

# **20-Year Vision and Strategic Plan**

**for the**

## **Manual on Uniform Traffic Control Devices**

**Developed by the Edit Committee**

**National Committee on Uniform Traffic Control Devices**

**Approved by the Council of the**

**National Committee on Uniform Traffic Control Devices**

**on**

**January 9, 2014**

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## DISCLAIMER

This document was developed through the efforts of the National Committee on Uniform Traffic Control Devices (NCUTCD). Some of the information used to develop this document was derived from National Cooperative Highway Research Program (NCHRP) Project 20-07, Task 323. The document is intended to foster discussions related to the future of the *Manual on Uniform Traffic Control Devices* (MUTCD). This document should not be considered to represent an official position of the Transportation Research Board, the National Research Council, or the Federal Highway Administration (FHWA). Opinions and conclusions expressed or implied in this paper are not necessarily those of the Transportation Research Board, the National Research Council, the Federal Highway Administration, or the author(s).

## ACKNOWLEDGMENTS

The long-range Vision and Strategic Plan for the MUTCD described in this document represents the culminating effort of several years of effort by volunteers associated with the NCUTCD and their interaction with staff from the FHWA. In addition, some of the information used to support the development of this strategic plan was provided through NCHRP Project 20-7, Task 323: Developing a Long-Range Strategic Plan for the MUTCD.

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The NCUTCD Edit Committee also devoted significant effort to revising and improving the long-range Vision and Strategic Plan. The NCUTCD Edit Committee members are listed below.

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## ABBREVIATIONS

The abbreviations listed below are used in this document.

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
ATSSA	American Traffic Safety Services Association
CFR	Code of Federal Regulations
FHWA	Federal Highway Administration
FR	Final Rule (Federal Register notice)
HTML	Hypertext markup language
ITE	Institute of Transportation Engineers
MUTCD	Manual on Uniform Traffic Control Devices for Streets and Highways
NCHRP	National Cooperative Highway Research Program
NCUTCD	National Committee on Uniform Traffic Control Devices
NPA	Notice of Proposed Amendments (Federal Register notice)
PDF	Portable Document Format
RFC	Request for Comments
SNPA	Supplemental Notice of Proposed Amendments (Federal Register notice)
USC	United States Code
UVC	Uniform Vehicle Code
VSP	MUTCD Vision and Strategic Plan

## EXECUTIVE SUMMARY

This Vision and Strategic Plan (VSP) was developed during 2013 and formally adopted by the National Committee on Uniform Traffic Control Devices (NCUTCD) on January 9, 2014. The VSP serves as a roadmap for future development of the *Manual on Uniform Traffic Control Devices* (MUTCD) and will be used by the NCUTCD to guide its future efforts in developing MUTCD language. The NCUTCD encourages the FHWA to use the VSP to guide its future efforts in administering the MUTCD over the next 20 years.

The VSP was developed through a consensus-building process. A draft of the document was distributed to all NCUTCD sponsoring organizations and NCUTCD members for review and comment. The VSP was also posted on the Internet for review by the public. Those comments were instrumental in improving the document to create the approved version. A portion of the overall effort in creating the VSP was supported by a research project of the National Cooperative Highway Research Program (NCHRP).

There are three key chapters in the VSP. Chapter 2 establishes a foundation for the later chapters by describing the landscape surrounding the MUTCD. The descriptions identify opinions, challenges, needs, and questions related to various aspects of the MUTCD. They address the general topics of: traffic control devices in general; the MUTCD's status as a reference document; the MUTCD's structure, organization, and content; who uses the MUTCD and in what ways; and how the MUTCD is administered and updated by the Federal Highway Administration (FHWA).

Chapter 3 presents a future vision for the MUTCD of the mid-2030s and is based on the context provided in Chapter 2. While this chapter contains 49 specific recommendations, some of the key ones include:

- The MUTCD should continue to be the authoritative national reference document for traffic control device principles.
- The MUTCD should continue to be defined by the Code of Federal Regulations as the national standard for traffic control devices.
- The FHWA should continue to own and administer the MUTCD.
- MUTCD content should be based on a number of guiding rules, which are described in Chapter 3.
- The purpose of the MUTCD is defined.
- The target road user groups are defined.
- Traffic control device characteristics and activities are defined.
- The MUTCD intended user is defined. An engineering study must be conducted by a professional, or licensed, engineer, or someone working under the supervision of such.
- Factors to be considered in making traffic control device decisions are defined.
- Levels of mandate are increased to four levels – Standard (requirements which do not allow deviation), Requirement (requirements which allow deviation based on engineering study), Recommendation (recommendations which allow deviation on the

basis of engineering study or engineering judgment), and Options (permissive conditions).

- New MUTCD content should be introduced at a lower level of mandate or be properly justified.
- A new edition of the MUTCD should be published at 8-10 year intervals.
- The number of significant items listed in an MUTCD rulemaking action should be limited to allow comprehensive review by those affected by the proposed changes.

Chapter 4 presents a strategic plan for transitioning from the current MUTCD to the MUTCD of the mid-2030s. Prior to the publication of a new MUTCD edition, additional studies are recommended to better define factors that affect the ability to define standards for traffic control devices. A new edition of the MUTCD is recommended for 2016, 2024-2026, and the mid-2030s. The 2016 MUTCD should focus on improvements to the 2009 MUTCD. The 2024-2026 MUTCD should focus upon the restructuring of the levels of mandate and improvement of MUTCD use (to the extent feasible). The mid-2030s MUTCD should focus upon developing technology tools to improve the usability of the MUTCD.

The document also includes six appendices which provide background related to the MUTCD.



## CHAPTER 1: INTRODUCTION

The *Manual on Uniform Traffic Control Devices* (MUTCD) is defined in the *Code of Federal Regulations* (CFR) as the national standard for all traffic control devices used in the United States on roads open to public travel (see Appendix A – Portions of the US Code and Code of Federal Regulations).<sup>1</sup> First published in 1935, the MUTCD has evolved incrementally over 79 years and 10 editions to its current form as the 2009 MUTCD (see Appendix B – History and Growth of the MUTCD). The current MUTCD consists of 862 pages that provide information on the various activities related to traffic control devices.

While there are several alternatives, the most common process used today to develop new MUTCD content or to revise existing content is for the National Committee on Uniform Traffic Control Devices (NCUTCD) to develop proposed language and submit the recommendation to the Federal Highway Administration (FHWA) for consideration for inclusion in the next edition or revision of the MUTCD (see Appendix C – Revising the MUTCD and Appendix D – NCUTCD). In using this process, the task forces, technical committees, and Council of the NCUTCD tend to focus upon individual items that are intended to improve an existing device in the MUTCD or add a new device to the MUTCD. In general, there has been limited effort devoted to strategic development of coordinated MUTCD content and strategic efforts focused on identifying overarching guiding rules for developing and improving MUTCD content. Such coordination of content is typically provided by the FHWA MUTCD Team during the development of proposed and final rules on MUTCD content.

The publication of the proposed rule that eventually became the 2009 MUTCD created a need for conducting an overall evaluation of the MUTCD and its future, particularly the process used for developing content and revising the MUTCD. That Notice of Proposed Amendments (NPA) consisted of 68 pages identifying 512 significant changes with a 7 month comment period.<sup>2</sup> The NCUTCD faced many challenges associated with reviewing so many proposed changes in the review period, assessing the potential impacts of those individual changes on agencies, and developing a coordinated perspective of the overlapping impacts of all the changes taken as a whole. Upon the publication of the Final Rule (FR) for the 2009 MUTCD, the NCUTCD immediately identified several items in the new edition that created concern for the public agencies.<sup>3</sup> The two most significant were: 1) the change in the definition of a standard (a change that was not described in the NPA) and 2) the elimination of language that indicated the decision to use a traffic control device should be based on an engineering study or engineering judgment. Concerns expressed by the NCUTCD about some of the changes made between the NPA and the FR led to a conference call with the FHWA Administrator, Victor Mendez, on January 11, 2011. During that conference call, the Administrator indicated that the MUTCD had become too complex and likened the document to the tax code. He further indicated that the document needed to be simplified. Revision 1 to the 2009 MUTCD addressed the two most significant concerns by reverting back to the 2003 MUTCD language for the definition of a standard and the

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<sup>1</sup> See 23 CFR 655.603.

<sup>2</sup> The NPA can be accessed at <http://www.gpo.gov/fdsys/pkg/FR-2008-01-02/pdf/E7-24863.pdf>.

<sup>3</sup> The FR can be access at <http://www.gpo.gov/fdsys/pkg/FR-2009-12-16/pdf/E9-28322.pdf>.

use of engineering judgment, but many of the other changes in the 2009 MUTCD also created concerns among transportation agencies and reinforced the need for a comprehensive evaluation of the current MUTCD, its strengths, weaknesses, and future needs in order to develop a long-range vision and strategic plan.<sup>4</sup>

## **VISION AND STRATEGIC PLAN OBJECTIVES**

The long-range VSP has been developed to meet the following objectives:

- Establish criteria for the type of content that is appropriate to include in the MUTCD.
- Identify the intended user(s) for whom MUTCD content should be prepared.
- Provide recommendations on the optimal structure and organization for the MUTCD.
- Provide recommendations for improving the manner by which MUTCD content is revised.
- Identify means for improving the ease of use of MUTCD content by the intended user.

## **STRUCTURE OF THE VSP DOCUMENT**

This document presents the long-range VSP for the MUTCD over a twenty year horizon. The remainder of this chapter provides details regarding the strategic planning process. The second chapter describes over 100 issues related to the past, present, and future of the MUTCD. These issues are presented as opinions, challenges, needs, and questions for several key areas. The third chapter presents the 20-year vision for the MUTCD and the fourth chapter offers a strategic plan for achieving that vision during the planning horizon. The remainder of the document presents references and appendices that provide supporting detail for the statements in the chapters.

The issues, ideas, and items presented in the second, third, and fourth chapters are presented in a numbered list format for brevity and to improve readability. Items numbered 1-124 describe past and present issues associated with the MUTCD and are presented as opinions, challenges, needs, and questions. Items numbered 501-549 present the vision recommendations. Items numbered 801-817 present the strategic plan recommendations.

## **STATUS OF VSP DOCUMENT**

This VSP document represents the culmination of several drafts that were shared with the NCUTCD members, the NCUTCD sponsoring organizations, and the public to generate comments and discussion for improving the document prior to approval by the NCUTCD Council on January 9, 2014. Although this document has been prepared to be as comprehensive as possible, individuals may find that issues important to them are not identified in the document.

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<sup>4</sup> The FR for Revision 1 can be accessed at <http://www.gpo.gov/fdsys/pkg/FR-2012-05-14/pdf>.

## PROCESS USED TO DEVELOP VISION AND STRATEGIC PLAN

There have been several attempts in the past to develop a strategic plan for the MUTCD, or to strategically consider the content or structure of the MUTCD. These efforts are listed below and citation information is included in the references in Chapter 5.

- A series of traffic control device workshops conducted by the Institute of Traffic Engineers (ITE) (now the Institute of Transportation Engineers) in 1965-1966 (ITE 1966).
- Several research projects sponsored by the FHWA in the mid- to late-1960s that supported the introduction of many new sign symbols for what eventually became the 1971 MUTCD (Markowitz, et.al 1968; Dietrich, et. al 1972; Jones, et. al 1972).
- A *Federal Register* notice published in 1983 asked for comments on an internal report entitled “A Study of Alternative Methods of Administering the National Standards for Uniform Traffic Control Devices” (Federal Register 1983).
- A *Federal Register* notice published in 1986 asked for comments on the need to reformat the MUTCD (Federal Register 1986). In response to this notice, the NCUTCD appointed a blue ribbon committee in 1989 to look at ways to improve the MUTCD. That committee developed the recommendations for MUTCD format that were eventually incorporated into the 2000 MUTCD.
- NCUTCD leaders met with FHWA MUTCD staff in Hanover, Maryland in August 2001 to discuss the future of the MUTCD and identify a list of action items.
- FHWA MUTCD staff met with NCUTCD leaders at the June 2005 NCUTCD meeting to discuss initiating an FHWA activity to develop a formal strategic plan for the MUTCD. This initial discussion led to a second meeting after the January 2006 NCUTCD meeting.
- The NCUTCD created an MUTCD strategic planning task force at the June 2009 meeting. The task force met for the first time at the January 2010 meeting and held additional meetings at most of the subsequent NCUTCD meetings.
- In April 2012, an NCHRP project provided the ability to gather additional information for use in developing the strategic plan.
- A *Federal Register* notice published in January 2013 asked for comments on the concept of splitting the MUTCD into two documents in order to streamline and simplify the MUTCD (Federal Register January 2013). In June 2013, the FHWA announced in the *Federal Register* that efforts to streamline the MUTCD would be postponed until completion of the NCUTCD MUTCD strategic planning effort (Federal Register June 2013).

The resources provided by NCHRP Project 20-7, Task 323 allowed the expansion of the visioning and strategic planning effort to include presentations at various meetings of MUTCD stakeholders and the development of a website for posting presentations, white papers, the VSP document, and for collecting comments from individuals.

## KEY DATES FOR DEVELOPMENT OF MUTCD VSP

The effort represented in this document began with the creation of a task force in June 2009. This task force first met during the NCUTCD meeting in January 2010. It met at subsequent NCUTCD meetings, but as with the earlier efforts, the overall scope of the undertaking proved to be too challenging to address within the resources of such a small group. In April 2012, NCHRP Project 20-7, Task 323 was created to provide the task force chair with financial resources to provide staff time, establish a web presence for the effort, and promote the strategic planning effort with selected stakeholder organizations.

Table 1 identifies the evolution of the VSP through the various drafts. The Review Draft was posted on the VSP website for review and comment by the public as well as being distributed to NCUTCD sponsors for review and comment. The review process resulted in 1,187 individual comments. The Edit Committee made numerous changes in response to those comments before presenting to the NCTUCD Council for approval. The NCUTCD submitted the approved VSP to the FHWA in the Spring 2014. The approved VSP is posted on the NCUTCD and VSP websites.<sup>5</sup>

**Table 1. VSP Evolution**

<b>Draft Date</b>	<b>Description</b>	<b>Developed/ Approved by</b>	<b>Action Taken or Expected Action</b>
June 12, 2013	Preliminary Draft	Gene Hawkins	Distributed to NCUTCD Edit Committee, NCUTCD Council members, SCOTE members, and posted on VSP website for initial review and comment
July 18, 2013	Review Draft	Edit Committee	Distributed to NCUTCD sponsors for review and comment (late August) and posted on VSP website (mid-July) for public review and comment
December 31, 2013	Preliminary Council Draft	Edit Committee	Preliminary revisions based on sponsor and public comments regarding the Review Draft
January 8, 2014	Council Draft	Edit Committee	Additional revisions made at the January 2014 Edit Committee meeting and approved by Edit Committee
January 9, 2014	NCUTCD Approved VSP	NCUTCD	Version approved by NCUTCD Council and submitted to FHWA

<sup>5</sup> NCUTCD website: <http://www.ncutcd.com>. VSP website: <http://mutcd.tamu.edu/mission-and-strategic-plan>.

## **CHAPTER 2: MUTCD OPINIONS, CHALLENGES, NEEDS, AND QUESTIONS**

The first step in developing a long-range vision for the MUTCD was to identify a wide range of items related to various topics associated with the MUTCD and traffic control devices. The identification of these items provided a platform that served to establish the content of the elements that are included in the vision and the direction for those elements. This chapter presents a comprehensive list of items that are divided into the general categories listed below. The items are numbered consecutively throughout the document so that they can be easily cross-referenced between items and in the vision and strategic plan.

- Traffic Control Devices as Independent Elements
- MUTCD as an Authoritative Reference Document
- MUTCD Structure and Organization
- MUTCD Content
- MUTCD Use and Users
- MUTCD Administration
- Influence of Previous MUTCD Editions on Current Practice
- Influence of Technology on Devices and the MUTCD

Within each general category, the numbered items are divided into four groups: opinions, challenges, needs, and questions. These groups are defined below. Items in the opinions and challenges groups generally lead to items in the needs and questions groups. Items in the needs and questions groups are generally related to items that are part of the long-range vision or strategic plan. A cross-reference is provided when an item relates to another item in a different category. Cross-references are not provided for items within the same category. References to items with numbers greater than 500 represent items that are part of the vision and references to items with numbers greater than 800 are part of the strategic plan.

- **Opinions:** Statements that express a comment, belief, or judgment regarding the status of an MUTCD or traffic control device issue. As used in this document, opinions may range from statements of fact upon which there will be universal agreement (or nearly so) to controversial statements upon which there may be limited agreement. Opinions typically relate to a need and/or question associated with that item.
- **Challenges:** Statements that indicate a difficulty or obstacle in some form as it relates to an issue regarding the MUTCD or traffic control devices. Challenges typically create a need and/or question associated with that item.
- **Needs:** Statements that indicate a lack of something wanted or deemed necessary.
- **Questions:** Interrogative statements that indicate a problem for discussion. Questions may indicate uncertainty that should be discussed as part of the refinement of the vision and strategic plan, or as part of the future development of the MUTCD.

## TRAFFIC CONTROL DEVICES AS INDEPENDENT ELEMENTS

Before addressing items related to the MUTCD, it is appropriate to address items that are associated with traffic control devices in general with specific relation to how devices are incorporated into the MUTCD. The items identified in this heading are independent of any MUTCD content.

### Opinions

1. Traffic control devices are all signs, signals, markings, channelizing devices or other devices that use colors, shapes, symbols, words, sounds and/or tactile information for the primary purpose of communicating a regulatory, warning, or guidance message to road users on a highway, pedestrian facility, bikeway, pathway, or private road open to public travel.
  - a. Infrastructure elements that restrict the road user's travel paths or vehicle speeds, such as curbs, speed humps, chicanes, and other raised roadway surfaces, are not traffic control devices.
  - b. Operational devices associated with the application of traffic control strategies and traffic control devices, such as in-vehicle electronics, fencing, roadway lighting, barriers, and attenuation devices are not traffic control devices.
  - c. Note: this definition is the one that was approved by the NCUTCD at the June 2011 meeting and submitted to the FHWA for inclusion in a future edition of the MUTCD.
2. Traffic control devices are an essential element of the roadway infrastructure and have a significant impact on the safety, mobility, and effectiveness of the roadway.
3. The current system of traffic control devices in this nation has achieved a relatively high level of uniformity and consistency. However, traffic control device uniformity in the U.S. does not rise to the same level as what has been achieved in European countries and some other nations, where there is stricter adherence to national and international standards by all levels of jurisdictions.
4. Characteristics and activities associated with traffic control devices include the following:
  - a. Meaning: The message the device is intended to convey and the expected road user response to the device.
  - b. Appearance/Design: The general physical characteristics of a specific device as it appears to the road user. These characteristics include color, shape, legend, acoustical and tactile features, and the relative position and layout of individual elements.
  - c. Application/Use: The process of making a decision to use a specific device at a specific location and the manner and criteria by which such a decision is made given the specific circumstances at that location.
  - d. Installation/Location: The process of determining the proper position for a device and providing appropriate visibility and usability for the device. Considerations related to installation include height, lateral distance (offset), longitudinal distance from a reference point, and distance from other devices. Installation also includes addressing the visibility of a device. In addition to height, lateral distance, and

longitudinal distance, visibility incorporates size, conspicuity, and contrast with the environmental background. The physical activity of installing a device is not an activity for MUTCD content purposes.

