

California Manual on Uniform Traffic Control Devices

for Streets and Highways

(FHWA's MUTCD 2003 Edition
including Revisions 1 and 2,
as amended for use in California)

Traffic Controls for Highway-Rail/Light Rail
Transit Grade Crossings

January 21, 2010



STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION

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California

Manual on Uniform

Traffic Control Devices

for Streets and Highways

(FHWA's MUTCD 2003 Edition
including Revisions 1 and 2,
as amended for use in California)

Issued by:



DIVISION OF TRAFFIC OPERATIONS

January 21, 2010

ARNOLD SCHWARZENEGGER
Governor

DALE BONNER
Secretary, Business, Transportation and Housing Agency

RANDELL IWASAKI
Director, Department of Transportation

The Manual on Uniform Traffic Control Devices (MUTCD) is approved by the Federal Highway Administrator as the National Standard in accordance with Title 23 U.S. Code, Sections 109(d), 114(a), 217, 315, and 402(a), 23 CFR 655, and 49 CFR 1.48(b)(8), 1.48(b)(33), and 1.48(c)(2).

The California Manual on Uniform Traffic Control Devices (California MUTCD) is published by the State of California, Department of Transportation and is issued to adopt uniform standards and specifications for all official traffic control devices, in accordance with Section 21400 of the California Vehicle Code.

This manual is current as of the date of publication on the cover. However, it may be necessary from time to time to modify, change or adopt new standards and specifications for traffic control devices and/or issue errata or editorial changes to the manual. To ensure that the traffic control device practitioner is accessing the most current information regarding traffic control device topics for California, the practitioner is advised to always reference the California MUTCD web site.

The California MUTCD, California Sign Specifications and other publications and related current information is available on the Internet at the following web link:

<http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/>

Addresses for Publications Referenced in the ~~MUTCD~~ California MUTCD

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

American Railway Engineering and Maintenance-of-Way Association (AREMA)
8201 Corporate Drive, Suite 1125
Landover, MD 20785-2230
www.arena.org

California Building Standards Code
International Conference of Building Officials
5360 South Workman Mill Road
Whittier, CA 90601
www.icbo.org

California Code Publications &
California Law
<http://www.leginfo.ca.gov/calaw.html>

California Department of Transportation Publications
Publications Distribution Unit
1900 Royal Oaks Drive
Sacramento, CA 95815-3800
<http://caltrans-opac.ca.gov/publicat.htm>

California Vehicle Code
Department of Motor Vehicles
Sacramento, California
<http://www.dmv.ca.gov/pubs/pubs.htm>

Federal Highway Administration Report Center
Facsimile number: 301.577.1421
report.center@fhwa.dot.gov

Illuminating Engineering Society (IES)
120 Wall Street, Floor 17

New York, NY 10005
www.iesna.org

Institute of Makers of Explosives
1120 19th Street, NW, Suite 310
Washington, DC 20036-3605
www.ime.org

Institute of Transportation Engineers (ITE)
1099 14th Street, NW, Suite 300 West
Washington, DC 20005-3438
www.ite.org

International Organization for Standards
c/o Mr. Gerard Kuso
Austrian Standards Institute
Heinestrasse 38
Postfach 130
A-1021
Wien, Austria
www.iso.ch

ISEA - The Safety Equipment Association
1901 North Moore Street, Suite 808
Arlington, VA 22209
www.safetysystem.org

National Committee on Uniform Traffic Laws and Ordinances (NCUTLO)
107 South West Street, Suite 110
Alexandria, VA 22314
www.ncutlo.org

Occupational Safety and Health Administration (OSHA)
U.S. Department of Labor
200 Constitution Avenue, NW
Washington, DC 20210
www.osha.gov

Transportation Research Board (TRB)
The National Academies
2101 Constitution Avenue, NW
Washington, DC 20418
www.nas.edu/trb

U.S. Architectural and Transportation Barriers Compliance Board (The U.S. Access Board)
1331 F Street, NW, Suite 1000
Washington, DC 20004-1111
www.access-board.gov

Acknowledgments

The Federal Highway Administration gratefully acknowledges the valuable assistance that it received from the National Committee on Uniform Traffic Control Devices and its over 200 voluntary members in the development of this Manual.

The Department of Transportation gratefully acknowledges the Federal Highway Administration's California Division, the California Traffic Control Devices Committee (CTCDC) members, staff from various cities and counties in California and the Department's headquarters and districts staff for providing guidance and direction in the development of this Manual. Information regarding the California portion (blue text and/or blue border line) of this Manual can be obtained by writing to:

State of California
Department of Transportation,
Chief, Division of Traffic Operations, MS-36
1120 N Street, Sacramento, CA 95814.

NOTE: The contents of this publication are not copyrighted. They may be reprinted freely.

The California MUTCD is available on the Department of Transportation Web Page at
<http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/>.



U.S. Department
of Transportation
**Federal Highway
Administration**

Federal Highway Administration
California Division

650 Capitol Mall, Suite 4-100
Sacramento CA 95814

January 21, 2010

Mr. Randell Iwasaki
California Department of Transportation
1120 N Street
Sacramento, CA 95814

Dear Mr. Iwasaki:

On January 21, 2010, the California Department of Transportation (Department) adopted the California Manual on Uniform Traffic Control Devices (MUTCD) (2003 National MUTCD Revision 2, as amended for use in California) to prescribe uniform standards and specifications for all official traffic control devices in California.

Our office has reviewed the 2010 California MUTCD and finds it to be in substantial conformance with the 2003 National MUTCD, Revision 2, per title 23, Code of Federal Regulations (23 CFR 655.603(b)(1)). In its draft form, the 2010 California MUTCD included several items which prevented us from finding substantial conformance with the national MUTCD. We commend the Department and the California Traffic Control Devices Committee for making the changes necessary to find the state document to be in substantial conformance with the national MUTCD and we look forward to continuing our partnership. Further, we continue to request that any proposed modifications to the California MUTCD gain our approval prior to incorporation and that actions of the California Traffic Control Devices Committee may not be incorporated in the California MUTCD until applicable federal approval is obtained.

Should you have questions, please do not hesitate to contact Steve Pyburn, Operations & ITS Engineer, at (916) 498-5057 or steve.pyburn@dot.gov.

Sincerely,

For
Walter C. Waidelich, Jr.
Division Administrator



Sample Page Sketches Showing Format Explanations

Manual title and exact version of FHWA's MUTCD that it incorporates

Page number

California MUTCD (FHWA's MUTCD 2003 Revision 1, as amended for use in California)

Page 2B-1

CHAPTER 2B. REGULATORY SIGNS

Section 2B.01 Application of Regulatory Signs

Standard:

Regulatory signs shall be used to inform road users of selected traffic laws or regulations and indicate the applicability of the legal requirements.

Regulatory signs shall be installed at or near where the regulations apply. The signs shall clearly indicate the requirements imposed by the regulations and shall be designed and installed to provide adequate visibility and legibility in order to obtain compliance.

Regulatory signs shall be retroreflective or illuminated to show the same shape and similar color by both day and night, unless specifically stated otherwise in the text discussion of a particular sign or group of signs (see Section 2A.08).

The requirements for sign illumination shall not be considered to be satisfied by street, highway, or strobe lighting.

Standard:

Orders, ordinances and resolutions by local authorities which affect State highways shall be approved by Department of Transportation.

Support:

Signs required for enforcement are normally placed by, and at the expense of, the authority establishing the regulation.

Refer to CVC 21461 for failure to obey a regulatory sign.

Section 2B.02 Design of Regulatory Signs

Support:

Most regulatory signs are rectangular, with the longer dimension vertical. The shapes and colors of regulatory signs are listed in Tables 2A-3, and 2A-4 2A-4(CA), respectively. Exceptions are specifically noted in the following Sections.

The use of educational plaques to supplement symbol signs is described in Section 2A.13.

Guidance:

Changeable message signs displaying a regulatory message incorporating a prohibitory message that includes a red circle and slash on a static sign should display a red symbol that approximates the same red circle and slash as closely as possible.

Support:

Sign design details are contained in FHWA's Standard Highway Signs book and Department of Transportation's California Sign Specifications. See Section 1A.11 for information regarding these publications.

Table 2B-101(CA) shows a list of California Regulatory Signs.

Table 2B-102(CA) shows a list of MUTCD Regulatory Signs.

Section 2B.03 Size of Regulatory Signs

Standard:

The sizes for regulatory signs shall should be as shown in Table 2B-1.

Guidance:

The Freeway and Expressway sizes should be used for higher-speed applications to provide larger signs for increased visibility and recognition.

Option:

The Minimum size may be used on low-speed roadways where the reduced legend size would be adequate for the regulation or where physical conditions preclude the use of the other sizes.

The Oversized size may be used for those special applications where speed, volume, or other factors result in conditions where increased emphasis, improved recognition, or increased legibility would be desirable.

Signs larger than those shown in Table 2B-1 may be used (see Section 2A.12).

Unedited MUTCD text shown in "Times New Roman" black color font.

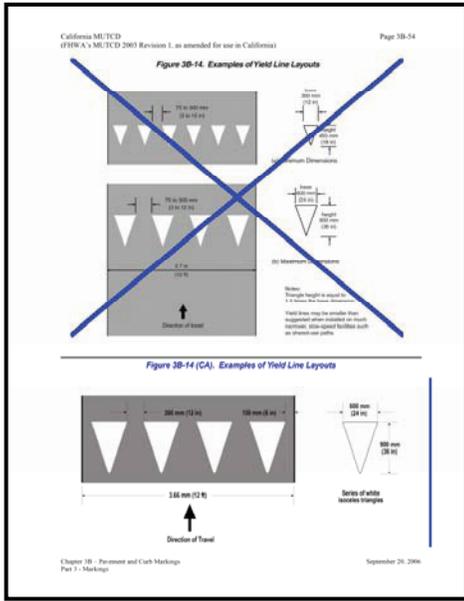
California text shown in "Arial Narrow" blue color font & blue margin line

Edited MUTCD text shown as strikethrough with blue margin line

CA MUTCD chapter number and chapter name CA MUTCD part number and part name

Date of adoption for CA MUTCD

Sample Page Sketches Showing Format Explanations



Entire MUTCD figure not applicable in California shown with blue X cross-out and the replacing California figure retains the same figure number but adds “(CA)” after the number and has a blue margin line.

California MUTCD (FHWA's MUTCD 2003 Revision 1, as amended for use in California)		Page TC4-4
		Page
Section 4K.04	Speed Limit Sign Beacon	4K-2
Section 4K.05	Stop Beacon	4K-3
Section 4K.101(CA)	Warning Beacon Financing	4K-3
Section 4K.102(CA)	Signal Ahead Flashing Beacons	4K-3
Section 4K.103(CA)	Flashing Beacons at School Crossings	4K-4
Section 4K.104(CA)	Speed Limit Sign Beacon	4K-4
Section 4K.105(CA)	Flashing Beacons for Fire Stations	4K-4
Section 4K.106(CA)	Stop Sign Flashing Beacons	4K-4
Section 4K.107(CA)	Flashing Beacons for Bus Stops on Freeway Interchanges	4K-5
CHAPTER 4L. IN-ROADWAY LIGHTS		
Section 4L.01	Application of In-Roadway Lights	4L-1
Section 4L.02	In-Roadway Warning Lights at Crosswalks	4L-1
Section 4L.101(CA)	In-Roadway Warning Lights at Crosswalks Financing and Maintenance-State Highways	4L-2
FIGURES		
CHAPTER 4C. TRAFFIC CONTROL SIGNAL NEEDS STUDIES		
Figure 4C-1	Warrant 2, Four-Hour Vehicular Volume	4C-9
Figure 4C-2	Warrant 2, Four-Hour Vehicular Volume (70% Factor)	4C-9
Figure 4C-3	Warrant 3, Peak Hour	4C-10
Figure 4C-4	Warrant 3, Peak Hour (70% Factor)	4C-10
Figure 4C-101(CA)	Traffic Signal Warrants Worksheet	4C-11
Figure 4C-102(CA)	Traffic Count Worksheet	4C-15
Figure 4C-103(CA)	Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)	4C-16
CHAPTER 4D. TRAFFIC CONTROL SIGNAL FEATURES		
Figure 4D-1	Maximum Mounting Height of Signal Faces Located Between 12 Meters (4 Feet) and 15.2 Meters (50 Feet) from Stop Line	4D-30
Figure 4D-2	Horizontal Location of Signal Faces	4D-31
Figure 4D-3	Typical Arrangements of Signal Lenses in Signal Faces	4D-32
Figure 4D-3(CA)	Typical Arrangements of Signal Lenses in Signal Faces	4D-33
Figure 4D-101(CA)	Left-Turn Phasing Methods (Phase Diagrams)	4D-34
Figure 4D-102(CA)	Typical Signal Layout at Offset Intersections, Signalized and Marked as a Single Intersection	4D-35
Figure 4D-103(CA)	Typical Signal Layout (Two Phase Operation)	4D-39
Figure 4D-104(CA)	Typical Signal Layout (Three Phase Operation)	4D-40
Figure 4D-105(CA)	Typical Signal Layout (Five Phase "Dual Left" Operation)	4D-41
Figure 4D-106(CA)	Typical Signal Layout (Six Phase "Opposing" Operation)	4D-42
Figure 4D-107(CA)	Typical Signal Layout (Eight Phase "Quad Left" Operation)	4D-43
Figure 4D-108(CA)	Typical Traffic Signal Installation	4D-44
Part 4 – Highway Traffic Signals		September 20, 2006

California sections with no corresponding MUTCD sections begin with 101 and add “(CA)”, increasing in sequence. The text is shown in “Arial Narrow” blue color font & blue margin line.

MUTCD Figure 4D-3 is applicable and is unedited. California figure adds to this MUTCD figure and retains the number 4D-3 adding “(CA)” with a blue margin line.

California figures with no corresponding MUTCD figures begin with 101 and add “(CA)”, increasing in sequence with a blue margin line.

CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES ~~MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES~~

INTRODUCTION

Support:

This California Manual on Uniform Traffic Control Devices (California MUTCD) is published by the State of California, Department of Transportation and is issued to adopt uniform standards and specifications for all official traffic control devices in California, in accordance with Section 21400 of the California Vehicle Code.

This California MUTCD incorporates Federal Highway Administration's Manual on Uniform Traffic Control Devices (2003 Edition Revision 2) dated December 21, 2007 and the previous California MUTCD dated September 26, 2006. It also incorporates all policies on traffic control devices issued by the California Department of Transportation that have been issued since September 26, 2006 and other editorial, errata and format changes that were necessary to update the previous documents.

Standard:

The California MUTCD is hereby adopted as, and shall be the standard for all official traffic control devices, under Section 11340.9(h) of California Government Code and Section 21400 of California Vehicle Code.

Support:

The California MUTCD supersedes and replaces the previously adopted (on September 26, 2006) California MUTCD as well as Chapters 4, 5, 6, 8, 10, 11, 12, and the traffic signals portion of chapter 9 of the 1996 Caltrans Traffic Manual, as amended, and all previous editions thereof. It does not supersede the Department's Standard Plans, Standard Specifications or the Standard Special Provisions publications.

Department of Transportation publishes Standard Specifications, Standard Special Provisions, Standard Plans and other manuals, which contain specifications and requirements for traffic control devices, including their use and placement, when performing work on State highways. In some cases those specifications and requirements can vary from, and be more stringent than those shown in the California MUTCD.

Standard:

Whenever there is a discrepancy between the specifications and requirements contained in the California MUTCD, and those contained in the publications noted in the previous paragraph for work on State highways, those publications shall govern.

On State highways the California MUTCD shall mean to include the Department of Transportation's Standard Plans, Standard Specifications and Standard Special Provisions publications.

Nothing contained in the California MUTCD shall prevent the Department of Transportation from modifying, changing, or adopting new specifications deemed necessary.

Whenever there is a discrepancy between the specifications and requirements incorporated from FHWA's MUTCD and the California MUTCD amendments, the California MUTCD amendments shall govern.

Traffic control devices shall be defined as all signs, signals, markings, and other devices used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, pedestrian facility, or bikeway by authority of a public agency having jurisdiction.

The Manual on Uniform Traffic Control Devices (MUTCD) is incorporated by reference in 23 Code of Federal Regulations (CFR), Part 655, Subpart F and shall be recognized as 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). The policies and procedures of the Federal Highway Administration (FHWA) to obtain basic uniformity of traffic control devices shall be as described in 23 CFR 655, Subpart F.

Any traffic control device design or application provision contained in this Manual shall be considered to be in the public domain. Traffic control devices contained in this Manual shall not be protected by a patent, trademark, or copyright, except for the Interstate Shield and any other items owned by FHWA. The California Department of Transportation logos consisting of the "CT" symbol and the

“Caltrans” logotype are registered service marks and when used on any traffic control device they shall be presented in a uniform and consistent manner as outlined in the Department’s Deputy Directive DD-33-R1.

Support:

This Manual is not applicable to privately owned and maintained roads or commercial establishments in California, unless the particular city or county enacts an ordinance or resolution to this effect. Refer to CVC Sections 21100, 21100.1, 21107, 21107.5, 21107.6, and 21107.7. However, the use of this Manual is encouraged on all privately owned and maintained roads or commercial establishments, in general, as a good practice. See Section 1A.07 for more information.

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 manual for rural highways in 1927, and the National Conference on Street and Highway Safety (NCSHS) published a manual for urban streets in 1930. In the early years, 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. That committee, now called the National Committee on Uniform Traffic Control Devices (NCUTCD), though changed from time to time in name, organization, and personnel, has been in continuous existence and has contributed to periodic revisions of this Manual. The FHWA has administered the MUTCD since the 1971 edition. The FHWA and its predecessor organizations have participated in the development and publishing of the previous editions. There were eight previous editions of the MUTCD, and several of those editions were revised one or more times. Table I-1 traces the evolution of the MUTCD, including the two manuals developed by AASHO and NCSHS.

Standard:

The U.S. Secretary of Transportation, under authority granted by the Highway Safety Act of 1966, decreed that traffic control devices on all streets and highways open to public travel in accordance with 23 U.S.C. 109(d) and 402(a) in each State shall be in substantial conformance with the Standards issued or endorsed by the FHWA.

Support:

23 CFR 655.603 adopts the MUTCD as the national standard for any street, highway, or bicycle trail open to public travel in accordance with 23 U.S.C. 109(d) and 402(a). The “Uniform Vehicle Code (UVC)” is one of the publications referenced in the MUTCD. The UVC contains a model set of motor vehicle codes and traffic laws for use throughout the United States. The States are encouraged to adopt Section 15-116 of the UVC, which states that, “No person shall install or maintain in any area of private property used by the public any sign, signal, marking, or other device intended to regulate, warn, or guide traffic unless it conforms with the State manual and specifications adopted under Section 15-104.”

Text Headings

The Standard, Guidance, Option, and Support material described in this edition of the MUTCD provide the transportation professional with the information needed to make appropriate decisions regarding the use of traffic control devices on streets and highways. The material in this edition is organized to better differentiate between Standards that must be satisfied for the particular circumstances of a situation, Guidances that should be followed for the particular circumstances of a situation, and Options that may be applicable for the particular circumstances of a situation.

Throughout this Manual the headings Standard, Guidance, Option, and Support are used to classify the nature of the text that follows. Figures, tables, and illustrations supplement the text and might constitute a Standard, Guidance, Option, or Support. The user needs to refer to the appropriate text to classify the nature of the figure, table, or illustration.

The figures shown in the California MUTCD are typical or example applications of the traffic control devices to illustrate their use and manner. Criteria for position, location, and use of traffic control devices in the figures are furnished solely for the purpose of guidance, understanding and information, and are not a legal standard. Engineering judgment must be used to apply these guidelines to the typical or example applications, or adjust them to fit individual field site conditions. The California MUTCD is not intended to be a substitute for engineering knowledge, experience or judgment.

Standard:

When used in this Manual, the text headings shall be defined as follows:

- 1. Standard—a statement of required, mandatory, or specifically prohibitive practice regarding a traffic control device. All standards are labeled, and the text appears in bold type. The verb shall is typically used. Standards are sometimes modified by Options.**
- 2. Guidance—a statement of recommended, but not mandatory, practice in typical situations, with deviations allowed if engineering judgment or engineering study indicates the deviation to be appropriate. All Guidance statements are labeled, and the text appears in unbold type. The verb should is typically used. Guidance statements are sometimes modified by Options.**
- 3. Option—a statement of practice that is a permissive condition and carries no requirement or recommendation. Options may contain allowable modifications to a Standard or Guidance. All Option statements are labeled, and the text appears in unbold type. The verb may is typically used.**
- 4. Support—an informational statement that does not convey any degree of mandate, recommendation, authorization, prohibition, or enforceable condition. Support statements are labeled, and the text appears in unbold type. The verbs shall, should, and may are not used in Support statements.**

For all purposes, regardless of the text heading, any sentence containing the verb shall or MUTCD text edited to the verb shall, shall be considered a Standard. Similarly, any sentence containing the verb should or MUTCD text edited to the verb should, shall be considered Guidance and any sentence containing the verb may or MUTCD text edited to the verb may, shall be considered an Option.

Metric and U.S. Customary (English) System of Units

Support:

Throughout this Manual all dimensions and distances are provided in the International System of Units, a modernized version of the Metric system, and their English equivalent units are shown in parentheses.

In 1993, the Department had adopted the International System of Units as the preferred system of weights and measures to comply with federal law. The law was subsequently changed making the use of the Metric System optional. The Department made the decision in 2004 to readopt the U.S. Customary (English) system of units and measures as the preferred system. Guidance on the use of the Metric and U.S. Customary Systems of Measurement is available from Department of Transportation's Division of Design, Metric Program.

Guidance:

Before laying out distances or determining sign sizes, the public agency should decide whether to use the International System of Units (Metric) or the English equivalent units. The chosen units should be specified on plan drawings. The chosen unit of measurement should be made known to those responsible for designing, installing, or maintaining traffic control devices.

Except when a specific numeral is required by the text of a Section of this Manual, numerals shown on the sign images in the figures that specify quantities such as times, distances, speed limits, and weights should be regarded as examples only. When installing any of these signs, the numerals should be appropriately altered to fit the specific signing situation.

Format, Reference and Manual Layout

Support:

The following information will be useful when reference is being made to a specific portion of text in this Manual.

There are ten Parts in this Manual and each Part is comprised of one or more Chapters. Each Chapter is comprised of one or more Sections. Parts are given a numerical identification, such as Part 2-Signs. Chapters are identified by the Part number and a letter, such as Chapter 2B-Regulatory Signs. Sections are identified by the Chapter number and letter followed by a decimal point and a number, such as Section 2B.03-Size of Regulatory Signs.

The California MUTCD uses a format similar to the MUTCD. It incorporates FHWA's MUTCD in its entirety and explicitly shows which portions thereof are applicable or not applicable in California. The unedited MUTCD text is shown in "Times New Roman" font with black color. The California edited MUTCD text is also shown in "Times New Roman"

font with black color but with strikethrough of all text portions that are not applicable in California and a blue margin line for easier distinction between the two types of MUTCD texts. The California text additions and enhancements are incorporated into the combined document at appropriate locations and shown in an "Arial Narrow" font with blue color and a blue margin line on the right to keep them distinct from the MUTCD content, whether the pages are viewed on a computer monitor, as hard copies in color or as black photo copies.

All MUTCD figures and tables, or portions thereof, which are not applicable in California, are shown with appropriate size blue X cross-outs. The MUTCD figures and tables that have been modified or added to, in the California MUTCD retain the same MUTCD Figure or Table number but include "(CA)" to indicate that it is the California version of the MUTCD Figure or Table. For example:

- Figure 3B-14(CA) Examples of Yield Line Layouts
- Table 9B-1(CA) California Minimum Sign Sizes for Bicycle Facilities

For California topics where there is no corresponding section, figure or table in the MUTCD, the California MUTCD gives a number that begins with 101 for that section, figure or table and increases in sequence, followed with a "(CA)" to indicate that this is a California created section, figure or table number. The blue margin line on the right is also added to all California figures and tables to keep them distinct from the MUTCD figures and tables. For example:

- Section 2B.112(CA) – Daylight Headlight Signs (S30(CA) Series)
- Figure 2C-101(CA) – Determination of Comfortable Speed From Ball Bank Indicator Readings
- Table 6F-102(CA) – Maximum Spacing of Channelizing Devices.

The California MUTCD contents within each chapter (Chapter 2B shown as example below) appear in a consistent order for ease of reference. This sequence is as follows:

1. MUTCD Sections per sequential numbering. For example, Sections 2B.01 through 2B.54.
2. California Sections per sequential numbering. For example, Sections 2B.101(CA) through 2B.113(CA).
3. MUTCD Figures (including edited and deleted) per sequential numbering. For example, Figures 2B-1 through 2B-22.
4. California Figures based upon or modifying MUTCD Figures are placed immediately after the respective MUTCD figure. For example, Figure 2B-14(CA) follows immediately after the deleted MUTCD Figure 2B-14 it replaces. Another example is Figure 2B-18(CA) which immediately follows MUTCD (undeleted) Figure 2B-18 as the California figure supplements the MUTCD Figure, it does not replace it.
5. California Figures that are stand alone and not based upon MUTCD Figures follow in sequence per their numbering. For example, Figures 2B-101(CA) through 2B-106(CA) follow after the end of MUTCD numbered figures.
6. MUTCD and California Tables follow the Figures under similar rules described above for the figures.

See California MUTCD sample page sketches on the front inside cover pages which show these and other format explanations with call outs.

Each Section is comprised of one or more paragraphs. The paragraphs are indented but are not identified by a number or letter. Paragraphs are counted from the beginning of each Section without regard to the intervening text headings (Standard, Guidance, Option, or Support). Some paragraphs have lettered or numbered items. As an example of how to cite this Manual, the phrase "Not less than 12 m (40 ft) beyond the stop line" that appears on Page 4D-12 of this Manual would be referenced in writing as "Section 4D.15, P7, D1(a)," and would be verbally referenced as "Item D1(a) of Paragraph 7 of Section 4D.15."

Target Compliance Dates and Deleted Traffic Control Devices

Standard:

In accordance with 23 CFR 655.603(b)(1), States or other Federal agencies that have their own MUTCDs or Supplements shall revise these MUTCDs or Supplements to be in substantial conformance with changes to the National MUTCD within 2 years of issuance of the changes. Unless a particular device is no longer serviceable, non-compliant devices on existing highways and bikeways shall be brought into compliance with the current edition of the National MUTCD as part of the systematic upgrading of substandard traffic control devices (and installation of new required traffic control devices) required pursuant to the Highway Safety Program, 23 U.S.C. § 402(a). In cases involving Federal-aid projects for new highway or bikeway construction or reconstruction, the traffic control devices installed (temporary or permanent) shall be in conformance with the most recent

edition of the National MUTCD before that highway is opened or re-opened to the public for unrestricted travel [23 CFR 655.603(d)(2)]. The FHWA has the authority to establish other target compliance dates for implementation of particular changes to the MUTCD [23 CFR 655.603(d)(4)]. These target compliance dates established by the FHWA shall be as follows:

Section 2A.09 Maintaining Minimum Retroreflectivity—new section—from the January 22, 2008 effective date of the Final Rule for Revision 2 of the 2003 MUTCD:

- 4 years (January 22, 2012) for implementation and continued use of an assessment or management method that is designed to maintain traffic sign retroreflectivity at or above the established minimum levels;
- 7 years (January 22, 2015) for replacement of regulatory, warning, and ground-mounted guide (except street name) signs that are identified using the assessment or management method as failing to meet the established minimum levels; and
- 10 years (January 22, 2018) for replacement of street name signs and overhead guide signs that are identified using the assessment or management method as failing to meet the established minimum levels.

~~Section 2A.19 Lateral Offset—crashworthiness of sign supports—January 17, 2013 for roads with posted speed limit of 80 km/h (50 mph) or higher.~~

~~Section 2B.03 Size of Regulatory Signs—increased sign sizes and other changes to Table 2B-1—10 years from the effective date of the Final Rule for the 2003 MUTCD.~~

~~Section 2B.04 STOP Sign (R1-1)—4-WAY plaque requirement—January 17, 2004.~~

~~Section 2B.06 STOP Sign Placement—signs mounted on back of STOP sign—10 years from the effective date of the Final Rule for the 2003 MUTCD.~~

~~Section 2B.09 YIELD Sign Applications—changes in YIELD sign application criteria from the 1988 MUTCD—January 17, 2011.~~

~~Section 2B.10 YIELD Sign Placement—signs mounted on back of YIELD sign—10 years from the effective date of the Final Rule for the 2003 MUTCD.~~

~~Section 2B.11 Yield Here to Pedestrians Signs (R1-5, R1-5a)—new section—10 years from the effective date of the Final Rule for the 2003 MUTCD.~~

~~Section 2B.13 Speed Limit Sign (R2-1)—color of changeable message legend of YOUR SPEED—10 years from the effective date of the Final Rule for the 2003 MUTCD.~~

~~Section 2B.25 Reversible Lane Control Signs (R3-9d, R3-9f through R3-9i)—removal of R3-9c and R3-9e signs—10 years from the effective date of the Final Rule for the 2003 MUTCD.~~

~~Section 2B.26 Preferential Only Lane Signs (R3-10 through R3-15)—10 years from the effective date of the Final Rule for the 2003 MUTCD.~~

~~Section 2B.27 Preferential Only Lanes for High-Occupancy Vehicles (HOVs)—new section in Millennium Edition—January 17, 2007.~~

~~Section 2B.28 Preferential Only Lane Sign Applications and Placement—10 years from the effective date of the Final Rule for the 2003 MUTCD.~~

~~Section 2B.37 ONE WAY Signs (R6-1, R6-2)—placement requirement at intersecting alleys—January 17, 2008.~~

~~Section 2B.46 Photo Enforced Signs (R10-18, R10-19)—new section—10 years from the effective date of the Final Rule for the 2003 MUTCD.~~

~~Section 2B.52 Hazardous Material Signs (R14-2, R14-3)—change in sign legend—10 years from the effective date of the Final Rule for the 2003 MUTCD.~~

~~Section 2C.04 Size of Warning Signs—increased sizes of W4-1, W5-2, W6-3, and W12-1 signs—January 17, 2008.~~

~~Section 2C.04 Size of Warning Signs—sizes of W1 Series Arrows signs, W7 Series truck runaway signs, W12-2p low clearance signs, and W10-1 advance grade crossing sign—10 years from the effective date of the Final Rule for the 2003 MUTCD.~~

~~Section 2C.11 Truck Rollover Warning Signs (W1-13, W1-13a)—new section—10 years from the effective date of the Final Rule for the 2003 MUTCD.~~

~~Section 2C.16 NARROW BRIDGE Sign (W5-2)—elimination of symbol sign—10 years from the effective date of the Final Rule for the 2003 MUTCD.~~

- Section 2C.25 PAVEMENT ENDS Sign (W8-3)**—removal of symbol sign—January 17, 2011.
- Section 2C.26 Shoulder Signs (W8-4, W8-9, and W8-9a)**—removal of symbol signs—January 17, 2011.
- Section 2C.30 Speed Reduction Signs (W3-5, W3-5a)**—removal of R2-5 Series Reduced Speed Ahead signs and use of W3-5 or W3-5a warning signs instead—15 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 2C.31 Merge Signs (W4-1, W4-5)**—Entering Roadway Merge sign (W4-1a)—10 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 2C.32 Added Lane Signs (W4-3, W4-6)**—Entering Roadway Added Lane sign (W4-3a)—10 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 2C.33 Lane Ends Signs (W4-2, W9-1, W9-2)**—new design of W4-2 sign—10 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 2C.34 Two-Way Traffic Sign (W6-3)**—transition from one-way street—5 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 2C.37 Intersection Warning Signs (W2-1 through W2-6)**—new design of Circular Intersection (W2-6) sign—10 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 2C.40 Vehicular Traffic Signs (W8-6, W11-1, W11-5, W11-5a, W11-6, W11-8, W11-10, W11-11, W11-12, W11-14)**—new symbol signs W11-1, W11-5, W11-5a, W11-6, W11-11, and W11-14—10 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 2C.41 Nonvehicular Signs (W11-2, W11-3, W11-4, W11-7, W11-9)**—elimination of crosswalk lines from crossing signs and use of diagonal downward pointing arrow supplemental plaque (W16-7) if at the crossing—January 17, 2011.
- Section 2C.53 PHOTO ENFORCED Plaque (W16-10)**—new section—10 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 2D.38 Street Name Sign (D3-1)**—symbol sizes, 150 mm (6 in) letter sizes for lettering on ground-mounted Street Name signs on roads that are not multi-lane streets with speed limits greater than 60 km/h (40 mph), other new provisions of Millennium Edition—January 9, 2012.
- Section 2D.38 Street Name Sign (D3-1)**—letter sizes on ground-mounted signs on multi-lane streets with speed limits greater than 60 km/h (40 mph) and letter sizes on overhead-mounted signs—15 years from the effective date of the Final Rule of the 2003 MUTCD.
- Section 2D.39 Advance Street Name Signs (D3-2)**—new section in 2000 MUTCD and revisions in 2003 MUTCD—15 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 2D.45 General Service Signs (D9 Series)**—Traveler Info Call 511 (D12-5) sign, Channel 9 Monitored (D12-3) sign—10 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 2D.46 Reference Location Signs (D10-1 through D10-3) and Intermediate Reference Location Signs (D10-1a through D10-3a)**—location and spacing of Reference Location signs and design of Intermediate Reference Location signs—10 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 2E.28 Interchange Exit Numbering**—size of exit number plaque—January 17, 2008.
- Section 2E.28 Interchange Exit Numbering**—LEFT on exit number plaques for left exits—5 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 2E.30 Advance Guide Signs**—advance placement distance—January 17, 2008.
- Section 2E.54 Reference Location Signs and Enhanced Reference Location Signs (D10-4, D10-5)**—design of Enhanced Reference Location signs and Intermediate Enhanced Reference Location signs—10 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 2E.59 Preferential Only Lane Signs**—new section in 2003 Edition—10 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 2F.05 Size of Lettering**—minimum height of letters and numerals on specific service signs—January 17, 2011.
- Section 2I.03 EVACUATION ROUTE Sign (EM-1)**—new design and size of EM-1 sign—15 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 3B.01 Yellow Centerline Pavement Markings and Warrants**—new section in Millennium Edition—January 3, 2003.

- Section 3B.03 Other Yellow Longitudinal Pavement Markings—spacing requirements for pavement marking arrows in two-way left turn lanes—5 years from the effective date of the Final Rule for the 2003 MUTCD.**
- Section 3B.07 Warrants for Use of Edge Lines—new section in Millennium Edition—January 3, 2003.**
- Section 3B.17 Crosswalk Markings—gap between transverse lines of a crosswalk—10 years from the effective date of the Final Rule for the 2003 MUTCD.**
- Section 3B.19 Pavement Word and Symbol Markings—typical spacing of lane-use arrows in two-way left turn lanes shown in Figure 3B-7—5 years from the effective date of the Final Rule for the 2003 MUTCD.**
- Section 3C.01 Object Marker Design and Placement Height—width of stripes on Type 3 striped marker—10 years from the effective date of the Final Rule for the 2003 MUTCD.**
- Section 4D.01 General—location of signalized midblock crosswalks—10 years from the effective date of the Final Rule for the 2003 MUTCD.**
- Section 4D.05 Application of Steady Signal Indications—Item B.4 in STANDARD—5 years from the effective date of the Final Rule for the 2003 MUTCD.**
- Section 4D.12 Flashing Operation of Traffic Control Signals—duration of steady red clearance interval in change from red-red flashing mode to steady (stop-and-go) mode—10 years from the effective date of the Final Rule for the 2003 MUTCD.**
- Section 4E.06 Accessible Pedestrian Signals—new section in Millennium Edition—January 17, 2005.**
- Section 4E.07 Countdown Pedestrian Signals—new section—10 years from the effective date of the Final Rule for the 2003 MUTCD for countdown pedestrian signal hardware; 3 years from the effective date of the Final Rule for the 2003 MUTCD for operational requirements of countdown pedestrian signals.**
- Section 4E.09 Accessible Pedestrian Signal Detectors—new section in Millennium Edition—January 17, 2005.**
- Section 4E.10 Pedestrian Intervals and Signal Phases—pedestrian clearance time sufficient to travel to far side of the traveled way—5 years from the effective date of the Final Rule for the 2003 MUTCD.**
- Section 5C.05 NARROW BRIDGE Sign (W5-2)—elimination of symbol sign—10 years from the effective date of the Final Rule for the 2003 MUTCD.**
- Section 6D.01 Pedestrian Considerations—all new provisions for pedestrian accessibility—5 years from the effective date of the Final Rule for the 2003 MUTCD.**
- Section 6D.02 Accessibility Considerations—5 years from the effective date of the Final Rule for the MUTCD.**
- Section 6D.03 Worker Safety Considerations—high-visibility apparel requirements—3 years from the effective date of the Final Rule for the 2003 MUTCD.**
- Section 6E.02 High-Visibility Safety Apparel—high-visibility apparel requirements for flaggers—3 years from the effective date of the Final Rule for the 2003 MUTCD.**
- Section 6F.03 Sign Placement—crashworthiness of sign supports—January 17, 2005.**
- Section 6F.58 Channelizing Devices—crashworthiness—January 17, 2005.**
- Section 6F.59 Cones—width of retroreflective stripes—5 years from the effective date of the Final Rule for the 2003 MUTCD.**
- Section 6F.63 Type I, II, or III Barricades—crashworthiness—January 17, 2005.**
- Section 6F.66 Longitudinal Channelizing Barricades—crashworthiness—January 17, 2005.**
- Section 6F.82 Crash Cushions—crashworthiness—January 17, 2005.**
- Section 7B.08 School Advance Warning Assembly (S1-1 with Supplemental Plaque)—use of AHEAD plaque (W16-9p) or distance plaque (W16-2 or W16-2a)—January 17, 2011.**
- Section 7B.09 School Crosswalk Warning Assembly (S1-1 with Diagonal Arrow)—elimination of crosswalk lines from crossing signs and use of diagonal downward pointing arrow supplemental plaque (W16-7)—January 17, 2011.**
- Section 7B.12 Reduced Speed School Zone Ahead Sign (S4-5, S4-5a)—15 years from the effective date of the Final Rule for the 2003 MUTCD.**

~~Section 7E.04 Uniform of Adult Crossing Guards and Student Patrols—requirement for high-visibility apparel for adult crossing guards—5 years from the effective date of the Final Rule for the 2003 MUTCD.~~

~~Section 8B.03 Highway-Rail Grade Crossing (Crossbuck) Sign (R15-1) and Number of Tracks Sign (R15-2)—retroreflective strip on crossbuck support—January 17, 2011.~~

~~Section 8B.04 Highway-Rail Grade Crossing Advance Warning Signs (W10 Series)—removal of existing W10-6 series signs—January 17, 2006.~~

~~Section 8D.07 Traffic Control Signals at or Near Highway-Rail Grade Crossings—pre-signals—10 years from the effective date of the Final Rule for the 2003 MUTCD.~~

~~Section 9B.04 Bicycle Lane Signs (R3-17, R3-17a, R3-17b)—deletion of preferential lane symbol (diamond) for bicycle lane signs—January 17, 2006.~~

~~Section 9B.17 Bicycle Warning Sign (W11-1)—elimination of crosswalk lines from crossing signs and use of diagonal downward pointing arrow supplemental plaque (W16-7) if at the crossing—January 17, 2011.~~

~~Chapter 9C Markings—deletion of preferential lane symbol (diamond) for bicycle pavement markings—January 17, 2007.~~

~~Part 10 Traffic Controls for Highway-Light Rail Transit Grade Crossings—automatic gates, flashing-light signals, and blank-out signs—January 17, 2011.~~

~~Section 10C.15 Highway-Rail Grade Crossing Advance Warning Signs (W10 Series)—removal of existing W10-6 series signs—January 17, 2006.~~

All these MUTCD target compliance dates (beginning with Section 2A.19 and ending with Section 10C.15) are deleted and shall not apply in California.

Option:

In order for maintenance personnel to understand what to do when replacing a damaged non-compliant traffic control device, agencies may establish a policy regarding whether to replace the device in kind or to replace it with a compliant device.

Support:

Often it is desirable to upgrade to a compliant device at the time of this maintenance of a damaged device. However, it might be appropriate to replace the damaged non-compliant device in kind at the time of this maintenance activity if engineering judgment indicates that:

- A. One compliant device in the midst of a series of adjacent non-compliant devices could potentially be confusing to road users; and/or
- B. The anticipated schedule for replacement of the whole series of non-compliant devices will result in achieving timely compliance with the MUTCD.

Standard:

Unless allowed per the Option below, in cases involving new highway or bikeway construction or reconstruction, the traffic control devices installed (temporary or permanent) shall be in conformance with the current edition of the California MUTCD before that highway is opened or re-opened to the public for unrestricted travel pursuant to the California Vehicle Code 21401.

Option:

In cases involving new highway or bikeway construction or reconstruction, the traffic control devices installed (temporary or permanent) may be in accordance with previous traffic control device standards of September 26, 2006 California MUTCD or prior to that of MUTCD 2003 and MUTCD 2003 California Supplement or Caltrans Traffic Manual, if in the judgment of the engineer, incorporating the California MUTCD standards would impose a significant delay or a significant increase in costs for the project.

Support:

Reconstruction, as used in the previous Standard and Option topics, for the purpose of a traffic control device would mean if a particular device is modified in any form or shape or is relocated. If a reconstruction project does not modify or relocate a traffic control device, although encouraged, there would be no obligation to upgrade the traffic control device per current edition of the California MUTCD standards.

Standard:

Unless allowed per the option below, non-compliant traffic control devices on existing highways and bikeways shall be brought into compliance with the California MUTCD as part of the systematic upgrading of

substandard traffic control devices (and installation of new required traffic control devices) required pursuant to the California Vehicle Code 21401.

Option:

All traffic control devices on existing highways and bikeways that have become non-compliant per California MUTCD adopted standards may remain in service through the end of their useful service life, unless identified specifically with a target compliance date per Table I-101(CA).

To limit financial impact on agencies and for fiscal responsibility reasons, existing inventory of non-compliant traffic control devices, except those identified per Table I-101(CA), may continue to be used until these inventories are depleted.

Support:

The signs listed in Table I-101(CA) are non-compliant per this California MUTCD and further; they have been singled out for specific target compliance dates by the California Traffic Control Devices Committee and California Department of Transportation.

Failure to replace a sign listed in Table I-101(CA) by its target compliance date does not reduce the effectiveness of the sign to impart information to the road user.

For ease of reference, Figure I-101(CA) shows the sign sketches of the deleted signs that have target compliance dates.

Standard:

The signs listed in Table I-101(CA), although used in the past, shall no longer be used in California. Further, any such signs on existing highways and bikeways shall be removed, and replaced if appropriate, by the target compliance dates shown in Table I-101(CA).

Support:

The signs listed in Table I-102(CA) are old California signs that have been deleted for application in the past. These signs are non-compliant per this California MUTCD but do not have any specific target compliance dates. Hence, any such signs on existing highways and bikeways can remain in service through the end of their useful service life.

Standard:

The signs listed in Table I-102(CA), although used in the past, shall no longer be used in California.

Support:

The signs listed in Table I-103(CA) are MUTCD signs that have been deleted throughout this Manual, wherever they were reference by the MUTCD. Refer to the section listed in this table for more details regarding the reason for the deletion and/or what signs they are replaced with.

Standard:

The signs listed in Table I-103(CA) shall not be used in California.

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Figure I-101 (CA). Deleted California Signs with Target Compliance Dates



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Year	Name	Month / Year Revised
1927	Manual and Specifications for the Manufacture, Display, and Erection of U.S. Standard Road Markers and Signs (for rural roads)	4/29, 12/31
1930	Manual on Street Traffic Signs, Signals, and Markings (for urban streets)	No revisions
1935	Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)	2/39
1942	Manual on Uniform Traffic Control Devices for Streets and Highways — War Emergency Edition	No revisions
1948	Manual on Uniform Traffic Control Devices for Streets and Highways	9/54
1961	Manual on Uniform Traffic Control Devices for Streets and Highways	No revisions
1971	Manual on Uniform Traffic Control Devices for Streets and Highways	11/71, 4/72, 3/73, 10/73, 6/74, 6/75, 9/76, 12/77
1978	Manual on Uniform Traffic Control Devices for Streets and Highways	12/79, 12/83, 9/84, 3/86
1988	Manual on Uniform Traffic Control Devices for Streets and Highways	1/90, 3/92, 9/93, 11/94, 12/96, 6/98, 1/00
2000	Manual on Uniform Traffic Control Devices for Streets and Highways — Millennium Edition	7/02
2003	Manual on Uniform Traffic Control Devices for Streets and Highways	

Table I-1(CA) Evolution of the California MUTCD

Year	Name
1955	Planning Manual of Instructions, Part 8 – Traffic Department of Public Works, Division of Highways
1972	Traffic Manual Department of Public Works, Division of Highways
1996	Traffic Manual (Metric Version) Department of Transportation, Division of Traffic Operations
2004	FHWA's MUTCD 2003 & MUTCD 2003 California Supplement Department of Transportation, Division of Traffic Operations
2006	California MUTCD Department of Transportation, Division of Traffic Operations
2010	California MUTCD (including Revs. 1 and 2 of FHWA's MUTCD 2003) Department of Transportation, Division of Traffic Operations

Table I-101(CA) Deleted California Signs with Target Compliance Dates

Sign Code	Title/Description	Comment	Target Compliance Date
R16B(CA)	NO RIGHT TURN word message	Use No Right Turn (R3-1) symbol sign	January 1, 2010
R17B(CA)	NO LEFT TURN word message	Use No Left Turn (R3-2) symbol sign	January 1, 2010
R19(CA)	NO LEFT OR U TURN word message	Use No Left or U Turn (R3-18) symbol sign	January 1, 2010
R34A(CA)	No U TURN word message	Use No U Turn (R3-4) symbol sign	January 1, 2010
SR2-M(CA)	SPEED LIMIT 35 mph 56 km/h	1976 Metric sign never implemented	January 1, 2007
SR3-M(CA)	END 35 mph 56 km/h SPEED LIMIT	1976 Metric sign never implemented	January 1, 2007
SR24-1(CA)	STOP ON RED SIGNAL word message	Use STOP HERE ON RED with arrow (R10-6) sign	January 1, 2010
SR31(CA)	SCHOOL STOP CROSSING round shape Paddle	Use STOP (C28A(CA)) octagon shape Paddle	January 1, 2010
SR36(CA)	CLOSED Red on White octagon shape sign	Use ROAD CLOSED (R11-2) sign	January 1, 2010
W54(CA)	Pedestrian Crossing Symbol with crosswalk lines	Use Pedestrian Crossing symbol (W11-2) without crosswalk lines & diagonal downward pointing arrow (W16-7P) plaque	January 1, 2011
W66(CA)	School Crossing Symbol with crosswalk lines	Use School Crossing symbol (S1-1) without crosswalk lines & diagonal downward pointing arrow (W16-7P) plaque	January 1, 2011
W66A(CA)	SCHOOL XING word message	Use School Crossing symbol (S1-1) without crosswalk lines & diagonal downward pointing arrow (W16-7P) plaque	January 1, 2011
SW1-1(CA)	TRAFFIC FROM RIGHT(LEFT) DOES NOT STOP with arrow	Use CROSS TRAFFIC DOES NOT STOP (W4-4P) plaque, which is without the arrow	January 1, 2007
SW6-M(CA)	40 mph - 64 km/h	1976 Metric sign never implemented	January 1, 2007
SW18-2.1(CA)	VERTICAL CLEARANCE __ FT. __ IN.	Use Low Clearance (W12-2) sign or rectangular (W12-2P) plaque	January 1, 2010
SW25(CA)	School Symbol - SCHOOL XING with crosswalk lines	Use School Crossing symbol (S1-1) without crosswalk lines & diagonal downward pointing arrow (W16-7P) plaque	January 1, 2011
SW27(CA)	Skewed RR Crossing symbol with Motorcycle symbol	Use Skewed Crossing symbol (W10-12) sign	January 1, 2015
SW27-1(CA)	Skewed RR Crossing symbol with Motorcycle & Bike symbol	Use Skewed Crossing symbol (W10-12) sign	January 1, 2015
SW28(CA)	STEEL DECK with Motorcycle symbol	Use modified STEEL BRIDGE DECK (SW28 (CA)) word message sign	January 1, 2015
SW72-M(CA)	EXIT 30 mph 48 km/h	1976 Metric sign never implemented	January 1, 2007

Table I-102(CA) Deleted California Signs - No Target Compliance Dates (Sheet 1 of 5)

California Code	Title/Description	Comment
R6-1(CA)	AUTOS WITH TRAILERS - TRUCKS 55 MAXIMUM	Replaced by two separate signs: TRUCKS, 3 AXLES OR MORE 55 MAXIMUM (R6-3(CA)) & ALL VEHICLES WHEN TOWING 55 MAXIMUM (R6-4(CA))
R6-2(CA)	TRUCKS - AUTOS WITH TRAILERS RIGHT 2 LANES ONLY	Replaced by two separate signs: TRUCKS 3 AXLES OR MORE RIGHT 2 LANES ONLY (R6-3A(CA)) & ALL VEHICLES WHEN TOWING RIGHT 2 LANES ONLY (R6-4A(CA))
R10(CA)	ONE WAY (Pentagon shape)	Use ONE WAY (R6-1) (Rectangular shape)
R13(CA)	NO TURN ON RED word message	Use symbolic No Turn On Red (R10-11)
R20E(CA)	SEMI OVER 38 FT KINGPIN TO REAR AXLE	Use No Trucks Variable Message (R20-1(CA)) or TRACTOR-SEMIS OVER (X FEET) KINGPIN TO REAR AXLE NOT ADVISED (SW48(CA))
R25G(CA)	Taxicab Passenger Loading ONLY w/ Double Arrow	Use R25B(CA)
R26B(CA)	NO PARKING HERE TO CORNER	See Section 2B.39
R26C(CA)	NO PARKING HERE TO CORNER	See Section 2B.39
R26D(CA)	No Parking	See Section 2B.39
R26E(CA)	ON PAVEMENT	See Section 2B.39
R26E(CA)	ON BRIDGE	See Section 2B.39
R26J(CA)	TOW-AWAY NO PARKING ANY TIME	Use R26K(CA)
R28B(CA)	NO PARKING VEHICLES OVER 6 FT HIGH	Use R28D(CA)
R32A(CA)	Limited Minute Parking Specific Hours	See Section 2B.39
R41(CA)	RIGHT TURN ONLY	Use Right Turn Arrow ONLY (R3-5R)
R42(CA)	LEFT TURN ONLY	Use Left Turn Arrow ONLY (R3-5L)
R49A(CA)	NO PED CROSSING - CROSS HERE	Use No Pedestrian Crossing (R9-3a) & USE CROSSWALK (R9-3b)
R67A(CA)	2 WAY TURN LANE	Use Two-Way Left Turn Only (R3-9a or R3-9b) symbol signs
R68(CA)	PASSING LANE AHEAD	Use PASSING LANE (X MILES) or AHEAD G69(CA)
R82(CA)	BUS CARPOOL LANE (HOV) AHEAD	Refer Caltrans HOV Guidelines 2003 Edition
R83(CA)	(HOV) BUS CARPOOL LANE AHEAD	Refer Caltrans HOV Guidelines 2003 Edition
R83A(CA)	6AM-9AM MON-FRI	Refer Caltrans HOV Guidelines 2003 Edition
R84(CA)	BUS CARPOOL LANE (HOV) ENDS	Refer Caltrans HOV Guidelines 2003 Edition
R84A(CA)	___ MILE	Refer Caltrans HOV Guidelines 2003 Edition
R85(CA)	(HOV) BUS CARPOOL LANE ENDS	Refer Caltrans HOV Guidelines 2003 Edition
R86-1(CA)	(HOV) CENTER LANE BUSES AND CARPOOLS ONLY 6AM-9AM 3PM-6PM MON-FRI	Refer Caltrans HOV Guidelines 2003 Edition
R87(CA)	(HOV) BUSES AND CARPOOLS WITH 3 OR MORE 6AM-9AM (Down Arrow) MON-FRI	Refer Caltrans HOV Guidelines 2003 Edition
R91A(CA)	MOTORCYCLES OK	Refer Caltrans HOV Guidelines 2003 Edition
R93(CA)	CARPOOL IS 3 OR MORE PERSONS PER VEHICLE	Refer Caltrans HOV Guidelines 2003 Edition
R93-1(CA)	CARPOOL IS 3 OR MORE PERSONS PER VEHICLE	Refer Caltrans HOV Guidelines 2003 Edition

