

(A) None of the three items listed in paragraph (f)(3)(ii)(A) of this section exceeds \$30 million (positive or negative).

(B) For fiscal year 2002 only, it is less than 20 percent owned, directly or indirectly, by all U.S. Reporters of the affiliate combined and none of the three items listed in paragraph (f)(3)(ii)(A) of this section exceeds \$100 million (positive or negative).

(C) For fiscal years other than 2002, it is less than 20 percent owned, directly or indirectly by all U.S. Reporters of the affiliate combined.

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DEPARTMENT OF TRANSPORTATION

Federal Highway Administration

23 CFR Part 655

[FHWA Docket Nos. 97-2295 (Formerly 96-47), 97-3032, 98-3644, 98-4720, 99-5704, 99-6298, 99-6575, and 99-6576]

RIN 2125-AE11, AE25, AE38, AE50, AE58, AE66, AE71, and AE72

National Standards for Traffic Control Devices; Manual on Uniform Traffic Control Devices for Streets and Highways

AGENCY: Federal Highway Administration (FHWA), DOT.

ACTION: Final amendments to the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD).

SUMMARY: This document contains the complete revision to the MUTCD as adopted by the FHWA. The MUTCD is incorporated by reference in 23 CFR part 655, subpart F and recognized as the national standard for traffic control devices on all public roads. The new MUTCD has incorporated technological advances and application change, as well as improved the overall organization to clarify the discussion of the content.

DATES: The final rule is effective January 17, 2001. However, the FHWA is setting later compliance dates for some portions of the MUTCD; see the **SUPPLEMENTARY INFORMATION** section for further details. Incorporation by reference of the publication listed in the regulations is approved by the Director of the **Federal Register** as of January 17, 2001.

FOR FURTHER INFORMATION CONTACT: Mr. Ernest D. L. Huckaby, Office of Transportation Operations (HOTO-1), (202) 366-9064, Department of Transportation, Federal Highway Administration, 400 Seventh Street, SW., Room 3412, 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

Internet users may access all comments received by the U.S. DOT Dockets, Room PL-401, by using the universal resource locator (URL) <http://dms.dot.gov>. It is available 24 hours each day, 365 days each year. Please follow the instructions online for more information and help.

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The text for the millennium edition of the MUTCD is available from the FHWA Office of Transportation Operations' web site at: <http://mutcd.fhwa.dot.gov>

Background

The FHWA announced its intent to rewrite and reformat the MUTCD on January 10, 1992, at 57 FR 1134. The purpose of this rewrite effort is to reformat the text for clarity of intended meanings, to include metric dimensions (*i.e.*, both English and metric dimensions will be included in the text)

and values for the design and installation of traffic control devices, and to improve the overall organization and discussion of the contents in the MUTCD.

Although the Federal Highway Administrator is responsible for adopting the changes contained in this new millennium edition, the National Committee on Uniform Traffic Control Devices (NCUTCD) took the lead in this effort to rewrite and reformat the MUTCD. The NCUTCD is a national organization of individuals from the American Association of State Highway and Transportation Officials (AASHTO), the National Association of County Engineers (NACE), the American Public Works Association (APWA), the Institute of Transportation Engineers (ITE), and other organizations that have extensive experience in the installation and maintenance of traffic control devices. The NCUTCD voluntarily assumed the arduous task of rewriting, reformatting and editing the entire 1988 MUTCD into an updated and more user friendly document.

The FHWA reviewed and incorporated most of the NCUTCD's proposals for revising the MUTCD in several **Federal Register** notices of proposed amendments. This document contains the disposition of the comments to the dockets of the notices of proposed amendments which were published in the **Federal Register** shown in the table below. The table also shows the number of letters submitted to each docket and the number of separate comments addressed as part of the FHWA review and deliberation.

Adopted changes to the MUTCD text, as discussed herein, are available on the MUTCD Internet site (<http://mutcd.fhwa.dot.gov>). The final rule text will be available on the MUTCD Internet site in December 2000. Anyone unable to download the text should write to the Federal Highway Administration, Office of Transportation Operations, HOTO-1, 400 Seventh Street, SW., Washington, DC 20590.

TABLE OF NOTICES OF PROPOSED AMENDMENTS PUBLISHED BY FHWA

MUTCD part	Title	Docket number and date	Number of letters received	Separate comment entries
Part 1	General provisions/Definitions	97-3032 12/05/97	24	86
Part 1 (update)	General provisions/Definitions	99-6575 12/30/99	14	60
Chapters 2A,D,E,F,I	Signs	98-3644 06/11/98	47	800
Chapters 2G, 2H	Tourist oriented directional signs, & recreation & cultural interest signs.	98-4720 06/24/99	80	95

TABLE OF NOTICES OF PROPOSED AMENDMENTS PUBLISHED BY FHWA—Continued

MUTCD part	Title	Docket number and date	Number of letters received	Separate comment entries
Chapter 2C	Warning signs	99-5704 06/24/99	42	329
Chapter 2B	Regulatory signs	99-6298 12/21/99	86	304
Part 3	Markings	97-2295 01/06/97	40	247
Part 3 (update)	Markings	99-6575 12/30/99	27	181
Part 4	Signals	97-2295 01/06/97	24	264
Part 4 (update)	Signals	99-6575 12/30/99	111	578
Part 5	Low volume roads	99-6298 12/21/99	23	231
Part 6	Temporary traffic control	99-6576 12/30/99	56	2652
Part 7	Traffic controls for school areas	97-3032 12/05/97	20	156
Part 8	Traffic control systems for railroad-highway grade crossings.	97-2295 01/06/97	29	210
Part 8 (update)	Highway-rail grade crossings	99-6298 12/21/99	23	210
Part 9	Traffic controls for bicycles	98-4720 06/24/99	79	357
Part 10	Traffic controls for highway-light rail grade crossings	99-5704 06/24/99	46	381

Summary of Comments

The FHWA has reviewed the comments received in response to the dockets listed above and other information related to the MUTCD and these proposals. The FHWA is acting on the following items published in the notice of proposed amendments. Each action and its basis is summarized below:

Discussion of Adopted Amendments to Part 1—General Provisions

The FHWA received 146 comments from 38 commenters concerning Part 1. Only the technical (not editorial) comments are addressed in this discussion. Two notices of proposed amendments (NPA) were published at 62 FR 64324 on December 5, 1997, and at 64 FR 73612 on December 30, 1999.

1. In Part 1 Introduction, the FHWA is incorporating a discussion on defining the following condition headings: STANDARD, OPTION, GUIDANCE, and SUPPORT. This change addresses many comments received regarding the difficulty in distinguishing between distinct sections in previous editions of the MUTCD. In the NPA for Part 1, this discussion was covered in Section 1A.10 MUTCD Changes, Interpretations, and Experimentations. Based on docket comments, the FHWA believes it is important for the reader to see this discussion before proceeding to the

other sections of the manual. Therefore, the FHWA is moving this discussion to the Introduction.

The FHWA is also changing the way that these condition headings appear throughout the text. The FHWA received many comments expressing a need for improvement in the blocked headings found in the notice of proposed amendments. An explanation of both the terms and new heading style is included in the Introduction.

Also being added is a new STANDARD statement indicating that any traffic control device design or application provision contained in the MUTCD shall be considered in the public domain. The FHWA will not include any copyrighted or patented devices in the MUTCD with the exception of the Interstate Shield, a copyrighted device developed by the American Association of State Highway and Transportation Officials (AASHTO). Since this is a frequently asked question, the FHWA has decided to include language in the MUTCD to address this policy.

A new GUIDANCE paragraph is added to Part 1 Introduction to discuss the use of the International System of Units, a modernized version of the Metric system, and English units used throughout the MUTCD. The FHWA recommends that a decision be made to consistently use either the International System of Units (Metric) or English

units in the design and installation of traffic control devices.

2. In Table I.1, Evolution of the MUTCD, two other revisions to the 1988 MUTCD are added for a total of seven revisions to the 1988 MUTCD, instead of the five revisions previously shown in the table. The FHWA has also added the new millennium edition to this table.

3. In Section 1A.01 Purpose of Traffic Control Devices, paragraph 1, the term “road users” is referenced. Road user is the preferred term because it encompasses both motorized and non-motorized traffic. The term “road user” is defined in Section 1A.13. The FHWA did not receive any docket comments on this change.

4. In Section 1A.02 Principles of Traffic Control Devices, under the SUPPORT statement, the term “speed” is added as a variable that governs the design, operation, placement, and location of various traffic control devices. The traveling speed of road users can affect their ability to appropriately respond to the driving task. The FHWA did not receive any docket comments on this change.

5. In Section 1A.03 Design of Traffic Control Devices, under the STANDARD statement, the term “colors” is added to the statement that all symbols not shown in the “Standard Highway Signs”¹ book shall be adopted using the

¹ “Standard Highway Signs,” FHWA, 1979 Edition is included by reference in the 1988

procedures described in Section 1A.10, "MUTCD Changes, Interpretations, and Experimentations." The FHWA did not receive any docket comments on this change.

Also in this section, an OPTION is added to explain that State and local highway agencies may develop word message signs to notify road users of special regulations or situations. The FHWA did not receive any docket comments on this change.

6. In Section 1A.05 Maintenance of Traffic Control Devices, GUIDANCE is added to explain the difference between functional and physical maintenance. The FHWA did not receive any docket comments on this change.

7. In Section 1A.07 Responsibility for Traffic Control Devices, under the STANDARD statement, a reference to 23 CFR 655.603 is added to adopt the MUTCD as the national standard for all traffic control devices, and require that any State or other Federal agency MUTCD shall be in substantial conformance with the national standards. The FHWA did not receive any docket comments on this change.

8. In Section 1A.08 Authority for Placement of Traffic Control Devices, (titled in the 1999 NPA as "Placement Authority,") paragraph 1, STANDARD language is added to require that all traffic control devices and any other signs or messages within the street or highway right-of-way shall be placed only as authorized by a public authority or official having jurisdiction for the street or highway. The FHWA did not receive any docket comments on this change.

Also in Section 1A.08, GUIDANCE is added to indicate that any unauthorized traffic control device or any non-essential sign or message placed within the highway right-of-way should be removed. The FHWA did not receive any docket comments on this change.

9. In Section 1A.09 Engineering Study and Engineering Judgment (titled in the 1999 NPA as "Engineering Study or Judgment Required"), a clarification discussion on the difference between engineering study and engineering judgment is added. The FHWA did not receive any docket comments opposed to adding this discussion.

Also in Section 1A.09, one commenter stated that the word "required" in the title of this section (titled in the 1999 NPA as "Engineering Study or Judgment Required"), conflicts

with the GUIDANCE given in this section. The FHWA agrees and has changed the title of this section to "Engineering Study and Engineering Judgment," because that title more appropriately conveys the objective of the section.

The same commenter also recommended that the STANDARD statement, which provides that the inclusion of a traffic control device in the MUTCD is not a legal requirement for their installation, be deleted from this section because he did not see its purpose. The FHWA disagrees because the STANDARD statement complements the GUIDANCE paragraphs in this section that discuss that the decision to use a particular device should be made on the basis of an engineering study or the application of engineering judgment.

10. In Section 1A.10 Interpretations, Experimentations, and Changes, STANDARD language is added to paragraph 1 to prohibit the design, application, and placement of traffic control devices other than those adopted in the MUTCD, unless the process for an interpretation, experimentation, or change is followed.

Also in Section 1A.10, is a new GUIDANCE statement indicating that any request for permission to experiment with a new traffic control device should contain a legally binding statement certifying that the traffic control device is not protected by a patent or a copyright since patented or copyright protected traffic control devices are not permitted in the MUTCD, except for the Interstate Shield.

11. A new Section 1A.13 Definitions of Words and Phrases, is added. Definitions in this section are provided for terms that are universally used throughout the MUTCD. The definitions for terms found in only one section of the MUTCD can be found within the specific section. The FHWA did not receive any docket comments opposed to this change. However, the FHWA did receive editorial comments on some of the definitions, and they are incorporated as minor modifications to the text.

12. A new Section 1A.14 Abbreviations Used on Traffic Control Devices, is added. These abbreviations shall be the STANDARD for word messages used in conjunction with traffic control devices. The FHWA did not receive any docket comments opposed to this change. However, the FHWA did receive editorial comments which have been incorporated as minor modifications to the text.

Discussion of Adopted Amendments to Chapter 2A—General Provisions and Standards

The FHWA received 800 comments from 47 commenters concerning Parts 2A, 2D, 2E, 2F, and 2I. Only the technical (not editorial) comments are addressed in this discussion. The notice of proposed amendments (NPA) was published at 63 FR 31950 on June 11, 1998.

13. The heading for Chapter 2A is changed from "Introduction and General Standards" to "General Provisions and Standards." This title better describes the discussion in this chapter. There were no docket comments on this change.

14. In Section 2A.01 Function and Purpose of Signs, the STANDARD is modified to make the design and application standards for "all" signs dependent on the particular class of highway on which they are used. The 1988 MUTCD only specified "guide" signs rather than "all" signs. The FHWA has also added "special purpose roads" to the list of highway classification definitions in this section. The FHWA received no docket comments on this section.

15. In Section 2A.07 the title is changed from "Variable Message Signs" to "Changeable Message Signs" which is more commonly used within the transportation field and throughout MUTCD Sections 6F.02 and 6F.52. The FHWA is also referring readers to Section 6F.02 for more detailed discussion on changeable message signs. There were no docket comments on this section.

16. In Section 2A.08 Illumination and Retroreflectivity, two tables are added (Table 2A.1 and 2A.2) to help clarify the text that used to be in Sections 2A.16, 2A.17, and 2A.18 of the 1988 MUTCD. The FHWA received no docket comments on this section. In the STANDARD statement, the requirement of sign retroreflectivity or illumination is extended to include guide signs. This requirement applies to all signs unless specifically stated otherwise in the MUTCD text for a particular sign or group of signs. The FHWA believes this will improve safety and visibility during adverse ambient conditions. There were no docket comments on this section.

17. In Section 2A.10 Shapes, a new Table 2A.3, Use of Shapes, is added. In this new table, the following shapes are for exclusive use: STOP sign, YIELD sign, pennant, crossbuck, and trapezoid. The trapezoid shape is exclusively for recreational signs. However, as one commenter noted, since most recreational signs currently installed are

MUTCD. It is available for purchase from the Government Printing Office, Superintendent of Documents, PO Box 371954, Pittsburgh, PA 15250-7954. It is available for inspection and copying at the FHWA Washington Headquarters and all FHWA Division Offices as prescribed at 49 CFR part 7.

rectangular, the FHWA has also included the recreation signs in the guide signs category (see double asterisk in new table).

18. In Section 2A.11 Sign Colors, a new Table 2A.4, Uses of Sign Colors is added. The FHWA has also included a statement that the color coordinates and values shall conform to those shown in the color specifications described in the "Standard Highway Signs" (SHS) Book.² There were no docket comments on this section.

The FHWA believes that including this statement will help promote uniformity of colors where traffic control signs are designed and installed by providing the reader with a specific reference source for determining the proper color coordinates and values.

19. In Section 2A.13 Symbols, paragraph 2 explains that new symbol signs shall be adopted by FHWA based on research evaluation studies to determine comprehension data and recognition/legibility distance for the symbol sign. The FHWA added an OPTION statement for State and/or local highway agencies to conduct these research studies. There were no docket comments on this section.

20. In Section 2A.14 Word Messages, paragraph 2 provides GUIDANCE for determining sign letter heights is added. Sign letter heights should be determined based on 1 inch per 40 feet of legibility distance. The FHWA believes this amendment will improve sign legibility for all road users, especially for older road users whose vision may be diminished. The FHWA received no docket comments on this section.

In paragraph 5, an OPTION is provided for State and local highway agencies to use the combination of lowercase letters with initial uppercase letters for street name signs. In Section 2A.15 of the 1988 MUTCD, this OPTION only applied to destination guide signs and did not give States this flexibility. The FHWA has also eliminated the restriction for using series B alphabets only on street name signs. States now have the flexibility to use other standard series alphabets, as appropriate. There were no docket comments on this section.

21. In Section 2A.17 Overhead Sign Installations, the FHWA removed the restriction for placing signs on bridges located along only "urban" freeways and expressways in the OPTION statement. Overhead signs may be placed on "any" freeway or expressway bridge where feasible, to enhance safety and economy. This change provides more installation flexibility to State and

local highway agencies. There were no docket comments on this section.

22. In Section 2A.18 Mounting Height, paragraph 7 allows State and local highway agencies the OPTION to adjust the mounting height of signs when the sign supports are located near the edge of the right-of-way on a steep backslope. There were no docket comments on this section.

23. In the first paragraph of Section 2A.19 Lateral Offset, a STANDARD is added that requires sign supports within the clear zone to be breakaway or shielded for the safety of the road user particularly in run-off-road incidents. There were no docket comments on this section.

24. In Section 2A.23 Maintenance, GUIDANCE is added to paragraph 2 which recommends that maintenance inspections be conducted both day and night. Although this is a general practice among many engineering and transportation officials, the FHWA believes it is a practice worth reiterating in the MUTCD. There were no docket comments on this section.

25. In Section 2A.24 Wrong-Way Traffic Control, the FHWA has deleted the OPTION and SUPPORT text that appeared in the NPA and modified the figures to more accurately show the typical sign application for wrong-way traffic control. This change helps the text read clearer and is based on the FHWA internal review process which identified inconsistencies, redundancy, and confusion between the text and the accompanying typical figures.

Discussion of Adopted Amendments to Chapter 2B—Regulatory Signs

The FHWA received 304 comments from 86 commenters concerning Chapter 2B Regulatory Signs. Only the technical (not editorial) comments are addressed in this discussion. The notice of proposed amendments (NPA) was published at 64 FR 71358 on December 21, 1999.

26. In Section 2B.03 Size of Regulatory Signs, the FHWA received several comments requesting the addition of a table that depicts sign sizes. The FHWA has adopted a similar format to the one recommended by the NCUTCD that expands the sign category headings to cover additional sizes. Table 2B-1 lists sign sizes for Conventional Roads, Expressways, and Freeways, "minimum" and "oversized" signs.

27. In Section 2B.04 STOP Sign, paragraph 3, under the STANDARD statement, we proposed text requiring the use of the 4-way supplemental plaque (R1-3) at intersections where all approaches are controlled by STOP signs. This practice was optional in the

1988 MUTCD. The FHWA received one comment in opposition to this adopted change. The FHWA has adopted this requirement because it believes the use of the supplemental plaque will provide additional emphasis and motorist information at the stop location.

The FHWA is providing a phase-in compliance period of 3 years after the effective date of this final rule for existing installations to minimize any potential impact to State and local highway agencies. This period will allow for replacement of the existing signs after the normal service life. This change takes effect immediately for all new installations.

28. The proposed amendment to Section 2B.05 STOP Sign Applications recommended changing the title of this section from "Warrants for Stop Signs" to "STOP Sign Applications." This change eliminates the misunderstanding created by the term "warrants" which has a "legal sanctions" connotation. No commenters objected to this amendment, therefore the FHWA has changed the section title as proposed.

Several commenters indicated disappointment that the GUIDANCE statement in Section 2B.05, paragraph 1, was not upgraded to a STANDARD since many local governments receive frequent requests for STOP signs to be installed for speed control. Traffic engineers would like to have the language in the MUTCD that would back up their decision when faced with political pressure to install STOP signs to control speed. The FHWA does not consider this sufficient justification to elevate this GUIDANCE to a STANDARD requirement, particularly when you consider the potential impacts on local governments. Two commenters questioned why an engineering study, as opposed to an engineering judgment, was not required in the NPA. The FHWA believes that it is more practical to recommend that an engineering study be done for multi-way stops and that engineering judgment be used for one-way or two-way stops.

29. The FHWA received no objections to the proposed language in Section 2B.06 Stop Sign Placement, changing the language from OPTION to GUIDANCE for using STOP lines to supplement a STOP sign. The FHWA believes that the use of the STOP line will provide the road user with additional information for making safe traffic operation decisions, therefore the proposal is adopted.

Also in this section, under GUIDANCE, the FHWA received no comments objecting to the proposed language stating that the STOP signs should not be placed on the far side of

²Ibid.

the intersection. The text has been modified to clarify that when only one sign is installed, the STOP sign should not be placed on the far side of the intersection. This would allow the use of a supplemental STOP sign on the left side which may be appropriate in some cases.

30. In Section 2B.07 Multi-way Stop Sign Applications, paragraph 3, the FHWA added GUIDANCE to recommend that the decision to install Multi-way Stop signs should be based on an engineering study. The FHWA offers the same rationale that was provided in Section 2B.05, which addresses the reasoning for the use of engineering judgment as opposed to engineering study.

Several commenters responded to the GUIDANCE statement (in item C.1) which lists the criteria to consider in an engineering study for a multi-way STOP sign installation. There is a misunderstanding that the criteria was reduced from 500 to 300 vehicles per hour. The 1988 MUTCD provides for 500 vehicles per hour from all approaches and 200 combined vehicular and pedestrian units per hour from the minor-street approaches. The revised text provides: "1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any eight hours of an average day, and 2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same eight hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour * * * " This is the same criteria presented in a slightly different manner.

Additionally, Item C.2 of the criteria includes bicycle volumes to the combination volume studies of vehicles and pedestrians. The FHWA believes that bicycle travel is an integral part of traffic control considerations. Therefore, this should improve the traffic data when considering installation of traffic control devices. One commenter pointed out that typical count methods do not allow for comprehensive counting of bicycles over long time periods. The FHWA agrees that manual counts are routinely done over an 8–12 hour period in order to gather pedestrian and bicyclist data. It is true that automatic 24-hour counts, typically done by machines with rubber tubes across the roadway, cannot count bicycles; however, video methods offer a highly effective means to capture this data. Since the language is provided

under GUIDANCE, the FHWA does not believe that this will cause an inconvenience to traffic engineers.

31. In Section 2B.11 Speed Limit Sign, a sentence is added to the OPTION statement to read: "A changeable message sign that changes for traffic and ambient conditions may be installed provided that the appropriate speed limit is shown at the proper times." In the NPA this was suggested as an addition to Section 2B.13 Night Speed Limit Sign. After reconsideration by the FHWA and from comments provided on this issue, it was determined that it be placed in Section 2B.11, because this is not necessarily a night condition.

32. In Section 2B.16 Reduced Speed Ahead Sign (R2–5 series), the FHWA received one comment regarding the proposed assembly method B under OPTION which when applied to a metric assembly, could require a five-sign configuration for an advance notice of change in speed limit. The FHWA believes that since this method is "optional" and not a requirement, its inclusion under OPTION is appropriate.

Also in this section, one comment was received suggesting that the background color for the supplemental plaques in GUIDANCE be changed from the color yellow to white so that motorists will not confuse this sign assembly with the School Speed Limit Sign Assembly. The FHWA agrees and has modified the language to read "When used with Speed Limit assemblies, the supplemental plaques should have a white background with a black legend and border, except for the METRIC plaque (see Section 2B.11)." The FHWA believes that it is essential that the METRIC plaque be distinct to draw attention to the use of metric units in that particular jurisdiction. The FHWA is providing a phase-in compliance period of 7 years after the effective date of this final rule for existing signs to minimize any impact on State and local highway agencies. This period will allow for replacement of existing signs after the normal service life. This change is effective immediately for new sign installations.

33. In Section 2B.17 Turn Prohibition Signs (R3–1 to R3–4) (referenced in the NPA as Section 2B.15), the FHWA is combining the language for the Turn Prohibition and the U-Turn Prohibition signs into one section. No negative comments were received for this amendment.

The FHWA received one comment suggesting that the following text be added as an OPTION: "Where ONE WAY signs are used, Turn Prohibition signs may be omitted (see Section 2B.31)." The FHWA agrees and is

adding this language because this may reduce the number of sign messages and prevent driver message overload.

34. In Section 2B.19 Mandatory Movement Lane Control Signs (R3–5, R3–5a and R3–7) (referenced in the NPA as Section 2B.16), the FHWA proposed adding a new Mandatory Movement Lane Control Sign (R3–5a) under OPTION to explain to road users that they must stay in the same lane and proceed straight through an intersection. Two comments were received that recommended changing the name of this sign to a "Straight Through Only" sign, which is a more specific description of the sign's intent. The FHWA agrees and is adopting this change.

Also in Section 2B.19 Mandatory Movement Lane Control Signs, a GUIDANCE statement is added to read: "Mandatory Movement Lane Control signs should be accompanied by lane control pavement markings, especially where traffic volumes are high, where there is a high percentage of commercial vehicles, or where other distractions exist." This was proposed as a requirement in the NPA, which stated that whenever lane use control signs are installed, lane-use pavement markings shall also be installed, and seven commenters objected to this proposal and mentioned that many jurisdictions are successfully using this signing without markings, and that making this condition mandatory may constitute an unfunded mandate creating serious hardships on many jurisdictions. The FHWA agrees with these suggestions, and believes that this language is more appropriately included as an OPTION in Section 2B.19.

35. In Section 2B.30 WRONG WAY Sign (R5–1a), the FHWA proposed to include a reference to Figure 2–5a which shows the signing and pavement marking treatments for divided highway intersections with medians 9 m (30 ft). Based on the negative comments received on the proposed figure, the FHWA has revised the figure to only depict WRONG WAY signing. The figure is renumbered Figure 2B–2, "Typical Wrong Way Signing for Divided Highways."

36. In Section 2B.32 ONE WAY Sign (R6–1, R6–2), the FHWA proposed to change the recommendation regarding placement of the One Way signs from a recommendation to a requirement. The FHWA received one negative comment regarding the change from GUIDANCE to STANDARD, stating the rationale that alley traffic is familiar traffic and that the current practice has been proven over time to be adequate. The FHWA disagrees with this comment and is adopting the proposed amendment. Not

all traffic in alleys will always be familiar traffic, and this new requirement will increase safety by reducing the chance of road users inadvertently making wrong-way movements.

Another commenter to this section suggested adding a compliance period to relieve the cost burden on local agencies. The FHWA is providing a phase-in compliance period of 7 years after the effective date of this final rule to minimize any impact on State and local highway agencies. This period will allow for replacement of the existing signs after the normal service life.

