statements regarding the use of wayside horn systems to provide directional audible warning at highway-light rail grade crossings, pursuant to the Interim Approval for the Use of Wayside Horn Systems, issued August 2, 2004.<sup>207</sup> The FHWA proposes a phase-in compliance period of 5 years for existing locations to minimize any impact on State or local highway agencies. See item 472 above for additional information because this proposed new section is very similar to proposed new Section 8C.06. FHWA would renumber the remaining sections in this chapter accordingly.

508. In existing Section 10D.08 (new Section 10D.07) Use of Traffic Control Signals for Control of Light Rail Transit Vehicles at Grade Crossings, the FHWA proposes to change the first paragraph of the SUPPORT statement to a GUIDANCE statement, to recommend that the light rail transit signal indications shown in Figure 10D-1 be used to control light rail transit movements. The existing MUTCD indicates that the indications shown in the figure are only examples of indications that could be used, and there is no requirement or recommendation to use these particular indications. As a result, there is no uniformity in the light rail transit signal indications used around the country. The FHWA believes that such uniformity is needed and that the indications shown in Figure 10D-1 should be recommended for use. The FHWA proposes a phase-in compliance period of 15 years for existing locations to minimize any impact on State or local highway or transit agencies.

509. In Figures 10D-3 and 10D-4, the FHWA proposes to change the striping on the gate arms from diagonal to vertical to reflect the proposed striping change in Section 8D.04.

510. In existing Section 10D.08 (new Section 10D.09) Pedestrian and Bicycle Signals and Crossings, the FHWA proposes to add to the GUIDANCE statement that an audible device should be installed, in addition to a Crossbuck sign, at pedestrian and bicycle crossings where determined by an engineering study. The FHWA also proposes to add that if an engineering study shows that flashing-light signals with a Crossbuck sign and an audible device would not provide sufficient notice of an approaching light rail transit vehicle, the LOOK sign and/or pedestrian gates should be considered. The FHWA proposes these changes to provide

<sup>206</sup> National Cooperative Highway Research Report 470 titled "Traffic Control Devices for Passive Railroad-Highway Grade Crossings," Transportation Research Board, 2002, can be viewed at the following Internet Web site: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_470-a.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_470-a.pdf).

<sup>207</sup> The Interim Approval can be viewed at the following Internet Web site: [http://mutcd.fhwa.dot.gov/res-ia\\_waysidehorns.htm](http://mutcd.fhwa.dot.gov/res-ia_waysidehorns.htm).

consistency with proposed changes in Section 10D.01 in item 506 above.

511. The FHWA proposes to add a new section following existing Section 10D.08 (new Section 10D.09) numbered and titled, "Section 10D.10 Highway-Light Rail Transit Grade Crossings(s) Within or In Close Proximity to Roundabouts, Traffic Circles, or Circular Intersections." This new section contains SUPPORT, STANDARD, and GUIDANCE statements that clarify the need for active traffic control devices where highway-rail grade crossings are within or in close proximity to roundabouts, traffic circles, or circular intersections. The FHWA proposes a phase-in compliance period of 5 years for existing locations to minimize any impact on State or local highway agencies.

512. The FHWA proposes to add a new Chapter titled, "Chapter 10E Quiet Zone Treatments at Highway-Light Rail Transit Grade Crossings." The purpose of this new Chapter is to add language to support and directly refer to the Final Rule adopted by Federal Railroad Administration regarding quiet zones established in conjunction with restrictions on train horns at certain highway-rail grade crossings (49 CFR Part 222)<sup>208</sup> which may have applicability to certain highway-light rail transit grade crossings.

513. The FHWA proposes to add a new Chapter titled, "Chapter 10F Pathway-Light Rail Transit Grade Crossings." The purpose of this new Chapter is to provide information for traffic control devices used at pathway-rail grade crossings. Shared-use paths and other similar facilities often cross light rail transit tracks and it is important that suitable traffic control devices be used to provide for safe and effective operation of such crossings. The FHWA proposes a phase-in compliance period of 5 years for existing signs in good condition to minimize any impact on State or local highway agencies.

### Rulemaking Analysis and Notices

#### *Executive Order 12866 (Regulatory Planning and Review) and U.S. DOT Regulatory Policies and Procedures*

The FHWA has determined that this action would not be a significant regulatory action within the meaning of Executive Order 12866 or significant within the meaning of U.S. Department

of Transportation regulatory policies and procedures. These changes are not anticipated to adversely affect, in any material way, any sector of the economy. Most of the proposed changes in the MUTCD would provide additional guidance, clarification, and optional applications for traffic control devices. The FHWA believes that the uniform application of traffic control devices will greatly improve the traffic operations efficiency and roadway safety. The standards, guidance, and support are also used to create uniformity and to enhance safety and mobility at little additional expense to public agencies or the motoring public. In addition, these changes would not create a serious inconsistency with any other agency's action or materially alter the budgetary impact of any entitlements, grants, user fees, or loan programs. Therefore, a full regulatory evaluation is not required.