Table I-102(CA) Deleted California Signs - No Target Compliance Dates (Sheet 2 of 5)

California Code	Title/Description	Comment
R94A(CA)	MOTORCYCLES OK	Refer Caltrans HOV Guidelines 2003 Edition
R96A(CA)	NO PED XING	Use NO PEDESTRIAN CROSSING (R9-3)
R96C(CA)	PEDESTRIANS PROHIBITED	Use No Pedestrian Crossing (R9-3a)
R100(CA)	SPECIAL PLACARD OR LICENSE PLATE REQUIRED	Use TOW-AWAY SPECIAL PLACARD OR LICENSE PLATE REQUIRED (R100A(CA))
SR4(CA)	SCHOOL SPEED LIMIT 25 WHEN CHILDREN ARE PRESENT	Use School Speed Limit Assembly C – SCHOOL (S4-3), Speed Limit (R2-1) & WHEN CHILDREN ARE PRESENT (S4-2)
SR14(CA)	SPEED ENFORCED BY AIRCRAFT (Plane symbol)	Use SPEED ENFORCED BY AIRCRAFT (R48-2(CA)), word message, no symbol
SR21-1(CA)	CAMPING PROHIBITED	Miscellaneous
SR38(CA)	CARPOOL PARKING ONLY	Refer Caltrans HOV Guidelines 2003 Edition
SR50(CA)	CARPOOL VIOLATION \$ ___ MINIMUM FINE	Refer Caltrans HOV Guidelines 2003 Edition
SR52A(CA)	NO VEHICLES ON TRACKS	Use DO NOT DRIVE ON TRACKS (R15-6a)
SR59(CA)	TRAFFIC FINES DOUBLED	CVC 42011 expired 1/1/07.
W16(CA)	GROOVED PAVEMENT	Changed to GROOVED PAVEMENT (SW45) on 6/17/87, change wasn't reflected in 1996 TM
W53(CA)	NOT A THROUGH STREET	Use DEAD END (W14-1) or NO OUTLET (W14-2)
W75(CA)	LANE ENDS MERGE LEFT (RIGHT)	Use Lane Ends (W4-2)
W75A(CA)	(HOV) LANE ENDS MERGE RIGHT	Use (HOV) LANE ENDS MERGE LEFT (RIGHT) (W75-1(CA))
W80(CA)	XING	Use Vehicular/Nonvehicular Traffic (W11 series) symbol signs and/or Diagonal Downward Pointing Arrow (W16-7p) plaque.
W82A(CA)	TROLLEY XING	Use Light Rail Transit (Trolley) Crossing W82(CA)
W84(CA)	TURNOUT 1/4 MILE	Never approved
SW1-2(CA)	OPPOSING TRAFFIC DOES NOT STOP	Use CROSS TRAFFIC DOES NOT STOP (W4-4P) with alternate message per section 2C.50.
SW8-1(CA)	TRUCKS CROSSING TO SCALES	None
SW14-1(CA)	FLOODED DURING STORM	Use SUBJECT TO FLOODING (W55B(CA))
SW21-1(CA)	FIRE STATION WATCH FOR TRUCKS	Use Emergency Vehicle (W11-8) symbol sign
SW21A(CA)	FIRE STATION	Use Emergency Vehicle (W11-8) symbol sign
SW21C(CA)	FIRE STATION	Use Emergency Vehicle (W11-8) symbol sign
SW24(CA)	School Symbol - SCHOOL	Use School Advance Warning (S1-1)
SW29(CA)	NARROW SUBWAY	Narrow application
SW30(CA)	ISLANDS	Miscellaneous
SW31(CA)	DIPS	Use DIP (W8-2) with NEXT X Miles (W7-3a) plaque
SW42(CA)	Double Head Arrow (Diamond shape)	Use Two-Direction Large Arrow (W1-7)
SW43(CA)	Single Head Arrow (Diamond shape)	Use One-Direction Large Arrow (W1-6)
SW53(CA)	___ WAY SIGNAL	Not commonly understood
SW56A(CA)	GOLF CART XING	Use Golf Cart (W11-11) symbol sign
G7-3(CA)	Street Name (FAIR OAKS BLVD)	Use Street Name (D3 or G7-1(CA))
G18(CA)	MT. WHITNEY FISH HATCHERY	Miscellaneous
G32-1(CA)	3-Head Arrow	Use Directional Arrow Auxiliary (M6 Series)
G62(CA)	SPEEDOMETER CHECK AHEAD	Miscellaneous
G63(CA)	MILE 0	Miscellaneous

Table I-102(CA) Deleted California Signs - No Target Compliance Dates (Sheet 3 of 5)

California Code	Title/Description	Comment
G64(CA)	END CHECK	Miscellaneous
G66-14A(CA)	EMERGENCY MEDICAL CARE	Use EMERGENCY MEDICAL CARE (D9-13c)
G66-16(CA)	Hospital symbol - HOSPITAL	Use Hospital (D9-2)
G66-20(CA)	NATURAL GAS	Use Compressed Natural Gas (G66-22A(CA)), Liquefied Natural Gas (G66-22B(CA)) or LP GAS (G81-52(CA))
G66-21B(CA)	NEXT EXIT	Use NEXT RIGHT/LEFT (G58(CA))
G70(CA)	PASSING LANE AHEAD	Use PASSING LANE (X MILES) or AHEAD G69(CA)
G70-1(CA)	445A	Use Single Line EXIT XXXX (G70-3(CA))
G70-2.2(CA)	EXIT 444	Use Single Line EXIT XX (G70-2(CA))
G70-3.2(CA)	EXIT 445A	Use Single Line EXIT XXXX (G70-3(CA))
G81-1(CA)	HIGHWAY PATROL	Use Highway Patrol (G66-57(CA))
G81-4(CA)	PHONE WATER	Use Telephone (D9-1) & Drinking Water (RG-050)
G81-7(CA)	HOSPITAL PHONE with Arrows	Use Telephone (D9-1) & Hospital (D9-2) with Directional Arrow Auxiliary (M6 series)
G81-9(CA)	HOSPITAL WATER PHONE with Arrows	Use Telephone (D9-1), Hospital (D9-2) & RG-050 with Directional Arrow Auxiliary (M6 series)
G81-11(CA)	HOSPITAL WATER PHONE with Arrows	Use Telephone (D9-1), Hospital (D9-2) & RG-050 with Directional Arrow Auxiliary (M6 series)
G81-13(CA)	HOSPITAL WATER PHONE with Arrows	Use Telephone (D9-1), Hospital (D9-2) & RG-050 with Directional Arrow Auxiliary (M6 series)
G81-15(CA)	HOSPITAL WATER PHONE with Arrows	Use Telephone (D9-1), Hospital (D9-2) & RG-050 with Directional Arrow Auxiliary (M6 series)
G81-17(CA)	HIGHWAY PATROL NEXT RIGHT	Use Highway Patrol (G66-57(CA)) & BRAKE CHECK AREA (G58(CA))
G81-27(CA)	CARPOOL VANPOOL INFO CALL ...	Use Carpool Information (SG19(CA)) or Park & Ride Facility/Carpool Information (SG20(CA))
G81-58(CA)	HOSPITAL	Use Hospital (D9-2)
G91-1(CA)	SKIING	Use Skiing (Bobbing) (RS-030), Skiing (Cross Country) (RS-040) or Skiing (Downhill) (RS-050)
G91-4(CA)	CAMPING BOATING	Use Camping (Tent) (RM-010), Camping (Trailer) (RM-020), Motorboating (RW-070), Ramp (Launch) (RW-080), Rowboating (RW-090) or Sailboating (RW-100)
G91-7(CA)	CAMPING SKIING with Arrows	Use Skiing (Bobbing) (RS-030), Skiing (Cross Country) (RS-040), Skiing (Downhill) (RS-050), Camping (Tent) (RM-010) or Camping (Trailer) (RM-020) with Directional Arrow Auxiliary (M6 series)
G91-9(CA)	CAMPING PICNICKING BOATING with Arrow	Use Camping (Tent) (RM-010), Camping (Trailer) (RM-020), Picnic Area (RM-120), Motorboating (RW-070), Ramp (Launch) (RW-080), Rowboating (RW-090) or Sailboating (RW-100) with Directional Arrow Auxiliary (M6 series)
G91-11(CA)	SKIING BOATING CAMPING with Arrows	Use Skiing (Water) (RW-110), Camping (Tent) (RM-010), Camping (Trailer) (RM-020), Motorboating (RW-070), Ramp (Launch) (RW-080), Rowboating (RW-090) or Sailboating (RW-100) with Directional Arrow Auxiliary (M6 series)

Table I-102(CA) Deleted California Signs - No Target Compliance Dates (Sheet 4 of 5)

California Code	Title/Description	Comment
G91-13(CA)	PICNICKING BOATING CAMPING with Arrow	Use Camping (Tent) (RM-010), Camping (Trailer) (RM-020), Picnic Area (RM-120), Motorboating (RW-070), Ramp (Launch) (RW-080), Rowboating (RW-090) or Sailboating (RW-100) with Directional Arrow Auxiliary (M6 series)
G91-15(CA)	BOATING SKIING PICNICKING with Arrows	Use Skiing (Water) (RW-110), Picnic Area (RM-120), Motorboating (RW-070), Ramp (Launch) (RW-080), Rowboating (RW-090) or Sailboating (RW-100) with Directional Arrow Auxiliary (M6 series)
G91-17(CA)	PICNICKING NEXT RIGHT	Use Picnic Area (RM-120) with NEXT RIGHT/LEFT (G58(CA))
G91-19(CA)	CAMPGROUND 1/4 MILE	Use Camping (Tent) (RM-010) with Distance Ahead (W16-2 series and W16-3 series) plaques
G94-3(CA)	AIRPORT	Use Airport (I-5) or Conventional Airport (G94-1(CA))
G97A-2(CA)	CALTRAIN	Use AMTRAK (G97A(CA)) with CALTRAIN word message option
SG11(CA)	STATE FIRE STATION	Use CDF FIRE STATION NEXT RIGHT (SG38(CA))
SG12(CA)	STATE RANGER HDQTRS	Use Ranger Station (RG-170)
SG13(CA)	INTERMOUNTAIN CONSERVATION CAMP	Miscellaneous
SG36(CA)	BUCKLE UP with symbol	Use Seat Belt (SR15(CA)) symbol sign
SG37(CA)	HIGHWAY MAINTENANCE COURTESY OF ---	Use Adopt-A-Highway (S32(CA) series)
SG40(CA)	CALL BOX ___ MILE SPACING NEXT ___ MILES	Obsolete
SG46(CA)	MOTORIST AID CALL BOX AHEAD	Obsolete
SG49(CA)	CALL 511 TRAVEL INFO	Use TRAVEL INFO CALL 511 (D12-5)
S4-1.1(CA)	THIS FOUNTAIN HAS BEEN CONSTRUCTED...	Miscellaneous
S11-1(CA)	LITTER REMOVAL NEXT 2 MILES (with Plaque)	Use Adopt-A-Highway (S32(CA) series)
S11-2(CA)	WILDFLOWERS (with Plaque)	Use Adopt-A-Highway (S32(CA) series)
S11-3(CA)	TREE PLANTING (with Plaque)	Use Adopt-A-Highway (S32(CA) series)
S11A(CA)	ADOPT-A-HIGHWAY	Use Adopt-A-Highway (S32(CA) series)
S13(CA)	CARE FOR CALIFORNIA with Symbol	Campaign is over
S14(CA)	CARE FOR CALIFORNIA with Symbol	Campaign is over
S15(CA)	CARE FOR CALIFORNIA with Symbol	Campaign is over
S31(CA)	HIGHWAY WORKERS - GIVE 'EM A BRAKE	Miscellaneous
C10(CA)	SLIDE AHEAD	Use ROAD WORK, ROAD CLOSED, DETOUR, ONE LANE ROAD, RIGHT LANE CLOSED (W20 series) or NARROW LANES (C12(CA)), LANE CLOSED (C30(CA)), LANE CLOSED AHEAD (SC10(CA)), etc instead of identifying condition.
C13(CA)	END CONSTRUCTION	Use END ROAD WORK (G20-2)
C18(CA)	ROAD CONSTRUCTION AHEAD	Use ROAD (STREET) WORK (W20-1)

Table I-102(CA) Deleted California Signs - No Target Compliance Dates (Sheet 5 of 5)

California Code	Title/Description	Comment
C21(CA)	SINGLE LANE AHEAD	Use RIGHT LANE CLOSED AHEAD (W20-5) or RIGHT TWO LANES CLOSED AHEAD (W20-5a)
C23A(CA)	ROAD WORK AHEAD (Square shape)	Use ROAD (STREET) WORK (W20-1)
C24A(CA)	SHOULDER WORK AHEAD (Square shape)	Use RIGHT (LEFT) SHOULDER CLOSED XXX FT (W21-5)
C32(CA)	END SURVEY WORK	Use END ROAD WORK (G20-2)
C33(CA)	BLASTING ZONE 1000 FT	Use BLASTING ZONE AHEAD (W22-1)
C36(CA)	PREPARE TO STOP	Use BE PREPARED TO STOP (W3-4)
C39(CA)	ACCIDENT AHEAD	Use ROAD WORK, ROAD CLOSED, DETOUR, ONE LANE ROAD, RIGHT LANE CLOSED (W20 series) or NARROW LANES (C12(CA)), LANE CLOSED (C30(CA)), LANE CLOSED AHEAD (SC10(CA)), etc instead of identifying condition.
C41(CA)	Uneven Lane symbol	Use UNEVEN LANES (W8-11) word message sign
C41A(CA)	UNEVEN LANES (Rectangular)	Use UNEVEN LANES (W8-11) (Diamond) word message sign
SC2-1(CA)	ONE LANE ROAD	Use ONE LANE ROAD (W20-4)
SC4(CA)	SECOND RAMP CLOSED AHEAD	Use ___ EXIT – RAMP CLOSED (SC8(CA))
SC6(CA)	NOTICE - THIS RAMP WILL BE CLOSED TEMPORARILY - (Dates & Times)	Use RAMP CLOSED (More than one day) (SC6-4(CA))
SC6-1(CA)	ON (Day - Date - Time)	Use Day/Month Plaque (SC6A(CA)) or Time Plaque (SC6B(CA))
SC6-2(CA)	WEEKDAYS (Day - Date - Time)	Use Day/Month Plaque (SC6A(CA)) or Time Plaque (SC6B(CA))
SC14(CA)	RIGHT LANE	Use DETOUR (M4-9 series) or Directional Arrow Auxiliary (M6 series)
SC17(CA)	TRAFFIC BREAK DO NOT PASS	Use DO NOT PASS (SC13(CA))

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Table I-103(CA). Deleted MUTCD Signs - No Target Compliance Dates (Sheet 1 of 2)

MUTCD Code	California Code	Title of Sign	California MUTCD Section
M1-4	None	U.S. Route	2D.11, 2E.25
M1-5	None	State Route	2D.11
R1-6a	None	In-Street Pedestrian Crossing	2B.12
R2-2	None	Truck Speed Limit	2B.14
R2-5	None	Reduced Speed Ahead	Introduction, Page I-4
R3-1a	None	No Right Turn Across Tracks	8B.06, 10C.09
R3-2a	None	No Left Turn Across Tracks	8B.06, 10C.09
R3-9c	None	Reversible Lane Control	Introduction, Page I-4
R3-9e	None	Reversible Lane Control	Introduction, Page I-4
R3-10	None	Preferential Only Lane	2B.26, 2B.28
R3-10b	None	Preferential Only Lane	2B.26, 2B.28
R3-11	None	Preferential Only Lane	2B.26, 2B.28
R3-11a	None	Preferential Only Lane	2B.26, 2B.28
R3-11c	None	Preferential Only Lane	2B.26, 2B.28
R3-12	None	Preferential Only Lane	2B.26, 2B.28
R3-12a	None	Preferential Only Lane	2B.26, 2B.28
R3-12b	None	Preferential Only Lane	2B.26, 2B.28
R3-13	None	Preferential Only Lane	2B.26, 2B.28
R3-13a	None	Preferential Only Lane	2B.26, 2B.28
R3-14	None	Preferential Only Lane	2B.26, 2B.28
R3-14a	None	Preferential Only Lane	2B.26, 2B.28
R3-14b	None	Preferential Only Lane	2B.26, 2B.28
R3-15	None	Preferential Only Lane	2B.26, 2B.28
R3-15a	None	Preferential Only Lane	2B.26, 2B.28
R3-17	None	BIKE LANE	9B.04
R3-17a	None	AHEAD	9B.04
R3-17b	None	ENDS	9B.04
R7-1	None	NO PARKING ANY TIME	2B.39
R7-2	None	NO PARKING 8:30 AM TO 5:30 PM	2B.39
R7-2a	None	No Parking 8:30 AM TO 5:30 PM	2B.39
R7-3	None	NO PARKING EXCEPT SUNDAYS AND HOLIDAYS	2B.39
R7-4	None	NO STANDING ANY TIME	2B.39
R7-5	None	ONE HOUR PARKING 9 AM-7 PM	2B.39
R7-6	None	NO PARKING LOADING ZONE	2B.39
R7-7	None	NO PARKING BUS STOP	2B.39
R7-8	None	RESERVED PARKING for persons with disabilities	2B.39
R7-107	None	NO PARKING BUS STOP	2B.39
R7-108	None	2 HR PARKING 8:30 AM TO 5:30 PM	2B.39
R7-200	None	red Parking Prohibition/green Permissive Parking	2B.40
R7-201	None	TOW-AWAY ZONE	2B.40
R7-201a	None	Tow-Away Zone	2B.40
R7-202	None	THIS SIDE OF SIGN	2B.39
R8-1	None	NO PARKING ON PAVEMENT	2B.39, 2B.40
R8-2	None	NO PARKING EXCEPT ON SHOULDER	2B.39, 2B.40
R8-3	None	NO PARKING	2B.39, 2B.40

Table I-103(CA). Deleted MUTCD Signs - No Target Compliance Dates (Sheet 2 of 2)

MUTCD Code	California Code	Title of Sign	California MUTCD Section
R8-3a	R26D(CA)	No Parking	2B.39, 2B.40
R8-3e	R26E(CA)	ON PAVEMENT	2B.40
R8-3d	R26E(CA)	ON BRIDGE	2B.40
R8-5	None	NO STOPPING ON PAVEMENT	2B.39
R8-6	None	NO STOPPING EXCEPT ON SHOULDER	2B.39
R10-6a	None	STOP HERE ON RED	2B.45
R10-11	None	Symbolic NO TURN ON RED	2B.45 & 8D.07
R10-11a	R13(CA)	NO TURN ON RED	2B.45
R10-11b	None	NO TURN ON RED	2B.45
R10-16	None	U-TURN YIELD TO RIGHT TURN	2B.45
R10-17a	None	RIGHT (LEFT) ON RED ARROW AFTER STOP	2B.45
R12-2	None	AXLE WEIGHT LIMIT X t (XX TONS)	2B.49
R12-3	None	NO TRUCKS OVER X t (XX TONS) EMPTY WT	2B.49
R12-4	None	WEIGHT LIMIT X t (XX TONS) PER AXLE, X t (XX TONS) GROSS	2B.49
R12-6	None	METRIC	2B.49
R14-2	None	Hazardous Material Route	2B.52
R14-3	None	Hazardous Material Prohibition	2B.52
R14-4	None	National Network	2B.53
R14-5	None	National Network Prohibition	2B.53
R15-3	None	EXEMPT	8B.05, 10C.10
W1-4b	None	Reverse Curve (2 lanes)	6F.45
W1-4e	None	Reverse Curve (3 lanes)	6F.45
W1-13a	None	Truck Rollover Warning	Introduction, Page I-4
W3-1a	None	STOP AHEAD	2C.29
W3-2a	None	YIELD AHEAD	2C.29
W4-1a	None	Entering Roadway Merge	Introduction, Page I-4
W5-4	None	RAMP NARROWS	6F.26
W6-1a	None	DIVIDED HIGHWAY	2C.18
W6-1b	None	DIVIDED ROAD	2C.18
W6-2a	None	DIVIDED HIGHWAY ENDS	2C.19
W6-2b	None	DIVIDED ROAD ENDS	2C.19
W9-2	W75(CA)	LANE ENDS MERGE LEFT (RIGHT)	2C.33
W10-6	None	WARNING LOOK BOTH WAYS	Introduction, Page I-6
W13-4	None	ON RAMP	6F.25
W13-5	None	Curve Speed	2C.06, 2C.36
W16-13p	None	WHEN FLASHING	2C.29
W20-7a	None	Flagger	6F.29
W24-1a	None	Double Reverse Curve (2 lane)	6F.45
W24-1b	None	Double Reverse Curve (3 lane)	6F.45
W25-1	None	ONCOMING TRAFFIC HAS EXTENDED GREEN	2C.39
W25-2	None	ONCOMING TRAFFIC MAY HAVE EXTENDED GREEN	2C.39

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CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
~~MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES~~

TABLE OF CONTENTS

INTRODUCTION

PART 1

GENERAL

Chapter 1A

General

PART 2

SIGNS

Chapter 2A

General

Chapter 2B

Regulatory Signs

Chapter 2C

Warning Signs

Chapter 2D

Guide Signs – Conventional Roads

Chapter 2E

Guide Signs – Freeways and Expressways

Chapter 2F

Specific Service Signs

Chapter 2G

Tourist-Oriented Directional Signs (TODS)

Chapter 2H

Recreational and Cultural Interest Area Signs

Chapter 2I

Emergency Management Signing

PART 3

MARKINGS

Chapter 3A

General

Chapter 3B

Pavement and Curb Markings

Chapter 3C

Object Markers

Chapter 3D

Delineators

Chapter 3E

Colored Pavements

Chapter 3F

Barricades and Channelizing Devices

Chapter 3G

Islands

PART 4

HIGHWAY TRAFFIC SIGNALS

Chapter 4A

General

Chapter 4B

Traffic Control Signals - General

Chapter 4C

Traffic Control Signal Needs Studies

Chapter 4D

Traffic Control Signal Features

Chapter 4E

Pedestrian Control Features

Chapter 4F

Traffic Control Signals For Emergency Vehicle Access

Chapter 4G

Traffic Control Signals For One-Lane, Two-Way Facilities

Chapter 4H

Traffic Control Signals For Freeway Entrance Ramps

Chapter 4I

Traffic Control For Movable Bridges

Chapter 4J

Lane-Use Control Signals

Chapter 4K

Flashing Beacons

Chapter 4L

In-Roadway Lights

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California Manual on Uniform Traffic Control Devices

for Streets and Highways

(FHWA's MUTCD 2003 Edition
including Revisions 1 and 2,
as amended for use in California)

PART 1
General



STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION

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PART 1. GENERAL

TABLE OF CONTENTS

		<u>Page</u>
CHAPTER 1A.	GENERAL	
Section 1A.01	Purpose of Traffic Control Devices	1A-1
Section 1A.02	Principles of Traffic Control Devices	1A-1
Section 1A.03	Design of Traffic Control Devices	1A-1
Section 1A.04	Placement and Operation of Traffic Control Devices	1A-2
Section 1A.05	Maintenance of Traffic Control Devices	1A-2
Section 1A.06	Uniformity of Traffic Control Devices	1A-3
Section 1A.07	Responsibility for Traffic Control Devices	1A-3
Section 1A.08	Authority for Placement of Traffic Control Devices	1A-4
Section 1A.09	Engineering Study and Engineering Judgment	1A-5
Section 1A.10	Interpretations, Experimentations, Changes, and Interim Approvals	1A-5
Section 1A.11	Relation to Other Publications	1A-10
Section 1A.12	Color Code	1A-12
Section 1A.13	Definitions of Words and Phrases in This Manual	1A-13
Section 1A.14	Abbreviations Used on Traffic Control Devices	1A-19

FIGURES

CHAPTER 1A.	GENERAL	
Figure 1A-1	Example of Process for Requesting and Conducting Experimentations for New Traffic Control Devices	1A-20
Figure 1A-1(CA)	Example for Requesting and Conducting Experimentations for New Traffic Control Devices in California	1A-21
Figure 1A-2	Example of Process for Incorporating New Traffic Control Devices into the MUTCD	1A-22
Figure 1A-2(CA)	Example for Process for the Use of Traffic Control Devices in California Approved as Interim Approval (IA) by FHWA	1A-23

TABLES

CHAPTER 1A.	GENERAL	
Table 1A-1	Acceptable Abbreviations	1A-24
Table 1A-2	Abbreviations That Are Acceptable Only with a Prompt Word	1A-25
Table 1A-3	Unacceptable Abbreviations	1A-26

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CHAPTER 1A. GENERAL

Section 1A.01 Purpose of Traffic Control Devices

Support:

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 and highways throughout the Nation.

Traffic control devices notify road users of regulations and provide warning and guidance needed for the reasonably safe, uniform, and efficient operation of all elements of the traffic stream.

Standard:

Traffic control devices or their supports shall not bear any advertising message or any other message that is not related to traffic control.

Support:

Tourist-oriented directional signs and Specific Service signs are not considered advertising; rather, they are classified as motorist service signs.

Section 1A.02 Principles of Traffic Control Devices

Support:

This Manual contains the basic principles that govern the design and use of traffic control devices for all streets and highways open to public travel regardless of type or class or the public agency having jurisdiction. This Manual's text specifies the restriction on the use of a device if it is intended for limited application or for a specific system. It is important that these principles be given primary consideration in the selection and application of each device.

Guidance:

To be effective, a traffic control device should meet five basic requirements:

- A. Fulfill a need;
- B. Command attention;
- C. Convey a clear, simple meaning;
- D. Command respect from road users; and
- E. Give adequate time for proper response.

Design, placement, operation, maintenance, and uniformity are aspects that should be carefully considered [by the engineer](#) in order to maximize the ability of a traffic control device to meet the five requirements listed in the previous paragraph. Vehicle speed [and geometrics](#) should be carefully considered as an element that governs the design, operation, placement, and location of various traffic control devices.

Support:

The definition of the word "speed" varies depending on its use. The definitions of specific speed terms are contained in Section 1A.13.

Guidance:

The actions required of road users to obey regulatory devices should be specified by State statute, or in cases not covered by State statute, by local ordinance or resolution consistent with the "Uniform Vehicle Code." The proper use of traffic control devices should provide the reasonable and prudent road user with the information necessary to reasonably safely and lawfully use the streets, highways, pedestrian facilities, and bikeways.

Support:

Uniformity of the meaning of traffic control devices is vital to their effectiveness. The meanings ascribed to devices in this Manual are in general accord with the publications mentioned in Section 1A.11.

Section 1A.03 Design of Traffic Control Devices

Guidance:

Devices should be designed so that features such as size, shape, color, composition, lighting or retroreflection, and contrast are combined to draw attention to the devices; that size, shape, color, and simplicity of message combine to produce a clear meaning; that legibility and size combine with placement

to permit adequate time for response; and that uniformity, size, legibility, and reasonableness of the message combine to command respect.

Standard:

All symbols shall be unmistakably similar to or mirror images of the adopted symbol signs, all of which are shown in the “Standard Highway Signs” book (see Section 1A.11). Symbols and colors shall not be modified unless otherwise stated herein. All symbols and colors for signs not shown in the “Standard Highway Signs” book shall follow the procedures for experimentation and change described in Section 1A.10.

Guidance:

Aspects of a device's design should be modified only if there is a demonstrated need.

Support:

An example of modifying a device's design would be to modify the Side Road (W2-2) sign to show a second offset intersecting road.

Standard:

Except as noted in the Option below, highway agencies shall not develop word message signs. In accordance with CVC Section 21401, only word message signs conforming to Department of Transportation standards and specifications shall be placed on streets and highways.

Option:

~~Highway agencies may develop word message signs to notify road users of special regulations or to warn road users of a situation that might not be readily apparent. Unlike symbol signs and colors, new word message signs may be used without the need for experimentation.~~ Highway agencies may develop place/facility name or day, date, time portion of the word message on signs to notify road users of special events/circumstances or to warn road users of a situation that might not be readily apparent. Unlike symbol signs and colors, these place/facility name or day, date, time modified word message signs may be used without the need for experimentation. With the exception of symbols and colors, minor modifications in the specific design elements of a device may be made provided the essential appearance characteristics are preserved. Although the standard design of symbol signs cannot be modified, it may be appropriate to change the orientation of the symbol to better reflect the direction of travel.

Section 1A.04 Placement and Operation of Traffic Control Devices

Guidance:

Placement of a traffic control device should be within the road user's view so that adequate visibility is provided. To aid in conveying the proper meaning, the traffic control device should be appropriately positioned with respect to the location, object, or situation to which it applies. The location and legibility of the traffic control device should be such that a road user has adequate time to make the proper response in both day and night conditions.

Traffic control devices should be placed and operated in a uniform and consistent manner.

Unnecessary traffic control devices should be removed. The fact that a device is in good physical condition should not be a basis for deferring needed removal or change.

Traffic control devices, which are used on a part-time basis, should be in operation only during the time periods that they are required.

Section 1A.05 Maintenance of Traffic Control Devices

Guidance:

Functional maintenance of traffic control devices should be used to determine if certain devices need to be changed to meet current traffic conditions.

Physical maintenance of traffic control devices should be performed to retain the legibility and visibility of the device, and to retain the proper functioning of the device.

Support:

Clean, legible, properly mounted devices in good working condition command the respect of road users.

Section 1A.06 Uniformity of Traffic Control Devices

Support:

Uniformity of devices simplifies the task of the road user because it aids in recognition and understanding, thereby reducing perception/reaction time. Uniformity assists road users, law enforcement officers, and traffic courts by giving everyone the same interpretation. Uniformity assists public highway officials through efficiency in manufacture, installation, maintenance, and administration. Uniformity means treating similar situations in a similar way. The use of uniform traffic control devices does not, in itself, constitute uniformity. A standard device used where it is not appropriate is as objectionable as a nonstandard device; in fact, this might be worse, because such misuse might result in disrespect at those locations where the device is needed and appropriate.

Standard:

Any given device for the control of traffic shall have the same meaning and require the same action on the part of motorists regardless of where it is encountered.

Section 1A.07 Responsibility for Traffic Control Devices

Standard:

The responsibility for the design, placement, operation, maintenance, and uniformity of traffic control devices shall rest with the public agency or the official having jurisdiction. 23 CFR 655.603 adopts the Manual on Uniform Traffic Control Devices as the national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel. When a State or other Federal agency manual or supplement is required, that manual or supplement shall be in substantial conformance with the national Manual on Uniform Traffic Control Devices.

This California MUTCD (including the incorporated FHWA's MUTCD) does not supersede the Department's Standard Plans, Standard Specifications or the Special Provisions publications. Nothing contained in the California MUTCD shall prevent the Department of Transportation from modifying, changing or adopting new specifications as necessary.

23 CFR 655.603 also states that traffic control devices on all streets and highways open to public travel in each State shall be in substantial conformance with standards issued or endorsed by the Federal Highway Administrator.

Support:

The "Uniform Vehicle Code" (see Section 1A.11) has the following provision in Section 15-104 for the adoption of a uniform Manual:

"(a)The [State Highway Agency] shall adopt a manual and specification for a uniform system of traffic control devices consistent with the provisions of this code for use upon highways within this State. Such uniform system shall correlate with and so far as possible conform to the system set forth in the most recent edition of the Manual on Uniform Traffic Control Devices for Streets and Highways, and other standards issued or endorsed by the Federal Highway Administrator."

"(b) The Manual adopted pursuant to subsection (a) shall have the force and effect of law."

Additionally, States are encouraged to adopt Section 15-116 of the "Uniform Vehicle Code," which states that, "No person shall install or maintain in any area of private property used by the public any sign, signal, marking or other device intended to regulate, warn, or guide traffic unless it conforms with the State manual and specifications adopted under Section 15-104."

Support:

Pursuant to the provisions in CVC Section 21400, the Department of Transportation adopts uniform standards and specifications for all traffic control devices after consultation with local agencies and public hearings. The Department of Transportation consults with local agencies and the public through the California Traffic Control Devices Committee (CTCDC). The Department of Transportation publicizes these uniform standards and specifications for traffic control devices through the California MUTCD.

Standard:

In accordance with CVC Section 21401, only traffic control devices conforming to Department of Transportation standards and specifications shall be placed on streets and highways.

Subject to the requirements in CVC Sections 21100, 21100.1, 21107, 21107.5, 21107.6, and 21107.7, no person shall install or maintain in any area of private property used by the public any sign, signal, or marking or other device intended to regulate, warn, or guide traffic unless it conforms with Department of Transportation standards and specifications.

Support:

The delegation of maintenance activities to local authorities is usually exercised under the authority of Streets and Highways Code Section 130.

The Department of Transportation standards and specifications for traffic control devices are not applicable to privately owned and maintained roads or commercial establishments, unless the particular city or county enacts an ordinance or resolution to this effect. Refer to CVC Sections 21100, 21100.1, 21107, 21107.5, 21107.6, and 21107.7. However, the use of Department of Transportation standards and specifications for traffic control devices are encouraged on all privately owned and maintained roads or commercial establishments, in general, as a good practice.

Section 1A.08 Authority for Placement of Traffic Control Devices

Standard:

Traffic control devices, advertisements, announcements, and other signs or messages within the highway right-of-way shall be placed only as authorized by a public authority or the official having jurisdiction, for the purpose of regulating, warning, or guiding traffic.

When the public agency or the official having jurisdiction over a street or highway has granted proper authority, others such as contractors and public utility companies shall be permitted to install temporary traffic control devices in temporary traffic control zones. Such traffic control devices shall conform with the Standards of this Manual.

This California MUTCD (including the incorporated FHWA's MUTCD) does not supersede the Department's Standard Plans, Standard Specifications or the Special Provisions publications. Nothing contained in the California MUTCD shall prevent the Department of Transportation from modifying, changing or adopting new specifications as necessary.

Guidance:

Any unauthorized traffic control device or other sign or message placed on the highway right-of-way by a private organization or individual constitutes a public nuisance and should be removed. All unofficial or nonessential traffic control devices, signs, or messages should be removed.

Standard:

All regulatory traffic control devices shall be supported by laws, ordinances, or regulations.

Support:

Provisions of this Manual are based upon the concept that effective traffic control depends upon both appropriate application of the devices and reasonable enforcement of the regulations.

California Vehicle Code (CVC) references are used throughout this California MUTCD when the subject matter relates to State law.

Standard:

CVC 21400 provides that the Department of Transportation shall, after consultation with local agencies and public hearings, adopt rules and regulations prescribing uniform standards and specifications for all official traffic control devices placed pursuant to the provisions of the Code.

CVC 21401 provides that only those official traffic control devices that conform to the uniform standards and specifications promulgated by the Department of Transportation shall be placed upon a street or highway.

CVC 21350 and 21351 give basic authority to the Department of Transportation and local authorities, in their respective jurisdictions, to place and maintain such official traffic control devices.

Option:

Local authorities may adopt rules and regulations by ordinance or resolution for regulating traffic by means of official traffic control devices meeting the requirements of CVC Section 21400. Refer to CVC Section 21100 (d).

Standard:

The use of unauthorized traffic control devices is prohibited by CVC 21465. Prohibited traffic control devices constitute a public nuisance and shall be removed per CVC 21467. This does not modify or limit the

authority of the Public Utilities Commission to erect or maintain traffic control devices as authorized by law. Refer to CVC 21468.

Private advertising is prohibited on any highway right-of-way by Section 5403 (a) of the Business and Professions Code. "Highway" in this context includes roads, streets, boulevards, lanes, courts, places, commons, trails, ways or other rights-of-way or easements used for or laid out and intended for the public passage of vehicles or of vehicles and persons per Section 5213 of the Business and Professions Code.

Support:

The California Public Utilities Commission is the state regulatory agency with statutory authority over highway-rail grade crossings and highway-light rail transit grade crossings. Refer to Public Utilities Code Section 1202(a).

Section 1A.09 Engineering Study and Engineering Judgment

Standard:

This Manual describes the application of traffic control devices, but shall not be a legal requirement for their installation.

Guidance:

The decision to use a particular device at a particular location should be made on the basis of either an engineering study or the application of engineering judgment. Thus, while this Manual provides Standards, Guidance, and Options for design and application of traffic control devices, this Manual should not be considered a substitute for engineering judgment.

Engineering judgment should be exercised in the selection, ~~and~~ application and replacement of traffic control devices, as well as in the location and design of the roads and streets that the devices complement. Jurisdictions with responsibility for traffic control that do not have engineers on their staffs should seek engineering assistance from others, such as the State transportation agency, their County, a nearby large City, or a traffic engineering consultant.

Support:

Refer to CVC 627 for definition and requirements of "Engineering and Traffic Survey". It is also abbreviated in this manual as E&TS.

Section 1A.10 Interpretations, Experimentations, Changes, and Interim Approvals

Standard:

Design, application, and placement of traffic control devices other than those adopted in this Manual shall be prohibited unless the provisions of this Section are followed.

Support:

Continuing advances in technology will produce changes in the highway, vehicle, and road user proficiency; therefore, portions of the system of traffic control devices in this Manual will require updating. In addition, unique situations often arise for device applications that might require interpretation or clarification of this Manual. It is important to have a procedure for recognizing these developments and for introducing new ideas and modifications into the system.

Standard:

Requests for any interpretation, permission to experiment, interim approval, or change to FHWA's MUTCD shall be sent to the Federal Highway Administration (FHWA), Office of Transportation Operations, 400 Seventh Street, SW, HOTO, Washington, DC 20590.

Support:

Requests for experimentation, interpretation, or changes relating to the California edited portion of the California MUTCD are covered later in this section.

An interpretation includes a consideration of the application and operation of standard traffic control devices, official meanings of standard traffic control devices, or the variations from standard device designs.

Guidance:

Requests for an interpretation of this Manual should contain the following information:

- A. A concise statement of the interpretation being sought;
- B. A description of the condition that provoked the need for an interpretation;
- C. Any illustration that would be helpful to understand the request; and

D. Any supporting research data that is pertinent to the item to be interpreted.

Support:

Requests to experiment include consideration of field deployment for the purpose of testing or evaluating a new traffic control device, its application or manner of use, or a provision not specifically described in this Manual.

A request for permission to experiment will be considered only when submitted by the public agency or private toll facility responsible for the operation of the road or street on which the experiment is to take place.

A diagram indicating the process for experimenting with traffic control devices is shown in Figure 1A-1 and 1A-1(CA).

Guidance:

The request for permission to experiment should contain the following:

- A. A statement indicating the nature of the problem.
- B. A description of the proposed change to the traffic control device or application of the traffic control device, how it was developed, the manner in which it deviates from the standard, and how it is expected to be an improvement over existing standards.
- C. Any illustration that would be helpful to understand the traffic control device or use of the traffic control device.
- D. Any supporting data explaining how the traffic control device was developed, if it has been tried, in what ways it was found to be adequate or inadequate, and how this choice of device or application was derived.
- E. A legally binding statement certifying that the concept of the traffic control device is not protected by a patent or copyright. (An example of a traffic control device concept would be countdown pedestrian signals in general. Ordinarily an entire general concept would not be patented or copyrighted, but if it were it would not be acceptable for experimentation unless the patent or copyright owner signs a waiver of rights acceptable to the FHWA. An example of a patented or copyrighted specific device within the general concept of countdown pedestrian signals would be a manufacturer's design for its specific brand of countdown signal, including the design details of the housing or electronics that are unique to that manufacturer's product. As long as the general concept is not patented or copyrighted, it is acceptable for experimentation to incorporate the use of one or more patented devices of one or several manufacturers.)
- F. The time period and location(s) of the experiment.
- G. A detailed research or evaluation plan that must provide for close monitoring of the experimentation, especially in the early stages of its field implementation. The evaluation plan should include before and after studies as well as quantitative data describing the performance of the experimental device.
- H. An agreement to restore the site of the experiment to a condition that complies with the provisions of this Manual within 3 months following the end of the time period of the experiment. This agreement must also provide that the agency sponsoring the experimentation will terminate the experimentation at any time that it determines significant safety concerns are directly or indirectly attributable to the experimentation. The FHWA's Office of Transportation Operations has the right to terminate approval of the experimentation at any time if there is an indication of safety concerns. If, as a result of the experimentation, a request is made that this Manual be changed to include the device or application being experimented with, the device or application will be permitted to remain in place until an official rulemaking action has occurred.
- I. An agreement to provide semiannual progress reports for the duration of the experimentation, and an agreement to provide a copy of the final results of the experimentation to the FHWA's Office of Transportation Operations within 3 months following completion of the experimentation. The FHWA's Office of Transportation Operations has the right to terminate approval of the experimentation if reports are not provided in accordance with this schedule.

Support:

A change includes consideration of a new device to replace a present standard device, an additional device to be added to the list of standard devices, or a revision to a traffic control device application or placement criteria.

Guidance:

Requests for a change to this Manual should contain the following information:

- A. A statement indicating what change is proposed;
- B. Any illustration that would be helpful to understand the request; and
- C. Any supporting research data that is pertinent to the item to be reviewed.

Support:

Requests for interim approval include consideration of allowing interim use, pending official rulemaking, of a new traffic control device, a revision to the application or manner of use of an existing traffic control device, or a provision not specifically described in this Manual. If granted, interim approval will result in the traffic control device or application being placed into the next scheduled rulemaking process for revisions to this Manual. The device or application will be permitted to remain in place, under any conditions established in the interim approval, until an official rulemaking action has occurred.

Interim approval is considered based on the results of successful experimentation, results of analytical or laboratory studies, and/or review of non-U.S. experience with a traffic control device or application. Interim approval considerations include an assessment of relative risks, benefits, and costs. Interim approval includes conditions that jurisdictions agree to comply with in order to use the traffic control device or application until an official rulemaking action has occurred.

Guidance:

The request for permission to place a traffic control device under interim approval should contain the following:

- A. A statement indicating the nature of the problem.
- B. A description of the proposed change to the traffic control device or application of the traffic control device, how it was developed, the manner in which it deviates from the standard, and how it is expected to be an improvement over existing standards.
- C. The location(s) where it will be used and any illustration that would be helpful to understand the traffic control device or use of the traffic control device.
- D. A legally-binding statement certifying that the concept of the traffic control device is not protected by a patent or copyright. (An example of a traffic control device concept would be countdown pedestrian signals in general. Ordinarily an entire general concept would not be patented or copyrighted, but if it were it would not be acceptable for interim approval unless the patent or copyright owner signs a waiver of rights acceptable to the FHWA. An example of a patented or copyrighted specific device within the general concept of countdown pedestrian signals would be a manufacturer's design for its specific brand of countdown signal, including the design details of the housing or electronics that are unique to that manufacturer's product. Interim approval of a specific patented or copyrighted product is not acceptable.)
- E. A detailed completed research or evaluation on this traffic control device.
- F. An agreement to restore the site(s) of the interim approval to a condition that complies with the provisions in this Manual within 3 months following the issuance of a final rule on this traffic control device. This agreement must also provide that the agency sponsoring the interim approval will terminate use of the device or application installed under the interim approval at any time that it determines significant safety concerns are directly or indirectly attributable to the device or application. The FHWA's Office of Transportation Operations has the right to terminate the interim approval at any time if there is an indication of safety concerns.

Option:

A State may submit a request for interim approval for all jurisdictions in that State, as long as the request contains the information listed in the Guidance above.

Standard:

Once an interim approval is granted to any jurisdiction for a particular traffic control device or application, subsequent jurisdictions shall be granted interim approval for that device or application by submitting a letter to the FHWA Office of Transportation Operations indicating they will abide by Item F above and the specific conditions contained in the original interim approval.

A local jurisdiction using a traffic control device or application under an interim approval that was granted either directly to that jurisdiction or on a statewide basis based on the State's request shall inform the State of the locations of such use.

Support:

A diagram indicating the process for incorporating new traffic control devices into this Manual is shown in Figure 1A-2 and 1A-2(CA).

Procedures for revising this Manual are set out in the Federal Register of June 30, 1983 (48 FR 30145).

For additional information concerning interpretations, experimentation, changes, or interim approvals, write to the FHWA, 400 Seventh Street, SW, HOTO, Washington, DC 20590, or visit the MUTCD website at <http://mutcd.fhwa.dot.gov>.

Standard:

Requests shall be made to the FHWA for experimenting with any new traffic control device, its application or manner of use, or a provision not specifically described in the Manual on Uniform Traffic Control Devices.

Support:

In addition to the requirements of the FHWA, experimental traffic control devices are subject to the laws, regulations and policies of the State of California.

Standard:

The agency shall request and receive approval from the California Traffic Control Devices Committee prior to installation of experimentation devices on public roadways in California.

Support:

For information, contact:

Secretary,
California Traffic Control Devices Committee
(916) 654-4715.

The California MUTCD contains the official standards and policies of the State of California for the design, application, and placement of traffic control devices.

Experimentation is defined as research involving the acts of testing, evaluating, analyzing or discovering the effect of a specific device, principle, supposition, etc., usually carried out in an operational context. Experimentation could also be performed in a laboratory. The request for experimentation is a submission specifically requesting approval to use a non-standard device on public roadways for purposes of gathering verification data.

As used herein, the term "device" includes not only signs, signals, and markings, but also their application and manner of use.

Guidance:

Requests for experimentation, interpretation, or changes relating to the California edited portion of the California MUTCD should be sent to:

Secretary,
California Traffic Control Devices Committee – MS36
P.O. Box 942874, Sacramento, CA-94274-0001

The following procedures apply to requests for experimentation:

Submission of Projects

Guidance:

A request for permission to experiment will be considered only when submitted by the public agency or private toll facility responsible for the operation of the road or street on which the experiment is to take place.

Experimentation requests should contain the following information:

1. A statement indicating the nature of the problem.
2. A description of the proposed change, how it was developed, the manner in which it deviates from the standard, and how it is expected to be an improvement over existing standards.

3. Any illustration, photograph, or videos, which would help, explain the experimental device or use of this device.
4. Any supporting data as to how the experimental device was developed, if it has been tried, in what ways it was found to be adequate or inadequate, and how was this choice of device or application arrived at.

Requests for experimentation that are submitted without an explanation of the objective, scope, and duration will be returned to the originator for amplification.

Procedure for Processing Requests

Support:

- A. All requests for experimentation will be reviewed by the Secretary of the California Traffic Control Devices Committee to determine whether other related experimentation has been scheduled, in process, or already completed.
- B. The Secretary of the California Traffic Control Devices Committee will list the experimentation proposal on the next Committee agenda for review and approval. The Committee's approval would also include the specific guidelines to be followed for the experimentation.
- C. Action by the California Traffic Control Devices Committee on any request for experimental use of a non-conforming device could take several forms:
 1. Approval of the device for limited use on an experimental project.
 2. Approval of the device for limited use in a formal research project.
 3. Disapproval until such time as satisfactory research or other justification is submitted.
 4. Disapproval.
- D. After action by the California Traffic Control Devices Committee, the Secretary of the California Traffic Control Devices Committee will notify the originating party of its decision. If approved, the originating parties will be requested to submit a status report on the experimental testing at appropriate intervals. When the results of experimentation are completed, a final report will be prepared and forwarded to the Secretary for Committee review.
- E. The agency receiving approval for experimentation must agree to faithfully follow the specific guidelines for the experimentation, must forward reports as indicated, and must agree to terminate the experimentation upon notification.

Specific Guidelines for Experimental Proposal

Guidance:

A specific proposal should be submitted for each request.

Support:

This proposal can be submitted with the initial request or could be a follow-up to specific comments by the California Traffic Control Devices Committee. The proposal, after approval by the Committee, will become an integral part of the approved experimentation.

Guidance:

Each proposal should include:

- A. **Scope** A detailed description of the experimentation, locations of installation, and number of experimental projects.
- B. **Work Plan** A description of the proposed plan of study; the variables that are to be measured; the criteria against which the devices is to be evaluated; observations, measures and data which will be collected; whether the experimentation will be carried out in the field or under laboratory conditions; how installations of the experimental device or application will be made; the indication if any adverse effects on safety or traffic operations can be anticipated, together with the means that may be taken to minimize them; and the factors which will be held constant or measured and controlled in order to ensure that the true effects of the device are measured.
- C. **Time Periods**: Time periods for experimentation will normally not be less than six months nor more than two years.
- D. **Evaluation Procedures**: The California Traffic Control Devices Committee will approve criteria, which will be used to evaluate experimental devices or applications. To permit meaningful comparisons with standard installations, advice from specialists such as human factor experts, statisticians, etc., could be included.
- E. **Reporting** A written status report must be forwarded to the sponsor 45 days prior to each public meeting. A final report must be completed within 90 days of the terminal date of the experimentation and forwarded to the

Secretary of the California Traffic Control Devices Committee. Status reports will describe the progress of the work, any particular deviation from the work plan and anticipated time of conclusion. The final report will contain, as a minimum, the basic information on the problem, the preliminary investigations, the proposed solutions, the study procedures, the detailed analysis of the data, the results of the work, a discussion of the results, and whatever conclusions are drawn. If a change in the California MUTCD is proposed, the recommended text (wording) for the California MUTCD should be included.

- F. **Administration:** All experimentation proposals will include the agency sponsoring the study, the agency conducting the study, and the name and titles of principal researchers. There must be proof of professional traffic engineering capabilities and other related professional expertise to perform the experimentation and related evaluation processes.

Termination of Experimentation

Standard:

The project shall terminate at the end of the approved period unless an extension is granted, and all experimental devices and applications shall be removed unless specific permission is given for continued operation.

Support:

The California Traffic Control Devices Committee could, at any time, terminate approval of experimentation if significant safety hazards are indicated to be directly or indirectly attributable to the experimentation. Approval of any experimentation could also be terminated if no status report is received 45 days prior to each public meeting or no final report is received within 90 days of the terminal date of the experimentation.

Removal of Experimentation Installations

Standard:

All experimentation installations shall be removed upon termination of the experiment-when a decision is made by the California Traffic Control Devices Committee that the device is not warranted.

Support:

Authority and reference cited for removal of experimentation installation is CVC Section 21400.

Section 1A.11 Relation to Other Publications

Standard:

To the extent that they are incorporated by specific reference, the latest editions of the following publications, or those editions specifically noted, shall be a part of this Manual: “Standard Highway Signs” book (FHWA); and “Color Specifications for Retroreflective Sign and Pavement Marking Materials” (appendix to subpart F of Part 655 of Title 23 of the Code of Federal Regulations).

Support:

The “Standard Highway Signs” book includes standard alphabets and symbols for highway signs and pavement markings.

For information about the above publications, visit the Federal Highway Administration’s MUTCD website at <http://mutcd.fhwa.dot.gov>, or write to the FHWA, 400 Seventh Street, SW, HOTO, Washington, DC 20590.

The publication entitled “Federal-Aid Highway Program Guidance on High Occupancy Vehicle (HOV) Lanes” is available at <http://www.fhwa.dot.gov/operations/hovguide01.htm>, or write to the FHWA, 400 Seventh Street, SW, HOTM, Washington, DC 20590.

The publication entitled “Maintaining Traffic Sign Retroreflectivity” (2007 Edition) is available at www.fhwa.dot.gov/retro, or write to the FHWA, 1200 New Jersey Avenue, SE, HSA-1, Washington, DC 20590.

