CHAPTER 80
APPLICATION OF DESIGN STANDARDS

Topic 81 - Project Development Overview

Index 81.1 - Philosophy

The Project Development process seeks to provide a degree of mobility to users of the transportation system that is in balance with other values. In the development of transportation projects, social, economic, and environmental effects must be considered fully along with technical issues so that final decisions are made in the best overall public interest. Attention should be given to such considerations as:

(a) Need for safe and efficient transportation.

(b) Attainment of community goals and objectives.

(c) Needs of low mobility and disadvantaged groups.

(d) Costs of eliminating or minimizing adverse effects on natural resources, environmental values, public services, aesthetic values, and community and individual integrity.

(e) Planning based on realistic financial estimates.

(f) The cost, ease, and safety of maintaining whatever is built.

Proper consideration of these items requires that a facility be viewed from the perspectives of the user, the nearby community, and larger statewide interests. For the user, efficient travel and safety are paramount concerns. At the same time, the community often is more concerned about local aesthetic, social, and economic impacts. The general population, however, tends to be interested in how successfully a project functions as part of the overall transportation system and how large a share of available capital resources it consumes. Therefore, individual projects must be selected for construction on the basis of overall system benefits as well as community goals, plans, and values.

Decisions must also emphasize different transportation modes working together effectively.

The goal is to increase highway mobility and safety in a manner that is compatible with, or which enhances, adjacent community values and plans.

Topic 82 - Application of Standards

82.1 Highway Design Manual Standards

(1) General. The highway design criteria and policies in this manual provide a guide for the engineer to exercise sound judgment in applying standards, consistent with the above Project Development philosophy, in the design of projects. This guidance allows for flexibility in applying design standards and approving design exceptions that take the context of the project location into consideration; which enables the designer to tailor the design, as appropriate, for the specific circumstances while maintaining safety.

The design standards used for any project should equal or exceed the minimum given in the Manual to the maximum extent feasible, taking into account costs (initial and life-cycle), traffic volumes, traffic and safety benefits, right of way, socio-economic and environmental impacts, maintenance, etc. Because design standards have evolved over many years, many existing highways do not conform fully to current standards. It is not intended that current manual standards be applied retroactively to all existing State highways; such is neither warranted nor economically feasible. However, when warranted, upgrading of existing roadway features such as guardrail, lighting, superelevation, roadbed width, etc., should be considered, either as independent projects or as part of larger projects. A record of the decision not to upgrade the existing non-standard mandatory or advisory features shall

be provided through the exception process (See Index 82.2).

This manual does not address temporary construction features. It is recognized that the construction conditions encountered are so diverse and variable that it is not practical to set geometric criteria. Guidance for use of traffic control devices for temporary construction zones can be found in Part 6 – Temporary Traffic Control of the Manual on Uniform Traffic Control Devices (MUTCD) and the California Supplement. Guidance for the engineering of pavements in temporary construction zones is available in Index 612.6.

In this manual design standards are categorized in order of importance in development of a safe State highway system operating at selected levels of service commensurate with projected traffic volumes and highway classification.

(2) Mandatory Standards. Mandatory design standards are those considered most essential to achievement of overall design objectives. Many pertain to requirements of law or regulations such as those embodied in the FHWA's 13 controlling criteria (see below). Mandatory standards use the word "shall" and are printed in **Boldface** type (see Table 82.1A).

(3) Advisory Standards. Advisory design standards are important also, but allow greater flexibility in application to accommodate design constraints or be compatible with local conditions on resurfacing or rehabilitation projects. Advisory standards use the word "should" and are indicated by Underlining (see Table 82.1B).

(4) Permissive Standards. All standards other than mandatory or advisory, whether indicated by the use of "should" or "may", are permissive with no requirement for application intended.

(5) Controlling Criteria. The FHWA has designated thirteen controlling criteria for selection of design standards of primary importance for highway safety, listed as follows: design speed, lane width, shoulder width, bridge width, horizontal alignment, vertical alignment, grade, stopping sight distance, cross slope, superelevation, horizontal clearance, vertical clearance and bridge structural capacity. All but the last of these criteria are also designated as geometric criteria.

The design standards related to the 12 geometric criteria are designated as mandatory standards in this manual (see Index 82.1(2) and Table 82.1A).

(6) Other. In addition to the design standards in this manual, the Traffic Manual contains standards relating to clearzone, signs, delineation, barrier systems, signals, and lighting.

Caution must be exercised when using other Caltrans publications which provide guidelines for the design of highway facilities, such as HOV lanes. These publications do not contain design standards; moreover, the designs suggested in these publications do not always meet Highway Design Manual Standards. Therefore, all other Caltrans publications must be used in conjunction with this manual.

