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APPROVED:  M. J. Cuddy, Assistant Commissioner/Chief Engineer Office of Engineering			

This Engineering Instruction (EI) revises the procedure and requirements provided in EI 88-14 for the performance of independent constructability reviews, and establishes a policy that the concept of "constructability" be considered for all projects as part of the regular plan review process.

Background

EI 88-14 introduced a procedure and requirements for the performance of independent constructability reviews and suggested that constructability be considered during the design process for all projects. Since the issuance of EI 88-14, several independent reviews have been performed; however, a significant number of requests to waive the requirement have been submitted. We have therefore re-evaluated the need for independent constructability reviews and have formalized a procedure that better serves the Department's quality assurance goals by emphasizing and requiring that "Constructability" be an essential component of the regular plan review process.

Key revisions to the procedure include:

1. As a component of the Department's regular plan review process, any review of plans at various stages of development shall consider the "Constructability" of projects.
2. A transfer of authority from the Chief Engineer to the Regional Director to waive the requirement for an independent constructability review.
3. An increase in the dollar threshold used to identify candidate projects for independent constructability reviews.

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Plan Review by Regional Construction Groups

The Design Procedure Manual requires that any submission by Regional Design (or by the Design Bureau for Regional Design) to the Design Quality Assurance Bureau or the Landscape Architecture Bureau be reviewed by the Regional Office functional units. All submissions to the Facilities Design Subdivision are considered to represent the position of the Region.

Regional Construction Groups shall review design plans and shall consider the "Constructability" of the proposed projects as a key aspect of their plan review process. Constructability issues such as bidding and building should be considered and addressed at a level of intensity commensurate with project cost, complexity and risk.

Constructability Issues

A constructability review addresses two fundamental questions -- can the project be bid rationally and can it be built without significant contract change? The constructability review should include consideration of economics, availability of materials, site restrictions, local conditions that may affect the construction process, environmental considerations, and maintenance and protection of traffic. Each of these components is defined below along with some pertinent criteria that should be addressed during design development. There are some overlapping issues, i.e. construction time allowed has a bearing on bidding and building. Therefore, the questions listed under each component are not intended to be mutually exclusive nor are they meant to be all inclusive.

Bidding - The clarity of the final plan and proposal to the bidders so that they may submit a fair and accurate bid.

Criteria

- Is the information contained in the bidding documents sufficient to allow the uninterrupted construction of the project?
- Have all necessary permits been identified and is sufficient time available to secure those permits prior to construction?

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- Have the appropriate parties been coordinated with during design and have agreements reached with those parties been provided for in the bidding documents?
- Are the bidders unnecessarily restricted in their bids or has the appropriate degree of flexibility been included in the bidding documents?
- Is the information contained in the bidding documents sufficient to avoid major field changes?
- Are the maintenance and protection of traffic plans adequate and complete?

Building - The accuracy and completeness of the contract plans so that the design as shown on the final plans can be built.

Criteria

- Has sufficient field investigation been made during design to insure that the project can physically be built?
- Is the sequence of construction activities realistic?
- Can the project be built in the time frame allowed?
- Are the materials specified in the contract documents readily available?
- Is sufficient right-of-way available to the contractor for all construction operations required during the construction of the project?
- Can the details as shown be constructed using the standard practices of the industry? If unusual contractor expertise, special equipment or non-standard operations are required, are the performance characteristics and quality of the end product clearly established.
- Are the maintenance and protection of traffic plans adequate and complete? Do the plans reference anticipated safety and health risks?

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Responsibility for Reviews

The Regional Director and the Regional Construction Engineer shall be responsible for assuring that Regional Construction Groups have qualified construction engineers assigned to a plan review function and that a prime consideration of that plan review process is the "constructability" of the proposed plans. In most cases, this function can be performed within the Regional Construction Group as a routine responsibility. In certain other cases, a Regional Director may determine that an Independent Constructability Review is required, utilizing some combination of resources from within, other Regions, the Main Office and Consultants. The Construction Division shall be notified of the initiation of each Independent Review. Should the need arise for outside assistance, the Regional Director shall request assistance through the Construction Division. (Consultant assistance may be obtained through Design Service Agreements, through a new designation, or in rare instances, through the project design agreement)

Independent Constructability Review

An independent constructability review is a formal review of all project data and documents by a specially selected independent team.

An independent constructability review team will be comprised of individuals with experience in the various aspects of design and construction required for the project at hand. Depending on the complexity of the project, the team will range in size from four to ten individuals. The team will be chaired by a representative from the Regional Construction Group staff selected by the Regional Director. Any project (or segment or component of a project) meeting one or more of the following criteria requires an independent constructability review.

- Large projects that are estimated to cost \$30 million or more to construct.
- Projects that are complex or involve new or unusual technology, regardless of cost.
- All Group C projects as defined by the program and project management system.

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- All projects of statewide significance as defined by the program and project management system.
- All projects of regional significance, as determined by the Regional Director, such as projects critical to local safety, traffic or program needs.

The Regional Director shall have the authority to waive the requirement for an independent constructability review. The reasons for this decision must be documented and a copy of such authorization provided to the Construction Division and the Chief Engineer. When determining the need for an independent constructability review, Regional Directors must consider the complexity of the project and the potential for an improved design as a result of a thorough review of constructability. Time and schedule constraints shall not be a reason for waiving the requirement for an independent constructability review.

Timing of Reviews

Constructability reviews for all projects shall be performed during the advance detail plan review phase. Earlier reviews of project specific constructability issues should be considered particularly if they have the potential to affect the project scope or schedule. Constructability reviews will be incorporated into the project management plan by the Project Manager.

Scope and Documentation of Review

The individuals selected to perform the constructability review i.e., construction group staff or the independent review team, will receive a thorough briefing of the project by the project designer and examine the project site (if appropriate). They should receive all pertinent reference materials, including the design report, advanced detail plans, any special specifications or special notes and all information concerning the construction schedule. The reviewers shall as a minimum address each of the criteria listed in the Constructability Issues section of this EI. Additional criteria concerning the bidding or building of the project will be identified by the reviewers on a project by project basis.

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Constructability issues that result from reviews performed by Regional Construction Groups during the advanced detail plan review stage shall be documented in a memorandum to the Designer and the Project Manager. After review and consideration of the Regional Construction Group's recommendations, the Designer must document the reasons for their course of action concerning each recommendation in a memorandum to the Regional Construction Group. Any recommendations to change statewide policies, procedures and standards should be brought to the attention of the appropriate Main Office Functional Unit.

Constructability reviews performed by independent review teams must be documented in a report prepared in accordance with general guidelines developed by the Construction Division. The completed report will be submitted to the Regional Director, the Designer, and the Project Manager for their consideration regarding changes to the contract documents. An informational copy must also be provided to the Main Office Construction Division. After review and consideration of the recommendations contained in the report, the Designers must document the reasons for their course of action concerning each recommendation and provide a copy to the independent review team, the Regional Director and the Construction Division.