Other publications that are useful sources of information with respect to use of this Manual are listed below. See Page i of this Manual for ordering information for the following publications:

1A. “AAA School Safety Patrol Operations Manual,” 2006 Edition (AAA)

1. “A Policy on Geometric Design of Highways and Streets,” 2001 Edition (American Association of State Highway and Transportation Officials—AASHTO)
2. “Guide for the Development of Bicycle Facilities,” 1999 Edition (AASHTO)
3. “Guide to Metric Conversion,” 1993 Edition (AASHTO)

4. "Guidelines for the Selection of Supplemental Guide Signs for Traffic Generators Adjacent to Freeways," 2001 Edition (AASHTO)
5. "List of Control Cities for Use in Guide Signs on Interstate Highways," 2001 Edition (AASHTO)
6. "Roadside Design Guide," 2001 Edition (AASHTO)
7. "Standard Specifications for Movable Highway Bridges," 1988 Edition (AASHTO)
8. "Traffic Engineering Metric Conversion Folders— Addendum to the Guide to Metric Conversion," 1993 Edition (AASHTO)
9. "2000 AREMA Communications & Signals Manual," American Railway Engineering & Maintenance-of- Way Association (AREMA)
10. "Designing Sidewalks and Trails for Access—Part 2—Best Practices Design Guide," 2001 Edition (FHWA) [Publication No. FHWA-EP-01-027]
11. "Practice for Roadway Lighting," RP-8, 2001, Illuminating Engineering Society (IES)
12. "Safety Guide for the Prevention of Radio Frequency Radiation Hazards in the Use of Commercial Electric Detonators (Blasting Caps)," Safety Library Publication No. 20, Institute of Makers of Explosives
13. "American National Standard for High-Visibility Public Safety Vests," (ANSI/ISEA 207-2006), 2006 Edition (International Safety Equipment Association—ISEA)
- 13A. "American National Standard for High-Visibility Safety Apparel and Headwear," (ANSI/ISEA 107-2004), 2004 Edition, (ISEA).
14. "Manual of Traffic Signal Design," 1998 Edition (Institute of Transportation Engineers—ITE)
15. "Manual of Transportation Engineering Studies," 1994 Edition (ITE)
16. "Pedestrian Traffic Control Signal Indications," 1985 Edition (ITE)
17. "Preemption of Traffic Signals at or Near Railroad Grade Crossings with Active Warning Devices," (ITE)
18. "Purchase Specification for Flashing and Steady Burn Warning Lights," 1981 Edition (ITE)
19. "School Trip Safety Program Guidelines," 1984 Edition (ITE)
20. "Traffic Detector Handbook," 1991 Edition (ITE)
21. "Traffic Engineering Handbook," 1999 Edition (ITE)
22. "Traffic Signal Lamps," 1980 Edition (ITE)
23. "Traffic Control Devices Handbook," 2001 Edition (ITE)
24. "Vehicle Traffic Control Signal Heads," Part 1—1985 Edition; Part 2—1998 Edition (ITE)
25. "Uniform Vehicle Code (UVC) and Model Traffic Ordinance," 2000 Edition (National Committee on Uniform Traffic Laws and Ordinances)
26. "Occupational Safety and Health Administration Regulations (Standards - 29 CFR), General Safety and Health Provisions - 1926.20," amended June 30, 1993, Occupational Safety and Health Administration (OSHA)
27. "Highway Capacity Manual," 2000 Edition (Transportation Research Board—TRB)
28. "Recommended Procedures for the Safety Performance Evaluation of Highway Features," (NCHRP Report 350), 1993 Edition (Transportation Research Board - TRB)
29. "Accessible Pedestrian Signals," A-37, 1998 Edition, U.S. Architectural and Transportation Barriers Compliance Board (The U.S. Access Board)
30. "Building a True Community—Final Report—Public Rights-of-Way Access Advisory Committee (PRWAAC)," 2001 Edition (The U.S. Access Board)
31. "The Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)," July 1998 Edition (The U.S. Access Board)
32. "Highway-Rail Intersection Architecture," U.S. Department of Transportation, Federal Railroad Administration (USDOT/FRA)

Standard:

The latest edition of Department of Transportation's California Sign Specifications shall be a part of this manual.

Support:

The latest version of other documents that are useful sources of information with respect to the use of this Manual are listed below. See Appendix for a list of web sites that have direct access to some of these publications. See the Introduction Part of this California MUTCD for ordering information for the following publications:

- A. "California Building Standards Code" 2001 Edition (California Building Standards Commission)
- B. "California Business and Professions Code" (State of California)
- C. "California Code of Regulations" (State of California)
- D. "California Education Code" (State of California)
- E. "California Government Code" (State of California)
- F. "California Health and Safety Code" (State of California)
- G. "California Streets and Highways Code" (State of California)
- H. "California Vehicle Code" (CVC), 2006 Edition (Department of Motor Vehicles)
- I. "Construction Manual", 2005 Edition. (Department of Transportation)
- J. "Highway Design Handbook For Older Drivers And Pedestrians", 2001 Edition (Federal Highway Administration)
- K. "Highway Design Manual", Fifth Edition (Department of Transportation)
- L. "High-Occupancy Vehicle Guidelines", 2003 Edition (Department of Transportation)
- M. "Historic Highway Bridges of California", (Department of Transportation)
- N. "Maintenance Manual", 1999 Edition (Department of Transportation)
- O. "Manual for Encroachment Permits on California State Highways", 2005 Edition (Department of Transportation)
- P. "Plans, Specifications and Estimates Guide" (PS&E), 2006 Edition (Department of Transportation)
- Q. "Project Development Procedures Manual", 2005 Edition (Department of Transportation)
- R. "Ramp Meter Design Manual", 2000 Edition (Department of Transportation)
- S. "Ready to List and Construction Contract Award Guide", 2009 Edition (Department of Transportation)
- T. "Signal, Lighting and Electrical System Design Guide", 2007 Edition (Department of Transportation)
- U. "Standard Plans", 2006 Edition (Department of Transportation)
- V. "Standard Specifications", 2006 Edition (Department of Transportation)
- W. "Standard Special Provisions", 2006 Edition (Department of Transportation)
- X. "Traffic Engineering Metric Conversion Factors", 1993 Edition (American Association of State Highway and transportation Officials - AASHTO).
- Y. "Traffic Manual", 1996 Edition (Department of Transportation)

Section 1A.12 Color Code

Support:

The following color code establishes general meanings for 10 colors of a total of 13 colors that have been identified as being appropriate for use in conveying traffic control information. Central values and tolerance limits for each color are available from the Federal Highway Administration, 400 Seventh Street, SW, HOTO, Washington, DC 20590, and at FHWA's MUTCD website at <http://mutcd.fhwa.dot.gov>.

The three colors for which general meanings have not yet been assigned are being reserved for future applications that will be determined only by FHWA after consultation with the States, the engineering community, and the general public. The meanings described in this Section are of a general nature. More specific assignments of colors are given in the individual Parts of this Manual relating to each class of devices.

Standard:

The general meaning of the 13 colors shall be as follows:

- A. Black—regulation**
- B. Blue—road user services guidance, tourist information, and evacuation route**
- C. Brown—recreational and cultural interest area guidance**
- D. Coral—unassigned**
- E. Fluorescent Pink—incident management**
- F. Fluorescent Yellow-Green—pedestrian warning, bicycle warning, playground warning, school bus and school warning**
- G. Green—indicated movements permitted, direction guidance**

- H. Light Blue—unassigned
- I. Orange—temporary traffic control
- J. Purple—unassigned
- K. Red—stop or prohibition
- L. White—regulation
- M. Yellow—warning

Section 1A.13 Definitions of Words and Phrases in This Manual

Standard:

Unless otherwise defined herein, or in the other Parts of this Manual, definitions contained in the most recent edition of the “Uniform Vehicle Code,” “AASHTO Transportation Glossary (Highway Definitions),” “California Vehicle Code” and other publications specified in Section 1A.11 are also incorporated and adopted by reference.

The following words and phrases, when used in this Manual, shall have the following meanings:

1. Active Grade Crossing Warning System—the flashing-light signals, with or without warning gates, together with the necessary control equipment used to inform road users of the approach or presence of trains at highway-rail or highway-light rail transit grade crossings.
2. Approach—all lanes of traffic moving towards an intersection or a midblock location from one direction, including any adjacent parking lane(s).
3. Arterial Highway (Street)—a general term denoting a highway primarily used by through traffic, usually on a continuous route or a highway designated as part of an arterial system.
4. Average Day—a day representing traffic volumes normally and repeatedly found at a location. Where volumes are primarily influenced by employment, the average day is typically a weekday. When volumes are primarily influenced by entertainment or recreation, the average day is typically a weekend day.
5. Beacon—a highway traffic signal with one or more signal sections that operates in a flashing mode.
6. Bicycle—a pedal-powered vehicle upon which the human operator sits.
7. Bicycle Lane—a portion of a roadway that has been designated by signs and pavement markings for preferential or exclusive use by bicyclists.
- 7A. CVC – California Vehicle Code.
- 7B. California Sign Specifications – Detailed drawings of signs approved by the Department of Transportation for use in California.
8. Centerline Markings—the yellow pavement marking line(s) that delineates the separation of traffic lanes that have opposite directions of travel on a roadway. These markings need not be at the geometrical center of the pavement.
9. Changeable Message Sign—a sign that is capable of displaying more than one message, changeable manually, by remote control, or by automatic control. These signs are referred to as Dynamic Message Signs in the National Intelligent Transportation Systems (ITS) Architecture.
10. Channelizing Line Marking—a wide or double solid white line used to form islands where traffic in the same direction of travel is permitted on both sides of the island.
11. Circular Intersection—an intersection that has an island, generally circular in design, located in the center of the intersection where traffic passes to the right of the island. Circular intersections include roundabouts, rotaries, and traffic circles.
12. Clear Zone—the total roadside border area, starting at the edge of the traveled way, that is available for an errant driver to stop or regain control of a vehicle. This area might consist of a shoulder, a recoverable slope, and/or a nonrecoverable, traversable slope with a clear run-out area at its toe.
13. Concurrent Flow HOV Lane—an HOV lane that is operated in the same direction as the adjacent mixed flow lanes, separated from the adjacent general purpose freeway lanes by a standard lane stripe, painted buffer, or barrier.

14. **Contraflow Lane**—a lane operating in a direction opposite to the normal flow of traffic designated for peak direction of travel during at least a portion of the day. Contraflow lanes are usually separated from the off-peak direction lanes by plastic pylons, or by moveable or permanent barrier.
15. **Conventional Road**—a street or highway other than a low-volume road (as defined in Section 5A.01), expressway, or freeway.
16. **Collector Highway**—a term denoting a highway that in rural areas connects small towns and local highways to arterial highways, and in urban areas provides land access and traffic circulation within residential, commercial, and business areas and connects local highways to the arterial highways.
17. **Crashworthy**—a characteristic of a roadside appurtenance that has been successfully crash tested in accordance with a national standard such as the National Cooperative Highway Research Program Report 350, “Recommended Procedures for the Safety Performance Evaluation of Highway Features.”
18. **Crosswalk**—(a) that part of a roadway at an intersection included within the connections of the lateral lines of the sidewalks on opposite sides of the highway measured from the curbs or in the absence of curbs, from the edges of the traversable roadway, and in the absence of a sidewalk on one side of the roadway, the part of a roadway included within the extension of the lateral lines of the sidewalk at right angles to the centerline; (b) any portion of a roadway at an intersection or elsewhere distinctly indicated as a pedestrian crossing by lines on the surface, which may be supplemented by contrasting pavement texture, style, or color.
19. **Crosswalk Lines**—white pavement marking lines that identify a crosswalk.
20. **Delineator**—a retroreflective device mounted on the roadway surface or at the side of the roadway in a series to indicate the alignment of the roadway, especially at night or in adverse weather.
- 20A. **Department of Transportation – California Department of Transportation or Caltrans.**
21. **Detectable**—having a continuous edge within 150 mm (6 in) of the surface so that pedestrians who have visual disabilities can sense its presence and receive usable guidance information.
- 21A. **Divided Highway – A highway with separated roadbeds for traffic in opposing directions.**
22. **Dynamic Envelope**—the clearance required for the train and its cargo overhang due to any combination of loading, lateral motion, or suspension failure.
23. **Edge Line Markings**—white or yellow pavement marking lines that delineate the right or left edge(s) of a traveled way.
24. **End-of-Roadway Marker**—a device used to warn and alert road users of the end of a roadway in other than temporary traffic control zones.
25. **Engineering Judgment**—the evaluation of available pertinent information, and the application of appropriate principles, **experience, education, discretion**, Standards, Guidance, and practices as contained in this Manual and other sources, for the purpose of deciding upon the applicability, design, operation, or installation of a traffic control device. Engineering judgment shall be exercised by an engineer, or by an individual working under the supervision of an engineer, through the application of procedures and criteria established by the engineer. Documentation of engineering judgment is not required.
26. **Engineering Study**—the comprehensive analysis and evaluation of available pertinent information, and the application of appropriate principles, **engineering judgment, experience, education, discretion**, Standards, Guidance, and practices as contained in this Manual and other sources, for the purpose of deciding upon the applicability, design, operation, or installation of a traffic control device. An engineering study shall be performed by an engineer, or by an individual working under the supervision of an engineer, through the application of procedures and criteria established by the engineer. An engineering study shall be documented.
27. **Expressway**—a divided highway with partial control of access.
28. **Flashing**—an operation in which a signal indication is turned on and off repetitively.
29. **Freeway**—a divided highway with full control of access.

30. **Guide Sign**—a sign that shows route designations, destinations, directions, distances, services, points of interest, or other geographical, recreational, or cultural information.
31. **High Occupancy Vehicle (HOV)**—a motor vehicle carrying at least two or more persons, including carpools, vanpools, and buses.
32. **Highway**—a general term for denoting a public way for purposes of travel by vehicular travel, including the entire area within the right-of-way.
33. **Highway-Rail Grade Crossing**—the general area where a highway and a railroad's right-of-way cross at the same level, within which are included the railroad tracks, highway, and traffic control devices for highway traffic traversing that area.
34. **Highway Traffic Signal**—a power-operated traffic control device by which traffic is warned or directed to take some specific action. These devices do not include signals at toll plazas, power operated signs, illuminated pavement markers, warning lights (see Section 6F.78), or steady burning electric lamps.
35. **HOV Lane**—any preferential lane designated for exclusive use by high-occupancy vehicles for all or part of a day—including a designated lane on a freeway, other highway, street, or independent roadway on a separate right-of-way.
36. **Inherently Low Emission Vehicle (ILEV)**—any kind of vehicle that is certified by the U.S. Environmental Protection Agency and that because of inherent properties of the fuel system design, will not have significant evaporative emissions, even if its evaporative emission control system has failed.
37. **Interchange**—a system of interconnecting roadways providing for traffic movement between two or more highways that do not intersect at grade.
38. **Intermediate Interchange**—an interchange with an urban or rural route that is not a major or minor interchange as defined herein.
39. **Intersection**—(a) the area embraced within the prolongation or connection of the lateral curb lines, or if none, the lateral boundary lines of the roadways of two highways that join one another at, or approximately at, right angles, or the area within which vehicles traveling on different highways that join at any other angle might come into conflict; (b) the junction of an alley or driveway with a roadway or highway shall not constitute an intersection.
40. **Island**—a defined area between traffic lanes for control of vehicular movements or for pedestrian refuge. It includes all end protection and approach treatments. Within an intersection area, a median or an outer separation is considered to be an island.
41. **Lane Line Markings**—white pavement marking lines that delineate the separation of traffic lanes that have the same direction of travel on a roadway.
42. **Lane-Use Control Signal**—a signal face displaying indications to permit or prohibit the use of specific lanes of a roadway or to indicate the impending prohibition of such use.
43. **Legend**—see Sign Legend.
44. **Logo**—a distinctive emblem, symbol, or trademark that identifies a product or service.
45. **Longitudinal Markings**—pavement markings that are generally placed parallel and adjacent to the flow of traffic such as lane lines, centerlines, edge lines, channelizing lines, and others.
46. **Major Interchange**—an interchange with another freeway or expressway, or an interchange with a high-volume multi-lane highway, principal urban arterial, or major rural route where the interchanging traffic is heavy or includes many road users unfamiliar with the area.
47. **Major Street**—the street normally carrying the higher volume of vehicular traffic.
- 47A. **Markings – All lines, words, or symbols, except signs, officially placed within the roadway to regulate, warn or guide traffic.**
48. **Median**—the area between two roadways of a divided highway measured from edge of traveled way to edge of traveled way. The median excludes turn lanes. The median width might be different between intersections, interchanges, and at opposite approaches of the same intersection.

49. **Minor Interchange**—an interchange where traffic is local and very light, such as interchanges with land service access roads. Where the sum of the exit volumes is estimated to be lower than 100 vehicles per day in the design year, the interchange is classified as local.
50. **Minor Street**—the street normally carrying the lower volume of vehicular traffic.
51. **Object Marker**—a device used to mark obstructions within or adjacent to the roadway.
52. **Occupancy Requirement**—any restriction that regulates the use of a facility for any period of the day based on a specified number of persons in a vehicle.
53. **Occupant**—a person driving or riding in a car, truck, bus, or other vehicle.
54. **Paved**—a bituminous surface treatment, mixed bituminous concrete, or Portland cement concrete roadway surface that has both a structural (weight bearing) and a sealing purpose for the roadway.
55. **Pedestrian**—a person afoot, in a wheelchair, on skates, or on a skateboard.
56. **Pedestrian Facilities**—a general term denoting improvements and provisions made to accommodate or encourage walking.
57. **Platoon**—a group of vehicles or pedestrians traveling together as a group, either voluntarily or involuntarily, because of traffic signal controls, geometrics, or other factors.
58. **Principal Legend**—place names, street names, and route numbers placed on guide signs.
59. **Public Road**—any road or street under the jurisdiction of and maintained by a public agency and open to public travel.
60. **Raised Pavement Marker**—a device with a height of at least 10 mm (0.4 in) mounted on or in a road surface that is intended to be used as a positioning guide or to supplement or substitute for pavement markings or to mark the position of a fire hydrant.
61. **Regulatory Sign**—a sign that gives notice to road users of traffic laws or regulations.
62. **Retroreflectivity**—a property of a surface that allows a large portion of the light coming from a point source to be returned directly back to a point near its origin.
63. **Right-of-Way [Assignment]**—the permitting of vehicles and/or pedestrians to proceed in a lawful manner in preference to other vehicles or pedestrians by the display of sign or signal indications.
64. **Road**—see Roadway.
65. **Roadway**—that portion of a highway improved, designed, or ordinarily used for vehicular travel and parking lanes, but exclusive of the sidewalk, berm, or shoulder even though such sidewalk, berm, or shoulder is used by persons riding bicycles or other human-powered vehicles. In the event a highway includes two or more separate roadways, the term roadway as used herein shall refer to any such roadway separately, but not to all such roadways collectively.
66. **Roadway Network**—a geographical arrangement of intersecting roadways.
67. **Road User**—a vehicle operator, bicyclist, or pedestrian within the highway, including persons with disabilities.
68. **Roundabout Intersection**—a circular intersection with yield control of all entering traffic, channelized approaches, and appropriate geometric curvature, such that travel speeds on the circulatory roadway are typically less than 50 km/h (30 mph).
69. **Rumble Strip** - a series of intermittent, narrow, transverse areas of rough-textured, slightly raised, or depressed road surface that is installed to alert road users to unusual traffic conditions.
70. **Rural Highway**—a type of roadway normally characterized by lower volumes, higher speeds, fewer turning conflicts, and less conflict with pedestrians.
- 70A. **Scenic Highway** – An officially designated portion of the State Highway System traversing areas of outstanding scenic beauty which together with the adjacent scenic corridors requires special scenic conservation treatment.
71. **Shared Roadway**—a roadway that is officially designated and marked as a bicycle route, but which is open to motor vehicle travel and upon which no bicycle lane is designated.
72. **Shared-Use Path**—a bikeway outside the traveled way and physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent alignment. Shared-use paths are also used by pedestrians

- (including skaters, users of manual and motorized wheelchairs, and joggers) and other authorized motorized and nonmotorized users.
- 72A. Shoulder** – The portion of the roadway contiguous with the traveled way for accommodations of stopped vehicles, for emergency use, and for lateral support of base and surface courses.
- 73. Sidewalk**—that portion of a street between the curb line, or the lateral line of a roadway, and the adjacent property line or on easements of private property that is paved or improved and intended for use by pedestrians.
- 74. Sign**—any traffic control device that is intended to communicate specific information to road users through a word or symbol legend. Signs do not include traffic control signals, pavement markings, delineators, or channelization devices.
- 75. Sign Assembly**—a group of signs, located on the same support(s), that supplement one another in conveying information to road users.
- 76. Sign Illumination**—either internal or external lighting that shows similar color by day or night. Street or highway lighting shall not be considered as meeting this definition.
- 77. Sign Legend**—all word messages, logos, and symbol designs that are intended to convey specific meanings.
- 78. Sign Panel**—a separate panel or piece of material containing a word or symbol legend that is affixed to the face of a sign.
- 79. Speed**—speed is defined based on the following classifications:
- (a) **Advisory Speed**—a recommended speed for all vehicles operating on a section of highway and based on the highway design, operating characteristics, and conditions.
 - (b) **Average Speed**—the summation of the instantaneous or spot-measured speeds at a specific location of vehicles divided by the number of vehicles observed.
 - (c) **Design Speed**—a selected speed used to determine the various geometric design features of a roadway.
 - (d) **85th-Percentile Speed**—The speed at or below which 85 percent of the motor vehicles travel.
 - (e) **Operating Speed**—a speed at which a typical vehicle or the overall traffic operates. Operating speed might be defined with speed values such as the average, pace, or 85th-percentile speeds.
 - (f) **Pace Speed**—the highest speed within a specific range of speeds that represents more vehicles than in any other like range of speed. The range of speeds typically used is 10 km/h or 10 mph.
 - (g) **Posted Speed**—the speed limit determined by law and shown on Speed Limit signs.
 - (h) **Statutory Speed**—a speed limit established by legislative action that typically is applicable for highways with specified design, functional, jurisdictional and/or location characteristic and is not necessarily shown on Speed Limit signs.
- 80. Speed Limit**—the maximum (or minimum) speed applicable to a section of highway as established by law.
- 81. Speed Measurement Marking**—a white transverse pavement marking placed on the roadway to assist the enforcement of speed regulations.
- 82. Speed Zone**—a section of highway with a speed limit that is established by law but which might be different from a legislatively specified statutory speed limit.
- 82A. State Highway** – Any highway owned and operated by the Department of Transportation.
- 83. Stop Line**—a solid white pavement marking line extending across approach lanes to indicate the point at which a stop is intended or required to be made. For all purposes, limit line(s) as defined per CVC 377 shall mean stop line(s).
- 84. Street**—see Highway.
- 85. Temporary Traffic Control Zone**—an area of a highway where road user conditions are changed because of a work zone or incident by the use of temporary traffic control devices, flaggers, uniformed law enforcement officers, or other authorized personnel.

86. **Traffic**—pedestrians, bicyclists, ridden or herded animals, vehicles, streetcars, and other conveyances either singularly or together while using any highway for purposes of travel.
87. **Traffic Control Device**—a sign, signal, marking, or other device used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, pedestrian facility, or shared-use path by authority of a public agency having jurisdiction.
88. **Traffic Control Signal (Traffic Signal)**—any highway traffic signal by which traffic is alternately directed to stop and permitted to proceed.
89. **Train**—one or more locomotives coupled, with or without cars, that operates on rails or tracks and to which all other traffic must yield the right-of-way by law at highway-rail grade crossings.
90. **Transverse Markings**—pavement markings that are generally placed perpendicular and across the flow of traffic such as shoulder markings, word and symbol markings, stop lines, crosswalk lines, speed measurement markings, parking space markings, and others.
91. **Traveled Way**—the portion of the roadway for the movement of vehicles, exclusive of the shoulders, berms, sidewalks, and parking lanes.
92. **Urban Street**—a type of street normally characterized by relatively low speeds, wide ranges of traffic volumes, narrower lanes, frequent intersections and driveways, significant pedestrian traffic, and more businesses and houses.
93. **Vehicle**—every device in, upon, or by which any person or property can be transported or drawn upon a highway, except trains and light rail transit operating in exclusive or semiexclusive alignments. Light rail transit operating in a mixed-use alignment, to which other traffic is not required to yield the right-of-way by law, is a vehicle.
94. **Warning Sign**—a sign that gives notice to road users of a situation that might not be readily apparent.
95. **Warrant**—a warrant describes threshold conditions to the engineer in evaluating the potential safety and operational benefits of traffic control devices and is based upon average or normal conditions. Warrants are not a substitute for engineering judgment. The fact that a warrant for a particular traffic control device is met is not conclusive justification for the installation of the device.
- 95A. **Worker**—people on foot whose duties place them within the right-of-way of a street or highway, such as street or highway construction and maintenance forces; survey crews; utility crews; responders to incidents within the street or highway right-of-way; firefighters and other emergency responders when they are not directly exposed to flame, fire, heat, and/or hazardous materials; and law enforcement personnel when directing traffic, investigating crashes, and handling lane closures, obstructed roadways, and disasters within the right-of-way of a street or highway.
96. **Wrong-Way Arrow**—a slender, elongated, white pavement marking arrow placed upstream from the ramp terminus to indicate the correct direction of traffic flow. Wrong-way arrows are intended primarily to warn wrong-way road users that they are going in the wrong direction.

Support:

The following terms are defined in the California Vehicle Code:

1. Alley - Section 110.
2. Amber - Section 112.
3. Authorized Emergency Vehicle - Section 165.
4. Automated Enforcement System - Section 210.
5. Axle - Section 230.
6. Bicycle - Section 231.
7. Bus - Section 233.
8. Business District - Section 235.
9. Clean Fuel Vehicle - Section 257.
10. Commercial Vehicle - Section 260.
11. Crosswalk - Section 275.

12. Department of Transportation - Section 291.
13. Disabled Person - Section 295.5.
14. Engineering and Traffic Survey - Section 627.
15. Freeway - Section 332.
16. Golf Cart - Section 345.
17. Hazardous Material - Section 353.
18. Highway - Section 360.
19. Intersection - Section 365.
20. Limit Line - Section 377.
21. Local Authorities - Section 385.
22. Motorcycle - Section 400.
23. Motor Vehicle - Section 415.
24. Official Traffic Control Device - Section 440.
25. Official Traffic Control Signal - Section 445.
26. Park or Parking - Section 463.
27. Pedestrian - Section 467.
28. Pickup Truck - Section 471.
29. Private Road or Driveway - Section 490.
30. Private School - Section 492.
31. Road - Section 527.
32. Roadway - Section 530.
33. Schoolbus - Section 545.
34. Sidewalk - Section 555.
35. Snowmobile - Section 557.
36. Stop or Stopping - Section 587.
37. Street - Section 590.
38. Street or Highway - Section 591.
39. Street or Highway – Highway Exclusion - Section 592.
40. Through Highway - Section 600.
41. Traffic - Section 620.
42. Trailer - Section 630.
43. U-Turn - Section 665.5.
44. Vehicle - Section 670.

Section 1A.14 Abbreviations Used on Traffic Control Devices

Standard:

When the word messages shown in Table 1A-1 need to be abbreviated in connection with traffic control devices, the abbreviations shown in Table 1A-1 shall be used.

Guidance:

The abbreviations for the words listed in Table 1A-2 should not be used in connection with traffic control devices unless the prompt word shown in Table 1A-2 either precedes or follows the abbreviation.

Standard:

The abbreviations shown in Table 1A-3 shall not be used in connection with traffic control devices because of their potential to be misinterpreted by road users.

Guidance:

Where multiple abbreviations are permitted in Tables 1A-1 or 1A-2, the same abbreviation should be used throughout a single jurisdiction.

Figure 1A-1. Example of Process for Requesting and Conducting Experimentations for New Traffic Control Devices

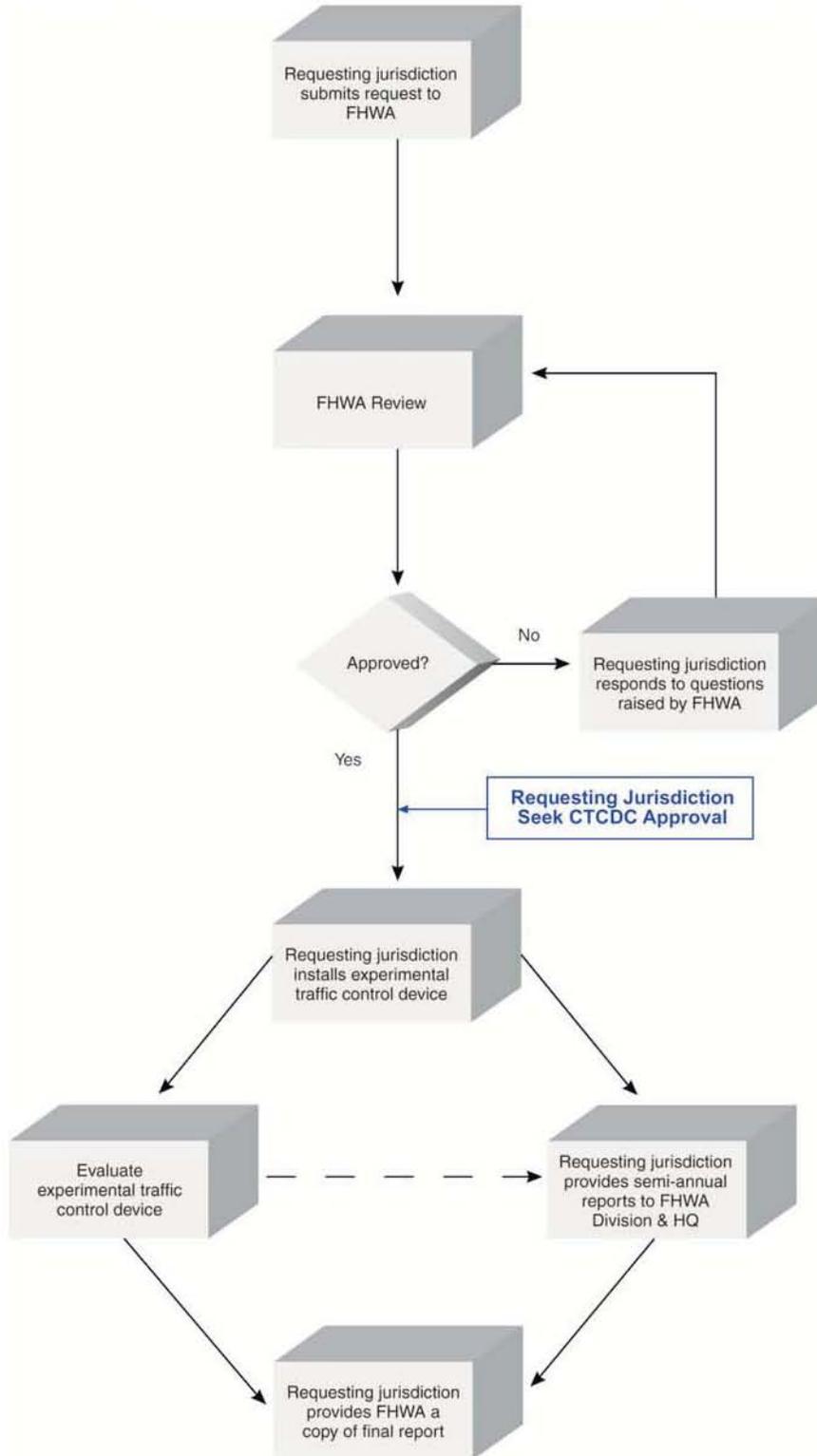


Figure 1A-1 (CA). Example for Requesting and Conducting Experimentations for New Traffic Control Devices in California

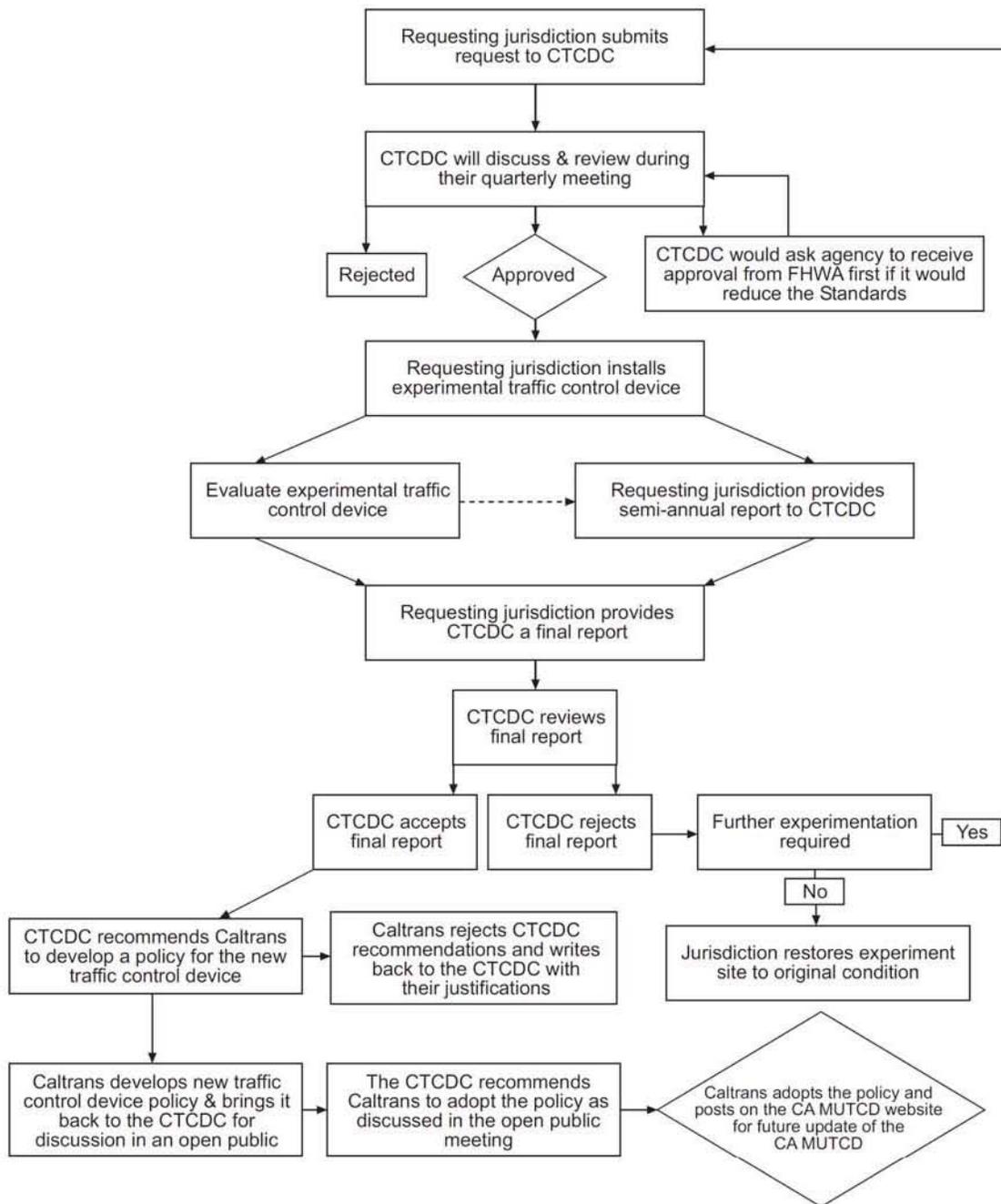


Figure 1A-2. Example of Process for Incorporating New Traffic Control Devices into the MUTCD

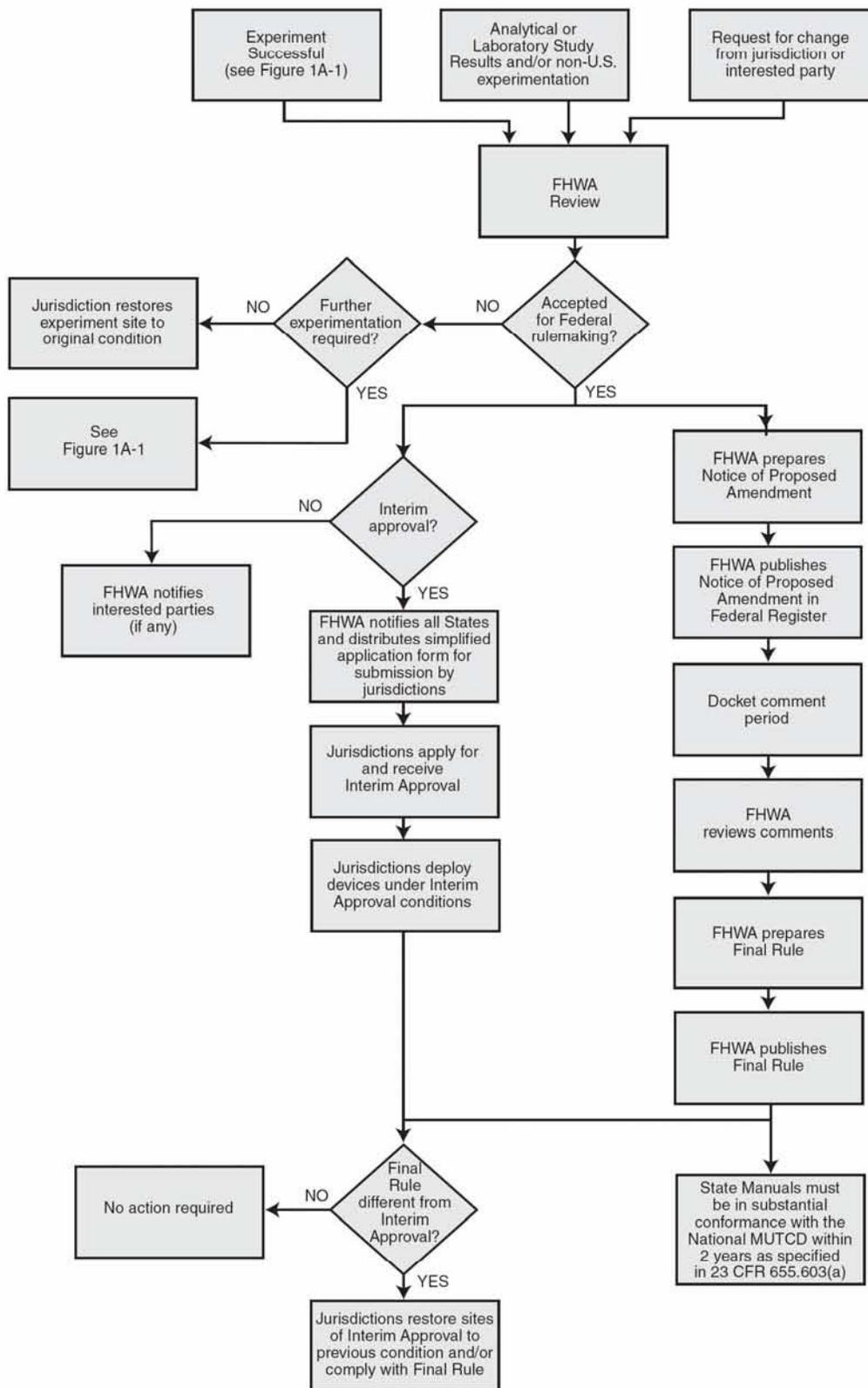
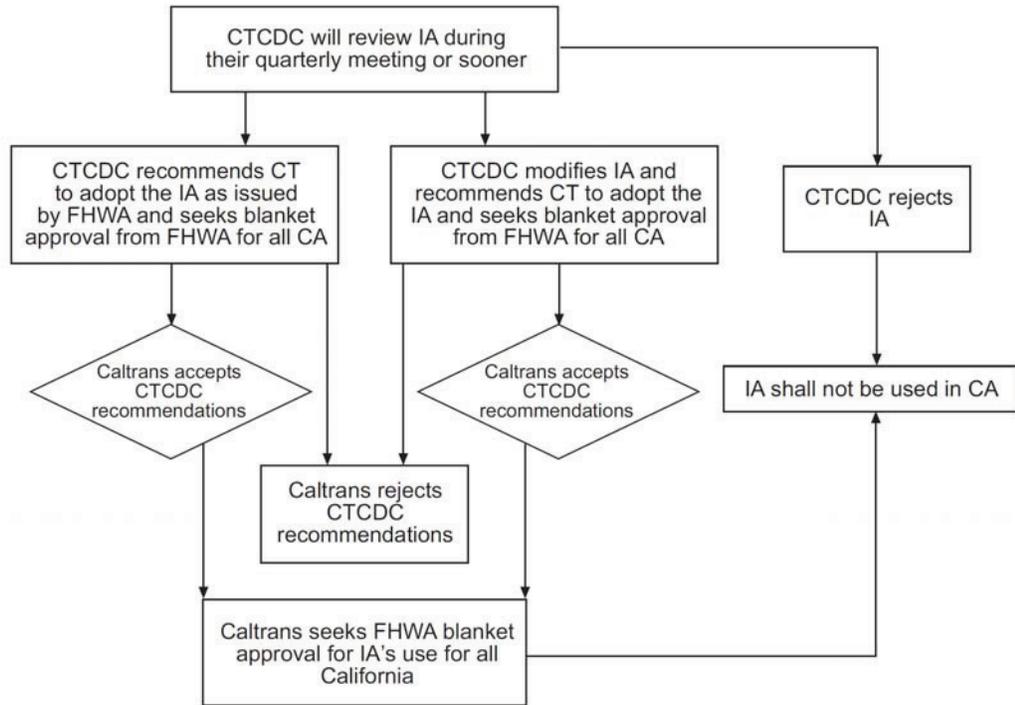


Figure 1A-2 (CA). Example for Process for the Use of Traffic Control Devices in California Approved as Interim Approval (IA) by FHWA



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Table 1A-1. Acceptable Abbreviations

Word Message	Standard Abbreviation	Word Message	Standard Abbreviation
Afternoon / Evening	PM	Maintenance	MAINT
Alternate	ALT	Meter(s)	m
Avenue	AVE, AV	Metric Ton	t
Bicycle	BIKE	Mile(s)	MI
Boulevard	BLVD	Miles Per Hour	MPH
Cannot	CANT	Minute(s)	MIN
CB Radio	CB	Monday	MON
Center	CNTR	Morning / Late Night	AM
Circle	CIR	Normal	NORM
Civil Defense	CD	North	N
Compressed Natural Gas	CNG	Northbound	N-BND
Court	CT	Parking	PKING
Crossing (other than highway-rail)	XING	Parkway	PKWY
Diesel Fuel	D	Pedestrian	PED
Do Not	DONT	Place	PL
Drive	DR	Pounds	LBS
East	E	Right	RHT
Eastbound	E-BND	Road	RD
Electric Vehicle	EV	Saturday	SAT
Emergency	EMER	Service	SERV
Entrance, Enter	ENT	Shoulder	SHLDR
Expressway	EXPWY	Slippery	SLIP
Feet	FT	South	S
FM Radio	FM	Southbound	S-BND
Freeway	FRWY, FWY	Speed	SPD
Friday	FRI	Street	ST
Hazardous Material	HAZMAT	Sunday	SUN
High Occupancy Vehicle	HOV	Telephone	PHONE
Highway	HWY	Temporary	TEMP
Highway-Rail Grade Crossing Pavement Marking	RXR	Terrace	TER
Hospital	H	Thursday	THURS
Hour(s)	HR	Tires With Lugs	LUGS
Information	INFO	Tons of Weight	T
Inherently Low Emission Vehicle	ILEV	Traffic	TRAF
It Is	ITS	Trail	TR
Junction / Intersection	JCT	Travelers	TRAVLRS
Kilogram	kg	Tuesday	TUES
Kilometer(s)	km	Two-Way Intersection	2-WAY
Kilometers Per Hour	km/h	Two-Wheeled Vehicles	CYCLES
Lane	LN	US Numbered Route	US
Left	LFT	Vehicle(s)	VEH
Liquid Propane Gas	LP-GAS	Warning	WARN
		Wednesday	WED
		West	W
		Westbound	W-BND
		Will Not	WONT

**Table 1A-2. Abbreviations That Are Acceptable
Only with a Prompt Word**

Word	Abbreviation	Prompt Word
Access	ACCS	Road
Ahead	AHD	Fog*
Blocked	BLKD	Lane*
Bridge	BRDG	[Name]*
Chemical	CHEM	Spill
Condition	COND	Traffic*
Congested	CONG	Traffic*
Construction	CONST	Ahead
Downtown	DWNTN	Traffic
Exit	EX, EXT	Next*
Express	EXP	Lane
Frontage	FRNTG	Road
Hazardous	HAZ	Driving
Interstate	I	[Number]
Local	LOC	Traffic
Lower	LWR	Level
Major	MAJ	Accident
Minor	MNR	Accident
Oversized	OVRSZ	Load
Prepare	PREP	To Stop
Pavement	PVMT	Wet*
Quality	QLTY	Air*
Roadwork	RDWK	Ahead [Distance]
Route	RT, RTE	Best*
Township	TWNSHP	Limits
Turnpike	TRNPK	[Name]*
Upper	UPR	Level

* These prompt words should precede the abbreviation

Table 1A-3. Unacceptable Abbreviations

Abbreviation	Intended Word	Common Misinterpretations
ACC	Accident	Access (Road)
CLRS	Clears	Colors
DLY	Delay	Daily
FDR	Feeder	Federal
L	Left	Lane (Merge)
LT	Light (Traffic)	Left
PARK	Parking	Park
POLL	Pollution (Index)	Poll
RED	Reduce	Red
STAD	Stadium	Standard
WRNG	Warning	Wrong

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California Manual on Uniform Traffic Control Devices

for Streets and Highways

(FHWA's MUTCD 2003 Edition
including Revisions 1 and 2,
as amended for use in California)

PART 8

Traffic Controls for
Highway-Rail Grade Crossings



STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION

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**PART 8. TRAFFIC CONTROLS FOR
HIGHWAY-RAIL GRADE CROSSINGS**

TABLE OF CONTENTS

		<u>Page</u>
CHAPTER 8A.	GENERAL	
Section 8A.01	Introduction	8A-1
Section 8A.02	Use of Standard Devices, Systems, and Practices	8A-3
Section 8A.03	Uniform Provisions	8A-3
Section 8A.04	Highway-Rail Grade Crossing Elimination	8A-4
Section 8A.05	Temporary Traffic Control Zones	8A-4
Section 8A.101(CA)	Relation to Other Documents	8A-5
CHAPTER 8B.	SIGNS AND MARKINGS	
Section 8B.01	Purpose	8B-1
Section 8B.02	Sizes of Grade Crossing Signs	8B-1
Section 8B.03	Highway-Rail Grade Crossing (Crossbuck) Sign (R15-1) and Number of Tracks Sign (R15-2)	8B-1
Section 8B.04	Highway-Rail Grade Crossing Advance Warning Signs (W10 Series)	8B-2
Section 8B.05	EXEMPT Highway-Rail Grade Crossing Signs (R15-3, W10-1a)	8B-3
Section 8B.06	Turn Restrictions During Preemption	8B-3
Section 8B.07	DO NOT STOP ON TRACKS Sign (R8-8)	8B-4
Section 8B.08	STOP (R1-1) or YIELD (R1-2) Signs at Highway-Rail Grade Crossings	8B-4
Section 8B.09	TRACKS OUT OF SERVICE Sign (R8-9)	8B-5
Section 8B.10	STOP HERE WHEN FLASHING Sign (R8-10)	8B-5
Section 8B.11	STOP HERE ON RED Sign (R10-6)	8B-5
Section 8B.12	Emergency Notification Sign (I-13 or I-13a)	8B-5
Section 8B.13	TRAINS MAY EXCEED 130 km/h (80 MPH) Sign (W10-8)	8B-6
Section 8B.14	NO TRAIN HORN Sign (W10-9)	8B-6
Section 8B.15	NO SIGNAL Sign (W10-10) or NO GATES OR LIGHTS Sign (W10-13)	8B-6
Section 8B.16	LOOK Sign (R15-8)	8B-6
Section 8B.17	Low Ground Clearance Highway-Rail Grade Crossing Sign (W10-5)	8B-6
Section 8B.18	Storage Space Signs (W10-11, W10-11a, W10-11b)	8B-7
Section 8B.19	Skewed Crossing Sign (W10-12)	8B-7
Section 8B.20	Pavement Markings	8B-8
Section 8B.21	Stop Lines	8B-8
Section 8B.22	Dynamic Envelope Markings	8B-8
Section 8B.101(CA)	Train Station Signs (I-7, G95F(CA), G95G(CA) and G97A(CA))	8B-9
CHAPTER 8C.	ILLUMINATION	
Section 8C.01	Illumination at Highway-Rail Grade Crossings	8C-1

		<u>Page</u>
CHAPTER 8D.	FLASHING-LIGHT SIGNALS, GATES, AND TRAFFIC CONTROL SIGNALS	
Section 8D.01	Introduction	8D-1
Section 8D.02	Flashing-Light Signals, Post-Mounted	8D-1
Section 8D.03	Flashing-Light Signals, Overhead Structures	8D-2
Section 8D.04	Automatic Gates	8D-2
Section 8D.05	Four-Quadrant Gate Systems	8D-3
Section 8D.06	Train Detection	8D-4
Section 8D.07	Traffic Control Signals at or Near Highway-Rail Grade Crossings	8D-5
 <u>FIGURES</u>		
CHAPTER 8A.	GENERAL	
Figure 8A-1	Train Dynamic Envelope	8A-5
CHAPTER 8B.	SIGNS AND MARKINGS	
Figure 8B-1	Highway-Rail Grade Crossing (Crossbuck) Regulatory Signs	8B-10
Figure 8B-2	Advance Warning Signs	8B-11
Figure 8B-3	Regulatory Signs	8B-11
Figure 8B-3(CA)	Regulatory Signs	8B-12
Figure 8B-4	Emergency Notification Signs	8B-13
Figure 8B-5	Warning Signs	8B-13
Figure 8B-6	Example of Placement of Warning Signs and Pavement Markings at Highway-Rail Grade Crossings	8B-14
Figure 8B-6 (CA)	Examples of Placement of Warning Signs and Pavement Markings at Highway-Rail Grade Crossings	8B-15
Figure 8B-7	Examples of Highway-Rail Grade Crossing Pavement Markings	8B-18
Figure 8B-7 (CA)	Examples of Highway-Rail Grade Crossing Pavement Markings	8B-19
Figure 8B-8	Typical Train Dynamic Envelope Pavement Markings	8B-20
Figure 8B-101(CA)	California Warning Signs and Train Station Signs	8B-20
CHAPTER 8D.	FLASHING-LIGHT SIGNALS, GATES, AND TRAFFIC CONTROL SIGNALS	
Figure 8D-1	Composite Drawing of Active Traffic Control Devices for Highway-Rail Grade Crossings Showing Clearances	8D-7
Figure 8D-2	Example of Location Plan for Flashing-Light Signals and Four-Quadrant Gates	8D-8
 <u>TABLES</u>		
CHAPTER 8B.	SIGNS AND MARKINGS	
Table 8B-1	Sign Sizes for Grade Crossing Signs	8B-21
Table 8B-1(CA)	California Sign Sizes for Grade Crossing Signs	8B-22

CHAPTER 8A. GENERAL

Section 8A.01 Introduction

Support:

Traffic control for highway-rail grade crossings includes all signs, signals, markings, other warning devices, and their supports along highways approaching and at highway-rail grade crossings. The function of this traffic control is to permit reasonably safe and efficient operation of both rail and highway traffic at highway-rail grade crossings.

For purposes of installation, operation, and maintenance of traffic control devices at highway-rail grade crossings, it is recognized that the crossing of the highway and rail tracks is situated on a right-of-way available for the joint use of both highway traffic and railroad traffic.