- e. Operation: The process of establishing how the physical characteristics of a device change over a relatively short period of time to impact the movement of traffic. Most traffic control devices are static and do not have an operational aspect. However, some devices do operate (such as signals and changeable message signs). Operation does not include gradual deterioration over an extended period of time of physical characteristics due to aging, weathering, or other factors.
  - f. Maintenance: The process of monitoring the visibility, crash worthiness, acoustical and tactile features of a device and its performance and taking appropriate actions so that it will function in the intended manner throughout the life of the device and be replaced at the end of its useful life.
    - i. The minimum sign retroreflectivity criteria are an example of numerical or other performance measurement based maintenance criteria in the MUTCD.
  - g. Removal: The process of determining when to remove a specific device from service.
5. Traffic control devices placed within the public right-of-way are usually the responsibility of public agencies.
- a. Most public agencies have processes in place for performing the activities associated with traffic control devices but smaller agencies may do so in a suboptimal manner (or with significant shortcomings) due to lack of professionally trained staff.
  - b. Some aspects of traffic control device activities for public agencies may be contracted to consultants or others to perform, although the public agency still maintains ultimate responsibility for the deployment of traffic control devices.
  - c. Traffic control devices placed in railroad right-of-way may appear to be traffic control devices on public roads but are typically the responsibility of the railroads.
6. Traffic control devices placed on privately-owned roadways are the responsibility of the property owner.
- a. Prior to 2006, the CFR or MUTCD did not specifically address whether the MUTCD was applicable to privately-owned roads open to public travel.
  - b. A 2006 revision to 23 CFR 655.603 clarified the application of the MUTCD to privately-owned roads open to public travel.
  - c. The 2006 CFR language defining privately-owned roads open to public travel was incorporated into the MUTCD in the 2009 edition.
    - i. Some states did not adopt the private property requirement when it was added to the CFR in 2006, although all states have now adopted the 2009 MUTCD or equivalent, which contains the same provisions.
  - d. Many private property owners with roads open to public travel are not aware of this requirement and do not have staff or expertise to make appropriate traffic control device decisions.
7. The use of traffic control devices is based on a balance of one or more of the following factors:
- a. Promoting safety.

- b. Promoting mobility (operational efficiency).
  - c. Providing for orderly movement of all road users.
  - d. Accommodating the needs of road user groups.
  - e. Making efficient use of funds (public or private).
8. Advancements will lead to improved traffic control devices in the future (see Appendix E – Future of Traffic Control Devices).
- a. Current types of traffic control devices are expected to be a part of the roadway infrastructure for at least twenty years.
    - i. Some high-volume roadways of the future may provide advanced capabilities that reduce the need for traffic control devices on those roads.
    - ii. The resources needed to provide advanced technologies will limit the ability to implement such application on lower classification roadways, meaning that current types of traffic control devices will continue to be needed on those roadways.
  - b. Possible areas of traffic control device improvements in the future include:
    - i. Roadside traffic control devices that send active messages to vehicles.
    - ii. In-vehicle displays that supplement the messages of roadside traffic control devices critical to safety and operations.
    - iii. Automated road systems that may eliminate the need for traffic control devices on those roads.
    - iv. Automated vehicles that rely on traffic control devices for vehicle guidance (lane keeping) and vehicle right-of-way.
    - v. Enhancements to nighttime visibility (i.e., luminescent materials and LEDs or other light sources in signs and markings),
    - vi. Traffic control device operation associated with vehicle position (vehicles sending position and speed information to smart traffic control devices and/or signal controllers).
    - vii. Active notification of violations,
    - viii. Use of traffic control devices to dynamically manage pavement space,
    - ix. Active warning of intermittent hazards, and
    - x. Possible reduction in use of traditional guide signs due to in-vehicle navigation systems.
    - xi. Active warning to pedestrians with disabilities that vehicles are in conflict with the pedestrian crossing.
9. Advancements leading to improved traffic control devices can be identified through research.
10. Some aspects of traffic control devices should be identical in all applications where some variability may be appropriate for other applications while maintaining a degree of consistency.
- a. For purposes of this document, uniformity represents situations where aspects should be identical in all applications.
  - b. For purposes of this document, consistency represents situations where aspects allow some degree of variability.



## Challenges

11. The high level of variability in field conditions makes it challenging to establish universal traffic control device standards that apply across all situations.
12. The MUTCD is sometimes perceived as restricting the flexibility of public agencies to operate roadways. However, it is sometimes not fully realized that a public agency really has the ultimate flexibility in determining the appropriate type of operation for its roadways, based on its evaluation of field and traffic conditions and its goals in managing its roadway system. The selection of traffic control devices merely reflects the selected operating strategy.
13. There is a wide range of users on the nation's roadways. The characteristics of these road users can vary from jurisdiction to jurisdiction and even within a jurisdiction.
  - a. It is challenging to provide traffic control device treatments that will meet the needs of all potential road users at all times of the day and night.
14. Most smaller public agencies and private property owners do not have traffic engineering staff for performing traffic control device activities.
15. It is difficult to predict the expected advancements in traffic control devices over the next twenty years.
16. The process of balancing safety, mobility (efficiency), cost-effectiveness, and other factors in making traffic control device decisions is difficult and may sometimes require solutions that are not optimal with respect to one or more of these needs.
17. Many parts of the MUTCD do not provide a list of factors that should be considered in using traffic control devices in general. It does provide lists of factors to consider for selected specific devices in certain situations.

## Needs

18. There needs to be a uniform and consistent system of traffic control devices throughout the nation.
  - a. A uniform/consistent system of traffic control devices can be provided only if there is a national authoritative reference document that describes traffic control device principles.
19. Agencies and other responsible officials or organizations need a national standard document to assure national uniformity and consistency when they make decisions relative to the various traffic control device activities.
20. There may be a need to redefine uniformity so that there is a distinction between uniformity and consistency.
  - a. A specific traffic control device needs to have an identical meaning and general appearance (including acoustical and tactile features) regardless of where it is used. There can be no deviation from requirements related to meaning and appearance.
    - i. This represents the concept of uniformity.
  - b. A specific traffic control device needs to be used, located, operated, maintained, and removed in a consistent manner regardless of where it is used. There may be a need to vary from the requirements for any of these to accommodate local conditions.
    - i. This represents the concept of consistency.

- ii. The MUTCD needs to ensure that appropriate flexibility is allowed for public agencies in applying traffic control devices. At the same time, public agencies need to demonstrate accountability by documenting any deviations from Standards in applying traffic control devices to meet site-specific needs.
21. There is a need to identify the specific factors that should be considered when using traffic control devices.
    - a. What is the proper balance between traffic control device use and other agency transportation and non-transportation demands for public resources?

## Questions

22. What types, groups, and/or characteristics of road users should be accommodated by traffic control devices?
23. Should smaller public agencies and private property owners be expected to acquire traffic engineering expertise to make traffic control device decisions?

## MUTCD AS AN AUTHORITATIVE REFERENCE DOCUMENT AND NATIONAL STANDARD

The MUTCD was originally developed to provide uniformity with respect to the wide variations in traffic control devices that were used around the nation in the 1920s and early 1930s. Since the publication of the first edition in 1935, the MUTCD has grown in stature and impact. The items in this section address the presence of the MUTCD as the primary reference document for traffic control devices.

## Opinions

24. The MUTCD, as it currently exists, is important for the following reasons:
  - a. It provides a national basis for promoting uniformity and consistency in traffic control devices.
  - b. It is a key, if not the key, traffic/transportation engineering reference document.
  - c. It is the only transportation engineering document that is specifically identified in federal code as a national standard.
  - d. It is the only document that requires compliance on the basis of federal and state law and/or regulation on all roads open to public travel regardless of classification or ownership.
25. The MUTCD is the national standard for all traffic control devices used on roads open to public travel.
  - a. It is defined as such in 23 CFR 655.603 (see Appendix A – Portions of US Code and Code of Federal Regulations) and is referenced in state motor vehicle laws.
    - i. Its definition as such makes it a legal document. Its incorporation into 23 C.F.R. 655.603 gives it the force and effect of a federal regulation.
    - ii. It can be revised or changed only through the federal rulemaking process (see Appendix C – Revising the MUTCD).
  - b. Changes to 23 CFR 655.603 in 2006 and to the MUTCD in 2009 applies MUTCD provisions to privately owned roads open to public travel.

26. The MUTCD is available on the FHWA website in Portable Document Format (PDF) and in hypertext markup language (HTML) formats.
  - a. The official version of the MUTCD is the PDF version.
  - b. The PDF version of the MUTCD can be downloaded for free by anyone.
    - i. Of the significant transportation engineering reference documents, it is the only one that is available as an electronic document at no charge.
  - c. A printed version of the MUTCD is available for purchase from several organizations, independent of the federal government.
    - i. The federal government does not print the current MUTCD as it did with every edition prior to the 2000 MUTCD.
27. While federal and state law requires compliance with the MUTCD, there is no formal mechanism in place to enforce compliance.
28. Compliance with MUTCD principles is motivated by one or more of the following:
  - a. A desire to promote safety of road users.
  - b. A desire to provide mobility for road users.
  - c. A desire to meet the needs of specific road user groups.
  - d. A desire to be consistent with national and/or state traffic control device practices.
  - e. A desire to reduce exposure to tort liability lawsuits.
  - f. A desire to avoid the potential loss of federal transportation funding (particularly applicable to state transportation agencies).
29. The MUTCD has matured into a document that provides extensive and detailed principles regarding traffic control devices (see Appendix B – History and Growth of the MUTCD).
30. The concept of traffic control device uniformity has evolved over the life of the MUTCD. Prior to the first MUTCD (1935), there was significant variability in the meaning, design, application, and operation of traffic control devices. The MUTCD was originally created to provide basic uniformity of key traffic control device features (see Appendix B – Evolution of MUTCD).
  - a. The early MUTCD addressed a limited number of traffic control devices.
  - b. The 1935 MUTCD presented traffic control device principles using the shall, should, and may language used in the current MUTCD.
  - c. As the MUTCD has grown in size, complexity, and level of mandate, the concept of uniformity has expanded to include all traffic control device activities.
31. The MUTCD has been owned and administered by the FHWA since shortly after the publication of the 1971 edition (ownership is addressed in the MUTCD Administration heading).
32. Title II of the Americans with Disabilities Act (ADA) requires that state and local governments ensure that persons with disabilities have access to the pedestrian routes in the public right-of-way (see Appendix F).
  - a. Title II applies to the programs and activities of state and local governmental entities.
  - b. The Department of Justice is the federal agency with responsibility for issuing regulations implementing the requirements of Title II of the ADA and for coordinating federal agency compliance activities with respect to those requirements.

- i. Regulation (or regulatory notices) having implications for traffic control devices are published through the U.S. Architectural and Transportation Barriers Compliance Board (US Access Board).
- ii. The US Access Board has published two proposed rules addressing shared use paths on public rights-of-way.
  - A notice of proposed rulemaking was published in the Federal Register on July 26, 2011.
  - A supplemental notice of proposed rulemaking was published in the Federal Register on February 13, 2013.
- c. The Department of Justice and the Department of Transportation share responsibility for enforcing the requirements of Title II of the ADA with respect to the public right of way, including streets, roads, and highways.

## Challenges

- 33. The purpose of the MUTCD has never been stated in the MUTCD. The 2009 MUTCD contains the following statement that defines the purpose of traffic control devices:
  - a. *“The purpose of traffic control devices, as well as the principles for their use, is to promote highway safety and efficiency by providing for the orderly movement of all road users on streets, highways, bikeways, and private roads open to public travel throughout the Nation.”* (Section 1A.01, Paragraph 1).
  - b. This statement implies that the purpose of the MUTCD is the same, but it does not specifically so state.
  - c. The language in 23 CFR 655.601 states that the purpose of the section is to prescribe the policies and procedures of the FHWA to obtain basic uniformity of traffic control devices on all streets and highways.
- 34. The definition of the MUTCD in federal code as a national standard creates a legal standard that often becomes an issue in or the focus of tort liability lawsuits against agencies and property owners.
  - a. This is appropriate when the agency or property owner has failed to meet the standard out of negligence or unreasonable variation from the standard, but this is a concern when the variance by the agency or property owner was insignificant (a technicality) or done with the best interests of road users in mind.
- 35. While the CFR requires each state to have an MUTCD that substantially conforms to the national MUTCD, it is difficult to establish absolute conformity to a national standard for all aspects of traffic control devices when there are state-to-state variations in traffic laws, state MUTCDs and supplements, engineering practice laws, and tort liability laws, all of which can have an impact on traffic control device practices.
  - a. Traffic laws are established by individual states, not by the federal government.
    - i. There are differences between state traffic laws regarding the meaning of some traffic control devices or traffic movements that are related to traffic control devices. Examples include:
      - Yellow signal indication: permissive versus restrictive definition.

- Yellow crosswalk lines: for school crossings in California and in Arizona.
    - Yellow crosswalks are used in California near schools
  - Left turn on red from a one-way street to another one-way street.
  - ii. The Uniform Vehicle Code (UVC) is no longer maintained as a national recommendation for traffic laws.
    - The National Committee on Uniform Traffic Laws and Ordinances (NCUTLO) has disbanded and is no longer a viable entity.
    - It is difficult to establish national traffic control device principles when there are no recommended national traffic laws related to those devices.
  - b. Some states have a state MUTCD and other states have a state MUTCD supplement that is a companion to the national MUTCD.
    - i. Some states are required to have state MUTCDs or supplements by state legislative mandate, while other states create their own MUTCDs or supplements purely for convenience and/or to promulgate their particular state policies.
    - ii. State manuals and supplements are required by the CFR to be in substantial conformance with the national MUTCD.
    - iii. State manuals and state supplements may contain additional devices and additional provisions or may omit some devices and provisions included in the national MUTCD.
    - iv. Differences in interpretations by FHWA division offices lead to differences in state MUTCDs or state MUTCD supplements
  - c. The laws related to the practice of engineering can vary between the states. These differences can have an impact on engineering decisions regarding traffic control devices.
    - i. Some states may require an engineer's seal/stamp on a traffic control plan where other states may not require such.
    - ii. At least one state has a traffic engineer professional license.
  - d. Tort liability laws vary from state to state.
    - i. Concerns related to tort liability impacts can lead to over use of traffic control devices, particularly in states that have significant tort liability activity.
    - ii. In addition to tort liability laws, court precedents can also affect traffic control device decision making.
36. It is not feasible to expect a traffic control device document to provide detailed provisions that will address all aspects of traffic control devices in all applications that can occur in practice. The range of differences between states and local jurisdictions, rural and urban areas, high and low speed roads, and the unique characteristics of a given site make it difficult, if not impossible, to provide inviolable standards that are applicable in all circumstances.
37. Daily use of the MUTCD is transitioning from primarily use of the printed version to use of various forms of an electronic version.
- a. Electronic versions can be viewed on:
    - i. Desktop computers in PDF and HTML formats.
    - ii. Tablets in PDF and HTML formats, plus as an app.
    - iii. On smart phones in PDF and HTML formats, plus as an app.

- b. Use of the electronic versions of the MUTCD is likely to increase in the future.
  - c. Electronic versions of the MUTCD provide greater opportunity for tools that aid in finding and using the content in the MUTCD.
38. Because the MUTCD is available for free there is a desire among some to include additional information in the document so that the additional information will reach a wider audience. If not monitored and controlled, this increases the size and complexity of the document.
39. The inclusion of requirements and recommendations, without labeling them as such, in typical application figures makes it difficult for practitioners to distinguish required, recommended, and desirable practice in such illustrations.
40. The federal government has specific procedures related to rulemaking and how regulations (such as those for traffic control devices) are subject to rulemaking.
- a. Laws are passed by Congress and the United States Code (USC) is the codification of those laws. The Code of Federal Regulations (CFR) is the codification of regulations adopted by the responsible agencies to implement and administer the laws passed by Congress.
  - b. The sections of the Code related to rulemaking are in 5 USC 551-553.<sup>6</sup>
  - c. Federal rulemaking is used to establish regulations and requirements.
    - i. As it relates to the MUTCD, rulemaking is used to establish the MUTCD, and the provisions contained therein, as a national standard for traffic control devices used on roads open to public travel.
  - d. The Office of Management and Budget Agency Good Guidance (AGG) Memorandum provides information on the development of significant guidance documents (federal documents that provide guidance but that are not standards with the force of law established by rulemaking).<sup>7</sup>
    - i. This document states that guidance documents cannot contain requirements (shall or must).
    - ii. If the MUTCD were divided into volumes, then all shall and must language would be in the volume(s) that are subject to rulemaking.
41. The U.S. Access Board can develop guidelines that, if adopted as federal regulations by appropriate agencies, can impact the use of traffic control devices and how they are regulated in the MUTCD.
42. A majority of the docket responses to the FHWA Request for Comments (RFC) on splitting the MUTCD indicate a desire to maintain the MUTCD as a single document.
- a. Out of 169 unique letters received, 92 percent were either against splitting the MUTCD into two separate documents or recommended postponing any action to split the MUTCD pending results from this strategic planning effort.
43. Some of the docket responses to the FHWA RFC on splitting the MUTCD indicate a desire to reduce the amount of content in the MUTCD that is subject to rulemaking.
- a. To maintain the MUTCD as a single document but apply rulemaking processes to only a portion of the content in the MUTCD (as opposed to rulemaking on all content in the MUTCD), would be a significant change from how the MUTCD

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<sup>6</sup> 5 USC 551-553 can be accessed at <http://www.gpo.gov/fdsys/granule/USCODE-2011-title5/USCODE-2011-title5-partI-chap5-subchapII-sec551/content-detail.html>.

<sup>7</sup> This memo can be accessed at <http://www.whitehouse.gov/sites/default/files/omb/memoranda/fy2007/m07-07.pdf>.

- and other federal regulations have been handled. Changing the related policies and procedures will require high-level discussions within the federal government.
- b. If it were decided to divide the MUTCD into volumes to limit the material subject to rulemaking, the content in the non-rulemaking portion of the MUTCD would be considered a “guidance document” as defined by the OMB AGG memo, which requires that guidance documents not contain requirements (shall or must).

## Needs

44. There is a need for one or more national reference documents that establish requirements, recommendations, and basic principles for traffic control devices.
  - a. There is a need to clearly define the purpose, scope, and appropriate content of the single document, or each of the multiple documents. Potential options include:
    - i. Revising the CFR so that only standard statements are defined as national standards and including only these standard statements in a primary document and placing other material in one or more other documents. .
    - ii. Removing content that relates to certain traffic control device activities, such as maintenance and removal. This content could be removed entirely, or it could be placed in a separate document. .
  - b. If separated into multiple documents, there is a need to define the purpose of each document and the appropriate content for each document.
45. There needs to be a dialog within the MUTCD user community on the advantages and disadvantages of changing the MUTCD rulemaking process so that rulemaking could be applied only to a portion of the MUTCD. If the MUTCD user community concludes that it is desirable to change the rulemaking process, then there needs to be a dialog with high level policymakers in the FHWA to explain the merits of changing the MUTCD rulemaking process and to explore the options for doing so.
46. There is a need to provide sufficient flexibility in the national MUTCD to accommodate differences in traffic laws, engineering practice laws, and the laws on tort liability. This flexibility should also be provided and allowed so that engineers can consider needs unique to local conditions.
47. There may be a need to redefine the levels of mandate. Possible mandate levels are listed below. Some of this content may not be appropriate for the MUTCD or for the regulatory element of the MUTCD.
  - a. Standard traffic control device provisions (requirements) that cannot be modified, revised, or exempted under any conditions.
  - b. Required traffic control device provisions (requirements) that establish a general range of required criteria or that may be modified, revised, or exempted in limited cases, such as at a specific site with conditions where meeting the standard is impossible or impractical.. Deviations from a required provision require an engineering study.
  - c. Recommended traffic control device provisions (recommendations) that indicate recommended courses of action, but which can be revised, modified, or exempted for a variety of reasons. Deviations from recommended provisions can be based on engineering judgment or engineering study.