37. In Section 2B.35 Design of Parking, Standing, and Stopping Signs, the FHWA inadvertently omitted the proposed text, stating that all street parking signs are to be illuminated or retroreflective. This text is consistent with Section 2A.08 Illumination and Retroreflectivity, which discusses the general provisions and standards for signs. The FHWA believes the language that addresses retroreflectivity and illumination is best discussed as a STANDARD in Section 2B.01 Application of Regulatory Signs. The FHWA is adopting the following text: "Regulatory signs shall be retroreflective or illuminated to show the same shape or similar color by both day and night, unless specifically stated otherwise in the MUTCD text discussion of a particular sign or group of signs (see Section 1A.08).

38. In Section 2B.37 Emergency Restriction Signs (referenced in the NPA as Section 2B.36, paragraph 3), FHWA is providing States with the choice of either using red or black legend and border on a white background for these signs. The FHWA did not receive any comments opposed to this adopted change.

39. The 1988 MUTCD contained a sentence that the WALK ON LEFT (R9-1) and NO HITCHHIKING (R9-4) signs do not have to be retroreflective. However, the FHWA is changing this and requiring that all signs, including these pedestrian signs, shall be either illuminated or retroreflective. The FHWA did not receive any comments opposed to this adopted change.

40. In Section 2B.40 Traffic Signal Signs, the FHWA proposed adding two new symbol signs for NO RIGHT TURN ON RED (R10-11c) and NO LEFT TURN ON RED (R10-11d). Three commenters disagreed with the use of these symbol signs as alternatives to the word legend R10-11a and R10-11b signs. Their concern was that these new symbol signs may be confused with the R3-1R (NO RIGHT TURN) and the R3-1L (NO LEFT TURN) symbol signs and will lead

to increased violations for No Right Turn or No Left Turns situations. The FHWA believes that since the use of the proposed signs is an OPTION and not a requirement, that jurisdictions should be able to have the option of using either word message signs or these new symbol signs. Therefore, the text has been modified to read: "A symbolic NO TURN ON RED sign (R10-11c) may be used as an alternate to the R10-11a and R10-11b signs."

41. The FHWA added two new sections to address High Occupancy Vehicle (HOV) signing: Section 2B.49 High Occupancy Vehicle Lanes, and Section 2B.50 High Occupancy Vehicle Sign Applications and Placement. No commenters objected to this amendment.

The FHWA has deleted the R3-18 and R3-19 HOV signs from the text and Table 2B-1. These signs have been replaced by the remaining HOV signs found in Table 2B-1. The FHWA is providing a phase-in compliance period of 6 years after the effective date of the final rule to minimize any potential impact on State and local highway agencies. This period will allow for replacement of the existing signs after the normal service life. Immediate compliance is required for all new installations.

Discussion of Adopted Amendments to Chapter 2C—Warning Signs

The FHWA received 329 comments from 42 commenters concerning Chapter 2C. The notice of proposed amendments (NPA) was published at 64 FR 33802 on June 24, 1999, under docket number FHWA-1999-5704.

42. The following general changes are in Chapter 2C: the various sizes of warning signs are shown in Table 2C-2; and the sections in 2C are grouped and discussed according to category type and application. Table 2C-1 shows the categories, application, appropriate sections, and sign numbers for the warning signs discussed in Chapter 2C. The table is designed so that it is easy to reference this information. The section topics are grouped by roadway-related, traffic-related, and non-vehicle related categories.

43. In Section 2C.02 Application of Warning Signs, paragraph 2 includes language that was proposed in the NPA as Section 2C.35 Motorized Traffic Signs. The language indicating that warning signs should be removed or covered when conditions or activities are seasonal or temporary is more appropriate for inclusion in Section 2C.02 which discusses general application for all warning signs. This

language is removed from the section on "Motorized Traffic Signs."

In Table 2C-2 Warning Sign Sizes, the minimum sizes of the following signs are increased from 600 mm (24 inches) to 750 mm (30 inches): Merge Sign (W4-1), Narrow Bridge Sign (W5-2), Two-Way Traffic Sign (W6-3), and the Double Arrow Sign (W12-1). This change makes the minimum size consistent with other signs in the respective sign series and improve the sign visibility for road users, particularly older drivers. The FHWA is providing a phase-in compliance period of 7 years after the effective date of this final rule for existing installations to minimize any potential impact to State and local highway agencies. This period will allow for replacement of existing signs after their normal service life. This change is effective immediately for all new installations.

The FHWA received comments from the Washington Department of Transportation (WDOT) and an engineering concerning Table 2C-2. The WDOT suggested that all diamond warning signs in this table should be the same size for a given roadway type facility. The example given was that the Curve Sign (W1 Series) requires more decision and reaction time than the Merge Sign (W4 Series). Therefore, the WDOT suggests that the Curve Sign, when used on expressways and freeways, should be at least the same size as shown for the Merge Sign which is 1200 mm x 1200 mm (48 inches by 48 inches). The FHWA agrees that there is a need to further study this issue of sign size consistency, and we will revisit it as part of a future notice of proposed amendments.

An engineering consultant suggested that the FHWA delete the term "standard size" used as a heading in Table 2C-2 because in tort liability cases, the term "standard size" is misunderstood and requires explanation. Based on this comment, the FHWA has revised Table 2C-2 to relate the warning sign sizes to the roadway classification using the following headings: Conventional Roads, Expressway, and Freeway. The FHWA has added a supplemental Table 2C-2a to show the minimum and oversized warning sign sizes.

44. In Section 2C.06 Horizontal Alignment Signs, the discussion for each of the horizontal alignment signs (W1-1 through W1-5) are combined into one section. A Table 2C-4 has been added to provide guidance for determining when to use the horizontal alignment signs based on the number of alignment changes and based on whether or not the advisory speed is

greater than, equal to, or less than 50 km/h (30 mph).

45. In Section 2C.07 Combination Horizontal Alignment/Advisory Speed Sign, a new W1-9 sign is added to the MUTCD. The W1-9 sign combines the Turn (W1-1) Sign or the Curve (W1-2) Sign with the Advisory Speed Plaque (W13-1) to create one sign. The FHWA has also included a reference to this sign in Section 2C.06 Horizontal Alignment Signs. In the NPA, the FHWA indicated that the W1-9 sign shall be installed within the turn or curve. However, based on the docket comments from the Illinois DOT, the Ohio DOT, and the Ohio Institute of Transportation Engineers, the FHWA has revised paragraph 2 to indicate that this sign shall be installed at the beginning of the turn or curve to give motorists prior warning before they enter the curve. The FHWA also received a comment from Pierce County, Washington indicating that this sign has potential application in urban or lower speed conditions. The FHWA agrees and has included a minimum size of 900 mm x 900 mm (36 x 36 inches) when this sign is used on low speed facilities.

46. In Section 2C.08 Combination Horizontal Alignment/Intersection Sign, a new W1-10 sign is added to the MUTCD. The W1-10 sign combines the Turn (W1-1) sign or the Curve (W1-2) sign with the Cross Road (W2-1) sign or Side Road (W2-2, W2-3) signs to create one sign. The FHWA has added a reference to this sign in Section 2C.06. The FHWA has deleted the following paragraph which was formerly paragraph 3 in the NPA: "The Combination Horizontal Alignment/Intersection sign should not be used if there is adequate roadway length to provide for separate signs showing each of the applicable features." Based on comments received, the FHWA believes that even when adequate space is available to install separate signs, this combination sign can provide a clearer message to the road user, and the decision to use this sign should be left to the State or local agency's discretion.

47. In Section 2C.10 Chevron Alignment Sign, based on a docket comment that the FHWA received from the Illinois DOT, the FHWA has added an OPTION to install the Chevron Alignment (W1-8) sign on the far side of an intersection to inform road users of a change in horizontal alignment through an intersection.

48. In Section 2C.12 Truck Escape Ramp Signs, a new TRUCK ESCAPE RAMP word message (W7-4c) sign is added to the MUTCD. Since this term is more widely and commonly used, the FHWA has included it as an OPTION to

the RUNAWAY TRUCK RAMP word message (W7-4) sign. The FHWA has included GUIDANCE for installing No Parking (R8-3 series) signs near the ramp entrance due to the potential hazard caused by parking at these ramp locations.

49. In Section 2C.13 Road Narrows Sign, an OPTION to use the Advisory Speed (W13-1) plaque with the ROAD NARROWS (W5-1) sign is added.

50. In Section 2C.20 Low Clearance Sign, the use of the Low Clearance (W12-2) sign is required to notify road users of clearances less than 12 inches above the statutory maximum vehicle height or minimum structure height. Providing this critical information is especially important to operators of large vehicles.

51. A new Section 2C.22 Speed Hump Sign and new word message sign (W17-1) is added. The FHWA received a docket comment from the NCUTCD requesting this new word message sign. With the prevalent application of traffic calming techniques within residential communities and the possibility of States developing their own word message signs, the FHWA believes it is appropriate to include a standard word message sign in the MUTCD. In an effort to promote uniformity and discourage a proliferation of States using a variety of signs, the FHWA adopts the SPEED HUMP sign recommended by the NCUTCD. The addition of this new section means that the section numbers for the sections following 2C.22 are changed.

52. In Section 2C.24 Shoulder Signs, language is added to describe the application of the SOFT SHOULDER (W8-4) sign, the LOW SHOULDER (W8-9) sign, the SHOULDER DROP-OFF (W8-9a) sign, and the UNEVEN LANE (W8-11) sign. These word message signs are also appropriate for use in work zones (MUTCD Part 6). Since Part 6 references the signs but does not include a description, the FHWA has included an application discussion for these signs. The symbols for these existing signs have created confusion and misunderstanding. Therefore, the symbol signs are deleted in lieu of word messages. A phase-in compliance period of 10 years from the effective date of this final rule is provided so that State and local agencies can replace their existing symbol signs with word message signs over the course of the normal service life of the signs.

53. In Section 2C.26 Advance Traffic Control Signs (W3 series), all of the Advance Traffic Control signs are combined into one section. The Advance Traffic Control signs include:

The Stop Ahead (W3-1a), the Yield Ahead (W3-2a), the Signal Ahead (W3-3), and a new BE PREPARED TO STOP (W3-4) sign. A new word message sign was submitted as a docket comment from the NCUTCD. This word message sign was already adopted in MUTCD Part 6, Work Zones. The MUTCD Part 6 shows the sign but does not have any descriptive text accompanying the sign. The FHWA believes this word message sign is appropriate for inclusion in both Chapter 2C and Part 6 because it advises road users that they may encounter traffic congestion or stopped traffic caused by traffic signals. This amendment includes descriptive text to discuss the application of the BE PREPARED TO STOP sign.

Also in this section, the FHWA received comments from the city of Bellevue, Washington and the Washington DOT indicating that they have installed Street Name plaques with the Advance Traffic Control signs and have had no negative effects. Therefore, in the first OPTION statement of Section 2C.26 the FHWA has modified the sentence to allow the OPTION of installing a supplemental Street Name plaque above or below any Advance Traffic Control sign rather than just the Signal Ahead sign because it gives States more flexibility.

54. In Section 2C.27 Cross Traffic Does Not Stop plaque, a new (W4-4P) plaque is added. This plaque is intended to warn road users that they are approaching a 2-way stop controlled intersection. This new word message plaque is based on research conducted by the Texas Transportation Institute³ and on recommendations included in the "Older Driver Highway Design Handbook."⁴ The FHWA believes it is appropriate from a safety standpoint to add this new warning sign to help road users quickly identify the type of stop controlled intersection. The FHWA did not receive any docket comments opposed to this new plaque. However, the FHWA did receive a comment suggesting that we add the OPTION to use this plaque on 1-way stop controlled T-intersections and the FHWA has included this modification.

The FHWA also received comments from the city of Bellevue, Washington and the Texas DOT questioning the

³Picha, D.L., C.E. Schuckel, J.A. Parham, and C.T. Mai, "Traffic Control Devices at Two-Way Stop Controlled Intersections," Research Report 1374-IF, Texas Transportation Institute, College Station, Texas, November 1996.

⁴"Older Driver Highway Design Handbook," Report No. 1 FHWA-RD-97-135, available from the FHWA Research and Technology Report Center, 9701 Philadelphia Court, Unit Q, Lanham, Maryland 20706.

appropriate color of the CROSS TRAFFIC DOES NOT STOP plaque. In response to these comments, and since this plaque is intended as a warning message to provide advance notice of an upcoming situation, language is added that the plaque colors are black legend on a yellow background. In State and local jurisdictions where this plaque is intended to regulate traffic, this plaque may be placed on the same post as the STOP sign. When used with the STOP sign, the colors are black legend on a white background.

55. In Section 2C.30, paragraph 4, a new sentence is added that roadway delineation may also be used to notify road users of lane reduction situations. The OPTION to use pavement markings in addition to the Lane Ends signs will provide additional guidance information to the road users.

Also in paragraph 5 of this section, GUIDANCE is included to indicate that, in situations where an extra lane has been added for slower moving traffic, a Lane Ends sign should be installed in advance of the end of the extra lane.

56. In Section 2C.33 Advisory Exit, Ramp, and Curve Speed Signs, GUIDANCE is added to clarify the difference between when the Exit Speed (W13-2) signs and the Ramp Speed (W13-3) signs should be used. Based on deliberation comments made to the docket review, the FHWA has changed the title of this section and included a new Curve Speed (W13-5) sign. This sign was not discussed in the NPA, but the FHWA believes it should be included in the MUTCD because it provides the advisory speed on roads and highways at the beginning of horizontal alignment changes. The Curve Speed sign is designed exactly like the Exit and Ramp Speed sign.

57. In Section 2C.34 Intersection Warning Signs, an OPTION to install an Advance Street Name (W16-8) plaque in conjunction with the intersection warning signs is provided. This change provides helpful advance information to the road user.

Also in this section, the FHWA has added a new Circular Intersection (W2-6) symbol sign that was submitted by the NCUTCD. The FHWA received comments from the Texas, Missouri, and Oregon DOTs in favor of a different symbol that was similar to the roundabout symbol used in Europe. With the advent of traffic calming practices in residential communities, the FHWA believes it is important to take advantage of this opportunity to include a sign in the MUTCD for circular intersections. Until further research can be done on another symbol, the FHWA plans to include the

symbol submitted by the NCUTCD and to include language indicating that the symbol be accompanied by an educational word message plaque.

58. A new Section 2C.36 Motorized Traffic Signs is added. Motorized traffic signs are used to alert road users to unexpected entries into the roadway by trucks, farm vehicles, emergency vehicles, and other vehicles.

Also in this section, a new EMERGENCY SIGNAL AHEAD (W11-12) warning sign for use with the Emergency Vehicle (W11-8) symbol sign is added. These two signs are required in advance of all emergency vehicle traffic control signals (Chapter 4F).

Based on FHWA internal comments made during the docket review deliberations, this section has also been revised to include an OPTION to use other word message warning signs to indicate the type of emergency vehicle station ahead (such as rescue squad, etc.) in situations when no emergency signal is present.

59. In Section 2C.37 Crossing Signs, a new design and application for advance crossing and crossing signs is added. In the past, the crossing signs were distinguished from the advance crossing signs by the use of crosswalk lines on the sign. However, people rarely noticed the difference. The FHWA has changed the design of these signs by deleting the crosswalk lines and using one sign for both the advance and the crossing location. The crossing sign when used to provide advance notice to road users is supplemented with the legend "AHEAD" or with an appropriate distance plaque. The crossing sign is used adjacent to crossings and must be supplemented with a diagonal downward pointing arrow when the crossing does not have pavement markings. If pavement markings are used to mark the crosswalk, then only the crossing sign is needed and the diagonal downward pointing arrow is optional. The FHWA is providing a phase-in compliance period of 10 years after the effective date of this final rule for existing signs to minimize any impact on State and local highway agencies. This change is effective immediately for new sign installations.

Discussion of Adopted Amendments to Chapter 2D—Guides Signs for Conventional Roads

The FHWA received 800 comments from 47 commenters concerning Parts 2A, 2E, 2F, and 2I. Only the technical (not editorial) comments are addressed in this discussion. The notice of proposed amendments (NPA) was

published at 63 FR 31950 on June 11, 1998.

60. Throughout Chapter 2D, the FHWA is replacing the word "marker" with the word "sign," since these route and auxiliary markers are generally considered signs. The sign numbers, however, will continue to carry the "M" designation (example: M1-4) so that the State's sign inventory will not need to change. Also, a reference to Chapter 2A is included to remind readers to check there for placement, location, and other general criteria for signs, since this information is not repeated in every section. There were no docket comments on this section.

61. In Section 2D.03 Color, Retroreflection, and Illumination, the STANDARD statement in paragraph 3 is modified to extend the general requirements for retroreflectivity and/or illumination to "all" guide sign messages and legends, unless specific exceptions are provided. This is consistent with Section 2A.08 which requires all signs to be retroreflective and/or illuminated. There were no docket comments on this section.

62. In Section 2D.09 Numbered Highway Systems, a sentence is added to paragraph 5 which states that the highest priority route sign legend shall be placed on top or to the left of the sign panel. This will help the road user better identify the class of roadway (example: Interstate vs. County route). There were no docket comments on this section.

63. In Section 2D.11 Design of Route Signs, paragraph 6 allows the OPTION of placing a white sign panel behind the Off-Interstate Business Route signs when they are installed on a green guide sign. This amendment will improve the sign's contrast and conspicuity. There were no docket comments on this section.

64. In Section 2D.15 Cardinal Direction Auxiliary Sign, the first letter of cardinal direction messages is increased by 10 percent. Increasing the first letter of cardinal direction signs such as EAST and WEST, helps the road user in the navigation task by providing a clearer distinction between the similar appearance of these two messages. This same principle is true for the NORTH and SOUTH cardinal directions. This change was previously adopted in revision number 5 to the 1988 MUTCD and is mentioned here to bring attention to the compliance date which was December 31, 1994. The FHWA received no docket comments on this section.

65. In Section 2D.33 Destination and Distance Signs, the OPTION statement is changed to add the placement of the route sign and cardinal direction within

the destination sign panel. When this option is used, the size of the route sign and cardinal direction auxiliary sign should be at least the minimum size specified for these signs. There were no docket comments on this section.

66. In Section 2D.34 Destination Signs, paragraph 9 recommends that when there are four destinations, they should be shown on two separate sign panels. The FHWA has changed this from a requirement (as shown in the 1988 edition of the MUTCD) to a GUIDANCE in order to allow State and local highway agencies more flexibility. The FHWA believes this change is appropriate since the OPTION in paragraph 10 allows all four destinations on one sign panel in situations where spacing is critical. The FHWA received no docket comments on this section.

67. In the 1988 edition of the MUTCD, distance signs were required to be placed approximately 500 feet outside the municipal limits or at the edge of the built-up district. Section 2D.37 Location of Distance Signs, eliminates this specific distance requirement and allows the State and local highway agencies the flexibility to determine the appropriate sign location. There were no docket comments on this section.

68. The FHWA received comments from the Minnesota Department of Transportation and reviewed the recommendations in the "Older Driver Highway Design Handbook,"⁵ which suggest that a discussion for installing street name signs on overhead mast arms be included in the MUTCD. Since many State and local highway agencies are already using this application and it does improve sign visibility, the FHWA is adopting this as an OPTION in paragraph 11 of Section 2D.38 Street Name Sign. At intersections having two different street names, the FHWA is also adopting the OPTION to show both street names on one panel with appropriate directional arrows. This is consistent with the "Older Driver Highway Design Handbook" and will also optimize sign visibility for the road user.

69. In Section 2D.44 General Service Signs, paragraph 15 is changed to eliminate the term "opaque background" since all backgrounds shall be either retroreflective or illuminated as discussed in Section 2D.03. There were no docket comments on this section.

In this same section, an OPTION is added to use the new word message sign "ROAD CONDITION DIAL 511" to notify road users of road and traffic

conditions. This is a new OPTION that was not included in the NPA because at the time, it had not been approved by the Federal Communications Commission.

70. The title of Section 2D.45 proposed in the NPA is changed from "Milepost Markers" to "Reference Posts." This change is based on internal review discussions during the FHWA's deliberation of docket comments. The FHWA has changed the title of this section to "Reference Posts" since this is a more accurate description.

The FHWA has also modified this section in paragraph 11 of the OPTION statement to eliminate the provision for placement of the kilometer (mile) fractions on the back of the post or on a separate small plate. The text in the 1988 edition of the MUTCD was written more for road maintenance and public works activities. This modification is being made to help road users better identify their location in emergency situations.

Discussion of Amendments to Chapter 2E—Guide Signs, Expressways and Freeways

The FHWA received 800 comments from 47 commenters concerning Parts 2A, 2D, 2E, 2F, and 2I. Only the technical (not editorial) comments are addressed in this discussion. The notice of proposed amendments (NPA) was published at 63 FR 31950 on June 11, 1998.

71. Chapters 2E (Guide Signs—Expressway) and 2F (Guide Signs—Freeways) in the 1988 MUTCD are combined into a new Chapter 2E titled "Guide Signs—Freeways and Expressways." The FHWA did not receive any comments.

72. In Section 2E.05, a STANDARD sentence is added in paragraph 1 to provide that signs which are not illuminated must be retroreflective.

Also in this section, paragraph 4 recommends that all overhead sign installations should be illuminated unless an engineering study shows that retroreflection alone will perform effectively. The FHWA did not receive any comments.

73. In Section 2E.06 Characteristics of Urban Signing, the first paragraph adds item H concerning visual clutter from roadside development to the list of features which characterize urban conditions. Growth in business development and environmental changes make this an appropriate item to consider when installing signs since excessive signs may create information overload for some road users and may complicate the navigation task. The FHWA did not receive any comments.

Also in this section, the second paragraph contains a list of special sign treatments for improving travel on urban freeways and expressways. The FHWA is amending item H to this list as follows: "Frequent use of street names as the principal message in guide signs." This amendment improves the guidance information provided to road users. The FHWA did not receive any comments.

74. In Section 2E.08 Memorial Highway Signing, the GUIDANCE in paragraph 1 is expanded to include all freeways and expressways in the discussion of classes of highways that should not be signed as memorial highways. The FHWA did not receive any comments.

75. In Section 2E.09 Amount of Legend on Guide Signs, paragraph 1 clarifies the previous GUIDANCE in the 1988 MUTCD which addressed the appropriate number of destinations on major guide signs in general. The FHWA is changing the wording to clarify that not more than two destination names or street names should be shown on the following specific signs: Advance Guide signs or Exit Direction signs. The FHWA did not receive any comments.

76. In Section 2E.12 Designation of Destinations, paragraph 4 highlights the fact that AASHTO is responsible for the selection of control cities shown on guide signs.

77. In Section 2E.16 Abbreviations, the second paragraph in GUIDANCE provides for using periods on expressway and freeway signs. It provides that periods should not be used except when a cardinal direction is abbreviated as part of a destination name. The FHWA did not receive any comments.

78. In Section 2E.17 Symbols, paragraph 1 requires that symbol designs be essentially like those shown in the MUTCD and the "Standard Highway Signs Book."⁶

79. In Section 2E.19 Diagrammatic Signs, the FHWA in the NPA proposed as a STANDARD the requirement of showing only one destination for each directional arrowhead on diagrammatic signs. Based on comments to the docket by the Missouri Department of Transportation, the FHWA has decided to recommend rather than require the practice of showing only one destination for each arrowhead on a

⁶ "Standard Highway Signs," FHWA, 1979 Edition is included by reference in the 2000 MUTCD. It is available for purchase from the Government Printing Office, Superintendent of Documents, PO Box 371954, Pittsburgh, PA 15250-7954. It is available for inspection and copying at the FHWA Washington Headquarters and all FHWA Division Offices as prescribed in 49 CFR part 7.

⁵ Ibid.

diagrammatic sign. The recommended number of destinations is two for each sign. However, the FHWA recognizes that there are some special situations where there are more than two principle destinations at the interchange and changing this sentence to GUIDANCE provides more flexibility to State and local highway agencies.

80. In Section 2E.20 Signing for Interchange Lane Drops, the last sentence in paragraph 1 is added to prohibit the use of the EXIT ONLY panel on diagrammatic signs at any major bifurcation or split. This change is intended to eliminate a potentially confusing situation for road users. The FHWA did not receive any comments.

81. In Section 2E.21 Changeable Message Signs, the FHWA is including GUIDANCE in paragraph 3(a) to indicate that the desirable letter size for changeable message signs is 450 mm (18 inches) or a minimum letter size of 265 mm (10.6 inches). The FHWA is also including additional criteria (as discussed in MUTCD Part 6) for the use of changeable message sign.

82. In Section 2E.24 Lateral Clearance, paragraph 1 adds a discussion on the importance of the clear zone and breakaway supports when determining the horizontal clearance distance for sign installation.

83. In Section 2E.29 Interchange Exit Numbering, paragraph 2 increases the vertical dimension of the exit number panel from 600 mm (24 inches) to 750 mm (30 inches). This change is adopted because it improves the visibility of critical sign information for directing the road users to their destinations. Since the FHWA received comments from North Carolina, Missouri, and Minnesota Departments of Transportation expressing concern regarding the impact of implementing this change for existing installations, the FHWA is providing a phase-in compliance period of 7 years after the effective date of this final rule for existing installations to minimize any potential impact to State and local highway agencies. This period will allow for replacement of existing signs after the normal service life. This change takes effect immediately for all new installations.

Also in this section, the text in the OPTION statement is modified to recommend the use of milepost numbering as the preferred method for interchange exit numbering. Consecutive numbering is optional for those States which are still working towards changing over to milepost numbering. The FHWA received a docket comment from the Ohio

Department of Transportation suggesting this change.

Additionally in this section, the FHWA has included an OPTION to add the word "LEFT" to the exit number panel. Since left exits are generally fewer and tend to violate expectancy, the FHWA believes that this OPTION will help the road user identify proper lane placement prior to the exit.

84. In Section 2E.31 Advance Guide Signs, the paragraph 2 GUIDANCE statement includes placement of Advance Guide signs in advance of the exit gore. The distance of an Advance Guide sign is changed from "400m to 1km" to "1 to 2 km (1/2 to 1 mile)" from the exit gore. This change places the Advance Guide sign back further from the exit gore in order to provide more decision and reaction time to the road user. Although the FHWA did not receive any comments expressing concern with this change, the FHWA is providing a phase-in compliance period of 7 years after the effective date of this final rule for existing installations in order to minimize any potential impact to State and local highway agencies. This period will allow for replacement of the existing signs after their normal service life. This change is effective immediately for all new installations.

85. In Section 2E.33 Other Supplemental Guide Signs, paragraph 2 adds GUIDANCE for installing only one supplemental guide sign on each interchange approach. The FHWA did not receive any comments on this section.