~~The highway agency or authority with jurisdiction and the regulatory agency with statutory authority, if applicable, jointly determine the need and selection of devices at a highway-rail grade crossing.~~

A diagnostic team, consisting of knowledgeable representatives of parties of interest in a highway-rail grade crossing, using crossing safety management principles, evaluates conditions at a grade crossing to make determinations or recommendations concerning safety needs at the crossing. The diagnostic team needs to, at a minimum, include representatives of the highway agency or authority with jurisdiction over the roadway, the railroad agency, and the California Public Utilities Commission (CPUC), which is the state regulatory agency with statutory authority over highway-rail grade crossings. The removal, reduction, addition, or change in the type of warning devices at each public at-grade crossing, or publicly used private at-grade crossing (as determined by CPUC or a court competent jurisdiction), must be authorized by CPUC. This includes any changes that can affect interconnections with adjacent traffic signals, or any other modification that may impact the safety of the grade crossing. Refer to Public Utilities Code Sections 1201 through 1205 and 7537, and CPUC General Orders 75 and 88, as amended.

In Part 8, the combination of devices selected or installed at a specific highway-rail grade crossing is referred to as a "traffic control system."

Standard:

The traffic control devices, systems, and practices described herein shall be used at all highway-rail grade crossings open to public travel, consistent with Federal, State, and local laws and regulations.

To promote an understanding of common terminology between highway and railroad signaling issues, the following definitions shall be used:

- 1. Advance Preemption**—the notification of an approaching train that is forwarded to the highway traffic signal controller unit or assembly by the railroad equipment in advance of the activation of the railroad warning devices.
- 2. Advance Preemption Time**—the period of time that is the difference between the required maximum highway traffic signal preemption time and the activation of the railroad warning devices.
- 3. Cantilevered Signal Structure**—a structure that is rigidly attached to a vertical pole and is used to provide overhead support of signal units.
- 4. Clear Storage Distance**—the distance available for vehicle storage measured between 1.8 m (6 ft) from the rail nearest the intersection to the intersection stop line or the normal stopping point on the highway. At skewed highway-rail grade crossings and intersections, the 1.8 m (6 ft) distance shall be measured perpendicular to the nearest rail either along the centerline or edge line of the highway, as appropriate, to obtain the shorter distance. Where exit gates are used, the distance available for vehicle storage is measured from the point where the rear of the vehicle would be clear of the exit gate arm. In cases where the exit gate arm is parallel to the track(s) and is not perpendicular to the highway, the distance is measured either along the centerline or edge line of the highway, as appropriate, to obtain the shorter distance.
- 5. Design Vehicle**—the longest vehicle permitted by statute of the road authority (State or other) on that roadway.
- 6. Dynamic Envelope**—the clearance required for the train and its cargo overhang due to any combination of loading, lateral motion, or suspension failure (see Figure 8A-1).

- 7. Dynamic Exit Gate Operating Mode**—a mode of operation where the exit gate operation is based on the presence of vehicles within the minimum track clearance distance.
- 8. Exit Gate Clearance Time**—for Four-Quadrant Gate systems, the exit gate clearance time is the amount of time provided to delay the descent of the exit gate arm(s) after entrance gate arm(s) begin to descend.
- 9. Exit Gate Operating Mode**—for Four-Quadrant Gate systems, the mode of control used to govern the operation of the exit gate arms.
- 10. Flashing-Light Signals**—a warning device consisting of two red signal indications arranged horizontally that are activated to flash alternately when a train is approaching or present at a highway-rail grade crossing.
- 11. Interconnection**—the electrical connection between the railroad active warning system and the highway traffic signal controller assembly for the purpose of preemption.
- 12. Maximum Highway Traffic Signal Preemption Time**—the maximum amount of time needed following initiation of the preemption sequence for the highway traffic signals to complete the timing of the right-of-way transfer time, queue clearance time, and separation time.
- 13. Minimum Track Clearance Distance**—for standard two-quadrant railroad warning devices, the minimum track clearance distance is the length along a highway at one or more railroad tracks, measured either from the highway stop line, warning device, or 3.7 m (12 ft) perpendicular to the track centerline, to 1.8 m (6 ft) beyond the track(s) measured perpendicular to the far rail, along the centerline or edge line of the highway, as appropriate, to obtain the longer distance. For Four- Quadrant Gate systems, the minimum track clearance distance is the length along a highway at one or more railroad tracks, measured either from the highway stop line or entrance warning device, to the point where the rear of the vehicle would be clear of the exit gate arm. In cases where the exit gate arm is parallel to the track(s) and is not perpendicular to the highway, the distance is measured either along the centerline or edge of the highway, as appropriate, to obtain the longer distance.
- 14. Minimum Warning Time—Through Train Movements**—the least amount of time active warning devices shall operate prior to the arrival of a train at a highway-rail grade crossing.
- 15. Preemption**—the transfer of normal operation of highway traffic signals to a special control mode.
- 16. Pre-signal**—supplemental highway traffic signal faces operated as part of the highway intersection traffic signals, located in a position that controls traffic approaching the highway-rail grade crossing in advance of the intersection.
- 17. Queue Clearance Time**—the time required for the design vehicle of maximum length stopped just inside the minimum track clearance distance to start up and move through and clear the entire minimum track clearance distance. If presignals are present, this time shall be long enough to allow the vehicle to move through the intersection, or to clear the tracks if there is sufficient clear storage distance. If a Four-Quadrant Gate system is present, this time shall be long enough to permit the exit gate arm to lower after the design vehicle is clear of the minimum track clearance distance.
- 18. Right-of-Way Transfer Time**—the maximum amount of time needed for the worst case condition, prior to display of the track clearance green interval. This includes any railroad or highway traffic signal control equipment time to react to a preemption call, and any traffic control signal green, pedestrian walk and clearance, yellow change, and red clearance intervals for conflicting traffic.
- 19. Separation Time**—the component of maximum highway traffic signal preemption time during which the minimum track clearance distance is clear of vehicular traffic prior to the arrival of the train.
- 20. Simultaneous Preemption**—notification of an approaching train is forwarded to the highway traffic signal controller unit or assembly and railroad active warning devices at the same time.
- 21. Timed Exit Gate Operating Mode**—a mode of operation where the exit gate descent is based on a predetermined time interval.

- 22. Vehicle Intrusion Detection Devices**—a detector or detectors used as a part of a system incorporating processing logic to detect the presence of vehicles within the minimum track clearance distance and to control the operation of the exit gates.
- 23. Wayside Equipment**—the signals, switches, and/or control devices for railroad operations housed within one or more enclosures located along the railroad right-of-way and/or on railroad property.

Section 8A.02 Use of Standard Devices, Systems, and Practices

Support:

Because of the large number of significant variables to be considered, no single standard system of traffic control devices is universally applicable for all highway-rail grade crossings.

Guidance:

~~The appropriate traffic control system to be used at a highway-rail grade crossing should be determined by an engineering study involving both the highway agency and the railroad company.~~

Option:

The engineering study may include the Highway-Rail Intersection (HRI) components of the National Intelligent Transportation Systems (ITS) architecture, which is a USDOT accepted method for linking the highway, vehicles, and traffic management systems with rail operations and wayside equipment.

Support:

More detail on Highway-Rail Intersection components is available from USDOT's Federal Railroad Administration, 1120 Vermont Ave., NW, Washington, DC 20590, or www.fra.dot.gov.

Standard:

Traffic control devices, systems, and practices shall be consistent with the design and application of the Standards contained herein.

~~Before any new highway-rail grade crossing traffic control system is installed or before modifications are made to an existing system, approval shall be obtained from the highway agency with the jurisdictional and/or statutory authority, and from the railroad company.~~

Before any new highway-rail grade crossing traffic control system is installed or before modifications are made to an existing system, approval shall be obtained from the California Public Utilities Commission. Refer to CPUC General Order 88, as amended, and Public Utilities Code Sections 1201 through 1205 and 7537.

Guidance:

To stimulate effective responses from vehicle operators and pedestrians, these devices, systems, and practices should use the five basic considerations employed generally for traffic control devices and described fully in Section 1A.02: design, placement, operation, maintenance, and uniformity.

Support:

Many other details of highway-rail grade crossing traffic control systems that are not set forth in Part 8 are contained in the publications listed in Section 1A.11.

Section 8A.03 Uniform Provisions

Standard:

All signs used in highway-rail grade crossing traffic control systems shall be retroreflectorized or illuminated as described in Section 2A.08 to show the same shape and similar color to an approaching road user during both day and night.

No sign or signal shall be located in the center of an undivided highway, except in a raised island.

Guidance:

Such signs or signals should be installed with a clearance of at least 0.6 m (2 ft) from the outer edge of the raised island to the nearest edge of the sign or signal, except as allowed in Section 2A.19.

Where the distance between tracks, measured along the highway between the inside rails, exceeds 30 m (100 ft), additional signs or other appropriate traffic control devices should be used.

Section 8A.04 Highway-Rail Grade Crossing Elimination

Guidance:

Because highway-rail grade crossings are a potential source of crashes and congestion, agencies should conduct engineering studies to determine the cost and benefits of eliminating these crossings.

Standard:

When a highway-rail grade crossing is eliminated, the traffic control devices for the crossing shall be removed.

If the existing traffic control devices at a multiple-track highway-rail grade crossing become improperly placed or inaccurate because of the removal of some of the tracks, the existing devices shall be relocated and/or modified.

Guidance:

Any highway-rail grade crossing that cannot be justified should be eliminated.

Where a roadway is removed from a highway-rail grade crossing, the roadway approaches in the railroad right-of-way should also be removed and appropriate signs should be placed at the roadway end in accordance with Section 3C.04.

Where a railroad is eliminated at a highway-rail grade crossing, the tracks should be removed or paved over.

Option:

Based on engineering judgment, the TRACKS OUT OF SERVICE (R8-9) sign (see Figure 8B-3) may be temporarily installed until the tracks are removed or paved over. The length of time before the tracks will be removed or paved over may be considered in making the decision as to whether to install the sign.

Section 8A.05 Temporary Traffic Control Zones

Support:

Temporary traffic control planning provides for continuity of operations (such as movement of traffic, pedestrians and bicycles, transit operations, and access to property/utilities) when the normal function of a roadway at a highway-rail grade crossing is suspended because of temporary traffic control operations.

Standard:

Traffic controls for temporary traffic control zones that include highway-rail grade crossings shall be as outlined in Part 6.

When a highway-rail grade crossing exists either within or in the vicinity of a temporary traffic control zone, lane restrictions, flagging, or other operations shall not be performed in a manner that would cause vehicles to stop on the railroad tracks, unless a law enforcement officer or flagger is provided at the highway-rail grade crossing to minimize the possibility of vehicles stopping on the tracks, even if automatic warning devices are in place.

Guidance:

Public and private agencies, including emergency services, businesses, and railroad companies, should meet to plan appropriate traffic detours and the necessary signing, marking, and flagging requirements for operations during temporary traffic control zone activities. Consideration should be given to the length of time that the highway-rail grade crossing is to be closed, the type of rail and highway traffic affected, the time of day, and the materials and techniques of repair.

Temporary traffic control operations should minimize the inconvenience, delay, and crash potential to affected traffic. Prior notice should be given to affected public or private agencies, emergency services, businesses, railroad companies, and road users before the free movement of vehicles or trains is infringed upon or blocked.

Temporary traffic control zone activities should not be permitted to extensively prolong the closing of the highway-rail grade crossing.

The width, grade, alignment, and riding quality of the highway surface at a highway-rail grade crossing should, at a minimum, be restored to correspond with the quality of the approaches to the highway-rail grade crossing.

Section 8A.101(CA) Relation to Other Documents

Support:

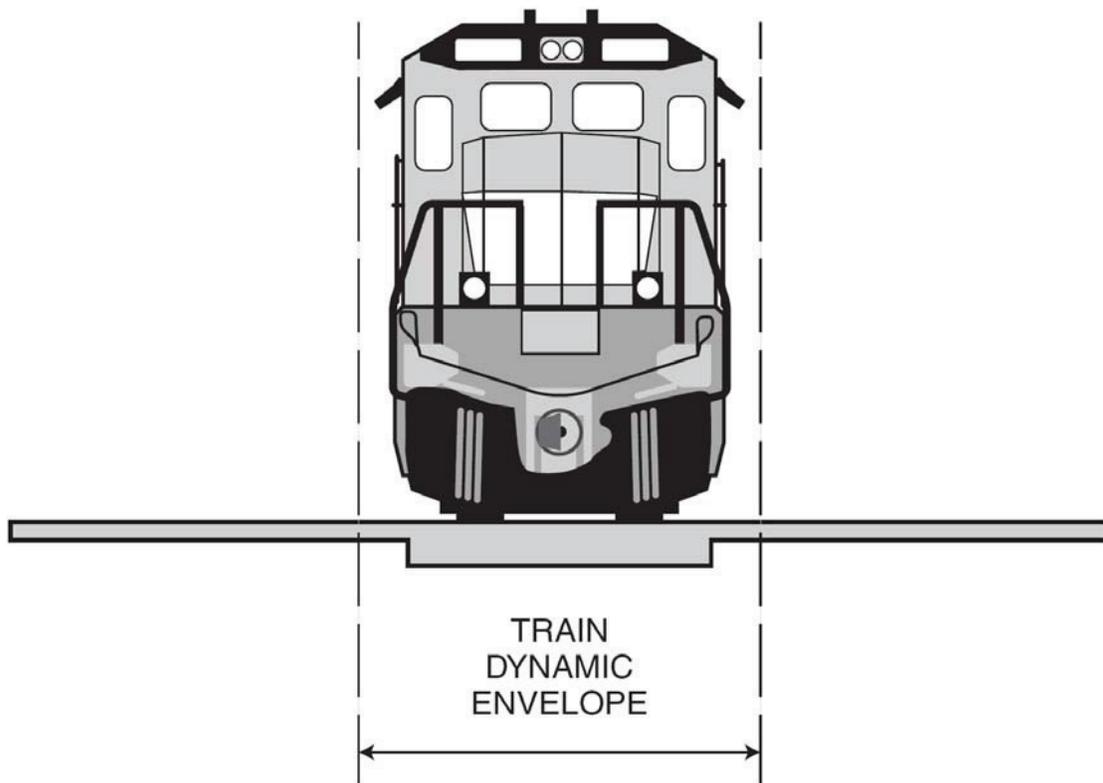
The following documents are useful sources of information:

- A. "Preemption of Traffic Signals at or near Railroad Grade Crossings with Active Warning Devices – A Recommended Practice", Institute of Transportation Engineers (ITE), Committee TENC-4M-35, 1997.
- B. "Traffic Signal Operations Near Highway-Rail Grade Crossings" NCHRP 271, Synthesis 271, Transportation Research Board (TRB), 1996.
- C. "Guidance on Traffic Control Devices at Highway-Rail Grade Crossings", USDOT Technical Working Group (TWG) for Highway Rail Grade Crossings, November 2002. Available from USDOT's web site.

The following regulations govern warning devices at highway-rail grade crossings in the State and are available through the California Public Utilities Commission's website:

- A. General Order No. 75, as amended, REGULATIONS GOVERNING STANDARDS FOR WARNING DEVICES FOR AT-GRADE HIGHWAY-RAIL CROSSINGS IN THE STATE OF CALIFORNIA, Public Utilities Commission of the State of California.
- B. General Order No. 88, as amended, RULES FOR ALTERING PUBLIC HIGHWAY-RAIL CROSSINGS, Public Utilities Commission of the State of California.
- C. General Order No. 145, as amended, REGULATIONS GOVERNING RAILROAD GRADE CROSSINGS TO BE CLASSIFIED EXEMPT FROM THE MANDATORY STOP REQUIREMENTS OF SECTION 22452 OF THE VEHICLE CODE, Public Utilities Commission of the State of California.

Figure 8A-1. Train Dynamic Envelope



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CHAPTER 8B. SIGNS AND MARKINGS

Section 8B.01 Purpose

Support:

Passive traffic control systems, consisting of signs and pavement markings, identify and direct attention to the location of a highway-rail grade crossing and advise motorists, bicyclists, and pedestrians to take appropriate action.

Section 8B.02 Sizes of Grade Crossing Signs

Standard:

The sizes of grade crossing signs shall be as shown in Table 8B-1.

Option:

Signs larger than those shown in Table 8B-1 may be used (see Section 2A.12).

Section 8B.03 Highway-Rail Grade Crossing (Crossbuck) Sign (R15-1) and Number of Tracks Sign (R15-2)

Standard:

The Highway-Rail Grade Crossing (R15-1) sign, commonly identified as the Crossbuck sign, shall be retroreflectorized white with the words RAILROAD CROSSING in black lettering, mounted as shown in Figure 8B-1.

As a minimum, one Crossbuck sign shall be used on each highway approach to every highway-rail grade crossing, alone or in combination with other traffic control devices.

~~If automatic gates are not present and if there are two or more tracks at the highway-rail grade crossing, the number of tracks shall be indicated on a supplemental Number of Tracks (R15-2) sign of inverted T shape mounted below the Crossbuck sign in the manner and at the height indicated in Figure 8B-1.~~

Option:

~~The supplemental Number of Tracks sign may also be used at highway-rail grade crossings with automatic gates.~~

Standard:

If there are two or more tracks at the highway-rail grade crossing, the number of tracks shall be indicated on a supplemental Number of Tracks (R15-2) sign of inverted T shape mounted below the Crossbuck (R15-1) sign in the manner and at the height indicated in Figure 8B-1.

The Crossbuck sign shall be installed on the right side of the highway on each approach to the highway-rail grade crossing. Where restricted sight distance or unfavorable highway geometry exists on an approach to a highway-rail grade crossing, an additional Crossbuck sign shall be installed on the left side of the highway, possibly placed back-to-back with the Crossbuck sign for the opposite approach, or otherwise located so that two Crossbuck signs are displayed for that approach.

A strip of retroreflective white material not less than 50 mm (2 in) in width shall be used on the back of each blade of each Crossbuck sign for the length of each blade, at all highway-rail grade crossings, except those where Crossbuck signs have been installed back-to-back.

A strip of retroreflective white material, not less than 50 mm (2 in) in width, shall be used on each support at passive highway-rail grade crossings for the full length of the front and back of the support from the Crossbuck sign or Number of Tracks sign to within 0.6 m (2 ft) above the edge of the roadway, except on the side of those supports where a STOP (R1-1) or YIELD (R1-2) sign or flashing lights have been installed or on the back side of supports for Crossbuck signs installed on one-way streets.

Guidance:

Crossbuck signs should be located with respect to the highway pavement or shoulder in accordance with the criteria in Chapter 2A and Figures 2A-1 and ~~2A-2~~ 2A-2(CA), and should be located with respect to the nearest track in accordance with Figure 8D-2.

The minimum lateral clearance for the nearest edge of the Crossbuck sign should be 1.8 m (6 ft) from the edge of the shoulder or 3.7 m (12 ft) from the edge of the traveled way in rural areas (whichever is greater), and 0.6 m (2 ft) from the face of the curb in urban areas.

Where unusual conditions make variations in location and lateral clearance appropriate, engineering judgment should be used to provide the best practical combination of view and safety clearances.

Section 8B.04 Highway-Rail Grade Crossing Advance Warning Signs (W10 Series)

Standard:

A Highway-Rail Grade Crossing Advance Warning (W10-1) sign (see Figure 8B-2) shall be used on each highway in advance of every highway-rail grade crossing except in the following circumstances:

- A. On an approach to a highway-rail grade crossing from a T-intersection with a parallel highway, if the distance from the edge of the track to the edge of the parallel roadway is less than 30 m (100 ft), and W10-3 signs are used on both approaches of the parallel highway; or**
- ~~B. On low-volume, low-speed highways crossing minor spurs or other tracks that are infrequently used and are flagged by train crews; or~~ Refer to CVC 21362.**
- ~~C. In business districts where active highway-rail grade crossing traffic control devices are in use; or~~ Refer to CVC 21362.**
- ~~D. Where physical conditions do not permit even a partially effective display of the sign.~~ Refer to CVC 21362.**

~~Placement of the Highway-Rail Grade Crossing Advance Warning sign shall be in accordance with Chapter 2A and Table 2C-4.~~

Placement of the Highway-Rail Grade Crossing Advance Warning (W10 Series) sign shall be in accordance with Figure 8B-6(CA).

Option:

On divided highways and one-way streets, an additional W10-1 sign may be installed on the left side of the roadway.

Standard:

If the distance between the railroad tracks and a parallel highway, from the edge of the tracks to the edge of the parallel roadway, is less than 30 m (100 ft), W10-2, W10-3, or W10-4 signs (see Figure 8B-2) shall be installed on each approach of the parallel highway to warn road users making a turn that they will encounter a highway-rail grade crossing soon after making a turn, and a W10-1 sign for the approach to the tracks shall not be required to be between the tracks and the parallel highway.

If the W10-2, W10-3, or W10-4 signs are used, sign placement in accordance with the guidelines for Intersection Warning signs in Table 2C-4 using the speed of through traffic shall be measured from the highway intersection.

Guidance:

If the distance between the railroad tracks and the parallel highway, from the edge of the tracks to the edge of the parallel roadway, is 30 m (100 ft) or more, a W10-1 sign should be installed in advance of the highway-rail grade crossing, and the W10-2, W10-3, or W10-4 signs should not be used on the parallel highway.

Standard:

The Number of Tracks (W48(CA)) sign shall be placed below the Highway-Rail Grade Crossing Advance Warning (W10-1) sign at grade crossings with two or more tracks.

Option:

The Number of Tracks (W48(CA)) sign may be placed below the Highway-Rail Grade Crossing Advance Warning (W10-2, W10-3, or W10-4) sign at grade crossings with two or more tracks.

Support:

The Number of Tracks (W48(CA)) sign is shown in Figure 8B-101(CA).

Section 8B.05 EXEMPT Highway-Rail Grade Crossing Signs (R15-3, W10-1a)

Option:

When authorized by law or regulation, a supplemental EXEMPT (R15-3) sign (see Figure 8B-3) with a white background bearing the word EXEMPT may be used below the Crossbuck sign or Number of Tracks sign, if present, at the highway-rail grade crossing, and a supplemental EXEMPT (W10-1a) sign (see Figure 8B-5) with a yellow background bearing the word EXEMPT may be used below the Highway-Rail Advance Warning (W10-1) sign.

Support:

~~These supplemental signs inform drivers of vehicles carrying passengers for hire, school buses carrying students, or vehicles carrying hazardous materials that a stop is not required at certain designated highway-rail grade crossings, except when a train, locomotive, or other railroad equipment is approaching or occupying the highway-rail grade crossing, or the driver's view is blocked.~~

Standard:

Highway-rail grade crossings shall be established as "exempt" from the stop requirements specified in CVC 22452 only with authorization of the California Public Utilities Commission (CPUC), pursuant to CVC 22452.5 and CPUC General Order 145, as amended.

The EXEMPT (W10-1a) sign (see Figure 8B-5), having a yellow background with black legend, shall be placed and maintained by the roadway authority below Highway-Rail Grade Crossing Advance Warning (W10 series) signs on each approach to an exempt crossing that was established after January 1, 1978. This sign shall not be replaced with a W46A(CA) black background with yellow legend sign or R15-3 white background with black legend sign.

The EXEMPT (W46A(CA)) sign (see Figure 8B-101(CA)), having a black background with yellow legend, shall be placed and maintained by the roadway authority below the Highway-Rail Grade Crossing Advance Warning (W10 series) signs on each approach to an exempt crossing that was established prior to January 1, 1978. The W46A(CA) sign displays the word EXEMPT above the crossing number assigned by the CPUC to the crossing which the sign governs. This sign shall have dimensions of 375mm (15 in) in width and 225 mm (9 in) in height. This W46A (CA) sign shall not be replaced with a W10-1a sign unless authorized by the CPUC.

The EXEMPT (R15-3) sign (see Figure 8B-3), having a white background with black legend, shall not be used.

Support:

These EXEMPT signs (W10-1a, W46A(CA)) inform drivers of certain vehicles that a stop may not be required at certain designated highway-rail grade crossings, per the CVC 22452.

At crossings where the W10-1a sign is installed, the CVC provides that any vehicle listed in CVC 22452(a), other than any school bus or any school pupil activity bus, is exempted from the highway-rail grade crossing stop requirements.

At crossings where the W46A (CA) sign is installed and was approved prior to January 1, 1978, the CVC provides that any vehicle listed in CVC 22452(a) is exempted from the highway-rail grade crossing stop requirements.

Section 8B.06 Turn Restrictions During Preemption

Guidance:

At a signalized intersection that is located within 60 m (200 ft) of a highway-rail grade crossing, measured from the edge of the track to the edge of the roadway, where the intersection traffic control signals are preempted by the approach of a train, all existing turning movements toward the highway-rail grade crossing should be prohibited during the signal preemption sequences.

Option:

A blank-out or changeable message sign and/or appropriate highway traffic signal indication or other similar type sign may be used to prohibit turning movements toward the highway-rail grade crossing during preemption. ~~The R3-1a and R3-2a signs shown in Figure 8B-3 may be used for this purpose.~~ The symbolic No Right Turn (R3-1) and No Left Turn (R3-2) signs and the DO NOT ENTER (R5-1) sign, as shown in 8B-3(CA) may be used as blank-out signs for this purpose.

Standard:

Turn prohibition signs that are associated with preemption shall be visible only when the highway-rail grade crossing restriction is in effect.

Support:

Left turns from a nearby signalized intersection toward a highway-rail crossing can be prohibited during railroad or light rail transit pre-emption by use of a red-left arrow display or an extinguishable R3-2 sign. Likewise, right turns from a nearby signalized intersection toward such a crossing can be prohibited by use of a red right arrow display or a extinguishable R3-1 sign. Through movements from a nearby signalized intersection toward a highway-rail crossing can be prohibited by a circular red display or an extinguishable R5-1 sign.

Refer to Section 4D.13 for railroad preemption.

Example of sign placement is shown in the ITE publication referenced in Section 8A.101(CA).

Section 8B.07 DO NOT STOP ON TRACKS Sign (R8-8)

Guidance:

Whenever engineering judgment determines that the potential for vehicles stopping on the tracks is high, a DO NOT STOP ON TRACKS (R8-8) sign (see Figure 8B-3) should be used.

The sign, if used, should be located on the right side of the highway on either the near or far side, ~~or both sides~~ of the highway-rail grade crossing, ~~as determined by engineering judgment, depending upon which side provides better visibility to approaching drivers to provide sufficient visibility to motorists approaching the crossing or motorists stopped on the crossing.~~

Option:

~~DO NOT STOP ON TRACKS signs may be placed on both sides of the track.~~

Guidance:

~~If used on~~ ~~an~~ divided highways and one-way streets, a second DO NOT STOP ON TRACKS sign ~~may~~ ~~should~~ be placed on the ~~near or far~~ left side of the ~~highway-rail grade crossing roadway~~ to further improve visibility of the sign.

Section 8B.08 STOP (R1-1) or YIELD (R1-2) Signs at Highway-Rail Grade Crossings

Option:

At the discretion of the responsible State or local highway agency, STOP (R1-1) or YIELD (R1-2) signs (see Figure 2B-1) may be used at highway-rail grade crossings that have two or more trains per day and are without automatic traffic control devices.

Support:

Two or more trains per day means an average of two or more trains per day operating over the highway-rail grade crossing for a 12-month period prior to the installation of the STOP or YIELD control sign.

Option:

For other highway-rail grade crossings with passive warning devices, STOP or YIELD signs may be used based on an engineering study.

Guidance:

The engineering study should take into consideration such factors as highway and train traffic characteristics (including volume and speed), collision history, the need for active control devices, and sight distance to the approaching train.

Option:

If a STOP or YIELD sign is installed at a highway-rail grade crossing, it may be installed on the Crossbuck post or on a separate post at a point where the vehicle is to stop, or as near to that point as practical.

Standard:

For all highway-rail grade crossings where STOP or YIELD signs are installed, the placement shall conform to the requirements of Sections 2B.06 and 2B.10. Stop Ahead (W3-1) or Yield Ahead (W3-2) Advance Warning signs (see Figure 2C-4) shall also be installed if the criteria for their installation given in Section 2C.29 is met.

STOP signs shall not be installed at any highway-rail grade crossing which is controlled by automatic traffic control devices except as provided in CVC 21355 and in the Options in this section of this Manual.

Guidance:

If used, the YIELD (R1-2) sign should be part of a sign assembly consisting of the Crossbuck (R15-1) sign and the LOOK FOR TRAINS (R106(CA)) sign as shown in Figure 8B-3(CA).

Section 8B.09 TRACKS OUT OF SERVICE Sign (R8-9)

Option:

The TRACKS OUT OF SERVICE (R8-9) sign (see Figure 8B-3) may be used at a highway-rail grade crossing instead of a Crossbuck (R15-1) sign and a Number of Tracks (R15-2) sign (see Figure 8B-1) when railroad tracks have been temporarily or permanently abandoned, but only until such time that the tracks are removed or paved over.

Standard:

~~When tracks are out of service, traffic control devices and gate arms shall be removed and the signal heads shall be removed or hooded or turned from view to clearly indicate that they are not in operation.~~

The R8-9 sign shall only be installed with authorization of the Public Utilities Commission. Upon placement of the R8-9 sign, traffic control devices and gate arms shall be removed and the signal heads shall be removed, covered, or turned from view to clearly indicate that they are not in operation.

The R8-9 sign shall be removed when the tracks have been removed or covered or when the highway-rail grade crossing is returned to service.

Section 8B.10 STOP HERE WHEN FLASHING Sign (R8-10)

Option:

The STOP HERE WHEN FLASHING (R8-10) sign (see Figure 8B-3) may be used at a highway-rail grade crossing to inform drivers of the location of the stop line or the point at which to stop when the flashing-light signals (see Section 8D.02) are activated.

Section 8B.11 STOP HERE ON RED Sign (R10-6)

Support:

The STOP HERE ON RED (R10-6) sign (see Figure 8B-3) defines and facilitates observance of stop lines at traffic control signals.

Option:

A STOP HERE ON RED sign may be used at locations where vehicles frequently violate the stop line or where it is not obvious to road users where to stop.

Guidance:

If possible, stop lines should be placed at a point where the vehicle driver has adequate sight distance along the track.

Section 8B.12 Emergency Notification Sign (I-13 or I-13a)

~~Guidance:~~

~~An Emergency Notification (I-13 or I-13a) sign (see Figure 8B-4) should be installed at all highway-rail grade crossings to provide for emergency notification. The sign should have a white message on blue background.~~

~~Location and placement should be decided cooperatively by the railroad company and the public or private highway agencies based on specific site conditions. However, these signs are typically located on the railroad right-of-way.~~

~~This sign, which is for emergency notification, should convey a clear and simple message that is visible to anyone stalled or disabled on the railroad tracks, and to anyone with other emergencies.~~

~~Support:~~

~~Examples of sign messages are shown in Figure 8B-4.~~

Standard:

An Emergency Notification (I-13 or I-13a) sign (see Figure 8B-4), including an identification number which has been assigned by the Commission and an emergency notification telephone number shall be installed and maintained by each railroad at each public grade crossing of its track. Such number shall be placed so as to be readily legible from the highway. Refer CPUC General Order 75, as amended.

Section 8B.13 TRAINS MAY EXCEED 130 km/h (80 MPH) Sign (W10-8)

Guidance:

Where trains are permitted to travel at speeds exceeding 130 km/h (80 mph), a TRAINS MAY EXCEED ~~130 km/h~~ (80 MPH) (W10-8) sign (see Figure 8B-5) should be installed facing road users approaching the highway-rail grade crossing.

If used, the TRAINS MAY EXCEED ~~130 km/h~~ (80 MPH) signs should be installed between the Highway- Rail Grade Crossing Advance Warning (W10-1) sign (see Figure 8B-2) and the highway-rail grade crossing on all approaches to the highway-rail grade crossing. The locations should be determined based on specific site conditions.

Section 8B.14 NO TRAIN HORN Sign (W10-9)

Standard:

A NO TRAIN HORN (W10-9) sign (see Figure 8B-5) shall be installed at each highway-rail grade crossing where there is a Federal Railroad Administration authorization for trains to not sound a horn. The sign shall be mounted as a supplemental plaque below the Highway-Rail Grade Crossing Advance Warning (W10-1) sign (see Figure 8B-2).

Section 8B.15 NO SIGNAL Sign (W10-10) or NO GATES OR LIGHTS Sign (W10-13)

Option:

A NO SIGNAL (W10-10) sign or a NO GATES OR LIGHTS (W10-13) sign (see Figure 8B-5) may be installed at highway-rail grade crossings that are not equipped with automated signals.

The NO SIGNAL (W10-10) sign or the NO GATES OR LIGHTS (W10-13) sign may be mounted as a supplemental plaque below the Advance Warning (W10-1) sign.

Section 8B.16 LOOK Sign (R15-8)

Option:

At highway-rail grade crossings, the LOOK (R15-8) sign (see Figure 8B-3) may be mounted as a supplemental plaque on the Crossbuck (R15-1) sign post, or as a separate sign in the immediate vicinity of the highway-rail grade crossing on the railroad right-of-way.

Support:

The LOOK (R15-8) sign is used to provide additional warning for pedestrians and bicyclists.

Section 8B.17 Low Ground Clearance Highway-Rail Grade Crossing Sign (W10-5)

Guidance:

If the highway profile conditions are sufficiently abrupt to create a hang-up situation for long wheelbase vehicles or for trailers with low ground clearance, the Low Ground Clearance Highway-Rail Grade Crossing (W10-5) sign (see Figure 8B-5) should be installed in advance of the highway-rail grade crossing.

Standard:

Because this symbol might not be readily recognizable by the public, the Low Ground Clearance Highway-Rail Grade Crossing (W10-5) warning sign shall be accompanied by an educational plaque, **LOW GROUND CLEARANCE**. The **LOW GROUND CLEARANCE** educational plaque shall remain in place for at least 3 years after the initial installation of the W10-5 sign (see Section 2A.13).

Guidance:

Auxiliary plaques such as AHEAD, NEXT CROSSING (W10-14), or USE NEXT CROSSING (W10-14a) (with appropriate arrows), or a supplemental distance plaque should be placed below the W10-5 sign at the

nearest intersecting highway where a vehicle can detour or at a point on the highway wide enough to permit a U-turn.

If engineering judgment of roadway geometric and operating conditions confirms that vehicle speeds across the railroad tracks should be below the posted speed limit, a W13-1 advisory speed plaque should be posted.

Option:

If the highway-rail grade crossing is rough, word message signs such as BUMP, DIP, or ROUGH CROSSING (W10-15) may be installed. A W13-1 advisory speed plaque may be installed below the word message sign in advance of rough crossings.

Support:

Information on railroad ground clearance requirements is also available in the "American Railway Engineering and Maintenance-of-Way Association's Engineering Manual," or the American Association of State Highway and Transportation Officials' "Policy on Geometric Design of Highways and Streets" (see Section 1A.11).

Section 8B.18 Storage Space Signs (W10-11, W10-11a, W10-11b)

Guidance:

A Storage Space (W10-11) sign supplemented by a word message storage distance (W10-11a) sign (see Figure 8B-5) should be used where there is a highway intersection in close proximity to the highway-rail grade crossing and an engineering study determines that adequate space is not available to store a design vehicle(s) between the highway intersection and the train dynamic envelope.

The Storage Space (W10-11 and W10-11a) signs should be mounted in advance of the highway-rail grade crossing at an appropriate location to advise drivers of the space available for vehicle storage between the highway intersection and the highway-rail grade crossing.

Option:

A Storage Space (W10-11b) sign (see Figure 8B-5) may be mounted beyond the highway-rail grade crossing at the highway intersection under the STOP or YIELD sign or just prior to the signalized intersection to remind drivers of the storage space between the tracks and the highway intersection.

Section 8B.19 Skewed Crossing Sign (W10-12)

Option:

The Skewed Crossing (W10-12) sign (see Figure 8B-5) may be used at a skewed highway-rail grade crossing to warn drivers that the railroad tracks are not perpendicular to the highway.

Guidance:

If the Skewed Crossing sign is used, the symbol should show the direction of the crossing (near left to far right as shown in Figure 8B-5, or the mirror image if the track goes from far left to near right). If the Skewed Crossing sign is used where the angle of the crossing is significantly different than 45 degrees, the symbol should show the approximate angle of the crossing.

Standard:

The Skewed Crossing sign shall not be used as a replacement for the required Advance Warning (W10-1) sign. If used, the Skewed Crossing sign shall supplement the W10-1 sign and shall be mounted on a separate post.

Guidance:

The Skewed Crossing (W10-12) sign should be used on State highways at skewed highway-rail grade crossings, that are skewed 30 degrees or less from the roadway centerline, to warn road users that the railroad tracks are not perpendicular to the highway.

Option:

The Skewed Crossing (W10-12) sign may be used on local streets at skewed highway-rail grade crossings, that are skewed 30 degrees or less from the roadway centerline, to warn road users that the railroad tracks are not perpendicular to the street.

Guidance:

If used, the symbol on the Skewed Crossing sign should show the direction and approximate angle of the crossing. The W10-12 sign should be erected approximately midway between the crossing and the Highway-Rail Grade Crossing Advance Warning (W10-1) sign.

Section 8B.20 Pavement Markings

Standard:

All highway-rail grade crossing pavement markings shall be retroreflectorized white. All other markings shall be in accordance with Part 3.

Pavement markings in advance of a highway-rail grade crossing shall consist of an X, the letters RR, a no-passing marking (two-lane highways where centerline markings are used), and certain transverse lines as shown in Figures ~~8B-6~~ **8B-6(CA)** and ~~8B-7~~ **8B-7(CA)**.

~~Identical markings shall be placed in each approach lane on all paved approaches to highway-rail grade crossings where signals or automatic gates are located, and at all other highway-rail grade crossings where the posted or statutory highway speed is 60 km/h (40 mph) or greater.~~

~~Pavement markings shall not be required at highway-rail grade crossings where the posted or statutory highway speed is less than 60 km/h (40 mph), or in urban areas, if an engineering study indicates that other installed devices provide suitable warning and control.~~

Identical (RXR) markings shall be placed in each approach lane on all paved approaches to highway-rail grade crossings where highway-rail crossing warning devices are installed pursuant to CPUC General Order 75, as amended.

Guidance:

~~When pavement markings are used, a portion of the X symbol should be directly opposite the Advance Warning sign. The X symbol and letters should be elongated to allow for the low angle at which they will be viewed.~~

Advance warning pavement markings should be placed with the first transverse line adjacent to the Highway-Rail Grade Crossing Advance Warning (W10-1) sign.

Figures 8B-6(CA) and 8B-7(CA) should be used for X symbol and letters details.

Option:

When justified by engineering judgment, supplemental pavement marking symbol(s) may be placed between the Advance Warning sign and the highway-rail grade crossing.

Pavement (RXR) markings may be omitted where the distance between a cross street and the track is less than 15 m (50ft).

Section 8B.21 Stop Lines

Guidance:

The stop line should be a transverse line at a right angle to the traveled way at a point where a vehicle is to stop or as near to that point as possible. The stop line should be placed approximately 2.4 m (8 ft) ~~from~~ in advance of the gate (if present), but no closer than 4.6 m (15 ft) from the nearest rail.

Stop lines should be used as shown in Figures 8B-6(CA) and 8B-7(CA).

Section 8B.22 Dynamic Envelope Markings

Option:

Dynamic envelope markings may be used to mark the edges of the dynamic envelope ~~where there is a highway intersection in close proximity to the highway-rail grade crossing and an engineering study determines that vehicles might stop within the dynamic envelope area.~~

Dynamic envelope markings may be installed at all highway-rail grade crossings, unless a Four-Quadrant Gate system (see Section 8D.05) is used.

Standard:

If used, pavement markings for indicating the dynamic envelope shall conform to Part 3 and shall be a 100 mm (4 in) normal solid white line or contrasting pavement color and/or contrasting pavement texture.

Guidance:

If used, dynamic envelope pavement markings should be placed on the highway 1.8 m (6 ft) from the nearest rail, installed parallel to the tracks, unless the operating railroad company advises otherwise. The pavement markings should extend across the roadway as shown in Figure ~~8B-8~~ 8B-6(CA).

Section 8B.101(CA) Train Station Signs (I-7, G95F(CA), G95G(CA) and G97A(CA))

Option:

The Train Station (I-7) sign may be used to direct motorists to a train station facility.

The Train Station NEXT RIGHT (G95F(CA)) or Specific Train Station NEXT RIGHT (G95G(CA)) sign may be used on freeways and conventional highways to direct motorists to a transit authority facility. The G95G(CA) may be used in place of the G95F(CA) sign only when it is determined that the name of the station is needed to avoid confusion.

Standard:

The AMTRAK (G97A(CA)) plaque shall be used for all new installations to identify Amtrak facilities.

Option:

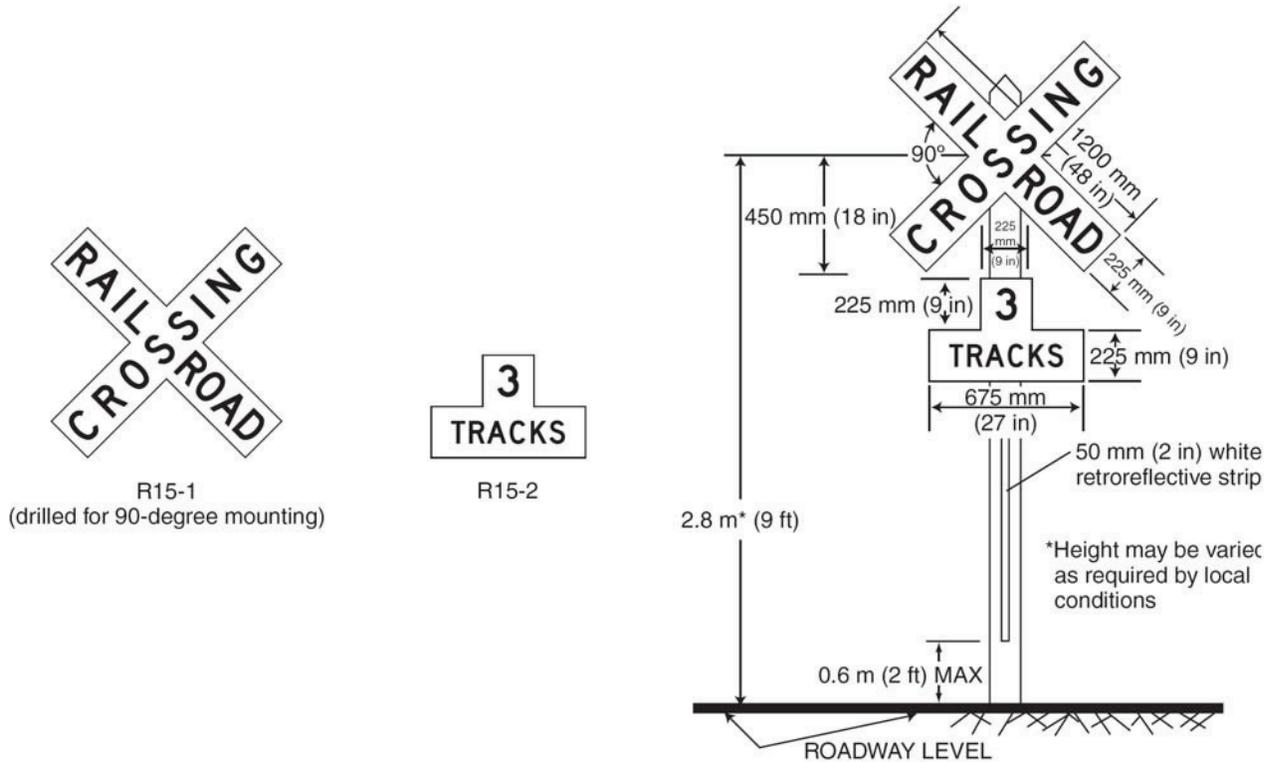
Alternatively, CALTRAIN, BART or other names of the transit system may be used, as appropriate.

Support:

The G95F(CA), G95G(CA) and G97A(CA) signs are shown in Figure 8B-101(CA).

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Figure 8B-1. Highway-Rail Grade Crossing (Crossbuck) Regulatory Signs



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Figure 8B-2. Advance Warning Signs



Figure 8B-3. Regulatory Signs

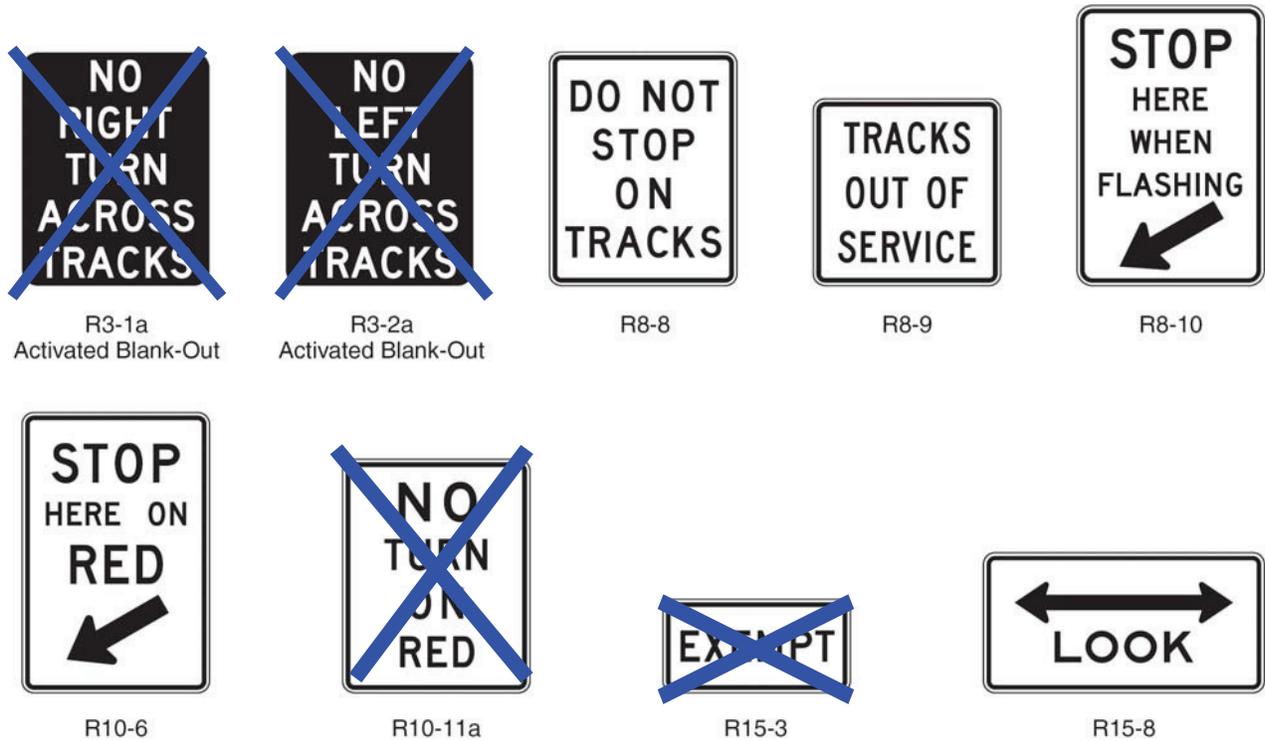
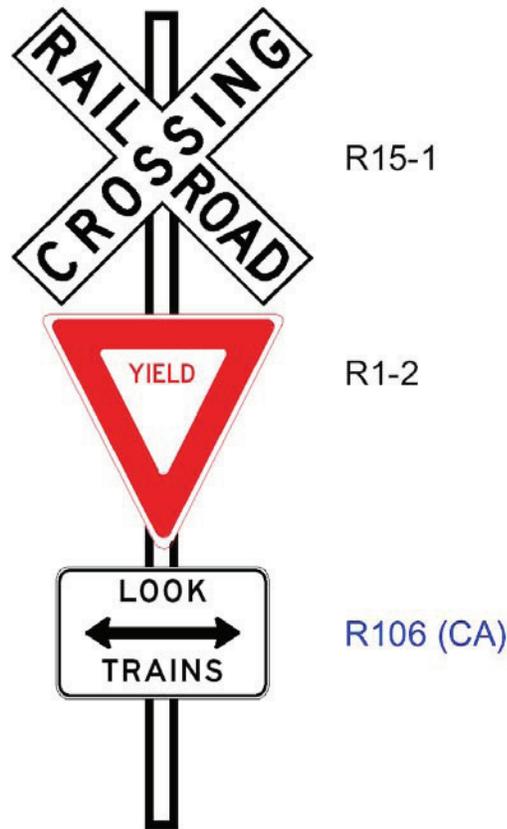


Figure 8B-3(CA) Regulatory Signs

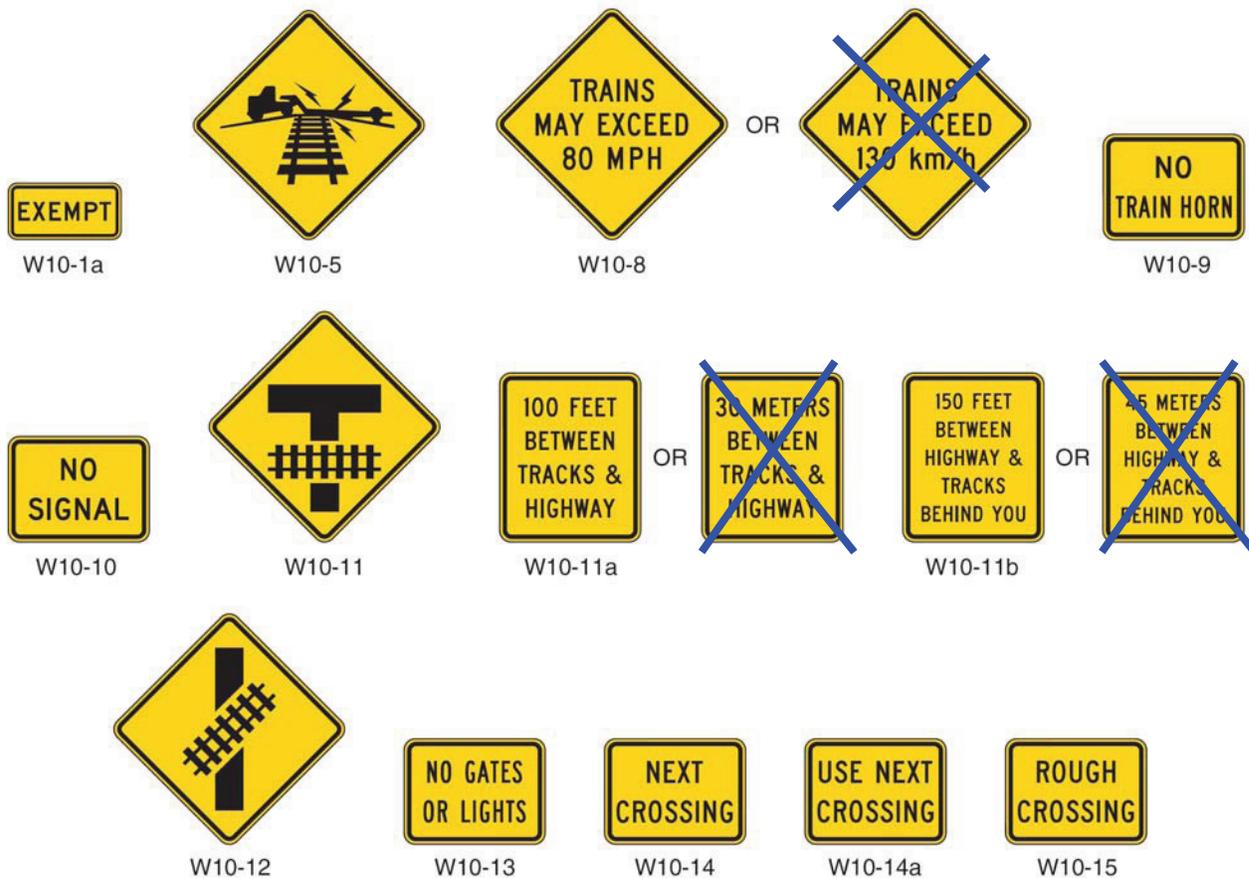


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Figure 8B-4. Emergency Notification Signs

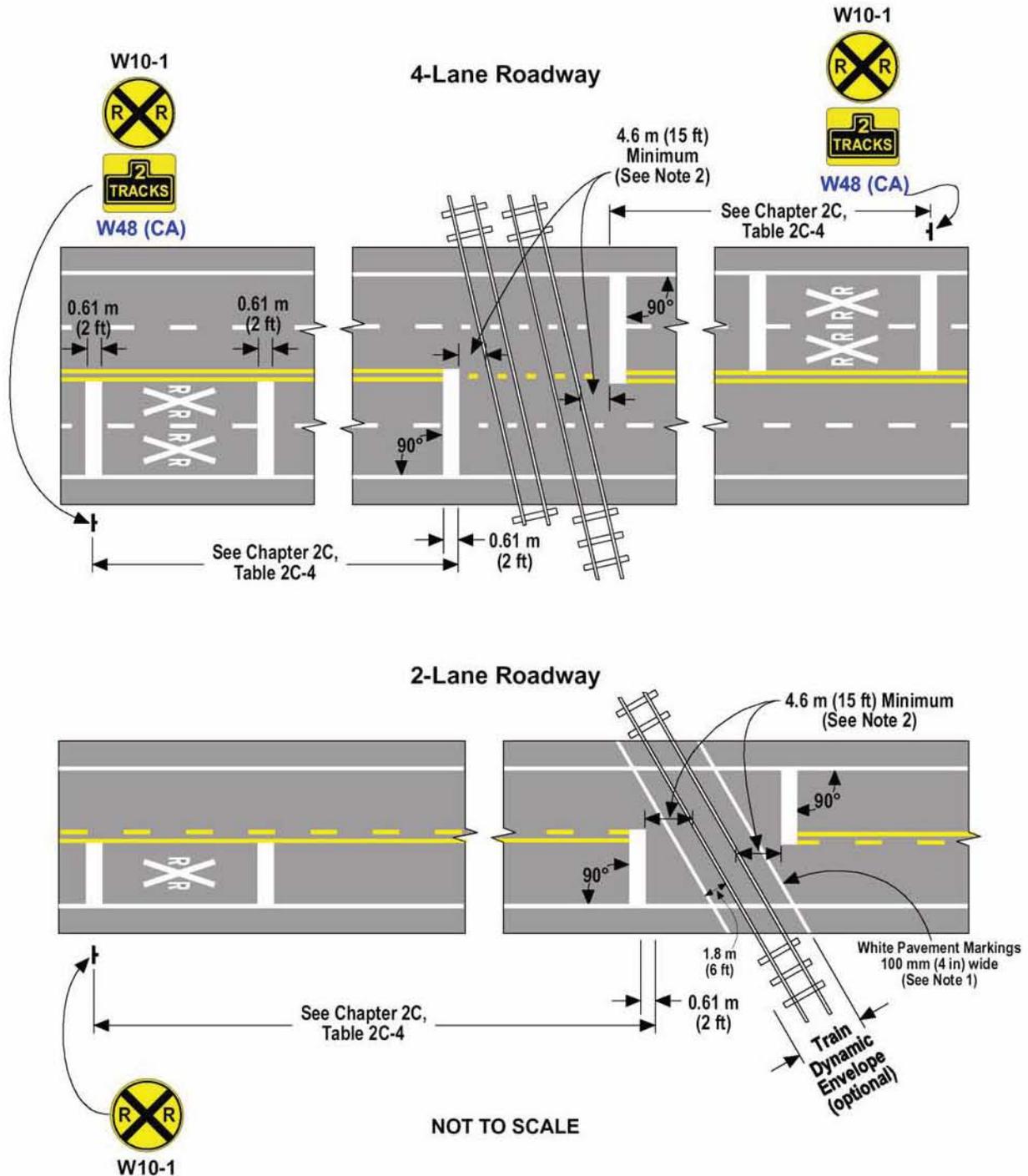


Figure 8B-5. Warning Signs



Note: The W10-11 sign is a W10-3 sign modified for geometrics. Other signs can be oriented or revised as needed to satisfy the geometrics of the roadways and the railroad tracks.