- d. Optional traffic control device provisions (options) that indicate allowable deviations from a required or recommended provision. Use of an optional provision does not require the use of engineering judgment or engineering study.
  - e. Support (background) information that can explain the basis for specific provisions, cite external content that may be of value, or other information that has no level of mandate.
48. Because the UVC is no longer maintained, there is a need for a national document that recommends a consistent meaning of traffic control devices and the traffic laws related to devices.
  49. There is a need to establish a set of guiding rules (procedures) that will serve as a guidepost for future development/refinement of the MUTCD.
  50. There is a need to reexamine the definition of substantial conformance as contained in 23 CFR 655.
    - a. State MUTCDs and supplements provide states with the ability to use traffic control device principles that have been proven effective in previous practice.

## Questions

51. What is the function of the MUTCD? Should it be to provide:
  - a. A manual of requirements only?
  - b. A manual of requirements and recommendations?
  - c. A manual with requirements, recommendations, and options?
  - d. A general reference similar to a textbook or other technical document?
52. What is the relative priority between safety, mobility (efficiency), cost-effectiveness, and other factors when making a decision regarding the use of a traffic control device?
  - a. How do these factors impact decisions when there are competing needs within one factor, i.e., safety needs of trucks versus safety needs of bicyclists, when making a specific traffic control device decision?
53. What is the intended meaning of the term “uniformity?” What is the relationship between the concept of uniformity and the level of mandate associated with traffic control device activities?
54. Can the MUTCD be maintained as a single document, but with only a portion of the MUTCD structure defined as a national standard in the CFR?

## MUTCD STRUCTURE AND ORGANIZATION

As described in Appendix B – History and Growth of the MUTCD, the MUTCD has grown in size (number of pages) and structure (number of parts and chapters) since 1935. The structure of the original 1935 MUTCD was changed in the 1948 edition. The MUTCD structure expanded with each succeeding edition, with significant expansions, restructuring, and/or reformatting occurring with the 1971 and 2000 editions. The items in this section address issues related to the structure and organization of MUTCD content, but do not address content issues (content is addressed in the next heading).



## Opinions

55. The current structure of the MUTCD is based on the type of device and the specialized application of devices.
  - a. Type of device content is the material that provides principles for individual devices. This is the content in Parts 2-4.
  - b. Specialized application content is the material that provides principles for the coordinated use of various devices in a single type of application. This is the content in Parts 5-9.
56. The current structure has been the basic structure of the MUTCD since the 1971 edition. This structure uses a “stovepipe” structure based on “Parts.” The coordination within the MUTCD regarding the use of related devices at a single location is often limited. An MUTCD user that is trying to make decisions regarding aspects of traffic control devices used at a specific location needs to reference many different portions of the MUTCD to determine the optimal combination of devices and device features.
57. The current division of content into Standards, Guidance, Options, and Support has implications on MUTCD use:
  - a. Separation clarifies the level of mandate associated with specific content.
  - b. Separation complicates the preparation of content that reads well.
58. In January 2013, the FHWA published an RFC in the *Federal Register* (Federal Register 2013) that asked several questions related to dividing the MUTCD into two documents in order to streamline and simplify MUTCD content.
  - a. Responses to the docket fell into two primary categories:
    - i. Those that felt that the MUTCD should remain as a single document.
    - ii. Those that felt there needed to be a more comprehensive evaluation of MUTCD issues before a decision was made to split or not split the document.

## Challenges

59. The MUTCD is challenging to read and apply.
  - a. The division of content into headings (Standard, Guidance, Option, and Support) can interrupt the flow of the material if all Standard text is grouped together rather than carefully interlacing Standard paragraphs with other paragraphs to read properly. There is a lack of consistency in this regard in how various Parts of the MUTCD have been written.
  - b. The stovepipe structure of the device content can make it more difficult to coordinate the use of different types of devices used at a single location.
    - i. Factors related to the use of a device or devices at a given field location are often distributed throughout the MUTCD.
    - ii. MUTCD illustrations typically do not show all of the devices that are used at the location being illustrated but focus primarily on the devices related to the part/chapter that the illustration is related to.
    - iii. The 2009 MUTCD has improved the integration of various content from different portions of the MUTCD.
  - c. The organization by device type does not allow easy coordination of sections to determine the combination of devices for a given type of operation.

## Needs

60. There is a need to evaluate the purpose and content of the MUTCD and develop a long-term plan for the format and content of the document.
61. There is a need to provide better integration and/or coordination of traffic control devices that might be used at a given location or for common application. Examples of application information that might be added include:
  - a. Intersection control (possibly separate content for urban and rural intersections). This application would include:
    - i. All signing used on the approaches and departures to the intersection, including regulatory, warning, and guide signs plus the appropriate sequence and spacing of the signs.
    - ii. All marking locations as they relate to signing and right-of-way control including longitudinal lines, stop/yield lines, crosswalks, and arrows.
    - iii. Traffic signal issues as they relate to the signing and marking aspects of the intersection.
    - iv. Coordination of these factors as a function of different geometric arrangements (for example, differences between a single intersection or two intersections at a divided highway).
  - b. Lane reductions, lane transitions, and lane drops for permanent installations (possibly separate content for urban and rural roadways).
  - c. Pedestrian and bicycle treatments that involve combinations of devices at a specific type of location.
  - d. The use of electronic communication media may provide an effective means of coordinating or linking related MUTCD content.
62. There is a need to improve the structure and organization of the MUTCD to make it easier for the intended user to use content in an effective manner.

## Questions

63. What is the optimal organizational structure for the MUTCD?
64. How should specific content be formatted?
65. Can MUTCD content be coordinated or integrated in a more effective manner?

## MUTCD CONTENT

The heart of the MUTCD is the content itself, which provides practitioners with principles for the appropriate use of traffic control devices. This vision and strategic planning effort is not addressing specific technical content or the need for specific technical content in the future. However, the items in this section describe issues where the content of the MUTCD impacts its use.

## Opinions

66. The MUTCD is a large and complex document. The current edition has 862 pages that are organized in 841 sections in 68 chapters among 9 parts. There is also an introduction and two appendices.
  - a. Between the 1935 and the 1988 editions, the MUTCD grew at an average rate of 2 percent per year for the 53 years between these editions.
  - b. The 2000 and later MUTCDs use a larger page size. The size of the document increased significantly between 1988 and 2000.
  - c. The 2003 and 2009 editions have fewer pages than the 2000 edition due to smaller font size, smaller margins, and reduced line spacing.
  - d. The 2009 MUTCD grew at an average rate of 2.3 percent per year from the 2003 edition.
  - e. If a growth rate of 2.3 percent per year is maintained through the planning horizon of this strategic planning effort, the MUTCD of 2033 would have slightly less than 1500 pages. It would have slightly less than 1400 pages at the growth rate of 2 percent per year that was consistent with editions up to 1988.
67. MUTCD is encompassing more and more information with each succeeding edition. The growth is due to:
  - a. Broadening subject matter.
  - b. Greater detail regarding individual devices.
  - c. Increased content related to devices that are not traffic control devices or content that describes traffic engineering practices related to traffic control devices, but that are not traffic control device principles.
  - d. Inclusion of additional background information so that less experienced users can use the MUTCD.
  - e. Increases in new technology.
  - f. Changes in U.S. laws.
  - g. The 2000 MUTCD and later editions included more information concerning ADA requirements.
68. There have been limited efforts to consider MUTCD content in a strategic manner.
  - a. MUTCD content has developed piecemeal over time. Changes and/or additions are generally developed by focusing on a specific device or series of devices. The coordination of content between various sections of the MUTCD can be limited in some cases.
  - b. There is no set of guidelines or rules that provide a basis for evaluating whether conceptual content should be included in the MUTCD.
  - c. There is a large number of groups and individuals that impact decisions on MUTCD content. While the FHWA and the NCUTCD have significant roles in developing content, the final form of that content is influenced by docket comments.
69. Some MUTCD content is presented in a manner such that there is no decision to be made. Other MUTCD content is presented in a manner to guide the practitioner in making the most appropriate decision regarding a particular device or combination of devices.

70. MUTCD content addresses the characteristics and activities associated with traffic control devices (meaning, appearance, use, installation, operation, maintenance, and removal).
  - a. The level of mandate that is appropriate for a traffic control device principle is likely a function of which of these characteristics or activities the principle is related to.
71. Some of the content in the 2009 MUTCD has created concerns among transportation agencies. Examples include the following:
  - a. The costs of implementing the changes in the 2009 MUTCD were not adequately considered by FHWA in developing the proposed language.
  - b. Changes were made to the MUTCD in the final rule that were significant, but which the public was not provided an opportunity to comment on.
  - c. A general increase in the size and level of detail in the MUTCD that makes it more difficult to use.

### **Challenges**

72. The size of the MUTCD can make it challenging to use and to coordinate related content within the document.
  - a. The expected growth in the MUTCD (based on the growth of previous editions) will cause the MUTCD to approach 1500 pages in size and make it even more complex, cumbersome, and challenging to use and coordinate the content in the MUTCD.
73. The desire to avoid tort liability risks generates a demand for more specific MUTCD language/content, which can result in reduced flexibility to make engineering decisions.

### **Needs**

74. There is a need to reduce the complexity of the MUTCD by taking one or more of the following actions:
  - a. Eliminate content from the MUTCD. It would be up to other organizations and/or individual authors whether to include that information in their respective documents. Examples of content that could be eliminated include:
    - i. Content that does not specifically address a specific activity associated with a traffic control device. Current MUTCD content related to barriers and floodlights are examples.
    - ii. Content that describes a traffic engineering practice that has some association with a traffic control device. The current MUTCD content that describes how to determine a speed limit is an example of such content.
    - iii. Content that carries a lower level of mandate related to traffic control devices.
  - b. Move selected content to another MUTCD-related document without splitting the MUTCD.
  - c. Provide better coordination of related content within the MUTCD so that users can more easily identify traffic control device provisions associated with a given

application and/or location. Better coordination might be achieved through one or more of the following:

- i. Hyperlinks between related content. Such hyperlinks need to do more than just provide cross-reference to other content, but provide a means of identifying all related MUTCD criteria associated with a specific application, location, or need.
  - ii. Use of “smart tags” to identify application information for specific devices.
  - iii. Addition of artificial intelligence logic to MUTCD content so that users can be guided through decision making steps associated with traffic control devices.
- d. Revise the format/organization of the MUTCD in a manner that makes it easier for practitioners to find and use applicable content. The MUTCD organization could be based on one or more of the following divisions:
- i. By type of activity or characteristic.
  - ii. By level of mandate.
  - iii. By MUTCD user. For many situations, the type of activity and type of MUTCD user would overlap each other. For example, MUTCD content related to installation issues is often used by field personnel.
  - iv. By elements of the MUTCD that are subject to federal regulations. With this concept, some part of the MUTCD would not be included in the CFR definition as a national standard. This content could also be revised without formal rulemaking.
    - This option would require revising the CFR.
- e. Redefine the levels of mandate that are in the current MUTCD.
- i. Divide Standards in the 2009 MUTCD into Standards and Requirements.
    - Standards cannot be modified or revised.
    - Requirements can be deviated from on the basis of an engineering study.
  - ii. Maintain Guidance, Options, and Support as they are in the 2009 MUTCD with limited changes in terminology.
75. Regardless of how the complexity of the MUTCD is reduced, there is a need to coordinate related content within the MUTCD.
- a. Users should be able to identify all information in the MUTCD related to the characteristics and activities of a given device
76. There is a need to better evaluate the financial impacts and effectiveness of new MUTCD standards that have not been widely used by agencies before adding them to the MUTCD.

## Questions

77. What type of content should be included in the MUTCD?
78. What is the best option for reducing the complexity of the MUTCD?

## MUTCD USE AND USERS

All streets, highways, and other related transportation facilities have traffic control devices to promote safety and efficiency. The activities associated with those traffic control devices are

conducted by a wide range of individuals with a range of backgrounds and training in traffic control devices. The items in this section address the current and future users of the MUTCD and how the user groups impact other aspects of MUTCD structure, content, and administration.

## Opinions

79. Because it is available for free to anyone and establishes legal standards and guidelines, the MUTCD is read by a wider variety of individuals than any other traffic engineering reference document.
80. Specific groups of individuals that may use the MUTCD are listed below.
  - a. Engineers. Engineers are professional engineers who have been licensed by a licensing jurisdiction to practice engineering in a specific field. Professional engineers are involved with all aspects of traffic control device activities. Some states and other organizations (such as the federal government) allow an individual to use the term “engineer” without being licensed. Within the context of this VSP, the term engineer means an individual who is licensed as a professional engineer or has equivalent qualifications and that has the level of traffic engineering expertise appropriate to make traffic control device decisions. Engineering groups involved with the MUTCD typically include:
    - i. Public agency traffic engineers.
    - ii. Other public agency engineers that have some involvement for agency transportation responsibilities. These are typically civil engineers and can include a public works director, city engineer, or county engineer, among others.
    - iii. Other types of engineers that work for agencies and provide specific engineering expertise as it relates to traffic control devices. These are commonly electrical engineers, human factors engineers, operations engineers, construction engineers, and maintenance engineers.
    - iv. Private sector engineers that are contracted to provide the appropriate engineering expertise for an agency or private road owner.
    - v. Research engineers that use specific engineering expertise to evaluate specific traffic control device issues.
  - b. Technical. Technical individuals are those with specialized technical knowledge that do not have an engineering license, but who may or may not work under the supervision of an engineer. Technical individuals are typically involved in recommending decisions regarding the application/selection of traffic control devices, traffic control device location, and incorporating traffic control devices into design plans. They typically include two groups:
    - i. Engineers-in-training. These are individuals who have an engineering degree but who have not yet met the requirements to obtain an engineering license.
    - ii. Technicians. These are individuals who do not have an engineering degree, but who have developed detailed technical knowledge.
  - c. Field personnel. Field personnel are individuals that are involved with those traffic control devices activities that occur in the field. These activities typically include installing devices in accordance with MUTCD provisions and agency/owner policies and may also include some aspects of traffic control device

operation and maintenance. Field personnel groups involved with the MUTCD typically include:

- i. Agency field personnel.
  - ii. Contractor field personnel.
  - iii. Utility company personnel.
  - iv. Emergency and first responder personnel.
- d. Administrative. Administrative individuals are those who are not typically involved in day-to-day activities of traffic control devices, but who may establish boundaries within a jurisdiction on those activities. User groups in this category may include: elected officials, legal/policy personnel, budgeting personnel, department heads, and public administrators.
  - e. Legal. Legal individuals are lawyers, paralegals, expert witnesses and others that are involved in traffic control device activities that occur through the courts. These activities most often occur as the result of tort liability lawsuits.
  - f. Industry/Manufacturing/Vendors. These individuals are involved in the invention and development of new traffic control devices and the fabrication, distribution, installation, and/or sales of traffic control devices.
  - g. Enforcement. These individuals enforce the regulations established by traffic control devices and/or develop materials used to educate road users about traffic control devices.
  - h. Education. These individuals conduct activities that educate road users regarding meanings of traffic control devices.
  - i. Public: These individuals respond to traffic control devices as part of their travels, but have no responsibility for conducting traffic control device activities. The public may also influence public opinion regarding use of traffic control devices. Members of the public may also be subject to complying with provisions in the MUTCD. Examples include:
    - i. Media personnel due to the requirement to wear high visibility apparel when on or near the roadway).
    - ii. School crossing guards.
81. The manner in which MUTCD content is used is highly influenced by the knowledge, skills, and abilities of the individual users of the MUTCD.
    - a. Smaller agencies usually do not have traffic engineering individuals or staff with expertise in traffic control devices.
    - b. Engineers that work for public agencies tend to move between technical areas (design, planning, traffic, construction, etc.) as they progress through their career. Fewer individuals employed by public agencies are spending the majority of their career in traffic engineering.
  82. The MUTCD cannot be a simple and streamlined document and also be all things to all people. One of the key rules of effective written communication is to prepare the content for the targeted audience.
  83. A user's decision regarding a specific activity for a specific traffic control device can be influenced by the following factors:
    - a. The level of mandate defined in the MUTCD and the reasonableness of deviating from the principle based on the circumstances.
    - b. The practices and policies of the jurisdiction.

- c. The specific conditions that exist in the field where the device is to be located.
- d. The desire to avoid creating a risk that might lead to tort liability.
- e. The influences of higher level management and/or elected officials.
- f. The complexity of the traffic control device decision and site conditions and the need to account for inter-relationships between devices and human factors.
- g. Users' knowledge of the MUTCD and experience in traffic engineering.
- h. The actual cost (i.e., labor, equipment, and materials), the ability and resources of the agency to perform the work, and the time frame for the installation and use of the traffic control device (i.e., short term vs. long term).

### **Challenges**

- 84. The intended user of the MUTCD has never been defined in the MUTCD. Some MUTCD content requires engineering study or judgment, while other content can be implemented by individuals that do not have an engineering background. There is also MUTCD content that establishes regulations or definitions that are closely related to laws and ordinances.

### **Needs**

- 85. There is a need to define the target audience for MUTCD content and to prepare the content for that audience.
  - a. There may be a need to restructure MUTCD content by user groups so that the content can be targeted to those groups.
- 86. Qualified practitioners need flexibility to develop traffic control device solutions that are the most appropriate for a given situation in a manner that best balances the needs of road users (including the need for uniformity/consistency) and the capabilities of the public/private organization responsible for the location.

### **Questions**

- 87. Should the MUTCD be structured so that content is organized according to the user that is expected to use specific content?
- 88. Should MUTCD content be written with a traffic engineer as the intended audience?
  - a. What is the appropriate level of experience/expertise for someone to be considered qualified to use the MUTCD?
  - b. Can MUTCD content be structured so that some content is targeted to traffic engineers and other content is targeted to other user groups?
- 89. Should the MUTCD be written so that agency employees that are not engineers can make decisions regarding specific traffic control device activities? If so, for which activities should such individuals be allowed to make decisions?

### **MUTCD ADMINISTRATION**

Because of its existence as a legally defined national standard reference document, the MUTCD also has a legally defined administrative status. This status defines its ownership and processes



that are used to modify its content. The items in this section address MUTCD ownership issues and issues related to changing the content of the MUTCD.