86. In Section 2E.34 Exit Direction Signs, paragraph 2 prohibits the use of population figures or other similar information on Exit Direction signs. The FHWA did not receive any comments on this section.

Also in this section, the second GUIDANCE statement deletes the words "cantilevered support" and allows the Exit Direction sign to be installed on any overhead support located over the exit lane in advance of a gore point.

The change in the last sentence of Section 2E.34, paragraph 10 is revised from that proposed in the NPA in response to a docket comment from the Minnesota Department of Transportation. Instead of recommending that the Exit Direction sign should be mounted on the face of the overhead structure, the FHWA is changing this to an OPTION to allow more flexibility at those locations that may not have available overhead structures.

87. In Section 2E.41 Signing by Type of Interchange, paragraph 3 provides GUIDANCE that the signing layout should be similar for interchanges

which have only one exit ramp in the direction of travel. The FHWA did not receive any comments on this section.

88. In Section 2E.42 Freeway-to-Freeway Interchange, an OPTION is added for installing overhead guide signs at the 1 km (1/2 mile) and 4 km (2 mile) points. This OPTION is in addition to the required overhead guide signs at the 2 km (1 mile) point and at the theoretical gore of each connecting ramp.

89. In Section 2E.48 Closely-Spaced Interchanges, paragraph 1 is changed from that proposal in the NPA in response to a docket comment from the Minnesota Department of Transportation. Instead of mandating or requiring that the advance guide signs for the next interchange should be mounted on an overhead structure, the FHWA is changing the GUIDANCE to an OPTION in an effort to allow more flexibility at those locations that may not have available overhead structures.

90. In Section 2E.52 General Service Signs, paragraph 2 adds an OPTION that allows an action message, such as NEXT RIGHT, to be placed on general service signs which do not have exit numbers included on the sign. Figure 2E-38 has been added as an example. The FHWA did not receive any comments on this section.

Also in this section, paragraph 4, GUIDANCE is added that recommends the distances to services should be shown on general service signs when the service is more than 2 km (1 mile) from the interchange.

Additionally, paragraph 4a(1), is changed based on comments from the Ohio Department of Transportation and logo organizations in 9 States, which suggested that the FHWA delete tire repair from the list of criteria for selecting and installing general service signs for gas stations. The FHWA is adopting this modification since the majority of businesses offering gas today, no longer provide tire repair services. This same change applies to Section 2F.01, paragraph 8, item 1.

Also in this section, paragraph 4b(4), 4c(4), and 4f(3) are revised to add "modern sanitary facilities" as a criteria for food, lodging, and camping services.

Additionally, paragraph 4b(2) modifies the number of days that a food service, selected for general service sign, is open. The 1988 MUTCD showed 7 days per week, and the new edition states at least 6 days per week. This amendment also applies to Section 2F.01, paragraph 9, item D(b). This revision to the MUTCD is made in order to comply with the requirement of Federal law, Public Law 105-178, 112 Stat. 214, which was effective on June

9, 1998. There were no docket comments on this section.

Also in this section, a STANDARD is added which requires that general service signs that are operated on a seasonal basis shall be removed or covered during periods when the service is not available. This amendment reduces the chance of road users mistakenly leaving their routes only to find that the particular service is closed. The FHWA received no comments on this section.

91. In Section 2E.57 Radio Information Signing, paragraph 1 allows State and local highway agencies the OPTION of using a word message Radio-Traffic Information (D12-4) sign in conjunction with traffic management systems. The FHWA received no comments on this section.

Also in this section, paragraph 2 establishes three as the maximum number of frequencies shown on each Radio-Traffic Information sign. The FHWA did not receive any comments on this change.

Discussion of Adopted Amendments to Part 2F—Specific Service Signs

The FHWA received 800 comments from 47 commenters concerning Parts 2A, 2D, 2E, 2F, and 2I. Only the technical (not editorial) comments are addressed in this discussion. The notice of proposed amendments (NPA) was published at 63 FR 31950 on June 11, 1998.

92. Since the FHWA has combined chapters 2E and 2F of the 1988 MUTCD into one chapter, the new chapter for Specific Service Signs is Chapter 2F (formerly Chapter 2G in the 1988 MUTCD). There were no docket comments on combining Chapters 2E and 2F.

93. In Section 2F.01 Eligibility, paragraph 4 adopts Title VI of the Civil Rights Act of 1964 as a STANDARD for selecting eligible specific services. This is consistent with the requirements of other Federal programs. The FHWA received no docket comments on this section.

Also in this section, paragraphs 5 and 12 adopt a new specific service sign category for attraction signs. This increases the Specific Service Sign categories to five (gas, food, lodging, camping, and attractions). There were no docket comments on this section.

Additionally, paragraph 7 is changed from that proposal in the NPA as a result of docket comments received from six logo organizations suggesting that the FHWA modify the discussion for Specific Service Sign eligibility to include the following text shown in bold: "If facilities for the specific service

being considered are not available within the 5 km (3 miles) limit or choose not to participate in the program, then the limit of eligibility may be extended in 5 km (3 miles) increments until one or more facilities for the services being considered choose to participate or until 25 km (15 miles) are reached, whichever comes first." The FHWA is adopting this modification to give states more flexibility in the selection of eligible specific service facilities

In paragraph 9, item (A)(1), under GUIDANCE, the FHWA adds "alternative fuels" to the list of qualification criteria for specific service signs. No comments were received regarding this change.

94. The FHWA received 11 comments from representatives of various State logo organizations requesting that FHWA modify the proposed Section 2F.02 Application, paragraph 2, to allow for up to three types of services to be displayed on a specific service sign (example: gas, food, and lodging). The FHWA is adopting three types of specific services on one sign as the maximum along with the requirement that if three types of services are allowed on one sign, then the logo panels (businesses) shall be limited to two for each type of service. This would allow for a total of six logo panels per sign which is consistent with the STANDARD in Section 2F.04 Number and Size of Logos and Signs. The FHWA believes that this change will give the states more flexibility in the selection of specific service facilities.

Also in this section under the STANDARD statement, paragraph 2 is changed to delete the requirement for a separate sign for each type of specific service at freeway and expressway interchanges.

95. In Section 2F.04 Number and Size of Logos and Signs, the proposed paragraph 2 allowed a maximum of six logo panels for any specific service category shown on a sign. Based on 12 docket comments received from State Departments of Transportation, representatives of various motorist information services, and logo organizations, the FHWA is also amending paragraph 2 to allow a maximum of four logo panels for one of the two service types on the same sign (example: four food logo panels and two lodging logo panels). When four logo panels for one type of service are installed on a sign, the maximum number of logo panels still shall not exceed six. The FHWA believes that this change will give the States more flexibility in the selection of specific service facilities.

Also in this section, the maximum logo panel size for expressway intersections is increased from 900 mm × 600 mm (36 inches × 24 inches) to 1500 mm × 900 mm (60 inches × 36 inches). There were no docket comments on this section.

96. In Section 2F.05 Size of Lettering, Table II-5, "Letter and Numeral Sizes for Specific Service Signs" as shown in the 1988 MUTCD is deleted. In the 1988 MUTCD, a category 1 size was included for use on expressways where access to crossroads was provided by at-grade intersections. The FHWA is deleting Table II-5 and the related categories. The FHWA is adopting a minimum height of 250 mm (10 inches) for all letters and numerals on specific service signs on freeways and expressways, and 150 mm (6 inches) for signs on conventional roads and ramps. The FHWA is providing a phase-in compliance period of 10 years after the effective date of this final rule for existing signs to minimize any impact on State and local highway agencies. This change is effective immediately for new sign installations.

97. In Section 2F.06 Signs at Interchanges, the requirement for a separate Specific Service sign for each type of services is deleted.

Also in this section, paragraph 2 adds GUIDANCE that specific service ramp signs should be spaced at least 30 m (100 feet) from the exit gore sign, from each other, and from the ramp terminal. The FHWA received no docket comments on this section.

98. In Section 2F.07 Single-Exit Interchanges, paragraph 4 adds an OPTION to install the exit number panel on top of specific service signs on the freeway or expressway for the single-exit interchanges. There were no docket comments on this section.

99. In Section 2F.09 Signs at Intersections, paragraph 3 deletes the reference to a specific distance at which logo panels should not be displayed because they are visible from the roadway or highway. The FHWA believes that the State and local highway agencies should determine the acceptable visibility limits. The FHWA did not receive any comments regarding this change.

Also in this section, paragraph 6 adds an OPTION to install the NEXT RIGHT (LEFT) and other directional information below the logos on the specific service signs.

Discussion of Adopted Amendments to Chapter 2G—Tourist-Oriented Directional Signs.

The FHWA received 52 comments from 10 commenters concerning

Chapter 2G. Only the technical (not editorial) comments are addressed in this discussion. The notice of proposed amendments (NPA) was published at 64 FR 33802 on June 24, 1999.

100. In Section 2G.01 Purpose and Application, the FHWA is defining the term "tourist-oriented directional sign." The term "panel" is also defined in Chapter 1. The FHWA received no comments on the definition.

One commenter suggested defining "immediate area" in the first STANDARD or allowing the States to provide a definition in their State policy. The FHWA believes that defining "immediate area" is best addressed through State policy (Section 2G.07), and is revising that section to include a definition as an element of the policy.

A State transportation department pointed out that requiring the use of tourist-oriented directional signs in place of specific service signing may conflict with State statutes. To avoid conflict with State statutes, the FHWA believes that this text would be better addressed as GUIDANCE, and is changing the section accordingly. This change gives the needed encouragement without eliminating the flexibility that some agencies might need.

Three State transportation departments suggested uniform placement of tourist-oriented directional signs regardless of whether the facility and its on-premise advertising signs are readily visible or not from the roadway. Additionally, one State transportation department recommended a definition of "readily visible from the roadway" be included. The FHWA believes that for positive guidance, tourist-oriented directional signs should be installed regardless of whether or not the facility and/or its on-premise advertising is readily visible from the roadway. The FHWA has deleted this text from the GUIDANCE.

101. In Section 2G.02 Design, the FHWA is including a STANDARD that each tourist-oriented directional panel shall display only one eligible business, service or activity facility. None of the commenters disagreed with this change and the American Traffic Safety Services Association, Inc. commented favorably.

102. In Section 2G.03 Style and Size of Lettering, the National Committee on Uniform Traffic Control Devices (NCUTCD) recommended deleting the text related to the legend on rural roads. The FHWA agrees with this recommendation and removed it from the GUIDANCE. Using smaller letters on "less important rural roads" is not helpful to the unfamiliar road user. One

commenter suggested that text referencing the "Standard Alphabets for Highway Signs and Pavement Markings"⁷ be added. The FHWA agrees with this recommendation and is adding it to the STANDARD, since it is the design standard for letters, numerals, and spacing.

103. In Section 2G.04 Arrangement and Size of Signs, the FHWA limits the size of a tourist-oriented directional sign to a maximum of 1.8m (6 ft.). One commenter suggested that the limitation should be on the number of panels on the sign, rather than the physical size of the sign. The FHWA agrees that there should be a limitation on the number of panels as well as the size of the sign. A maximum sign size is specified to prevent visual obstructions.

Also, under the first GUIDANCE in Section 2G.04, it was proposed in the NPA that no more than three panels should be displayed on each sign. One State transportation department objected. The FHWA agrees because this may place an undue burden for sign removal on those jurisdictions with existing signs. Therefore, the FHWA will continue to allow display of four panels per tourist-oriented directional sign.

Several comments were received on the text regarding installation of intersection approach signs. The text in the first GUIDANCE contained conflicting language. The FHWA is revising the first GUIDANCE to allow for a straight ahead approach sign and is clarifying that intersection approach signs for tourist-oriented destinations to the left, right and straight ahead should be installed in advance of the intersection and that no more than four panels should be displayed on each sign. The FHWA is adding other clarifications to the text, based on the comments received, including: (1) Recommending the order in which signs should be installed; for consistency signs should appear in the following order: (a) The left turn sign should be located farthest from the intersection, (b) then the right turn sign, and (c) the straight ahead sign located closest to the intersection; (2) recommending that when there are multiple destinations in the same direction that the panels on the tourist-oriented directional sign should be displayed in order based on

the destination's distance from the intersection (the closest destination should appear first); (3) clarifying that the left, right or straight ahead turn panels may be combined on the same sign, but that the straight ahead sign should not be combined with a sign displaying both the left and right turn destinations, and (4) allowing signs for destinations in the straight ahead direction when there are signs for destinations in either the left or right direction.

104. In Section 2G.05 Advance Signs, the first OPTION regarding installation of advance signs in the NPA has been moved to the GUIDANCE statement in Section 2G.07 State Policy, which is a more appropriate location. Also, in Section 2G.05, the FHWA is including GUIDANCE to clarify that in cases where directional word messages such as NEXT RIGHT (LEFT) or AHEAD are appropriate for application, this additional information may be added to the 1.8m (6 ft) maximum sign height. None of the commenters disagreed with this change and the American Traffic Safety Services Association, Inc., commented in support of the change. One State transportation department objected to installation of the directional word messages above the business identification panels. The destinations on tourist-oriented directional signs and where to turn are priority information; therefore, the directional word message action should be shown first. There were several comments requesting sign dimensions be shown on the figures. The dimensions were inadvertently left off the figures in the NPA and the dimensions in the 1988 Manual will be used with the appropriate metric conversions.

105. Section 2G.06 Sign Locations, require that the location of all other traffic control devices shall take precedence over the location of tourist-oriented directional signs, and that tourist-oriented directional signs shall not obstruct the road user's view of other traffic control devices. None of the commenters disagreed with this change.

The NCUTCD and two other commenters objected to the exception, found in Section 2G.06 GUIDANCE, for the location of the straight ahead sign. The FHWA agrees and has deleted the exception. For positive guidance, a straight ahead business should have a sign in advance of the intersection.

Also in this section, one commenter suggested that the location of and distance between signs, for the advance signs was excessive. The FHWA believes that locating advance signs 1 km (1/2 mi) from the intersection is an appropriate distance, but agrees that the

⁷The "Standard Alphabets for Highway Signs and Pavement Markings," 1977 Edition, is published by the Federal Highway Administration. It may be obtained from the FHWA, Office of Transportation Operations, 400 7th Street, SW, Washington, DC 20590. It is available for inspection and copying at the FHWA headquarters and all FHWA Division Offices as prescribed at 49 CFR part 7.

spacing between signs is excessive and has reduced the distance to 152 m (500 ft). Since this is a shorter minimum distance than the current MUTCD, this will not have any impact on State or local highway agencies.

One commenter objected to the phrase in the OPTION paragraph. The Executive Order referenced in the comment was revoked by Executive Order 13132 dated August 4, 1999, and effective on November 2, 1999. However, the FHWA is modifying this paragraph by deleting "but within the right-of-way" to be consistent with other parts of the Manual which do not reference right-of-way limits for sign placement.

106. In Section 2G.07 State Policy, the FHWA proposed to add the equal opportunity criteria of Title VI of the Civil Rights Act of 1964 (Pub. L. 88-352, 78 Stat. 241) as a STANDARD condition for destinations to be eligible for tourist-oriented directional signs. One State transportation department and one State chapter of the Institute of Transportation Engineers objected to including civil rights requirements in the Manual, while the American Traffic Safety Services Association, Inc. supported their inclusion. The FHWA disagrees with these objections to include the civil rights requirements. This paragraph was added as a condition for destinations eligible for tourist-oriented directional signs, because most Federal programs require compliance with Title VI regulations. This paragraph is consistent with Chapter 2F Specific Service Signs.

Also in Section 2G.07, the GUIDANCE statement is revised to include a definition of "immediate area" for the area to be served. "Immediate Area" was used in the first STANDARD of Section 2G.01 Purpose and Application, of the NPA. In order to give the State highway agencies more flexibility, the FHWA believes that the definition is best addressed through State policy.

Discussion of Adopted Amendments to Chapter 2H—Recreational and Cultural Interest Area Signs

The FHWA received 46 comments from eight commenters concerning Chapter 2H. Only the technical (not editorial) comments are addressed in this discussion. The notice of proposed amendments (NPA) was published at 64 FR 33802 on June 24, 1999.

As proposed in the NPA, the FHWA is modifying the following recreational and cultural interest signs to improve their visibility and make the sign design less complex: Litter Container (RG-130), Ranger Station (RG-170), Picnic Area (RM-120), Laundry (RA-060), Sleeping

Shelter (RA-110) and Interpretative Trail (RL-130).

Also, the FHWA is adopting the following Forest Service symbols⁸ and will include them in the "Standard Highway Signs" book⁹ Motor Home (RM-200), Group Picnicking (RM-220), Group Camping (RM-210), Dog (RG-240), Seaplane (RG-260), Family Restroom (RA-150), Helicopter (RA-160), All-Terrain Vehicle (RL-170), Archer (RL-190), Hang Glider (RL-210), Fishing Pier (RW-160), Hand Launch for Boating (RW-170), Kayak (RW-190), Wind Surf (RW-210) and Chairlift for Skiing (RS-100). The FHWA has only included new or modified symbol signs in the revised manual.

None of the commenters disagreed with the modified or adopted symbols. However, one State transportation department recommended that we mandate that titles be used with the signs. The FHWA disagrees with the need for this clarification because Section 2A.13 permits an education plate to accompany a symbol sign that is not readily recognizable by the public.

107. In Section 2H.01 Scope, use of recreational and cultural interest signs is expanded by providing the OPTION of using these symbols on directional guide signs found on expressways and freeways. The American Traffic Safety Services Association supported the expanded use of these symbols. Two commenters opposed the expanded use of the symbols suggesting the possible overloading of road users with too many signs along freeways, especially in congested areas. The FHWA disagrees because the GUIDANCE in Section 2H.02 encourages agencies to adopt policies for recreational and cultural interest signing, and cautions agencies not to use them where they might be confused with other traffic control signs.

Also, in this section, the STANDARD paragraph has been removed. General signing requirements are covered in Chapter 2A.

108. In Section 2H.02 Application of Recreational and Cultural Interest Signs, one State transportation department recommended removing the text related

⁸ Based on a Memorandum of Understanding between the FHWA and the U.S. Department of Agriculture Forest Service, many of the symbols used by the Forest Service are adopted by reference in the MUTCD. These symbols are referred to as the "88 Forest Service Symbol Signs."

⁹ "Standard Highway Signs," FHWA, 1979 Edition is included by reference in the 2000 MUTCD. It is available for purchase from the Government Printing Office, Superintendent of Documents, PO Box 371954, Pittsburgh, PA 15250-7954. It is available for inspection and copying at the FHWA Washington Headquarters and all FHWA Division Offices as prescribed in 49 CFR part 7.

to nonvehicular events and amenities. The FHWA disagrees with the recommendation because the Manual has jurisdiction over the signing that leads road users to nonvehicular events and amenities such as trails, structures, and facilities.

109. In Section 2H.04 General Design Requirements for Recreational and Cultural Interest Area Symbol Signs, several commenters recommended including examples of the usage and series categories and one State chapter of the Institute of Transportation Engineers opposed the removal of the Category and Usage Chart. The FHWA agrees with this last recommendation. A Category Chart is included. This chart is similar to the Category and Usage Chart included in the 1988 Manual, except the road/type usage information has been removed. It is no longer appropriate to specify usage since the use of the symbols has been expanded to include both conventional roads and expressways and freeways.

Also, in Section 2H.04, the FHWA has removed the SUPPORT paragraph proposed in the NPA. The use of recreational and cultural interest symbol signs is discussed in Section 2H.01.

110. In Section 2H.05 Symbol Sign Sizes, sign information is discussed in paragraph format. The FHWA received no negative comments regarding the removal of Table II-7, "Sign Sizes." The American Traffic Safety Services Association recommended that a minimum size of 750 mm × 750 mm (30 in × 30 in) be used for expressway and freeway installation to ensure legibility and increase comprehension commensurate with today's higher speeds and complexities evidenced on these types of roadways. The FHWA agrees with this recommendation. The recommended expressway/freeway sign size text is contained in GUIDANCE.

111. In Section 2H.06 Use of Educational Plaques, GUIDANCE recommends that, if used, the educational plaque should be the same width as the symbol sign. None of the commenters disagreed with this change.

112. One State transportation department recommended deleting the proposed Section 2H.08 Color Format. The FHWA agrees with this recommendation and has removed Section 2H.08 as referenced in the NPA, because sign design requirements, including color, are addressed in Section 2H.04.

113. In Section 2H.08 Placement of Recreational and Cultural Interest Area Symbol Signs (referenced in the NPA as Section 2H.09), one State transportation department suggested that the exception to the vertical mounting height for

symbol signs on low speed, low volume roads is not necessary and may cause some signs to be installed so that they are no longer crashworthy. The FHWA disagrees with the recommendation to eliminate the exception. Chapter 2A of the Manual requires all signs within the clear zone to be mounted at 2.1 m (7 ft) in urban areas, and at 1.5m (5 ft) in rural areas.

114. In Section 2H.09 Destination Guide Signs (referenced in the NPA as Section 2H.10), one State transportation department recommended that both the recreational and cultural interest area symbol signs and destination guide signs be white on brown. The FHWA disagrees with the recommendation. The GUIDANCE lists the order of preference for use of shapes and colors. While rectangular, white on green is listed first, States may use rectangular, white on brown. This provides maximum flexibility to the States.

Also, in this section, one State transportation department recommended deleting the requirement that advance guide signs and exit direction signs have the white on green color combination where there are destinations other than a recreational or cultural interest area. The FHWA disagrees with the recommendation. Guide signs shall be white on green, except white on brown may be used when solely recreational or cultural interest area destinations are shown.

Several commenters recommended removal of the trapezoidal shape. The FHWA is retaining the GUIDANCE that allows use of the trapezoidal shape. However, the FHWA will consider this recommendation in the future after further study.

115. The FHWA received no objections to deleting Sections 2H.10 through 2H.15 of the 1988 Manual, as proposed in the NPA. These sections gave a general description of the categories of recreation and cultural interest symbol signs.

Discussion of Adopted Amendments to Chapter 2I—Emergency Management

The FHWA received 800 comments from 47 commenters concerning Parts 2A, 2D, 2E, 2F, and 2I. Only the technical (not editorial) comments are addressed in this discussion. The notice of proposed amendments (NPA) was published at 63 FR 31950 on June 11, 1998.

116. With the renumbering of Part 2, Chapter 2J is changed to Chapter 2I. The FHWA received a recommendation from the National Committee on Uniform Traffic Control Devices to change the title of Chapter 2I from "Signing for Civil Defense" to "Emergency

Management Signing." The FHWA has adopted this new title and has deleted reference to civil defense because the more prevalent concerns today are from emergency traffic management situations such as natural disasters and chemical warfare threats.

117. In Section 2I.02 Design of Emergency Management Signs, the Civil Defense symbol is deleted from the evacuation route sign. The evacuation route plaque number is changed from CD-1 to EM-1. All of the emergency management sign numbers discussed in Chapter 2I now have the EM prefix.

118. In Section 2I.04 Area Closed Sign, the reference to "dangerous radiological or biological contamination" is deleted since the AREA CLOSED sign is not limited to these type areas but can be used for other emergencies such as natural disasters. The AREA CLOSED sign number is EM-2.

119. In Section 2I.05, the title is changed from "Traffic Regulation Post Sign" to "Traffic Control Point Sign." The FHWA believes that this is a more appropriate title since these signs are used at checkpoint locations where traffic is stopped and controlled by designated officials.

The sign number for the TRAFFIC CONTROL POINT sign is EM-3.

120. In Section 2I.07, the title is changed to include both a ROAD USE PERMIT REQUIRED FOR THRU TRAFFIC (EM-5) sign or an AREA USE PERMIT REQUIRED FOR THRU TRAFFIC (EM-5a) sign. There may be situations when the area use permit may be the more appropriate signing message. Therefore, the FHWA has included the OPTION to use this message as an alternative.

121. In Section 2I.09, the title is changed to "Shelter Directional Sign" which is a more general heading than "Fallout Shelter Directional Sign." The Shelter Directional Signs may carry one of the following legends: EMERGENCY SHELTER, HURRICANE SHELTER, FALLOUT SHELTER, or CHEMICAL SHELTER.

Discussion of Proposed Amendments to Chapter 2A Which Were Not Adopted

122. In Section 2A.03, the FHWA has deleted the OPTION sentence which indicated that traffic engineering judgment or studies may show that signs would be unnecessary at certain locations. By definition, the purpose of engineering judgment and studies is to determine whether or not a sign or other traffic control device is needed.

123. In Section 2A.18, paragraph 1, the FHWA has decided not to adopt the proposal to require the minimum

mounting height of 2.1 m (7 feet) for all signs. This decision is based on crash-worthiness research results¹⁰ which did not justify universal application of the increased mounting height. It is also based on docket comments received from 8 county highway agencies which opposed the increased mounting height for all signs. The minimum mounting height will remain at 5 feet for rural areas and 7 feet for urban areas where parking and other obstructions to view may occur. This minimum mounting height does not preclude the installation of signs at higher heights.

Discussion of Not Adopted Amendments to Chapter 2E—Expressway and Freeway Guide Signs

124. In Section 2E.29, paragraph 2, the FHWA has decided not to adopt the amendment to increase the vertical dimension of the exit number sign panel from 600 mm (24 inches) to 750 mm (30 inches). The FHWA received comments from North Carolina, Missouri and Minnesota Departments of Transportation expressing disagreement with the idea of increasing the vertical dimension of the exit number sign panel to 30 inches, particularly in the absence of specific data to indicate that the 24 inch panels are not performing adequately. The FHWA agrees and will revisit as part of a future research study.

Discussion of Not Adopted Amendments to Chapter 2F—Specific Service Signs

The FHWA received 800 comments from 47 commenters concerning Parts 2A, 2D, 2E, 2F, and 2I. Only the technical (not editorial) comments are addressed in this discussion. The notice of proposed amendments (NPA) was published at 63 FR 31950 on June 11, 1998.

125. In Section 2F.02, paragraph 4, the FHWA has decided not to limit the use of the ATTRACTION to expressways and freeways since in paragraph 5, the other specific service categories may be used on any class of highway.

Discussion of Adopted Amendments to Part 3—Markings

The FHWA received 352 comments from 40 commenters concerning Part 3 under docket number 96-47 (in mid-1997 this docket was scanned into the U.S. Dockets Facility as FHWA-1997-2295 and may be retrieved

¹⁰ Marzougui, Dhafer; Bedewi, Nabih; Meczkowski, Leonard; and Taylor, Harry W.; "Sign Support Height Analysis Using Finite Element Simulation." Presented at International Journal on Crash Conference, September 6-8, 2000. To be published in the International Journal on Crash.

electronically with this number). Also, the FHWA received 181 comments from 27 commenters in response to docket number 99-6575. The two notices of proposed amendments (NPA) were published at 62 FR 691 on January 6, 1997, and at 64 FR 73612 on December 30, 1999. Only the technical (not editorial) comments are addressed in this discussion.