#### *Regulatory Flexibility Act*

In compliance with the Regulatory Flexibility Act (Pub. L. 96-354, 5 U.S.C. 601-612), the FHWA has evaluated the effects of these changes on small entities and has determined that this action would not have a significant economic impact on a substantial number of small entities. This proposed rule would add some alternative traffic control devices and only a very limited number of new or changed requirements. Most of the proposed changes are expanded guidance and clarification information.

#### *Unfunded Mandates Reform Act of 1995*

This proposed rule would not impose unfunded mandates as defined by the Unfunded Mandates Reform Act of 1995 (Pub. L. 104-4, 109 Stat. 48, March 22, 1995). The proposed revisions can be phased in by the States over specified time periods in order to minimize hardship. The proposed changes to traffic control devices that would require an expenditure of funds all would have future effective dates sufficiently long to allow normal maintenance funds to replace the devices at the end of the material life-cycle. To the extent the proposed revisions would require expenditures by the State and local governments on Federal-aid projects, they are reimbursable. This action would not result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of \$128.1 million or more in any one year (2 U.S.C. 1532).

#### *Executive Order 13132 (Federalism)*

This action has been analyzed in accordance with the principles and

criteria contained in Executive Order 13132 dated August 4, 1999, and the FHWA has determined that this action would not have sufficient federalism implications to warrant the preparation of a federalism assessment. The FHWA has also determined that this rulemaking will not preempt any State law or State regulation or affect the States' ability to discharge traditional State governmental functions. The MUTCD is incorporated by reference in 23 CFR part 655, subpart F. These proposed amendments are in keeping with the Secretary of Transportation's authority under 23 U.S.C. 109(d), 315, and 402(a) to promulgate uniform guidelines to promote the safe and efficient use of the highway. The overriding safety benefits of the uniformity prescribed by the MUTCD are shared by all of the State and local governments, and changes made to this rule are directed at enhancing safety. To the extent that these proposed amendments override any existing State requirements regarding traffic control devices, they do so in the interest of national uniformity.

#### *Executive Order 13175 (Tribal Consultation)*

The FHWA has analyzed this action under Executive Order 13175, dated November 6, 2000, and believes that it would not have substantial direct effects on one or more Indian tribes; would not impose substantial direct compliance costs on Indian tribal governments; and would not preempt tribal law. Therefore, a tribal summary impact statement is not required.

#### *Executive Order 13211 (Energy Effects)*

The FHWA has analyzed this action under Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use. We have determined that it is not a significant energy action under that order because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Therefore, a Statement of Energy Effects under Executive Order 13211 is not required.

#### *Executive Order 12372 (Intergovernmental Review)*

Catalog of Federal Domestic Assistance program Number 20.205, Highway Planning and Construction. The regulations implementing Executive Order 12372 regarding intergovernmental consultation on Federal programs and activities apply to this program.

<sup>208</sup> The Federal Register Notice was published on December 18, 2003 (Volume 68, Number 243, Page 70586-70687) and can be viewed at the following Internet Web site: [http://www.fra.dot.gov/downloads/Safety/train\\_horn\\_rule/fed\\_reg\\_trainhorns\\_final.pdf](http://www.fra.dot.gov/downloads/Safety/train_horn_rule/fed_reg_trainhorns_final.pdf).

*Paperwork Reduction Act*

Under the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3501, *et seq.*), Federal agencies must obtain approval from the Office of Management and Budget for each collection of information they conduct, sponsor, or require through regulations. The FHWA has determined that this action does not contain collection information requirements for purposes of the PRA.

*Executive Order 12988 (Civil Justice Reform)*

This action meets applicable standards in sections 3(a) and 3(b)(2) of Executive Order 12988, Civil Justice Reform, to minimize litigation, eliminate ambiguity, and reduce burden.

*Executive Order 13045 (Protection of Children)*

The FHWA has analyzed this action under Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. The FHWA certifies that this action would not concern an environmental risk to health or safety that may disproportionately affect children.

*Executive Order 12630 (Taking of Private Property)*

The FHWA does not anticipate that this action would affect a taking of private property or otherwise have taking implications under Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights.

*National Environmental Policy Act*

The agency has analyzed this action for the purpose of the National Environmental Policy Act of 1969 (42 U.S.C. 4321–4347) and has determined that it would not have any effect on the quality of the environment.

*Regulation Identification Number*

A regulation identification number (RIN) is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN contained in the heading of this document can be used to cross reference this action with the Unified Agenda.

**List of Subjects**

*23 CFR Part 634*

Design standards, Highways and roads, Incorporation by reference, Workers, Traffic regulations.

*23 CFR Part 655*

Design standards, Grant programs—transportation, Highways and roads, Incorporation by reference, Signs, Traffic regulations.