## Opinions

90. The MUTCD is owned and administered by the FHWA.
  - a. It has been owned and administered by the FHWA since shortly after publication of the 1971 edition.
  - b. Because it is a federal regulation (due to the fact that it is defined in the CFR as a national standard), it can be changed or revised only through the federal rulemaking process.
    - i. There are federal regulations that specify the procedures for changing the MUTCD.
    - ii. The CFR requires the states to adopt an MUTCD that is in substantial conformance with the national MUTCD. States have their own procedures for adopting the national MUTCD or a state MUTCD that is in substantial conformance.
91. Although the MUTCD is owned by the FHWA, the FHWA distributes the MUTCD only in PDF and HTML formats.
  - a. Printed versions of the MUTCD are available from various sources, including AASHTO, ATSSA, and ITE.
    - i. The printed versions are not typically updated or reprinted when FHWA publishes an MUTCD revision.
92. The NCUTCD provides input to FHWA regarding MUTCD content (see Appendix D – NCUTCD).
  - a. NCUTCD and its predecessor organizations have been involved in developing content since before publication of the first edition in 1935.
93. Revising the MUTCD is a cumbersome process. The process of changing the MUTCD is an involved one that requires multiple steps and can take place over an extended period of time depending upon the extent of the proposed change (see Appendix C – Revising the MUTCD).
  - a. The rulemaking effort for the 2009 MUTCD took almost two years from the publication of the NPA to the publication of the final rule.
94. In recent times, changes to the MUTCD have attracted a significant number of docket comments.
  - a. There were over 15,000 individual comment items that derived from over 1,800 letters posted to the docket for the NPA that resulted in the 2009 MUTCD.
95. Over its entire life, the average time between new editions of the MUTCD is 8.2 years.
96. In recent times, changes to the MUTCD have generally been limited to new editions with the exception of a few revisions that focused on specific issues. Since the publication of the 2000 edition, there have been 5 revisions:
  - a. 2000 MUTCD: 1 revision on accessible pedestrian signals.
  - b. 2003 MUTCD: 2 revisions; 24-hour pharmacy signing and minimum sign retroreflectivity.
  - c. 2009 MUTCD: 2 revisions; use of engineering judgment and compliance dates.

97. Since the publication of the 1988 edition, the number of revisions to the MUTCD has been limited in order to keep the printed version of the MUTCD viable and to minimize the frequency at which extensive training of agency personnel on MUTCD changes is needed..
  - a. Experiences with the 1971 and 1978 editions showed that extensive revisions between editions caused the printed edition to become out-of-date soon after publication.
98. Recent experience with the 2000, 2003, and 2009 MUTCD rulemaking indicate that there are a large number of changes associated with rulemaking for a new MUTCD.
  - a. The number of items identified in the NPA and FR rulemaking notices for these editions are:
    - i. 2000 MUTCD: multiple items in 8 NPA rulemaking notices, 288 items in FR.
    - ii. 2003 MUTCD: 316 items in NPA, 384 items in FR.
    - iii. 2009 MUTCD: 513 items in NPA, 611 items in FR.
  - b. Evaluating the impacts of such a large number of proposed changes and the interaction between the various proposed changes, particularly without a review of the revised MUTCD language prior to publication of the final rule, is a difficult undertaking.
    - i. The NCUTCD is most effective in reviewing a large number of proposed changes when the NPA is published at least one month before an NCUTCD meeting and the docket comment period encompasses two NCUTCD meetings.
    - ii. The NCUTCD provides the FHWA with invaluable practitioner insights into the impacts of proposed MUTCD language. The volunteer effort contributed by NCUTCD members has significant value to the FHWA but can be realized only when adequate time is provided for thorough review.
    - iii. Although it might be assumed that the NCUTCD process for evaluating rulemaking should be changed to accommodate modern communication methods, it has been found that without the opportunity for face-to-face discussion, it is difficult to effectively review a large number of proposed changes.
  - c. As the MUTCD migrates to greater use of electronic formats, it will be easier to revise the MUTCD on a more frequent basis, meaning that individual revisions can address fewer significant items.
    - i. Limiting the number of revisions in a single rulemaking may reduce the total time needed to develop and process the rulemaking.
    - ii. The frequency of revisions may need to be limited.
99. With the exception of the two rulemaking efforts for sign and marking minimum retroreflectivity, rulemaking effort for changes to the MUTCD have not included an assessment of the economic impacts of the proposed changes.
  - a. The costs of making changes to implement MUTCD revisions is of increasing concern to agencies

## Challenges

100. Changing the MUTCD is cumbersome and occurs at a slow pace.
101. Rulemaking for a new edition of the MUTCD creates the potential for numerous challenges with respect to unintended consequences of insufficiently coordinated content.
  - a. The magnitude of the number of changes and the establishment of a new format associated with the 2000 MUTCD required the publication of the 2003 MUTCD within a short period of time in order to correct numerous errors and shortcomings.
  - b. Objections to final rule content in the 2009 MUTCD that were not subject to public review required additional rulemaking to address the objections.
102. The interest in MUTCD rulemaking actions is demonstrated by the large number of docket comments. Such a large number of comments make it more challenging to coordinate conflicting opinions and to minimize unintended consequences of changes made to the NPA.
103. Proposed changes associated with a new edition of the MUTCD have grown to a size that makes it difficult to absorb the potential impact of the changes within the available time.
104. The requirement that MUTCD changes can be made only through rulemaking makes it more difficult to change the MUTCD, which is both an advantage and disadvantage. Some of the challenges associated with the rulemaking process are:
  - a. It is a time-consuming process. A small rulemaking can take a year or more to complete. A more complex rulemaking (such as a new edition) can take multiple years to prepare the material and do the rulemaking.
  - b. There is a limited period of time for the public and practitioners to process the proposed changes and respond with comments. There may or may not be an adequate amount of time depending upon the number of proposed changes and the significance of the proposed changes.
  - c. The number of significant changes associated with a new edition can be numerous. The ability to adequately review and comment on a large number of changes can be limited if the comment period is too short.
  - d. Proposed rulemaking actions that do not fully encompass two NCUTCD meetings limit the ability of the NCUTCD to provide thoughtful and meaningful comment on proposed changes.
  - e. The slow pace of the MUTCD rulemaking process (including development of proposed language) promotes changes that are thought-out and not reactive.
105. When a Final Rule is published, it can be difficult to discern the text changes that have been made from the Notice of Proposed Amendments.
  - a. In an NPA, the FHWA typically provides a markup document that shows the proposed changes compared to the current MUTCD.
  - b. In a FR, the FHWA typically provides a markup document that shows the final rule changes for the new MUTCD compared to the previous MUTCD.
  - c. There is no markup in a FR that shows the changes from the NPA to the FR.

## Needs

106. There is a need for improved processes for incorporating new technologies, laws, and practices into the MUTCD in an appropriate and timely manner.
107. Changes to the MUTCD need to have a rational basis. The basis for making changes should be related to the degree of requirement associated with a change.
  - a. Changes to standard (shall) statements should be made only when required by state/federal law or regulation or when justified by scientifically conducted research that is both peer-reviewed and published. If changes to standards are proposed on some other basis, there should be a more detailed review and evaluation process.
108. There is a need to reduce the amount of content in an MUTCD rulemaking action. Potential options for reducing the size of rulemaking actions include:
  - a. Reducing the portion of the MUTCD subject to rulemaking.
  - b. Reducing the size of the MUTCD.
  - c. Doing more frequent revisions but limiting the scope of each revision. An example of such a revision process could be to confine revisions to content in one Part of the MUTCD during a particular rulemaking.
109. There is a need to better integrate MUTCD revisions that take place between complete editions into practice.
  - a. This can occur through greater reliance on electronic versions.
110. There is a need to time the publication of an NPA so that it meets one of the following:
  - a. The NPA is published no less than one month before an NCUTCD meeting.
  - b. If the NPA is published less than one month before an NCUTCD meeting, the docket comment period should remain open until after the second NCUTCD meeting following the publication of the NPA.
111. There is a need for the FHWA to distribute an NPA-to-FR markup when a Final Rule is published.
112. There is a need for the NCUTCD to review its consensus-building processes for possible improvements in developing recommendations for MUTCD content.

## Questions

113. What is the proper threshold to establish for determining the basis for adding a new standard to the MUTCD or revising an existing standard?
114. What degree of review should be conducted on studies that are used to support changes to the MUTCD?
115. Should the MUTCD be a document that is owned and administered by FHWA?
  - a. If not, what is the most appropriate group to own and administer the MUTCD?
    - i. NCUTCD, AASHTO, ITE, or other?
116. Is there a way that FHWA could retain ownership of the MUTCD, but make changes without the cumbersome requirements of rulemaking?
  - a. Could changes for some MUTCD content be required to go through rulemaking while changes to other MUTCD content be allowed without rulemaking?

- b. If changes can be made without rulemaking, is it possible to require a consensus-developing approach to approve those changes before inclusion in the MUTCD?
    - i. Approval by the NCUTCD is one such option for developing a consensus.
117. What marketing and/or outreach efforts need to be associated with the development of an MUTCD long-range vision and strategic plan?

## **INFLUENCE OF TECHNOLOGY ON DEVICES AND THE MUTCD**

For most of their existence, the technologies associated with traffic control devices have remained relatively stable and there have been few technological advancements that necessitated swift changes in the MUTCD. Since the mid-1990s, technology in general has advanced rapidly. In recent years, there have been several advancements that could impact the future of traffic control devices or the delivery of MUTCD content. The items in this section describe technology-related issues associated with traffic control devices and the MUTCD.

### **Opinions**

118. Use of electronic versions of the MUTCD is increasing.
- a. The MUTCD is currently available in PDF and HTML versions, and tablet/smart phone applications.
  - b. Over the next few years, publication delivery technologies are expected to improve so that the primary means of delivering the MUTCD to the user will be some form of electronic format. These advances in information technologies will make it easier to connect/coordinate content in one place in the MUTCD with related content in other places of the MUTCD (or related documents if the MUTCD is divided into multiple documents).
  - c. With the growth of an electronic MUTCD, the use of printed versions of the MUTCD will decrease, but there will likely always be a need for a paper version for archival or legal purposes.
119. Technologies that are used in traffic control devices and roadway operation are advancing rapidly (see Appendix E – Future of Traffic Control Devices)
- a. These advancements provide greater capabilities for devices and can improve the effectiveness or ability to operate/maintain the devices.

### **Challenges**

120. Innovative traffic control device solutions may be developed in advance of MUTCD content that address all possible uses of these innovative devices. The complexity of the MUTCD process for considering innovative new traffic control devices may hamper potentially beneficial applications and may result in inconsistent uses.
- a. Traffic control device technologies may be advancing so rapidly that it is difficult to develop MUTCD content before advanced devices are introduced and experience widespread use.
  - b. Advancements in technology could lead to a tendency to encourage over-control of road user movements and activities.

- c. Advancements in technology could lead to a tendency to encourage the use of a new traffic control device without proper human factor studies.

### **Needs**

- 121. There is a need to focus greater attention on upcoming traffic control device technologies and how those technologies should be addressed in the MUTCD.
- 122. There is a need to provide early flexibility in traffic control device principles for advancements and new technologies while directing the use of such advancements and technologies toward national uniformity/consistency.
- 123. New technologies need to have human factors evaluations before being implemented in the MUTCD.

### **Questions**

- 124. What is the best way to deal with the development of innovative traffic control devices that are not addressed by the MUTCD?

## **CHAPTER 3: VISION FOR THE FUTURE OF THE MUTCD**

Having identified the critical opinions, challenges, needs, and questions associated with the MUTCD, this chapter presents a long-range vision for the future of the MUTCD. This vision recommends what the MUTCD should be in about 20 years (mid-2030s). Each of the vision statements evolves from an issue, challenge, need, or question expressed in the previous chapter. The vision is divided into the following topics:

- Fundamental Assumptions
- Fundamental Recommendations
- Guiding Rules for MUTCD Content
- MUTCD Structure and Content
- MUTCD Revisions

Items that make up the vision have numbers that are greater than 500 so that they can be distinguished from the items in the previous chapter. The strategic plan, described in the next chapter, offers recommendations on how to transition from the current MUTCD to the MUTCD described in the long-range vision. The justification for each numbered item in the vision (except for those in the Fundamental Assumptions section) is labeled as the “basis for recommendation” and is provided as the last subitem under each numbered item. The basis for recommendation is shown by a square bullet (■).

### **FUNDAMENTAL ASSUMPTIONS**

Fundamental assumptions represent foundational elements of a national traffic control device system. These items do not need to be justified or supported by evidence, argument, or data.

501. Traffic control devices are an essential element of the transportation infrastructure.
  - a. They promote roadway safety, operational efficiency (mobility), and the orderly movement of traffic by communicating regulations, warnings, and guidance information to road users.
  - b. They will continue to be needed in the foreseeable future.
502. Agencies and owners responsible for private property roadways open to public travel have a duty to provide traffic control devices that are appropriate for the conditions at a specific location. Agencies and property owners conduct a range of traffic control device activities in meeting their duty (see item 527 for a list of traffic control device characteristics and activities).
503. Traffic control devices need to meet the expectations of road users. Meeting road user expectations means that:
  - a. A given device always has the same meaning. The meaning of a device does not change based on the context in which it is used.
  - b. The desired response or responses to a device is the same no matter where the device is used, although it may be necessary for the road user to make a decision whether to initiate that response.

- c. A device has the same basic appearance (communication features) no matter where it is used. Appearance characteristics are color, shape, legend, and the layout of the individual elements that make up the device. These appearance characteristics need to be defined in such a manner that they cannot vary from one location to another (there can be no deviations or exceptions).
    - i. Because size can vary depending upon the application and location, size is not defined as an appearance characteristic, but as an installation characteristic.
    - ii. Communication features can also include acoustic and tactile properties, but as these can also vary, they are also defined as installation characteristics.
  - d. The application of a device in a given situation is consistent with driver expectations. There needs to be some flexibility to adapt the use of a device to the specific conditions that exist at a given location.
  - e. A specific traffic control device operates in a consistent manner.
  - f. The installation of a device is appropriate for the conditions in which it is used. Installation characteristics include size, height, lateral distance from the travel lane or other reference point, longitudinal distance from the subject of the device, and its conspicuity.
504. National principles are necessary to provide a system of traffic control devices that meet the expectations of road users.
- a. Traffic control device principles can range from required to optional practices.
  - b. The level of mandate associated with specific traffic control device principles depends upon how variance from expectations affects road user performance.
505. It is not possible to establish national traffic control device provisions that apply to every aspect of traffic control device activities in all situations.
- a. Some aspects of traffic control device activities can be standardized so that they are always the same everywhere used.
  - b. Some traffic control device activities can be required, but necessitate decision-making flexibility to accommodate local site conditions.
506. Traffic control device principles should:
- a. Consider the needs of all road users, but should not be expected to accommodate 100 percent of the needs of 100 percent of road users 100 percent of the time.
    - i. There are two basic types of road users: vehicle operators (including bicyclists) and pedestrians.
    - ii. The road user is expected to behave in a reasonable, prudent, and lawful manner.
    - iii. The road user is expected to be attentive to the task at hand when traveling the right of way and not distracted or under the influence.
    - iv. The road user is expected to use the right-of-way as intended and not for other purposes such as play, protests, sale of merchandise, etc.
  - b. Account for human factors concepts such as expectancy, visual performance, comprehension, detection, and reaction time.
    - i. Auditory and tactile perceptions are additional human factors concepts that relate to pedestrians that may need to be accounted for.



- c. Address the typical traffic control devices situations that occur in the field and provide flexibility to address variations from typical conditions where it is appropriate for such variations.
- d. Recognize that there are not always sufficient resources to implement the most effective solution, particularly for public agencies.
- e. Relate to aspects of the ADA and the associated regulations that establish requirements that must be met for certain traffic control devices as they relate to pedestrians.

## **FUNDAMENTAL RECOMMENDATIONS**

These fundamental recommendations address critical issues related to the MUTCD as a document and its status as a national standard that is defined in federal code.

- 507. The MUTCD should continue to be the authoritative national reference document for traffic control device principles.
  - a. This vision recommends changes to the MUTCD to improve its ability to function as the authoritative national reference document for traffic control device principles.
    - Basis for recommendation: The need for a uniform and consistent system of traffic control devices can be met only if there is one primary reference document that establishes the most critical traffic control device principles.
- 508. The MUTCD should continue to be defined in the CFR as the national standard for traffic control devices.
  - a. States should continue to be required to adopt the national MUTCD or a state MUTCD that is in substantial conformance.
    - Basis for recommendation: The authority for the MUTCD as the authoritative national reference document is based on its definition as the national standard in the CFR.
- 509. The FHWA should continue to own and administer the MUTCD.
  - a. This vision recommends changes in how MUTCD content is revised and how content is developed.
    - Basis for recommendation: No other organization can provide all of the following capabilities that are necessary for the MUTCD to be the authoritative national reference document for traffic control devices.
      - (i) National reach.
      - (ii) Dedicated staff and resources focused solely on the MUTCD.
      - (iii) Ability to distribute the MUTCD as a free document.
      - (iv) A revision process that provides for input from all stakeholders using appropriate consensus-developing procedures.
- 510. MUTCD content should provide the appropriate level of flexibility to make traffic control device decisions that are in the best interest of road users and the agencies/private property owners responsible for traffic control devices.
  - Basis for recommendation: Although currently defined in the CFR as a national standard, not all content in the MUTCD represents a standard (requirement) that cannot be modified or revised.

511. The FHWA should revise the definition of substantial conformance as stated in 23 CFR 655 to the definition that will ultimately be approved by the NCUTCD.
  - a. The NCUTCD Edit Committee is currently working to prepare a new definition of substantial conformance.
    - Basis for recommendation: The definition of substantial conformance was added to the CFR in a 2006 revision and became a significant issue during discussions about the impacts of MUTCD changes implemented with the 2009 edition.
512. The FHWA and the National Committee should continue to advocate for traffic control device research that will evaluate the effectiveness of existing and proposed traffic control devices.
  - Basis for recommendation: The best means of improving traffic control devices is through thorough and scientific study of devices, the benefits associated with their use, and their effectiveness.
513. The MUTCD should be produced in the form, format, and content that provides the best possible ease of use by the user. Such streamlining can include, but not be limited to, the following approaches to improve ease of use of the MUTCD.
  - a. Develop smart search apps.
  - b. Improve organization of content; reorganize content where opportunities for improving flow are identified.
  - c. Eliminate redundancy and unnecessary language.
  - d. Provide cross-indexing.
  - e. Provide information in modular or tabular format.
  - f. Provide more hotlinks and pop-ups.
  - g. Better position figures with associated text.
  - h. Use more summary tables and figures to reduce text.
  - i. Reorganize / reconfigure existing figures to better manage space.
  - j. Improve consistency on what information about devices is presented.
  - k. Provide subheadings to help a user find information on a particular subtopic.
    - Basis for recommendation: The MUTCD has grown in size and complexity to the point that efforts are needed to improve the use of the document by practitioners.

## **GUIDING RULES FOR MUTCD CONTENT**

The guiding rules for MUTCD content establish a basic set of expectations that all MUTCD content should meet. The NCUTCD strongly encourages that current and future MUTCD content be evaluated for consistency with these guiding rules. These Guiding Rules should be posted on the NCUTCD website and/or the FHWA MUTCD website.

514. MUTCD content should be consistent with the purpose of the MUTCD.
  - a. The recommended purpose of the MUTCD is presented in item 525.
    - Basis for recommendation: Content that is not consistent with the purpose of the MUTCD is beyond its scope and should not be included.
515. MUTCD content should establish the appropriate level of mandate for a given traffic control device principle.
  - a. The recommended levels of mandate are presented in item 530.

