



BRIDGE CONSTRUCTION MEMO 2-18.0
SECTION 2-MISCELLANEOUS
INFORMATION AND
INSTRUCTIONS

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Constructability Review

Introduction

In a 1998 memo, the Caltrans Program Manager of Design and Local Programs called for all the districts to enact the use of a formal Constructability Review (CR) during the project initiation and design phases of the project development process. The goal of a CR is to improve overall constructability, thus reducing contract change orders, claims and traffic delays. Division of Engineering Services (DES) has developed procedures for constructability reviews on projects delivering a structures Plans, Specifications, and Estimate (PS&E) state highway system package. This BCM provides direction to OSC staff on the CR process and responsibilities.

Background

Since the 1998 memo, each district has developed a system for addressing constructability reviews. DES has developed an internal process to address these reviews. A CR is a recognized Quality Assurance (QA) element of project delivery, and is intended to supplement, not replace, the use of the Project Delivery Team (PDT) and other reviews. The purpose of the CR process is to ensure DES Structures projects have addressed all constructability issues. Coordination of the design Task Manager will be necessary to address the district constructability review milestones (30%-60%-90% of final PS&E) and the DES structures constructability checkpoints. The DES structures checkpoints include the Advance Planning Study (APS), General Plan (GP) Stage, Unchecked Details (UD) stage and draft structures Plan, Specifications, and Estimate (dsPS&E) stage. The design Task Manager (TM) will be coordinating these reviews with the district to prevent independent efforts. See the DES Structures Constructability Review Process Guidelines and Memo-To-Designers (MTD) 1-31 for more information.

Project Levels

Since projects vary in complexity, the department has established distinct project levels to be considered in the CR process. Correspondingly each level has different CR requirements.

Level 1:

- Large, complex roadway/facility or building projects.
- Complex interchange construction or modifications.
- Large structure projects with complex or high cost features.
- Large rehabilitation projects which include major replacements of structures or other features.

Level 2:

- Less complex roadway/facility or building projects.
- Less complex structure or interchange projects.

- Most rehabilitation projects which include structure rehabilitation, minor widening or safety improvements.

Level 3:

- Capital Preventative Maintenance projects (CAPM) or Minor B projects that include structural features, such as barrier upgrades, deck rehabilitation, joint seal replacement, approach slabs and similar projects.

Review Stages

The DES has established the following constructability review stages for the various project levels that have been established by the department.

Structures Constructability Review Checkpoints

Review Stage	Level 1	Level 2	Level 3	Project Phase	WBS Code	WBS Description
Advance Planning Studies	X	X	X	K or 0	150.15.30 or 160.10.85	Structures Advanced Planning Study (APS)
General Plans	X	X		1	240.75	Draft General Plans
Unchecked Details	X			1	240.85	Draft Structure Plans
Draft Structures PS & E	X	X	X	1	250.50	Project Review

Typically the CR will be completed in conjunction with the Type Selection meeting. For the final CR, at the dsPS&E stage, the design TM will schedule a meeting. This is the last opportunity prior to project advertising, thus an in person meeting affords the quickest avenue for finalizing project issues.

APS = Advance Planning Study
 GP = General Plan- associated with Type Selection
 Unchecked Details = Typically associated with 65% complete stage
 dsPS&E = draft structures Plans, Specifications, and Estimate

Constructability Review Process

The DES process and desired outcomes are presented in Attachment No 1.

Constructability Review Tools

Constructability reviewers are to utilize the DES CR Feedback Form for making comments (form is located on the OSC website). Some districts have developed their own feedback form, if this is the case, the reviewer may elect to use the district form so as not to duplicate their efforts.

Checklists have been developed to assist in performing a CR for a structures project. The checklists can be accessed on the OSC website and are provided to focus attention on key issues.

Feedback During Construction

During construction, the field representative shall contact the Structures Project Engineer to discuss any structures related contract change orders addressing design issues. This feedback process is intended to reduce repeatable construction problems. During construction, the Project Engineer is encouraged to visit the jobsite with the Structure Representative as well as on a final walk-through.

Constructability Review Close Out

Many districts have integrated a close out meeting to review lessons learned. If the District does not initiate a close out meeting, the OSC Senior is to discuss conducting a close out meeting with the design TM for a Level 1 project and if warranted for a Level 2 project. Close out meetings are a tool to improve communication back to design on issues encountered during the construction phase, and look for ways to integrate lesson learned into future projects. Issues discussed at the closeout meeting with broader implications on future projects, should be raised to an ACM level for further review. Potential specification or standard plan changes should be directed to the appropriate OSC Technical Committee for pursuing changes.

Constructability Review Responsibilities

Area Construction Manager:

- Ensure area staff is aware of constructability roles and responsibilities.
- Maintain performance records on CR status for projects in their area.
- Participate as appropriate, i.e. in large complex projects.

Bridge Construction Engineers:

- Identify who the reviewer will be for a specific project.
- When a CR is requested for a project in their area, ensure timely CR input is provided on the Feedback Form and plans as needed. An ACM may elect to have their Senior Specialist conduct the CR. In this case, the specialist is responsible to obtain site specific information and provide input.
- Ensure OSC HQ Office Associate for your area receives a copy of the CR Feedback Form. Typically the OA will be the liaison between design and construction for CR distribution. However, if design/field construction distributes directly, the OA must receive a copy for tracking purposes.
- When a project field review is requested, i.e. from design prior to the Type Selection meeting, ensure appropriate staff is present to facilitate the safe field review of the project limits. Depending on the project, encourage participation by district personnel such as traffic or environmental staff.
- Ensure participation on all DES CR requests and meetings. If staff is unable to attend a Type Selection meeting in Sacramento, encourage participation by teleconference or relaying information to the OSC HQ liaison senior that will be attending the meeting.
- Discuss performing a closeout meeting with structures design personnel particularly on Level 1 projects and when applicable on Level 2 projects.