126. Chapter A, General Principles, of the 1988 MUTCD is renamed "General." Several sections within this chapter are more appropriately relocated to Chapter B as follows: (a) Section 3A.08 is moved to 3B.08 Extensions Through Intersections or Interchanges, (b) Section 3A.09 is moved to 3B.15 Transverse Markings, and (c) Section 3A.10 is moved to Section 3B.07 Warrants for Use of Edge Lines. Section 3A.07 of the 1988 MUTCD discussed the different types of yellow and white lines. This discussion was reorganized and moved to Section 3B. Each type of line in Section 3A.07 is now discussed in the first six sections of Section 3B, which is organized by color of longitudinal lines.

127. In Section 3A.06 Widths and Patterns of Longitudinal Line Markings, the FHWA is adding to the OPTION statement a recommended ratio for line segments and gaps for "dotted lines." One comment was received from a State highway agency recommending that a definition be provided for the wording "or longer gaps." Since the proposed text did not contain any guidance on the maximum spacing of the longer gaps, the FHWA is including an OPTION statement recommending a maximum ratio of 1:3 for line segments and gaps, respectively, for dotted lines.

128. The section headings on Chapter B, Pavement and Curb Markings, are renamed and reorganized to read as follows:

- 3B.01 Yellow Longitudinal Line and Left Edge Line Pavement Markings and Warrants
- 3B.02 No-Passing zone Markings
- 3B.03 Other Yellow Longitudinal Pavement Markings
- 3B.04 White Longitudinal Line and Right Edge Line Markings and Warrants
- 3B.05 Other White Longitudinal Pavement Markings
- 3B.06 Edge Line Markings
- 3B.07 Warrants for Use of Edge Lines
- 3B.08 Extensions Through Intersections or Interchanges
- 3B.09 Lane Reductions Transition Markings
- 3B.10 Approach Markings for Obstructions
- 3B.11 Raised Pavement Markers

- 3B.12 Raised Pavement Markers as Vehicle Positioning Guides with Other Longitudinal Markings
- 3B.13 Raised Pavement Markers Supplementing Other Markings
- 3B.14 Raised Pavement Markers Substituting for Pavement Markings
- 3B.15 Transverse Markings
- 3B.16 Stop and Yield Lines
- 3B.17 Crosswalk Markings
- 3B.18 Parking Space Markings
- 3B.19 Pavement Word and Symbol Markings
- 3B.20 Speed Measurement Markings
- 3B.21 Curb Markings
- 3B.22 Preferential Lane Word and Symbol Markings
- 3B.23 Preferential Lane Longitudinal Markings for Motorized Vehicles
- 3B.24 Markings for Roundabouts
- 3B.25 Markings for Other Circular Intersections
- 3B.26 Speed Hump Markings
- 3B.27 Advance Speed Hump Markings

129. Sections 3B.01 Yellow Longitudinal Line and Left Edge Line Pavement Markings and Warrants, 3B.02 No-Passing Zone Markings, and 3B.03 Other Yellow Longitudinal Pavement Markings (all referenced in the NPA as Section 3B.01); Section 3B.04 White Longitudinal Line and Right Edge Line Markings and Warrants, and Section 3B.05 Other White Longitudinal Pavement Markings (both referenced in the NPA as 3B.02); and 3B.06 Edge Line Markings, and 3B.07 Warrants for Use of Edge Lines (both referenced in the NPA as Section 3B.03), are modified to include the provisions of the amendments on standards for center line and edge line markings published as a Final Rule at 65 FR 9 on January 3, 2000. There were 96 commenters on the proposed amendments to include the center line and edge line Final Rule into the proposed Section 3B.01 and 3B.03. Sixty-one commenters opposed the proposed text, and 45 of these commenters suggested two technical corrections. Most of the comments opposed to the proposed text were concerned about the warrants for center line and edge line markings which required edge lines on rural roads before center lines. The FHWA agreed with the comments and changed the text to make the warrants for rural center line and edge line markings consistent. Many commenters suggested a technical correction concerning the ADT values in the proposed warrants. The discussion in the final amendments of January 3, 2000 on center line and edge line markings (65 FR 9, January 3, 2000) stated that "The FHWA believes that jurisdictions should be aware of the average daily traffic (ADT) volumes and

widths of the major roadways now specified in the standards and that the ADTs are an estimate that can be performed at a jurisdiction's judgment." The FHWA agrees with the commenters and included a SUPPORT statement "If a traffic count is not available, the ADTs described in this section can be estimates that are based on engineering judgment." Many comments included suggestions that were addressed in the final rule published on January 3, 2000. Many commenters also suggested revisions lowering the STANDARDS, which cannot be accepted because it would adversely impact safety to the traveling public.

As noted in the final amendments for center line and edge line pavement markings, dated January 3, 2000, the compliance date for these sections is January 3, 2003 or when pavement lane markings are replaced within an established pavement marking program, or when the highway is resurfaced or reconstructed, whichever date is earlier.

130. Section 3B.01 Yellow Longitudinal Line and Left Edge Line Pavement Markings and Warrants, now contains GUIDANCE on the speed definition in the warrants for no-passing zones at curves which was in the 1988 MUTCD in Section 3B.05. The text in the NPA for these warrants reduced the minimum passing sight distances because it was based on posted or statutory speed limits as shown in Table 3B-1. In the 1988 MUTCD, the minimum passing sight distances were determined based on the greater of the off-peak 85th percentile speed or the posted speed limits. The FHWA received eight comments that opposed deleting the use of the 85th percentile speed because using the 85th percentile improves safety. Accordingly, the FHWA is returning to the use of the 85th percentile speed because it agrees that this improves safety.

131. In Section 3B.02 No-Passing Zone Pavement Markings and Warrants, the FHWA is changing the first paragraph of the first OPTION to be consistent with Section 8B.16 Pavement Markings, the STANDARD for highway-rail grade crossings. The STANDARD will read: "No-passing zone markings shall be used on approaches to highway-rail grade crossings in conformance with Section 8B.16 Pavement Markings." The second paragraph of the first OPTION will remain an OPTION and will read: "No-passing zone markings may also be used at other locations where the prohibition of passing is appropriate."

132. In Section 3B.04 White Longitudinal Line and Right Edge Line Markings and Warrants, and Section 3B.05 Other White Longitudinal

Pavement Markings (referenced in the NPA as 3B.02 White Longitudinal Line Markings), 11 commenters had concerns about specific wording in the text or details about the figures as proposed and suggested technical or editorial revisions to make them acceptable. Of these suggested revisions, five concerned lane lines within a crosswalk. The FHWA agrees with these comments and the lines are removed from within the crosswalks.

After the NPA was published at 62 FR 691 on January 6, 1997, the FHWA noted that text requiring lane line markings was inadvertently omitted from the proposed amendment and was included in the updated text published 64 FR 73612 on December 30, 1999. One comment, received in response to the second NPA, noted that the standard for lane lines on Interstate highways was omitted from the proposed text and that it should be reinserted. The FHWA agrees and is including this STANDARD in the final text.

133. The FHWA is revising the STANDARD for the extension of dotted lines through intersections in Section 3B.08 Extensions Through Intersections (referenced in the NPA as 3B.04 Extensions Through Intersections or Interchanges). One commenter was opposed to the color being the color of the line extended, rather than the color of the line to which it is extended. One commenter was opposed to the width of the marking being the same as the line it extends. The FHWA believes that the proposed text is appropriate because it will provide the most consistent application of dotted line extensions. The FHWA will retain the proposed text in the final version.

Also in this section, paragraph 2, the FHWA added Figure 3B-11, sheet 2 of 2, Typical Pavement Marking Applications (referenced in the NPA as Figure 3-9a, Typical Pavement Marking Applications), to show more examples of the use of dotted line markings in intersections. This figure was in response to older driver research that shows that motorists benefit by having these additional markings. The FHWA received nine, mostly editorial, comments. Two commenters suggested reducing the GUIDANCE to an OPTION which would reduce safety. One commenter suggested adding curvature of the roadway to the list of examples where line extensions should be considered. The FHWA agrees to include “* * * on curved roadways * * *” into the final text.

134. In Section 3B.13 Raised Pavement Markers Supplementing Other Markings, and 3B.14 Raised Pavement Markers Substituting for

Pavement Markings (both referenced in the NPA as 3B.07 Raised Pavement Markers, Retroreflective and Non-Retroreflective), the FHWA received 21 comments about raised pavement markers. Two comments, from northern States, opposed the minimum height of the raised pavement marker. Since the height definition is SUPPORT and not a STANDARD or GUIDANCE, the proposed text is retained. Seven of the comments proposed technical changes to the spacing of the raised pavement markers. Since the space of raised pavement markers is GUIDANCE, the proposed text will be retained until research indicates that different spacing would provide better information to road users. The FHWA received no comments, however, about the color of raised pavement markers conforming to the color of the pavement marking where they are placed. The FHWA received five comments about the use of raised pavement markers at right edge lines. Two comments addressed the use of raised pavement markers in construction work zones. One comment recommended that raised pavement markers be permitted, and another opposed the use of raised pavement markers on right edge lines. Several commenters agreed that raised pavement markers should not be used on right edge lines. Since there is not a consensus on using raised pavement markers on right edge lines at this time, the FHWA is retaining the proposed GUIDANCE that raised pavement markers should not supplement right edge line markings.

135. In Section 3B.16 Stop and Yield Lines (referenced in the NPA as Section 3B.09), paragraphs 2, 4, and 6, the FHWA is adding an optional “Yield Line” marking for use where it is important to indicate the point behind which vehicles are required to yield. Figure 3-24, Typical Yield Line Layout, provides an illustration of these markings. The FHWA received ten comments. Five of the comments opposed the proposal and indicated that the proposed markings were not needed. The FHWA believes that improved public awareness of yield line markings will lead to consistency in the use of the stop line marking for mandatory stops and the yield line when a yield is the appropriate action. Since these markings would be optional, State and local highway agencies would not be required to use them.

Also in this section, the FHWA received one comment which suggested that the wording of the following phrase be clarified as follows: “Where through lanes of traffic approaching an intersection become the mandatory turn

lanes.” The FHWA is incorporating the above underlined words into the final text to clarify the sentence. The FHWA received two comments suggesting reductions to the use of blue markings to designate parking spaces for persons with disabilities. The FHWA believes the suggestions would reduce the visibility of the markings and is adopting the text as proposed in the NPA.

136. In Section 3B.19 Pavement Word and Symbol Markings (referenced in the NPA as Section 3B.12), third OPTION, paragraph 5, the FHWA is adding a “Yield Ahead” triangle symbol marking for optional use in advance of intersections where approaching traffic will encounter a YIELD sign. Figure 3B-24 provides an illustration of these markings. The FHWA received 14 comments, of which only four opposed the proposal. Three comments addressed text and figures that had not changed from the 1988 MUTCD and that will be retained. Only one comment opposed the proposed yield ahead markings. The FHWA is adopting the yield ahead marking as proposed in the NPA.

Also in Section 3B.19 Pavement Word and Symbol Markings, second SUPPORT, the second paragraph states: “Where crossroad channelization of ramp geometry do not make wrong-way movements physically difficult, guidance to a potential wrong-way road user can be provided by placing a lane-use arrow * * *.” The FHWA is changing this SUPPORT to GUIDANCE to be consistent with the GUIDANCE, paragraph B, in Part 2E.50 Wrong-Way Traffic Control at Interchange Ramps which states “Where crossroad channelization or ramp geometrics do not make wrong-way movements difficult, a lane-use arrow should be placed in each lane * * *.”

137. In Section 3B.22 Preferential Lane Word and Symbol Markings (referenced in the NPA as Section 3B.13), the FHWA is differentiating between types of preferential lanes. The diamond pavement marking symbol is for exclusive HOV lane use. In situations where a preferential lane is not an HOV lane, then the word message (Bus, Taxi, etc.) or symbol (Bike, etc.) for the type of traffic allowed would be used. The FHWA received three comments that suggested editorial changes to this section, and it has made one minor editorial change to the second STANDARD, paragraph 2, to include a reference to Figure 3B-25.

138. In Section 3B.21 Curb Markings (referenced in the NPA as 3B.15), paragraph 5, the FHWA is adding paved median noses to the locations that

should have retroreflective solid yellow markings. This addition is made in response to recommendations for older drivers¹¹, which shows the benefits of having these additional markings. The FHWA received two comments which suggested that the text be changed to an OPTION, and one technical comment that suggested that additional guidance be included on the placement of the markings. The FHWA is adopting the text as proposed in the NPA because the FHWA believes that retroreflective markings should be placed to increase the visibility of paved median noses. The FHWA also believes that the portion of the paved median nose that should be marked should be left to each jurisdiction's judgment.

139. In Section 3B.23 Preferential Lane Longitudinal Markings for Motorized Vehicle (referenced in the NPA as Section 3B.16), is added to provide the STANDARDS for longitudinal lane line markings for physically and non-physically separated, reversible and non-reversible, and left and right side concurrent flow preferential lanes for motorized vehicles. Table 3B-2 was added to list the standards in a tabular format. Figure 3B-25 provides an illustration of these markings.

Furthermore, GUIDANCE is added on marking the neutral area between a preferential use lane and a regular traffic lane, when the distance between them is greater than 1.2 m (4 ft). The FHWA received eight comments concerning this section. Several comments were about showing a double yellow centerline on the figures. The FHWA believes that since the figures clearly show that there is a median, the use of a double yellow centerline is not appropriate. One commenter suggested using a double white dashed line for the right lane line on concurrent flow HOV lanes. Another commenter suggested that the double wide white longitudinal lines should be double normal white longitudinal lines. The FHWA believes that the longitudinal lines shown in the proposed figures provide reasonable options which will promote uniformity of markings to the road users. The FHWA is retaining the proposed figures in the final version.

140. Section 3B.24 Markings for Roundabouts (referenced in the NPA as Section 3B.17), Figure 3B-26 (referenced in the NPA as Figure 3-26), Typical Markings for Roundabouts with One Lane, and Figure 3B-27, Typical

Markings for Roundabouts with Two Lanes, (referenced in the NPA as Figure 3-27), are added to incorporate standard markings for roundabouts to the MUTCD. The FHWA disagrees with one commenter opposed to this section which suggested a reduction from GUIDANCE to OPTION. The FHWA did receive 14 editorial comments on the text and figures and they are incorporated as minor modifications to the text.

141. Section 3B.25 Markings for Other Circular Intersections (referenced in the NPA as Section 3B.18), is added to incorporate optional standard markings for other circular intersections including rotaries, traffic circles, and residential traffic calming designs. Figures 3B-26, Typical Markings for Roundabouts with One Lane, and 3B-27, Typical Markings for Roundabouts with Two Lanes, provides illustrations of typical markings for other circular intersections. The FHWA received one comment about the placement of the crosswalk in advance of the yield line in the figures. The FHWA believes that the location of the crosswalk in advance of the yield lines as shown in the figures provides the shortest and safest location for pedestrians to walk. The FHWA will retain the proposed figures in the final version.

142. Section 3B.26 Speed Hump Markings (referenced in the NPA as Section 3B.19), is added to provide pavement markings to assist motorists in identifying the locations of speed humps. Figures 3B-28, Pavement Markings for Speed Humps, and 3B-29, Pavement Markings for Speed Humps, provide illustrations of typical speed hump markings. The FHWA received 11 comments, none of which opposed having speed hump markings. Most, however, were concerned that the markings were excessive and would be difficult to maintain. The FHWA is retaining the text and figures because these markings are optional and the FHWA is not convinced that the alternate markings are better.

143. Section 3B.27 Advance Speed Hump Markings (referenced in the NPA as 3B.20), is added to provide pavement markings to assist motorists in identifying the locations of speed humps. Figure 3B-30, Advance Warning Markings for Speed Humps, provides an illustration of typical advance warning markings for speed humps. The FHWA received four comments. One commenter stated that the advance warning for speed hump markings should not be used because they are similar in appearance to stop lines. The FHWA disagrees with the commenter, because the advance warning markings

are a series of transverse bars located in advance of a speed hump, which would not be found at an intersection where a stop bar is located.

144. In Section 3F.02 Channelizing Devices, the FHWA received seven comments on a new STANDARD that states that the color of cones and tube markers used outside construction and maintenance areas shall be the same as the pavement markings. Three comments had concerns about allowing orange as the color of a tubular marker on a white or yellow lane line. One commenter wanted the STANDARD to be more restrictive by excluding orange as a substitute color. Another commenter called the STANDARD difficult to achieve and enforce in practice. The third commenter suggested orange as the predominant color, with permanently mounted tubular markers to be only white. The FHWA will adopt the proposed wording because orange is a universal color for cones and tubular markers. While it is preferable that the color of cones in non-work zones match the color of line that they supplement or are substituted for, the FHWA believes motorists will understand if orange cones or tubular markers are used.

Discussion of Adopted Amendments to Part 4—Highway Traffic Signals

The FHWA received 842 comments from 135 commenters concerning Part 4. Only the technical (not editorial) comments are addressed in this discussion. Two notices of proposed amendments (NPA) were published at 62 FR 691 on January 6, 1997, and 64 FR 73612 on December 30, 1999.

145. For Section 4A.02 Definitions Relating to Highway Traffic Signals, the FHWA reviewed the text of Part 4 to ensure all terms that need to be explained are defined in this section and that all terms in the definitions are used in the text. Based on this review, the FHWA is adding new definitions for the terms "signal housing" and "walk interval" because these terms are used in the text of Part 4, but were never defined. The definition for "signal installation" is removed because it is no longer used in the text. This section is significantly expanded from four definitions to seventy-one definitions that are being used throughout Part 4.

146. In Section 4C.01 through 4C.09 concerning warrants, the number of warrants are increased from seven, as noted in the 1997 NPA, to eight (The School Crossing Warrant, which was moved to Section 7D.04 in the 1997 NPA, is being moved back to Chapter 4C to keep all the signal warrants together, eliminating the need for the reader to

¹¹ "Older Driver Highway Design Handbook," Report No. 1 FHWA-RD-97-135, available from the FHWA Research and Technology Report Center, 9701 Philadelphia Court, Unit Q, Lanham, Maryland 20706.

use two parts of the MUTCD. See 62 FR 693). The FHWA did not receive any comments opposed to moving the school crossing warrant from Part 7 back to Part 4.

147. The FHWA inadvertently omitted Section 4C.06 Warrant 5, School Crossing, from the previous NPAs. Section 4C.06 is essentially the same as the 1988 version, with some minor exceptions. The exceptions are:

(1) A new SUPPORT paragraph explaining that the School Crossing Warrant is to be applied in instances where school children crossing the street is the principal reason to consider installing a traffic signal. The FHWA is deleting this paragraph from Warrant 4, Pedestrian Volume, and moving it to Section 4C.06.

(2) To be more consistent with the other STANDARD wording used in the MUTCD, the statement concerning the need for a traffic control signal is changed from "may be warranted when * * *" to "shall be considered when * * *."

(3) To match the other chapters in Part 4, the FHWA is adding a new STANDARD paragraph which will indicate that, before deciding to install a traffic control signal, "consideration shall be given to implementation of other remedial measures."

(4) To match Warrant 4, Pedestrian Volume, a new STANDARD paragraph is added to Warrant 5 which will state that the School Crossing warrant shall not be applied within 300 feet of another traffic signal, unless the proposed signal will not restrict the progressive movement of traffic.

(5) Due to a desire to assist in the reduction of traffic congestion, a new GUIDANCE paragraph is added that states, "If installed within a signal system, the traffic control signal should be coordinated."

(6) The use of pedestrian detectors is changed from an OPTION to a GUIDANCE to match Warrant 4, Pedestrian Volume. The GUIDANCE now reads, "At an intersection, the traffic control signal should be traffic-actuated and should include pedestrian detectors."

(7) The FHWA is deleting the sentence from the 1988 MUTCD which reads, "Special police supervision and/or enforcement should be provided for a new non-intersection installation" because the effectiveness of this depends on the local traffic characteristics and should be determined by local engineering judgment.

148. In Section 4D.04 Meaning of Vehicular Signal Indications, the FHWA is retaining the phrase "Unless

otherwise determined by law" in the first paragraph under STANDARD. Two comments were received, both in opposition to the proposal to delete this phrase in the January 1997 NPA on the basis that the proposed deletion would infringe on the States' rights to have additional or different meaning of signal indications. The FHWA withdrew this proposal in the December 1999 NPA and put the phrase back in this section. The FHWA encourages States and local entities to achieve uniform rules of the road that are in accord with chapter 11, Rules of the Road, in the "Uniform Vehicle Code (UVC) and Model Traffic Ordinance," 1992, published by the National Committee on Uniform Traffic Laws and Ordinances, Alexandria, Virginia.¹²

149. In Sections 4D.04, 4D.05, 4D.06, 4D.07, 4D.08, 4D.11, and 4D.16, the text concerned with the use of red arrows is being retained in the MUTCD. In the 1999 NPA, it was suggested that this text be removed for reasons of motorist confusion as to the meaning of the red arrow indication. Comments were received from 8 States, 21 cities, 6 counties, 8 consultants, the National Committee on Uniform Traffic Control Devices (NCUTCD), and 9 others that objected to the removal of the red arrow from the MUTCD. Most of the comments pointed out that the red arrow has now been in widespread use for many years, and drivers, including older drivers, understand its meaning and are using it safely. It was pointed out that the research summarized in the "Older Driver Highway Design Handbook"¹³ was conducted shortly after the red arrow was introduced; therefore, the education of the motoring public, especially older drivers, was still underway. Most of the comments also pointed out that significant funds would need to be spent to convert to circular red displays for protected only mode left-turn phases, including adding LEFT TURN SIGNAL signs on span wires and mast arms, some of which might not be able to handle the additional load. No comments supporting the removal of red arrows were received. The FHWA agrees with these comments and has decided to retain the text concerned with the use of red arrows in the MUTCD.

150. In Section 4D.05 Application of Steady Signal Indications, three commenters questioned the accuracy of

item d(3) of the NPA that states a YELLOW ARROW can be terminated by a CIRCULAR YELLOW. The FHWA agrees that this statement is inaccurate and is removing the phrase, "a CIRCULAR YELLOW indication or" from this section. Also, the revised text is now part of item E4 of this section.

151. In Section 4D.06 Application of Steady Signal Indications For Left Turns, the 1999 NPA proposed to add a new STANDARD statement and a new OPTION statement in an attempt to favor the leading protected only mode left-turn phases over the other types of left-turn phasing based on the "Older Driver Highway Design Handbook." Comments were received from ten cities, one county, the NCUTCD, and three others that objected to the inclusion of these paragraphs in the MUTCD. Most of the comments mentioned that the decision as to the type of left-turn phasing to use should be made on a case-by-case basis and that a proliferation of leading protected only mode left-turn phases would not be in the interest of anyone, including older drivers. Because there are many legitimate uses for both protected/permissive and lagging left-turn phases, the FHWA is replacing these two paragraphs with an OPTION paragraph regarding special consideration for older drivers in the design of left-turn phasing.

Also in this section, four cities asked that clarifying text allowing the use of "Dallas phasing" be added in compliance with the 1993 interpretation request by the Texas Department of Transportation. "Dallas phasing" provides for a protected/permissive (five section) signal to display a circular green for the left turn approach while the through movement approach signal displays a circular red. The FHWA interpreted the MUTCD "to permit "Dallas phasing" if the five section display for the left turn is shielded, hooded, louvered, positioned or designed so that the left turn signal displays are not seen by the through movement driver." Based on these requests, the FHWA is adding a second means of providing protected/permissive mode left-turn phasing. This second means involves an exclusive left-turn signal face instead of a shared left-turn signal face. Therefore, "Dallas phasing" is allowed in both of the above described situations.

152. In Section 4D.12 Flashing Operation of Traffic Control Signals, the FHWA received one comment that additional information needs to be added to clarify the procedures for changing from flashing to steady mode. The FHWA is adding language to this

¹² National Committee on Uniform Traffic Laws and Ordinances, 107 S. West St, #110, Alexandria, VA 22314.

¹³ "Older Driver Highway Design Handbook," Report No. 1 FHWA-RD-97-135, available from the FHWA Research and Technology Report Center, 9701 Philadelphia Court, Unit Q, Lanham, Maryland 20706.

section describing the process of changing from either a yellow-red or a red-red flashing mode to a steady mode. This additional language is needed to ensure a safe transition from a flashing to a steady (stop-and-go) operation.

Another commenter stated that a new GUIDANCE paragraph needs to be added to Section 4D.12 to recommend that, for any steady red clearance interval provided during the change from red-red flashing mode to steady (stop-and-go) mode, the minimum duration should be 6 seconds. The FHWA agrees and is adding a new GUIDANCE paragraph to this section.

153. In Section 4D.13 Preemption and Priority Control of Traffic Control Signals, one comment was received that revisions need to be made regarding the shortening or omission of pedestrian intervals in priority control sequences. The FHWA is adding text to this section's STANDARD paragraph to clarify that pedestrian intervals may be omitted if the entire vehicular phase is also omitted.

154. In Section 4D.15, the FHWA is changing the title from "Number and Location of Signal Faces by Approach" to "Size, Number, and Location of Signal Faces by Approach." This was done based one comment suggesting the information on the size of signal faces is more appropriately contained in this section than as shown in Section 4D.16 Number and Arrangement of Sections in Signal Faces, in the 1999 NPA.

Also in Section 4D.15, a new paragraph D is added to the first GUIDANCE statement listing a fourth recommended reason to use 12 inch signals. This new GUIDANCE is to use 12 inch signals at locations where there is a significant percentage of elderly drivers. Comments received from two States, two cities, the NCUTCD, and one consultant objected to the inclusion of this paragraph in the SUPPORT statement of Section 4D.16 as proposed in the 1999 NPA. Most of the commenters stated that the STANDARDS and GUIDANCE found elsewhere in Chapter 4D adequately address the decision as to which size lenses to use. The FHWA decided the new paragraph D was a more appropriate location for this information.