- b. The recommended levels of mandate are intended to give practitioners the appropriate levels of flexibility to address competing needs and resources.
    - i. Such flexibility should provide practitioners with the ability to appropriately balance roadway safety, operational efficiency (mobility), and costs, with due consideration of the needs of the typical road user population at the location where a device is installed and the ability of agencies to implement MUTCD content.
    - ii. Flexibility should enable effective management of assets and resources.
  - Basis for recommendation: MUTCD principles range from absolute requirements (no deviation allowed) to optional practices that have no level of mandate. Conformance with principles is best achieved when the mandate level is appropriate to the need for compliance.
516. MUTCD content should be prepared so that it is precise, articulate, and readily understood by the intended users of the MUTCD.
- a. Intended users of the MUTCD are the following user groups that represent practitioners responsible for conducting traffic control device activities.
    - i. Engineering: Professional engineers with the appropriate training, experience, and expertise. Professional engineers can be involved in all traffic control device activities.
      - Some states and other organizations (such as the federal government) allow an individual to use the term “engineer” without being licensed. Within the context of this VSP, the term engineer means an individual who is licensed as a professional engineer or has equivalent qualifications and that has the level of expertise appropriate to make traffic control device decisions.
    - ii. Technical: Professional staff with the appropriate training, experience, and expertise.
    - iii. Field: Individuals responsible for conducting the physical acts of placing, operating, maintaining, and/or removing traffic control devices.
  - Basis for recommendation: MUTCD principles will not be effective if they are written at a level above that of the intended user.
517. MUTCD content and changes to MUTCD content should be based on one or more of the following:
- a. Widespread national and/or international experience that conclusively demonstrates the traffic control device is effective.
  - b. Peer-reviewed and published research that demonstrates the traffic control device is effective.
    - i. In this context, peer-reviewed implies review and approval by individual reviewers that are not a part of the organization that conducted or sponsored the research.
    - ii. In this context, published implies distribution of the research results through a venue other than the organization that conducted or sponsored the research.
  - c. A change in federal law or regulation related to traffic control devices.
    - Basis for recommendation: Content should not be included in the MUTCD unless it is adequately justified and/or supported.

518. The MUTCD should limit the discussion of traffic engineering practices and related topics that are not traffic control device activities to those items that are most essential for traffic safety and efficiency, to meet road users' needs and for the practitioner to understand how they are to be applied.
- Basis for recommendation: MUTCD content should be limited only to principles that specifically describe traffic control device characteristics or activities.
519. MUTCD content should caution against over-control of the road user.
- Basis for recommendation: Excessive use of traffic control devices breeds disrespect, increases road user workload, and increases driver distraction.
520. While the MUTCD is not a traffic engineering educational document, it may, at times, explain guiding rationales through Support statements. The use of Support statements should be limited to providing clarity and not for educational purposes.
- Basis for recommendation: As stated in item 525, the purpose of the MUTCD is to establish national criteria for the use of traffic control devices. The MUTCD is not intended as a document that educates those that do not have the appropriate experience and expertise for making traffic control device decisions (see item 528).
521. Decisions regarding the use of traffic control devices should be based on sound engineering principles and demonstrated effectiveness.
- Basis for recommendation: Traffic control device decisions should not be based on non-engineering factors or factors that are not related to safety or effectiveness.
522. The MUTCD should provide a means of accommodating advancements in traffic control device technologies and other traffic control device-related improvements in a timely manner, but in a way that does not rush implementation of new technologies before they have been fully evaluated.
- Basis for recommendation: Advancements in traffic control device and vehicle technologies will introduce new capabilities into the traffic control device field in the coming years. The MUTCD has historically addressed existing traffic control device technologies. New traffic control device technologies are typically not incorporated into the MUTCD until they have been established in practice.
523. MUTCD content should recognize that alternative traffic control device treatments or combinations of treatments may be as or more effective than the treatment specified in the MUTCD. MUTCD content should allow alternative treatments if there is adequate justification or evidence of equal or better performance as long as the alternative treatments do not compromise the provisions in the MUTCD.
- Basis for recommendation: Innovative uses of traffic control devices are appropriate as long as they are consistent with the guiding rules in the MUTCD.
524. For each traffic control device, the MUTCD content should address the meaning, appearance, use, installation, and operation. It is not necessary to separately describe these aspects for every device. For example, it is not necessary for every section about signs to indicate that the sign should be placed at least 12 feet from the edge of the traveled way. However, each of these aspects should be addressed for each device.
- Basis for recommendation: All devices in the MUTCD need to be described in a similar manner.

## RECOMMENDED MUTCD LANGUAGE

Use of the MUTCD can be improved through the addition of specific language to Part 1. This language clarifies critical aspects about MUTCD intent, use, and application. Such clarifications are not currently included in the MUTCD. The items in this heading should be added to Part 1 of the MUTCD.

525. **Section 1A.XX Purpose of the MUTCD:** The purpose of the MUTCD is to establish national criteria for the use of traffic control devices that meet the needs and expectations of road users on all streets, highways, bikeways, and private roads open to public travel. This purpose is achieved through the following objectives:
- a. Promote national uniformity in the meaning and appearance of traffic control devices.
  - b. Promote national consistency in the use, installation, and operation of traffic control devices.
  - c. Provide principles for traffic engineers to use in making decisions regarding the use, installation, operation, maintenance, and removal of traffic control devices.
  - d. Promote safety and efficiency through appropriate use of traffic control devices.
    - Basis for recommendation: The purpose of the MUTCD has never been defined but a clear statement of its purpose is critical in defining what content should be in the MUTCD and how that content should be used.
526. **Section 1A.XX Target Road Users:** There are two groups of target road users:
- a. One target road user group for traffic control devices is an operator of a vehicle, including bicyclists. This target user is the reasonable and prudent individual who is alert and attentive, has demonstrated a basic proficiency in operating a vehicle on a specific facility, has demonstrated a basic understanding of traffic control devices and traffic laws, and is operating in a lawful manner that is appropriate for the facility and conditions, while demonstrating due care for the current conditions on the roadway.
  - b. Another target road user group for traffic control devices is pedestrians. This target user is an alert and attentive individual who is functioning in a lawful manner that is appropriate for the facility and conditions, while demonstrating due care for the current conditions on the roadway. Pedestrians with disabilities may be blind or vision-impaired, have mobility limitations, or other impairments.
    - Basis for recommendation: Proper use of traffic control devices can be optimized by specifying the expectations of the road users that will be responding to the traffic control devices.
527. **Section 1A.XX Traffic Control Device Characteristics and Activities:** The characteristics and activities associated with traffic control devices are:
- a. **Meaning:** The message the device is intended to convey and the expected road user response to the device.
  - b. **Appearance:** The general physical characteristics of a specific device as it appears to the road user. These characteristics include color, shape, legend, acoustical and tactile features, and the relative position and layout of individual elements.

- c. **Use:** The process of making a decision to use a specific device at a specific location and the manner and criteria by which such a decision is made given the specific circumstances at that location.
  - d. **Installation:** The process of determining the proper position for a device and providing appropriate visibility for the device. Considerations related to installation include height, lateral distance (offset), longitudinal distance from a reference point, and distance from other devices. Installation also includes addressing the visibility/detection of a device. In addition to height, lateral distance, and longitudinal distance, visibility/detection incorporates size, conspicuity, and contrast with the environmental background. The physical activity of installing a device is not an activity for MUTCD content purposes.
  - e. **Operation:** The process of establishing how the physical characteristics of a device changes over a relatively short period of time to impact the movement of traffic. Most traffic control devices are static and do not have an operational aspect. However, some devices do operate (such as signals and changeable message signs). Operation does not include gradual deterioration over an extended period of time of physical characteristics due to aging, weathering, or other factors.
  - f. **Maintenance:** The process of monitoring the visibility, crash worthiness, operational, acoustical and tactile features of a device and its performance and taking appropriate actions so that that it will function in the intended manner throughout the life of the device and be replaced at the end of its useful life.
  - g. **Removal:** The process of determining when to remove a specific device from service.
    - Basis for recommendation: Distinctions between the types of activities will provide the ability to establish the qualifications needed to perform selected traffic control device principles.
528. **Section 1A.XX MUTCD User:** Traffic control device principles in the MUTCD shall be developed for and used by individuals who are duly authorized and qualified to conduct traffic control device activities. Where MUTCD content requires a decision for implementation, such decisions shall be made by individuals who have the appropriate levels of experience and expertise to make traffic control device decisions.
- Basis for recommendation: Establishes minimum qualifications for those responsible for performing traffic control devices activities. Reduces the potential for individuals that are not qualified to perform traffic control device activities.
529. **Section 1A.XX Traffic Control Device Decision Making:** In making traffic control device decisions, individuals should consider the impacts of the decision on the safety and operational efficiency (mobility) of road users at that location, the impact of the decision on the effective utilization of agency resources, cost-effectiveness, and the impact of the decision on enforcement and education aspects of traffic control devices.
- Basis for recommendation: Specifically states that traffic control device decisions require a balance between competing factors.
530. **Section 1A.XX Definition of Headings:** Where used, the text headings of Standard, Requirement, Recommendation, Option, and Support have the following definitions:

- a. **Standard:** A statement of a required, mandatory, or specifically prohibited practice that cannot be revised or modified under any circumstances. Standard statements are never modified by an Option statement. Standard statements use the word “shall.”
- b. **Requirement:** A statement of a required, mandatory, or specifically prohibited practice, with deviations allowed when justified by an engineering study or as allowed by an Option statement. Requirement statements use the words “is/are required.”
- c. **Recommendation:** A statement of a recommended practice or specifically prohibited practice, with deviations allowed when justified by an engineering study or engineering judgment or as allowed by an Option statement. Recommendation statements use the word “should.”
- d. **Option:** A statement of a permissive practice that carries no requirement or recommendation. Option statements sometimes contain allowable modifications to a Requirement or Recommendation statement. An Option Statement may require an engineering study or the exercise of engineering judgment. Option statements use the word “may.”
- e. **Support:** An informational statement that does not convey any degree of mandate, requirement, recommendation, authorization, prohibition, or enforceable condition. The terms “shall,” “is/are required,” “should,” and “may” are not used in Support statements.
  - Basis for recommendation: Definitions are needed for the new levels of mandate that are recommended. See item 534 for a detailed description of each term. The above terms would replace the text headings currently defined in Section 1A.13 of the MUTCD.

531. **Section 1A.XX Definition of Engineering Study:**

- a. Engineering Study – The analysis and evaluation of available pertinent information, and the application of appropriate principles, provisions, and practices as contained in the MUTCD and other sources, for the purpose of deciding upon the appearance, use, installation, or operation of a traffic control device. An engineering study shall be performed by a professional engineer with appropriate traffic engineering expertise, or by an individual working under the supervision of such an engineer, through the application of procedures and criteria established by the engineer. An engineering study shall be documented in writing.
  - Basis for recommendation: This definition of an engineering study specifically indicates that an engineering study must be performed by a professional, or licensed, engineer, or by someone working under such supervision.

## MUTCD CONTENT

This vision recommends changes to MUTCD content and to the manner by which MUTCD content is evaluated.

- 532. All MUTCD content should be consistent with the Guiding Rules (see items 514 to 524).

- Basis for recommendation: The Guiding Rules establish basic requirements for MUTCD content. Content that is not consistent with the Guiding Rules should not be included in the MUTCD.
- 533. The lack of a maintained UVC requires that the recommended legal meaning of traffic control devices should be provided in the MUTCD or a separate document subject to rulemaking.
  - a. MUTCD should be the basis for the guidance of highway, traffic, and motor vehicle laws.
    - Basis for recommendation: Effective use of traffic control devices requires an understanding of their meaning and relation to traffic law.
- 534. The current MUTCD is based on three levels of mandate – Standard, Guidance, and Option. For future editions, the MUTCD content should be structured to provide a range of mandates as described below:
  - a. Standard practices (Standard)
    - i. A Standard represents the need to establish uniformity across the nation for critical aspects of traffic control devices.
    - ii. Standards are absolute and cannot be violated at any time under any circumstances. There can be no variation and no range of performance or other criteria.
    - iii. Standards use the word “shall.”
    - iv. Standards are required for the meaning and appearance aspects of traffic control devices. Standards can also be established for other aspects of traffic control devices.
    - v. Deviations from a Standard are not permitted.
    - vi. Standards cannot be modified by an option.
  - b. Required practices (Requirement)
    - i. A Requirement represents the need to establish consistency across the nation for crucial aspects of traffic control devices.
    - ii. Requirements define an expected practice that may have a minimum, maximum, or range of criteria.
    - iii. Requirements use the words “is/are required.”
    - iv. Requirements would most often apply to selected aspects of use and installation, but can be applied to other aspects of traffic control devices.
    - v. Deviations from a Requirement need to be justified by an engineering study. Deviations from a Requirement may also be allowed by an Option.
  - c. Recommended practices (Recommendation)
    - i. A Recommendation represents the need to promote consistency across the nation for various aspects of traffic control devices that are deemed important but not crucial.
    - ii. Recommendation defines a recommended practice.
    - iii. Deviations from a Recommendation may be appropriate due to a wide variety of factors.
    - iv. Recommendation uses the word “should.”
    - v. Recommendation would typically apply to all traffic control device aspects except meaning and appearance.



- vi. Deviations from a Recommendation need to be justified by an engineering study or the exercise of engineering judgment.
  - d. Optional practices (Option)
    - i. An Option represents alternatives that may improve the performance of traffic control devices.
    - ii. Options define an optional practice.
    - iii. Options use the word “may.”
    - iv. The decision to implement an option may require an engineering study or the exercise of engineering judgment depending upon the specific language of the option.
    - v. Implementation of an option may be appropriate due to a wide variety of factors.
    - vi. Options typically apply to traffic control device aspects other than meaning and appearance.
    - vii. There is no expectation of compliance (no requirement to use) with an option statement. If an option statement is exercised, there may be standards or guidance associated with the implementation of the option.
  - e. Background information (Support)
    - i. These represent statements that provide additional information about a traffic control device but which have no associated expectation of action.
    - ii. Support statements do not use any of the other distinctive words (shall, is/are required, should, or may) used in Standards, Requirements, Recommendation, or Options.
      - Basis for recommendation: The creation of additional levels of mandate will provide greater flexibility to practitioners in those areas where flexibility is appropriate, particularly as it related to field installation issues. In addition, the issue of substantial conformance may be simplified by defining substantial conformance as compliance with the Standards.
535. When a new traffic control device or practice is added to the MUTCD, consideration should be given to introducing its use as an option or recommendation statement rather than as a requirement or standard statement in the initial edition in which it appears. If used, a standard or requirement could apply to its meaning, appearance, installation, or operation.
- a. Such an approach provides a means of implementing new devices or practices in a manner that allows agencies to transition previous installations to the optional or recommended practice before it becomes a requirement or standard
  - b. Such an approach will also provide a national opportunity to evaluate the effectiveness of the devices or practices before they become a Standard or a Requirement.
    - Basis for recommendation: Traffic control device principles that are implemented without national use can create implementation challenges or demands that were not apparent before establishing the principles.

## MUTCD STRUCTURE

As described in the previous chapter, the structure of the 2009 MUTCD is of a stovepipe nature. This structure has been in place for virtually the entire existence of the MUTCD. Users are familiar with this structure and comments to the FHWA RFC in the Spring 2013 indicated a desire to keep the MUTCD as a single document.

536. The MUTCD should continue to exist as a single document with the current structure.
  - a. The ability to use MUTCD content can be simplified by labeling traffic control device provisions with “smart tags” that identify the traffic control device, characteristics(s)/activity(s) being addressed by each provision and the user group(s) that would most likely perform the activity. Additional information, such as the level of mandate, related reference materials, applications, and other information, could also be included as part of the smart tags.
    - i. Such smart tags provide the ability to easily find or reorganize MUTCD content to meet various needs.
    - ii. Smart tags may be created for specific applications such as urban intersections, rural intersections, mid-block pedestrian crossings, and others. These smart tags can be used to illustrate various approaches for traffic control device treatments related to these applications.
  - Basis for recommendation: The splitting of current standard statements into two levels (Standards and Requirements) reduces the need for a document that is divided by user group, level of mandate, or traffic control device activity. Furthermore, content can be labeled with “smart tags” so that the electronic version of the MUTCD can be reorganized into individual “break-out” documents to better suit the needs of a specific user group.
537. Significant effort should be devoted to a study of how portions of the MUTCD can be subject to rulemaking while other portions of the MUTCD can be revised/updated without going through the rulemaking process. As an alternative, an effort should explore all legal means of allowing Option and Support statements, which carry no mandate, to be adopted by rulemaking without seeking public comment. Such an effort should:
  - a. Develop a method for determining what content should go through rulemaking with public comment and what should not.
  - b. Involve a dialogue with high-level policymakers at the FHWA to identify potential options and explore legal options for accomplishing the desired outcome.
  - Basis for recommendation: Being able to revise some portions of the MUTCD by means other than rulemaking would provide increased ability to keep the MUTCD relevant to current practices and technologies.

## MUTCD REVISIONS

The vision items in this heading recommend changes to the manner by which MUTCD content is added or revised.

538. A new edition of the MUTCD should be published every 8-10 years.
- a. New traffic control devices or practices can be implemented through the use of experimentation or interim approvals between MUTCD editions.
    - Basis for recommendation: There is a need for stability following the publication of a new edition before beginning the extensive process of preparing a new edition. This helps to identify new content in the current edition that needs to be modified based on experience with the new principles. Substantial resources are required to implement a new edition of the MUTCD including: rulemaking, adoption by the states, training, modification of related documents and standard drawings, and revision of previously prepared construction plans.
539. The Federal Aid process should be evaluated and changes considered to the Federal Aid process to reduce burdens on agencies in the final stages of design and construction of projects when a new edition of the MUTCD is released.
- Basis for recommendation: The MUTCD requires all traffic control devices on new or reconstructed projects to be in compliance with the current MUTCD. This is impractical for projects near the end of the design stage, or in construction, when a new MUTCD is adopted. An improved “grand-fathering” method is needed.
540. MUTCD revisions between new editions should be limited to only those that address one or more of the following:
- a. To address known errors or inaccuracies in the current edition.
  - b. To address a change in national law or regulation.
  - c. To address a significant safety, operational, or administrative issue.
  - d. To provide principles for new devices not currently addressed in the MUTCD that are, or will soon be, in widespread use throughout the nation.
    - Basis for recommendation: Revisions between editions may not be recognized by all users, particularly those that rely upon printed versions of the MUTCD. Also, new editions issued too frequently put a burden on agencies to frequently retrain their staff on all the new provisions of the MUTCD.
541. Large MUTCD NPA rulemaking actions should provide more thorough review of the proposed content and impacts of the proposed content. This can be achieved through one or more of the following actions:
- a. Limit the size of a single rulemaking action to not more than 100 items identified in the *Federal Register* notice, with not more than 25 items covering material that was not previously approved as a recommendation from the NCUTCD.
  - b. Extend the docket comment period for NPA rulemaking that has more than 100 items, or more than 25 items covering material that was not previously approved as a recommendation from the NCUTCD, to encompass at least two NCUTCD meetings and publish the NPA no less than one month before a NCUTCD meeting
  - c. Revise the CFR so that only a portion of the MUTCD requires rulemaking to make changes or additions.
    - Basis for recommendation: It is difficult to review and coordinate large numbers of significant items in a proposed rule. Limiting the number of changes will make it easier for the public to consider the impacts of proposed changes and evaluate the value of the proposed changes.