OSC Field Staff

- Be aware of the CR process employed by the district in which they work.
- Know the basic milestones of project delivery and when constructability reviews take place.
- When requested, provide input for a CR on the Feedback Form and attach any additional comments from a CR checklist or project plan document.
- Provide the OSC HQ Office Associate for your area a copy of the CR comments.
- When requested, participate in a CR related event such as a project field review meeting or Type Selection meeting.

OSC HQ Senior Liaisons

- When requested, determine responsible field staff for a given project to participate in a CR activity.
- Attend Type Selection meetings. Prior to meeting, discuss project specific construction issues with field staff. If field staff is unable to attend meeting, ensure field issues are presented by OSC representative to the meeting and addressed.
- Ensure Office Associates are documenting receipt of constructability reviews and distributing in a timely manner.

OSC Office Associates

- Follow duties as outlined in the Office Associate manual for constructability reviews such as tracking distribution and receipt of review.

Constructability Review Process and Desired Outcomes

Review Stage	Process	Desired Outcomes
Advance Planning Studies Or PID Review For Building Projects	<ol style="list-style-type: none">1. Design TM to identify applicable functional Offices.2. Each functional office to identify CR Functional Reviewer.3. Optional field review at discretion of Design PE.4. Design PE to consult with Functional Reviewers during the development of the APS and incorporate comments as applicable.5. Design PE to transmit completed APS to Functional Reviewers for comment.6. Functional Reviewers to provide comments on plans and summarize on DES CR feedback form.7. Design PE to complete response portion of CR feedback form, respond to Functional Reviewers and file.8. Comments that do not impact project programming or PA&ED will be incorporated at the next APS update or during the development of the General Plans.	<ol style="list-style-type: none">1. Identify issues that impact project programming, specifically issues related to scope and capital costs.2. Identify fatal flaws.3. Identify proper scope.4. Input for project risk management plan.5. Identify proprietary systems or potential unusual specification issues.6. Identify issues that impact the development of PA&ED or the Project Report.

Review Stage	Process	Desired Outcomes
General Plans Or Preliminary Plans for Building Projects	<ol style="list-style-type: none"> 1. Update list of Functional Reviewers, if needed. 2. Mandatory field review at project site prior to Type Selection for Level 1 projects, evaluate for Level 2. 3. Design PE to consult with Functional Reviewers during the development of the GP and incorporate comments as applicable. 4. Design PE to schedule Type Selection meeting and distribute package to all Functional Reviewers. 5. All Functional Reviewers to attend Type Selection meeting (mandatory CR review meeting). 6. Design Project Engineer to transmit completed GP to Functional Reviewers for comment. 7. Functional Reviewers to provide comments on plans and summarize on DES CR feedback form. 8. Design PE to complete response portion of CR feedback form, respond to Functional Reviewers and file. 9. Comments not incorporated prior to General Plan Distribution will be incorporated at the Unchecked Details stage. 	<ol style="list-style-type: none"> 1. Identify issues that impact project programming, specifically issues related to scope, schedule and capital costs. 2. Identify fatal flaws and risks. 3. Update project risk management plan. 4. Assess risk for: staging, traffic control, permits, environmental, clearances, site access and utility conflicts. 5. Evaluate foundation recommendations. 6. Evaluate aesthetic issues. 7. Identify potential CRIPs. 8. Identify proprietary systems or potential unusual specification issues. 9. Check material availability.

Review Stage	Process	Desired Outcomes
Unchecked Details Or 50% Plans Complete for Building Projects	<ol style="list-style-type: none"> 1. Update list of Functional reviewers, if needed. 2. Design Project Engineer to transmit Unchecked Details to Functional Reviewers for comment. 3. Functional Reviewers to provide comments on plans and summarize on DES CR feedback form. 4. Design PE to complete response portion of CR feedback form, respond to Functional Reviewers and file. 5. Comments received will be incorporated at the draft structures PS&E. 	<ol style="list-style-type: none"> 1. Identify issues that impact project programming, specifically issues related to scope, schedule, and capital costs. 2. Resolve previously identified Issues. 3. Identify proprietary systems or potential unusual specification issues. 4. Determine status of all permits. 5. Review non-standard details.
Draft Structures PS&E	<ol style="list-style-type: none"> 1. Update list of Functional Reviewers, if needed. 2. SOE to provide draft SPS&E package Functional Reviewers. 3. Design TM to schedule Project Review meeting (CR review meeting). 4. All Functional Reviewers to attend Project Review meeting (mandatory CR review meeting), review dsPS&E package and make final comments. 5. All Functional Reviewers to incorporate recommendations into their respective functional deliverables (i.e. Hydraulic Report, Foundation Reports, Special Provisions, Type Selection Report) during Project Review. 6. All Functional Reviewers to concur that all applicable constructability comments have been properly incorporated into the final Structures PS&E. 7. Design TM to send final CR feedback forms and CR Check List to RE Pending File (OSC HQ). 	<ol style="list-style-type: none"> 1. Identify issues that impact project programming, specifically issues related to scope, schedule and capital costs. 2. Resolve previously identified issues. 3. Review and resolve conflicts with roadway plans: geometry, staging, permits, construction easements. 4. Identify and resolve construction impacts on plans or specifications: working day estimates, foundation review, utilities. 5. Final review and updating of all project documents. 6. Concurrence by Functional Reviewer that project is ready for final SPS&E.