Figure 8B-6 (CA). Example of Placement of Warning Signs and Pavement Markings at Highway-Rail Grade Crossings (Sheet 1 of 3)

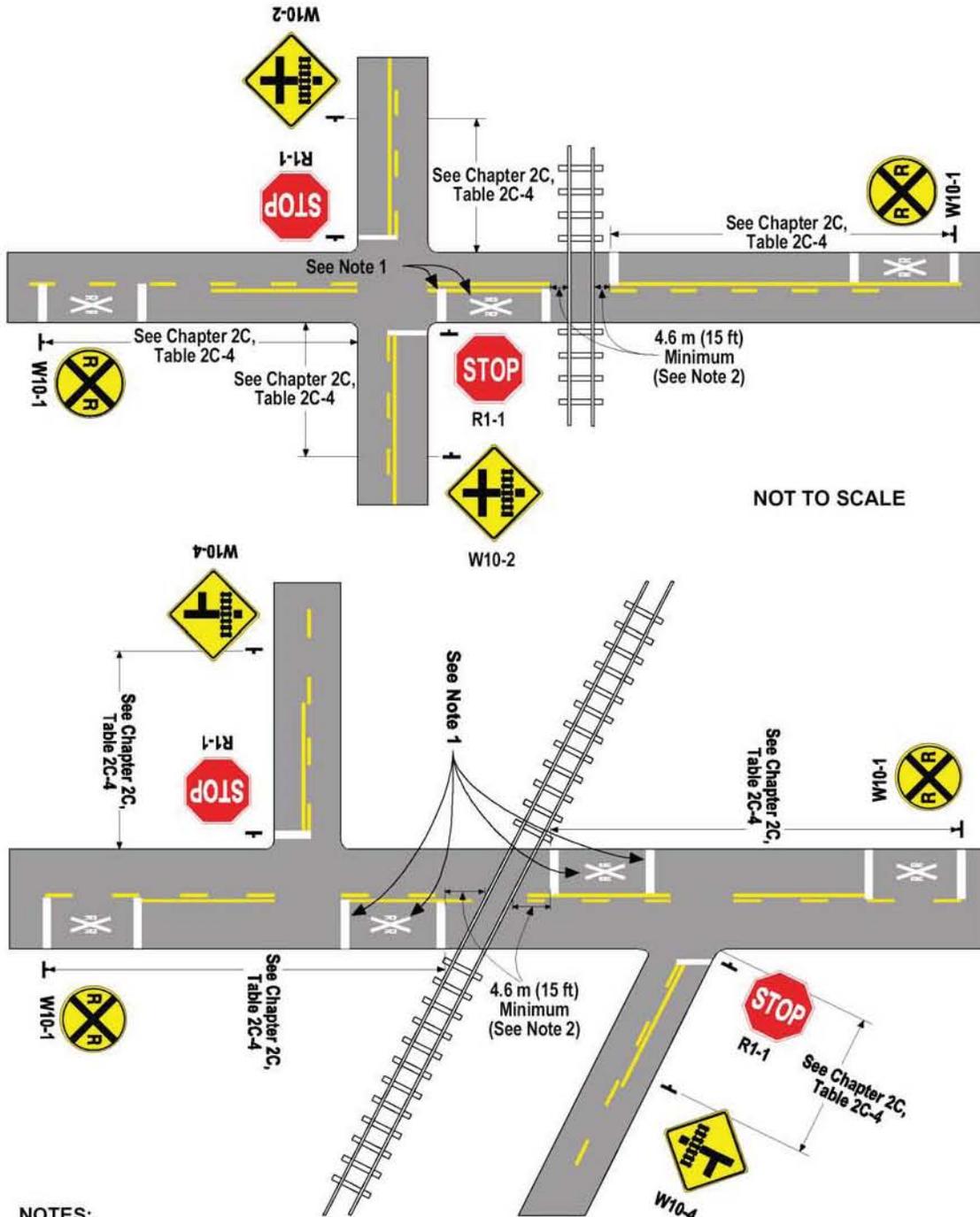


NOTES:

1. The distance between rail and the optional dynamic envelope pavement marking should be equal to 1.8 m (6 ft) unless otherwise advised by the operating railroad.
2. Minimum 2.4 m (8 ft) from the gate (if present), but no closer than 4.6 m (15 ft) from the nearest rail. See Section 8B.21.
3. Longitudinal markings can be extended across the tracks at offset, skewed, complex, multilegged, curved roadway or multiple track crossings. See Section 8B.20.

Figure 8B-6 (CA). Example of Placement of Warning Signs and Pavement Markings at Highway-Rail Grade Crossings (Sheet 2 of 3)

Parallel Roadway < 30 m (100 ft) - Uncontrolled Approach

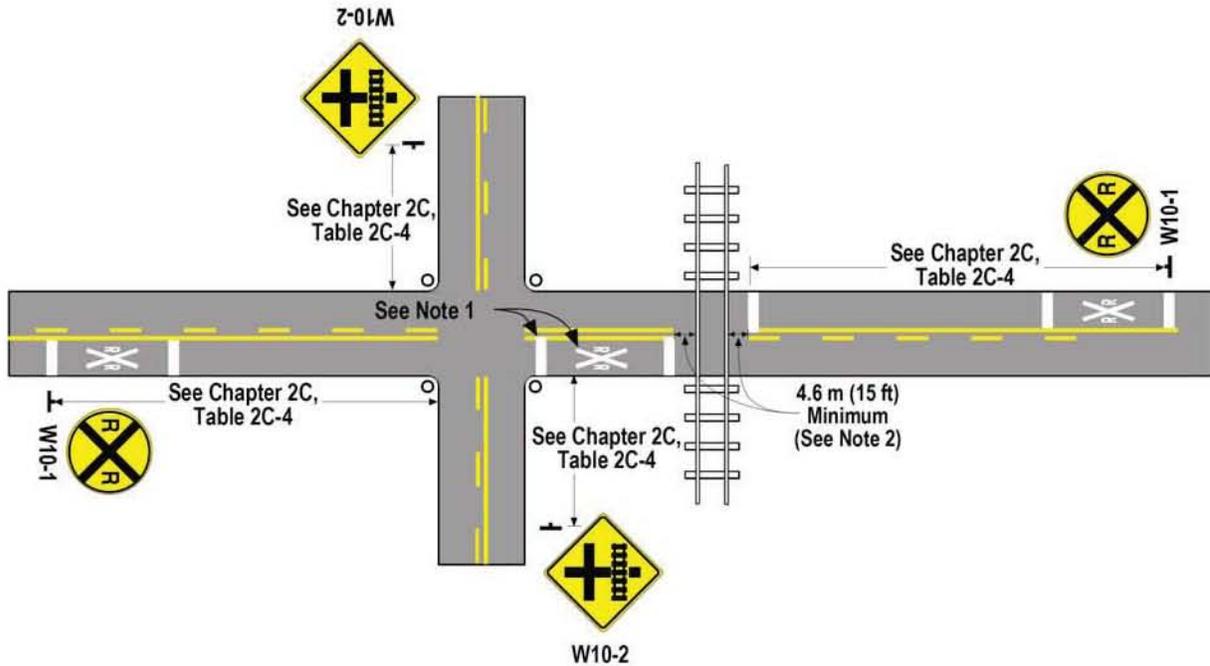


NOTES:

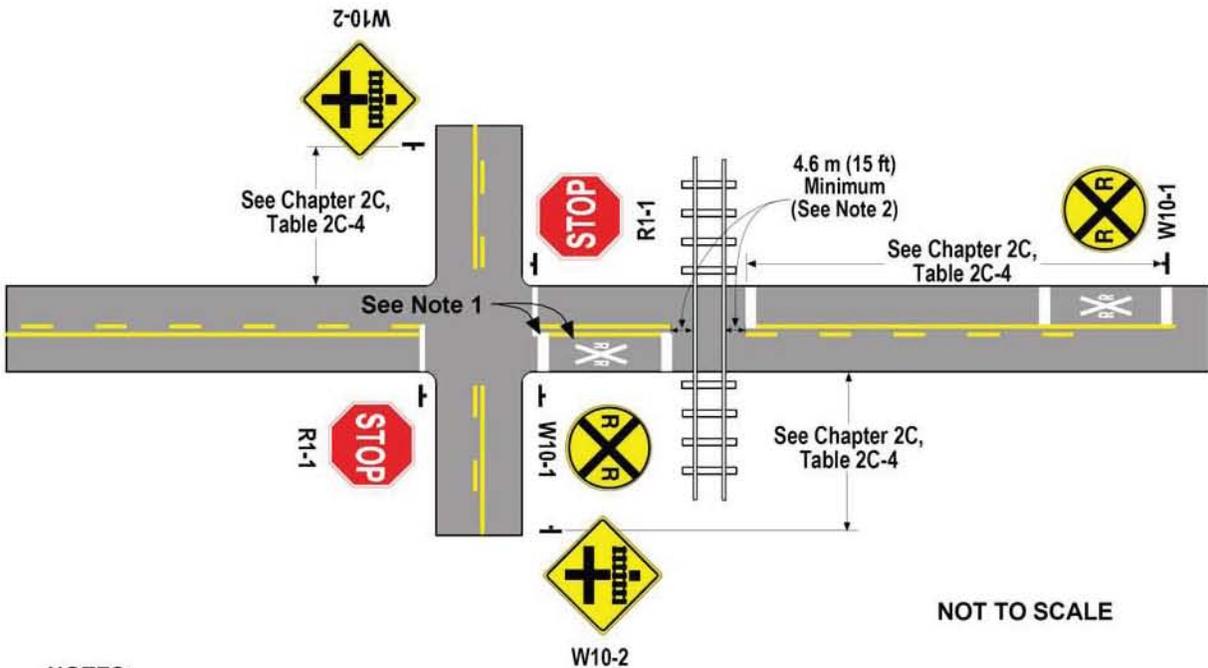
1. These pavement markings can be omitted where the distance is less than 15 m (50 ft). See Section 8B.20.
2. Minimum 2.4 m (8 ft) from the gate (if present), but no closer than 4.6 m (15 ft) from the nearest rail. See Section 8B.21.
3. Longitudinal markings can be extended across the tracks at offset, skewed, complex, multilegged, curved roadway or multiple track crossings. See Section 8B.20.

Figure 8B-6 (CA). Example of Placement of Warning Signs and Pavement Markings at Highway-Rail Grade Crossings (Sheet 3 of 3)

Parallel Roadway < 30 m (100 ft) - Intersection Signalized



Parallel Roadway < 30 m (100 ft) - Approach Controlled by Stop Signs



NOT TO SCALE

NOTES:

1. These pavement markings can be omitted where the distance is less than 15 m (50 ft). See Section 8B.20.
2. Minimum 2.4 m (8 ft) from the gate (if present), but no closer than 4.6 m (15 ft) from the nearest rail.

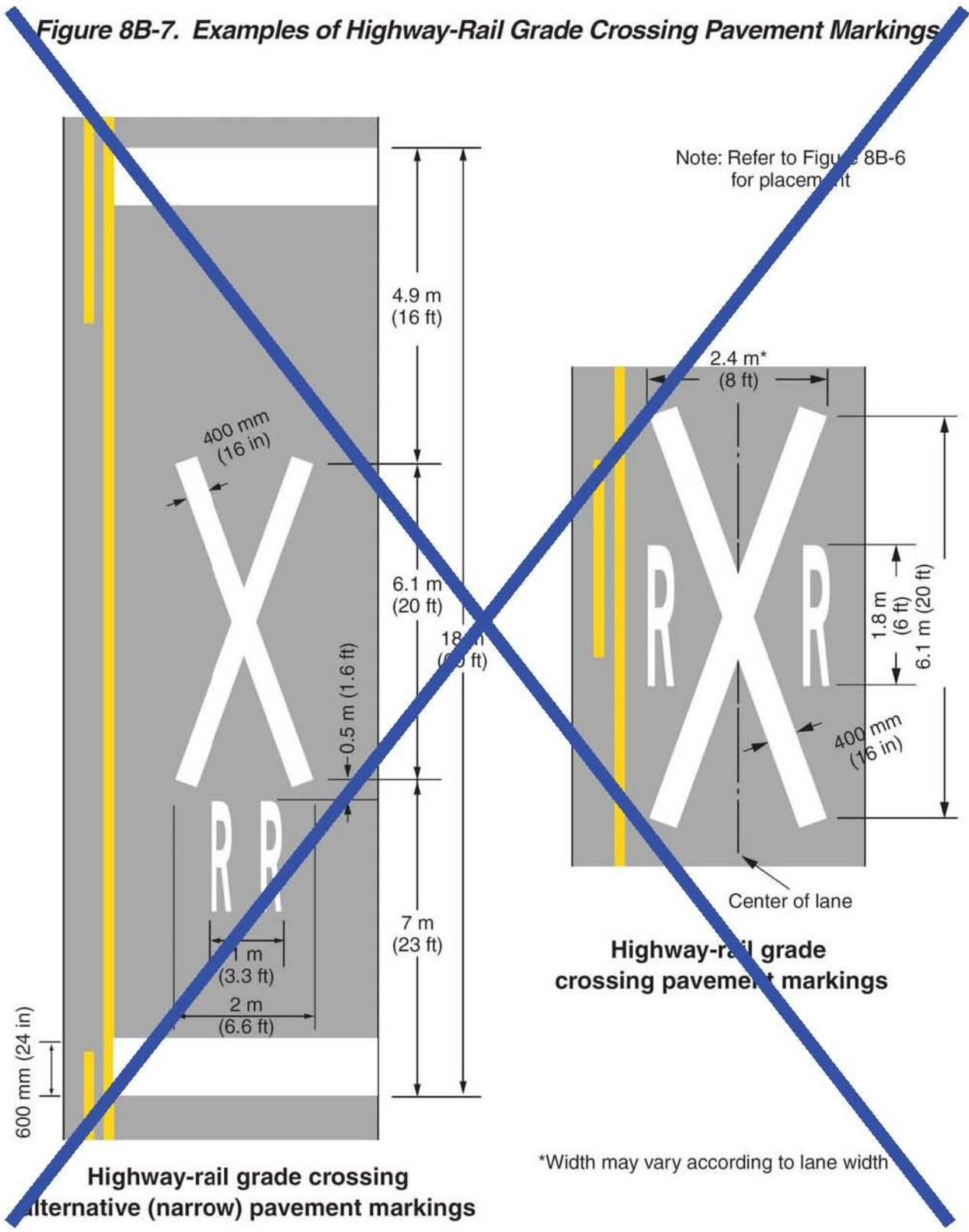
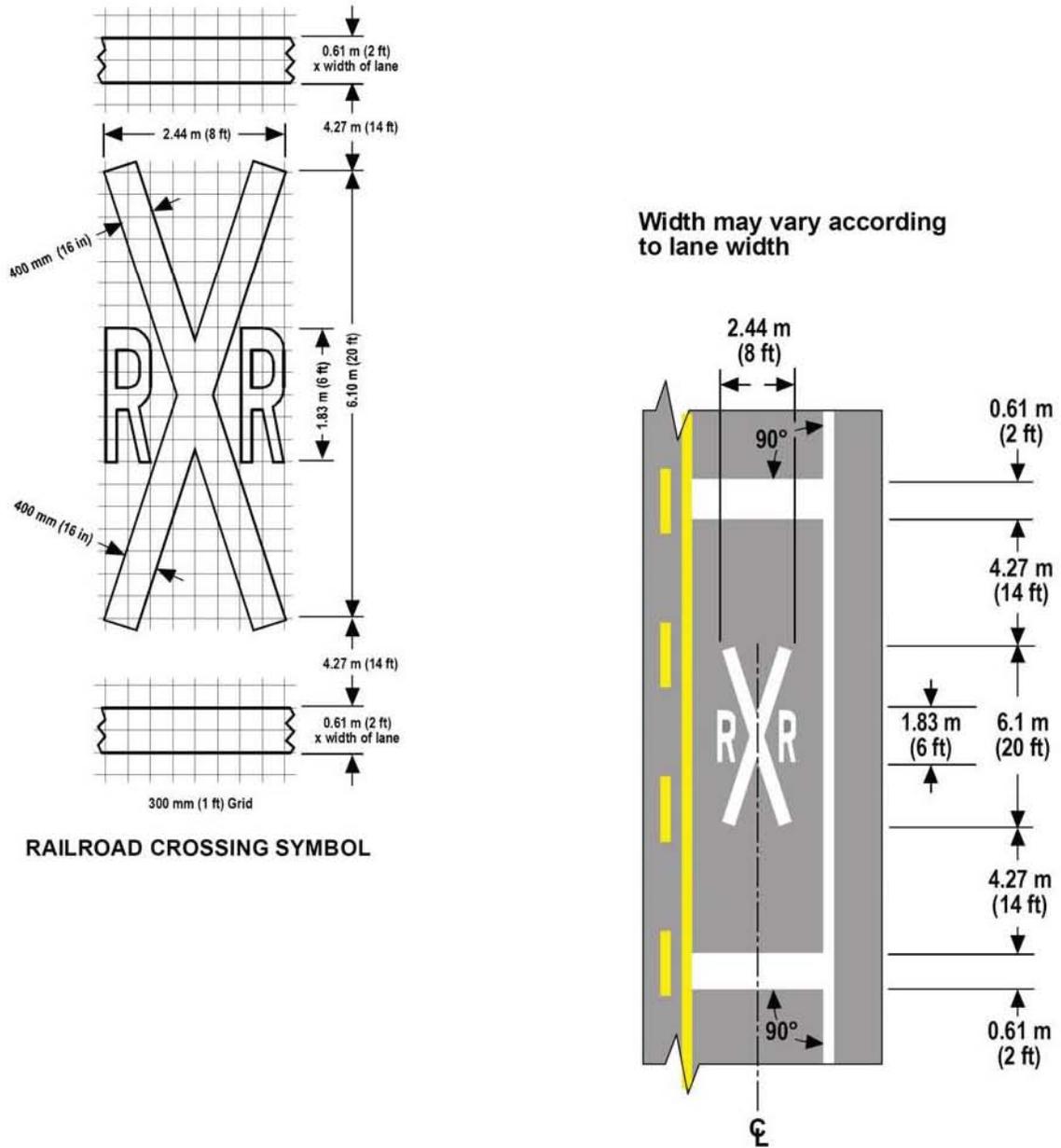


Figure 8B-7 (CA). Examples of Highway-Rail Grade Crossing Pavement Markings



NOT TO SCALE

NOTE: The design detail is also shown in Department of Transportation's Standard Plans.

Figure 8B-8. Typical Train Dynamic Envelope Pavement Markings

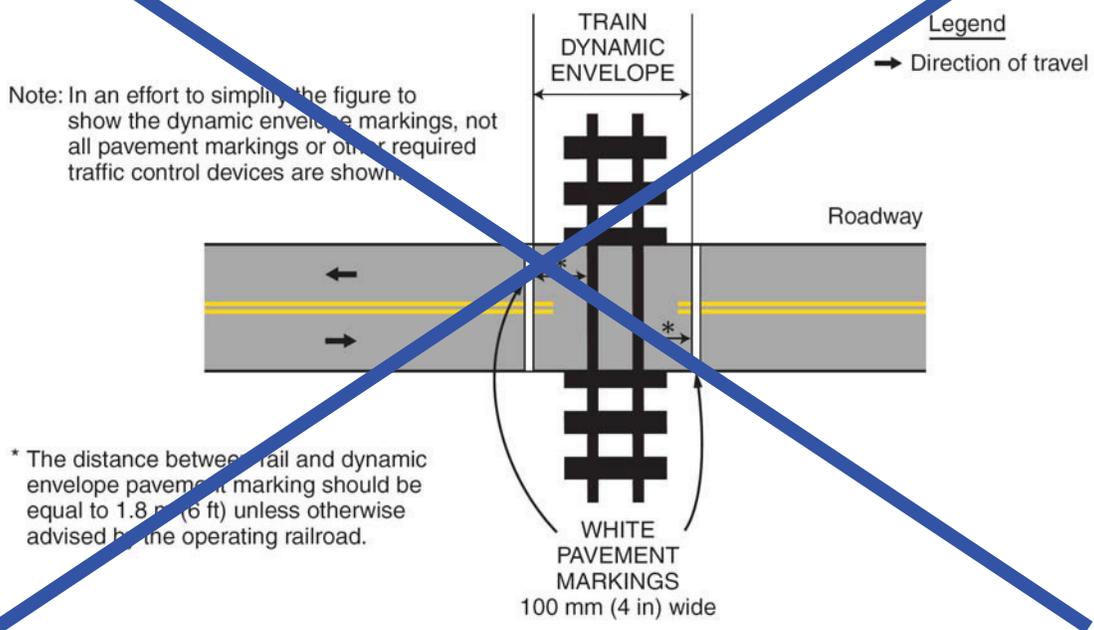
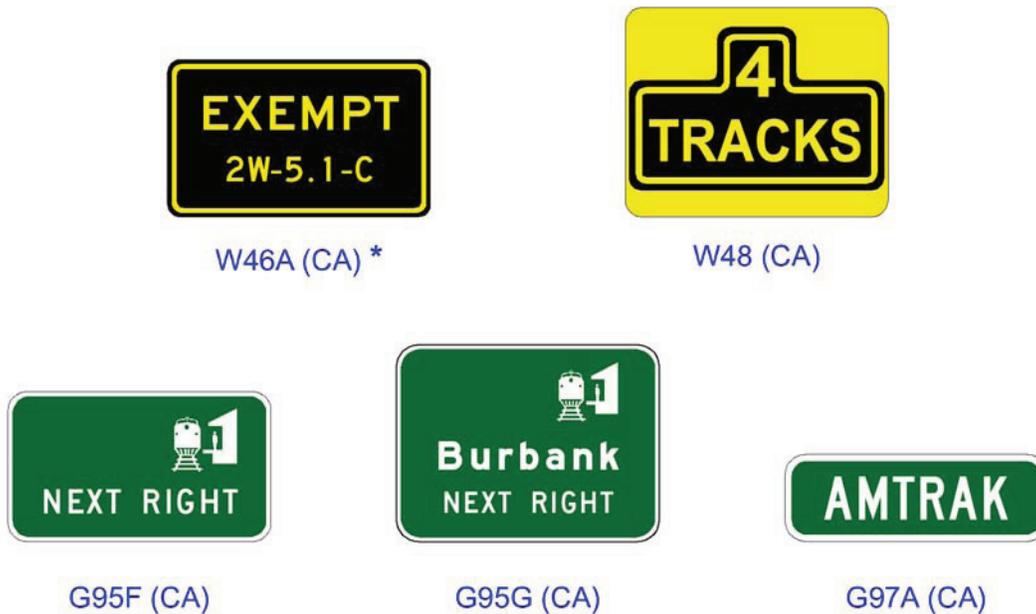


Figure 8B-101(CA) California Warning Signs and Train Station Signs



* The number below the word "EXEMPT" is the identification number uniquely associated with the associated highway-rail crossing.

Table 8B-1. Sign Sizes for Grade Crossing Signs (Sheet 1 of 2)

Sign	MUTCD Code	Section	Conventional Road	Expressway	Minimum	Oversized
No Right Turn Across Tracks	R3-1a	8B.06, 10C.09	600 x 750 (24 x 36)	—	—	—
No Left Turn Across Tracks	R3-2a	8B.06, 10C.09	600 x 750 (24 x 30)	—	—	—
Do Not Stop on Tracks	R8-8	8B.07, 10C.05	600 x 750 (24 x 30)	—	—	—
Tracks Out of Service	R8-9	8B.09, 10C.06	600 x 600 (24 x 24)	—	—	—
Stop Here When Flashing	R8-10	8B.10, 10C.08	600 x 900 (24 x 36)	—	—	—
Stop Here on Red	R10-6	8B.11, 10C.07	600 x 900 (24 x 36)	—	—	—
No Turn on Red	R10-11a R10-11	8D.07, 10C.09	600 x 750 (24 x 30)	—	—	—
Highway-Rail Grade Crossing (Crossbuck)	R15-1	8B.03, 10C.02	1200 x 225 (48 x 9)	—	—	—
Number of Tracks	R15-2	8B.03 10C.02	675 x 450 (27 x 18)	—	—	—
Exempt	R15-3	8B.05, 10C.10	600 x 300 (24 x 12)	—	—	—
Light Rail Only Right Lane	R15-4a	10C.13	600 x 750 (24 x 30)	—	—	—
Light Rail Only Left Lane	R15-4b	10C.13	600 x 750 (24 x 30)	—	—	—
Light Rail Only Center Lane	R15-4c	10C.13	600 x 750 (24 x 30)	—	—	—
Light Rail Do Not Pass	R15-5	10C.14	600 x 750 (24 x 30)	—	—	—
Do Not Pass Stopped Train	R15-5a	10C.14	600 x 750 (24 x 30)	—	—	—
Do Not Drive On Tracks Light Rail Symbol	R15-6	10C.12	600 x 600 (24 x 24)	—	—	—
Do Not Drive On Tracks	R15-6a	10C.12	600 x 750 (24 x 30)	—	—	—
Light Rail Divided Highway Symbol	R15-7	10C.11	600 x 600 (24 x 24)	—	—	—
Light Rail Divided Highway Symbol (T-Intersection)	R15-7a	10C.11	600 x 600 (24 x 24)	—	—	—
Look	R15-8	8B.16, 10C.03	900 x 450 (36 x 18)	—	—	—
Highway-Rail Grade Crossing Advance Warning	W10-1	8B.04, 10C.15	900 Dia. (36 Dia.)	—	—	—
Exempt	W10-1a	8B.05, 10C.10	600 x 300 (24 x 12)	—	—	—
Highway-Rail Grade Crossing Advance Warning	W10-2,3,4	8B.04, 10C.15	900 x 900 (36 x 36)	—	—	—
Low Ground Clearance Highway-Rail Grade Crossing	W10-5	8B.17, 10C.16	900 x 900 (36 x 36)	—	—	—
Light Rail Activated Blank-Out Symbol	W10-7	10C.17	600 x 600 (24 x 24)	—	—	—
Trains May Exceed 130 km/h (80 MPH)	W10-8	8B.13	900 x 900 (36 x 36)	—	—	—
No Train Horn	W10-9	8B.14	600 x 450 (24 x 18)	—	—	—
No Signal	W10-10	8B.15	600 x 450 (24 x 18)	—	—	—
Storage Space Symbol	W10-11	8B.18, 10C.18	900 x 900 (36 x 36)	—	—	—

See W10-1a or W46A(CA) Sign Sizes

Table 8B-1. Sign Sizes for Grade Crossing Signs (Sheet 2 of 2)

Sign	MUTCD Code	Section	Conventional Road	Expressway	Minimum	Oversized
Storage Space XX Meters (Feet) Between Tracks & Highway	W10-11a	8B.18, 10C.18	750 x 900 (30 x 36)	—	—	—
Storage Space XX Meters (Feet) Between Highway & Tracks Behind You	W10-11b	8B.18, 10C.18	750 x 900 (30 x 36)	—	—	—
Skewed Crossing	W10-12	8B.19, 10C.19	900 x 900 (36 x 36)	—	—	—
No Gates or Lights	W10-13	8B.15	600 x 450 (24 x 18)	—	—	—
Next Crossing	W10-14	8B.17	7600 x 450 (24 x 18)	—	—	—
Use Next Crossing	W10-14a	8B.17	600 x 450 (24 x 18)	—	—	—
Rough Crossing	W10-15	8B.17	600 x 450 (24 x 18)	—	—	—
Light Rail Station Symbol	I-12	10C.20	600 x 600 (24 x 24)	—	—	—
Emergency Notification	I-13	8B.12, 10C.21	750 x 750 (30 x 30)	—	—	—
Emergency Notification	I-13a	8B.12, 10C.21	750 x 450 (30 x 18)	—	—	—

Notes:

1. Larger signs may be used when appropriate.
2. Dimensions are shown in millimeters followed by inches in parentheses and are shown as width x height.

Table 8B-1(CA) California Sign Sizes for Grade Crossing Signs

Sign	California Code	California MUTCD Section	Conventional Road	Expressway	Minimum	Oversized
LOOK FOR TRAINS	R106(CA)	8B.08	(24 x 36)	(30 x 48)		
EXEMPT	W46A(CA)	8B.05	(24 x 12)	(24 x 12)	---	---
Number of Tracks	W48(CA)	8B.04	(30 x 24)	30 x 24	---	---
Light Rail Transit (Trolley) Crossing	W82(CA)	10C.101(CA)	(24 x 24)	(30 x 30)	---	---
Light Rail Transit (Trolley) Crossing /LOOK BOTH WAYS	W82-1(CA)	10C.101(CA)	(24 x 24)	(30 x 30)	---	---
Train Station NEXT RIGHT	G95F(CA)	8B.101(CA)	(variable x 36)	(variable x 48)	---	---
Specific Train Station NEXT RIGHT	G95G(CA)	8B.101(CA)	variable x 54	(variable x 66)	---	---
Light Rail Station	G96(CA)	10C.20	(24 x 24)	(30 x 30)	---	---
TROLLEY Plaque	G96A(CA)	10C.20	(24 x 6)	(30 x 8)	---	---
AMTRAK	G97A(CA)	8B.101(CA)	(24 x 6)	(30 x 8)	---	---

CHAPTER 8C. ILLUMINATION

Section 8C.01 Illumination at Highway-Rail Grade Crossings

Option:

Illumination may be installed at or adjacent to a highway-rail grade crossing.

Guidance:

If an engineering study is conducted and if the engineering study determines that better nighttime visibility of the train and the highway-rail grade crossing is needed (for example, where a substantial amount of railroad operation is conducted at night, where train speeds are low and highway-rail grade crossings are blocked for long periods, or crash history indicates that drivers experience difficulty in seeing trains or traffic control devices during hours of darkness), then illumination should be installed at and adjacent to the highway-rail grade crossing.

Support:

Types and location of luminaires for highway-rail grade crossing illumination are contained in the American National Standards Institute's (ANSI) "Practice for Roadway Lighting RP-8" available from the Illuminating Engineering Society (see Section 1A.11).

Support:

Delineators can be placed on the right side of all approaches to non-illuminated rural grade crossings. If needed, place the delineators from the location of the Highway-Rail Grade Crossing Advance Warning (W10-1) sign to the Crossbuck (R15-1) sign and extend an equal distance downstream, spacing no more than 15 m (50 ft) apart.

Other devices can be added to supplement the existing devices and device spacing can be adjusted to provide additional reaction time or delineation.

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CHAPTER 8D. FLASHING-LIGHT SIGNALS, GATES, AND TRAFFIC CONTROL SIGNALS

Section 8D.01 Introduction

Support:

Active traffic control systems inform motorists, bicyclists, and pedestrians of the approach or presence of trains, locomotives, or other railroad equipment at highway-rail grade crossings.

A composite drawing (see Figure 8D-1) shows a post-mounted flashing-light signal (two light units mounted in a horizontal line), a flashing-light signal mounted on an overhead structure, and an automatic gate assembly.

Option:

Post-mounted and overhead-mounted flashing-light signals may be used separately or in combination with each other as determined by an engineering study. Also, flashing-light signals may be used without automatic gate assemblies, as determined by an engineering study.

Standard:

The meaning of flashing-light signals and gates shall be as stated in the “Uniform Vehicle Code” (see Sections 11-701 and 11-703 of the “UVC”), which is available from the National Committee on Uniform Traffic Laws and Ordinances (see Page i for the address).

Location and clearance dimensions for flashing-light signals and gates shall be as shown in Figure 8D-1.

When there is a curb, a horizontal clearance of at least 0.6 m (2 ft) shall be provided from the face of the vertical curb to the closest part of the signal or gate arm in its upright position. When a cantilevered-arm flashing-light signal is used, the vertical clearance shall be at least 5.2 m (17 ft) above the crown of the highway to the lowest point of the signal unit.

Where there is a shoulder, but no curb, a horizontal clearance of at least 0.6 m (2 ft) from the edge of a paved or surfaced shoulder shall be provided, with a clearance of at least 1.8 m (6 ft) from the edge of the traveled way.

Where there is no curb or shoulder, the minimum horizontal clearance shall be 1.8 m (6 ft) from the edge of the traveled way.

Guidance:

Equipment housings (controller cabinets) should have a lateral clearance of at least 9 m (30 ft) from the edge of the highway, and where railroad property and conditions allow, at least 7.6 m (25 ft) from the nearest rail.

If a pedestrian route is provided, sufficient clearance from supports, posts, and gate mechanisms should be maintained for pedestrian travel.

When determined by an engineering study, a lateral escape route to the right of the highway in advance of the highway-rail grade crossing traffic control devices should be kept free of guardrail or other ground obstructions. Where guardrail is not deemed necessary or appropriate, barriers should not be used for protecting signal supports.

The same lateral clearance and roadside safety features should apply to flashing-light signal and automatic gate locations on both the right and left sides of the roadway.

Option:

In industrial or other areas involving only low-speed highway traffic or where signals are vulnerable to damage by turning truck traffic, guardrail may be installed to provide protection for the signal assembly.

Section 8D.02 Flashing-Light Signals, Post-Mounted

Standard:

The flashing-light signal assembly (shown in Figure 8D-1) on the side of the highway shall include a standard Crossbuck (R15-1) sign, and where there is more than one track, a supplemental Number of Tracks (R15-2) sign, all of which indicate to motorists, bicyclists, and pedestrians the location of a highway-rail grade crossing.

Option:

Bells or other audible warning devices may be included in the assembly and may be operated in conjunction with the flashing lights to provide additional warning for pedestrians and bicyclists.

Standard:

When indicating the approach or presence of a train, the flashing-light signal shall display toward approaching highway traffic two red lights mounted in a horizontal line flashing alternately.

Flashing-light signals shall be placed to the right of approaching highway traffic on all highway approaches to a highway-rail grade crossing. They shall be located laterally with respect to the highway in conformance with Figure 8D-1 except where such location would adversely affect signal visibility.

At highway-rail grade crossings with highway traffic in both directions, back-to-back pairs of lights shall be placed on each side of the tracks. On multi-lane one-way streets and divided highways, flashing light signals shall be placed on the approach side of the highway-rail grade crossing on both sides of the roadway or shall be placed above the highway.

Each red signal unit in the flashing-light signal shall flash alternately. The number of flashes per minute for each lamp shall be 35 minimum and 65 maximum. Each lamp shall be illuminated approximately the same length of time. Total time of illumination of each pair of lamps shall be the entire operating time. Flashing-light units shall use either 200 mm (8 in) or 300 mm (12 in) nominal diameter lenses.

Guidance:

~~In choosing between the 200 mm (8 in) or 300 mm (12 in) nominal diameter lenses for use in highway-rail grade crossing flashing light signals, consideration should be given to the principles stated in Section 4D.15.~~

Standard:

Highway-rail grade crossing flashing-light signals shall operate at a low voltage using storage batteries either as a primary or stand-by source of electrical energy. Provision shall be made to provide a source of energy for charging batteries.

Option:

Additional pairs of flashing-light units may be mounted on the same supporting post and directed toward vehicular traffic approaching the highway-rail grade crossing from other than the principal highway route, such as where there are approaching routes on highways closely adjacent to and parallel to the railroad.

Section 8D.03 Flashing-Light Signals, Overhead Structures

Option:

Flashing-light signals may be installed on overhead structures or cantilevered supports as shown in Figure 8D-1 where needed for additional emphasis, or for better visibility to approaching traffic, particularly on multilane approaches or highways with profile restrictions.

If it is determined by an engineering study that one set of flashing lights on the cantilever arm is not sufficiently visible to road users, one or more additional sets of flashing lights may be mounted on the supporting post and/or on the cantilever arm.

Standard:

Breakaway or frangible bases shall not be used for overhead structures or cantilevered supports.

Section 8D.04 Automatic Gates

Support:

An automatic gate is a traffic control device used as an adjunct to flashing-light signals.

Standard:

The automatic gate (see Figure 8D-1) shall consist of a drive mechanism and a fully retroreflectorized red- and white-striped gate arm with lights. When in the down position, the gate arm shall extend across the approaching lanes of highway traffic.

In the normal sequence of operation, unless constant warning time or other advanced system requires otherwise, the flashing-light signals and the lights on the gate arm (in its normal upright

position) shall be activated immediately upon detection of the approaching train. The gate arm shall start its downward motion not less than 3 seconds after the flashing-light signals start to operate, shall reach its horizontal position at least 5 seconds before the arrival of the train, and shall remain in the down position as long as the train occupies the highway-rail grade crossing.

When the train clears the highway-rail grade crossing, and if no other train is detected, the gate arm shall ascend to its upright position, following which the flashing lights and the lights on the gate arm shall cease operation.

Gate arms shall be fully retroreflectorized on both sides, have 45-degree diagonal stripes alternately red and white at 400 mm (16 in) intervals measured horizontally, and shall have at least three red lights as indicated in Figure 8D-1.

When activated, the gate arm light nearest the tip shall be illuminated continuously and the other lights shall flash alternately in unison with the flashing-light signals.

The entrance gate arm mechanism shall be designed to fail safe in the down position.

Guidance:

The gate arm should ascend to its upright position in not more than 12 seconds.

In its normal upright position, when no train is approaching or occupying the highway-rail grade crossing, the gate arm should be either vertical or nearly so (see Figure 8D-1).

In the design of individual installations, consideration should be given to timing the operation of the gate arm to accommodate large and/or slow-moving vehicles.

The gates should cover the approaching highway to block all motor vehicles from being driven around the gate without crossing the centerline.

Option:

Automatic gate installations may include median islands between opposing lanes on an approach to a highway-rail grade crossing.

Where gates are located in the median, additional median width may be required to provide the minimum clearance for the counterweight supports.

Section 8D.05 Four-Quadrant Gate Systems

Option:

Four-Quadrant Gate systems may be installed to improve safety at highway-rail grade crossings based on an engineering study when less restrictive measures, such as automatic gates and median islands, are not effective.

Standard:

A Four-Quadrant Gate system shall consist of a series of automatic gates used as an adjunct to flashing-light signals to control traffic on all lanes entering and exiting the highway-rail grade crossing.

The Four-Quadrant Gate system shall consist of a drive mechanism and fully retroreflectorized red and white-striped gate arms with lights, and when in the down position the gate arms extend individually across the entrance and exit lanes of highway traffic as shown in Figure 8D-2. Standards contained in Sections 8D.01 through 8D.03 for flashing-light signals shall be followed for signal specifications, location, and clearance distances.

In the normal sequence of operation, unless constant warning time or other advanced system requires otherwise, the flashing-light signals and the lights on the gate arms (in their normal upright positions) shall be activated immediately upon detection of the approaching train. The gate arms for the entrance lanes of traffic shall start their downward motion not less than 3 seconds after the flashing-light signals start to operate and shall reach their horizontal position at least 5 seconds before the arrival of the train. Exit gate arm activation and downward motion shall be based on detection or timing requirements established by an engineering study of the individual site. The gate arms shall remain in the down position as long as the train occupies the highway-rail grade crossing.

When the train clears the highway-rail grade crossing, and if no other train is detected, the gate arms shall ascend to their upright positions, following which the flashing lights and the lights on the gate arms shall cease operation.

Gate arm design, colors, and lighting requirements shall be in accordance with the Standards contained in Section 8D.04.

~~Except as noted in the Option below, the exit gate arm mechanism shall be designed to fail safe in the up position.~~

The exit gate arm mechanism shall be designed to fail-safe in the up position. Refer to CPUC General Order 75, as amended.

Timed Exit Gate Operating Mode shall not be used. Only Dynamic Exit Gate Operating Mode shall be used. A Vehicle presence detection devices system shall be installed to control exit gate operation based on vehicle presence within the minimum track clearance distance. Refer to CPUC General Order 75, as amended.

At locations where gate arms are offset a sufficient distance for vehicles to drive between the entrance and exit gate arms, median islands shall be installed in accordance with the needs established by an engineering study.

Guidance:

The gate arm should ascend to its upright position in not more than 12 seconds.

Four-Quadrant Gate systems should only be used in locations with constant-warning-time train detection.

~~The operating mode of the exit gates should be determined based upon an engineering study, with input from the affected railroad company.~~

If the Timed Exit Gate Operating Mode is used, the engineering study, with input from the affected railroad company, should also determine the Exit Gate Clearance Time (see Section 8A.01).

~~If the Dynamic Exit Gate Operating Mode is used, vehicle intrusion detection devices should be installed to control exit gate operation based on vehicle presence within the minimum track clearance distance.~~

Regardless of which exit gate operating mode is used, the Exit Gate Clearance Time should be considered when determining additional time requirements for the Minimum Warning Time.

~~If a Four-Quadrant Gate system is used at a location that is adjacent to an intersection that could cause vehicles to queue within the minimum track clearance distance, the Dynamic Exit Gate Operating Mode should be used unless an engineering study indicates otherwise.~~

If a Four-Quadrant Gate system is interconnected with a highway traffic signal, backup or standby power should be considered for the highway traffic signal. Also, circuitry should be installed to prevent the highway traffic signal from leaving the track clearance green interval until all of the gates are lowered.

At locations where sufficient space is available, exit gates should be set back from the track a distance that provides a safety zone long enough to accommodate at least one design vehicle between the exit gate and the nearest rail.

Four-Quadrant Gate systems should include remote health (status) monitoring capable of automatically notifying railroad signal maintenance personnel when anomalies have occurred within the system.

Option:

~~Exit gate arms may fail in the down position if the highway-rail grade crossing is equipped with remote health (status) monitoring. Refer to CPUC General Order 75, as amended.~~

Four-Quadrant Gate installations may include median islands between opposing lanes on an approach to a highway-rail grade crossing.

Guidance:

Where sufficient space is available, median islands should be at least 18 m (60 ft) in length.

Section 8D.06 Train Detection

Standard:

The devices employed in active traffic control systems shall be actuated by some form of train detection.

Train detection circuits, insofar as practical, shall be designed on the fail-safe principle.

Flashing-light signals shall operate for at least 20 seconds before the arrival of any train, except as noted in the Option below.

Option:

On tracks where all trains operate at less than 30 km/h (20 mph) and where flagging is performed by an employee on the ground, a shorter signal operating time for the flashing-light signals may be used.

Additional warning time may be provided when determined by an engineering study.

Guidance:

Where the speeds of different trains on a given track vary considerably under normal operation, special devices or circuits should be installed to provide reasonably uniform notice in advance of all train movements over the highway-rail grade crossing. Special control features should be used to eliminate the effects of station stops and switching operations within approach control circuits to prevent excessive activation of the traffic control devices while trains are stopped on or switching upon the approach track control circuits.

Section 8D.07 Traffic Control Signals at or Near Highway-Rail Grade Crossings

Support:

Refer to Section 4D.13 for Railroad Preemption

Option:

Traffic control signals may be used instead of flashing-light signals to control road users at industrial highway-rail grade crossings and other places where train movements are very slow speed does not exceed 16 km/h (10 mph), such as in switching operations.

Standard:

The appropriate provisions of Part 4 relating to traffic control signal design, installation, and operation shall be applicable where traffic control signals are used to control road users instead of flashing-light signals at highway-rail grade crossings.

Traffic control signals shall not be used instead of flashing-light signals to control road users at a mainline highway-rail grade crossing.

Guidance:

The highway agency with jurisdiction, the regulatory agency with statutory authority, if applicable, and the railroad company should jointly determine the preemption operation at highway-rail grade crossings adjacent to signalized highway intersections.

If a highway-rail grade crossing is equipped with a flashing-light signal system and is located within 60 m (200 ft) of an intersection or mid-block location controlled by a traffic control signal, the traffic control signal should be provided with preemption in accordance with Section 4D.13.

Coordination with the flashing-light signal system, queue detection, or other alternatives should be considered for traffic control signals located farther than 60 m (200 ft) from the highway-rail grade crossing. Factors to be considered should include traffic volumes, vehicle mix, vehicle and train approach speeds, frequency of trains, and queue lengths.

Standard:

If preemption is provided, the normal sequence of traffic control signal indications shall be preempted upon the approach of trains to avoid entrapment of vehicles on the highway-rail grade crossing by conflicting aspects of the traffic control signals and the highway-rail grade crossing flashing-light signals.

This preemption feature shall have an electrical circuit of the closed-circuit principle, or a supervised communication circuit between the control circuits of the highway-rail grade crossing warning system and the traffic control signal controller. The traffic control signal controller preemptor shall be activated via the supervised communication circuit or the electrical circuit that is normally energized by the control circuits of the highway-rail grade crossing warning system. The approach of a train to a highway-rail grade crossing shall de-energize the electrical circuit or activate the supervised communication circuit, which in turn shall activate the traffic control signal controller preemptor. This shall establish and maintain the preemption condition during the time the highway-rail grade crossing warning system is activated, except that when crossing gates exist, the preemption condition shall be maintained until the crossing gates are energized to start their upward movement. When multiple or successive preemptions occur, train activation shall receive first priority.

Guidance:

If a highway-rail grade crossing is located within 15 m (50 ft) (or within 23 m (75 ft) for a highway that is regularly used by multi-unit vehicles) of an intersection controlled by a traffic control signal, the use of pre-signals to control traffic approaching the grade crossing should be considered.

Standard:

If used, the pre-signals shall display a red signal indication during the track clearance portion of a signal preemption sequence to prohibit additional vehicles from crossing the railroad track.

Guidance:

Consideration should be given to using visibility-limited signal faces (see Section 4A.02) at the intersection for the downstream signal faces that control the approach that is equipped with pre-signals.

Option:

The pre-signal phase sequencing may be timed with an offset from the signalized intersection such that the railroad track area and the area between the railroad track and the downstream signalized intersection is generally kept clear of stopped vehicles.

Standard:

If a pre-signal is installed at an interconnected highway-rail grade crossing near a signalized intersection, a STOP HERE ON RED (R10-6) sign shall be installed near the pre-signal or at the stop line if used. If there is a nearby signalized intersection with insufficient clear storage distance for a design vehicle, or the highway-rail grade crossing does not have gates, a ~~NO TURN ON RED (R10-11) sign~~ No Right Turn on Red (R13A(CA)) sign or No Left Turn on Red (R13B(CA)) sign (see Figure 2B-19(CA)) shall be installed for the approach that crosses the railroad track.

Option:

At locations where a highway-rail grade crossing is located more than 15 m (50 ft) (or more than 23 m (75 ft) for a highway regularly used by multi-unit vehicles) from an intersection controlled by a traffic control signal, a pre-signal may be used if an engineering study determines a need.

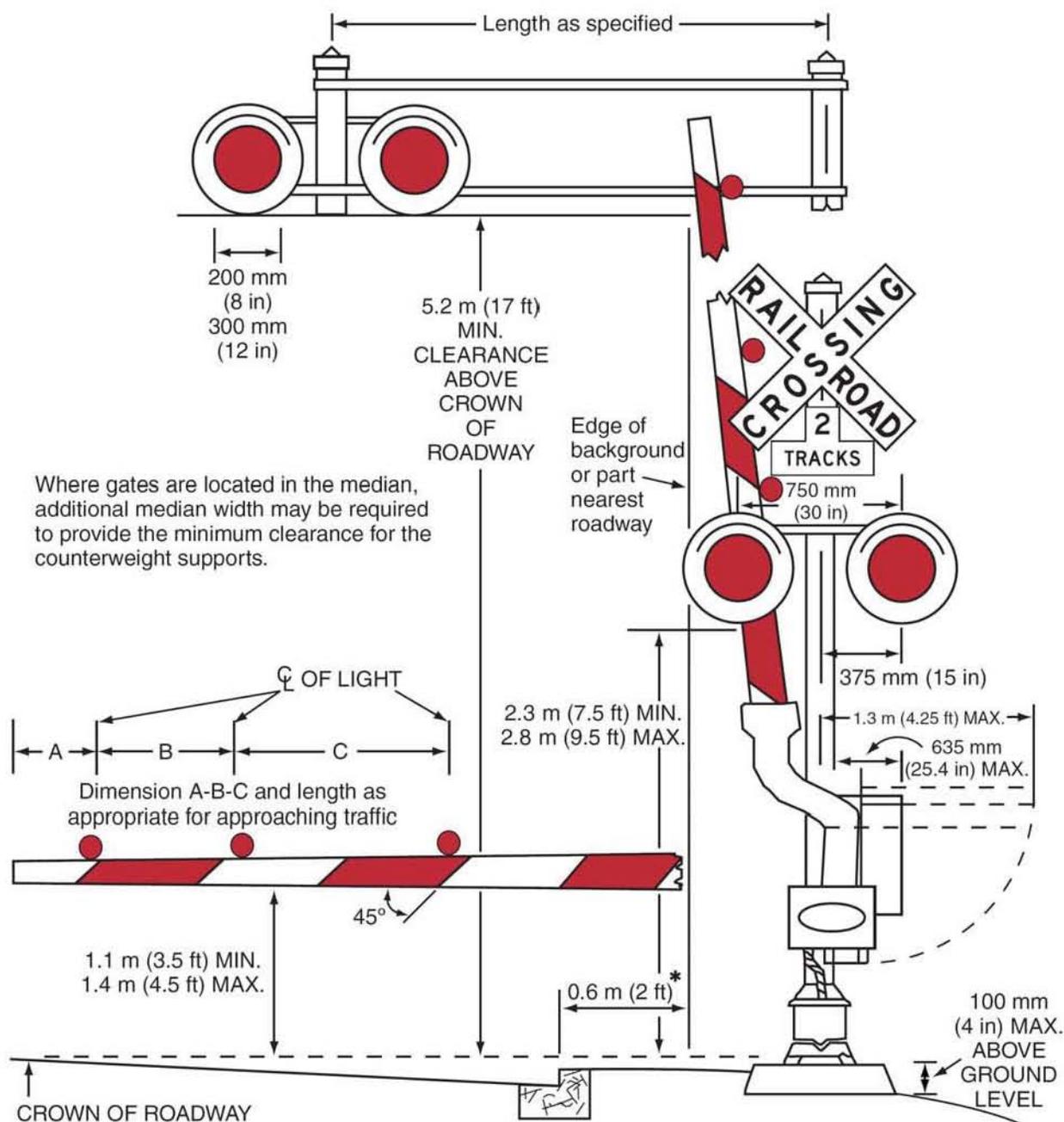
If highway traffic signals must be located within close proximity to the flashing-light signal system, the highway traffic signals may be mounted on the same overhead structure as the flashing-light signals.