155. In Section 4D.16, the FHWA is changing the title from "Number and Arrangement of Sections in Signal Faces" to "Number and Arrangement of Signal Sections in Vehicular Traffic Control Signal Faces." This was done based on a comment suggesting the need to clarify that this section deals only with vehicular traffic control signals. This allows items a, c, and d to be

deleted from the proposed STANDARD paragraph since they are not vehicular traffic control signals.

156. In Section 4D.17 Visibility, Shielding, and Positioning of Signal Faces, the FHWA has removed the first sentence of the last SUPPORT paragraph listed in the 1999 NPA. Comments received from three States, three cities, the NCUTCD, and two consultants objected to the inclusion of this sentence describing the size of the backplates in the MUTCD. Most of the comments noted that the use of backplates three times the diameter of the signal would cause infrastructure problems because of inordinate size; a backplate of that size is not needed.

Also in this section and in response to a comment, proposed paragraph 3 in the 1999 NPA under the STANDARD statement, and proposed paragraph 5 in the 1999 NPA under the GUIDANCE statement, are removed because it is not appropriate to aim signal heads in a direction that does not serve drivers at the stop line. Most agencies provide an additional signal face if one is needed to attract the attention of drivers approaching a signal on a curved approach. The FHWA is also adding an OPTION to address the possibility of providing an additional head on the approach.

In response to another comment, the FHWA is adding a GUIDANCE paragraph to Section 4D.17 about the preferability of using visors instead of louvers. The FHWA is adding this paragraph since visors are preferred because they do not diminish light output.

157. In Section 4D.20 Temporary Traffic Control Signals (referenced in the NPA as Section 4D.19), the FHWA is revising the text to remove references to portable traffic control signals (except for the definition of a portable traffic control signal) because a portable traffic control signal is a temporary traffic control signal that is easily moved. Also, the STANDARDS, GUIDANCE, and SUPPORT in this section deal with both portable and temporary. The FHWA is changing the definition of a portable traffic control signal to, "A portable traffic control signal shall be defined as a temporary traffic control signal that is designed so that it can be easily transported and reused at different locations."

158. The FHWA is adding two new sections, 4E.06 Accessible Pedestrian Signals and 4E.08 Accessible Pedestrian Signal Detectors, to provide GUIDANCE and STANDARDS for accessible pedestrian signals and accessible pedestrian signal detectors. Text related to accessible pedestrian signals has also

been added in various other sections, such as Sections 4C.01 and 4D.03. This was done in response to numerous comments that were received, including 65 comments from the U.S. Architectural and Transportation Compliance Board and 16 comments from The Environmental Access Committee of Division Nine of the Association for Education and Rehabilitation of the Blind and Visually Impaired. The FHWA is providing a phase-in compliance period of 4 years after the effective date of this final rule for existing installations of accessible pedestrian signals and accessible pedestrian signal detectors to minimize any impact on State and local highway agencies. This change is effective immediately for new installations.

159. In Section 4E.06 Accessible Pedestrian Signals, based on a comment received, the FHWA is adding a phrase to the third STANDARD statement that requires the walk tone to have a faster repetition rate only if the walk tone is similar to the tone for the pushbutton locator tone.

160. In Section 4E.07 Pedestrian Detectors, the FHWA is changing the title proposed in the 1999 NPA as "Pedestrian Signal Timing" to "Pedestrian Detectors," because the new title accurately reflects information contained in this section. The FHWA is also including a paragraph 8, GUIDANCE, and a paragraph 10, STANDARD, that are part of the 1988 MUTCD, but were inadvertently left out of the NPAs. The GUIDANCE paragraph reads, "If used, special purpose pushbuttons (to be operated only by authorized persons) should include a housing capable of being locked to prevent access by the general public." The STANDARD paragraph reads, "If used, a pilot light or other means of indication installed with a pedestrian pushbutton shall not be illuminated until actuation. Once it is actuated, it shall remain illuminated until the pedestrian's green or WALKING PERSON (symbolizing WALK) signal indication is displayed."

161. In Section 4E.08 Accessible Pedestrian Signal Detectors, a new OPTION paragraph is added that allows the use of pushbutton locator tones with accessible pedestrian signals. This is being added to clarify the rest of the text in Section 4E.08.

Also, based on a comment, the FHWA is adding a new phrase to the second STANDARD statement to read, "When used, pushbutton locator tones shall be easily locatable, shall have a duration of 0.15 seconds or less, and shall repeat at one-second intervals."

162. In Section 4E.09 Pedestrian Intervals and Signal Phases, two commenters objected to the change in the duration of the pedestrian clearance time being calculated to the far side of the traveled way. The 1988 MUTCD text states the duration of the pedestrian clearance time should be calculated to the center of the farthest traveled lane. The proposed change would have added time to flashing DON'T WALK intervals and would have forced many agencies to retune their traffic signal systems. This would place an undue burden on many local and State jurisdictions. The FHWA agrees with the two commenters and is reverting to the 1988 MUTCD text that refers to the center of the farthest traveled lane.

Also in this section another commenter stated that a change to the second paragraph in the STANDARD statement is needed to make the sentence accurate. It is only the first portion of the pedestrian clearance time that is comprised of the flashing DON'T WALK interval. The FHWA is revising the text to make it clear that the yellow and red intervals can also be included in the pedestrian clearance time.

163. In Section 4F.02 Design of Emergency-Vehicle Traffic Control Signals, the FHWA has changed paragraph 5 from GUIDANCE to STANDARD to be consistent with the STANDARD statement in Section 2B.40 Traffic Signal Signs. The STANDARD in Section 2B.40 states that the R10-13 sign, bearing the legend EMERGENCY SIGNAL, shall be used with the emergency-vehicle traffic control signal on each major street approach. In addition, a sentence will be added to Section 4F.02, paragraph 5, to be consistent with the GUIDANCE in Section 2B.40 that the EMERGENCY SIGNAL sign be mounted adjacent to an overhead emergency-vehicle traffic control signal.

164. In Section 4K.03 Warning Beacon, the FHWA is adding the phrase "except for SCHOOL SPEED LIMIT sign beacons" to the second paragraph in the STANDARD statement to clarify that SCHOOL SPEED LIMIT sign beacons are allowed to be included within the border of the sign to be consistent with Section 7B.10.

165. In Section 4L.02 In-Roadway Warning Lights at Crosswalks, a commenter suggested that the third paragraph in the OPTION statement proposed in the 1999 NPA, concerned with the placement of the lights in the center of lanes and on lane lines be relocated to the GUIDANCE statement. In order to provide clear recommendations to agencies regarding the proper installation of these new

optional devices, the FHWA is making this change and also adding the phrase "away from the normal tire track paths" at the end of the paragraph. The paragraph now reads as follows: "If used, In-Roadway Warning Lights should be installed in the center of each travel lane, at the centerline of the roadway, at each edge of the roadway or parking lanes, or at suitable locations away from the normal tire track paths."

Discussion of Adopted Amendments to Part 5—Low Volume Roads

The FHWA received 231 comments from 23 commenters concerning Part 5. Only the technical (not editorial) comments are addressed in this discussion. The notice of proposed amendments (NPA) was published at 64 FR 71358 on December 21, 1999.

166. A new Part 5 is added to the MUTCD entitled, "Traffic Control Devices for Low Volume Roads." After consideration, the NPA's proposed title, "Low Volume Rural Roads" was revised because these roads are not exclusive to rural areas.

167. In Section 5A.01 Function, 16 commenters requested that the maximum volume on low volume roads be raised from the proposed 200 AADT (average annual daily traffic) to 400 AADT. The FHWA agrees and is adopting a maximum volume of 400 AADT because AASHTO uses 400 vehicles per day as the breakpoint for low-volume roads in its current version of "A Policy on Geometric Design of Highway and Streets."¹⁴ Also, recent on-going research conducted by Midwest Research Institute as part of NCHRP 20-7(108) indicates that those geometric design guidelines applicable to roads with AADTs of 400 vehicles per day or less differ from geometric design guidelines normally applied to higher volume. This change provides State and local jurisdictions with more flexibility when installing and maintaining traffic control devices to provide for efficient and safe traffic flow within their fiscal restraints.

Also in this section, several commenters requested a change in the proposed definition of low volume roads which restricted these roads to those facilities outside the corporate limits of communities. The FHWA is changing the language to describe low volume roads as facilities lying outside built-up areas of cities, towns and communities. The FHWA is adopting this definition to avoid confusion

¹⁴ "A Policy on Geometric Design of Highway and Streets" 1994 Edition (American Association of State Highway and Transportation Officials-AASHTO).

caused by varying corporate limit treatments practiced by State and local agencies.

Additionally in Section 5A.01, in the STANDARD statement, the classification scheme for low volume roads is being changed to paved and unpaved. This modification replaces the proposed Categories 1 through 3 in this section and throughout Part 5. Several commenters expressed problems with applications of the proposed categories, and the FHWA agrees that the classification change will eliminate most of the confusion.

168. In Section 5A.03 Design, in the second paragraph of the STANDARD statement, proposed Table 5A-1 is mentioned. The heading for this table is changed to "Minimum Sign Sizes for Low Volume Roads," and a number of signs are eliminated that typically would not be used on low volume roads. The following signs have been removed from Part 5:

R2-3 Night Speed Limit
R3-1 Turn Prohibition
R9-1 WALK ON LEFT FACING TRAFFIC
R10-7 DO NOT BLOCK INTERSECTION
R13-1 Weigh Station
R14-1 TRUCK ROUTE
R14-3 Hazardous Cargo Prohibition

The above changes to Table 5A-1 do not prevent a jurisdiction from using the above signs or any other sign in the MUTCD that is appropriate for its roadways.

Also in Table 5A-1, the FHWA has changed minimum sizes for several signs so that all signs in the table are consistent with dimensions published in other parts of the MUTCD. This will not impose any additional requirement to State and local highway agencies. Minimums for the following signs have been modified:

R1-1 STOP
W5-2 NARROW BRIDGE
W8-3 PAVEMENT ENDS
W11-(XX) Entering/Crossing
W10-2, 3, 4 Railroad Crossing
Warning
W14-3 NO PASSING ZONE
W20-1 ROAD WORK XX M (FT)
W20-7a Flagger
W20-7b BE PREPARED TO STOP
W21-1a Workers
W21-6 Survey Crews

The above changes to Table 5A-1 will have no impact on State or local jurisdictions.

169. In Section 5C.09 Motorized Traffic and Crossing Signs (W-11 Series and W8-6), the proposed section on seasonal or temporary signing is changed from a STANDARD statement to GUIDANCE statement in the final

MUTCD amendment. Although it is good practice to remove or cover such signs when the activities described will not be occurring for an extended period of time, it is not imperative for low volume roads.

170. In Section 5E.02 Center Line Markings, the FHWA has eliminated the proposed OPTION stating a minimum width for roadways with center line markings. There are no definitive guidelines, supported by research, for such minimums on low volume roads.

171. In Section 5E.05 Object Markers, the FHWA has changed the proposed first phrase of the GUIDANCE statement to an OPTION statement for when to consider to use TYPE III barricades to mark the end of a low volume road. Commenters pointed out that such barriers are typically not warranted for low volume roads and should not be recommended as a general treatment for such facilities. The FHWA agrees because no supporting data has been presented showing that the barricades are needed on all low volume roads.

172. In Section 5F.05 Pavement Markings, the proposed STANDARD statement is removed as it only directed readers to Sections 8B.9 and 8B.10. The proposed SUPPORT statement is changed to GUIDANCE on when to install pavement markings in advance of highway-rail grade crossings on low-volume roads. The FHWA agrees with the commenters who suggested that on a paved road with center line markings, the unfamiliar motorist would have no knowledge of the low AADT and, therefore, would expect highway-rail grade crossing markings. These markings should increase safety at these highway-rail grade crossings. This should have no impact on State or local jurisdictions because this is not a change from the current MUTCD requirements.

Discussion of Adopted Amendments to Part 6—Temporary Traffic Control

The FHWA received 2875 comments from 56 commenters concerning Part 6. Only the technical (not editorial) comments are addressed in this discussion. The notice of proposed amendments (NPA) was published at 64 FR 73606 on December 30, 1999.

173. The title of Part 6 is changed from “Standards and Guides for Traffic Controls for Street and Highway Construction, Maintenance, Utility, and Incident Management Operations” to “Temporary Traffic Control” as indicated in the NPA.

174. In Chapter 6A General, the FHWA has moved a portion of the STANDARD from the end of Chapter 6B Fundamental Principles because it

applies to all Chapters of Part 6. The moved portion reads, “There shall be adequate statutory authority for the implementation and enforcement of needed traffic regulations, parking controls, speed zoning, and incident management. Such statutes shall provide sufficient flexibility in the application of traffic control to meet the needs of changing conditions in the temporary traffic control zone.”

175. In Chapter 6B Fundamental Principles of Temporary Traffic Control, paragraph 3b of the GUIDANCE statement, a number of commenters suggested the need to indicate conditions under which permanent traffic control devices do not have to be removed in a temporary traffic control zone. The FHWA is retaining language similar to that used in the 1988 MUTCD, Revision 3 dated September 3, 1993, which clearly indicated which traffic control devices to be used. The last sentence reads, “However, in intermediate-term stationary, short term and mobile operations where visible permanent devices are inconsistent with intended travel paths, devices that highlight or emphasize the appropriate path should be used.”

In Chapter 6B Fundamental Principles of Temporary Traffic Control, paragraph 4c of the GUIDANCE statement, a commenter suggested the need to describe ambient conditions factors. The FHWA is retaining the modifiers “road user volumes, light, and weather” from the 1988 Edition of MUTCD, Revision 3 to describe ambient conditions. This change should have no impact on State or local highway agencies since the FHWA is retaining the current MUTCD requirements.

176. In Section 6C.01 Temporary Traffic Control Plans, the FHWA is adding a fourth GUIDANCE statement to provide additional information on minimizing the need to reduce speed limits in temporary traffic control zones. It reads, “Reduced speed limits should be used only in the specific portion of the temporary traffic control zone where the above conditions or restrictive features are present; however, frequent changes in speed limit should be avoided. A traffic control plan should be designed so that vehicles can safely travel through the temporary traffic control zone with a speed limit reduction of no more than 10 mph. A reduction of more than 10 mph in the speed limit should be used only when required by restrictive features in the temporary traffic control zone. Where restrictive features justify a speed reduction of more than 10 mph, additional driver notification should be provided. The speed limit should be

stepped down in advance of the location requiring the lowest speed, and additional warning should be used.” This change will have no economic impact on State and local highway agencies. However, roadway safety and efficiency should increase because research has shown that speed reductions should be no more than a 10 mph increment.

177. A new Section 6C.02 Temporary Traffic Control Zones, is added to the MUTCD to better define temporary traffic control zones. It contains only general information concerned with temporary traffic control zones. A new definition for “temporary traffic control zones” includes a work area or an incident area. In the NPA this text was included as part of the Section 6C–2 Components of Temporary Traffic Control Zones. This change is not adding any new requirements for State or local jurisdictions.

178. Section 6C.03 Components of Temporary Traffic Control Zones (referenced in the NPA as Section 6C.2) includes information concerned exclusively with the four components of a temporary traffic control zone, *i.e.*, the advance warning area, the transition area, the activity area, and the termination area. The examples of a work zone area and an incident area are removed from this Section 6C.2 and relocated to Chapter 6G which is concerned with types of temporary traffic control zone activities. In the NPA, the text of Sections 6C.02 and 6C.03 was combined into just one section and four commenters suggested that the NPA language was too cumbersome and recommended that the text be split. The FHWA agrees and has made the change to clarify the text.

179. In Section 6C.06 Activity Area (referenced in the NPA as Section 6C.5), Table 6–1, “Guidelines for Length of Minimum Advance Working Area,” was incorrectly titled and located in the NPA. The FHWA is renumbering the table as Table 6E–1, is moving the table to Section 6E.05 Flagger Stations, and re-titling it “Distance of Flagger Station in Advance of Work Space.” This table provides information on the distance a flagger should be in advance of the work area based on the speed of approaching traffic. The information in the table has nothing to do with Activity Areas and lengths of minimum advance working areas.

180. In Section 6C.07 Termination Area (referenced in the NPA as Section 6C.6), the FHWA has changed the first SUPPORT statement to a STANDARD as the statement is a definition, and definitions are by their very nature STANDARDS.

The GUIDANCE statement dealing with END ROAD WORK signs has been moved to Section 6F.49 END ROAD WORK Sign (G20-2) as it most appropriately goes in the section that describes the sign and not in this section discussing a termination area.

In place of the GUIDANCE statement, an OPTION statement has been added to this section indicating the need for an END ROAD WORK, speed limit, or other sign to indicate to road users that they may resume normal operations. The above changes were made to be consistent throughout the MUTCD and to add guidance to optimize road user performance in temporary traffic control zones.

181. In Section 6C.08 Tapers (referenced in the NPA as Section 6C.7), in the sixth proposed SUPPORT statement regarding a One-Lane, Two-Way Taper, the last sentence, "Typically, traffic is controlled by a flagger or temporary traffic control signal." Seven commenters suggested the need that this and other sections be more specific on providing temporary traffic control for two-way traffic using a one-lane roadway. The FHWA agrees and has changed the text accordingly. The text is being revised and relocated to the sixth GUIDANCE statement in the MUTCD because anywhere two-way traffic is moved in a one-lane of a road, there needs to be some type of temporary traffic control to maintain traffic flow and safety. The GUIDANCE statement reads, "Traffic should be controlled by a flagger or temporary traffic signal (if sight distance is limited), or a STOP or a YIELD sign." This change should have no impact on State and local jurisdictions while improving road user safety by providing positive direction to road users during temporary traffic control operations.

182. In Section 6C.10 One-Lane, Two-Way Traffic Control (referenced in the NPA as Section 6C.9), the FHWA is changing the first proposed GUIDANCE statement indicating the need for some type of temporary traffic control for one-lane, two-way traffic flow operations to a STANDARD. Anywhere two-way traffic is moved in a one-lane of a road, there needs to be some type of temporary traffic control to maintain traffic flow and safety. This change should have no impact on State and local jurisdictions while improving road user safety by providing positive direction to road users during temporary traffic control operations.

183. In Section 6D.01 Pedestrian Considerations, the proposed third STANDARD statement is changed to a GUIDANCE statement because there are no acceptable measures to judge "when

pedestrians are especially vulnerable to impact by errant vehicles, all pedestrians shall be separated and protected by a temporary barrier." Three commenters recommended this change and the FHWA agrees. The fifth GUIDANCE statement now reads, "When pedestrian and motor vehicle paths are rerouted to a closer proximity to each other, consideration should be given to separating them with a temporary barrier." This will provide more flexibility to State and local highway agencies and, thereby, reducing the impacts on them.

Also in this section, the first STANDARD statement is relocated from the end of proposed Section 6D.2 Worker Considerations, because it is applicable to both pedestrian and worker safety. These changes were based on comments from the NCUTCD as well as other commenters. The FHWA agrees and it now reads, "the various traffic control provisions for pedestrian and worker safety set forth in this Part shall be applied by qualified persons after appropriate evaluation and engineering judgment."

184. In Section 6E.01 Qualifications for Flaggers, the FHWA is changing the first proposed SUPPORT sentence to a STANDARD as the statement is a definition and definitions are by their very nature STANDARDS.

185. In Section 6E.03 Hand-Signaling Devices, the proposed statement "When flashing lights are used at night, the illumination shall not blind drivers." was questioned by three commenters because there no acceptable measures to determine this. The FHWA agrees and has removed the statement from the second GUIDANCE of this section.

In the second STANDARD the word "red" was inadvertently left out of the NPA. The STANDARD now reads, "When used at nighttime, flags shall be retroreflectorized red." This is identical wording to that in the 1988 Edition of MUTCD, Revision 3. This should have no impact on State or local governments since the FHWA is retaining the current requirements.

186. In Section 6F.01 Types of Devices, the proposed first SUPPORT statement is changed to a GUIDANCE statement and revised to read, "The design and application of temporary traffic control devices used in temporary traffic control zones should consider the needs of all road users." This change is made to emphasize the need to consider all road users, pedestrians, bicyclists, transit, and railroads as well as motor vehicle traffic, when designing and applying traffic control devices.

187. In Section 6F.02 General Characteristics of Signs, the FHWA has

added an OPTION statement which retains language from the 1988 MUTCD, Revision 3 dated September 3, 1993, that allows the use of non-black on orange pedestrian warning signs in work zones. The new OPTION statement reads, "In order to maintain the systematic use of yellow or fluorescent yellow-green background for pedestrian, bicycle, and school warning signs in a jurisdiction, the yellow or fluorescent yellow-green background for pedestrian, bicycle, and school warning signs may be used in temporary traffic control zones." This OPTION is modified to include the fluorescent yellow-green color because many jurisdictions have adopted this optional warning sign color for pedestrian, bicyclist and school facilities and locations. In addition, this provides more flexibility to State and local highway agencies to increase awareness of pedestrians and bicyclists in temporary traffic control zones.

188. In Section 6F.03 Sign Placement, the FHWA is adding the GUIDANCE statement, "Neither portable nor permanent sign supports should be located on sidewalks, bicycle lanes, or areas designated for pedestrian or bicycle traffic." The Insurance Institute for Highway Safety commented on this omission that would allow the placement of temporary traffic control signs to hinder the movement of pedestrians and bicyclists. The FHWA agrees and this should not have an impact on State or local governments.

189. In Section 6F.09 LOCAL TRAFFIC ONLY Signs (R-11-3, R11-4), the FHWA is changing the first STANDARD statement to a GUIDANCE statement to provide more flexibility in signing in rural communities where the temporary traffic control zone may be within a residential block and not kilometers (miles) down a road without intersections.

190. Section 6F.15 Warning Sign Function (as referenced in the NPA) has been combined with Section 6F.16 Warning Sign Design and Application (as referenced in the NPA), and renamed, "Section 6F.15 Warning Sign Function, Design, and Application." These changes were made because the FHWA agrees with the comments from six commenters that the material in the two sections really belongs together.

Also in Section 6F.15, the STANDARD statement and GUIDANCE statement proposed in the NPA concerning flexible signs are removed as these items are adequately addressed in Section 6F.02 Signs, and in Section 6F.03 Sign Placement. Five commenters indicated this overlap.

191. Section 6F.16 Position of Advance Warning Sign (referenced as

Section 6F.17 in the NPA) has been combined with Section 6F.18 Other Advance Warning Signs (as referenced in the NPA) and Section 6F.19 Application of Warning Signs for Maintenance, Minor Road Work, and Utility Sites (as referenced in the NPA) and has been moved and named, "Section 6F.16 Position of Advance Warning Signs." These changes were made because the FHWA agrees with the five commenters that indicated the overlap in technical issues in these three sections.

192. In Section 6F.20 ONE LANE ROAD Sign (W20-4) (referenced in the NPA as Section 6F.23), the FHWA has moved to Section 6C.10 One-Lane, Two-Way Traffic Control, the proposed GUIDANCE statement concerning how to temporarily control two-way traffic on a one-lane roadway. This GUIDANCE statement has been reworded to read, "If traffic on the affected one-lane roadway is not visible from one end to the other, then flagging procedures or traffic signal control should be used to control alternate traffic flows." This GUIDANCE has been clarified and is more appropriately placed in Section 6C.10.

193. In Section 6F.28 EXIT OPEN, EXIT CLOSED signs (E5-2) (referenced in the NPA as Section 6F.31), one commenter suggested that a complementary sign, EXIT CLOSED (E5-2a), was inadvertently left out of the NPA. The FHWA agrees and has included this sign in this section as an OPTION. In temporary traffic control work zones in and around interchanges it is important to provide current traveler information such as notifying motorists that an exit is, in fact, closed. This change provides for uniformity for signs used at exit locations and will have no impact on State or local highway agencies.

194. In Section 6F.52 Portable Changeable Message Signs (referenced in the NPA as Section 6F.55), the FHWA is changing the first SUPPORT statement to a STANDARD statement as the statement is a definition and definitions are by their very nature STANDARDS. The statement is revised to read, "Portable Changeable Message Signs are traffic control devices with the flexibility to display a variety of messages. Each message consists of either one or two phases, only. Typically, a phase consists of up to three lines of eight characters per line."

195. In Section 6F.53 ARROW PANELS (referenced in the NPA as Section 6F.56), the FHWA is changing the first proposed SUPPORT statement in the NPA to a STANDARD as the statement is a definition and definitions are by their very nature STANDARDS.

Additionally, since arrow panels are similar to portable changeable message signs, the FHWA is adding a GUIDANCE statement to Section 6F.53 identical to the GUIDANCE statement for locating and providing protection for portable changeable message signs. The GUIDANCE statement reads, "An arrow panel should be placed on the shoulder of the roadway or, if practical, further from the traveled lane. It should be delineated with retroreflective temporary traffic control devices or when within the clear zone, shielded with a barrier or crash cushion. When an arrow panel is not being used, it should be removed; if not removed, shielded; or if the previously two options are not feasible, delineated with retroreflective temporary traffic control devices." This GUIDANCE will maintain traffic flow efficiency and improve safety.

196. In Section 6F.55 Channelizing Devices, Subsection A General (referenced in the NPA as Section 6F.58), the FHWA changed the second paragraph of the second SUPPORT paragraph in the NPA "Standard designs of channelizing devices are shown in Figure 6F-06," to a STANDARD at the beginning of the section. The design dimensions in Figure 6F-06 have always been STANDARDS. One commenter pointed out this discrepancy.

Also in this section, in Subsection D Vertical Panels, the requirement that vertical "panel strip widths shall be 150 mm (6 in), except where panel heights are less than 900 mm (36 in), then 100 mm (4 in) stripes may be used" was inadvertently reversed in the NPA. The FHWA has corrected this wording making it similar to that in the 1988 MUTCD, Revision 3 dated September 3, 1993. Since this change is keeping the current requirements of the MUTCD, there is no impact on State or local highway agencies.

Additionally, Subsection G Direction Indicator Barricade, the FHWA has changed the proposed first GUIDANCE statement to an OPTION statement to read: "The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to motorists is necessary." Direction indicator barricades do not have to always be used in these situations. This provides State and local highway agencies more flexibility in selecting temporary traffic control devices for work zones.

Subsection J Opposing Traffic Lane Divider, is more appropriately relocated to this section from proposed Section 6F.67 as referenced in the NPA because

it provides directional guidance to motorists.

197. In Section 6F.69 Lighting Devices, Subsection D(4) Warning Lights (referenced in the NPA as Section 6F.60), the FHWA relocated to this Subsection a GUIDANCE statement from Figure TA-34 and Figure TA-36. The GUIDANCE statement reads, "The maximum spacing for warning lights should be identical to the channelizing device spacing requirements." This GUIDANCE is applicable to any situation where lighting devices are used, not just in the two typical application Figures.