Issued on: December 14, 2007.

**J. Richard Capka,**  
*Federal Highway Administrator.*

In consideration of the foregoing, under the authority 23 U.S.C. 315, the FHWA proposes to amend title 23, Code of Federal Regulations parts 634 and 655 as follows:

**PART 634—[REMOVED AND RESERVED]**

1. Part 634, as added at 71 FR 67800 (November 24, 2006), is removed and reserved.

**PART 655—TRAFFIC OPERATIONS**

2. The authority citation for part 655 continues to read as follows:

**Authority:** 23 U.S.C. 101(a), 104, 109(d), 114(a), 217, 315, and 402(a); 23 CFR 1.32; and, 49 CFR 1.48(b).

3. Revise paragraph (a) of § 655.601 to read as follows:

**§ 655.601 Purpose.**

\* \* \* \* \*

(a) Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), \_\_\_\_\_ [date to be inserted] Edition, FHWA, dated \_\_\_\_\_ [date to be inserted]. This publication is incorporated by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51 and is on file at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA call (202) 741–6030, or go to [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html). It is available for inspection and copying at the Federal Highway Administration, 1200 New Jersey Avenue, SE., Washington, DC 20590, as provided in 49 CFR part 7. The text is also available from the FHWA Office of Operations Web site at: <http://mutcd.fhwa.dot.gov>.

\* \* \* \* \*

4. Amend § 655.603 by revising paragraph (a) to read as follows:

**§ 655.603 Standards.**

(a) *National MUTCD.* The MUTCD approved by the Federal Highway Administrator is the national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel in accordance with 23 U.S.C. 109(d) and 402(a). For the purpose of MUTCD applicability, open

to public travel includes toll roads and roads within shopping centers, parking lot areas, airports, sports arenas, and other similar business and/or recreation facilities that are privately owned but where the public is allowed to travel without access restrictions. Private gated properties where access is restricted and private highway-rail grade crossings are not included in this definition.

**Appendix to Subpart F of Part 655— [Amended]**

5. Amend Table 1 by changing the daytime chromaticity coordinates for retroreflective sign material for the color Purple as follows:

x	Y
Existing 0.300 Proposed 0.302.	Existing 0.064 Proposed 0.064.
Existing 0.320 Proposed 0.307.	Existing 0.200 Proposed 0.202.
Existing 0.550 Proposed 0.374.	Existing 0.300 Proposed 0.247.
Existing 0.600 Proposed 0.457.	Existing 0.202 Proposed 0.136.

6. Amend Table 2 by adding the nighttime chromaticity coordinates for retroreflective sign material for the color Purple as follows:

x	Y
0.300 .....	0.064
0.307 .....	0.150
0.480 .....	0.245
0.530 .....	0.170

7. Amend Table 3 by changing the daytime chromaticity coordinates for retroreflective sign material for the color Fluorescent Pink as follows:

x	Y
Existing 0.450 Proposed 0.600.	Existing 0.270 Proposed 0.340.
Existing 0.590 Proposed 0.450.	Existing 0.350 Proposed 0.332.
Existing 0.644 Proposed 0.430.	Existing 0.290 Proposed 0.275.
Existing 0.563 Proposed 0.536.	Existing 0.230 Proposed 0.230.
Existing _____ Proposed 0.644.	Existing _____ Proposed 0.290.

8. Amend Table 3 by adding after Fluorescent Pink the color Fluorescent Red and its daytime chromaticity coordinates for retroreflective sign material as follows:

x	Y
0.666 .....	0.334
0.613 .....	0.333
0.671 .....	0.275
0.735 .....	0.265

9. Amend Table 3A by adding after Fluorescent Pink the color Fluorescent Red and its daytime luminance coordinates for retroreflective sign material as follows:

Minimum	Maximum	Y <sub>F</sub>
20 .....	30	15

10. Amend Table 4 by adding after Fluorescent Green the color Fluorescent Red and its nighttime chromaticity coordinates for retroreflective sign material as follows:

x	Y
0.680 .....	0.320
0.645 .....	0.320
0.712 .....	0.253

x	Y
0.735 .....	0.265

11. Amend Table 5 by adding after the color Blue the daytime chromaticity coordinates for Purple retroreflective pavement marking material as follows:

x	Y
0.300 .....	0.064
0.309 .....	0.260
0.362 .....	0.295
0.475 .....	0.144

12. Amend Table 5A by adding after the color Blue the daytime luminance factors for Purple retroreflective pavement marking material as follows:

Minimum	Maximum
5 .....	15

13. Amend Table 6 by adding after the color Yellow the nighttime chromaticity coordinates for Purple retroreflective pavement marking material as follows:

x	Y
0.338 .....	0.080
0.425 .....	0.365
0.470 .....	0.385
0.635 .....	0.221

[FR Doc. E7-24863 Filed 12-31-07; 8:45 am]

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