Support:

Section 4D.13 describes additional considerations regarding preemption of traffic control signals at or near highway-rail grade crossings.

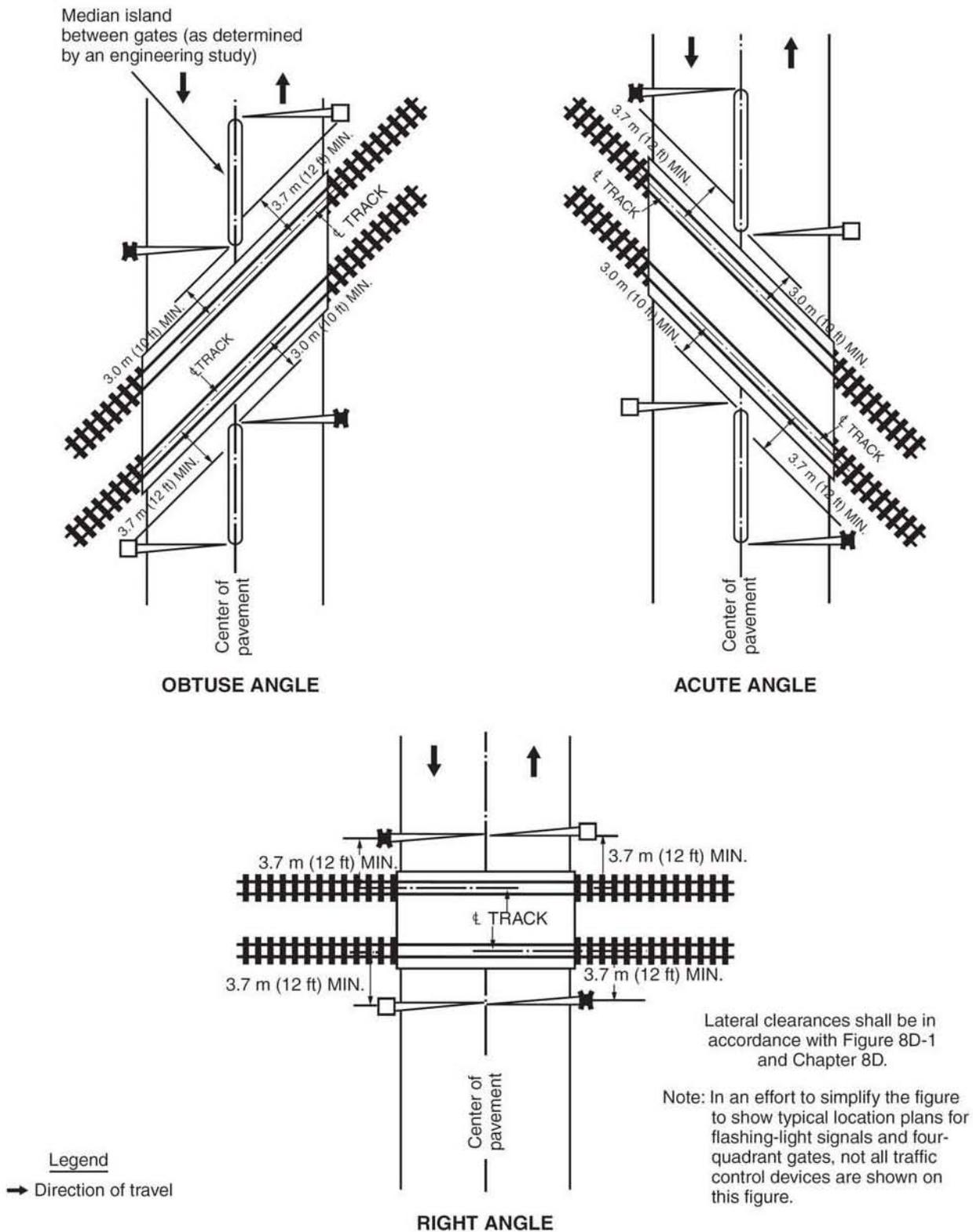
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Figure 8D-1. Composite Drawing of Active Traffic Control Devices for Highway-Rail Grade Crossings Showing Clearances



* For locating this reference line at other than curb section installation, see Section 8D.01.

Figure 8D-2. Example of Location Plan for Flashing-Light Signals and Four-Quadrant Gates



California Manual on Uniform Traffic Control Devices

for Streets and Highways

(FHWA's MUTCD 2003 Edition
including Revisions 1 and 2,
as amended for use in California)

PART 10 Traffic Controls for Highway-Light Rail Transit Grade Crossings



STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION

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**PART 10. TRAFFIC CONTROLS FOR HIGHWAY-LIGHT
RAIL TRANSIT GRADE CROSSINGS**

TABLE OF CONTENTS

		<u>Page</u>
CHAPTER 10A.	GENERAL	
Section 10A.01	Introduction	10A-1
Section 10A.02	Use of Standard Devices, Systems, and Practices	10A-1
Section 10A.03	Uniform Provisions	10A-2
Section 10A.04	Highway-Light Rail Transit Grade Crossing Elimination	10A-2
Section 10A.05	Temporary Traffic Control Zones	10A-3
CHAPTER 10B.	HIGHWAY-LIGHT RAIL TRANSIT GRADE CROSSING CONTROL SYSTEMS	
Section 10B.01	Introduction	10B-1
CHAPTER 10C.	SIGNS, ILLUMINATION, AND MARKINGS	
Section 10C.01	Purpose	10C-1
Section 10C.02	Highway-Rail Grade Crossing (Crossbuck) Sign (R15-1) and Number of Tracks Sign (R15-2)	10C-1
Section 10C.03	LOOK Sign (R15-8)	10C-2
Section 10C.04	STOP (R1-1) or YIELD (R1-2) Signs at Highway-Light Rail Transit Grade Crossings	10C-2
Section 10C.05	DO NOT STOP ON TRACKS Sign (R8-8)	10C-2
Section 10C.06	TRACKS OUT OF SERVICE Sign (R8-9)	10C-3
Section 10C.07	STOP HERE ON RED Sign (R10-6)	10C-3
Section 10C.08	STOP HERE WHEN FLASHING Sign (R8-10)	10C-3
Section 10C.09	Light Rail Transit-Activated Blank-Out Turn Prohibition Signs (R3-1a , R3-2a)	10C-3
Section 10C.10	EXEMPT Highway-Rail Grade Crossing Signs (R15-3, W10-1a)	10C-4
Section 10C.11	Divided Highway With Light Rail Transit Crossing Signs (R15-7 Series)	10C-4
Section 10C.12	No Vehicles On Tracks Signs (R15-6, R15-6a)	10C-4
Section 10C.13	Light Rail Transit Only Lane Signs (R15-4 Series)	10C-5
Section 10C.14	Do Not Pass Light Rail Transit Signs (R15-5, R15-5a)	10C-5
Section 10C.15	Highway-Rail Grade Crossing Advance Warning Signs (W10 Series)	10C-5
Section 10C.16	Low Ground Clearance Highway-Rail Grade Crossing Sign (W10-5)	10C-6
Section 10C.17	Light Rail Transit Approaching-Activated Blank-Out Warning Sign (W10-7)	10C-6
Section 10C.18	Storage Space Signs (W10-11, W10-11a, W10-11b)	10C-6
Section 10C.19	Skewed Crossing Sign (W10-12)	10C-7
Section 10C.20	Light Rail Transit Station Sign (I-12)	10C-7
Section 10C.21	Emergency Notification Sign (I-13 or I-13a)	10C-7
Section 10C.22	Illumination at Highway-Light Rail Transit Crossings	10C-7
Section 10C.23	Pavement Markings	10C-7

		<u>Page</u>
Section 10C.24	Stop Lines	10C-8
Section 10C.25	Dynamic Envelope Markings	10C-8
Section 10C.101(CA)	Trolley Crossing Signs (W82(CA) and W82-1(CA))	10C-9

CHAPTER 10D. HIGHWAY-LIGHT RAIL TRANSIT ACTIVE TRAFFIC CONTROL GRADE CROSSING SYSTEMS

Section 10D.01	Introduction	10D-1
Section 10D.02	Flashing-Light Signals	10D-1
Section 10D.03	Automatic Gates	10D-1
Section 10D.04	Four-Quadrant Gate Systems	10D-2
Section 10D.05	Traffic Control Signals	10D-3
Section 10D.06	Highway Traffic Signal Preemption Turning Restrictions	10D-4
Section 10D.07	Use of Traffic Control Signals for Control of Light Rail Transit Vehicles at Grade Crossings	10D-4
Section 10D.08	Pedestrian and Bicycle Signals and Crossings	10D-5

FIGURES

CHAPTER 10C. SIGNS, ILLUMINATION, AND MARKINGS

Figure 10C-1	Highway-Rail Grade Crossing (Crossbuck) Regulatory Signs	10C-9
Figure 10C-2	Regulatory Signs	10C-10
Figure 10C-2(CA)	Regulatory Signs	10C-11
Figure 10C-3	Warning Signs and Light Rail Station Sign	10C-11
Figure 10C-3(CA)	California Warning Signs and Light Rail Station Signs	10C-12
Figure 10C-4	Emergency Notification Signs	10C-12
Figure 10C-5	Example of Placement of Warning Signs and Pavement Markings at Highway-Light Rail Transit Grade Crossings	10C-13
Figure 10C-6	Examples of Highway-Light Rail Transit Grade Crossing Pavement Markings	10C-14
Figure 10C-7	Light Rail Transit Vehicle Dynamic Envelope	10C-15
Figure 10C-8	Typical Light Rail Transit Vehicle Dynamic Envelope Pavement Markings	10C-15
Figure 10C-9	Example of Light Rail Transit Vehicle Dynamic Envelope Pavement Markings	10C-16
Figure 10C-10	Example of Light Rail Transit Vehicle Dynamic Envelope Contrasting Color and/or Texture	10C-16

CHAPTER 10D. HIGHWAY-LIGHT RAIL TRANSIT ACTIVE TRAFFIC CONTROL GRADE CROSSING SYSTEMS

Figure 10D-1	Examples of Light Rail Transit Signals	10D-6
Figure 10D-1(CA)	Examples of Light Rail Transit Signals	10D-7
Figure 10D-2	Example of Light Rail Transit Flashing-Light Signal Assembly for Pedestrian Crossings	10D-8
Figure 10D-3	Example of Pedestrian Gate Placement Behind the Sidewalk	10D-9
Figure 10D-4	Example of Pedestrian Gate Placement with Pedestrian Gate Arm	10D-9

		<u>Page</u>
Figure 10D-5	Examples of Placement of Pedestrian Gates	10D-10
Figure 10D-6	Example of Swing Gates	10D-11
Figure 10D-7	Example of Pedestrian Barriers at an Offset Highway-Light Rail Transit Crossing	10D-11
Figure 10D-8	Examples of Pedestrian Barrier Installation at an Offset Non- intersection Light Rail Transit Crossing	10D-12

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CHAPTER 10A. GENERAL

Section 10A.01 Introduction

Support:

Part 10 provides standards and guidelines for the design, installation, and operation of traffic control devices at grade crossings of highway traffic and light rail transit vehicles to facilitate the reasonably safe, orderly, and integrated movement of all traffic. The principles in Section 8A.01 are the same but, because light rail vehicles sometimes operate along streets and highways in mixed traffic with automotive vehicles, the traffic controls and associated standards and guidelines for highway-light rail transit grade crossings presented in Part 10 can be different than those presented in Part 8.

Light rail transit is a mode of metropolitan transportation that employs light rail transit vehicles (commonly known as light rail vehicles, streetcars, or trolleys) that operate on rails in streets in mixed traffic, in semiexclusive rights-of-way, or in exclusive rights-of-way. Grade crossings with light rail transit can occur at intersections or at midblock locations, including public and private driveways.

An initial educational campaign along with an ongoing program to continue to educate new drivers is beneficial when introducing light rail operations to an area and, hence, new traffic control devices.

Light rail alignments can be grouped into one of the following three types:

- A. Exclusive: A light rail transit right-of-way that is grade-separated or protected by a fence or traffic barrier. Motor vehicles, pedestrians, and bicycles are prohibited within the right-of-way. Subways and aerial structures are included within this group. This type of alignment does not have grade crossings and is not further addressed in Part 10.
- B. Semiexclusive: A light rail transit alignment that is in a separate right-of-way or along a street or railroad right-of-way where motor vehicles, pedestrians, and bicycles have limited access and cross at designated locations only.
- C. Mixed-Use: An alignment where light rail transit operates in mixed traffic with all types of road users. This includes streets, transit malls, and pedestrian malls where the right-of-way is shared.

Standard:

Where light rail transit and railroads use the same tracks or adjacent tracks, the traffic control devices, systems, and practices for highway-rail grade crossings described in Part 8 shall be used.

Support:

Section 8A.01 contains a set of definitions, most of which also apply to Part 10.

A diagnostic team, consisting of knowledgeable representatives of parties of interest in a highway-rail grade crossing, using crossing safety management principles, evaluates conditions at a grade crossing to make determinations or recommendations concerning safety needs at the crossing. The diagnostic team needs to, at a minimum, include representatives of the highway agency or authority with jurisdiction over the roadway, the railroad agency, and the California Public Utilities Commission (CPUC), which is the state regulatory agency with statutory authority over highway-rail grade crossings. The removal, reduction, addition, or change in the type of warning devices at each public at-grade crossing, or publicly used private at-grade crossing (as determined by CPUC or a court competent jurisdiction), must be authorized by CPUC. This includes any changes that can affect interconnections with adjacent traffic signals, or any other modification that may impact the safety of the grade crossing. Refer to Public Utilities Code Sections 1201 through 1205 and 7537, and CPUC General Orders 75 and 88, as amended.

Section 10A.02 Use of Standard Devices, Systems, and Practices

Support:

Because of the large number of significant variables to be considered, no single standard system of traffic control devices is universally applicable for all highway-light rail transit grade crossings.

Guidance:

The appropriate traffic control system to be used at a highway-light rail transit grade crossing should be determined by an engineering study conducted by the transit or highway agency in cooperation with other appropriate State and local organizations.

Standard:

Traffic control devices, systems, and practices shall be consistent with the design and application of the Standards contained herein.

The traffic control devices, systems, and practices described herein shall be used at all highway-light rail transit grade crossings.

~~Before any new highway-light rail transit grade crossing traffic control system is installed or modifications are made to an existing system, approval shall be obtained from the local agencies having statutory authority to grant such approval.~~

Before any new highway-light rail transit grade crossing traffic control system is installed or modifications are made to an existing system, approval shall be obtained from the California Public Utilities Commission. Refer to California Public Utilities Commission General Order 88, as amended, and Public Utilities Code, Sections 1201 – 1205, 7537, and 99152.

Guidance:

To stimulate effective responses from vehicle operators and pedestrians, these devices, systems, and practices should use the five basic considerations employed generally for traffic control devices and described fully in Section 1A.02: design, placement, operation, maintenance, and uniformity.

Support:

Many other details of highway-light rail transit grade crossing traffic control systems that are not set forth in Part 10 are contained in the publications listed in Section 1A.11.

Section 10A.03 Uniform Provisions

Standard:

All signs used in highway-light rail transit grade crossing traffic control systems shall be retroreflectorized or illuminated as described in Section 2A.08 to show the same shape and similar color to an approaching road user during both day and night.

No sign or signal shall be located in the center of an undivided highway, except in a raised island.

Guidance:

Such signs or signals should be installed with a clearance of at least 0.6 m (2 ft) from outer edge of the raised island to the nearest edge of the sign or signal, except as allowed in Section 2A.19.

Where the distance between tracks, measured along the highway between the inside rails, exceeds 30 m (100 ft), additional signs or other appropriate traffic control devices should be used.

Section 10A.04 Highway-Light Rail Transit Grade Crossing Elimination

Guidance:

Because highway-light rail transit grade crossings are a potential source of crashes and congestion, agencies should conduct engineering studies to determine the cost and benefits of eliminating these crossings.

Standard:

When a highway-light rail transit grade crossing is eliminated, the traffic control devices for the crossing shall be removed.

If the existing traffic control devices at a multiple-track highway-light rail transit grade crossing become improperly placed or inaccurate because of the removal of some of the tracks, the existing devices shall be relocated and/or modified.

Guidance:

Where a roadway is removed from a highway-light rail transit grade crossing, the roadway approaches in the light rail transit right-of-way should also be removed and appropriate signs should be placed at the roadway end in accordance with Section 3C.04.

Where light rail transit is eliminated at a highway-light rail transit grade crossing, the tracks should be removed or paved over.

Option:

Based on engineering judgment, the TRACKS OUT OF SERVICE (R8-9) sign (see Figure 10C-2) may be temporarily installed until the tracks are removed or paved over. The length of time before the tracks will be removed or paved over may be considered in making the decision as to whether to install the sign.

Section 10A.05 Temporary Traffic Control Zones

Support:

Temporary traffic control planning provides for continuity of operations (such as movement of traffic, pedestrians and bicycles, transit operations, and access to property/utilities) when the normal function of a roadway at a highway-light rail transit grade crossing is suspended because of temporary traffic control operations.

Standard:

Temporary traffic control operations on highways with highway-light rail transit grade crossings shall be as outlined in Part 6.

When a highway-light rail transit grade crossing exists either within or in the vicinity of a temporary traffic control zone, lane restrictions, flagging, or other operations shall not be performed in a manner that would cause vehicles to stop on the light rail transit tracks, unless a law enforcement officer or flagger is provided at the highway-light rail transit grade crossing to minimize the possibility of vehicles stopping on the tracks, even if automatic warning devices are in place.

Guidance:

The agencies responsible for the operation of the light rail transit and highway should be contacted when the initial planning begins for any temporary traffic control zone that may directly or indirectly influence the flow of traffic on mixed-use facilities where light rail transit and road users operate. Responsible agencies, along with others affected, such as emergency services and businesses, should meet to plan appropriate traffic detours and the necessary signing, marking, and flagging requirements for operations during temporary traffic control activities. Consideration should be given to the length of time that the grade crossing is to be closed, roadway classification, type of vehicle and traffic affected, the time of day, and the materials and techniques of repair.

Temporary traffic control operations should minimize the inconvenience, delay, and crash potential to affected traffic. Prior notice should be given to affected public or private parties, emergency services, businesses, and road users before the free movement of vehicles or light rail transit is infringed on or blocked.

Temporary traffic control activities should not be permitted to extensively prolong the closing of a grade crossing.

The width, grade, alignment, and riding quality of the highway surface at a light rail transit crossing should, at a minimum, be restored to correspond with the quality of the approaches to the highway-light rail transit grade crossing.

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CHAPTER 10B. HIGHWAY-LIGHT RAIL TRANSIT GRADE CROSSING CONTROL SYSTEMS

Section 10B.01 Introduction

Support:

The combination of devices selected or installed at a specific highway-light rail transit grade crossing is referred to as a Light Rail Transit Traffic Control System.

For the safety and integrity of operations by highway and light rail transit users, the highway agency with jurisdiction, the regulatory agency with statutory authority, if applicable, and the light rail transit authority jointly determine the need and selection of traffic control devices and the assignment of priority to light rail transit at a highway-light rail transit grade crossing.

The normal rules of the road and traffic control priority identified in the Uniform Vehicle Code govern the order assigned to the movement of vehicles at an intersection unless the local agency determines that it is appropriate to assign a higher priority to light rail transit. Examples of different types of light rail transit priority control include separate traffic control signal phases for light rail transit movements, restriction of movement of roadway vehicles in favor of light rail transit operations, and preemption of highway traffic signal control to accommodate light rail transit movements.

Standard:

Highway-light rail transit grade crossings in semiexclusive alignments shall be equipped with a combination of automatic gates and flashing-light signals, or flashing- light signals only, or traffic control signals, unless an engineering study indicates that the use of STOP, YIELD, or advance warning signs alone would be adequate.

Option:

Highway-light rail transit grade crossings in mixed-use alignments may be equipped with traffic control signals unless an engineering study indicates that the use of STOP, YIELD, or advance warning signs alone would be adequate.

Support:

Section 10C.04 describes the appropriate conditions for the use of STOP or YIELD signs alone at a highway-light rail transit grade crossing.

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CHAPTER 10C. SIGNS, ILLUMINATION, AND MARKINGS

Section 10C.01 Purpose

Support:

Signs and markings regulate, warn, and guide the road users so that they, as well as light rail transit vehicle operators, can take appropriate action.

Standard:

The design and location of signs shall conform to Part 2.

Support:

Section 8B.02 contains information regarding the sizes of signs for grade crossings.

Section 10C.02 Highway-Rail Grade Crossing (Crossbuck) Sign (R15-1) and Number of Tracks Sign (R15-2)

Standard:

The Highway-Rail Grade Crossing (R15-1) sign, commonly identified as the Crossbuck sign, shall be retroreflectorized white with the words RAILROAD CROSSING in black lettering, mounted as shown in Figure 10C-1.

As a minimum, one Crossbuck sign shall be used on each highway approach to every highway-light rail transit grade crossing on a semiexclusive alignment, alone or in combination with other traffic control devices.

Option:

A Crossbuck sign may be used on a highway approach to a highway-light rail transit grade crossing on a mixed-use alignment, alone or in combination with other traffic control devices.

Standard:

~~If automatic gates are not present where a Crossbuck sign is being used and if there are two or more tracks at the highway-light rail transit grade crossing, the number of tracks shall be indicated on a supplemental Number of Tracks (R15-2) sign of inverted T shape mounted below the Crossbuck sign in the manner and at the height indicated in Figure 10C-1.~~

If a Crossbuck (R15-1) sign is being used and if there are two or more tracks at the highway-light rail transit grade crossing, the number of tracks shall be indicated on a supplemental Number of Tracks (R15-2) sign of inverted T shape mounted below the Crossbuck sign in the manner and at the height indicated in Figure 10C-1.

Option:

~~The supplemental Number of Tracks sign may also be used at highway-light rail transit grade crossings with automatic gates.~~

Standard:

If used, the Crossbuck sign shall be installed on the right side of the highway on each approach to the highway-light rail transit grade crossing. Where restricted sight distance or unfavorable highway geometry exists on an approach to a highway-light rail transit grade crossing, an additional Crossbuck sign shall be installed on the left side of the highway, possibly placed back-to-back with the Crossbuck sign for the opposite approach, or otherwise located so that two Crossbuck signs are displayed for that approach.

A strip of retroreflective white material not less than 50 mm (2 in) in width shall be used on the back of each blade of each Crossbuck sign for the length of each blade, at all highway-light rail transit grade crossings, except those where Crossbuck signs have been installed back-to-back.

A strip of retroreflective white material, not less than 50 mm (2 in) in width, shall be used on each support at passive highway-light rail transit grade crossings for the full length of the front and back of the support from the Crossbuck sign or Number of Tracks sign to within 0.6 m (2 ft) above the edge of the roadway, except on the side of those supports where a STOP (R1-1) or YIELD (R1-2) sign or flashing lights have been installed or on the back side of supports for Crossbuck signs installed on one-way streets.

Guidance:

If used, Crossbuck signs should be located with respect to the highway pavement or shoulder in accordance with the criteria in Chapter 2A and Figures 2A-1 and ~~2A-2~~ 2A-2(CA), and should be located with respect to the nearest track in accordance with Figure 8D-2.

The minimum lateral clearance for the nearest edge of the Crossbuck sign should be 1.8 m (6 ft) from the edge of the shoulder or 3.7 m (12 ft) from the edge of the traveled way in rural areas, and 0.6 m (2 ft) from the face of the curb in urban areas.

Where unusual conditions make variations in location and lateral clearance appropriate, engineering judgment should be used to provide the best practical combination of view and safety clearances.

Section 10C.03 LOOK Sign (R15-8)

Option:

A LOOK (for light rail transit vehicles) (R15-8) sign (see Figure 10C-2) may be mounted at highway-light rail transit grade crossings as a supplemental plaque on the Crossbuck (R15-1) sign post, or as a separate sign in the immediate vicinity of the highway-light rail transit grade crossing on the light rail transit right-of-way.

Section 10C.04 STOP (R1-1) or YIELD (R1-2) Signs at Highway-Light Rail Transit Grade Crossings Standard:

For all highway-light rail transit grade crossings where STOP (R1-1) or YIELD (R1-2) signs are installed, the placement shall conform to the requirements of Sections 2B.06 and 2B.10. Stop Ahead (W3-1) or Yield Ahead (W3-2) Advance Warning signs (see Figure 2C-4) shall also be installed if the criteria for their installation given in Section 2C.29 is met.

Guidance:

The use of STOP or YIELD signs for road users at highway-light rail transit grade crossings should be limited to those crossings where the need and feasibility is established by an engineering study. Such crossings should have all of the following characteristics:

- A. The crossing roadways should be secondary in character (such as a minor street with one lane in each direction, an alley, or a driveway) with low traffic volumes and low speed limits. The specific thresholds of traffic volumes and speed limits should be determined by the local agencies.
- B. Light rail transit speeds do not exceed 40 km/h (25 mph).
- C. The line of sight for an approaching light rail transit operator is adequate from a sufficient distance such that the operator can sound an audible signal and bring the light rail transit vehicle to a stop before arriving at the crossing.
- D. The road user has sufficient sight distance at the stop line to permit the vehicle to cross the tracks before the arrival of the light rail transit vehicle.
- E. If at an intersection of two roadways, the intersection does not meet the warrants for a traffic control signal as specified in Chapter 4C.
- F. The light rail transit tracks are located such that vehicles are not likely to stop on the tracks while waiting to enter a cross street or highway.

If a STOP or YIELD sign is installed beyond the light rail transit crossing such that vehicle queues are likely to extend into the path of the light rail transit, a DO NOT STOP ON TRACKS sign (R8-8) should be posted in accordance with Section 10C.05.

Option:

If a STOP or YIELD sign is installed at a highway-light rail transit grade crossing, it may be installed on the Crossbuck post or on a separate post at the point where the vehicle is to stop, or as near to that point as practical.

Section 10C.05 DO NOT STOP ON TRACKS Sign (R8-8)

Guidance:

A DO NOT STOP ON TRACKS (R8-8) sign (see Figure 10C-2) should be installed whenever an engineering study determines that the potential for vehicles stopping on the tracks at a highway-light rail

transit grade crossing is significant. Placement of the R8-8 sign should be determined as part of the engineering study. The sign, if used, should be located on the right side of the highway on either the near or far side of the grade crossing, depending upon which position provides better visibility to approaching drivers.

Option:

DO NOT STOP ON TRACKS signs may be placed on both sides of the track.

Guidance:

On divided highways and one-way streets, a second DO NOT STOP ON TRACKS sign ~~may~~ **should** be placed on the near or far left side of the highway ~~light rail transit~~ at the grade crossing to further improve visibility of the sign.

Section 10C.06 TRACKS OUT OF SERVICE Sign (R8-9)

Option:

The TRACKS OUT OF SERVICE (R8-9) sign (see Figure 10C-2) may be used at a highway-light rail transit grade crossing instead of a Crossbuck (R15-1) sign and a Number of Tracks (R15-2) sign when light rail transit tracks have been temporarily or permanently abandoned, but only until such time that the tracks are removed or paved over.

Standard:

When tracks are out of service, traffic control devices and gate arms shall be removed and the signal heads shall be removed or hooded or turned from view to clearly indicate that they are not in operation.

The R8-9 sign shall be removed when the tracks have been removed or covered or when the highway-light rail transit grade crossing is returned to service.

Section 10C.07 STOP HERE ON RED Sign (R10-6)

Support:

The STOP HERE ON RED (R10-6) sign (see Figure 10C-2) defines and facilitates observance of the stop lines at traffic control signals.

Option:

A STOP HERE ON RED sign may be used at locations where vehicles frequently violate the stop line or where it is not obvious to road users where to stop.

Guidance:

If possible, stop lines should be placed at a point where the vehicle driver has adequate sight distance along the track.

Section 10C.08 STOP HERE WHEN FLASHING Sign (R8-10)

Option:

The STOP HERE WHEN FLASHING (R8-10) sign (see Figure 10C-2) may be used at a highway-light rail transit grade crossing to inform drivers of the location of the stop line or the point at which to stop when the flashing-light signals (see Section 10D.02) are activated.

Section 10C.09 Light Rail Transit-Activated Blank-Out Turn Prohibition Signs (R3-1a, R3-2a)

Support:

Light rail transit operations can include the use of activated blank-out sign technology for turn prohibition (~~R3-1a, R3-2a~~) (**R3-1, R3-2 and R5-1**) signs (see Figure ~~10C-2~~ **10C-2(CA)**). ~~The~~ **These** signs are typically used on roads paralleling a semiexclusive or mixed-use light rail transit alignment where road users might turn across the light rail transit tracks. A blank-out sign displays its message only when activated. When not activated, the sign face is blank.

Guidance:

A light rail transit-activated blank-out turn prohibition sign should be used where an intersection adjacent to a highway-light rail transit crossing is controlled by STOP signs, or is controlled by traffic control signals with permissive turn movements for road users crossing the tracks.

Option:

A light rail transit-activated blank-out turn prohibition sign may be used for turning movements that cross the tracks. The symbolic No Right Turn (R3-1) and No Left Turn (R3-2) signs and the DO NOT ENTER (R5-1) sign, as shown in Figure 10C-2(CA), may be used as blank-out signs for this purpose.

As an alternative to light rail transit-activated blank-out turn prohibition signs at intersections with traffic control signals, exclusive traffic control signal phases such that all movements that cross the tracks have a steady red indication may be used in combination with NO TURN ON RED (R10-11a) signs No Right Turn on Red (R13A(CA)) sign or No Left Turn on Red (R13B(CA)) sign (see Figure 2B-19(CA)).

Standard:

Turn prohibition signs that are associated with preemption shall be visible only when the highway-light rail transit grade crossing restriction is in effect.

Section 10C.10 EXEMPT Highway-Rail Grade Crossing Sign (R15-3, W10-1a)

Option:

~~When authorized by law or regulation, a supplemental EXEMPT (R15-3) sign (see Figure 10C-2) with a white background may be used below the Crossbuck sign or Number of Tracks sign, if present, at the highway-light rail transit grade crossing, and a supplemental EXEMPT (W10-1a) sign (see Figure 10C-3) with a yellow background may be used below the Highway-Rail Advance Warning (W10-1) sign. Where neither the Crossbuck nor the advance warning signs exist for a particular crossing, an EXEMPT (R15-3) sign with a white background may be placed on its own post on the near right side of the approach to the crossing.~~

Support:

~~These supplemental signs inform drivers of vehicles carrying passengers for hire, school buses carrying students, or vehicles carrying hazardous materials that a stop is not required at certain designated highway-light rail transit grade crossings, except when a light rail transit vehicle is approaching or occupying the highway-light rail transit grade crossing, or the driver's view is blocked.~~

Section 10C.11 Divided Highway with Light Rail Transit Crossing Signs (R15-7 Series)

Option:

The Divided Highway With Light Rail Transit Crossing (R15-7) sign (see Figure 10C-2) may be used as a supplemental sign on the approach legs of a roadway that intersects with a divided highway where light rail transit vehicles operate in the median. The sign may be placed beneath a STOP sign or mounted separately.

Guidance:

The number of tracks shown on the R15-7 sign should be the same as the actual number of tracks.

Standard:

When the Divided Highway With Light Rail Transit Crossing sign is used at a four-legged intersection, the R15-7 sign shall be used. When used at a T-intersection, the R15-7a sign shall be used.

Section 10C.12 No Vehicles On Tracks Signs (R15-6, R15-6a)

Support:

The No Vehicles On Tracks (R15-6) sign (see Figure 10C-2) is used where there are adjacent traffic lanes separated from the light rail transit lane by a curb or pavement markings.

Guidance:

The DO NOT ENTER (R5-1) sign should be used where a road user could wrongly enter a light rail transit only street.

Option:

A No Vehicles On Tracks sign may be used to deter vehicles from driving on the trackway. It may be installed either on a 0.9 m (3 ft) flexible post between double tracks, on a post alongside the tracks, or overhead.

Instead of the R15-6 symbol sign, a regulatory sign with the word message DO NOT DRIVE ON TRACKS (R15-6a) may be used (see Figure 10C-2).

A reduced size of 300 x 300 mm (12 x 12 in) may be used if the R15-6 sign is installed between double tracks.

Standard:

The smallest size for the R15-6 sign shall be 300 x 300 mm (12 x 12 in).

Section 10C.13 Light Rail Transit Only Lane Signs (R15-4 Series)

Support:

The Light Rail Transit Only Lane (R15-4 series) signs (see Figure 10C-2) are used for multi-lane operations, where road users might need additional guidance on lane use and/or restrictions.

Option:

Light Rail Transit Only Lane signs may be used on a roadway lane limited to only light rail transit use to indicate the restricted use of a lane in semiexclusive and mixed alignments.

Guidance:

If used, the R15-4a, R15-4b, and R15-4c signs should be installed on posts adjacent to the roadway containing the light rail transit tracks or overhead above the light rail transit only lane.

Option:

If the trackway is paved, preferential lane markings (see Section 3B.22) may be installed but only in combination with light rail transit only lane signs.

Support:

The trackway is the continuous way designated for light rail transit, including the entire dynamic envelope. Section 10C.25 contains more information regarding the dynamic envelope.

Section 10C.14 Do Not Pass Light Rail Transit Signs (R15-5, R15-5a)

Support:

A Do Not Pass Light Rail Transit (R15-5) sign (see Figure 10C-2) is used to indicate that vehicles are not allowed to pass light rail transit vehicles that are loading or unloading passengers where there is no raised platform or physical separation from the lanes upon which other motor vehicles are operating.

Option:

The R15-5 sign may be used in mixed-use alignments and may be mounted overhead where there are multiple lanes.

Instead of the R15-5 symbol sign, a regulatory sign with the word message DO NOT PASS STOPPED TRAIN (R15-5a) may be used (see Figure 10C-2).

Guidance:

If used, the R15-5 sign should be located immediately before the light rail transit boarding area.

Section 10C.15 Highway-Rail Grade Crossing Advance Warning Signs (W10 Series)

Standard:

A Highway-Rail Grade Crossing Advance Warning (W10-1) sign (see Figure 10C-3) shall be used on each highway in advance of every highway-light rail transit grade crossing in semiexclusive alignments except in the following circumstances:

- A. On an approach to a highway-light rail transit grade crossing from a T-intersection with a parallel highway, if the distance from the edge of the track to the edge of the parallel roadway is less than 30 m (100 ft), and W10-3 signs are used on both approaches of the parallel highway; or**
- ~~B. On low volume, low speed highways crossing minor spurs or other tracks that are infrequently used and are flagged by transit crews; or Refer to CVC 21362.~~**
- ~~C. In business districts where active highway-light rail transit grade crossing traffic control devices are in use; or Refer to CVC 21362.~~**
- ~~D. Where physical conditions do not permit even a partially effective display of the sign. Refer to CVC 21362.~~**

~~Placement of the Highway-Rail Grade Crossing Advance Warning sign shall be in accordance with Chapter 2A and Table 2C-4.~~

Placement of the Highway-Rail Grade Crossing Advance Warning (W10 Series) signs shall be in accordance with Figure 8B-6 (CA).

Option:

On divided highways and one-way streets, an additional W10-1 sign may be installed on the left side of the roadway.

Standard:

If the distance between the light rail transit tracks in a semiexclusive alignment and a parallel highway, from the edge of the tracks to the edge of the parallel roadway, is less than 30 m (100 ft), W10-2, W10-3, or W10-4 signs (see Figure 10C-3) shall be installed on each approach of the parallel highway to warn road users making a turn that they will encounter a highway-light rail transit grade crossing soon after making a turn, and a W10-1 sign for the approach to the tracks shall not be required to be between the tracks and the parallel highway.

If the W10-2, W10-3, or W10-4 signs are used, sign placement in accordance with the guidelines for Intersection Warning signs in Table 2C-4 using the speed of through traffic shall be measured from the highway intersection.

Guidance:

If the distance between the light rail transit tracks and the parallel highway, from the edge of the tracks to the edge of the parallel roadway, is 30 m (100 ft) or more, a W10-1 sign should be installed in advance of the highway-light rail transit grade crossing, and the W10-2, W10-3, or W10-4 signs should not be used on the parallel highway.

Standard:

The Highway-Rail Grade Crossing Advance Warning (W10 Series) signs shall be placed by the roadway authority in advance of highway-light rail transit grade crossings on State highways, and roadways under local jurisdiction, in accordance with CVC 21362.

The Number of Tracks (W48(CA)) sign shall be placed below the Highway-Rail Grade Crossing Advance Warning (W10-1) sign and at grade crossings with two or more tracks.

Support:

The Number of Tracks (W48(CA)) sign is shown in Figure 10C-3(CA).

Section 10C.16 Low Ground Clearance Highway-Rail Grade Crossing Sign (W10-5)

Guidance:

If the highway profile conditions are sufficiently abrupt to create a hang-up situation for long wheelbase vehicles or for trailers with low ground clearance, the Low Ground Clearance Highway-Rail Grade Crossing (W10-5) sign (see Figure 10C-3) should be installed in advance of the highway-light rail transit grade crossing.

Support:

Information regarding the use of the W10-5 sign is contained in Section 8B.17.

Section 10C.17 Light Rail Transit Approaching-Activated Blank-Out Warning Sign (W10-7)

Support:

The Light Rail Transit Approaching-Activated Blank-Out (W10-7) warning sign (see Figure 10C-3) supplements the traffic control signal to warn road users turning across the tracks of an approaching parallel light rail transit vehicle.

Option:

A Light Rail Transit Approaching-Activated Blank-Out warning sign may be used at signalized intersections near grade crossings or at crossings controlled by STOP signs or automatic gates.

Section 10C.18 Storage Space Signs (W10-11, W10-11a, W10-11b)

Guidance:

A Storage Space (W10-11) sign supplemented by a word message storage distance (W10-11a) sign (see Figure 10C-3) should be used where there is a highway intersection in close proximity to the highway-light

rail transit grade crossing and an engineering study determines that adequate space is not available to store a design vehicle(s) between the highway intersection and the light rail transit vehicle dynamic envelope.

Support:

Information regarding the use of the W10-11, W10-11a, and W10-11b signs is contained in Section 8B.18.

Section 10C.19 Skewed Crossing Sign (W10-12)

Option:

The Skewed Crossing (W10-12) sign (see Figure 10C-3) may be used at a skewed highway-light rail transit grade crossing to warn drivers that the light rail transit tracks are not perpendicular to the highway.

Support:

Information regarding the use of the W10-12 sign is contained in Section 8B.19.

Section 10C.20 Light Rail Transit Station Sign (I-12)

Option:

The Light Rail Transit Station (I-12, [G96\(CA\)](#) and [G96A\(CA\)](#)) signs (see Figures [10C-3](#) and [10C-3\(CA\)](#)) may be used to direct road users to a light rail transit station or boarding location. It may be supplemented by the name of the transit system and by arrows as provided in Section 2D.08.

Section 10C.21 Emergency Notification Sign (I-13 or I-13a)

Guidance:

~~An Emergency Notification (I-13 or I-13a) sign (see Figure 10C-4) should be installed at all highway-light rail transit grade crossings on semiexclusive alignments to provide for emergency notification. The sign should have a white message on blue background.~~

~~Location and placement should be decided cooperatively by the transit company and the public or private highway agencies based on specific site conditions.~~

~~This sign, which is for emergency notification, should convey a clear and simple message that is visible to anyone stalled or disabled on the transit tracks, and to anyone with other emergencies.~~

Support:

~~Examples of sign messages are shown in Figure 10C-4.~~

Standard:

An Emergency Notification (I-13 or I-13a) sign (see Figure 10C-4), including an identification number which has been assigned by the Commission and an emergency notification telephone number, shall be installed and maintained by the light rail transit agency or authority at each public highway-light rail transit grade crossing on semiexclusive alignments of its track. Such number shall be placed so as to be readily legible from the highway. Refer CPUC General Order 75, as amended.

Section 10C.22 Illumination at Highway-Light Rail Transit Crossings

Guidance:

Where light rail transit operations are conducted at night, illumination at and adjacent to the highway-light rail transit grade crossing should be considered.

Support:

Recommended types and location of luminaires for highway-rail (light rail transit) grade crossings are contained in the American National Standards Institute's (ANSI) "Practice for Roadway Lighting RP-8," available from the Illuminating Engineering Society (see Section 1A.11).

Section 10C.23 Pavement Markings

Standard:

All highway-light rail transit grade crossing pavement markings shall be retroreflectorized white. All other markings shall be in accordance with Part 3.

Pavement markings in advance of a highway-light rail transit grade crossing shall consist of an X, the letters RR, a no-passing marking (two-lane highways where centerline markings are used), and certain transverse lines as shown in Figures 10C-5 8B-6(CA) and 10C-6 8B-7(CA).

~~Identical markings shall be placed in each approach lane on all paved approaches to highway-light rail transit grade crossings where signals or automatic gates are located, and at all other highway-light rail transit grade crossings where the posted or statutory highway speed is 60 km/h (40 mph) or greater.~~

~~Pavement markings shall not be required at highway-light rail transit grade crossings where the posted or statutory highway speed is less than 60 km/h (40 mph), or in urban areas, if an engineering study indicates that other installed devices provide suitable warning and control.~~

Identical (RXR) markings shall be placed in each approach lane on all paved approaches to highway-light rail transit grade crossings.

Guidance:

When pavement markings are used, a portion of the X symbol should be directly opposite the Advance Warning sign. The X symbol and letters should be elongated to allow for the low angle at which they will be viewed.

Figures 8B-6(CA) and 8B-7(CA) should be used for X symbol and letters details.

Option:

When justified by engineering judgment, supplemental pavement marking symbol(s) may be placed between the Advance Warning sign and the highway-light rail transit grade crossing.

Pavement markings and no-passing zone markings may be omitted at exempt highway-light rail transit grade crossings as provided in CVC 22452 and 22452.5.

Pavement (RXR) markings may be omitted where the distance between a cross street and a railroad is less than 15 m (50ft).

Section 10C.24 Stop Lines

Support:

Information regarding the use of stop lines at grade crossings is contained in Section 8B.21.

Section 10C.25 Dynamic Envelope Markings

Support:

The dynamic envelope (see Figure 10C-7) markings indicate the clearance required for the light rail transit vehicle overhang resulting from any combination of loading, lateral motion, or suspension failure.

Option:

The dynamic envelope may be delineated on the pavement using pavement markings (see Figures 10C-8 8B-6(CA) and 10C-9) or contrasting pavement color and/or contrasting pavement texture (see Figure 10C-10).

Standard:

If used, pavement markings for indicating the dynamic envelope shall conform to Part 3 and shall be a 100 mm (4 in) normal solid white line or contrasting pavement color and/or contrasting pavement texture.

Guidance:

If pavement markings are used to convey the dynamic envelope, they should be placed completely outside of the dynamic envelope. If used at light-rail transit grade crossings, dynamic envelope pavement markings should be placed on the highway 1.8 m (6 ft) from the nearest rail and installed parallel to the tracks, unless the transit authority and/or operating company advises otherwise. The pavement markings should extend across the roadway as shown in Figure 10C-8 8B-6(CA).

Option:

In semiexclusive alignments, the dynamic envelope markings may be along the light rail transit trackway between intersections where the trackway is immediately adjacent to travel lanes and no physical barrier is present.

In mixed-use alignments the dynamic envelope markings may be continuous between intersections.

Dynamic envelope markings may be installed at all highway-light rail transit grade crossings, unless a Four-Quadrant Gate system (see Section 10D.04) is used.

Pavement markings for adjacent travel or parking lanes may be used instead of dynamic envelope markings if the lines are outside the dynamic envelope.

Section 10C.101(CA) Trolley Crossing Signs (W82(CA) and W82-1(CA))

Option:

The Light Rail Transit (Trolley) Crossing sign (W82(CA)) may be used in advance of a light rail transit crossing controlled by traffic signals or stop signs.

The Light Rail Transit (Trolley) Crossing /LOOK BOTH WAYS sign (W82-1(CA)) may be used on driveways and alleys that cross a one-way street with two-way light rail transit side running operation, to alert vehicle drivers and pedestrians that the light rail transit vehicles approach from both directions.

Support:

The W82(CA) and W82-1(CA) signs are shown in Figure 10C-3(CA).