The FHWA is moving the SUPPORT statement (referenced in the NPA as Subsection D(4) Flashing Beacon (Vehicle Mounted)) "During normal daytime maintenance operations, the functions of flashing warning beacons are adequately provided by rotating lights or strobe lights on a maintenance vehicle" to the beginning of the Section. Furthermore, the FHWA is retaining a STANDARD statement, "The use of the vehicle hazard warning lights shall not be used instead of rotating lights or strobe lights" and an OPTION statement, "The vehicle hazard warning lights may only supplement the rotating lights or strobe lights" to clarify the intent of 'rotating lights or strobe lights'. The STANDARD and OPTION statements were added to MUTCD in January 9, 1997, and were inadvertently omitted in the NPA.

198. In Section 6F.74 Temporary Traffic Control Signals (referenced in the NPA as Section 6F.61), the first GUIDANCE is revised to read: "When temporary traffic control signals are used, conflict monitors that are typically used in traditional traffic signal operations should be used." This was corrected because the spacing between traffic signal installations, as proposed in the NPA, has nothing to do with the need for a conflict monitor. This has no impact on State or local governments since the FHWA is retaining existing MUTCD requirements.

199. In Section 6F.75 Temporary Traffic Barriers (referenced in the NPA as Section 6F.62), the FHWA is changing a GUIDANCE statement to a STANDARD statement. The statement reads, "In order to mitigate the effect of striking the end of a temporary traffic barrier, the end shall be installed in accordance with the AASHTO Roadside Design Guide by flaring until the end is outside the acceptable clear zone or by providing with crashworthy end treatments." This requirement should improve safety because research indicates that there are no acceptable methods of providing the required

degree of safety other than flaring or providing crashworthy end treatments.

200. In Section 6F.76 Crash Cushions, Subsection B Truck-Mounted Attenuators, the second proposed SUPPORT statement is changed to a STANDARD in the new MUTCD as the statement is a definition of "truck-mounted attenuators" and definitions are by their very nature STANDARDS.

Under this same Subsection B, the proposed the first STANDARD statement is changed to a GUIDANCE statement in the new MUTCD to provide more flexibility in the spacing of the shadow vehicle behind the workers and their work vehicles.

201. In Section 6G.05 Work Outside of Shoulder (referenced in the NPA as Section 6G.6), the FHWA has changed to an OPTION statement the GUIDANCE statement which reads, "Where the activity is spread out over a distance of more than 3.2 km (2 mi), the sign should be repeated every 1.6 km (1 mi)." Since the work being performed is outside the shoulder, there may not always be a need to install signs that frequently. This will provide more flexibility to State and local highway agencies.

202. In Section 6G.06 Work on the Shoulder With No Encroachment (referenced as Section 6G.7, Subsection B in the NPA), the GUIDANCE statement "Truck off-tracking should be considered when determining whether the minimum lane width of 3 m (10 ft) is adequate" from Figure TA-43 has been added to Section 6G.06 Subsection B Minor Encroachment on the Traveled Way. It is in this Subsection that minimum lane widths are discussed and accounting for truck off-tracking is applicable to all temporary traffic control zones with minimum lane widths.

203. Section 6G.08 Work Within the Median, is added to the new MUTCD as a separate section. It was referenced in the NPA as the GUIDANCE statement under Section 6G.3. The new section reads, "If work in the median of a divided highway is within 4.5 m (15 ft) from the edge of the traveled way for either direction of travel, traffic control should be used through the use of advance warning signs and channelization devices." This change provides for improved road user safety in temporary traffic control work zones.

204. In Section 6G.10 Work Within Traveled Way of Urban Streets, Subsection B. Bicyclists, the FHWA is changing a proposed SUPPORT statement to a STANDARD statement to ensure that bicyclists are accommodated during a temporary traffic control zone. The statement reads, "If the work area affects the movement of bicyclists,

adequate access to the roadway, bicycle path, or shared-use path shall be provided. For details on controlling bicycle traffic, see Part 9." This change should provide for increased safety for bicyclist in temporary traffic control work zones and has no significant impact on State or local government agencies.

205. In Section 6G.18 Work in the Vicinity of Highway-Rail Grade Crossings, a new GUIDANCE statement is added to read, "Early coordination with the railroad company should occur before work starts." As it is important that all users of the work area are aware of temporary changes and for continued highway-rail grade crossing operations. This early coordination should improve road user operations and improve safety while having no economic impact on State and local highway agencies.

Discussion of Adopted Amendments to Part 7—Traffic Controls for School Areas

The FHWA received 156 comments from 20 commenters concerning Part 7. The notice of proposed amendments (NPA) was published at 62 FR 64324 on December 5, 1997.

206. In Section 7A.01, the Typical School Route Plan Map (Figure 7A-1) is revised as proposed in the NPA. Several comments were received suggesting modifications to the figure. The figure has been enlarged and printed in color to better identify signals and stop signs. The arrow heads reflecting direction of travel are enlarged. Traffic control devices are added where intersecting streets meet the collector road.

The FHWA received no negative comments regarding our proposal to include middle and high schools in the development plans for school routes. This amendment to Section 7A.01, paragraph 6, adopts the following GUIDANCE: "A school route plan for each school serving elementary to high school students should be prepared * * *."

The amendment to Section 7A.01, paragraph 8, requires the traffic control devices in the school plan to be related to the volume and speed of vehicle traffic, street width, and the number and age of children using the crossing. There were no negative comments to this change.

207. The FHWA received two comments that objected to the deletion of the text found in Sections 7A.05 through 7A.10, 7B.01 through 7B.04, 7B.07, and 7B.08 of the 1988 MUTCD. The FHWA believes that retaining this text is not necessary with the new layout of the MUTCD, because this

information is provided in other sections.

208. Six comments were received on the proposed text in Section 7B.01 which found the sign size terminology confusing. Based on these comments, the heading is revised to read "Size of School Signs." The FHWA received no other negative comments regarding this amendment. However, there were three comments regarding Table 7B-1 "Size of School Area Signs and Plaques." One comment suggested using "centimeters" to display metric units. In a final rule published at 64 FR 33751 on June 24, 1999, the FHWA adopted two American Association of State Highway and Transportation Officials publications for the design of traffic control devices for use on all roads open to public travel. These documents use millimeters, not "centimeters." Another comment noted that the proposed table was not in agreement with the "Standard Highway Signs" book.¹⁵ This book is also undergoing revision. The FHWA will ensure that there are no conflicts with sign sizes shown in both publications. There was a comment regarding the "older driver" issue of sign size and legibility. The FHWA believes this issue is adequately covered in the OPTION statement that reads: "The 'special' sized sign may be used for applications that require increased emphasis, improved recognition or increased legibility."

Based on comments received, the OPTION statement has been expanded to define where the minimum size signs are used.

209. A new section, 7B.07 Sign Color for School Warning Signs, is added that addresses the optional use of the color fluorescent yellow green for school warning signs. This amendment was adopted in a final rule published at 63 FR 33546 on June 19, 1998. The FHWA has included this OPTION for use of the color and GUIDANCE that addresses the systematic approach for the use of this color.

210. Section 7B.08 School Advance Warning Sign (S1-1) was referenced in the NPA as Section 7B.07 School Advance Warning Sign (S1-1). Section 7B.09 School Crosswalk Warning Assembly (S1-1 with Diagonal Arrow) was referenced in the NPA as Section 7B.08 School Crosswalk Warning Sign

¹⁵ "Standard Highway Signs," FHWA, 1979 Edition is included by reference in the 1988 MUTCD. It is available for purchase from the Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. It is available for inspection and copying at the FHWA Washington Headquarters and all FHWA Division Offices as prescribed at 49 CFR part 7.

(S2-1). The text for both sections is modified to be consistent with Section 2C.36 which discusses a new application for advance crossing and crossing signs. The FHWA is eliminating the crosswalk lines on the crossing signs since road user comprehension studies show that they generally do not know the difference between the two signs. Instead of using crosswalk lines within the sign to indicate where the actual crossing is located, the new application consists of a crossing sign with supplemental downward pointing arrow plaque to show the crossing location. For advance crossing situations, the new application will consist of a crossing sign supplemented with an "Ahead" or "XX feet" plaque. This assembly shall be used in advance of the first installation of the School Speed Limit Sign assembly. The FHWA believes that the supplemental plaques must be used (not optional) to ensure safety of children at crosswalks in school zones. The FHWA is providing a phase-in compliance period of 10 years after the effective date of this final rule for existing signs to minimize any impact on State and local highway agencies. This period will allow for replacement of existing signs after their normal service life. This change is effective immediately for new sign installations.

211. In Section 7B.09, paragraph 4, under the GUIDANCE statement, new text recommends that an engineering study should be conducted before installing the School Crosswalk Warning Sign. No commenters objected to this amendment. However, as mentioned above, the sign is now referred to as the School Crosswalk Warning Assembly sign.

212. Section 7B.11 changes the title to "School Speed Limit Assembly (S4-1, S4-2, S4-3, S4-4, S5-1)." The FHWA is adopting this amendment based on two comments received indicating that this section describes the complete assembly of signs that make up a school speed limit sign, not just the plates. The FHWA concurs with this recommendation.

Also in Section 7B.11, one commenter suggested moving the text for the "End School Zone" (S5-2) sign to a separate section, since it is a separate sign from the others found in 7B.11. This text is moved to new Section 7B.13.

213. The title of Section 7B.12 is changed to "School Reduced Speed Ahead Assembly." This amendment is based on one comment received suggesting changing the title to better reflect the actual sign used and illustrated. The appropriate text is also modified to reflect this change.

214. One comment was received for Section 7B.14 Parking and Stopping Signs (R7 and R8 Series), suggesting that "No Standing" signs be addressed as an example. The FHWA agrees with this suggestion and a discussion is included in paragraph 2.

Figure 7-2, "Placement of the S1-1 sign" which was shown in the 1988 MUTCD, is deleted based on three comments that pointed out that this subject is covered in Section 2C, and revised Figure 7B-1 "Typical Signage for School Area Traffic Control" that is depicted in this Final Rule. The FHWA has renumbered the remaining figures appropriately.

The revised Figure 7B-1 is corrected to reflect the assembly signs with the diagonal arrow and the "AHEAD" and "XX FEET" plaques as discussed in Sections 7B.08 and 7B.09. The figure has also been expanded to show the metric versions of the speed limit signs along with English units.

215. In Section 7C Markings, four commenters indicated conflict with the text in Part 3 Markings. The FHWA has amended the text for consistency with Part 3.

216. A GUIDANCE statement in Section 7C.04 Stop Line Markings, paragraph 1, is adopted for the placement of a Stop line in the absence of a marked crosswalk.

217. This amendment to Section 7C.06, the OPTION statement, clarifies that the "SCHOOL" word markings may extend across two lanes. (See Figure 7C-1). In the proposed text, this OPTION was inadvertently shown in the GUIDANCE discussion, and was brought to FHWA's attention by a docket comment.

218. In Chapter 7D Signals, the text is deleted and the reader is referred to Part 4 Signals, Section 4C.06 School Crossing Signal Warrant. The FHWA only received one comment in opposition to this change.

219. Chapter 7E Crossing Supervision deletes the discussion on legal authority for adult guards and student patrols since the state and local agencies are responsible for establishing laws regarding these crossing supervisors. There were no objections received on this change.

220. This amendment to Section 7E.04, paragraph 2, is based on a comment that the FHWA received indicating that mentioning "daytime, nighttime, and twilight hours," and the reference to Section 6E.03 is redundant. The FHWA agrees and the reference to "daytime, nighttime, and twilight hours" is deleted.

The FHWA is also amending the text in the last paragraph of Section 7E.04 to

include "police officers" in addition to adult guards and student patrols in wearing high-visibility retroreflective material or clothing, since police officers may be used for crossing supervision as mentioned in Section 7E.06.

221. The discussion on the use and size of the Stop paddle in Section 7E.05, paragraph 2, is changed from the OPTION to GUIDANCE. It was also suggested that the STANDARD in paragraph 3 be modified to indicate that the paddles should be "at least" 450mm (18 in). The FHWA agrees and is adopting this change. This would then allow the use of a larger paddle. Paragraph 3 is also modified to require the word "STOP" on both sides of the paddle instead of "one or both sides" since it is important for traffic to read and respond to this command from both directions of travel.

222. Section 7E.10 High Visibility Clothing has been eliminated since this text is a duplicate to that stated in Section 7E.04.

Discussion of Adopted Amendments to Part 8—Traffic Controls for Highway-Rail Grade Crossings

The FHWA received 412 comments from 52 commenters concerning Part 8. Only the technical (not editorial) comments are addressed in this discussion. Two notices of proposed amendments (NPA) were published at 64 FR 691 on January 6, 1997 and at 64 FR 71358 on December 21, 1999.

223. In Section 8A.01 Introduction, commenters from 4 States and 1 county recommended that the last sentence in Paragraph 3 of the 1999 NPA, a SUPPORT statement, be changed to reflect that the responsibility for determining the need and selection of devices at a grade crossing should be shared with the highway agency, the regulatory agency, and the railroad company, instead of just resting with the highway agency. The FHWA and the Federal Railroad Administration have reviewed Federal law, regulations, and guidance and found that although they encourage voluntary railroad involvement (as members of diagnostic teams where Federal funds are involved) in the analysis of need for and type of protection, they do not impose on railroads the responsibility to make, or share in making, determinations of need for or selection of traffic control devices. Therefore, the FHWA is not making the suggested changes.

224. The FHWA is changing the title for Section 8A.05 from "Traffic Controls in Work Zones During Construction or Maintenance," to "Temporary Traffic

Control,” to be consistent with Part 6 of this Manual.

225. In proposed Section 8A.08 Private Highway-Rail Grade Crossings, a State commented that paragraph 4 in the GUIDANCE statement containing a recommendation to evaluate a private crossing by means of an engineering study to determine possible closure or the appropriate type of traffic control, be downgraded to OPTION or deleted. The FHWA has decided to delete this section on Private Highway-Rail Grade Crossings. The Federal Railroad Administration will be addressing the private highway-rail grade crossing issue in an upcoming safety inquiry.

226. In Section 8B.02 Highway-Rail Grade Crossing (Crossbuck) Sign (R15-1, R15-2), the FHWA has added a STANDARD statement (as proposed in the 1999 NPA) to require the placement of a strip of retroreflective white material on the back of each Crossbuck sign for the length of each blade, except where Crossbuck signs are installed back-to-back. The FHWA also added a STANDARD statement (as proposed in the 1999 NPA) to require the placement of a strip of retroreflective white material on the front and back of each Crossbuck support. The FHWA is providing a phase-in compliance period of 10 years for existing installations to minimize any potential impact to State and local highway agencies. This change takes effect immediately for all new installations.

227. In Section 8B.03 Highway-Rail Grade Crossing Advance Warning Signs, a State recommended the continued inclusion of the phrase, “Where physical conditions do not permit even a partially effective display of the sign,” under the STANDARD statement. The FHWA agrees and is including this item, which is one of the exceptions to the mandated use of the W10-1 Highway-Rail Grade Crossing Advance Warning sign, because it is still relevant.

In response to a comment, the FHWA is upgrading the proposed last paragraph of Section 8B.03 from GUIDANCE to STANDARD and placing it as Item A in the first paragraph of this section. This item will require the use of the W10-2, W10-3, or W10-4 sign on the parallel highway when the parallel highway is less than 100 feet from the railroad track.

In response to another commenter, the FHWA is adding the phrase “(using the speed of the turning maneuver)” to paragraph 4, STANDARD, to clarify what speed to use to determine placement distance on the parallel highway for the W10-2, W10-3, or W10-4 advance warning signs.

228. In Section 8B.06 DO NOT STOP ON TRACKS Sign, paragraph 1, GUIDANCE, the FHWA is changing “engineering study” to “engineering judgment” because engineering experience and familiarity with local traffic and geometric conditions is sufficient to determine whether the potential for vehicles stopping on tracks is high.

229. In Section 8B.12 NO SIGNAL Sign, a State, a county, and the Association of American Railroads commented on the inclusion of the NO SIGNAL sign in the MUTCD. They believe that the sign does not convey any needed information and just adds to sign clutter. The FHWA is retaining this optional sign because of comments from members of Congress and the FHWA’s desire to provide warning to the road user that the crossing does not have active warning devices. In addition, no jurisdiction is required to install this sign. However, if a jurisdiction determines it is needed, this is a standard sign it may use.

230. The FHWA decided to change the sequence of sections near the end of Chapter 8B so that all signs are discussed first, then pavement markings for better continuity. The headings for Sections 8B.14, 8B.15, 8B.16, 8B.17, and 8B.18 now read as follows:

8B.14 Low Ground Clearance Highway-Rail Grade Crossing Sign (W10-5)

8B.15 Storage Space Signs (W10-11, W10-11a, W10-11b)

8B.16 Pavement Markings

8B.17 Stop Lines

8B.18 Dynamic Envelope Delineation

231. In Section 8B.14 Low Ground Clearance Highway-Rail Grade Crossing Sign (W10-5) (referenced in the NPA as Section 8B.16), several commenters suggested relocation of text concerning a hang-up of long wheelbase vehicles or trailers with low ground clearance from the STANDARD statement to the GUIDANCE statement. The FHWA moved the text because there are no established means for determining which crossings will create a hang-up of long wheelbase vehicles or trailers with low ground clearance.

232. In Section 8B.15 Storage Space Signs (referenced in the NPA as Section 8A.7), commenters from a State and a county remarked that the W10-11 Storage Space sign does not convey the information that there is limited space beyond the crossing. The FHWA agrees that the GUIDANCE should include the use of the W10-11a word message “storage distance” sign in conjunction with the W10-11 sign. Another commenter stated that the letter size on

the W10-11a sign with four lines of text on a 24” by 24” (600 mm by 600 mm) panel will not be large enough to be legible to drivers at normal highway speeds. The FHWA agrees and is including a drawing of the W10-11a as a 30” by 36” (750 mm by 900 mm) sign with a 4-inch letter size in the MUTCD and in the Standard Highway Signs manual.¹⁶

Also, the FHWA is adding a new W10-11b word message storage distance sign as an OPTION to remind motorists of the storage distance space between the intersection and the tracks behind them.

233. In Section 8B.18 Dynamic Envelope Delineation (referenced in the NPA as Section 8A.6), a railroad company commented that the use of dynamic envelope delineation markings should be made an OPTION instead of GUIDANCE. There were a number of other comments about these markings being mistaken for stop lines, about how far from the tracks the markings should be placed, and the design of the markings.

One State requested that the entire section be deleted. Because of the comments and lack of real-world experience with these markings, the FHWA is changing this section to an OPTION until research on this concept is done. The FHWA would appreciate the assistance of the State and local jurisdictions that use these markings in determining their effectiveness.

234. In Section 8D.01 Introduction, the U.S. Architectural and Transportation Compliance Board requested that a number of provisions of the Americans with Disabilities Act (42 U.S.C. 1201 *et seq.*) be complied with when a “pedestrian circulation route” crosses a railroad track. The FHWA is adding a new GUIDANCE paragraph that reads, “If a pedestrian route is provided, sufficient clearance from supports, posts, and gate mechanisms should be maintained for pedestrian travel.”

235. In Section 8D.03, the FHWA is changing the title from “Flashing-Light Signals, Cantilevered Supported” to “Flashing-Light Signals, Overhead Structures” because flashing-light signals are not only mounted on cantilevered supports, but also on overhead structures that extend over the entire width of the roadway.

236. In Section 8D.04 Automatic Gates, a comment was received on using medians at grade crossings that do not have four-quadrant gates. The FHWA agrees that text regarding median islands, which is adequately covered in

¹⁶ Ibid.

Section 8D.05 in conjunction with four-quadrant gates, should also be covered in this section for automatic gates in general. The FHWA is adding a new OPTION paragraph to Section 8D.04 that reads, "Automatic gate installations may include median islands between opposing lanes on an approach to a highway-rail grade crossing."

237. Several comments were received on Section 8D.04, paragraph 4 in the 1999 NPA, GUIDANCE, and Section 8D.05, paragraph 5 in the 1999 NPA, GUIDANCE, that pointed out the paragraphs had both a "shall" and a "should" in the same sentence. They requested the FHWA change the "should" to a "shall," thus making the entire sentence a STANDARD. The FHWA agrees that the gate going back to its upright position after the train is gone be mandatory, not just recommended, and is changing this sentence to a STANDARD, and therefore the "should" to a "shall." Those submitting comments also wanted to delete the 12-second time period, but the FHWA is retaining the 12-second time period as GUIDANCE.

238. In Section 8D.07 Traffic Control Signals at or Near Highway-Rail Grade Crossings, paragraphs 1 and 3, the FHWA is reverting to the STANDARD and OPTION language used in the 1988 MUTCD describing the use of traffic signals at highway-rail grade crossings based on comments that the proposed language was not as clear about the types of crossings where traffic signals are appropriate. Also, a comment was received suggesting that this section clarify that the preemption condition should be terminated only when the crossing gates are energized to start their upward movement. The person submitting the comment felt clarification on preemption termination would make a difference in responding to situations when a second train approaches as the preemption associated with the first train is terminating. The FHWA agrees and is inserting clarifying wording.

Discussion of Adopted Amendments to Part 9-Traffic Controls for Bicycle Facilities

The FHWA received 357 comments from 79 commenters concerning Part 9. The notice of proposed amendments (NPA) was published at 64 FR 33802 on June 24, 1999.

239. The FHWA received no objections to deleting Sections 9A.01, 9A.04, 9A.06, 9A.07, and 9A.09. The information found in these sections can be found in Part 1 of the MUTCD.

240. In Section 9A.03, the FHWA is modifying the definitions by adopting

the definitions published in the "Guide for the Development of Bicycle Facilities," 1999 edition, AASHTO¹⁷. The term "Shared Roadway" has been deleted from the definitions relating to bicycle facilities since this term is not used in Part 9. The adoption of these definitions was recommended by the NCUTCD and concurred in by 65 commenters.

241. In Section 9A.05, the FHWA received comments from the NCUTCD and 65 other commenters to change the text related to the reference to the "Uniform Vehicle Code and Model Traffic Ordinance"¹⁸ published by the National Committee on Uniform Traffic Laws and Ordinance, from a STANDARD to SUPPORT to better reflect the information included in this section. The FHWA agrees that this change is also consistent with the language found in Part 1 of the MUTCD.

242. In Section 9B.01, the FHWA received no negative comments regarding the consolidation of application and location of signs into this section. In paragraph 5 of this section, the NCUTCD and 68 other commenters suggested adding language discussing the maximum mounting height of 1.5m (5 ft) which is shown in Figure 9B-1. The FHWA agrees that this omission was an oversight and should have been stated in the text of Section 9B.01, therefore it is reviewing this section accordingly. In addition, there were no negative comments received concerning the minimum mounting height remaining 1.2m (4 ft) as reflected in Section 9B.01 paragraph 5, and Figure 9B-1.

There were several favorable comments received on Table 9B-1 "Bikeway Sign Sizes." Several signs have been added to the table that were inadvertently left out of the NPA. The column reflecting sign sizes has been modified to read "Minimum Sign Size." The signs have been reordered to reflect the order found in Part 2.

243. In Section 9B.02, the statement that sign sizes for shared use paths should be those shown in Table 9B-1 is changed from GUIDANCE to STANDARD since sign sizes are considered STANDARDS in other parts of the MUTCD. An OPTION statement is

added to allow the use of larger size signs when appropriate.

Also in Section 9B.02, the OPTION statement regarding the use of fluorescent yellow green warning signs for "Bicycle Crossing" warning signs has been moved to Section 9B.15 Bicycle Crossing Warning Signs which is a more appropriate location for this discussion.

244. In Section 9B.03, text has been added to the OPTION statement that allows the use of larger STOP and YIELD signs when appropriate. One commenter recommended adding GUIDANCE on assignment of priority at path/roadway intersections and to recommend selection of appropriate intersection control. The FHWA is adding this language to this section.

245. In Section 9B.04 (referenced in the NPA as Section 9B.06 with the Proposed title "Preferential Bicycle Land Signs"), the title of this section is modified to read "Bicycle Lane Signs" to be consistent with the definition found in Section 9A. The word "preferential" is deleted throughout the text for consistency. Three comments were received that addressed the inconsistency between this section and Section 9C.04 Markings For Bicycle Lanes.

Two paragraphs have been added to Section 9B.04 as an OPTION statement that addresses the use of the R3-16a and R3-17a "Bicycle Lane" signs that were shown in the NPA but not addressed in the text. The R3-16a sign may be used to notify the bicyclist that the bicycle lane is ending. The R3-17a sign may be used to notify bicyclists that they may encounter parked vehicles where parking is allowed.

The proposed deletion of the preferential lane symbol (diamond) for bicycles was well received. Both the R3-16 and R3-17 signs and appropriate figures that were proposed to be modified in the NPA, and there were no objections to this change. The FHWA is providing a phase-in compliance period of 5 years after the effective date of this final rule for existing markings to minimize any impact on State and local highway agencies. This change is effective immediately for new signing installations.

246. In Section 9B.05 (referenced in the NPA as Section 9B.10 and proposed changing the title from "Lane Use Control Signs" to "Bicycle Preferential Lane-Use Control Signs"), the NCUTCD and 65 other commenters recommended changing this sign to "Begin Right Turn Lane Yield to Bikes Sign" (R4-4), to better define the sign's use. A comment was received and concurred with by 66 others that the OPTION statement

¹⁷ The "Guide for the Development of Bicycle Facilities," 1999 edition, AASHTO, is available for inspection as prescribed at 49 CFR part 7. It may be purchased from AASHTO, 444 North Capitol Street, NW., Suite 249, Washington, DC 20001, or electronically at <http://www.aashto.org>.

¹⁸ The "Uniform Vehicle Code and Model Traffic Ordinance," 1992 Revision, is published by the National Committee on Uniform Traffic Laws and Ordinances, 107 S. West Street, #110, Alexandria, Virginia 22314. It is available for inspection as prescribed at 49 CFR part 7.

should be revised to reduce redundancy and to clarify the intent of this sign to be used at the beginning of right turn only lanes with parallel through bicycle lanes. The FHWA is revising this section to substitute the word "weave" for "merge" to better describe the movements at these locations.

Also, the R3-7 sign mentioned in Section 9B.10 is not specifically a bicycle-related sign, but is instead related to right turn only lanes. The FHWA agrees that this sign is adequately addressed in Part 2B and is deleted from this section.