82.2 Approvals for Nonstandard Design

(1) Mandatory Standards. **To promote uniform practice on a statewide basis, design features or elements which deviate from most mandatory standards indicated herein shall require the approval of the Chief, Division of Design. This approval authority has been delegated to the Design Coordinators, except the mandatory standards in Chapters 600 through 670, which have been delegated to the Chief, Office of Pavement Design, and may involve coordination with the Design Coordinator.**

The current procedures and documentation requirements pertaining to the approval process for those exceptions to mandatory design standards that have been delegated to the Design Coordinators are contained in Chapter 21 of the Project Development Procedures Manual (PDPM).

Design exception approval must be obtained prior to District approval of the PSR, or any project initiation document (i.e., PSSR, PEER, combined PSR/PR), other than the PSR-PDS. The text of the project initiation report must include a brief description of the nonstandard features, as well as a reference to all approved Fact Sheets and their approval dates by the Division of Design and/or FHWA (when applicable).

If the need for a design exception is identified after approval of the project's initiation document, the above described consultation and documentation process shall be initiated immediately, and must be completed prior to approval of the next project development report. The text of the project development report (i.e., Draft Project Report, Project Report, Supplemental PR, PAR, etc.) must include the design exception reference normally provided in the project initiation report (see above).

During the construction phase of a project, Fact Sheets must be prepared (by Design staff) to document any nonstandard features proposed in a Contract Change Order. Such Change Orders shall not be executed until the proposed design exception has been approved (at least verbally) by the appropriate Caltrans and FHWA (if required) authority (ies). If verbal approval is granted to expedite Change Order execution, the Fact Sheet must be completed and approved immediately thereafter.

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) allows significant delegation to the states by FHWA to approve and administer portions of the Federal-Aid Transportation Program. California has accepted the maximum delegations offered as outlined in the May 27, 1992 memorandum signed by W.P. Smith. If required, FHWA approval of exceptions to mandatory design standards related to the 13 controlling criteria should be sought as early in the project development process as possible. However, formal approval shall not be requested until the appropriate Design Coordinator has approved the design exception.

FHWA approval is not required for exceptions to "Caltrans-only" mandatory standards. Table 82.1A identifies these mandatory standards.

For local facilities crossing the State right of way see Index 308.1.

(2) Advisory Standards. The authority to approve exceptions to advisory standards has been delegated to the District Directors. Proposals for exceptions from advisory standards should be discussed with the Design Coordinators during development of the approval documentation. The responsibility for the establishment of procedures for review, documentation, and long term retention of approved exceptions from advisory standards has also been delegated to the District Directors.

82.3 Use of FHWA and AASHTO Standards and Policies

The standards in this manual generally conform to the standards and policies set forth in the AASHTO publications, "A Policy on Geometric Design of Highways and Streets" (2004) and "A Policy on Design Standards-Interstate System" (2005). A third AASHTO publication, "Roadside Design Guide" (2002), focuses on creating safer roadsides. These three documents, along with other AASHTO and FHWA publications cited in 23 CFR Ch 1, Part 625, Appendix A, contain most of the current AASHTO policies and standards, and are approved references to be used in conjunction with this manual.

AASHTO policies and standards, which are established as nationwide standards, do not always satisfy California conditions. When standards differ, the instructions in this manual govern, except when necessary for FHWA project approval (Index 108.3, Coordination with the FHWA).

82.4 Mandatory Procedural Requirements

Required procedures and policies for which Caltrans is responsible, relating to project clearances, permits, licenses, required tests, documentation, value engineering, etc., are indicated by use of the word "must". Procedures and actions to be performed by others (subject to notification by Caltrans), or statements of fact are indicated by the word "will".

82.5 Effective Date for Implementing Revisions to Design Standards

Revisions to design standards will be issued with a stated effective date. It is understood that all projects will be designed to current standards unless an exception has been approved in accordance with Index 82.2.

On projects where the project development process has started, the following conditions on the effective date of the new or revised standards will be applied:

- For all projects where the PS&E has not been finalized, the new or revised design standards shall be incorporated unless this would impose a significant delay in the project schedule or a significant increase in the project engineering or construction costs. The Design Coordinator or individual delegated authority will make the final determination on whether to apply the new or previous design standards on a project-by-project basis for roadway features.
- For all projects where the PS&E has been submitted to Headquarters Office Engineer for advertising or the project is under construction, the new or revised standards will be incorporated only if they are identified in the Change Transmittal as requiring special implementation.