Figure 10C-1. Highway-Rail Grade Crossing (Crossbuck) Regulatory Signs

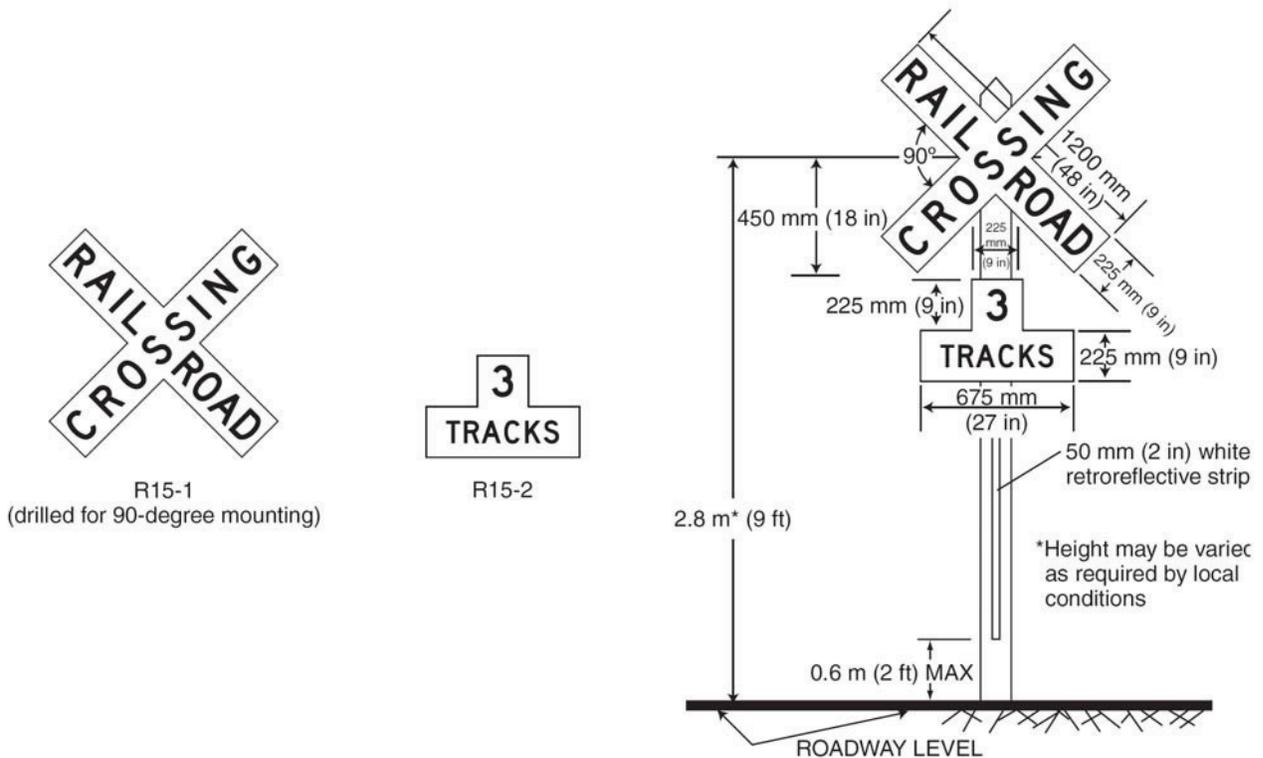
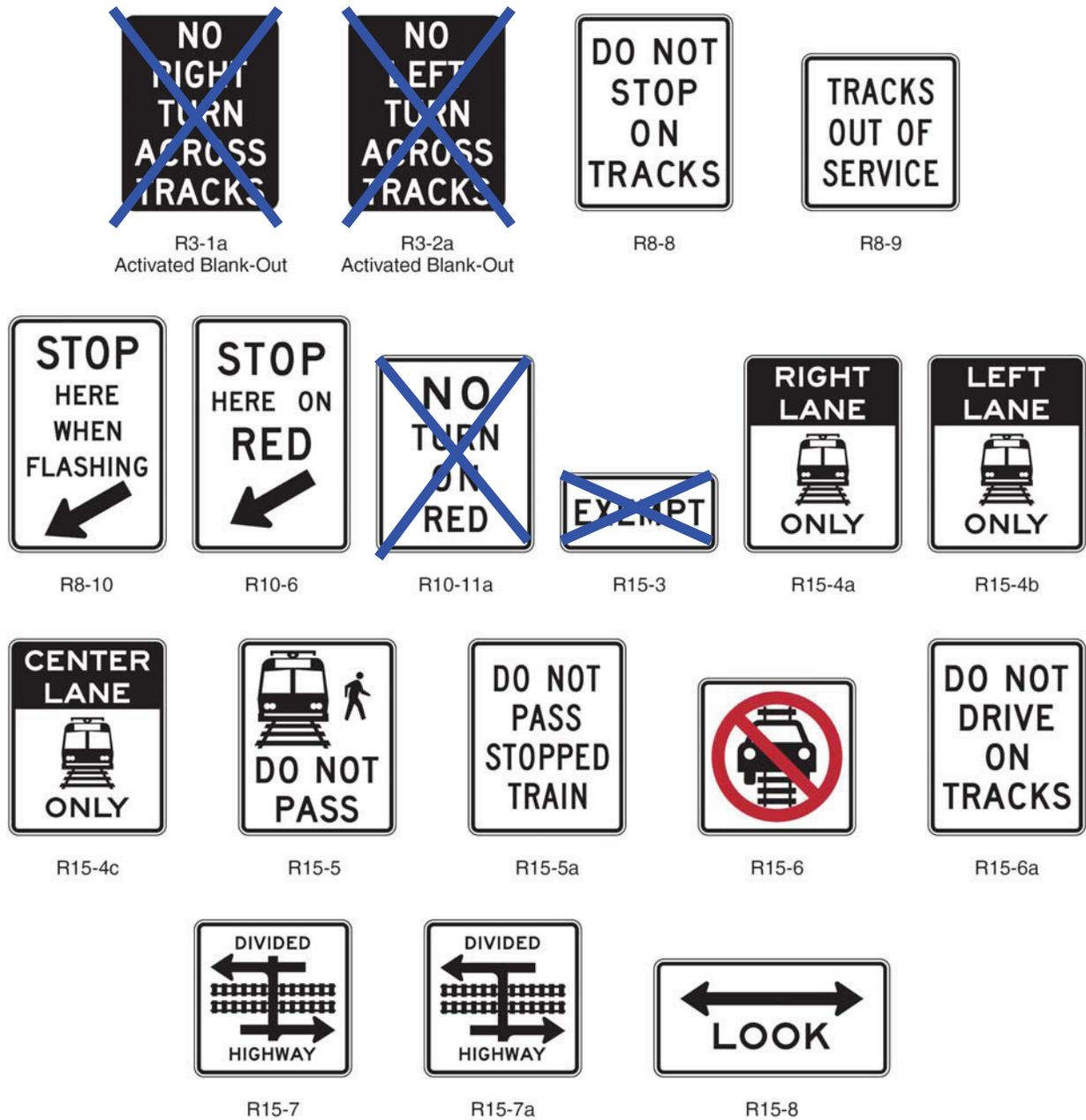


Figure 10C-2. Regulatory Signs



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Figure 10C-2(CA) Regulatory Signs



Figure 10C-3. Warning Signs and Light Rail Station Sign

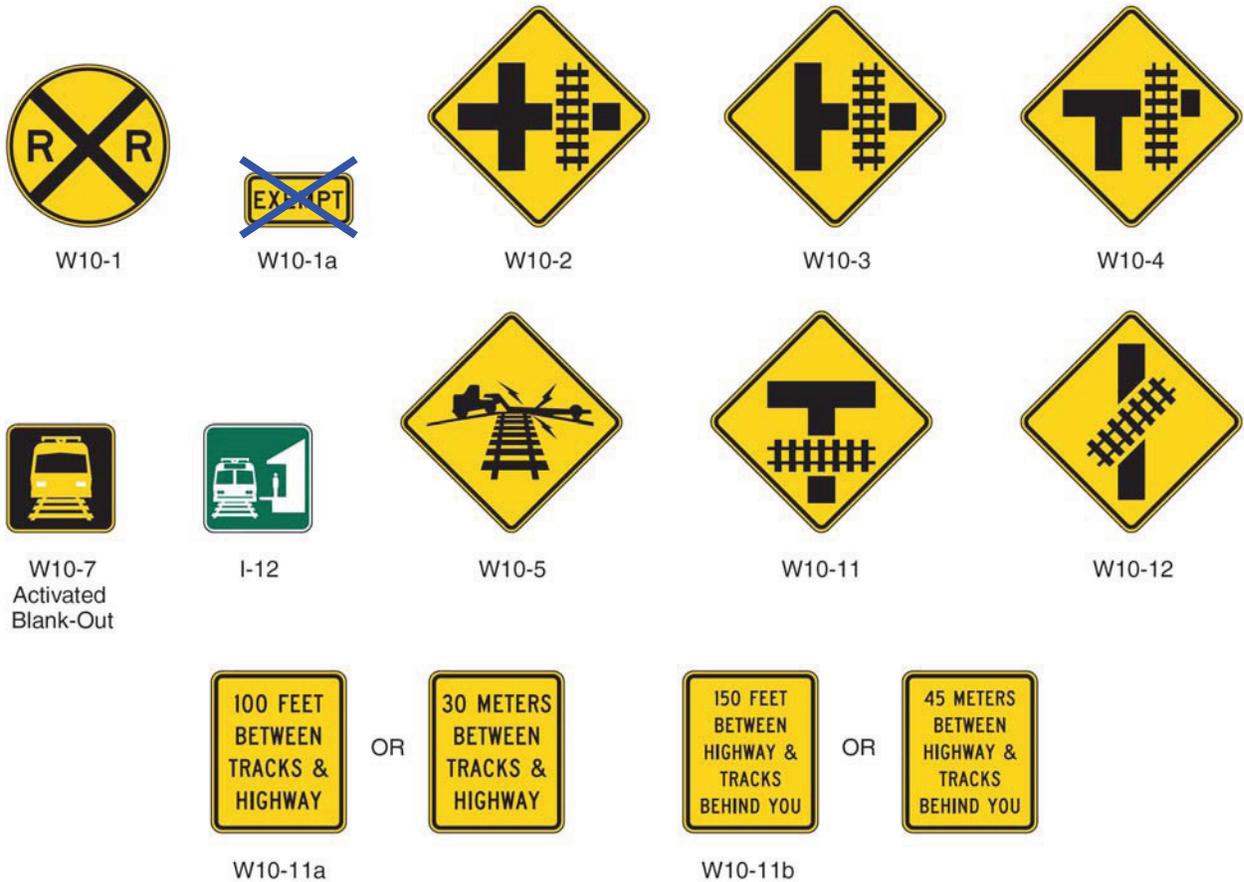


Figure 10C-3(CA) California Warning Signs and Light Rail Station Signs

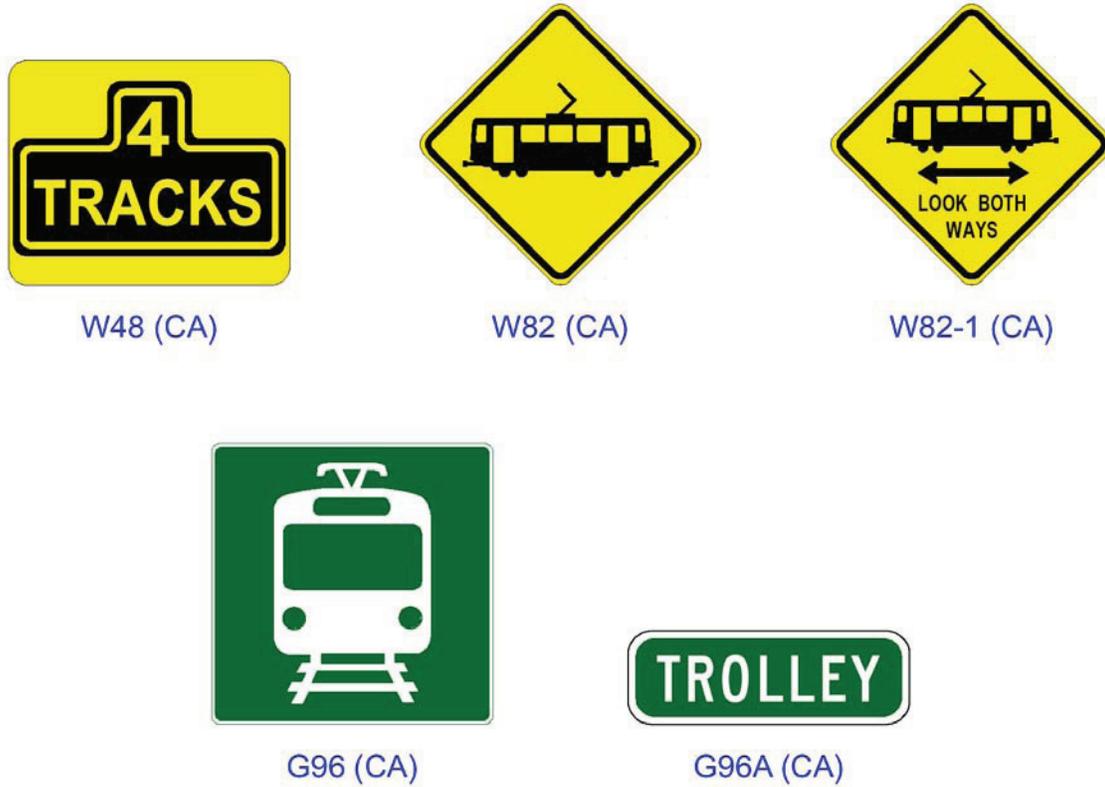


Figure 10C-4. Emergency Notification Signs



Figure 10C-5. Example of Placement of Warning Signs and Pavement Markings at Highway-Light Rail Transit Grade Crossings

See Figure 8B-6(CA)

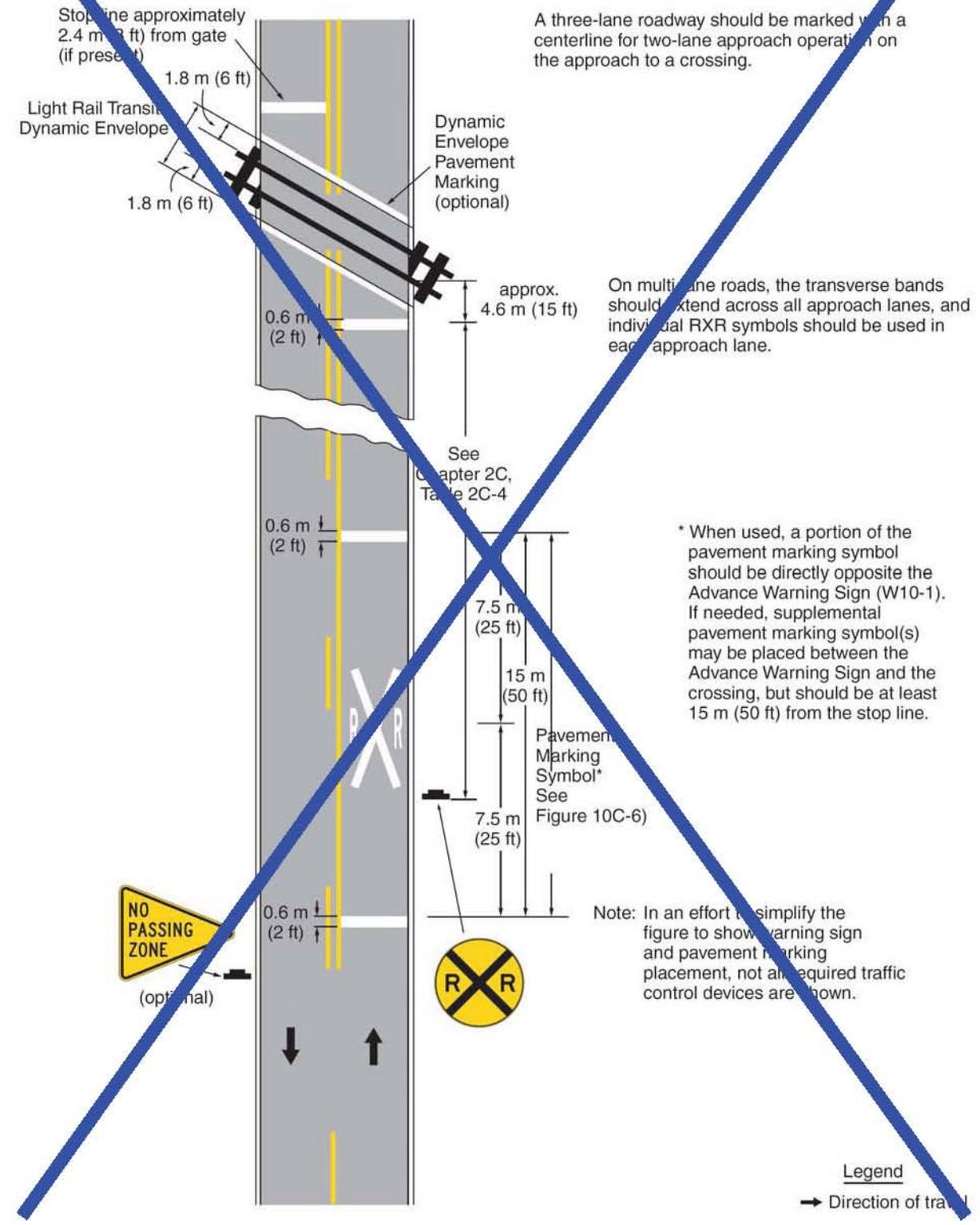
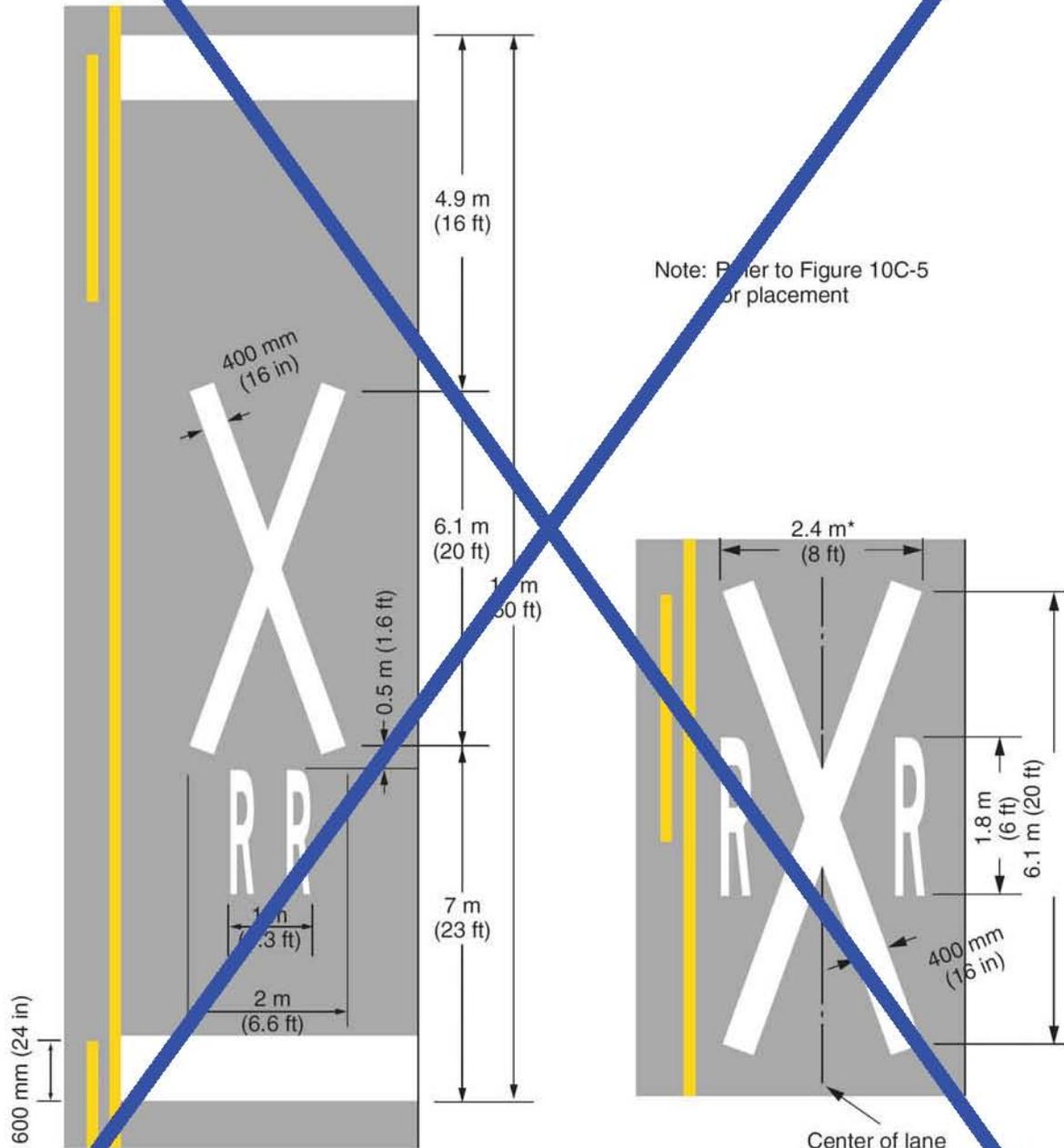


Figure 10C-6. Examples of Highway-Light Rail Transit Grade Crossing Pavement Markings

See Figure 8B-7(CA)



Highway-Light Rail Transit grade crossing alternative (narrow) pavement markings

Highway-Light Rail Transit grade crossing pavement markings

*Width may vary according to lane width

Figure 10C-7. Light Rail Transit Vehicle Dynamic Envelope

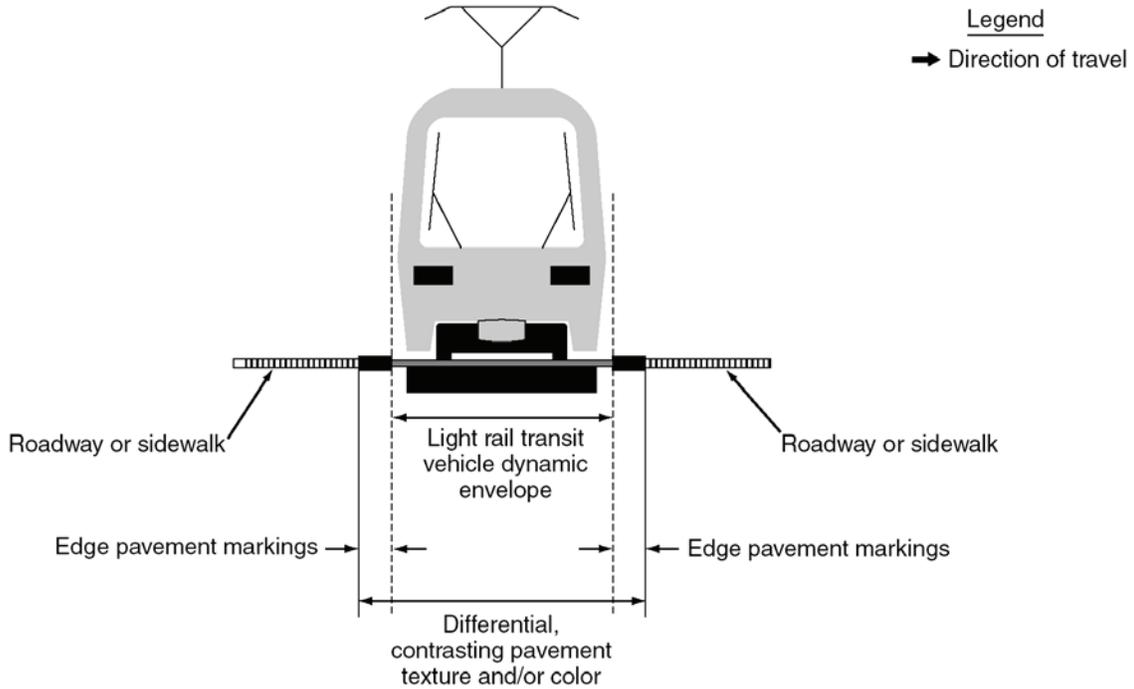


Figure 10C-8. Typical Light Rail Transit Vehicle Dynamic Envelope Pavement Markings

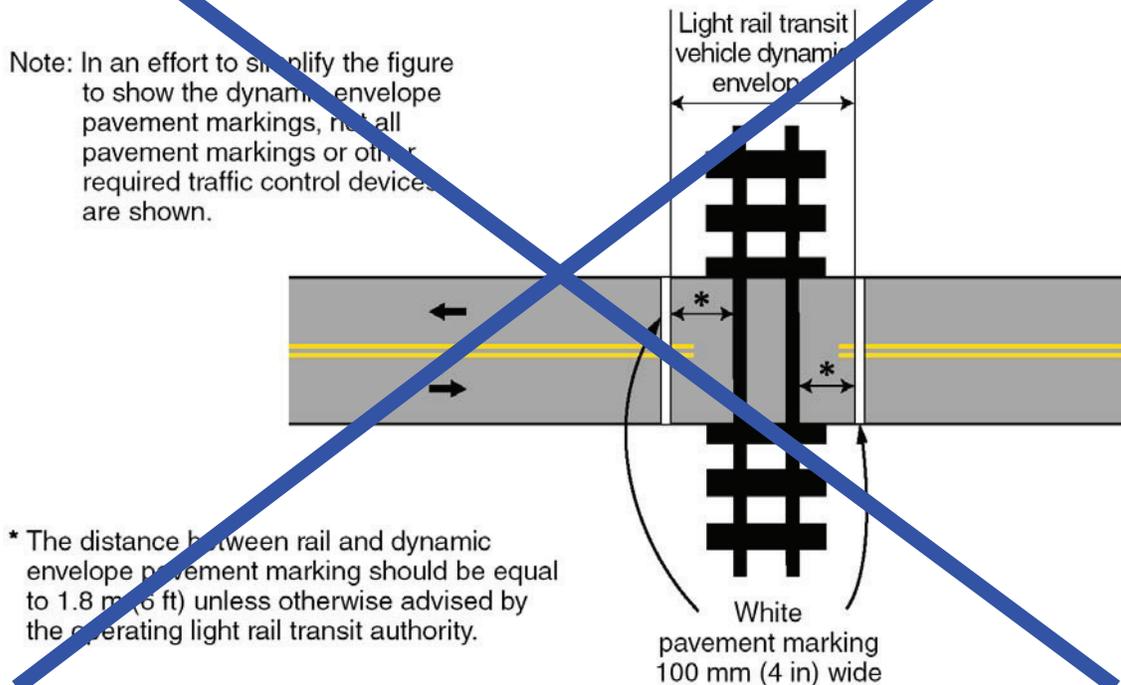


Figure 10C-9. Example of Light Rail Transit Vehicle Dynamic Envelope Pavement Markings

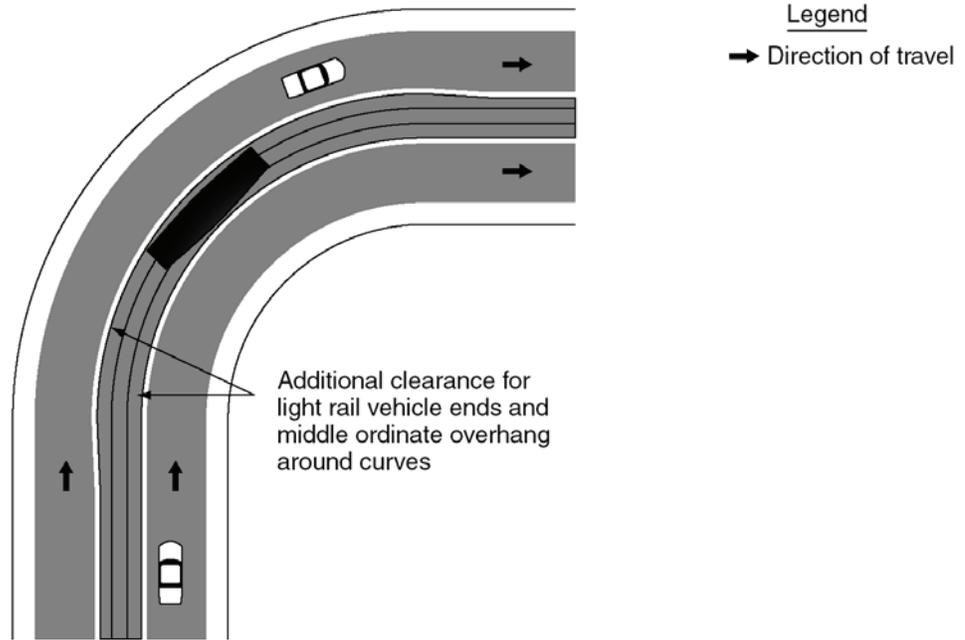
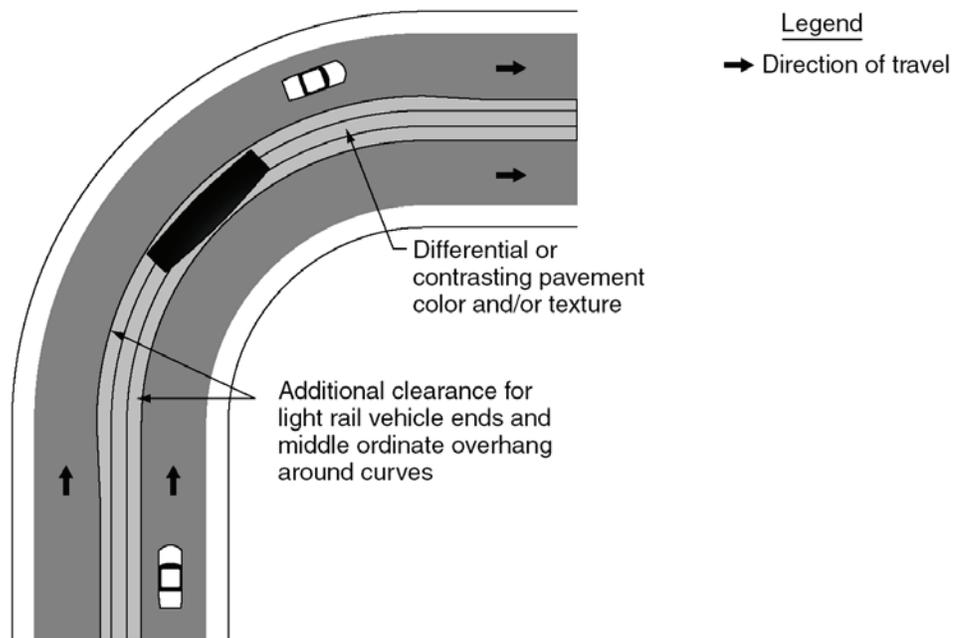


Figure 10C-10. Example of Light Rail Transit Vehicle Dynamic Envelope Contrasting Color and/or Texture



CHAPTER 10D. HIGHWAY-LIGHT RAIL TRANSIT ACTIVE TRAFFIC CONTROL GRADE CROSSING SYSTEMS

Section 10D.01 Introduction

Support:

Active light rail transit traffic control systems inform motorists, bicyclists, and pedestrians of the approach or presence of light rail transit vehicles at highway-light rail transit grade crossings. These systems include four-quadrant gate systems, automatic gates, flashing-light signals, traffic control signals, actuated blank-out and variable message signs, and other active traffic control devices.

Guidance:

Where both traffic control signals and flashing-light signals (with or without automatic gates) are in operation at the same highway-light rail transit grade crossing, the operation of the devices should be coordinated to avoid any display of conflicting signal indications.

If a pedestrian route is provided, sufficient clearance from supports, posts, and gate mechanisms should be maintained for pedestrian travel.

~~Option:~~

~~Audible devices may be operated in conjunction with the flashing lights or traffic control signals.~~

Standard:

Where flashing light signals are installed, audible devices shall conform to the provisions of Section 8D.02.

Support:

Light rail transit typically operates through grade crossings in semiexclusive and mixed-use alignments at speeds between 16 km/h (10 mph) and 105 km/h (65 mph).

When light rail transit speed is cited in this Part, it refers to the maximum speed at which light rail transit vehicles are permitted to traverse a particular grade crossing.

[California Public Utilities Commission General Order 143, "Safety Rules and Regulations Governing Light-Rail Transit"](#), as amended, governs the operation and allowable speeds of light rail transit systems.

Section 10D.02 Flashing-Light Signals

Support:

Sections 8D.02 and 8D.03 contain additional details regarding flashing-light signals.

Standard:

Highway-light rail transit grade crossings in semiexclusive alignments shall be equipped with flashing-light signals where light rail transit speeds exceed 60 km/h (35 mph). Flashing-light signals shall be clearly visible to motorists, pedestrians, and bicyclists.

Guidance:

Where the crossing is at a location other than an intersection, where light rail transit speeds exceed 40 km/h (25 mph), flashing light signals should be installed.

Option:

Traffic control signals may be used instead of flashing-light signals at highway-light rail transit grade crossings within highway-highway intersections where light rail transit speeds do not exceed 60 km/h (35 mph). Traffic control signals or flashing-light signals may be used where the crossing is at a location other than an intersection, where light rail transit speeds do not exceed 40 km/h (25 mph), and when the roadway is a low-volume street where prevailing speeds do not exceed 40 km/h (25 mph).

Section 10D.03 Automatic Gates

Support:

An automatic gate is a traffic control device used as an adjunct to flashing-light signals.

Section 8D.04 contains further details regarding automatic gates.

Guidance:

Highway-light rail transit grade crossings in semiexclusive alignments should be equipped with automatic gates and flashing-light signals (see Section 10D.02) where light rail transit speeds exceed 60 km/h (35 mph).

Option:

Where the grade crossing is at a location other than an intersection, where light rail transit speeds exceed 40 km/h (25 mph), automatic gates and flashing-light signals may be installed.

Traffic control signals may be used instead of automatic gates at highway-light rail transit grade crossings within highway-highway intersections where light rail transit speeds do not exceed 60 km/h (35 mph). Traffic control signals or flashing-light signals without automatic gates may be used where the crossing is at a location other than an intersection and where light rail transit speeds do not exceed 40 km/h (25 mph) and the roadway is a low-volume street where prevailing speeds do not exceed 40 km/h (25 mph).

Automatic gates may be supplemented by cantilevered flashing-light signals (see Figure 8D-1) where there is a need for additional emphasis or better visibility.

The effectiveness of gates may be enhanced by the use of channelizing devices or raised median islands to discourage driving around lowered automatic gates.

Section 10D.04 Four-Quadrant Gate Systems

Option:

Four-Quadrant Gate systems may be installed to improve safety at highway-light rail transit grade crossings based on an engineering study when less restrictive measures, such as automatic gates and channelization devices, are not effective.

Standard:

A Four-Quadrant Gate system shall consist of a series of automatic gates used as an adjunct to flashing-light signals to control traffic on all lanes entering and exiting the highway-light rail transit grade crossing.

The Four-Quadrant Gate system shall consist of a drive mechanism and fully retroreflectorized red and white-striped gate arms with lights, and which in the down position extends individually across the entrance and exit lanes of highway traffic as shown in Figure 8D-2. Standards contained in Section 10D.02 for flashing-light signals shall be followed for signal specifications, location, and clearance distances.

In the normal sequence of operation, unless constant warning time or other advanced system requires otherwise, the flashing-light signals and the lights on the gate arms (in their normal upright positions) shall be activated immediately upon detection of the approaching light rail transit vehicle. The gate arms for the entrance lanes of traffic shall start their downward motion not less than 3 seconds after the flashing-light signals start to operate and shall reach their horizontal position at least 5 seconds before the arrival of the light rail transit vehicle. Exit gate arm activation and downward motion shall be based on timing requirements established by an engineering study of the individual site. The gate arms shall remain in the down position as long as the light rail transit vehicle occupies the highway-light rail transit crossing.

When the light rail transit vehicle clears the highway-light rail transit grade crossing, and if no other light rail transit vehicle is detected, the gate arms shall ascend to their upright positions, following which the flashing lights and the lights on the gate arms shall cease operation.

Gate arm design, colors, and lighting requirements shall be in accordance with the Standards contained in Section 8D.04.

~~**Except as noted in the Option below, the exit gate arm mechanism shall be designed to fail-safe in the up position.**~~

The exit gate arm mechanism shall be designed to fail-safe in the up position. Refer to CPUC General Order 75, as amended.

Timed Exit Gate Operating Mode shall not be used. Only Dynamic Exit Gate Operating Mode shall be used. A Vehicle presence detection devices system shall be installed to control exit gate operation based on vehicle presence within the minimum track clearance distance. Refer to CPUC General Order 75, as amended.

At locations where gate arms are offset a sufficient distance for vehicles to drive between the entrance and exit gate arms, median islands shall be installed in accordance with the needs established by an engineering study.

Guidance:

The gate arm should ascend to its upright position in not more than 12 seconds.

~~Four-Quadrant Gate systems should only be used in locations with constant warning time light rail transit vehicle detection.~~

~~The operating mode of the exit gates should be determined based upon an engineering study, with input from the affected transit agency.~~

~~If the Timed Exit Gate Operating Mode is used, the engineering study, with input from the affected transit agency, should also determine the Exit Gate Clearance Time.~~

~~If the Dynamic Exit Gate Operating Mode is used, vehicle intrusion detection devices should be installed to control exit gate operation based on vehicle presence within the minimum track clearance distance.~~

~~Regardless of which exit gate operating mode is used, the Exit Gate Clearance Time (see Section 8A.01) should be considered when determining additional time requirements for the Minimum Warning Time.~~

~~If a Four-Quadrant Gate system is used at a location that is adjacent to an intersection that could cause vehicles to queue within the minimum track clearance distance, the Dynamic Exit Gate Operating Mode should be used unless an engineering study indicates otherwise.~~

If a Four-Quadrant Gate system is interconnected with a highway traffic signal, backup or standby power should be considered for the highway traffic signal. Also, circuitry should be installed to prevent the highway traffic signal from leaving the track clearance green interval until all of the gates are lowered.

At locations where sufficient space is available, exit gates should be set back from the track a distance that provides a safety zone long enough to accommodate at least one design vehicle between the exit gate and the nearest rail.

Four-Quadrant Gate systems should include remote health (status) monitoring capable of automatically notifying light rail transit signal maintenance personnel when anomalies have occurred within the system.

Option:

~~Exit gate arms may fail in the down position if the highway light rail transit grade crossing is equipped with remote health (status) monitoring. Refer to CPUC General Order 75, as amended.~~

Four-Quadrant Gate system installations may include median islands between opposing lanes on an approach to a highway-light rail transit grade crossing.

Guidance:

Where sufficient space is available, median islands should be at least 18 m (60 ft) in length.

Section 10D.05 Traffic Control Signals

Support:

There are two types of traffic control signals for controlling vehicular and light rail transit movements at interfaces of the two modes. The first is the standard traffic control signal described in Part 4, which is the focus of this section. The other type of signal is referred to as a light rail transit signal and is discussed in Section 10D.07.

Standard:

The provisions of Parts 4 and 8 relating to traffic control signal design, installation, and operation, including interconnection with nearby automatic gates or flashing-light signals, shall be applicable as appropriate where traffic control signals are used at highway-light rail transit grade crossings.

Guidance:

When a highway-light rail transit grade crossing equipped with a flashing-light signal system is located within 60 m (200 ft) of an intersection or midblock location controlled by a traffic control signal, the traffic control signal should be provided with preemption in accordance with Section 4D.13.

Coordination with the flashing-light signal system should be considered for traffic control signals located more than 60 m (200 ft) from the crossing. Factors to be considered should include traffic volumes, vehicle mix, vehicle and light rail transit approach speeds, frequency of light rail transit vehicles, and queue lengths.

If the highway traffic signal has emergency vehicle preemption capability, it should be coordinated with light rail transit operation.

Where light rail transit operates in a wide median, vehicles crossing the tracks and being controlled by both near and far side traffic signal faces should receive a protected left-turn green phase from the far side signal face to clear vehicles from the crossing when light rail transit vehicles are approaching the crossing.
Option:

Green indications may be provided during light rail transit phases for vehicle, pedestrian, and bicycle movements that do not conflict with light rail transit movements.

Traffic control signals may be installed in addition to four-quadrant gate systems and automatic gates at a highway-light rail transit crossing if the crossing occurs within a highway-highway intersection and if the traffic control signals meet the warrants described in Chapter 4C.

At a location other than an intersection, when light rail transit speeds are less than 40 km/h (25 mph), traffic control signals alone may be used to control road users at highway-light rail transit grade crossings only when justified by an engineering study.

Typical circumstances may include:

- A. Geometric conditions preclude the installation of highway-light rail transit grade crossing warning devices.
- B. Light rail transit vehicles share the same roadway with road users.
- C. Traffic control signals already exist.

Support:

See Section 4D.13 for considerations regarding traffic control signals at or near highway-light rail transit grade crossings that are not equipped with highway-light rail transit grade crossing warning devices.

Section 10D.06 Highway Traffic Signal Preemption Turning Restrictions

Guidance:

When a light rail transit grade crossing exists within a signalized intersection, consideration should be given to providing separately controlled Protected Only Mode turn phases for the movements crossing the tracks (see Section 4A.02).

Standard:

Signal faces that are provided for separately controlled Protected Only Mode turn movements toward the crossing shall display a steady red indication during the approach and/or passage of light rail transit vehicles.

Guidance:

When a signalized intersection that is located within 60 m (200 ft) of a highway-light rail transit grade crossing is preempted, all existing turning movements toward the highway-light rail transit grade crossing should be prohibited.

Support:

Part 4 contains information regarding signal phasing and timing requirements.

Option:

An activated blank-out or changeable message sign and/or an appropriate highway traffic signal display may be used to prohibit turning movements toward the crossing during preemption (see Section 10C.09).

Standard:

Messages on the activated blank-out or changeable message signs shall be visible only when the highway-light rail transit intersection restriction is in effect.

Support:

Refer to Section 4D.13 for railroad preemption.

Section 10D.07 Use of Traffic Control Signals for Control of Light Rail Transit Vehicles at Grade Crossings

Guidance:

Light rail transit movements in semiexclusive alignments at nongated grade crossings that are equipped with traffic control signals should be controlled by special light rail transit signal indications.

Support:

Examples of light rail transit traffic control signals, used to control light rail transit movements only, are shown in Figure 10D-1 10D-1(CA).

Option:

Standard traffic control signals may be used instead of light rail transit traffic control signals to control the movement of light rail transit vehicles (see Section 10D.05).

Standard:

If a separate set of standard traffic control signal indications (red, yellow, and green circular and arrow indications) is used to control light rail transit movements, the indications shall be positioned so they are not visible to motorists, pedestrians, and bicyclists (see Section 4D.17).

If the light rail transit crossing control is separate from the intersection control, the two shall be interconnected. The light rail phase shall not be terminated until after the light rail transit vehicle has cleared the crossing.

Option:

Light rail transit signals may be used at grade crossings and at intersections in mixed-use alignments in conjunction with standard traffic control signals where special light rail transit signal phases are used to accommodate turning light rail transit vehicles or where additional light rail transit clearance time is desirable.

Guidance:

Light rail transit signal faces should be separated vertically or horizontally from the nearest highway traffic signal face for the same approach by at least 0.9 m (3 ft).

Section 10D.08 Pedestrian and Bicycle Signals and Crossings

Standard:

Pedestrian signals shall be in accordance with Section 4E.04.

Guidance:

Where light rail transit tracks are immediately adjacent to other tracks or a road, pedestrian signalization should be designed to avoid having pedestrians wait between sets of tracks or between the tracks and the road. If adequate space exists for a pedestrian refuge and is justified based on engineering judgment, additional pedestrian signal indicators, signing, and detectors should be installed (see Section 4E.08).

Standard:

Flashing-light signals (see Figure 10D-2) with a Crossbuck (R15-1) sign and audible warning device shall be installed at pedestrian and bicycle crossings where an engineering study has determined that the sight distance is not sufficient for pedestrians and bicyclists to complete their crossing prior to the arrival of the light rail transit vehicle at the crossing, or where light rail transit speeds exceed 60 km/h (35 mph). Refer to CPUC General Order 75, as amended.

Guidance:

If an engineering study shows that flashing-light signals alone would not provide sufficient notice of an approaching light rail transit vehicle, the LOOK (R15-8) sign (see Figure 10D-2) and/or pedestrian gates should be considered (see Figures 10D-3, 10D-4, and 10D-5).

Support:

A pedestrian gate is similar to an automatic gate except the gate arm is shorter.

The swing gate alerts pedestrians to the light rail transit tracks that are to be crossed. Swing gates are designed to open away from the tracks, requiring users to pull the gate open to cross, but permitting a quick exit from the trackway, and to automatically close.

Option:

Swing gates may be installed across pedestrian and bicycle walkways (see Figure 10D-6).

Pedestrian barriers at offset crossings may be used at pedestrian and bicycle crossings as passive devices that force users to face approaching light rail transit before entering the trackway (see Figures 10D-7 and 10D-8).

Standard:

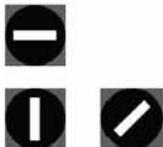
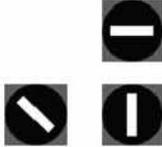
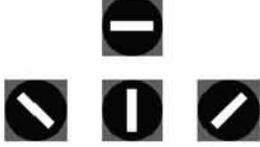
Flashing light signals shall conform to the provisions of Section 8D.02.

Figure 10D-1. Examples of Light Rail Transit Signals

	Three-Lens Signal	Two-Lens Signal
<p>SINGLE LRT ROUTE</p> 	<p>STOP </p> <p>PREPARE TO STOP  <i>Flashing</i></p> <p>GO </p>	<p> STOP</p> <p>⁽²⁾ GO</p>
<p>TWO LRT ROUTE DIVERSION</p> 	<p></p> <p> <i>Flashing</i></p> <p> ⁽¹⁾</p>	<p></p> <p> ^{(1),(2)}</p>
<p></p>	<p></p> <p><i>Flashing</i> </p> <p> ⁽¹⁾</p>	<p></p> <p> ^{(1),(2)}</p>
<p>THREE LRT ROUTE DIVERSION</p> 	<p></p> <p> <i>Flashing</i></p> <p>  ⁽¹⁾</p>	<p></p> <p>  ^{(1),(2)}</p>

Notes:
 All aspects (or signal indications) are white.
 (1) could be in single housing.
 (2) "Go" lens may be used in flashing mode to indicate "prepare to stop".

Figure 10D-1 (CA) Examples of Light Rail Transit Signals

	Two-Lens Signal	Three-Lens Signal
<p>SINGLE LRT ROUTE</p> 	 <p>STOP GO⁽²⁾</p>	
<p>TWO LRT ROUTE DIVERSION</p> 	 <p>(1),(2)</p>	 <p>STOP PREPARE TO STOP GO</p> <p>Diverging route signal aspects to be determined jointly by transit agency and highway agency.</p> <p>The diagonal PREPARE TO STOP signal can be rotated 45 degrees either clockwise or counter-clockwise.</p>
	 <p>(1),(2)</p>	
<p>THREE LRT ROUTE DIVERSION</p> 	 <p>(1),(2)</p>	

Notes:

All aspects (or signal indications) are white.

(1) Could be in single housing.

(2) "Go" lens may be used in flashing mode to indicate "prepare to stop".

Figure 10D-2. Example of Light Rail Transit Flashing-Light Signal Assembly for Pedestrian Crossings

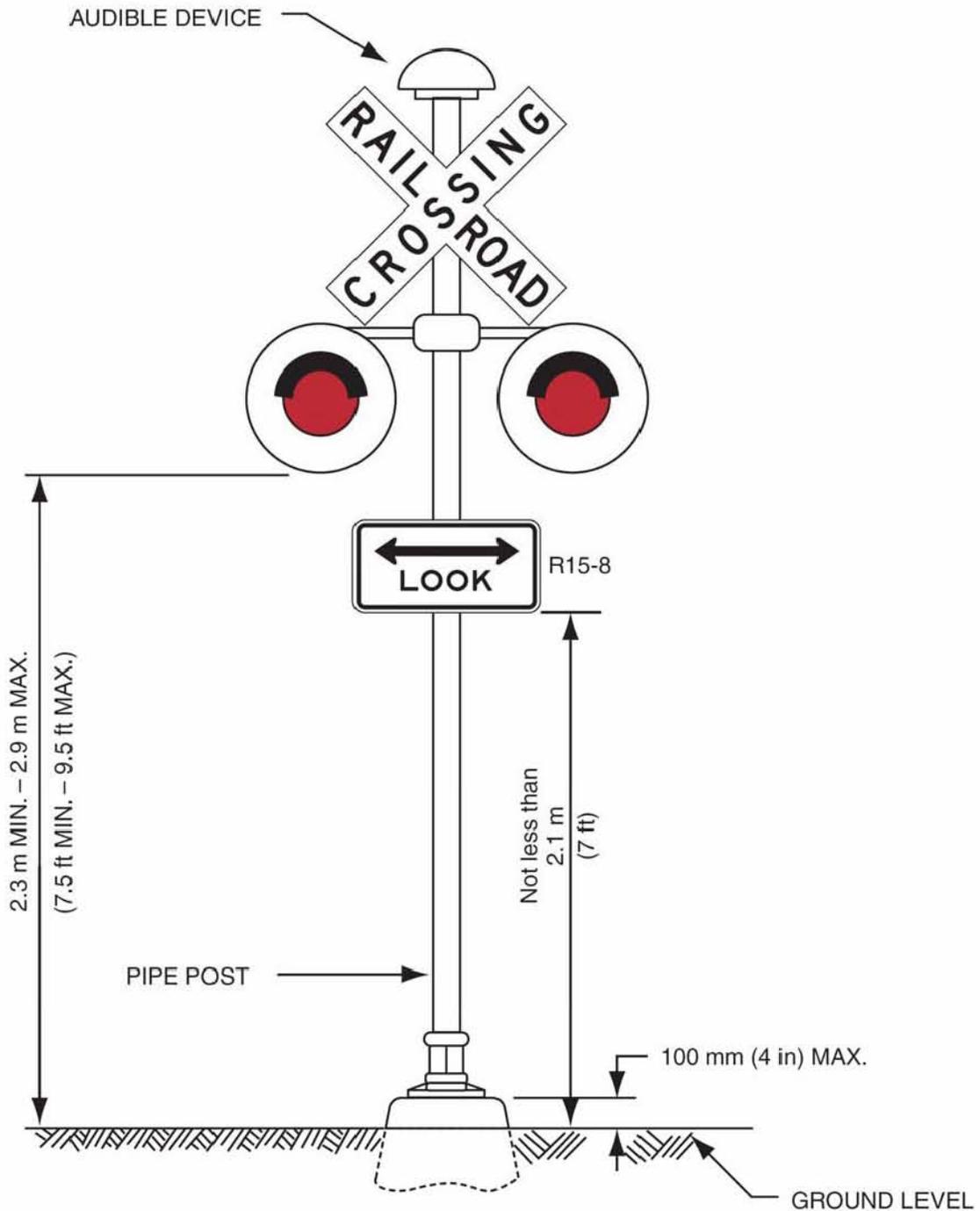


Figure 10D-3. Example of Pedestrian Gate Placement Behind the Sidewalk

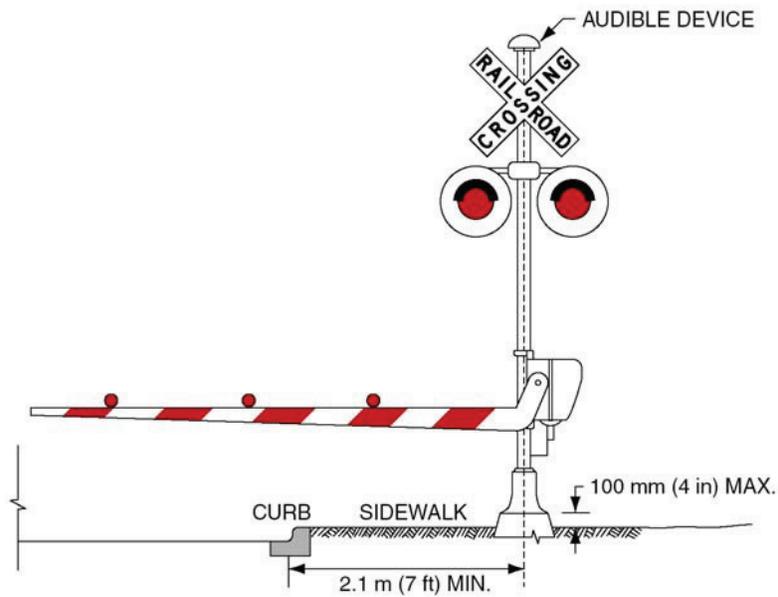
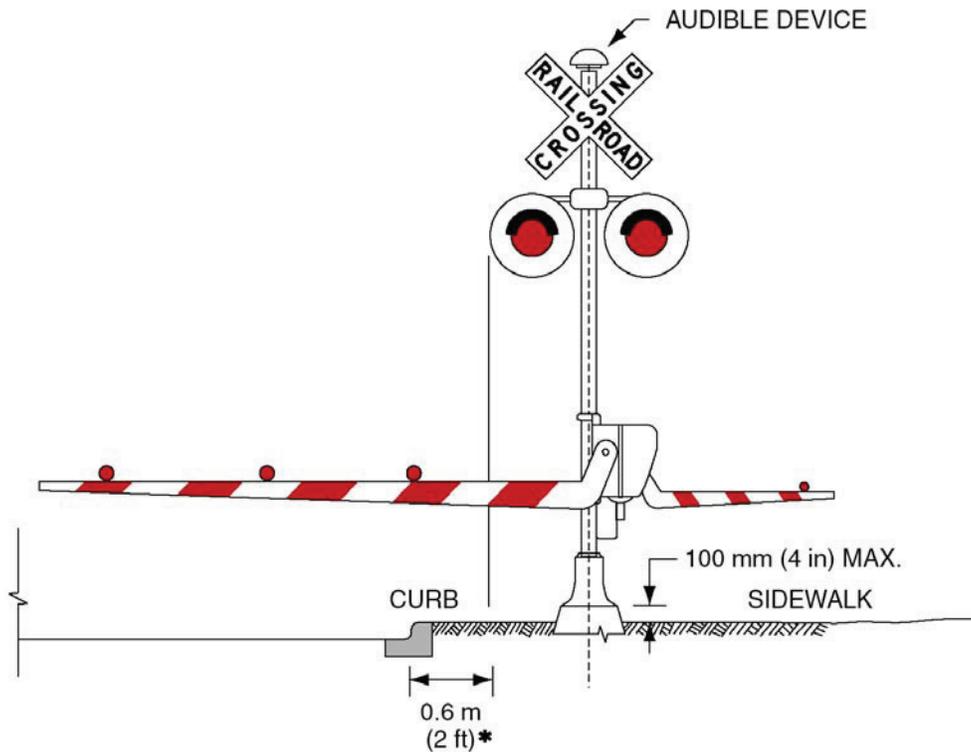


Figure 10D-4. Example of Pedestrian Gate Placement with Pedestrian Gate Arm



* For locating this reference line at other than curb section installation, see Section 8D.01.