247. In Section 9B.08 (referenced in the NPA as Section 9B.09), the title is changed from "No Parking Signs" to "No Parking Bicycle Lane Signs." None of the commenters disagreed with this change.

One comment was received regarding the language found in the NPA Section 9B.09 and pointed out that due to variances in State and local laws affecting parking in bicycle lanes that this STANDARD text would be better addressed as GUIDANCE. The FHWA disagrees with this change in condition and is adding the text "If the installation of signs is necessary to restrict parking * * *" in order to clarify that when these signs are posted, this concept shall be followed. This addition to the text allows flexibility and has no impact on State and local jurisdictions.

248. In Section 9B.09 Bicycle Regulatory Signs (referenced in the NPA as Section 9B.05 Bicycle Restriction Signs), several commenters recommended changing the title and text to "Bicycle Regulatory Signs" since these signs are more appropriately noted as regulatory signs, not specifically as restriction signs. The FHWA agrees with this recommendation and is changing the title. It was also suggested that text be added to the OPTION statement in Section 9B.09 to address the use of the R10-3 sign at locations without pedestrian signals. The FHWA agrees and is adding this OPTION. The GUIDANCE statement is modified deleting the phrase "where bicyclists are expected to dismount and walk with pedestrians while crossing the street" since the State's law or Uniform Vehicle Code may not require bicyclists to dismount.

249. The proposed amendment to Section 9B.10 recommended changing the name of this sign from "Travelpath Restriction Signs" to "Shared-Use Path Restriction Sign." None of the commenters disagreed with this change. The proposed change is adopted.

250. A new Section 9B.11 Other Regulatory Signs is added after it was suggested that there are other regulatory

signs that may be applicable to shared use paths and other bicycle facilities.

251. Several comments were received on the text regarding Intersection Warning Signs in Section 9B.13 (proposed as Section 9B.14). The text was in conflict with that found in Section 2C.33. The text found under OPTION of Section 2C.33 has been inserted in this section and modified to include "shared use paths." Several commenters also questioned the language in the second OPTION statement that also conflicted with the GUIDANCE statement found in Section 2C.33. The FHWA has deleted this second OPTION and added language to be consistent with the GUIDANCE statement found in Section 2C.33 that states that intersection warning signs should not be used when the path approach to the intersection has a stop, yield, or signal control.

252. In Section 9B.14, 67 commenters remarked that the word "Hazardous" in the Bicycle Hazardous Condition Warning sign be changed to "Surface" since the word may be misinterpreted for the warning condition ahead in the bicycle path surface. The FHWA agrees and the sign and text is changed to read "Bicycle Surface Condition Warning Sign."

It was also proposed in 9B.14 that the SLIPPERY WHEN WET plaque be made a supplemental plaque similar to other specific surface conditions (DIP, BUMP). The SLIPPERY WHEN WET plaque has been assigned the designation "W8-10p."

253. The text in Section 9B.15 Bicycle Crossing Warning Signs has been replaced with text that was published in Section 2C.36 which proposed a new application for advance crossing and crossing signs. The FHWA eliminated the crosswalk lines on the crossing signs since road user's comprehension studies show that they generally do not know the difference between the two signs. Instead of using crosswalk lines within the sign to indicate where the actual crossing is located, the FHWA is requiring a crossing sign with supplemental downward pointing arrow plaque to show the crossing location. In an advance crossing situation, the FHWA is requiring using a crossing sign supplemented with an "AHEAD" or "XX FEET" plaque. The FHWA is providing a phase-in compliance period of 7 years after the effective date of this final rule for existing signs to minimize any impact on State and local highway agencies. This period will allow for replacement of existing signs after their normal service life. This change is effective immediately for new sign installation.

It was also suggested that the text in the GUIDANCE paragraph of Section 9B.15 be revised to remove the distances stated for low and high speed roadways and refer the reader to Table 2C-3 which states the guidelines for advance placement of warning signs. The FHWA agrees with this recommendation and has deleted the duplicate language.

254. In Section 9B.16, the FHWA received no negative comments on the proposed text under OPTION, published at 62 FR 1364 on January 9, 1997. The text is modified to clarify that the Share the Road word message plaque (W16-1) may be used in conjunction with the W11-1 Bicycle Crossing sign. One comment was received suggesting a picture of the sign be added. This sign has been added to the page with warning signs.

The SUPPORT paragraph found in Section 9B.20 Warning Signs is relocated to 9B.16 Other Bicycle Warning Signs in order to consolidate references to other warning signs.

255. In Section 9B.18 Bicycle Route Markers (referenced in the NPA as Section 9B.17), the FHWA is changing the GUIDANCE which recommends that the M1-8 marker should be used to establish a unique designation for a State or local bicycle route to an OPTION. The FHWA did not receive any comments opposing this proposal.

The NCUTCD recommended that the M1-9 Bicycle Route Marker that is shown in the NPA be revised to be consistent with the M1-9 design depicted in the "Standard Highway Signs"¹⁹ book. The M1-9 design shows the route number above and the bicycle below which improves the legibility of the route number. The FHWA agrees with this recommendation, and has modified the M1-9 bicycle route marker.

256. In Section 9B.19 Destination Arrow and Supplemental Plaque Signs for Bicycle Route Signs, the NCUTCD recommended that the discussion of color of the M7-1 through M7-7 signs be stated as a STANDARD instead of GUIDANCE. The FHWA agrees and the discussion of sign colors is changed to a STANDARD to ensure uniformity.

257. In Figure 9B-2, the title has been revised by replacing the word "typical" with "example" and now reads "Example Signing for the Beginning and

¹⁹"Standard Highway Signs," FHWA, 1979 Edition is included by reference in the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD). It is available for purchase from the U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. It is available for inspection and copying as prescribed at 49 CFR part 7.

End of a Bicycle Route” since this may not be considered a “typical” drawing. Other modifications to the figure are made on comments received, including removing the crosswalk lines, extending the centerline through the roadway, adding a curb line at the beginning/end of the bicycle route, and extending the size of the arrow sign (M7-1) to match the D11-1 sign.

258. Figure 9C-3, “Typical Signing for the Beginning and End of a Bikeway of a Preferential Bicycle Lane,” is removed from the MUTCD. The NCUTCD submitted a figure that shows recommended signing and markings for bicycle lanes combined on one figure. The FHWA agrees with this concept, therefore a new Figure 9C-5, “Typical Pavement Marking for Bicycle Lanes on Two-way Street,” is added with accompanying text to Chapter 9C MARKINGS.

259. The FHWA received no objections to the proposed language in Section 9C.02 regarding pavement markings for bicycle facilities. The text in GUIDANCE is modified to include all bicycle facilities, not merely bicycle lanes. Also, the text in Section 9C.02 regarding “pavement marking materials that will minimize loss of traction under wet conditions” is changed to a more generalized statement since some materials may be slippery to bicyclists when dry as well as wet.

260. The FHWA received no objections to the proposal in Section 9C.03 to change the language from GUIDANCE to OPTION for using a solid white line to separate different types of users on shared use paths. The proposed change is adopted.

261. In Section 9C.04, the title now reads “Markings for Bicycle Lanes” in order to be consistent with the revised definition of this term. It was recommended that the word “preferential” be deleted throughout Part 9 to be consistent with the language found in the “Guide for the Development of Bicycle Facilities,” 1999 edition, AASHTO.²⁰ This was adopted. Also, the proposed amendment to Section 9C.04 included text requiring signs to be used with preferential lane symbols. Commenters suggested deleting this text from this section since it is covered in Section 9B. The FHWA believes requiring the use of these signs is of importance and is including the proposed text in Section 9C.

The FHWA is adding a GUIDANCE statement to indicate how bicycle lanes are specifically defined by marking. This paragraph reads “Longitudinal pavement markings should be used to define bicycle lanes.”

Also in Section 9C.04, the FHWA is changing the STANDARD so that both markings and signs are mandatory. Use of pavement markings only would not alert drivers to the presence of the lane to the same extent as markings and signs together would, especially in inclement weather conditions.

Three commenters found the language proposed in Section 9C.04 regarding the placement of bicycle lane symbols immediately after an intersection confusing. The FHWA is revising the text to include maximum distance between markings. The sentence reads “If used, the bicycle lane symbol shall be placed immediately after, but not closer than 20m (65 ft) from the cross road, or other locations as needed.”

262. Several comments were received regarding Figure 9C-4, “Intersection Pavement Markings—Designated Bicycle Lane with Left Turn Area, Heavy Turn Volumes, Parking, One-way Traffic, or Divided Roadway.” The FHWA is adopting a figure submitted by the NCUTCD which more clearly shows recommended signs and symbols for a bicycle lane. Several comments were received regarding Figures 9C-7, “Typical Bicycle Lane Treatment at Parking Lane into Right Turn Only Lane” and 9-8, “Typical Bicycle Lane Treatment at Right Turn Only Lane.” The figure legends that were proposed in the NPA are revised and corrected.

263. In Section 9C.06, the FHWA is expanding the discussion of markers on shared use paths in the STANDARD paragraph and is adding text to be consistent with the text found in Section 3C.02.

264. The FHWA’s proposal to add a separate Section 9C.07 to cover the discussion on pavement markings used for obstruction received no objections, however, the title is simplified to “Pavement Markings for Obstructions.”

The SUPPORT statement in Section 9C.07 is modified by changing the word “condition” to “obstruction” to better define the application of this marking. The second sentence in the statement is deleted because such obstruction may not always be visible to bicyclists, and may lead to the marking not being used in locations where it is appropriate.

The GUIDANCE statement in Section 9C.07 is revised to make the marking applicable to obstructions other than drainage grates, and to specify that such markings should be used specifically for hazards near the roadway edge and not

in the center of the roadway. The sentence reads “In roadway situations where a drainage grate or other roadway obstruction that is inappropriate for bicycle travel cannot be eliminated, white markings applied as shown in Figure 9C-7 should be used.”

265. In Section 9D.02 Signal Operations for Bicycles, one commenter recommended combining the discussion on visibility requirements with the discussion on signal operations for bicycles and using the term “visibility-limited signal faces.” There were no other negative comments received. One commenter recommended revising the language in the second paragraph. The FHWA agrees, and the text is revised to read “On bikeways, the needs of bicyclists shall be considered when setting signal timing.”

266. Modifications are made to several of the figures in Part 9 based on comments received. The Figure 9C-5 (NPA Figure 9-6) is divided into two figures based on comments received from the NCUTCD. The top two diagrams are numbered and titled “Figure 9B-3. Typical Signs and Marking for Shared-Use Paths.” The bottom right diagram on NPA Figure 9-6 is deleted because it is not considered necessary. The bottom two diagrams remain and are numbered and titled “Figure 9C-6. Optional Word and Symbol Pavement Markings for Bicycle Lanes.”

A new figure is added, numbered and titled “Figure 9C-2. Center Line Markings for Shared-Use Paths.” This figure depicts centerline and obstruction markings for paths. This figure is added to more clearly show how to divide a shared use path of sufficient width into two opposing lanes and how to delineate an obstruction.

The NPA Figure 9-9 is replaced with a figure that was submitted by the NCUTCD and is renumbered and titled “Figure 9C-7. Obstruction Pavement Marking.” This figure is also found in AASHTO’s “Guide of Development of Bicycle Facilities,” and clearly shows marking details and taper rates.

267. As proposed in Part 9C of the NPA, the FHWA is deleting the preferential lane symbol (diamond) for bicycle signs and pavement markings. The American Traffic Safety Services Association commented that the 7 to 10 year phase-in is too long and should be shortened to 3 to 5 years if the use of the diamond symbol on preferential lanes has caused confusion among the public. The FHWA agrees that the use of the diamond symbol on preferential lanes is confusing and with ATSSA’s suggestion requiring that all new projects comply now. The FHWA agrees

²⁰ The “Guide for the Development of Bicycle Facilities,” 1999 edition, AASHTO, is available for inspection as prescribed at 49 CFR part 7. It may be purchased from AASHTO, 444 North Capitol Street, NW., Suite 249, Washington, DC 20001, or electronically at <http://www.aashto.org>.

that the 7 to 10 year phase-in is excessive and is revising the proposed phase-in period to 6 years. This change takes effect immediately for new installations.

Part 10—Traffic Controls for Highway-Light Rail Transit Grade Crossings

The FHWA received 381 comments from 46 commenters concerning part 10. Only the technical (not editorial) comments are addressed in this discussion. The notice of proposed amendments (NPA) was published at 64 FR 33806 on June 24, 1999.

268. Part 10 is added to the MUTCD. The FHWA received 5 comments supporting the addition of Part 10 to the MUTCD.

269. In Section 10A.01 Introduction, a new paragraph 3 is added under the SUPPORT statement to read: "An initial educational campaign along with an ongoing program to continue to educate new drivers is beneficial when introducing light rail operations to an area and, hence, new traffic control devices." This paragraph is added to address docket comment concerns about road users' comprehension of new traffic control devices that pertain to light rail operation.

Also in this section, a new paragraph 5 under STANDARD is added to read: "Where light rail transit and railroads use the same track or adjacent tracks, the traffic control devices, systems, and practices for railroad crossings shall be used. (See Part 8)." This paragraph is added based on review of docket comments concerning the use of the W10-6 sign (light rail transit advance warning sign) proposed to be added in Part 10 versus the W10-1 sign (highway-rail advance warning sign) that is required in Part 8. This paragraph clarifies that the traffic controls described in Part 8 have precedence when a track or adjacent tracks are used by both heavy and light rail.

The FHWA has removed from this section proposed paragraphs 4 (STANDARD) and 5 (OPTION) from the 1999 NPA, regarding applicability of Part 10 to only new and modernized locations and when consistent with Federal and State laws and regulations. The compliance date for automatic gates, flashing-light signals and blank-out signs is 5 years after the effective date of this final rule. This 5-year phase-in period for automatic gates, flashing-light signals and blank-out signs is given in order to not cause an undue economic burden on the affected jurisdictions.

270. In Section 10A.05 Temporary Traffic Control Zones, the FHWA is changing paragraph 7 concerning lane

restrictions or the performance of flagging near highway-light rail transit grade crossings from GUIDANCE to STANDARD to be consistent with the STANDARD paragraph in Section 8A.05 Temporary Traffic Control Zones. This change will require that lane restrictions, flagging or other operations not be performed in a manner that would cause vehicles to stop on the tracks with no means of escape.

271. In Chapter 10C Signs, Illumination and Markings (titled "Signs, Pavement Markings, and Illumination" in the 1999 NPA), the FHWA is reordering the sections to follow other parts of the Manual (regulatory, warning, information, illumination and pavement markings). Within the regulatory category, the FHWA reordered the sections as: at the crossing, near the crossing, and then signs for mixed-use alignment operation. The new order is: 10C.01 Introduction, 10C.02 Look Sign, 10C.03 STOP or YIELD Sign, 10C.04 DO NOT STOP ON TRACKS Sign, 10C.05 STOP HERE ON RED Sign, 10C.06 Light Rail Transit-Activated Blank-Out Turn Prohibition Signs, 10C.07 Divided Highway With Light Rail Transit Crossing Sign, 10C.08 No Vehicles On Tracks Sign, 10C.09 Light Rail Transit Only Lane Signs, 10C.10 Do Not Pass Light Rail Transit Sign, 10C.11 Highway-Rail Advance Warning Signs, 10C.12 Light Rail Transit Approaching-Activated Blank-Out Warning Sign, 10C.13 Light Rail Station Sign, 10C.14 Illumination at Highway-Light Rail Transit Crossings, and 10C.15 Dynamic Envelope Delineation Markings.

272. In Section 10C.01 Introduction, the proposed OPTION paragraph in the 1999 NPA, concerning the use of smaller than standard size signs, is removed. A commenter stated that unlike bicycle facilities, for light rail transit, sign sizes and placement similar to standard highway signs are required because of the similarity of motor vehicle driver needs. The FHWA agrees with this comment and is removing the OPTION so that the signs conform to Chapter 2A as stated in the STANDARD. Since this issue is provided for in Chapter 2A, it should not be stated as an OPTION in this section.

273. Proposed Section 10C.02 Light Rail Transit Warning Signs (W10-6, W10-6a) has been removed and replaced with a new Section 10C.02 entitled, "LOOK Sign (R15-8)." Based on docket comments received about the W10-6 light rail transit advance warning sign and review of the section, the FHWA agrees that allowing the use of a warning sign at crossings to supplement the Crossbuck (Figure 10-6

in the 1999 NPA) is not appropriate (warning signs are used in advance to warn the road user of an approaching unexpected condition, not at the condition). The FHWA agrees to include the option to use the LOOK sign (R15-8) as a supplemental panel to the Crossbuck at light rail transit grade crossings. The LOOK sign is currently an OPTION allowed in Part 8, Traffic Control for Highway-Rail Grade Crossings; therefore, to be consistent the FHWA is adding it to Part 10.

The FHWA received several comments in response to the proposal to add a new standard Light Rail Transit Warning Sign (W10-6) and a Light Rail Transit Both Directions Warning Sign (W10-6a, W10-6b). Three docket commenters stated that the W10-1 sign is already a universally accepted advance warning sign standard at all highway-rail grade crossings. They stated that the new light rail transit warning sign provides the potential for confusion and may fail to elicit the appropriate degree of caution. In an effort to create uniform standards, they recommend the W10-1 sign be installed instead of W10-6. One commenter wanted this sign to be an OPTION instead of a requirement, thinking that at signalized intersections with light rail transit crossing one leg the placement of the sign would be subject to different interpretations as to what approaches qualify for such an installation. One commenter suggested that the W10-6 and the W10-6a be round to match the shape of the W10-1. Another commenter stated that the distinction provided between the W10-6 and the W10-6a and W10-6b appears to be unnecessary and potentially hazardous and that drivers should be alert to the possibility of bi-directional rail traffic at all crossings.

In response to the above comments, the FHWA is removing the section referenced in the 1999 NPA as 10C.2 Light Rail Transit Warning Signs (W10-6, W10-6a) and replacing it with Section 10C.11 Highway-Rail Advance Warning Signs (W10-1, W10-2, W10-3, W10-4). The W10-1 sign is already a universally accepted advance warning sign standard at all highway-rail grade crossings and is currently required in Part 8 of the MUTCD. This will remove the potential for confusion and the potential of not achieving the appropriate degree of caution. The compliance date removal of existing W10-6 series signs is 5 years after the effective date of this final rule. This 5-year phase-in period for removal of existing W10-6 series signs is given in order to not cause an undue economic burden on the affected jurisdictions.

274. In Section 10C.03 STOP or YIELD Signs (R1-1, W3-1, R1-2, W3-2), two commenters suggested the wording on the use of STOP AHEAD or YIELD AHEAD signs be changed to match that in Section 2C.25 (use on approaches with insufficient sight distance). The FHWA agrees with these comments and made text changes to reflect this change.

One commenter requested a change from a STANDARD to an OPTION, and another commenter requested a change from a STANDARD to a GUIDANCE when STOP or YIELD signs are used to control the highway-light rail transit crossing. The FHWA disagrees that the STANDARD should be changed to an OPTION or a GUIDANCE. A clarifying phrase is added to the end of the first paragraph that indicates the STOP AHEAD and YIELD AHEAD signs shall be installed in accordance with Section 2C.25. Section 2C.25 indicates that these signs shall be installed if there is a sight distance problem.

Six commenters suggested the addition of two new characteristics for deciding whether to use a STOP or YIELD sign. The FHWA will consider the proposal for adding two new characteristics for deciding if a crossing should use a STOP or YIELD sign in the future.

One commenter indicated that proposed paragraph 4 in the 1999 NPA (covering not installing a STOP or YIELD sign near a crossing such that vehicles might extend into the path of an approaching light rail transit vehicle) is in conflict with State laws concerning when a light rail crosses a local road that intersects a State highway, the local road is required to stop before entering the highway. The FHWA agrees and is removing this sentence and replacing it with a new paragraph that gives GUIDANCE about posting a DO NOT STOP ON TRACKS sign if a STOP or YIELD sign is installed near a crossing where vehicle queues are likely to extend into the path of a light rail transit train.

One commenter took exception to the GUIDANCE recommending that STOP or YIELD signs be erected on a separate post. He stated that this guidance was unnecessarily restrictive and that there is no reason why a STOP sign could not be mounted on an existing fixture (e.g., a street light pole) if that fixture is in a suitable position. He said that the other requirements of this paragraph are already covered by Part 2, and the entire paragraph 4 (referenced in the 1999 NPA as paragraph 3) should be deleted. The FHWA agrees that STOP and YIELD signs may be installed on another suitable post and is changing that

paragraph to an OPTION instead of deleting it.

After review of this section, the FHWA is removing proposed paragraph 5 in the 1999 NPA, (OPTION) regarding the option to install a STOP or YIELD sign as an interim measure while waiting for active devices to be installed and operational. This paragraph is no longer appropriate because Section 10B.01 Introduction and other paragraphs in Section 10C.03 give the authority to use STOP and YIELD signs at crossings for other than interim measures.

275. In Section 10C.06 Light Rail Transit-Activated Blank-Out Turn Prohibition Sign (R3-1a to R3-2a) (referenced in the 1999 NPA as Section 10C.04), a commenter questioned the appropriateness of transit-activated turn prohibitions. His experience with such blank-out signs showed that road users often fail to note and respond to the activation of such signs. He found this problem significant in cases of high volumes or permissive left turns across heavy traffic. He recommended using traffic signal phasing with protected/prohibited operation instead of these signs. The FHWA disagrees. These signs are appropriate for use, and road users are helped by and do respond to the message. If protected-only left-turn phasing is used, it would not be necessary to install a blank-out turn-prohibition sign for the left-turn movement.

One commenter objected to the blank-out sign because he said the detail on the sign cannot be reproduced on a fiber optic sign. A problem was also found with adding the railroad tracks to the sign because it may weaken turn prohibitions where no specified hazard is identified on the sign. The FHWA disagrees with this comment. There are a number of different technologies that can be used to convey this message if the use of fiber optic technology for this sign is in question.

After a review of this section, the FHWA realized that the GUIDANCE given in proposed paragraph 2 of the 1999 NPA unduly prohibited the use of this sign on mixed-use alignments. In proposed paragraph 3 of the 1999 NPA, the words "on a semi-exclusive alignment" also unduly prohibited the use of this sign on mixed-use alignments. The FHWA is removing paragraph 2 from GUIDANCE and the words, "on a semi-exclusive alignment" from paragraph 3 to allow the light rail transit-activated blank-out turn prohibition signs to be used in mixed-use and semi-exclusive alignments.

276. In Section 10C.08 No Vehicles on Tracks Sign (R15-6, R15-6a) (referenced

in the 1999 NPA as Section 10C.07), several comments were received as well as the results from the FHWA research study, "Evaluation of Selected Potential MUTCD Signs."²¹ One commenter requested that the use of this sign be extended to locations where the tracks are only separated by pavement markings. The FHWA agrees with this comment and is making the appropriate text changes to this section.

Another commenter suggested that the use of this sign is more appropriate when adjacent traffic lanes are separated from the transit lane only by striping or lane designation, and that it is obvious when curbs are used that vehicles are prohibited from driving on the tracks and the curb itself provides a deterrent. The FHWA partially agrees with this comment. However, we believe an important application of this sign is at intersections in order to inform drivers not to proceed down the wrong (light rail transit) side of the curb.

A third commenter thought the sign would call attention to the tracks and be misinterpreted as indicating traffic may travel on the exclusive roadway as long as they do not drive on the tracks. He also suggested using turn restrictions and DO NOT ENTER signs instead. The FHWA disagrees with the suggestion to substitute a DO NOT ENTER sign for a No Vehicles on Tracks symbol sign—it is important to tell drivers why they are not permitted to enter or turn onto the light rail transit track area, as some drivers intentionally violate turn restriction signs when they think that they will not be putting their safety in jeopardy. When the guideway is not paved, most agencies will not exercise their option to use this sign. However, the FHWA agrees that in some instances a DO NOT ENTER (R5-1) sign is appropriate. The FHWA is removing the phrase from paragraph 1 (SUPPORT) that suggests the No Vehicles on Tracks sign is appropriate for streets solely for light rail transit. The FHWA is adding as the new second paragraph in Section 10C.08 the following GUIDANCE language: The DO NOT ENTER (R5-1) sign should be used where a road user could wrongly enter a light rail transit only street." A DO NOT ENTER conveys the message better for this situation.

The fourth commenter recommended a word message sign be used instead of the symbol sign because the symbol is confusing. The FHWA disagrees that only a word message sign (DO NOT DRIVE ON TRACKS, R15-6a) should be

²¹ "Evaluation of Selected Potential MUTCD Signs," Publication Number FHWA-RD-00-053, is available from National Technical Information Services (NTIS), 5285 Port Royal Road, Springfield, VA 22161.

used. However, the FHWA is adding an optional word message sign that could be used in lieu of the symbol sign based on this docket comment and results from the FHWA symbol sign research.²²

277. In Section 10C.09 Light Rail Transit Only Lane Signs (R15-4 Series) (referenced in the 1999 NPA as Section 10C.05), one commenter suggested that the use of the "Light Rail Transit Only Lane" regulatory (R15-4 series) sign in mixed alignments (an alignment where motor vehicles and light rail transits operate in the same lane) does not appear to be appropriate. He recommended that the OPTION paragraph be revised. The FHWA disagrees with this comment because the purpose of these signs is for mixed-use alignments.

278. In Section 10C.10 Do Not Pass Light Rail Transit Sign (R15-5) (referenced in the 1999 NPA as Section 10C.06), the FHWA conducted a symbol sign research evaluation.²³ Based on the results of that study, an optional word message sign is added: "DO NOT PASS STOPPED TRAIN" (R15-5a).

279. In Section 10C.12 Light Rail Transit Approaching-Activated Blank-Out Warning Sign (W10-7) (referenced in the 1999 NPA as Section 10C.11), one commenter found the proposed W10-7 sign to be unclear and had the potential to be confused with the I-12 sign. The commenter believes that by shape and color, the W10-7 sign appears to be regulatory rather than warning. He also believes that standard railroad warning signs and exclusive signal phases appear to be adequate without the W10-7 sign. The FHWA partially agrees and is adding descriptive wording to the text to reinforce that the W10-7 sign is a warning sign.