542. The FHWA should limit the number of open MUTCD rulemaking actions to no more than two at any point in time.
- Basis for recommendation: The limit will help to promote greater consistency between rulemaking actions and will avoid having a single large rulemaking broken up into numerous smaller rulemakings.
543. An MUTCD NPA rulemaking action should take full advantage of the benefits of a thorough NCUTCD review and comment on the proposed language through one of the following actions:
- a. The FHWA should publish an NPA notice in the *Federal Register* no less than one month in advance of an NCUTCD meeting.
  - b. If the NPA notice is published less than one month before an NCUTCD meeting, the docket comment period should extend through at least the second NCUTCD meeting following the publication of the notice.
- Basis for recommendation: The NCUTCD is a group that represents a significant cross-section of groups and practitioners with an interest in traffic control device principles and that are responsible for using the MUTCD on a daily basis.
544. The FHWA should publish a Supplemental NPA (SNPA) if any of the following situations occur:
- a. An NPA has more than 100 items in the Federal Register notice and the number of docket comments is substantial.
    - i. A substantial number of comments is defined as more than 100 unique, non-form letters submitted to the docket.
  - b. The NPA has more than 100 items in the Federal Register notice and the comment period is less than 6 months.
  - c. The FR, in the absence of an SNPA, would contain new language that was not included in the NPA.
  - d. The US Access Board publishes a regulation (or regulatory notice) having implications and /or impacts on traffic control devices.
- Basis for recommendation: When changes are made to NPA language, those changes benefit from review by the practitioners responsible for complying with the provisions to avoid conflicts and errors before being published as a final rule.
545. Proposed changes to MUTCD required or recommended provisions (Standards, Requirements, or Recommendations) shall include a safety and/or operational assessment of the individual changes as part of the NPA.
- Basis for recommendation: Previous rulemaking efforts have not provided detailed assessments of the benefits associated with a proposed change in an MUTCD requirement.
546. Proposed changes to MUTCD required or recommended provisions (Standards, Requirements, or Recommendations) shall include an estimated economic impact of the individual changes as part of the NPA. The estimate should address not only the costs associated with replacement of the device itself, but also any updating of related infrastructure (such as sign supports or signal poles/arms). The assessment should be of life cycle costs and not limited to just the 7-year time frame associated with the unfunded mandate regulations.

- a. The estimate should recognize that some existing traffic control device provisions require significant infrastructure modifications that may not be economically feasible for the limited benefits that might be realized.
  - Basis for recommendation: With the exception of the minimum retroreflectivity requirements, previous rulemaking efforts have stated only that economic impacts are not significant and have not provided a detailed assessment or analysis of the economic impacts of changes to requirements or recommendations. A detailed analysis is needed to determine whether a proposed change contributes to the classification of a rulemaking action as an unfunded mandate.
- 547. Changes to MUTCD content should be proposed only if the changes are adequately justified by one or more of the following (see related item 517 for additional detail):
  - a. Widespread national and/or international experience.
  - b. Peer-reviewed and published research that indicate a safety, operational, or economic improvement.
  - c. A change in federal law or regulation.
    - Basis for recommendation: MUTCD content, particularly requirements or recommendations, should not be added or revised simply on the perception that it is beneficial to incorporate into the MUTCD.
- 548. When an MUTCD Final Rule is published, the FHWA should distribute a markup that shows the changes from the Notice of Proposed Amendments to the Final Rule.
  - a. This markup would be in addition to the markup that shows changes from the previous MUTCD.
    - Basis for recommendation: To provide the ability to assess the number of changes that are made as part of the FR (in response to docket comments) that were not in the NPA. This would allow MUTCD users to quickly assess where changes have been made from the material that was provided for review and comment.
- 549. The MUTCD should not include compliance dates associated with the addition of or changes to MUTCD content. Where the implementation of new or revised MUTCD content should be accelerated, the establishment of specific deadlines for meeting MUTCD criteria should be established through memorandum or other administrative procedures.
  - Basis for recommendation: Placing compliance dates in the MUTCD creates legal requirements that cannot be adjusted without initiating rulemaking. Establishing implementation deadlines using procedures other than inclusion in the MUTCD provide flexibility for agencies to work with FHWA to best meet road user needs.

## **CHAPTER 4: STRATEGIC PLAN**

For purposes of this document, the strategic plan describes the manner in which the recommended items of the vision are implemented. In essence, it represents a road map for achieving the MUTCD that is desired by the mid-2030s. The strategic plan is structured into four phases.

### **PHASE I – COMPLETION OF STRATEGIC PLANNING PROCESS**

The items associated with this phase are projected to occur between the present time and 2015. The intent of this phase is to complete the MUTCD strategic planning effort and to identify additional activities that are needed to address the long-range needs of the MUTCD.

801. There should be a comprehensive evaluation of the differences in state traffic laws (rules of the road) that are related to traffic control devices or otherwise impact the use of traffic control devices.
802. There should be a comprehensive evaluation of the differences in state tort liability laws that are related to traffic control devices or otherwise impact the use of traffic control devices.
803. There should be a comprehensive evaluation of the differences in state engineering practice/registration laws that are related to traffic control devices or otherwise impact the use of traffic control devices.

### **PHASE II – PREPARATION OF AND RULEMAKING FOR THE 2016 MUTCD**

Once the MUTCD strategic planning process is completed, there will be sufficient direction to begin preparation of the next MUTCD. For purposes of this document, the next MUTCD is assumed to be published in 2016.

804. The focus of the 2016 MUTCD should be on improving the content in the 2009 MUTCD, including streamlining the MUTCD to improve ease of use.
  - a. There should not be major changes in the 2016 MUTCD in order to provide a level of stability in the MUTCD over at least two editions.
805. Changes introduced in the 2016 edition should be limited to:
  - a. Incorporation of all NCUTCD recommendations submitted to FHWA since the last material included in the 2009 MUTCD.
  - b. Incorporation of all NCUTCD recommendations which can be submitted to FHWA before the NPA is published (the June 2014 NCUTCD meeting will likely be the last NCUTCD meeting before the NPA is published)
  - c. Content to address new technologies or treatments that have been introduced or developed since the 2009 MUTCD.
  - d. Possible reorganizations of all Parts of the MUTCD prepared by FHWA staff, but without removal of existing text or addition of new text that was not previously submitted by the NCUTCD.

- e. The FHWA should include the following items as part of the 2016 MUTCD:
  - i. Purpose of the MUTCD (item 525)
  - ii. Target Road Users (item 526)
  - iii. Traffic Control Device Characteristics and Activities (item 527)
  - iv. MUTCD User (item 528)
  - v. Traffic Control Device Decision Making (item 529)
  - vi. Definition of Engineering Study (item 531)
- 806. Streamlining can include, but is not necessarily limited to, the following approaches to improve ease of use of the MUTCD.
  - a. Develop smart search apps
  - b. Improve organization of content; reorganize content where opportunities for improving flow are identified
  - c. Eliminate redundancy and unnecessary language
  - d. Provide cross-indexing
  - e. Provide information in modular or tabular format
  - f. Provide more hotlinks and pop-ups
  - g. Better position figures in relation to associated text
  - h. Use more summary tables and figures to reduce text
  - i. Reorganize / reconfigure existing figures to better manage space
  - j. Improve consistency on what information about devices is presented
  - k. Provide subheadings to help a user find information on a particular subtopic
- 807. The NCUTCD should begin work on developing smart tags or other content-coordination processes for incorporation into the 2025 MUTCD.

### **PHASE III – PREPARATION OF 2024-2026 MUTCD**

Once the 2016 MUTCD is published, the NCUTCD and FHWA can begin work on the 2024-2026 MUTCD.

- 808. The focus of the 2024-2026 MUTCD should be a restructuring of the levels of mandate within the 2009 and 2016 MUTCDs.
- 809. The NCUTCD should evaluate current MUTCD language to determine:
  - a. Standard statements that are more appropriately stated as Requirement statements.
  - b. Other content for which the level of mandate should be changed.
- 810. NCUTCD activity related to level of mandate should consider material previously submitted to FHWA that has not yet been incorporated into the MUTCD.
- 811. Due to the expected number of changes associated with the 2024-2026 MUTCD, the FHWA should conduct rulemaking in a manner consistent with the recommendations in Chapter 3, specifically the limitations on the amount of material in a single rulemaking and limits on the number of concurrent rulemakings.
  - a. This may necessitate some early NPA rulemakings.
- 812. The 2024-2026 MUTCD should include as many items from Phase IV as practical (items 813 to 817).

## **PHASE IV – PREPARATION OF MID-2030S MUTCD**

Plans for the mid-2030s MUTCD are difficult to propose due to uncertainty over content and advances in communication technologies. This plan assumes that technologies will have advanced sufficiently to provide the ability for specific users to select MUTCD content that is pertinent to only a specific group or specific application (such as urban intersections).

813. The FHWA develops the necessary information technology tools so that MUTCD content can be easily categorized by all of the following:
  - a. Expected user group(s).
  - b. Expected traffic control device activity.
  - c. Typical traffic control device type of application(s) (location or use). A few examples of applications include:
    - i. Urban intersection.
    - ii. Rural intersection.
    - iii. Residential street.
    - iv. Mid-block pedestrian crossing.
    - v. Pedestrian facilities.
  - d. Level of mandate.
814. The NCUTCD completes the process of categorizing every sentence in the MUTCD by the desired categories.
815. The FHWA, with support from the NCUTCD, completes the process of developing an electronic draft version of the MUTCD that can be restructured according to various needs and that provides the ability to quickly and easily combine content that relates to a specific need or application.
816. The FHWA initiates rulemaking for the restructured MUTCD.
817. New content is included in the NPA rulemaking effort in a manner that is consistent with the recommendations in the vision.



## CHAPTER 5: REFERENCES

### DOCUMENTS

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**APPENDIX A:  
PORTIONS OF US CODE AND CODE OF FEDERAL REGULATIONS**

USC Notes:

- The USC language in this appendix represents the current version as of May 23, 2013.
- This portion of the appendix includes only those portions of the USC that are referenced in 23 CFR 655.603

**U.S. Code**

**Title 23 - Highways**

**§ 109. Standards**

(d) On any highway project in which Federal funds hereafter participate, or on any such project constructed since December 20, 1944, the location, form and character of informational, regulatory and warning signs, curb and pavement or other markings, and traffic signals installed or placed by any public authority or other agency, shall be subject to the approval of the State transportation department with the concurrence of the Secretary, who is directed to concur only in such installations as will promote the safe and efficient utilization of the highways.

**§ 402. Highway safety programs**

(a) Each State shall have a highway safety program approved by the Secretary, designed to reduce traffic accidents and deaths, injuries, and property damage resulting therefrom. Such programs shall be in accordance with uniform guidelines promulgated by the Secretary. Such uniform guidelines shall be expressed in terms of performance criteria. In addition, such uniform guidelines shall include programs

- (1) to reduce injuries and deaths resulting from motor vehicles being driven in excess of posted speed limits,
- (2) to encourage the proper use of occupant protection devices (including the use of safety belts and child restraint systems) by occupants of motor vehicles,
- (3) to reduce deaths and injuries resulting from persons driving motor vehicles while impaired by alcohol or a controlled substance,
- (4) to prevent accidents and reduce deaths and injuries resulting from accidents involving motor vehicles and motorcycles,
- (5) to reduce injuries and deaths resulting from accidents involving school buses, and
- (6) to reduce accidents resulting from unsafe driving behavior (including aggressive or fatigued driving and distracted driving arising from the use of electronic devices in vehicles)
- (7) to improve law enforcement services in motor vehicle accident prevention, traffic supervision, and post-accident procedures. The Secretary shall establish a highway safety program for the collection and reporting of data on traffic-related deaths and injuries by the States. Under such program, the States shall collect and report such data as the Secretary may require. The purposes of the program are to ensure national uniform data on such deaths and injuries and to allow the Secretary to make determinations for use in developing programs to reduce such deaths and injuries and making recommendations to Congress concerning legislation necessary to implement such programs. The program shall provide for annual

reports to the Secretary on the efforts being made by the States in reducing deaths and injuries occurring at highway construction sites and the effectiveness and results of such efforts. The Secretary shall establish minimum reporting criteria for the program. Such criteria shall include, but not be limited to, criteria on deaths and injuries resulting from police pursuits, school bus accidents, aggressive driving, fatigued driving, distracted driving, and speeding, on traffic-related deaths and injuries at highway construction sites and on the configuration of commercial motor vehicles involved in motor vehicle accidents. Such uniform guidelines shall be promulgated by the Secretary so as to improve driver performance (including, but not limited to, driver education, driver testing to determine proficiency to operate motor vehicles, driver examinations (both physical and mental) and driver licensing) and to improve pedestrian performance and bicycle safety. In addition such uniform guidelines shall include, but not be limited to, provisions for an effective record system of accidents (including injuries and deaths resulting therefrom), accident investigations to determine the probable causes of accidents, injuries, and deaths, vehicle registration, operation, and inspection, highway design and maintenance (including lighting, markings, and surface treatment), traffic control, vehicle codes and laws, surveillance of traffic for detection and correction of high or potentially high accident locations, enforcement of light transmission standards of window glazing for passenger motor vehicles and light trucks as necessary to improve highway safety, and emergency services. Such guidelines as are applicable to State highway safety programs shall, to the extent determined appropriate by the Secretary, be applicable to federally administered areas where a Federal department or agency controls the highways or supervises traffic operations.

CFR Notes:

- The CFR language in this appendix represents the current version as of May 23, 2013.
- This portion of the appendix does not include Appendix to Subpart F of Part 655—Alternate Method of Determining the Color of Retroreflective Sign Materials and Pavement Marking Materials

**Code of Federal Regulations**

**Title 23: HIGHWAYS**

**PART 655—TRAFFIC OPERATIONS**

**SUBPART F—TRAFFIC CONTROL DEVICES ON FEDERAL-AID AND OTHER STREETS AND HIGHWAYS**

**§ 655.601 Purpose.**

To prescribe the policies and procedures of the Federal Highway Administration (FHWA) to obtain basic uniformity of traffic control devices on all streets and highways in accordance with the following references that are approved by the FHWA for application on Federal-aid projects:

- (a) MUTCD.
- (b) AASHTO Guide to Metric Conversion.
- (c) AASHTO Traffic Engineering Metric Conversion Factors.

(d) The standards required in this section are incorporated by reference into this section in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, the FHWA must publish notice of change in the Federal Register and

the material must be available to the public. All approved material is available for inspection at the Federal Highway Administration, Office of Transportation Operations, 1200 New Jersey Avenue SE., Washington, DC 20590, (202) 366-8043 and is available from the sources listed below. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA call (202) 741-6030, or go to <http://www.archives.gov/federal-register/cfr/index.html>.

(1) AASHTO, American Association of State Highway and Transportation Officials, Suite 249, 444 North Capitol Street NW., Washington, DC 20001

(i) AASHTO Guide to Metric Conversion, 1993;

(ii) AASHTO, Traffic Engineering Metric Conversion Factors, 1993—Addendum to the Guide to Metric Conversion, October 1993.

(2) FHWA, Federal Highway Administration, 1200 New Jersey Avenue SE., Washington, DC 20590, telephone (202) 366-1993, also available at <http://mutcd.fhwa.dot.gov>.

(i) Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), 2009 Edition, including Revisions No. 1 and No. 2, FHWA, dated May 2012.

(ii) [Reserved]

[77 FR 28466, May 14, 2012]

## **§ 655.602 Definitions.**

The terms used herein are defined in accordance with definitions and usages contained in the MUTCD and 23 U.S.C. 101(a).

## **§ 655.603 Standards.**

(a) National MUTCD. The MUTCD approved by the Federal Highway Administrator is the national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel in accordance with 23 U.S.C. 109(d) and 402(a). For the purpose of MUTCD applicability, open to public travel includes toll roads and roads within shopping centers, airports, sports arenas, and other similar business and/or recreation facilities that are privately owned but where the public is allowed to travel without access restrictions. Except for gated toll roads, roads within private gated properties where access is restricted at all times are not included in this definition. Parking areas, driving aisles within parking areas, and private highway-rail grade crossings are also not included in this definition.

(b) State or other Federal MUTCD. (1) Where State or other Federal agency MUTCDs or supplements are required, they shall be in substantial conformance with the National MUTCD. Substantial conformance means that the State MUTCD or supplement shall conform as a minimum to the standard statements included in the National MUTCD. The FHWA Division Administrators and Associate Administrator for the Federal Lands Highway Program may grant exceptions in cases where a State MUTCD or supplement cannot conform to standard statements in the National MUTCD because of the requirements of a specific State law that was in effect prior to the effective date of this final rule, provided that the Division Administrator or Associate Administrator determines based on information available and documentation received from the State that the non-conformance does not create a safety concern. The guidance statements contained in the National MUTCD shall also be in the State Manual or supplement unless the reason for not including it is satisfactorily explained based on engineering judgment, specific conflicting State law, or a documented engineering study. The FHWA Division Administrators

shall approve the State MUTCDs and supplements that are in substantial conformance with the National MUTCD. The FHWA Associate Administrator of the Federal Lands Highway Program shall approve other Federal land management agencies MUTCDs and supplements that are in substantial conformance with the National MUTCD. The FHWA Division Administrators and the FHWA Associate Administrators for the Federal Lands Highway Program have the flexibility to determine on a case-by-case basis the degree of variation allowed.

(2) States and other Federal agencies are encouraged to adopt the National MUTCD in its entirety as their official Manual on Uniform Traffic Control Devices.

(3) States and other Federal agencies shall adopt changes issued by the FHWA to the National MUTCD within two years from the effective date of the final rule. For those States that automatically adopt the MUTCD immediately upon the effective date of the latest edition or revision of the MUTCD, the FHWA Division Administrators have the flexibility to allow these States to install certain devices from existing inventory or previously approved construction plans that comply with the previous MUTCD during the two-year adoption period.

(c) Color specifications. Color determinations and specifications of sign and pavement marking materials shall conform to requirements of the FHWA Color Tolerance Charts.<sup>8</sup> 1 An alternate method of determining the color of retroreflective sign material is provided in the appendix.

(d) Compliance —(1) Existing highways . Each State, in cooperation with its political subdivisions, and Federal agency shall have a program as required by 23 U.S.C. 402(a), which shall include provisions for the systematic upgrading of substandard traffic control devices and for the installation of needed devices to achieve conformity with the MUTCD. The FHWA may establish target dates of achieving compliance with changes to specific devices in the MUTCD.

(2) New or reconstructed highways. Federal-aid projects for the construction, reconstruction, resurfacing, restoration, or rehabilitation of streets and highways shall not be opened to the public for unrestricted use until all appropriate traffic control devices, either temporary or permanent, are installed and functioning properly. Both temporary and permanent devices shall conform to the MUTCD.

(3) Construction area activities. All traffic control devices installed in construction areas using Federal-aid funds shall conform to the MUTCD. Traffic control plans for handling traffic and pedestrians in construction zones and for protection of workers shall conform to the requirements of 23 CFR part 630, subpart J, Traffic Safety in Highway and Street Work Zones. [48 FR 46776, Oct. 14, 1983, as amended at 51 FR 16834, May 7, 1986; 68 FR 14139, Mar. 24, 2003; 71 FR 75115, Dec. 14, 2006; 74 FR 28442, June 16, 2009; 74 FR 66861, Dec. 16, 2009]

#### **§ 655.604 Achieving basic uniformity.**

(a) Programs. Programs for the orderly and systematic upgrading of existing traffic control devices or the installation of needed traffic control devices on or off the Federal-aid system should be based on inventories made in accordance with the Highway Safety Program Guideline 21, “Roadway Safety.” These inventories provide the information necessary for programming traffic control device upgrading projects.