For locally-sponsored projects, the Oversight Engineer must inform the funding sponsor within 15 working days of the effective date of any changes in mandatory or advisory design standards as defined in Index 82.2.

82.6 Design Information Bulletins and Other Guidance

In addition to the design standards in this manual, Design Information Bulletins (DIBs) establish policies and procedures for the various design specialties of the Department that are in the Division of Design. Some DIBs may eventually become part of this manual, while others are written with the intention to remain as design guidance in the DIB format. References to DIBs are made in this manual by the “base” DIB number only and considered to be the latest version available on the Department Design website. See the Department Design website for further information concerning DIB numbering protocol and postings.

Caution must be exercised when using other Caltrans publications, which provide guidelines for the design of highway facilities, such as HOV lanes. These publications do not contain design standards; moreover, the designs suggested in these publications do not always meet Highway Design Manual Standards. Therefore, all other Caltrans publications must be used in conjunction with this manual.

Table 82.1A
Mandatory Standards

CHAPTER 80 APPLICATION OF DESIGN STANDARDS

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Index 82.2 Approvals for Nonstandard Design

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Index 101.1 Technical Reductions of Design Speed

101.1 Selection of Design Speed - Local Facilities

101.1 Selection of Design Speed - Local Facilities - with Connections to State Facilities

101.2 Design Speed Standards

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Index 104.4 Protection of Access Rights(1)

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Topic 201 Sight Distance

Index 201.1 Sight Distance Standards

Topic 202 Superelevation

Index 202.2 Standards for Superelevation

202.7 Superelevation on City Streets and County Roads

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Index 203.1 Horizontal Alignment - Local Facilities

203.1 Horizontal Alignment and Stopping Sight Distance

203.2 Standards for Curvature

Topic 204 Grade

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204.3 Standards for Grade

204.8 Vertical Falsework Clearances(1)

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Index 205.1 Sight Distance Requirements for Access Openings on Expressways

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301.2 Cross Slopes

301.2 Algebraic Differences in Cross Slopes

Topic 302 Shoulder Standards

Index 302.1 Shoulder Width

302.2 Shoulder Cross Slopes

Topic 305 Median Standards

Index 305.1 Median Width(1)

Topic 307 Cross Sections for State Highways

Index 307.2 Shoulder Width for Structural Section Support on Two-lane Cross Sections for New Construction

307.2 Shoulder Standards for Two-lane Cross Sections for New Construction

Topic 308 Cross Sections for Roads Under Other Jurisdictions

Index 308.1 Cross Section Standards for City Streets and County Roads without Connection to State Facilities

308.1 Minimum Width of 2-lane Structures for City Streets and County Roads without Connection to State Facilities

(1) Caltrans-only Mandatory Standard.

(2) Authority to approve deviations from this Mandatory Standard is delegated to the Chief, Office of Pavement Design.

Table 82.1A
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	309.1	Clear Recovery Zone
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	309.3	Horizontal Tunnel Clearances
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	405.1	Sight Distance at Public Road Intersections
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Topic 504 **Interchange Design Standards**

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	504.2	Ramp Deceleration Lane and “DL” Distance
	504.3	Ramp Lane Width
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	504.3	Ramp Metering Design Features
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	504.3	Ramp Meters on Connector Ramps
	504.3	Lane Drop Transitions on Connector Ramps
	504.3	Distance Between Ramp Intersection and Local Road Intersection
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(1) Caltrans-only Mandatory Standard.

(2) Authority to approve deviations from this Mandatory Standard is delegated to the Chief, Office of Pavement Design.

Table 82.1A
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1003.1 Class I Bikeway Horizontal Clearance(1)

1003.1 Class I Bikeway Structure Width(1)

1003.1 Class I Bikeway Vertical Clearance(1)

(1) Caltrans-only Mandatory Standard.

(2) Authority to approve deviations from this Mandatory Standard is delegated to the Chief, Office of Pavement Design.

Table 82.1A
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1003.1	Class I Bikeway Design Speeds(1)
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1003.2	Class II Bikeway Design(1)
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1003.2	Class II Bikeways Adjacent to Parking(1)
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1003.2	Class II Bikeway Widths where Parking is Prohibited(1)
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1003.6	Bikeway Overcrossing Structures(1)
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(1) Caltrans-only Mandatory Standard.

(2) Authority to approve deviations from this Mandatory Standard is delegated to the Chief, Office of Pavement Design.

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Index 309.1 Clear Recovery Zone

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309.5 Structures Across or Adjacent to Railroads - Vertical Clearance

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