Six commenters suggested that the proposed third paragraph be changed from an OPTION to GUIDANCE, recommending these signs be used at traffic signals where traffic turning across tracks is not controlled by exclusive signal phases. The FHWA disagrees because many agencies do not want to use these signs. Changing this to GUIDANCE would force these agencies to justify their decision to not use a device that should only be an OPTION.

One commenter suggested that a special sign is not needed for this situation because the road user does not distinguish between heavy and light rail. The FHWA disagrees because there is no similar sign for heavy rail.

One commenter stated that the proposed format of the blank-out sign does not convey a message that the light rail transit car may be approaching from behind the driver. Also, the use of a verbal message format should be an OPTION. The FHWA disagrees. This sign is not required, but is a device the traffic engineer may use. The FHWA is adding descriptive words to the text to improve this section.

280. In Section 10C.14 Illumination at Highway-Light Rail Transit Crossings, the FHWA is removing proposed paragraph 2 of the 1999 NPA, (STANDARD) of this section, dealing with location of luminaires, because it is already covered in paragraph 2 (referenced in the 1999 NPA as paragraph 3), which references a recommended practice for roadway lighting.

281. In Section 10C.15 Dynamic Envelope Delineation (referenced in the 1999 NPA as Section 10C.13), one commenter recommended deleting the proposed fifth paragraph of the 1999 NPA where GUIDANCE is provided on delineation along the roadway between intersections in mixed-use alignments. He believed that this practice could confuse road users and diminish their respect for the distinctive paving at locations where its purpose is to deter vehicle encroachment into a reserved trackway. The FHWA disagrees because delineation of the dynamic envelope along the roadway in mixed-use alignments will better communicate to road users where to expect the light rail transit train. This is especially important in mixed-use alignments because road users may have a greater number of possible crossings with a light rail transit train (depending on lane restrictions). However, the FHWA is changing this paragraph to an OPTION so the decision of whether to delineate the dynamic envelope in mixed-use alignments can be made based on local conditions.

One commenter suggested changing the proposed sixth paragraph of the 1999 NPA (on extending the markings across all highway-light rail transit crossings) from GUIDANCE to OPTION because it may be more appropriate to use a stop line so motorists don't pull up to the dynamic envelope marking thinking it serves as a stop line and be in the way of a descending gate. The FHWA agrees with changing this paragraph to an OPTION; and includes the drawing of the dynamic envelope pavement marking for a semi-exclusive alignment (currently shown in Figure 8B-4 in Part 8) in Figure 10C-2. The FHWA is modifying the length of the pavement marking in that figure to

extend across the width of the entire roadway so it will not be confused with a stop line.

One commenter suggested that markings should only be installed when an engineering study demonstrates a need to define the envelope. The FHWA agrees with this suggestion and is changing paragraph 2 of this section to be an OPTION in the MUTCD. The FHWA also is adding a phrase to the end of paragraph 7 explaining that if used, markings should extend across all crossings, "unless a four quadrant gate system (see Section 10D.04) is used."

One commenter stated that additional guidance is needed on pavement marking colors, line style, etc. The FHWA agrees and is modifying paragraph 3 to add the words, "and shall be a 100 mm (4 in) normal solid white line" to the end of the paragraph. The current text refers to Part 3, but there is no mention of the size and colors of dynamic envelope delineation in Part 3.

282. In Section 10D.01 Introduction, one commenter stated that, based on experience with light rail transit operating speeds, the speeds mentioned in paragraph 6 (referenced in the 1999 NPA as paragraph 2) need to be changed from a maximum speed of 55 mph to a maximum speed of 65 mph. The FHWA agrees and is making this change to the text.

Another commenter suggested deleting proposed paragraph 4 of the 1999 NPA (the last paragraph in SUPPORT) and proposed paragraph 5 of the 1999 NPA (the first paragraph in GUIDANCE) because they do not make any substantive contribution to Part 10. The FHWA agrees that these paragraphs are unnecessary and is removing them.

Six commenters suggested paragraph 5 (referenced in the 1999 NPA as paragraph 7), on audible devices, be changed from OPTION to GUIDANCE in order to provide adequate warning for the visually impaired community and to meet the American with Disabilities Act (ADA) Requirements. The FHWA disagrees because the ADA requirements do not require audible devices at every grade crossing. The FHWA believes that changing paragraph 5 to GUIDANCE could mean significant financial burdens to State and local governments. In addition, the FHWA believes that the jurisdictions that need these devices will conduct the appropriate engineering studies and install these devices. FHWA will investigate this issue further.

283. The FHWA is adding two new sections to Chapter 10D Highway-Light Rail Transit Active Traffic Control Grade Crossing Systems. The FHWA is

²² "Evaluation of Selected Potential MUTCD Signs," FHWA, 2000 (Publication No. FHWA-RD-00-053)

²³ Ibid.

adding Section 10D.02 Four Quadrant Gate Systems to mirror the current wording in Part 8 (Traffic Control for Highway-Rail Grade Crossings) to govern four quadrant gate systems, if used. This decision is based on the inclusion of a section on four quadrant gates in Part 8 and the current use of four quadrant gates at highway-light rail transit grade crossings. The FHWA is adding Section 10D.04 Flashing-Light Signals, to properly categorize some of the wording from Section 10D.03 Automatic Gates (referenced in the 1999 NPA as Section 10D.02) and to cover the aspects of flashing-light signals that are unique to light rail transit.

284. In Section 10D.03 Automatic Gates (referenced in the 1999 NPA as Section 10D.02 Traffic Gates), one commenter suggested that the title should be changed from "Traffic Gates," to "Automatic Gates" because the term "Automatic Gates" is used in Part 8. The FHWA agrees and has changed the title to "Automatic Gates" for this section (to match Part 8).

Another commenter suggested the FHWA not use the term "automatic gate" since most, if not all, gates at highway-rail grade crossings and highway-light rail transit grade crossings are operated by power and controlled by electrical circuits that make them automatic. However, there was concern that the term "traffic gate" failed to distinguish between Barrier (Resistance) Gates, and Warning Gates. He suggested that "traffic gates" be replaced by "barrier traffic gates." The FHWA disagrees because, before changing to a term other than "automatic gates" (as used in Part 8), the development of new technical definitions needs to be addressed by the rail and traffic engineering professions.

Six commenters suggested changing paragraph 3 (referenced in the 1999 NPA as paragraph 2) from a GUIDANCE to a STANDARD. They stated that industry experience has found gated light rail transit grade crossings safer than ungated crossings, especially at speeds above 60 km/h (35 mph). In addition, they stated that the California Public Utilities Commission requires that gates be used where light rail transit speeds exceed 60 km/h (35 mph). Where light rail transit speeds exceed 60 km/h (35 mph), the commenters said the need for gates is due to both the increased stopping distance required for light rail vehicles traveling over this speed and the increase in property damage, injuries and fatalities reported when light rail transit collisions occur at speeds above 60 km/h (35 mph). The commenters also say this is standard design practice for all new light rail

transit systems in the United States, and so would not create an additional financial burden for light rail transit systems. The FHWA disagrees with changing this paragraph to a STANDARD at this time. Additionally, the USDOT Highway/Rail Grade Crossing Technical Working Group is developing a report that may recommend changes in GUIDANCE at active highway-rail grade crossings. Based on that report, the FHWA will consider whether changes to Part 10 are needed.

Six commenters suggested that paragraph 5 (referenced in the 1999 NPA as paragraph 4), concerning the OPTION to install automatic gates and flashing-light signals when the highway-light rail transit grade crossing is not at an intersection and when light rail transit speeds greater than 40 km/h (25 mph), be changed from OPTION to STANDARD because of industry experience. The commenters state that motorists are not expecting to stop at mid-block locations, and as such the need for traffic gates is greater at lower light rail transit speeds to provide a physical barrier between the motorist and the tracks. The FHWA disagrees with changing this paragraph to a STANDARD. This proposed change would need to be part of a future notice of proposed amendment to allow the public a chance to comment. Additionally, the USDOT Highway/Rail Grade Crossing Technical Working Group is developing a report that may lead to changes in GUIDANCE at active crossings. After reviewing that report, the FHWA will consider whether changes are needed to Part 10.

Two commenters questioned the restriction of light rail transit speeds in paragraph 5 (referenced in the 1999 NPA as paragraph 4). The FHWA disagrees with these objections because paragraph 5 defines when traffic control signals may be used instead of flashing-light signals or gates. That paragraph is not an attempt to control speeds of light rail transit operations or drivers of other motor vehicles. The criteria listed in this paragraph are not speed limits. Paragraph 5 contains valuable information to most agencies, however it is not a STANDARD. This paragraph allows a particular agency to use traffic control signals at a grade crossing that has light rail transit speeds in excess of 60 km/h (35 mph). This paragraph does not limit light rail transit speeds; it discusses the use of gates depending on speed.

285. In Section 10D.05 Traffic Control Signals (referenced in the 1999 NPA as Section 10D.03). One commenter suggested a change to paragraph 3,

GUIDANCE, saying 60 meters (200 ft) is inadequate for desirable interconnection. He recommended 200 m (650 ft) and recommended that this be a STANDARD requirement. The FHWA disagrees because 60 meters (200 feet) is the distance used in other parts of the MUTCD for guidance related to railroad preemption.

Six commenters suggested two new paragraphs (concerning the use of traffic control signals at highway-light rail transit grade crossings based on an engineering study, light rail transit speeds, and traffic control devices at the crossings) be added as OPTIONS. The FHWA partially agrees, but is only adding the phrase, "at a location other than an intersection," to paragraph 9 of Section 10D.05. The remainder of the suggested new paragraph will not be added because the FHWA does not want road users to disregard the importance of traffic signals. If traffic signals are placed at grade crossings where they would display GREEN for a majority of the time, there will be a disregard for traffic signals. The suggested second paragraph would conflict with Part 8.

Three commenters requested that the paragraph referenced in the 1999 NPA as paragraph 7 (exclusive only turn phase with arrow indications) be changed from OPTION to GUIDANCE. They stated that industry experience has demonstrated that, at intersections with exclusive turn lanes parallel to the tracks, a protected only turn phase should be provided to minimize the potential for a road user to run in front of a light rail vehicle approaching from behind. As a result of these docket comments, the FHWA has changed this paragraph to a STANDARD instead of the requested GUIDANCE to improve safety at highway-light rail transit grade crossings. This paragraph was reworded to require a red indication to be displayed so that vehicles are prohibited from turning onto the tracks when trains are approaching or occupying the crossing. The FHWA also has moved this paragraph into the Traffic Signal Preemption Turning Restrictions section (now renumbered as Section 10D.06).

286. In Section 10D.06 Traffic Signal Preemption Turning Restrictions (referenced in the 1999 NPA as Section 10D.04), two commenters opposed the restriction of turn movements at nearby signalized intersections. They believed the restriction should be changed to provide for an engineering study of site conditions. The FHWA disagrees. Motorists, pedestrians, and bicyclists should not be trapped when crossing the tracks due to a lack of storage distance and should not run into the path of an oncoming train.

287. In Section 10D.07 Use of Traffic Control Signals for Control of Light Rail Transit Vehicles at Grade Crossings (referenced in the 1999 NPA as Section 10D.05), six commenters recommended that paragraph 3 (referenced in the 1999 NPA as paragraph 2), concerning allowing standard traffic signals to be used for light rail transit signals, be deleted. They stated that industry experience has demonstrated that motorist confusion occurs if standard traffic signal indications are used in lieu of special light rail transit signal indications. They stated that existing systems that have standard traffic signals in place to control light rail transit movements will not be affected by this because of the provisions in the 1999 NPA in paragraphs 4 and 5 in Section 10A.01. The FHWA disagrees with deleting paragraph 3. There is no reason why green-yellow-red signals cannot be used to control light rail transit traffic, especially since the GUIDANCE (erroneously shown as the second paragraph of SUPPORT in Section 10D.5, paragraph 6 of the 1999 NPA) states that the indications should be positioned so as not to be visible to motorists. In addition, proposed paragraphs 4 and 5 in the 1999 NPA for Section 10A.01 have been deleted. The FHWA has changed this GUIDANCE concerning positioning of indications to a STANDARD in paragraph 4, to emphasize the importance of positioning green-yellow-red signals.

One commenter recommended that the second sentence in paragraph 5 (referenced in the 1999 NPA as paragraph 3), concerning termination of the light rail transit phase, be moved to GUIDANCE. He indicated that it is not always practical to terminate the light rail phase until after the light rail transit vehicle has cleared the crossing. The FHWA disagrees because we believe that modern electronics technology can accomplish this STANDARD and because it does not seem safe to terminate a light rail transit phase prior to the light rail transit clearing the crossing.

Another commenter also recommended deletion of the second sentence in paragraph 5 (referenced in the 1999 NPA as paragraph 3), concerning termination of the light rail transit phase, because this requirement would preclude the use of fixed time traffic controllers on light rail transit intersections. The FHWA disagrees because of the hazard associated with the light rail transit phase terminating prior to the clearing of the crossing and because actuated controller equipment can be used. In addition, a pre-timed controller set up with special cabinet

wiring that allows stop-timing on the light rail transit phase would satisfy this STANDARD.

Six comments were received regarding paragraph 2 (referenced in the 1999 NPA as paragraph 4) and Figure 10D-1 (numbered as Figure 10-1 in the 1999 NPA). Two commenters suggested the GUIDANCE was too specific regarding the white bars and that it is not a proper function of the Manual to dictate the specifics of railway signaling. They stated that green, yellow and red signal indications are universally recognized, and other coding systems increase the opportunity for error. One commenter opposed the language on the use of white bars, because white bars are used for track switching operations, and a switching operation signal should be different from a stop and go signal. He recommended adopting the California Traffic Control Devices Committee (CTCDC) language of a T shape, or a vertical or horizontal bar for the Go signal. Another commenter said the CTCDC permits a shape and a triangle in addition to the bars. He recommended that the triangle and T shape be added to the list of signal indications. One commenter suggested that an amber color should be allowed for the horizontal bar with a white color for the vertical bar. Another commenter recommended deletion of the language governing diverging routes in Figure 10D-1. Based on these docket comments, the FHWA is changing this paragraph to an OPTION and is making it less specific regarding railway signaling. The FHWA is also modifying Figure 10D-1 to say "Typical," not "Recommended."

Two commenters opposed the 8 ft separation between the light rail transit signals and traffic signals described in paragraph 7 (referenced in the 1999 NPA as paragraph 8). They suggested a minimum 3 ft separation. One reasoned that the separation is unnecessary since the signals are required to be distinctly different, and such a requirement could force the placement of a light rail transit signal into a sub-satisfactory position. The other commenter stated that since the light rail transit signal and traffic signal displays are dissimilar such a restriction would correspond to requiring a pedestrian signal and vehicular traffic signal to be separated by 8 feet. The FHWA partially agrees but believes some separation is desirable. Therefore, the FHWA is changing the requirement to a 1m (3 ft) separation.

288. In Section 10D.08 Pedestrian and Bicyclist Signals and Crossings (referenced in the 1999 NPA as Section

10D.06 Non-Motorist Signals and Crossings), one commenter suggested that the term "non-motorist" be replaced with "pedestrian" because "non-motorist" is both cumbersome and strange. The FHWA partially agrees and is changing the term "non-motorist" to "pedestrian and bicyclist" in the title of this section and throughout this section.

Six commenters recommended the first sentence of proposed paragraph 3 of the 1999 NPA, concerning the use of flashing-light signals, be changed from OPTION to GUIDANCE. The FHWA agrees and is changing this sentence to GUIDANCE, with minor modifications to the sentence to respond to another comment.

One commenter suggested that paragraph 4 be changed to recommend flashing-light signals instead of gates at pedestrian crossings where an engineering study has determined sight distance is insufficient for completion of crossing prior to arrival of light rail transit, or where light rail transit speeds are greater than 60 km/h (35mph). The commenter suggested gates be allowed as an OPTION if flashing-light signals are not sufficient. The FHWA agrees that flashing-light signals should be added before or with gates, and is making appropriate text changes to paragraph 4.

One commenter indicated that the text and the figure reference in paragraph 4 disagree. The commenter suggested text be added to indicate that a traffic gate may be used as a combination vehicle/pedestrian control device by placing the gate behind the sidewalk, keeping in mind that the flashing-light signals need to be clearly visible to road users and the lights shall not be obstructed by walls, buildings, trees, etc. The commenter further recommended another restriction for such an installation should be that the gate arm length not be excessive, as determined by industry standards. The FHWA partially agrees; however, gates do not necessarily need to be placed behind the sidewalk. Figure 10D-3 shows this type of combination vehicle/pedestrian traffic control device. The FHWA is correcting the references to the figures in this section. The third sentence suggested by the commenter referred to industry standards that the FHWA is not aware of, so that sentence is not included in the text.

The same commenter recommended that paragraph 5 would then no longer be relevant and should be deleted. The FHWA disagrees because the SUPPORT paragraph is still relevant to describe the optional gates.

One commenter suggested criteria be added to Section 10D.08 for the use of

swing gates or that paragraph 6, which mentions swing gates, be deleted. The FHWA disagrees because the swing gates are described and illustrated in an acceptable manner. The purpose of swing gates is to prevent pedestrians from entering the track area.

Another commenter recommended new figures be added to Part 10 that show light rail transit/pedestrian and bicycle crossings that take up a smaller amount of right-of-way. The FHWA disagrees because the text and figures in Part 10 do not refer to the amount of right-of-way needed for accommodating light rail transit parallel to a roadway.

One commenter stated that physically blocking the sidewalk with an automatic gate, shown in Figures 10D-3, 10D-4, and 10D-5 (numbered in the 1999 NPA as Figures 10-3, 10-4, and 10-5) can be problematic and should not be considered "typical." The commenter believed that this matter is addressed sufficiently in the text and these illustrations should be deleted. The FHWA disagrees. Blocking sidewalks with automatic gates during the passage of trains or light rail transit vehicles is done all the time and is safe, not problematic.

Rulemaking Analysis and Notices

Executive Order 12866 (Regulatory Planning and Review) and DOT Regulatory Policies and Procedures

The FHWA has determined that this action is not a significant regulatory action within the meaning of Executive Order 12866 or significant within the meaning of Department of Transportation regulatory policies and procedures. It is anticipated that the economic impact of this rulemaking will be minimal. Most of the changes in this final rule 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 the safety of roadways at little additional expense to public agencies or the motoring public. Therefore, a full regulatory evaluation is not required.

Regulatory Flexibility Act

In compliance with the Regulatory Flexibility Act 5 (U.S.C. 601-612), the FHWA has evaluated the effects of this action on small entities, including small governments. This final rule adds some alternative traffic control devices and only a very limited number of new or changed requirements. Most of the changes are expanded guidance and clarification information. Based on this evaluation, the FHWA hereby certifies

that this action would not have a significant economic impact on a substantial number of small entities.

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 it has been determined that this action does not have a substantial direct effect or sufficient federalism implications on States that would limit the policymaking discretion of the States. Nothing in the MUTCD directly preempts any State law or regulation. The MUTCD is incorporated by reference in 23 CFR part 655, subpart F, which requires that changes to the national standards issued by the FHWA shall be adopted by the States or other Federal agencies within 2 years of issuance. These 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. Note that the overriding safety benefits of the uniformity prescribed by the MUTCD are shared by all of the State and local governments, and that changes made in this notice are directed at enhancing safety. To the extent that these amendments override any existing State requirements regarding traffic control devices, they do so in the interest of national uniformity.

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.

Paperwork Reduction Act of 1995

This action does not contain a collection of information requirements for purposes of the Paperwork Reduction Act of 1995, 44 U.S.C. 3501 *et seq.*

Unfunded Mandates Reform Act of 1995

Note that the revisions directed by this action can be phased in by the States over specified time periods in order to minimize hardship. The changes made to traffic control devices that would require an expenditure of funds all have 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 involved

revisions require expenditures by the States and local governments on Federal-aid projects, they are reimbursable. This rule does not impose a Federal mandate resulting in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of \$100 million or more in any one year. (2 U.S.C. 1531 *et seq.*)

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)

We have analyzed this action under Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. This rule is not an economically significant rule and does not concern an environmental risk to health or safety that may disproportionately affect children.

Executive Order 12630 (Taking of Private Property)

This rule will not effect 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 *et seq.*) and has determined that this action 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 in 23 CFR Part 655

Design standards, Grant program-transportation, Highways and roads, Incorporation by reference, Signs, and Traffic regulations.

The FHWA hereby amends chapter I of title 23, Code of Federal Regulations, part 655 as set forth below.

PART 655—TRAFFIC OPERATIONS

1. Revise the authority citation for part 655 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).

Subpart F—Traffic Control Devices on Federal-Aid and Other Streets and Highways [Amended]

2. Revise § 655.601, paragraph (a), to read as follows:

§ 655.601 Purpose.

* * * * *

(a) Manual on Uniform Traffic Control Devices (MUTCD), 2000 Millennium Edition, FHWA dated December, 2000. 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 Office of the **Federal Register**, 800 North Capitol Street, NW., Suite 700, Washington, DC. It is available for inspection and copying at FHWA, 400 Seventh Street, SW., Room 3408, Washington, DC 20590, as provided in 49 CFR part 7. The text is also available from the FHWA Office of Transportation Operations' web site at: <http://mutcd.fhwa.dot.gov>.

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Issued on: December 11, 2000.

Kenneth R. Wykle,

Federal Highway Administrator.

[FR Doc. 00-31974 Filed 12-15-00; 8:45 am]

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DEPARTMENT OF COMMERCE**United States Patent and Trademark Office****37 CFR Part 1**

RIN 0651-AA98

Changes to Implement the Patent Business Goals

AGENCY: United States Patent and Trademark Office, Commerce.

ACTION: Final rule and correction to final rule.

SUMMARY: The United States Patent and Trademark Office (Office) published a final rule in the **Federal Register** of September 8, 2000, revising the rules of practice in patent cases to implement the Patent Business Goals. This document corrects errors in that final rule and amends the Rules of Practice for consistency with the Patent Business Goals final rule.

DATES: *Effective Date:* December 18, 2000. *Applicability date:* For fees paid

prior to November 7, 2000, the two-year time period for requesting a refund is extended to expire on the later of February 16, 2001.

FOR FURTHER INFORMATION CONTACT:

Hiram H. Bernstein ((703) 305-8713) or Robert W. Bahr ((703) 308-6906), Senior Legal Advisors, or Robert J. Spar, Director ((703) 308-5107), Office of Patent Legal Administration (OPLA), directly by phone, or by facsimile to (703) 305-1013, marked to the attention of Mr. Bernstein, or by mail addressed to: Box Comments—Patents, Commissioner for Patents, Washington, DC 20231.

SUPPLEMENTARY INFORMATION: The Office published a final rule in the **Federal Register** of September 8, 2000 (65 FR 54604), entitled "Changes to Implement Patent Business Goals" (final rule). This document corrects errors in that final rule as discussed below.

The final rule is corrected to indicate that the changes to §§ 1.52(e), 1.96, and 1.821 *et seq.* concerning the submission of computer program listings and sequence listings are effective on September 8, 2000, rather than November 7, 2000.

The final rule is corrected to indicate that the time period for requesting a refund for fees paid prior to November 7, 2000, expires the later of November 8, 2000 (rather than November 7, 2002), or two years from the date the fee was paid. Since this correction will not be published until after November 7, 2000, the two-year time period for requesting a refund is extended to expire on the later of the date that is sixty days after publication of this correction notice in the **Federal Register** or the date that is two years from the date the fee was paid.

The final rule is corrected to eliminate the sentences indicating that only the paper portions of the application will be published as patent application publications or patents. Portions of an application submitted on an electronic medium under § 1.52(e) will be available (published) at least through an electronic medium.

The final rule is corrected to indicate that if continuity data is included in an application data sheet, but not in the first sentence of the specification, the continuity data to be set forth in the application data sheet will not appear in the first line of the specification in the patent. In such a situation, the continuity data will only appear on the front page of the patent.

The final rule is corrected to delete the sentence indicating that § 1.78(a)(4) is additionally amended by deletion of the term "copending" as a requirement

for a nonprovisional application to claim priority to a provisional application. Section 1.78 was previously amended to delete the copendency requirement for a nonprovisional application claiming priority to a provisional application. *See Changes to Application Examination and Provisional Application Practice*, interim rule, 65 FR 14865, 14867, 14872 (Mar. 20, 2000), 1233 *Off. Gaz. Pat. Office* 47, 48, 53 (Apr. 11, 2000).

Section 1.14(h) in the final rule is corrected to refer to "§ 1.47(c)" rather than "§§ 1.47(a) and (b)" (the relevant portion of §§ 1.47(a) and (b) was transferred to new § 1.47(c)).

Sections 1.16(a) through (l), 1.17(a) through (e), (r) and (s), 1.18(a) through (c), 1.20(d) through (h) and 1.492(a) through (e) are corrected to change their reference to "§ 1.9(f)" to a reference to "§ 1.27(a)" (the substance of former § 1.9(f) was transferred to § 1.27(a)).

Section 1.20(b) is corrected to indicate that its fee is a processing fee (rather than a petition fee).

Section 1.53(c) is corrected to change its reference to "§ 1.78(a)(3)" to a reference to "35 U.S.C. 119(e) and § 1.78(a)(4)" (the substance of former § 1.78(a)(3) was transferred to "§ 1.78(a)(4)").

Section 1.366 is corrected to change its reference to "§ 1.28(b)" to a reference to "§ 1.27(g)" (the substance of former § 1.28(b) was transferred to § 1.27(g)).

In rule FR Doc. 00-22392, published on September 8, 2000 (65 FR 54604), make the following corrections and 37 CFR Part 1 is amended as follows:

1. On page 54604, in column 1, the sentence "This rule is effective November 7, 2000, except that the changes to §§ 1.27, 1.78, 1.131, 1.132, 1.137, 1.152, 1.155, 1.324, 1.366, 1.740, and 1.760, and the removal of § 1.44 are effective September 8, 2000" should read "This rule is effective November 7, 2000, except that the changes to §§ 1.27, 1.78, 1.52(e), 1.96, 1.131, 1.132, 1.137, 1.152, 1.155, 1.324, 1.366, 1.740, 1.760, 1.821, 1.823, 1.824, and 1.825, and the removal of § 1.44 are effective September 8, 2000."

2. On page 54608, in the sentence bridging columns 2 and 3, "The two year time period for requesting a refund will end two years and sixty days from the date of publication in the **Federal Register** for fees paid prior to sixty days from the date of publication in the **Federal Register**, or two years from payment of the fee for fees paid on or after sixty days from the date of publication in the **Federal Register**" should read "For fees paid prior to sixty days from the date of publication in the