(b) Inventory. An inventory of all traffic control devices is recommended in the Highway Safety Program Guideline 21, “Roadway Safety.” Highway planning and research funds and highway related safety grant program funds may be used in statewide or systemwide studies or

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<sup>8</sup> Available for inspection from the Office of Traffic Operations, Federal Highway Administration, 1200 New Jersey Avenue, SE., Washington, DC.

inventories. Also, metropolitan planning (PL) funds may be used in urbanized areas provided the activity is included in an approved unified work program.

[48 FR 46776, Oct. 14, 1983, as amended at 71 FR 75115, Dec. 14, 2006]

**§ 655.605 Project procedures.**

(a) Federal-aid highways. Federal-aid projects involving the installation of traffic control devices shall follow procedures as established in 23 CFR part 630, subpart A, Federal-Aid Programs Approval and Project Authorization. Simplified and timesaving procedures are to be used to the extent permitted by existing policy.

(b) Off-system highways. Certain federally funded programs are available for installation of traffic control devices on streets and highways that are not on the Federal-aid system. The procedures used in these programs may vary from project to project but, essentially, the guidelines set forth herein should be used.

**§ 655.606 Higher cost materials.**

The use of signing, pavement marking, and signal materials (or equipment) having distinctive performance characteristics, but costing more than other materials (or equipment) commonly used may be approved by the FHWA Division Administrator when the specific use proposed is considered to be in the public interest.

**§ 655.607 Funding.**

(a) Federal-aid highways. (1) Funds apportioned or allocated under 23 U.S.C. 104(b) are eligible to participate in projects to install traffic control devices in accordance with the MUTCD on newly constructed, reconstructed, resurfaced, restored, or rehabilitated highways, or on existing highways when this work is classified as construction in accordance with 23 U.S.C. 101(a). Federal-aid highway funds for eligible pavement markings and traffic control signalization may amount to 100 percent of the construction cost. Federal-aid highway funds apportioned or allocated under other sections of 23 U.S.C. are eligible for participation in improvements conforming to the MUTCD in accordance with the provisions of applicable program regulations and directives.

(2) Traffic control devices are eligible, in keeping with paragraph (a) (1) of this section, provided that the work is classified as construction in accordance with 23 U.S.C. 101(a) and the State or local agency has a policy acceptable to the FHWA Division Administrator for selecting traffic control devices material or equipment based on items such as cost, traffic volumes, safety, and expected service life. The State's policy should provide for cost-effective selection of materials which will provide for substantial service life taking into account expected and necessary routine maintenance. For these purposes, effectiveness would normally be measured in terms of durability, service life and/or performance of the material. Specific projects including material or equipment selection shall be developed in accordance with this policy. Proposed work may be approved on a project-by-project basis when the work is (i) clearly warranted, (ii) on a Federal-aid system, (iii) clearly identified by site, (iv) substantial in nature, and (v) of sufficient magnitude at any given location to warrant Federal-aid participation as a construction item.

(3) The method of accomplishing the work will be in accordance with 23 CFR part 635, subpart A, Contract Procedures.

(b) Off-system highways. Certain Federal-aid highway funds are eligible to participate in traffic control device improvement projects on off-system highways. In addition, Federal-aid highway funds apportioned or allocated in 23 U.S.C. are eligible for the installation of traffic control devices on any public road not on the Federal-aid system when the installation is directly related to a traffic improvement project on a Federal-aid system route.

**Appendix to Subpart F of Part 655—Alternate Method of Determining the Color of Retroreflective Sign Materials and Pavement Marking Materials**

Not included in this appendix but available on-line at:

<http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&sid=b7cc2200066b6240b626b1c8b19d2291&rgn=div6&view=text&node=23:1.0.1.7.30.2&idno=23>.



**APPENDIX B:  
HISTORY AND GROWTH OF THE MUTCD**

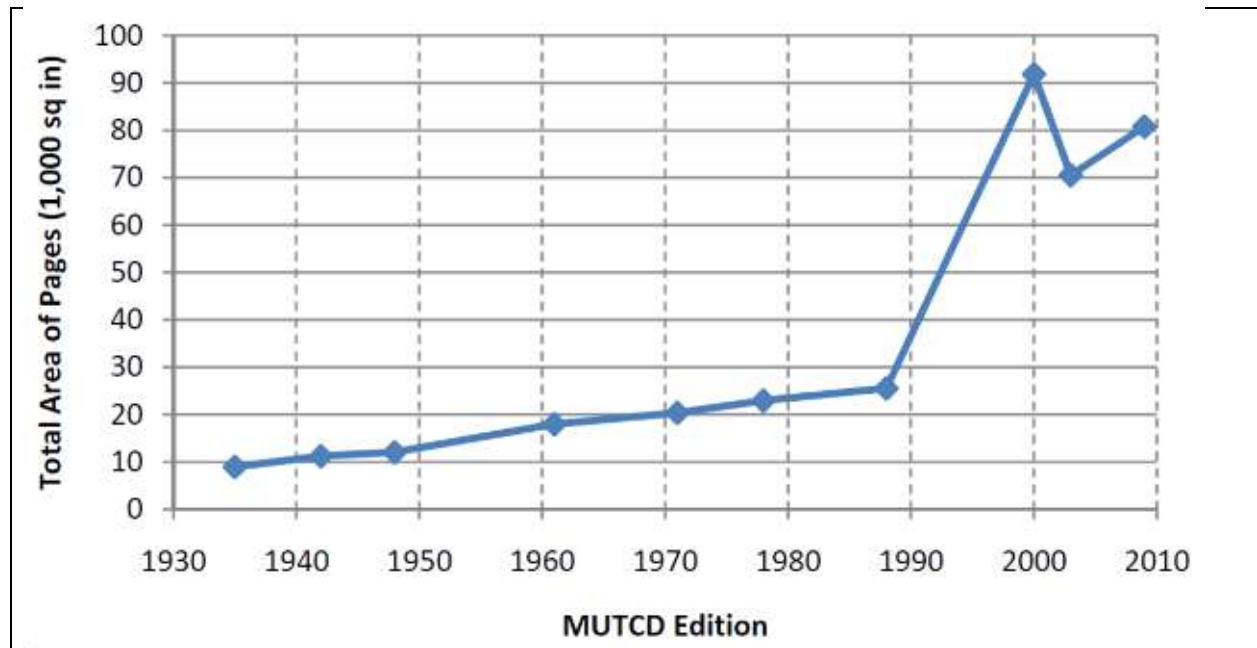
The MUTCD was first published in 1935 and there have been succeeding editions in 1942, 1948, 1961, 1971, 1978, 1988, 2000, 2003, and 2009. Table 2 summarizes the evolution of the MUTCD and key information about the size of each edition. The need for uniform standards was recognized long ago. The American Association of State Highway Officials (AASHO), now known as the American Association of State Highway and Transportation Officials (AASHTO), published a signing manual for rural highways in 1927, and the National Conference on Street and Highway Safety (NCSHS) published a traffic control device manual for urban streets in 1930. In the early 1930s, the necessity for unification of the standards applicable to the different classes of road and street systems was obvious. To meet this need, a joint committee of AASHO and NCSHS developed and published the original edition of this *Manual on Uniform Traffic Control Devices* (MUTCD) in 1935. A special War Emergency Edition of the MUTCD was published in 1942 to address the unique needs of World War II. These first two editions represent the initial era of the MUTCD. The first post-war edition was published in 1948 and represented a significant change from the earlier editions. The 1961 edition also represented a significant change from the 1948 edition. The 1948 and 1961 editions represent the transition era as the MUTCD expanded to include more items. A new edition was published in 1971 and represented the first edition administered by the FHWA as they took ownership of the MUTCD shortly after publication of the 1971 edition. Later editions in the mature era are the 1978 and 1988 MUTCDs. After publication of the 1988 MUTCD, work began on a significantly revised edition, which was published in 2000. This represents the beginning of the modern MUTCD era and the establishment of electronic versions of the MUTCD that were freely available on the FHWA website. The 2000 MUTCD contained numerous shortcomings which were addressed by the publication of a new edition relatively soon in 2003. The most recent edition was published in 2009.

**Table 2. Summary of MUTCD Evolution**

<b>Edition</b>	<b>MUTCD Era</b>	<b>Pages</b>	<b>Parts</b>	<b>Size (inches)</b>	<b>Thickness (inches)</b>
1935	Initial	166	4	6×9	$\frac{3}{8}$
1942		208	4	6×9	$\frac{3}{8}$
1948	Transition	223	4	6×9	$\frac{3}{8}$
1961		333	6	6×9	$\frac{5}{8}$
1971*	Mature	377	8	6×9	$\frac{3}{4}$
1978		425	9	6×9	$1\frac{1}{8}$
1988		473	9	6×9	$1\frac{1}{8}$
2000	Modern	982	10	8½×11	$1\frac{5}{8}$
2003		754	10	8½×11	$1\frac{1}{4}$
2009		864	9	8½×11	$1\frac{5}{8}$

Note: \*FHWA assumed MUTCD ownership

As the MUTCD has progressed through the years, it has also grown in size and depth of content. Figure 1 illustrates the growth of the MUTCD over its lifetime as a function of the area of total pages. Until the publication of the 2000 edition, the MUTCD was printed on pages that were 6×9 inches. Beginning with the 2000 edition, the size of a page increased to 8½×11 inches. The figure accounts for this change in size by reporting MUTCD size as area instead of the number of pages. The figure also indicates a decrease in the number of pages between the 2000 and 2003 editions. This was achieved through a reduction in white space (reduced fonts and line spacing).



**Figure 1. Growth of the MUTCD**

Prior to the publication of the 2000 edition, the MUTCD provided a significant amount of general guidance information (before guidance was defined as a “should” statement). The MUTCD editions prior to 2000 provided the practitioner with a great deal of flexibility (some may say too much) in adapting traffic control device decisions to the local circumstances. Many practitioners thought they had flexibility because the shall, should, and may statements were intertwined in every paragraph. This was confusing and led to misinterpretations of the intent of the MUTCD. The 2000 MUTCD was an attempt to correct these misinterpretations. The number of shall and should statements in the 2009 MUTCD has grown significantly from the 2003 MUTCD, as shown in Table 3. This increase is due predominantly to the addition of new devices and new topics that were not in the 2003 edition, such as flashing yellow and flashing red arrow turn signal displays, automated flagger assistance devices (AFADs), toll road/toll plaza signing, signing for managed lanes, community wayfinding signs, and more than 50 other unique new devices or revisions in devices that were deemed by NCUTCD and/or FHWA as being needed to address new technology, emerging new applications such as electronic toll collection, and device improvements as found effective by research (see Table 4 and Table 5).

**Table 3. Comparison of Shall, Should, and May between  
2009 and 2003 Editions**

Edition	Number of Times the Word Occurs*		
	Shall	Should	May
2003	2,073	2,152	1,377
2009	2,987	2,503	1,661
# Increase	914	351	284
% Increase	44%	16%	21%

\*In the text of the MUTCD, does not include figures or tables.

The structure of the MUTCD has also grown over time. The MUTCD began in 1935 with four parts and has grown to as many as ten parts, as was the case with the 2003 MUTCD. However, the sign part of the MUTCD contains many chapters for different types of signs. Many of these sign chapters rival other parts of the MUTCD in the breadth of content. Table 6 identifies when each part (and chapters for signs) were added to a new edition of the MUTCD. It is worth noting that the devices associated with specific applications were often included in earlier editions before that application became a stand-alone part of the MUTCD. An example is that the signing and signals for highway-railroad grade crossings were included in earlier editions of the MUTCD before they were separated out into Part 8 with the publication of the 1978 edition.

Detailed information about the evolution of the MUTCD and copies of previous editions of the MUTCD can be found on the MUTCD History website.<sup>9</sup>

**Table 4. New Topics Added to Chapters 1A, 2B, 2C, 2D, and 2E of the MUTCD  
Resulting in New Shalls in the 2009 Edition**

Chapter or Section	Number of New Subject Matter Shalls Added in New Material
1A.13 Definitions – added terms defined	9 (note 1)
2B.27 Jughandle Regulatory Signs	5
2B.35 Slow Vehicle Turnout Regulatory Signs	1
2B.43 - 45 Roundabout Regulatory Signs	5
2B.68 Gates (other than RR crossing)	7
2C.06-2C.10 Horizontal Alignment Warning Signs – revs	6
2C.35 added Depth Gauge sign	2
2C.37 added Ramp Metered When Flashing sign	1
2C.43 new W9-7 sign	1
2C.62 NEW plaque	2
2D.27 Lane Designation Aux Signs	3
2D.33 Combination Lane-Use/Destin. Overhead Guide Sign	6
2D.38 Destination Signs at Roundabouts	2
2D.39 Destination Signs at Jughandles	1
2D.50 Community Wayfinding Signs	36
2E.20-21-23 Option Lane Guide signs	27

<sup>9</sup> See Gene Hawkins “History of the MUTCD” at <https://ceprofs.civil.tamu.edu/ghawkins/MUTCD-History.htm>.

**Table 5. New Topics Added to Other MUTCD Chapters Resulting  
in New Shalls in the 2009 Edition**

Chapter or Section	Number of New Subject Matter Shalls Added in New Material
Chp 2F Toll Road Signs	60
2G.01-07 & 09-15 Reorg & Amplific of Pref Lane Signing material	17 (note 2)
2G.08 Preferential Lane Warning Signs on Median Barriers	3
2G.16 - 18 Managed Lane Signing	35
2H.08 Acknowledgement Signs	12
2I.04 Interstate Oasis Signs	4
2J.01 added 24-hr Pharm signs	5
2J.09 Specific Svc Trailblazer Signs	8
Chp. 2L Changeable Message Signs	16
3B.04 - 3B.05 Dotted Lines for Non-continuing Lanes	4
3B.17 Do Not Block Intersection Markings	2
3B.22 Speed Reduction Markings	3
3B.24 Chevron & Diagonal X-Hatch Markings	6
Chp. 3C Roundabout Markings	5
Chp. 3E Markings for Toll Plazas	5
Chp. 3H Channelization Devices for Markings Pattern Emphasis	5
Chp. 3J Rumble Strip Markings	3
4C.10 New Warrant #9	4
4D.08 Added u-turn arrow indications	4
4D.04 & 4D.17-25 New mat'l on LT Phasing Displays (FYA & FRA)	223
4E.09-4E.13 Accessible Pedestrian Signals & Detectors – revs	39
Chp. 4F Pedestrian Hybrid Beacons	19
4G.04 Emergency-Vehicle Hybrid Beacons	11
Chp. 4K Hwy Traffic Signals at Toll Plazas	4
6D.03 & 6E.02 added High-Vis Safety Apparel	10
6E.03 added flashlight method of flagging	8
6E.04 - 06 AFADs	64
6F.60 Portable CMS	13
6F.63-6F.68 Channelizing Devices	15
8A.07 Quiet Zones	1
8B.04 Stop & Yield Signs at Passive Crossings	11
8C.07 Wayside Horns for RR & LRT Grade Crossings	1
Chp 8D Pathway Crossings	16
9B.09 Bikeway Selective Exclusion Signs	1
9B.20 Bicycle Destination Signs	5
9B.24 Bikeway Ref Location Signs	5
9C.07 Shared Lane Markings	1
<b>TOTAL ADDED</b>	<b>762</b>
Note 1: 19 in 2009 vs. 10 in 2003 (incl Parts 1 & 4 & 9 defns)	
Note 2: 83 in 2009 vs. 67 in 2003 (46 in 2B + 21 in 2E)	

**Table 6. Growth of Parts and Sign Chapters**

Part and Chapter	Edition									
	1935	1942 <sup>C</sup>	1948	1961	1971	1978	1988	2000	2003	2009
Introduction/General	0	0	0	0	1	1	1	1	1	1
Definitions	0	0	0	App A	8	×	×	1	1	1
Signs	1	1	1	1	2	2	2	2	2	2
Sign Introduction	×	×	1A	1A	2A	2A	2A	2A	2A	2A
Regulatory Signs	×	×	1B	1B	2B	2B	2B	2B	2B	2B
Warning Signs	×	×	1C	1C	2C	2C	2C	2C	2C	2C
Guide Signs	×	×	1D	1D	×	×	×	×	×	×
Guide Signs – Conventional	×	×	×	×	2D	2D	2D	2D	2D	2D
Guide Signs - Expressways	×	×	×	×	2E	2E	2E	2E	2E	2E
Guide Signs - Freeways	×	×	×	×	2F	2F	2F	2E	2E	2E
Motorist/Specific Services Signs	×	×	×	×	×	×	2G	2F	2F	2J
Recreational and Cultural Interest Area Signs	×	×	×	×	×	×	2H	2H	2H	2M
Tourist Oriented Directional Signs	×	×	×	×	×	×	2I	2G	2G	2K
Civil Defense/Emergency Management Signs	×	×	×	6	2G	2G	2J	2I	2I	2N
Toll Road Signs	×	×	×	×	×	×	×	×	×	2F
Preferential and Managed Lane Signs	×	×	×	×	×	×	×	×	×	2G
General Information Signs	×	×	×	×	×	×	×	×	×	2H
General Service Signs	×	×	×	×	×	×	×	×	×	2I
Changeable Message Signs	×	×	×	×	×	×	×	×	×	2L
Markings	2	2	2	2	3	3	3	3	3	3
Signals	3	3	3	3	4	4	4	4	4	4
Islands <sup>A</sup>	4	4	4	4	5	5	5	×	×	×
Low-Volume Roads	×	×	×	×	×	×	×	5	5	5
Temporary Traffic Control <sup>B</sup>	×	×	×	5	6	6	6	6	6	6
School Areas	×	×	×	×	7	7	7	7	7	7
Rail Grade Crossings	×	×	×	×	×	8	8	8	8	8
Light Rail Crossings	×	×	×	×	×	×	×	10	10	×
Bicycles	×	×	×	×	×	9	9	9	9	9

Notes: This table does not identify parts/chapters that were added between publication of new editions.

An × indicates that the part/chapter was not included in that edition of the MUTCD.

A: The islands part of the MUTCD was converted to markings for islands in the 2000 edition and incorporated into Part 3.

B: The title of this part has changed several times through the various editions.

C: Parts 1-4 were provided for both normal conditions and for blackout conditions.

## APPENDIX C: REVISING THE MUTCD

Because it is defined as a federal regulation, the MUTCD can be changed only through the federal rulemaking process. In brief, this means that the responsible federal agency (for the MUTCD, this is the FHWA as part of the Department of Transportation) must publish proposed changes to the MUTCD so that the public can comment on those changes. It is worth noting that the terms “rulemaking” and “amendments” are sometimes used interchangeably with respect to revising the MUTCD. However, because the MUTCD is a published document, revisions of the document are more properly defined as amendments rather than rulemaking. The typical steps of the revision process are described below. The order of some of the early steps may vary.