Figure 10D-5. Examples of Placement of Pedestrian Gates

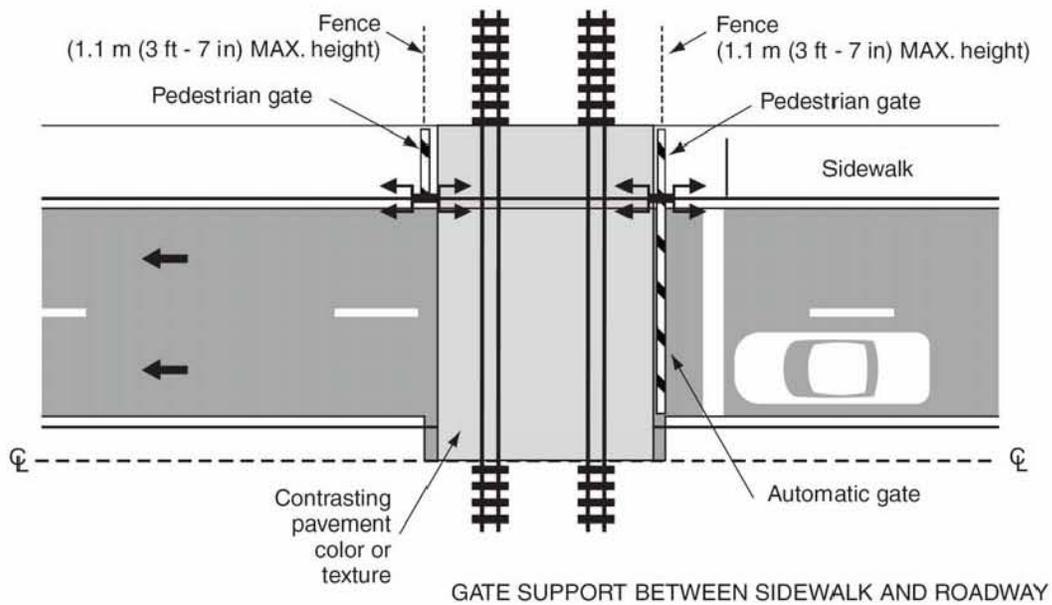
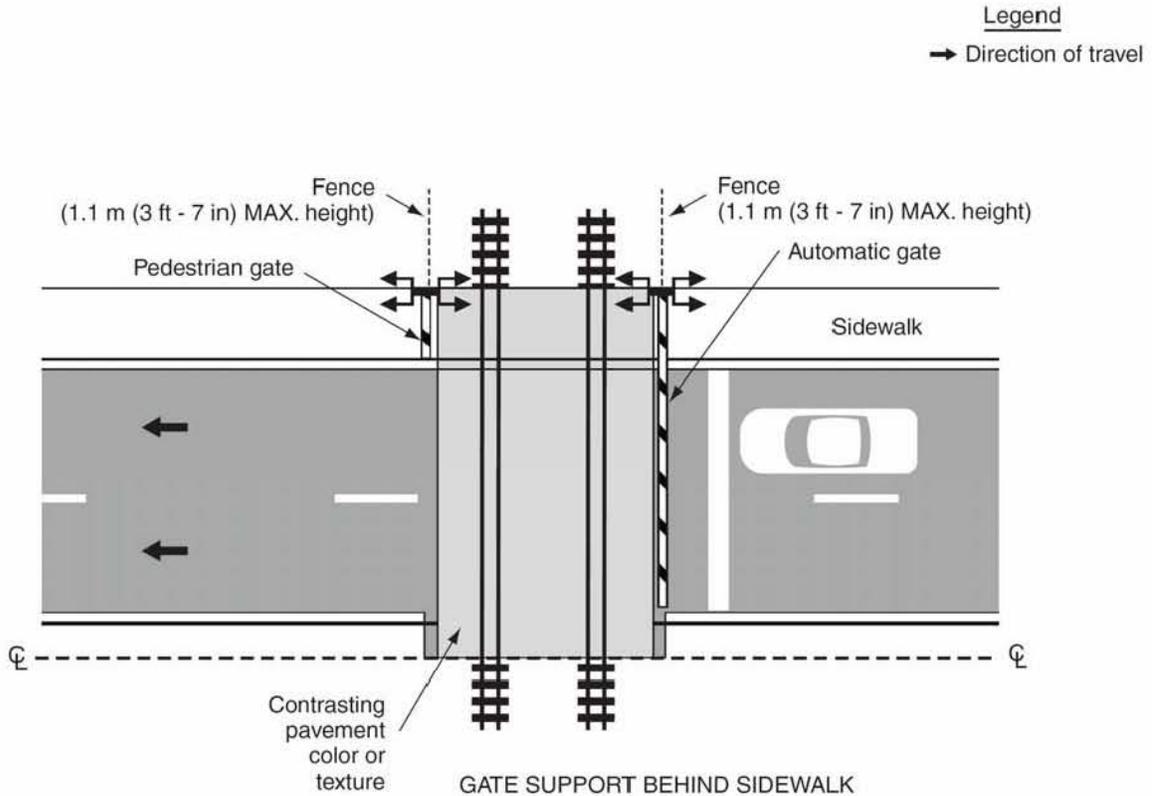


Figure 10D-6. Example of Swing Gates

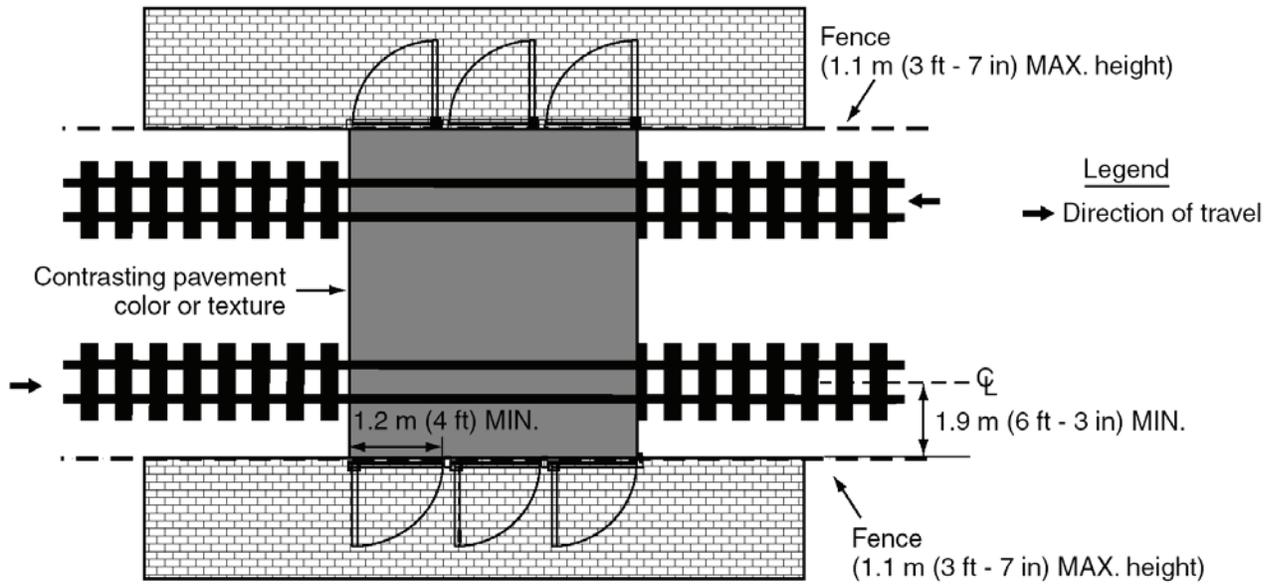


Figure 10D-7. Example of Pedestrian Barriers at an Offset Highway-Light Rail Transit Crossing

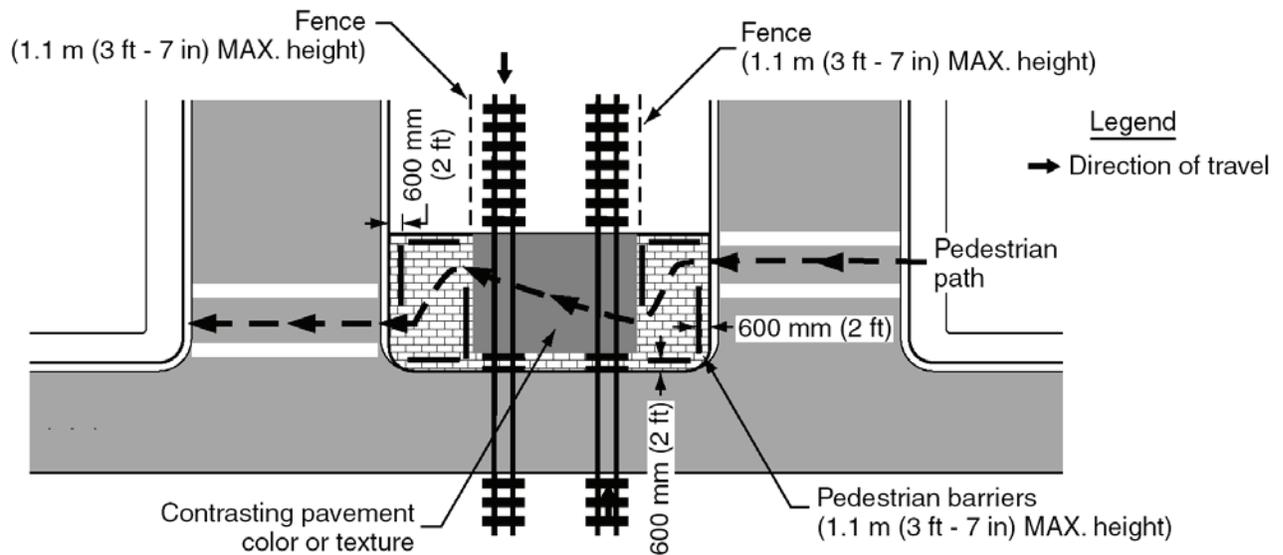
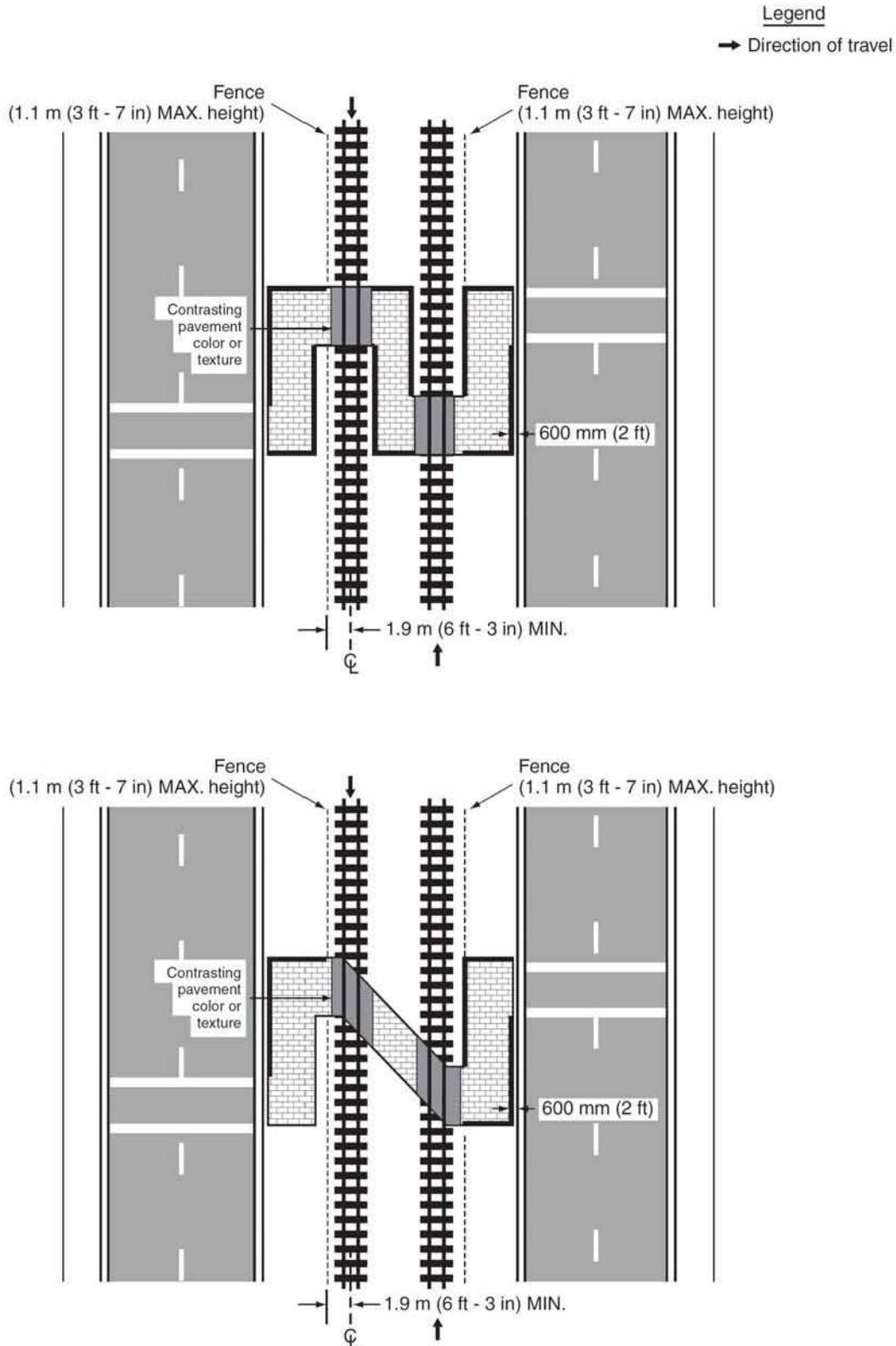


Figure 10D-8. Examples of Pedestrian Barrier Installation at an Offset Nonintersection Light Rail Transit Crossing



California Manual on Uniform Traffic Control Devices

for Streets and Highways

(FHWA's MUTCD 2003 Edition
including Revisions 1 and 2,
as amended for use in California)

APPENDIX



STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION

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APPENDIX

TABLE OF CONTENTS

		<u>Page</u>
A1	Congressional Legislation	A1-1
A101(CA)	California Sign Chart (September 2006)	A101(CA)-1
A102(CA)	List of Acronyms & Abbreviations	A102(CA)-1
A103(CA)	List of Useful TCD Related Web Sites	A103(CA)-1

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CONGRESSIONAL LEGISLATION

PUBLIC LAW 102-240-DEC. 18, 1991 (INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT OF 1991)

Section 1077. REVISION OF MANUAL — Not later than 90 days after the date of the enactment of this Act, the Secretary shall revise the Manual of Uniform Traffic Control Devices and such other regulations and agreements of the Federal Highway Administration as may be necessary to authorize States and local governments, at their discretion, to install stop or yield signs at any rail-highway grade crossing without automatic traffic control devices with 2 or more trains operating across the rail-highway grade crossing per day.

PUBLIC LAW 102-388-OCT. 6, 1992 (DEPARTMENT OF TRANSPORTATION AND RELATED AGENCIES APPROPRIATIONS ACT, 1993)

Section 406 — The Secretary of Transportation shall revise the Manual of Uniform Traffic Control Devices to include —

- (a) a standard for a minimum level of retroreflectivity that must be maintained for pavement markings and signs, which shall apply to all roads open to public travel; and
- (b) a standard to define the roads that must have a centerline or edge lines or both, provided that in setting such standard the Secretary shall consider the functional classification of roads, traffic volumes, and the number and width of lanes.

PUBLIC LAW 104-59-NOV. 28, 1995 (NATIONAL HIGHWAY SYSTEM DESIGNATION ACT OF 1995)

Section 205. RELIEF FROM MANDATES —

(c) METRIC REQUIREMENTS —

(1) PLACEMENT AND MODIFICATION OF SIGNS — The Secretary shall not require the States to expend any Federal or State funds to construct, erect, or otherwise place or to modify any sign relating to a speed limit, distance, or other measurement on a highway for the purpose of having such sign establish such speed limit, distance, or other measurement using the metric system.

(2) OTHER ACTIONS — Before September 30, 2000, the Secretary shall not require that any State use or plan to use the metric system with respect to designing or advertising, or preparing plans, specifications, estimates, or other documents, for a Federal-aid highway project eligible for assistance under title 23, United States Code.

(3) DEFINITIONS — In this subsection, the following definitions apply:

(A) HIGHWAY — The term 'highway' has the meaning such term has under section 101 of title 23, United State Code.

(B) METRIC SYSTEM — the term 'metric system' has the meaning the term 'metric system of measurement' has under section 4 of the Metric Conversion Act of 1975 (15 U.S.C. 205c).

Section 306. MOTORIST CALL BOXES — Section 111 of title 23, United States Code, is amended by adding at the end the following:

(c) MOTORIST CALL BOXES—

(1) IN GENERAL— Notwithstanding subsection (a), a State may permit the placement of motorist call boxes on rights-of-way of the National Highway System. Such motorist call boxes may include the identification and sponsorship logos of such call boxes.

(2) SPONSORSHIP LOGOS—

(A) APPROVAL BY STATE AND LOCAL AGENCIES—All call box installations displaying sponsorship logos under this subsection shall be approved by the highway agencies having jurisdiction of the highway on which they are located.

(B) **SIZE ON BOX**—A sponsorship logo may be placed on the call box in a dimension not to exceed the size of the call box or a total dimension in excess of 12 inches by 18 inches.

(C) **SIZE ON IDENTIFICATION SIGN**—Sponsorship logos in a dimension not to exceed 12 inches by 30 inches may be displayed on a call box identification sign affixed to the call box post.

(D) **SPACING OF SIGNS**—Sponsorship logos affixed to an identification sign on a call box post may be located on the rights-of-way at intervals not more frequently than 1 per every 5 miles.

(E) **DISTRIBUTION THROUGHOUT STATE**—Within a State, at least 20 percent of the call boxes displaying sponsorship logos shall be located on highways outside of urbanized areas with a population greater than 50,000.

(3) **NONSAFETY HAZARDS**—The call boxes and their location, posts, foundations, and mountings shall be consistent with requirements of the Manual on Uniform Traffic Control Devices or any requirements deemed necessary by the Secretary to assure that the call boxes shall not be a safety hazard to motorists.

Section 353(a) SIGNS — Traffic control signs referred to in the experimental project conducted in the State of Oregon in December 1991 shall be deemed to comply with the requirements of Section 2B-4 of the Manual on Uniform Traffic Control Devices of the Department of Transportation.

Section 353(b) STRIPES — Notwithstanding any other provision of law, a red, white, and blue center line in the Main Street of Bristol, Rhode Island, shall be deemed to comply with the requirements of Section 3B-1 of the Manual on Uniform Traffic Control Devices of the Department of Transportation.

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APPENDIX A101(CA). CALIFORNIA SIGN CHART (January 2010)

Support:

The most commonly used signs in California are shown in the California Sign Chart (January 2010). This chart is not meant to be used as a comprehensive sign chart but is provided on the following pages for ease of use and as a handy reference. It consists of the following sheets:

- Regulatory Signs (Sheets 1 through 4 of 12).
 - Warning Signs (Sheets 5 and 6 of 12).
 - Guide Signs (Sheets 7 through 10 of 12).
 - Temporary Traffic Control Signs (Sheets 11 and 12 of 12).
-

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California Sign Chart

Sheet 1 of 12 - Federal Regulatory Signs

This chart contains commonly used signs in California, and is not meant to be used as a comprehensive sign chart.

California codes are designated by (CA). Otherwise Federal codes are shown. For a complete directory of signs, visit www.dot.ca.gov/hq/traffops/signtech/signdel/index.htm.

California Department of Transportation
Signs and Work Zones Branch
January 2010



R1-1



R1-2



R1-2a



R1-3



R1-4



R1-5a



R2-1



R3-1



Activated Blankout



R3-2



Activated Blankout



R3-3



R3-4



Activated Blankout



R3-5



R3-5a



R3-6



R3-7



R3-8



R3-8a



R3-8b



R3-9a



R3-10a



R3-11b



R3-14b



R3-18



Activated Blankout



R4-1



R4-3



R4-5



R4-6



R4-7



R4-7a



R4-7b



R4-8



R4-10



R5-1



Activated Blankout



R5-1a



Activated Blankout



R5-2



R5-6



R5-10a



R5-10c



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R6-3



R6-3a



R7-8b



R7-9



R8-4



R8-8



R9-2



R9-3



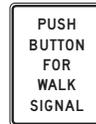
R9-3a



R9-3b



R10-3



R10-4



R10-4b



R10-6



R10-7



R10-12



R10-15



R11-2



R12-1



R12-5



R14-1



R15-1



R15-2



S4-2



S5-2

California Sign Chart

Sheet 2 of 12 - California Regulatory Signs

This chart contains commonly used signs in California, and is not meant to be used as a comprehensive sign chart.

California codes are designated by (CA). Otherwise Federal codes are shown. For a complete directory of signs, visit www.dot.ca.gov/hq/traffops/signtech/signdel/index.htm.

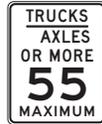
California Department of Transportation
Signs and Work Zones Branch
January 2010



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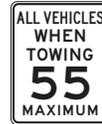
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R6-3 (CA)



R6-3A (CA)



R6-4 (CA)



R6-4A (CA)



R13A (CA)



R13B (CA)



R18A (CA)



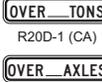
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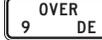
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R20D-2 (CA)



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R20D-4 (CA)



R20H (CA)



R20-1 (CA)



R20-1A (CA)



R21 (CA)



R22 (CA)



R23 (CA)



R24 (CA)



R24A (CA)



R24B (CA)



R24C (CA)



R24D (CA)



R24E (CA)



R25 (CA)



R25A (CA)



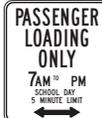
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R26(S) (CA)



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R26K (CA)



R26L (CA)



R26(S) (CA)



R27 (CA)



R27A (CA)



R28 (CA)



R28(S) (CA)



R28A (CA)



R28A(S) (CA)



R28C (CA)



R28D (CA)



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R30A (CA)



R30B (CA)



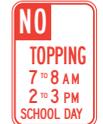
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R32C (CA)



R32D (CA)



R32E (CA)



R32F (CA)



R33 (CA)



R33A (CA)



R33B (CA)



R33C (CA)



R36 (CA)



R37 (CA)



R38 (CA)



R38(S) (CA)



R38A (CA)



R39 (CA)



R39-1 (CA)



R39-2 (CA)



R40 (CA)



R44A (CA)



R44B (CA)



R44C (CA)



R47 (CA)



R47A (CA)



R48 (CA)



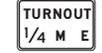
R48-1 (CA)



R48-2 (CA)



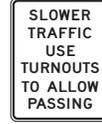
R51 (CA)



R50 (CA)



R52 (CA)



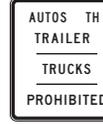
R52A (CA)



R53A (CA)



R53B (CA)



R53D (CA)



R53E (CA)



R55 (CA)

California Sign Chart

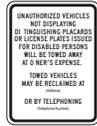
Sheet 3 of 12 - California Regulatory Signs

This chart contains commonly used signs in California, and is not meant to be used as a comprehensive sign chart.

California codes are designated by (CA). Otherwise Federal codes are shown. For a complete directory of signs, visit www.dot.ca.gov/hq/traffops/signtech/signdel/index.htm.

California Department of Transportation
Signs and Work Zones Branch
January 2010



 R57 (CA)	 R58 (CA)	 R60B (CA)	 R61-1 (CA)	 R61-3 (CA)	 R61-5 (CA)	 R61-7 (CA)	 R61-9 (CA)	 R61-11 (CA)	 R61-13 (CA)
 R61-15 (CA)	 R61-17 (CA)	 R61-19 (CA)	 R61-22 (CA)	 R61-24 (CA)	 R61-26 (CA)	 R61-28 (CA)	 R61-30 (CA)	 R61-32 (CA)	 R61-34 (CA)
 R61-36 (CA)	 R62C (CA)	 R62E (CA)	 R70 (CA)	 R73-1 (CA)	 R73-2 (CA)	 R73-3 (CA)	 R73-4 (CA)	 R73-5 (CA)	 R73-6 (CA)
 R73-8 (CA)	 R73-9 (CA)	 R74 (CA)	 R75 (CA)	 R76 (CA)	 R76-1 (CA)	 R77 (CA)	 R78 (CA)	 R79 (CA)	 R80-1 (CA)
 R81 (CA)	 R81A (CA)	 R81B (CA)	 R82A (CA)	 R82B (CA)	 R82-1 (CA)	 R84-1 (CA)	 R84-2 (CA)	 R86 (CA)	 R86-2 (CA)
 R86-3 (CA)	 R87-1 (CA)	 R87-2 (CA)	 R88 (CA)	 R89 (CA)	 R89-2 (CA)	 R89-3 (CA)	 R90-1 (CA)	 R91 (CA)	 R91-1 (CA)
 R91-3 (CA)	 R91B (CA)	 R92 (CA)	 R93A (CA)	 R93-2 (CA)	 R94 (CA)	 R99 (CA)	 R99B (CA)	 R99C (CA)	 R100A (CA)
 R100B (CA)	 R101 (CA)	 R102 (CA)	 R102A (CA)	 R103 (CA)	 R103A (CA)	 R104 (CA)	 R104A (CA)	 R105 (CA)	 R105A (CA)
 S3-1 (CA)	 S8 (CA)	 S20 (CA)	 S21 (CA)	 S22 (CA)	 S22-1 (CA)	 S23 (CA)	 S24 (CA)	 S30-1 (CA)	 S30-2 (CA)
 S30-3 (CA)	 S30-4 (CA)	 S30-5 (CA)	 S33 (CA)	 S34 (CA)	 SR2 (CA)	 SR5-1 (CA)	 SR6-1 (CA)	 SR7-1 (CA)	 SR8-1 (CA)

California Sign Chart

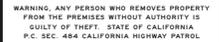
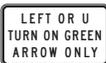
California Department of Transportation
Signs and Work Zones Branch
January 2010



Sheet 4 of 12 - California Regulatory Signs (Continued)

This chart contains commonly used signs in California, and is not meant to be used as a comprehensive sign chart.

California codes are designated by (CA). Otherwise Federal codes are shown. For a complete directory of signs, visit www.dot.ca.gov/hq/traffops/signtech/signdel/index.htm.

 SR9-1 (CA)	 SR11-1 (CA)	 SR13-1 (CA)	 SR15 (CA)	 SR15A (CA)	 SR17 (CA)	 SR18 (CA)	 SR19-1 (CA)	 SR20-1 (CA)	
 SR10-1 (CA)	 SR12-1 (CA)								
 SR22-1 (CA)	 SR23-1 (CA)	 SR25 (CA)	 SR26 (CA)	 SR27-1	 SR39A (CA)	 SR39A(U) (CA)	 SR40 (CA)	 SR41 (CA)	 SR42 (CA)
 SR43 (CA)	 SR44 (CA)	 SR46 (CA)	 SR47 (CA)	 SR50-1 (CA)	 SR50-2 (CA)	 SR53 (CA)	 SR54 (CA)	 SR55 (CA)	 SR56 (CA)
 SR57 (CA)	 SR58 (CA)	 SR60-1 (CA)	 SR60-2 (CA)	 SR60-3 (CA)	 SR60-4 (CA)	 SR60-5 (CA)	 SR60-6 (CA)	 SR60-7 (CA)	 SR60-8 (CA)
 SR60-9 (CA)	 Vehicle Speed Feedback Sign								

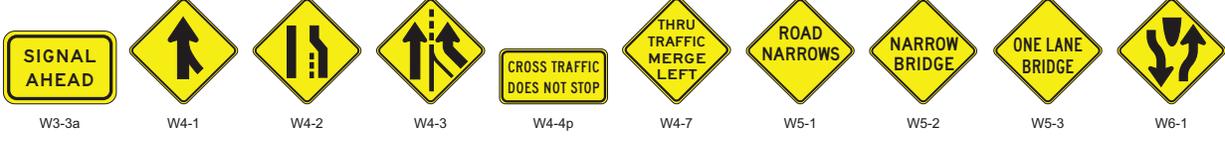
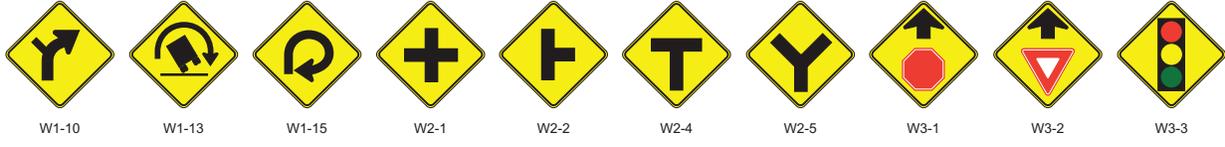
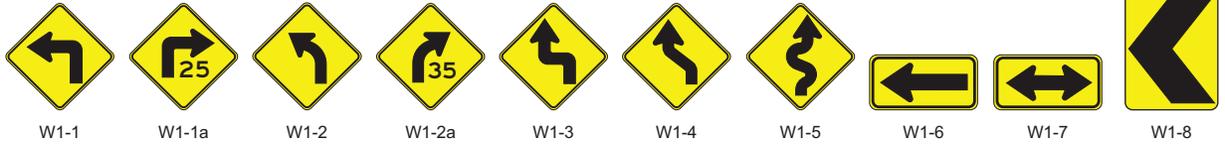
California Sign Chart

Sheet 5 of 12 - Federal Warning Signs

This chart contains commonly used signs in California, and is not meant to be used as a comprehensive sign chart.

California codes are designated by (CA). Otherwise Federal codes are shown. For a complete directory of signs, visit www.dot.ca.gov/hq/traffops/signtech/signdel/index.htm.

California Department of Transportation
Signs and Work Zones Branch
January 2010



California Sign Chart

Sheet 6 of 12 - California Warning Signs

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California Department of Transportation
Signs and Work Zones Branch
January 2010



W4-1 (CA)



W4-10 (CA)



W4-14 (CA)



W4-18 (CA)



W4-22 (CA)



W11-1 (CA)



W20 (CA)



W20A (CA)



W30B (CA)



W30C (CA)



W31 (CA)



W31A (CA)



W34A (CA)



W34C (CA)



W38 (CA)



W43 (CA)



W44A (CA)



W46A (CA)



W48 (CA)



W49 (CA)



W50 (CA)



W50-1 (CA)



W51 (CA)



W55 (CA)



W55B (CA)



W59-1 (CA)



W61A (CA)



W61B (CA)



W61C (CA)



W61E (CA)



W61F (CA)



W61G (CA)



W61H (CA)



W66B (CA)



W69 (CA)



W70 (CA)



W72B (CA)



W73 (CA)



W73A (CA)



W74-1 (CA)



W75-1 (CA)



W82 (CA)



W82-1 (CA)



W83 (CA)



SW4-1 (CA)



SW17-1 (CA)



SW22-1 (CA)



SW22-1A (CA)



SW26 (CA)



SW28 (CA)



SW32 (CA)



SW35 (CA)



SW36 (CA)



SW37 (CA)



SW38 (CA)



SW41 (CA)



SW44 (CA)



SW45 (CA)



SW46 (CA)



SW47 (CA)



SW48 (CA)



SW48-1 (CA)



SW49 (CA)



SW50 (CA)



SW52 (CA)



SW54 (CA)



SW54-1 (CA)



SW54A (CA)



SW54B (CA)



SW54C (CA)



SW58 (CA)



SW59 (CA)



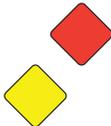
SW60 (CA)



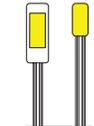
Type R (CA)



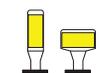
Type P (CA)



Type N (CA)



Type L (CA)



Type K (CA)



Type Q (CA)

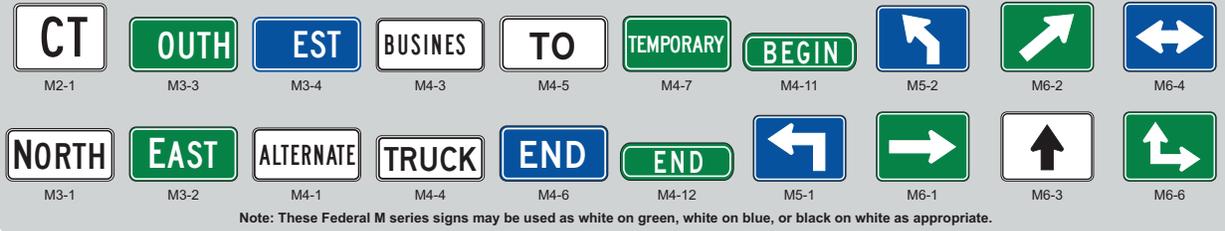
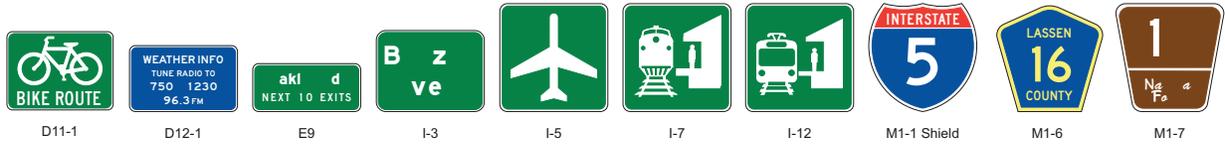
California Sign Chart

Sheet 7 of 12 - Federal Guide Signs

This chart contains commonly used signs in California, and is not meant to be used as a comprehensive sign chart.

California codes are designated by (CA). Otherwise Federal codes are shown. For a complete directory of signs, visit www.dot.ca.gov/hq/traffops/signtech/signdel/index.htm.

California Department of Transportation
Signs and Work Zones Branch
January 2010



California Sign Chart

Sheet 8 of 12 - California Guide Signs

This chart contains commonly used signs in California, and is not meant to be used as a comprehensive sign chart.

California codes are designated by (CA). Otherwise Federal codes are shown. For a complete directory of signs, visit www.dot.ca.gov/hq/traffops/signtech/signdel/index.htm.

California Department of Transportation
Signs and Work Zones Branch
January 2010



G1-1 (CA)	G1-4 (CA)	G1-7 (CA)	G1-10 (CA)	G1-13 (CA)	G1-16 (CA)	G1-19 (CA)	G5 (CA)	G8-1 (CA)	G8-4 (CA)		
G8-7 (CA)	G8-10 (CA)	G8-13 (CA)	G8-16 (CA)	G8-19 (CA)	G8-22 (CA)	G9-2 (CA)	G9-5 (CA)	G10 (CA)	G10-3 (CA)		
G10-4 (CA)	G10B (CA)	G11-2 (CA)	G11-4A (CA)	G11-6 (CA)	G11-7 (CA)	G11-8 (CA)	G12-1 (CA)	G12-2 (CA)	G13-1 (CA)		
G13-2 (CA)	G14 (CA)	G15 (CA)	G16 (CA)	G17 (CA)	G20-1 (CA)	G20-3 (CA)	G20-5 (CA)	G20-7 (CA)	G20-9 (CA)	G21-1 (CA)	
G21-3 (CA)	G22 (CA)	G23-1 (CA)	G23-2 (CA)	G23-3 (CA)	G23-4 (CA)	G23-5 (CA)	G23-6 (CA)	G24-1 (CA)	G24-3 (CA)		
G24-4 (CA)	G24-5 (CA)	G24-6 (CA)	G26-1 (CA) Shield	G26-2 (CA) Marker	G27-1 (CA) Shield	G27-2 (CA) Marker	G28-1 (CA) Shield	G28-2 (CA) Marker			
G30 (CA)	G30A (CA)	G30B (CA)	G33-1 (CA)	G58 (CA)	G66-11 (CA)	G66-12A (CA)	G66-21 (CA)	G66-21A (CA)	G66-22A (CA)		
G66-22B (CA)	G66-22C (CA) G66-22D (CA)	G66-22E (CA) G66-22F (CA)	G66-22G (CA) G66-22H (CA)	G66-22J (CA) G66-22K (CA)	G66-55 (CA)	G66-56 (CA)	G66-56A (CA)	G66-57 (CA)	G66-58 (CA)		
G66-59 (CA)	G66-60 (CA)	G66-61 (CA)	G66-62 (CA)	G68 (CA)	G69 (CA)	G70-2 (CA)	G70-3 (CA)	G70-4 (CA)	G70-5 (CA)	G72 (CA)	G76 (CA)
G77-1 (CA)	G77-4 (CA)	G77-7 (CA)	G78-1 (CA)	G78-4 (CA)	G80B (CA)	G81-21 (CA)	G81-24 (CA)	G81-52 (CA)	G81-62 (CA)	G81-63 (CA)	

California Sign Chart

Sheet 9 of 12 - California Guide Signs (Continued)

This chart contains commonly used signs in California, and is not meant to be used as a comprehensive sign chart.

California codes are designated by (CA). Otherwise Federal codes are shown. For a complete directory of signs, visit www.dot.ca.gov/hq/traffops/signtech/signdel/index.htm.

California Department of Transportation
Signs and Work Zones Branch
January 2010



California Sign Chart

Sheet 10 of 12 - California Guide Signs (Continued)

This chart contains commonly used signs in California, and is not meant to be used as a comprehensive sign chart.

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California Department of Transportation
Signs and Work Zones Branch
January 2010



S29-1 (CA)



S29-2 (CA)



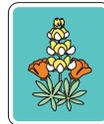
S32 (CA)



S32A (CA)



S32-1 (CA)



S32-2 (CA)



S32-3 (CA)



S32-4 (CA)



S32-5 (CA)



S34 (CA)



S35 (CA)



S35-1 (CA)



S35-2 (CA)



S35-3 (CA)



S36 (CA)



S36A (CA)



S36B (CA)

California Sign Chart

California Department of Transportation
Signs and Work Zones Branch
January 2010



Sheet 11 of 12 - Federal Temporary Traffic Control Signs

This chart contains commonly used signs in California, and is not meant to be used as a comprehensive sign chart.

California codes are designated by (CA). Otherwise Federal codes are shown. For a complete directory of signs, visit www.dot.ca.gov/hq/traffops/signtech/signdel/index.htm.

E5-2	E5-2a	G20-1	G20-2	G20-4	G20-5aP	M4-8	M4-8a	M4-9a	M4-10	
R2-12	R3-1	R4-1	R9-11a	R11-2	R11-2 (Alternates)	R11-3a	R11-4	W1-4	W1-6	
W1-8	W3-3	W3-4	W3-5	W3-5a	W4-1	W4-2	W8-6	W8-7	W8-9	
W9-3	W8-12	W12-1	W12-2	W14-3	W16-2	W20-1	W20-1 (Alternate)	W20-2	W20-3	
W20-3 (Alternate)	W20-4	W20-5	W20-5a	W21-1	W21-1a	W21-2	W21-3	W21-5	W21-5b	
W21-6	W21-7	W22-1	W22-2	W22-3	W23-1	Paddle	Paddle			

California Sign Chart

California Department of Transportation
Signs and Work Zones Branch
January 2010



Sheet 12 of 12 - California Temporary Traffic Control Signs

This chart contains commonly used signs in California, and is not meant to be used as a comprehensive sign chart.

California codes are designated by (CA). Otherwise Federal codes are shown. For a complete directory of signs, visit www.dot.ca.gov/hq/traffops/signtech/signdel/index.htm.



C9A (CA)



C12 (CA)



Front
C17 (CA)



Back
C17 (CA)



C20 (CA)



C20A (CA)



C23B (CA)



C24 (CA)



C27 (CA)



C29 (CA)



C30 (CA)



C30A (CA)



C31A (CA)



C37 (CA)



C37 (CA)



C38 (CA)



C40 (CA)



C40A (CA)



C43 (CA)



C44 (CA)



SC3 (CA)



SC5 (CA)



SC6-3 (CA)



SC6-4 (CA)



SC6A (CA)



SC6B (CA)



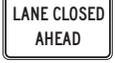
SC7 (CA)



SC8 (CA)



SC9 (CA)



SC10 (CA)



SC11 (CA)



SC13 (CA)



SC15 (CA)



SC18 (CA)



SC19 (CA)



SC20 (CA)



SC21 (CA)



Type R (CA)



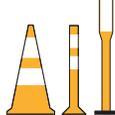
Type P (CA)



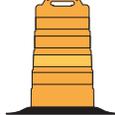
Type N (CA)



Type II
Barricade



Cone,
Tubular Marker,
Channelizer



Plastic
Drum

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APPENDIX A102(CA). LIST OF ACRONYMS & ABBREVIATIONS

Support:

The following list of acronyms are related to traffic control devices and provided for ease of use and as a handy reference:

<u>A</u>	
@	At
AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
AHS	Automated Highway System
Alt	Alternate
AM	Time from midnight to noon
AMBER	Use of CMS signs for child abduction alert messages
AMIS	Automated Management Information System
ANSI	American National Standards Institute
Approx	Approximate
APWA	American Public Works Association
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
ATIS	Advanced Traveler Information Systems
ATMS	Advanced Traffic Management System
ATSSA	American Traffic Safety Services Association
AVCS	Automated Vehicle Control System
Ave or AVE	Avenue
Avg	Average
<u>B</u>	
BART	Bay Area Rapid Transit
Bldg	Building
Bldv or BLVD	Boulevard
Br or BR	Bridge
BT&H	Business, Transportation & Housing Agency
<u>C</u>	
CA	California
CAC	California Administrative Code
Cal/OSHA	California Occupational Safety and Health Administration
CA MUTCD	California Manual on Uniform Traffic Control Devices for Streets and Highways
Caltrans	California Department of Transportation
CBD	Central Business District
CCMP	County Congestion Management Plan
CCO	Contract Change Order
CCR	California Code of Regulations
CDC	California Department of Conservation
CDF	California Department of Forestry
CDFG	California Department of Fish and Game

CEAC	County Engineers Association of California
CELSOC	Consulting Engineering and Land Surveyors of California
CFR	Code of Federal Regulations
CHIN	California Highway Information Network
CHP	California Highway Patrol
cm	Centimeter
CMA	Congestion Management Agency
CMP	Congestion Management Program
CMS	Changeable Message Sign or Congestion Management System
Co or CO	County
COB	Close of Business
COZEEP	Construction Zone Enhanced Enforcement Program
CPC	California Penal Code
CPH	California Permit Handbook
CPM	Critical Path Method
CPUC	California Public Utilities Commission
Cr or CR	Creek
CRHR	California Register of Historical Resources
CT	Caltrans or California Department of Transportation
CTA	California Trucking Association
CTC	California Transportation Commission
CTCDC	California Traffic Control Devices Committee
CTP	California Transportation Plan
CURE	Clean-up Roadside Environment
CVC	California Vehicle Code
<u>D</u>	
Deg	Degree
Del	Delineator
Det	Detour or Detail
DHV	Design Hourly Volume
DI	Delay Index, Drop Inlet or Drainage Inlet
Dia	Diameter
DIB	Design Information Bulletin
Dist	Distance or District
DMV	Department of Motor Vehicles
DOT	Department of Transportation
Dr or DR	Drive
DTO	Division of Traffic Operations
Dwy or DWY	Driveway
DYS	Double Yellow Stripe
<u>E</u>	
e.g.	“For Example”
E	East
EB	Eastbound, Environmental Branch or End of Bridge
Elev	Elevation
ENGR	Engineer or Engineering
EP	Edge of Pavement or Environmental Planning
ES	Edge of Shoulder or End Section

ESA	Environmentally Sensitive Area or Endangered Species Act
ESAL	Equivalent Single-Axle Loads
ETW	Edge of Traveled Way
Exp or EXP	Expressway
<u>F</u>	
F&E System	Freeway and Expressway System
FAI	Federal-aid Interstate
FAP	Federal-aid Primary
FCC	Federal Communication Commission
FEBT	Facing Eastbound Traffic
FHWA	Federal Highway Administration
Fig	Figure
FNBT	Facing Northbound Traffic
FR	Federal Register
Fr Rd	Frontage Road
FS	Far Side
FSBT	Facing Southbound Traffic
FSP	Freeway Service Patrol
Ft or FT	Foot or Feet
FWBT	Facing Westbound Traffic
Fwy or FWY	Freeway
<u>G</u>	
g	Acceleration due to gravity
GPS	Global Positioning System
GR	Guard Railing
<u>H</u>	
H	Height
HAR	Highway Advisory Radio
HAZMAT	Hazardous Material
HCM	Highway Capacity Manual
HDM	Highway Design Manual
HOT	High Occupancy Toll
HOV	High-Occupancy Vehicle
HOVL	High-Occupancy Vehicle Lane
HM	Hazardous Material
HQ	Caltrans Headquarters
Hr or HR	Hour
HW	Hazardous Waste
Hwy or HWY	Highway
<u>I</u>	
i.e.	“In Other Words”
IGR	Intergovernmental Review
ILEV	Inherently Low Emission Vehicle
in	Inch
Inj or INJ	Injury
IRLs	In-Roadway Lights
IRWLs	In-Roadway Warning Lights

ISO	International Standards Organization
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991 (Federal)
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation Systems or Institute of Transportation Studies
ITTE	Institute of Transportation & Traffic Engineering
IVHS	Intelligent Vehicle Highway System
<u>K</u>	
km	Kilometer
KP	Kilometer Post
<u>L</u>	
L	Length
Lat	Latitude
lb or LB	Pound
LED	Light Emitting Diode
LF	Linear Foot
Ln or LN	Lane
Loc or LOC	Location
LOS	Level of service (Traffic Congestion Measure)
LPA	Local Public Agency
LRT	Light Rail Transit
Lt or LT	Left
<u>M</u>	
m	meter
MADT	Monthly Average Daily Traffic
Maint	Maintenance
Max or MAX	Maximum
MAZEEP	Maintenance Zone Enhanced Enforcement Program
MBGR	Metal Beam Guard Rail
Med or MED	Median
MF	Mixed Flow
mi or MI	Mile or Miles
Min or MIN	Minimum
Misc or MISC	Miscellaneous
mm	Millimeter
mph or MPH	Miles per Hour
MPO	Metropolitan Planning Organization
MSL	Mean Sea Level
MT	Mass Transit
MTC	Metropolitan Transportation Commission (for the San Francisco Bay Area)
MUTCD	Manual on Uniform Traffic Control Devices
MVM	Per Million Vehicle Miles
<u>N</u>	
N	North
NB	Northbound
NCEES	National Council of Examiners for Engineering and Surveying
NCHRP	National Cooperative Highway Research Program
NCRP	National Cooperative Research Program

NCUT	National Committee on Urban Transportation
NCUTCD	National Committee on Uniform Traffic Control Devices
NCUTLO	National Committee on Uniform Traffic Laws and Ordinances
NHI	National Highway Institute
NHL	National Historic Landmark
NHS	National Highway System
NHSB	National Highway Safety Bureau
NHTSA	National Highway Traffic Safety Administration
NNIH	National Network of Interstate Highways
No.	Number (must have period)
Nos.	Numbers (must have period)
NPRM	Notice of Proposed Rule Making
NPS	National Park Service (U.S.)
NR	National Register (of Historic Places, abbreviation)
NRHP	National Register of Historic Places
NS	Near Side
NTS	National Transportation System or Not To Scale
NTSB	National Transportation Safety Board
<u>O</u>	
O & D	Origin and Destination
Oc or OC	Overcrossing
OCTA	Orange County Transportation Authority
ODA	Outdoor Advertising (Act)
OES	Office of Emergency Services
OG	Original Ground
OH	Overhead (Structure)
OHP	Office of Historic Preservation
Opp	Opposite
OSA	Office of the State Architect
OSHA	Occupational Safety and Health Administration
<u>P</u>	
P2P	Peer-to-Peer Program
P&P	Policy & Procedure
PCH	Pacific Coast Highway
PCMS	Portable Changeable Message Sign
PDO	Property Damage Only
PE	Professional Engineer or Project Engineer
Ped or PED	Pedestrian
PHF	Peak Hour Factor
PHI	Point of Historic Interest
PM	Post Mile
PMS	Pavement Management System
PMT	Passenger Miles Traveled
PS&E	Plans, Specifications, and Estimate
Pvmt or PVMT	Pavement
PUC	California Public Utilities Commission

<u>Q</u>	
Q&A	Questions and Answers
Qty	Quantity
<u>R</u>	
R&D	Research and Development
RCE	Registered Civil Engineer
Rd	Road
Rdwy	Roadway
RE	Resident Engineer or Right of Entry
ROW	Right of Way
RR	Railroad
Rt or RT	Right
Rte or RTE	Route or Registered Traffic Engineer
RV	Recreational Vehicle
R/W	Right of Way
Rwy	Railway
RXR	Railroad Crossing
<u>S</u>	
S&H Code	Streets & Highways Code
S	South
SACOG	Sacramento Area Council of Governments
SAFE	Service Authority for Freeways & Expressways
SB	Southbound or Senate Bill
SCAG	Southern California Association of Governments
SCRRA	Southern California Regional Rail Authority
SCRTD	Southern California Rapid Transit District
Sec	Second or Section
SHELL	State Highway Extra Legal Loads
SHL	State Historical Landmark
SHOPP	State Highway Operation and Protection Program
SHS	Standard Highway Signs Book (FHWA)
SI	Safety Index or International System of Units (Metric)
SR	State Route or Senate Resolution
SRRA	Safety Roadside Rest Area
SSD	Stopping Sight Distance
SSP’s	Standard Special Provisions
St or ST	Street
STA	State Transit Assistance
STIP	State Transportation Improvement Program
Str or STR	Structure
SW	Sidewalk or Soundwall
SWITRS	Statewide Integrated Traffic Records Systems
<u>I</u>	
TASAS	Traffic Accident Surveillance and Analysis System
TC	Traffic Control
TCM	Transportation Control Measure
TCP	Traffic/Transportation Control Plan

TEA21	Transportation Efficiency Act for the 21st Century
Temp or TEMP	Temporary
TI	Traffic Index
TM	Caltrans Traffic Manual
TMC	Traffic Management Center
TMP	Transportation Management Plan
TMT	Traffic Management Team
TODS	Tourist-Oriented Directional Signs
TOPD	Traffic Operations Policy Directives
TOS	Traffic Operations System
TRB	Transportation Research Board
TS	Traffic Signal
TSS	Caltrans Traffic Sign Specifications
TTC	Temporary Traffic Control
<u>U</u>	
UC	Under Crossing
UP	Underpass
UPRR	Union Pacific Railroad
URR	Urban Rail Transit Program (State)
USA	Underground Service Alert
USC	United States Code (Federal)
USCE	United States (Army) Corps of Engineers (Federal)
USDOT	United States Department of Transportation
<u>V</u>	
VMS	Variable Message Sign
VMT	Vehicle Miles Traveled
vph or VPH	Vehicles Per Hour
vphpl or VPHPL	Vehicles Per Hour Per Lane
<u>W</u>	
W	West or Width
WATCH	Work Area Traffic Control Handbook
WB	Westbound
WIM	Weigh-in Motion
WS	White Stripe
Wt	Weight
<u>X</u>	
Xing or XING	Crossing
<u>X</u>	
Yr	Year
YS	Yellow Stripe

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APPENDIX A103(CA). LIST OF USEFUL TCD RELATED WEB SITES

Support:

The following list of web sites are related to traffic control devices and provided for ease of use and as a handy reference:

Description	Internet Web Site Address
American Association of State Highway and Transportation Officials (AASHTO)	http://www.transportation.org/
American Railway Engineering and Maintenance-of-Way Association (AREMA)	http://www.arena.org/
American Traffic Safety Services Association (ATSSA)	http://www.atssa.com
California Building Standards Code	http://www.iccsafe.org/
California Code of Regulations (CCR)	http://ccr.oal.ca.gov/
California Department of Motor Vehicles (DMV)	http://www.dmv.ca.gov/dmv.htm
California Highway Patrol	http://www.chp.ca.gov/
California Law	http://www.leginfo.ca.gov/calaw.html
California MUTCD	http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/
California Public Utilities Commission (CPUC)	http://www.cpuc.ca.gov/
California Sign Chart	http://www.dot.ca.gov/hq/traffops/signtech/signdel/signchart.html
California Traffic Control Devices Committee (CTCDC)	http://www.dot.ca.gov/hq/traffops/signtech/newtech/
California Vehicle Code	http://www.dmv.ca.gov/pubs/vctop/vcpdfc.htm
Caltrans Approved Safety Devices List	http://www.dot.ca.gov/hq/esc/approved_products_list/pdf/highway_safety_features.pdf
Caltrans Interchange Exit Numbering	http://www.dot.ca.gov/hq/traffops/signtech/calnexus/index.htm
Caltrans Manuals	http://www.dot.ca.gov/manuals.htm
Caltrans Office of Truck Services (STAA Truck Routes)	http://www.dot.ca.gov/hq/traffops/trucks/
Caltrans Publications	http://caltrans-opac.ca.gov/publicat.htm
Caltrans Rural/Urban Roadway Classification	http://www.dot.ca.gov/hq/tsip/hpms/Page1.php
Caltrans Sign Specifications	http://www.dot.ca.gov/hq/traffops/signtech/signdel/specs.htm
Caltrans Traffic Manual	http://www.dot.ca.gov/hq/traffops/signtech/signdel/trafficmanual.htm

Description	Internet Web Site Address
Federal-Aid Highway Program Guidance on High Occupancy Vehicle (HOV) Lanes	http://www.fhwa.dot.gov/operations/hovguide01.htm
Federal Highway Administration	http://www.fhwa.dot.gov/
Federal Railroad Administration	http://www.fra.dot.gov/
FHWA's Experimentation/Interpretation Letters	http://www.atssa.com/page.wv?section=Resources&name=Interpretation+Letters
FHWA's MUTCD	http://mutcd.fhwa.dot.gov/
FHWA's Office of Safety	http://safety.fhwa.dot.gov/index.htm
FHWA's Standard Highway Signs Book	http://mutcd.fhwa.dot.gov/ser-shs_millennium.htm
Going Going Gone (Free Surplus Transportation Literature from UC Berkeley's ITS Tech Transfer)	http://www.techtransfer.berkeley.edu/freestuff/
Illuminating Engineering Society (IES)	http://www.iesna.org/
Institute of Makers of Explosives	http://www.ime.org/
Institute of Transportation Engineers (ITE)	http://www.ite.org
International Organization for Standards (ISO)	http://www.iso.org/
International Safety Equipment Association (ISEA)	http://www.safetysite.org/
National Committee on Uniform Traffic Control Devices (NCUTCD)	http://www.ncutcd.org
National Committee on Uniform Traffic Laws and Ordinances (NCUTLO)	http://www.ncutlo.org
Occupational Safety and Health Administration (OSHA)	http://www.osha.gov/
Tech Transfer Training: UC Berkeley Institute of Transportation Studies	http://www.techtransfer.berkeley.edu/training/index.php
Transportation Research Board (TRB)	http://www.trb.org/
U.S. Architectural and Transportation Barriers Compliance Board (The U.S. Access Board)	http://www.access-board.gov/

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