1. **Request for Comments.** This is an optional step and is not always a part of the MUTCD rulemaking process. In this step, the FHWA announces that they are considering rulemaking related to some aspect of the MUTCD and requests comments from the public regarding critical issues identified by the FHWA.
2. **Change Development.** The need for a change is identified. This need may be identified by FHWA, the NCUTCD, an agency, a group, or an individual. The ideas for MUTCD changes typically originate with the FHWA MUTCD team or the NCUTCD.
3. **Experimentation.** If the change does not comply with the current MUTCD, an experiment is conducted to evaluate the effectiveness of the proposed change.
4. **Advance Notice of Proposed Amendments (ANPA).** This is an optional step and is not always a part of the MUTCD rulemaking process. In this step, the FHWA announces the general nature of revisions to the MUTCD that it is considering and asks for public input on those revisions. The descriptions of the proposed revisions may be general and conceptual or they may be specific. The draft language is evaluated and refined by the FHWA in preparation for publication of a Notice of Proposed Amendments (NPA) to the MUTCD
5. **Public Comment for ANPA.** If an ANPA is published, this is a mandatory step. In this step, the public provides input on the ANPA by submitting comments to the Federal Register docket. The length of time that comments will be accepted (how long the docket is open) varies depending upon the amount of material and significance of the revisions being considered.
6. **MUTCD Proposed Language.** Complete draft language for the MUTCD is developed (typically by the FHWA or NCUTCD).
7. **Notice of Proposed Amendments (NPA).** The FHWA publishes an NPA in the *Federal Register*. This is a mandatory step if revisions to the MUTCD are to be proposed. The notice describes the changes being proposed to the MUTCD, explains the justification for the changes, and the deadline for making comments about the proposed changes. Depending upon the scope of the proposed revisions, the descriptions may be limited to the most significant of the revisions. If there was an ANPA, the NPA summarizes the public comments to the ANPA.
8. **Public Comment for NPA.** The public makes comments on the proposed changes by submitting them to the *Federal Register* docket. All comments are viewable to the

public on the [www.regulations.gov](http://www.regulations.gov) website. The length of time during which comments can be made varies depending upon the extent of the proposed changes. For a new edition of the MUTCD, the comment period is typically about six months.

9. **Public Comment Review.** The FHWA reviews the public (docket) comments and identifies needed changes to the NPA language as they deem appropriate.
10. **Supplemental Notice of Proposed Amendments (SNPA).** This is an optional step and is not always a part of the MUTCD rulemaking process. The FHWA may publish a Supplemental NPA if the changes they make to the NPA are significantly different in nature from those proposed in the original NPA. The public then comments on the SNPA in the same manner they commented on the NPA.
11. **Public Comment on SNPA.** The public makes comments on the supplemental notice of proposed changes by submitting them to the *Federal Register* docket. All comments are viewable to the public on the <http://www.regulations.gov> website. The length of time during which comments can be made varies depending upon the extent of the proposed changes.
12. **Final Rule (FR).** In this step, the FHWA publishes a *Federal Register* notice that makes the official changes to the MUTCD as a new MUTCD or a revision of the current MUTCD. The notice provides a response to issues raised by public comments and an updated analysis and justification for the rule, including an analysis of any new data submitted by the public.
13. **Effective Date.** The changes become effective 30 days after the date of the FR.

Once a rulemaking notice is published, the FHWA will not comment on or share plans regarding opinions or anticipated changes to the NPA.

## **APPENDIX D: NATIONAL COMMITTEE ON UNIFORM TRAFFIC CONTROL DEVICES**

Throughout the life of the MUTCD, there has been a committee associated with the MUTCD.<sup>10</sup> This committee has been known by four different names and has had many changes in membership.<sup>11</sup> In its early years, the committee was responsible for the development and publication of the MUTCD. However, since 1979, the National Committee on Uniform Traffic Control Devices (NCUTCD) has served as an independent organization providing professional input on the content of the MUTCD, which has been published by the federal government.

The NCUTCD is an organization whose purpose is to assist in the development of standards, guides and warrants for traffic control devices and practices used to regulate, warn and guide traffic on streets and highways. The NCUTCD recommends to the Federal Highway Administration (FHWA) and to other appropriate agencies proposed revisions and interpretations to the *Manual on Uniform Traffic Control Devices* (MUTCD) and other accepted national standards. NCUTCD develops public and professional awareness of the principles of safe traffic control devices and practices and provides a forum for qualified individuals with diverse backgrounds and viewpoints to exchange professional information.

The earliest form of the NCUTCD was created in 1932 in response to the conflicts caused by having separate manuals for rural and urban areas. It was named the Joint Committee on Uniform Traffic Control Devices (JC). Its purpose was to bring all standards for traffic control devices under one cover and to recognize the rapid developments in the art of traffic control. In its original form, the JC consisted of members representing the American Association of State Highway Officials (AASHO) and the National Conference on Street and Highway Safety (NCSHS). The JC was expanded after the start of World War II to add representatives of the Institute of Traffic Engineers (ITE) to those of AASHO and the NCSHS.

After publication of the 1948 MUTCD, the NCSHS was dissolved and replaced on the JC by the National Committee on Uniform Traffic Laws and Ordinances (NCUTLO) and the committee was renamed the National Joint Committee on Uniform Traffic Control Devices (NJC). In 1960, the American Municipal Association and the National Association of County Officials were added to the committee. The final draft of the 1971 MUTCD was approved by the five parent organizations of the NJC in May 1970.

The publication of the 1971 MUTCD was significant for a number of reasons and marked a point of departure for the NJC. Following the publication of the 1971 MUTCD, the FHWA took over full responsibility for the development of the MUTCD from the NJC. Accordingly, in 1972, the name of the committee was changed to the National Advisory Committee on Uniform Traffic Control Devices (NAC) and its role was changed to that of an official advisory committee to the Secretary of Transportation. Requests for rulings or changes were submitted by FHWA to the NAC and the committee returned its recommendations to FHWA for a final decision. The NAC

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<sup>10</sup> <http://ncutcd.com/doc/History.pdf> (accessed May 27, 2013).

<sup>11</sup> A detailed history of the NCUTCD is found on the NCUTCD website at <http://ncutcd.com/doc/History.pdf>.



continued to grow, and by the time the 1978 MUTCD was published in September 1978, NAC membership had grown to 10 organizations.

In June 1979, the Secretary of Transportation terminated its sponsorship of the NAC in accordance with President Carter's policy to limit the number of federal advisory committees. About the same time, FHWA also announced it would adopt all future changes to the MUTCD through the Federal Register rulemaking process. The NAC responded to this action by forming the NCUTCD as a new organization that was independent of the federal government. In its new role, the responsibilities of the NCUTCD were to initiate, review, and/or comment on proposed changes to the MUTCD. As such, the NCUTCD had the opportunity to review proposals and make recommendations to the FHWA in the same manner as any other member of the public.

Today, the NCUTCD continues to function in the same way that it has since 1980. The governing body of the NCUTCD is the Council. The Council has 38 members appointed by the 20 sponsoring organizations, which are listed in Table 7. All recommendations and comments of the NCUTCD must be approved by the Council. There is also an Executive Board and 8 permanent Technical Committees: Regulatory/Warning Signs, Guide and Motorist Information Signs, Markings, Signals, Temporary Traffic Control, Railroad and Light Rail Transit Highway Grade Crossings, Bicycle, and Research. The Technical Committees are responsible for developing the recommendations, which are then distributed to the NCUTCD sponsoring organizations for comment before they are presented to the Council for approval. The NCUTCD meets twice a year in January (the week before the Transportation Research Board Annual Meeting) and June in coordination with the AASHTO Subcommittee on Traffic Engineering. An NCUTCD meeting typically lasts 3 days and is attended by approximately 250 individuals.

**Table 7. NCUTCD Sponsoring Organizations**

American Assoc. of State Highway & Transportation Officials (AASHTO)	Association of Pedestrian and Bicycle Professionals (APBP)
American Automobile Association (AAA)	American Highway Users Alliance (AHUA)
American Public Transportation Association (APTA)	Human Factors Resources (HFR)
American Public Works Association (APWA)	Institute of Transportation Engineers (ITE)
American Railway Engineering & Maintenance of Way Association (AREMA)	International Assoc. of Chiefs of Police (IACP)
American Road & Transportation Builders Association (ARTBA)	International Bridge, Tunnel & Turnpike Association (IBTTA)
American Society of Civil Engineers (ASCE)	International Municipal Signal Association (IMSA)
American Traffic Safety Services Association (ATSSA)	League of American Bicyclists (LAB)
Association of American Railroads (AAR)	National Association of County Engineers (NACE)
	Governors Highway Safety Association (GHSA)
	National Safety Council (NSC)

Proposed MUTCD content that is developed or refined within the NCUTCD process typically experiences the following steps in developing a consensus opinion on the proposal:

1. An NCUTCD task force develops initial language.
2. An NCUTCD technical committee refines and approves the language.

3. The language is sent to NCUTCD sponsoring organizations for comment. The comments are reviewed by the task force, which makes suggested changes to the original language.
4. The revised language is presented to the technical committee. The technical committee may further refine the language before voting to approve the language.
5. The revised language is presented to the NCUTCD Council for a formal vote. At least two-thirds of the Council must vote in favor of a proposal to establish a policy of the NCUTCD.
6. If approved by the Council, the language is sent to the FHWA as an official recommended change to MUTCD language with a request that the language be considered for inclusion in the next MUTCD rulemaking action.

## **APPENDIX E: FUTURE OF TRAFFIC CONTROL DEVICES**

Our current system of traffic control devices (TCDs) originated in the early part of the 20<sup>th</sup> century as the amount of automobile traffic increased and it became necessary to control vehicle traffic for both safety and operational reasons. In the early days, there was a great deal of variability in traffic control devices. Signs were hand painted and took whatever appearance the creator thought appropriate. Pavement markings used whatever color provided contrasts and might be used only in limited locations. There were a wide range of traffic signal designs with various arrangements of lenses, colors, and shapes. The recognition of the need to create a uniform system of traffic control devices led to the publication of the first MUTCD in 1935. The national system of traffic control devices achieved uniformity as our surface transportation network matured between the 1930s and 1970s, largely due to the recognition of the MUTCD as the national standard for traffic control devices. The use of the network also grew during this time, increasing the travel between jurisdictions. In the 1970s and 1980s, there began an increase in the prevalence of tort liability claims involving traffic control devices and this led to a restructuring of the MUTCD, which was published in 2000. At the present time, the United States has a well-developed traffic control device infrastructure, which is highly standardized through the MUTCD and which has been relatively stable for over a quarter century. During this last quarter century, there have been numerous advances in traffic control, some of which have found their way into the MUTCD. Among these advances are:

- Brighter sign sheeting.
- Improved sign fabrication practices.
- Light emitting diodes (LEDs) in traffic signals and signs.
- Improvements in traffic signal controller technologies, which increase the signal phasing flexibility.
- Improvements in accessible pedestrian signals.
- Improvements in pedestrian acoustical and tactile devices.

Also during the last 25 years or so, there have been other types of advancements that impact the MUTCD and traffic control devices. These include:

- The MUTCD has become a free, on-line document.
- Revisions to the MUTCD have shifted to the federal rulemaking process.
- The technology revolution in computers, communications, and materials has created expanded opportunities for the use and management of traffic control devices.
- Individual mobility has significantly increased, with much higher travel within and between communities.
- Vehicle technologies and safety features have improved dramatically.
- Tort liability claims related to traffic control devices have increased.

And during the last 5 years or so, the following trends have also impacted the MUTCD and the use of traffic control devices:

- A greater emphasis on accessibility and equality for pedestrians and bicyclists.
- The introduction of new devices with new materials or advanced technologies.
- An increase in the regulation of traffic control devices through more specific language in the MUTCD.
- The sometimes politicization of the traffic control devices decision-making process, either through legislation or direction by elected officials.
- A reduction in public agency staffing levels and the resulting decrease in traffic engineering expertise.
- The need to bring into uniformity diverse road operators or those entities which have an effect on travel safety in the U.S. such as: railroads, toll authorities, airports and private property open to public travel.
- The increasing demand for various forms of advertising (both in-vehicle, out-of-vehicle) that effectively compete for drivers' attention.
- An enhanced need to "share" roadway, sidewalk and pathway rights-of-way among pedestrians (walkers, joggers, bike, wheelchair) and motorized vehicles (single-person vehicle, mopeds, autos, buses, trucks).
- Concerns related to increases in red-light running, speeding above the posted speed limit, and general disregard for traditional traffic control devices.

Given the recent advances and the expectation of even greater advances in the near future (Moore's law predicts that the number of transistors that can be placed inexpensively on an integrated circuit doubles approximately every two years), there can be little doubt that the transportation system and traffic control environment will be radically different in 20-30 years from what it is today. It is likely that today's professionals will tell their grandchildren the statements below and their grandchildren will stare in disbelief.

- We could drive on roads without paying tolls.
- We had to steer the vehicle with an actual steering wheel (it also had pedals for brakes and gas).
- Signs, markings, and signals told us what to do.
- We used paper maps to help us find our way (already a dated concept).

In the future, we may see some of the following trends occur:

- Increases in most modes of travel:
  - ♦ Bus,
  - ♦ Rail (light, commuter, heavy, high speed),
  - ♦ Pedestrians,
  - ♦ Bicycles,
  - ♦ Personal (skates, skate/long boards, single person vehicles), and
  - ♦ Share-a-car applications.
- Improvements in the traditional passenger vehicle:
  - ♦ Predictive cruise control,
  - ♦ GPS tracking (needed for vehicle-mile based taxes),
  - ♦ Vision enhancements (night vision, traffic control device tracking, vehicle and obstacle identification),

- ♦ Driver and vehicle monitoring:
  - Driver drowsiness, distraction, and impairment,
  - Vehicle's position with respect to lane lines,
  - Vehicle's speed with respect to speed limit,
- ♦ Reduced reliance on fossil fuels, and
- ♦ Fully automated vehicles capable of unmanned travel.
- Changes in the characteristics of road users:
  - ♦ Increase in older drivers (the aging population of the U.S. will bring into increased focus the needs of the elderly and mobility-impaired individuals and their interface with larger and higher-performing road vehicles),
  - ♦ Decrease in younger drivers,
  - ♦ Increased diversity in driver language,
  - ♦ Demand for access to personal transportation despite limitations, and
  - ♦ Increase in demand for driver attention.
    - Increase distraction opportunities.
- Improvements to existing traffic control devices (current form likely to exist for another 15± years):
  - ♦ TCDs that communicate with vehicles and pedestrians,
    - Roadside traffic control devices that send active messages to vehicles,
    - In-vehicle traffic control devices that supplement the messages of roadside traffic control devices, and
    - Automated road systems that may eliminate the need for traffic control devices on those roads.
  - ♦ Enhancements to nighttime visibility (luminescent materials and LEDs in signs and markings, for example),
  - ♦ TCD operation associated with vehicle position (vehicles sending position and speed information to smart traffic control devices and/or signals controllers).
  - ♦ Active notification of violations,
  - ♦ Use of traffic control devices to dynamically manage pavement space,
  - ♦ Active warning of intermittent hazards, and
  - ♦ Reduction in use of traditional guide signs due to in-vehicle navigation systems.
- Issues related to the use of traffic control devices:
  - ♦ Shorter time frames for introducing new products and new devices,
  - ♦ Recognition of need for traffic control device expertise in making decisions,
  - ♦ Greater communication between agencies responsible for traffic control devices.
  - ♦ The MUTCD will need to be adaptable to changing technologies.
- Changes in the roadway environment:
  - ♦ Increase in toll roads; either flat or variable pricing (the increase in toll road relates to the issue of agencies and the public being willing to pay for advanced traffic control devices).
  - ♦ Increase in variable on-street variable parking pricing or downtown congestion pricing schemes (requiring need for new signing or communication w/drivers re: fees).

There are barriers to these and other advances in traffic control devices and related technologies. Among the barriers are:

- Funding:
  - ♦ Will agencies and the public be willing to pay for the improved capabilities of smart traffic control devices?
  - ♦ Maintenance demands of the advanced systems could be greater and require higher funding levels.
- Safety and liability:
  - ♦ Advanced systems will require a higher level of precision and accuracy than that currently used.
  - ♦ Who will be at fault when technology fails?
  - ♦ What is the failsafe mode when there is a power failure or other type of failure?
- Accessibility:
  - ♦ How do pedestrians and bicyclists fit into an advanced traffic control device system? Will they need tracking capability that is consistent with vehicles?
- Institutional momentum:
  - ♦ “We’ve always done it that way” attitude hinders innovation.
- Privacy:
  - ♦ Drivers may want to protect personal travel information.
- Fleet turnover:
  - ♦ Some of the advanced traffic control device systems could eliminate the ability of older vehicles to travel on some roads.
- Turf protection:
  - ♦ Agencies and industry have an investment in the current system and may want to retain that investment rather than move to newer systems.
- Changing the MUTCD through the rulemaking process is a time-consuming activity and limits the ability of the MUTCD to respond to changing technologies and innovation.
  - ♦ Because of the slow pace of MUTCD change, the private sector may be on a second or third generation of technology by the time the first generation is adopted in the MUTCD.

There will be a need in the future to provide some degree of standardization and/or consistency in the manner that in-vehicle traffic control device messages are communicated to drivers. This may be a new part of the MUTCD that addresses how traffic control device are displayed to the driver, automatic vehicle control system response to assure uniform automated response to a traffic control device, fail-safe features, maintenance and how on-board or roadside failures are reconciled by the system. By assuring uniformity of automated vehicle systems to traffic control device (whatever they might look like, if visible at all), there will be standardized response by all vehicles to each traffic control device. This should facilitate queue compression, braking rates and distances, etc.

Given the information described above, the MUTCD of the future should be a document that is adaptable to changing technologies in traffic control devices, vehicles, and user characteristics. The strategic planning effort should focus on overarching visions and goals and should not address issues related to specific traffic control devices.

## **APPENDIX F: ADA LAWS AND REGULATIONS**

ADA laws and regulations may affect the content of the MUTCD. This appendix summarizes those laws and regulations. The complete text of the law may be found in the Code of Federal Regulations CFR 36 CFR Part 1190.

Title II of the Americans with Disabilities Act (ADA) requires that state and local governments ensure that persons with disabilities have access to the pedestrian routes in the public right of way.

The Department of Justice is the federal agency with responsibility for issuing regulations implementing the requirements of title II of the ADA and for coordinating federal agency compliance activities with respect to those requirements. Title II applies to the programs and activities of state and local governmental entities. The Department of Justice and the Department of Transportation share responsibility for enforcing the requirements of title II of the ADA with respect to the public right of way, including streets, roads, and highways.

The Americans with Disabilities Act (42 U.S.C. 12101 et seq.) is a federal civil rights law that prohibits discrimination against individuals with disabilities. Title II of the Americans with Disabilities Act covers state and local governments. The Department of Justice is responsible for issuing regulations to implement Title II of the Americans with Disabilities Act, except for the public transportation parts. The regulations issued by the Department of Justice include accessibility standards for the design, construction, and alteration of facilities (other than facilities used in the provision of public transportation covered by regulations issued by the Department of Transportation). The Department of Justice's accessibility standards adopt, with additions and modifications, the Access Board's current guidelines. See 28 CFR 35.104 and 35.151.

The Department of Transportation is responsible for issuing regulations to implement the public transportation parts of Title II of the Americans with Disabilities Act. The regulations issued by the Department of Transportation include accessibility standards for the design, construction, and alteration of facilities used in the provision of public transportation covered by the public transportation parts of Title II of the Americans with Disabilities Act. The Department of Transportation's accessibility standards adopt, with additions and modifications, the Access Board's current guidelines. See 49 CFR 37.9 and Appendix A to 49 CFR part 37.

The Department of Justice is responsible for overall enforcement of Title II of the Americans with Disabilities Act. The Department of Justice has designated the Department of Transportation as the federal agency responsible for investigating complaints and conducting compliance reviews "relating to programs, services, and regulatory activities relating to transportation, including highways." See 28 CFR 35.190 (b) (8).