1-8 PLANNING STUDIES

Introduction

There are two types of structure planning studies that can be requested by the district during the Project Initiation Document (PID) and Project Approval and Environmental Document (PA&ED) stages. The two types of studies are 1) Structure Project Study Report – Project Development Support (PSR-PDS) Cost Estimate, and 2) Advance Planning Study (APS). The particular type of study requested depends on the type of PID required for the project and/or stage of the project.

Structure PSR-PDS Cost Estimates are studies used to determine preliminary scope, feasibility, rough cost range and a list of potential project risks for the proposed work. These studies are used to program only the support costs needed to achieve project approval (including Environmental Document approval). This type of study is prepared when the necessary PID is a PSR-PDS, which is used for STIP, SHOPP, and special funded projects.

An APS is a comprehensive study that is typically prepared for inclusion into a Project Scope Summary Report or Project Study Report at the PID stage and a Project Report during the PA&ED stage. When prepared, the APS is used to program all structure project development and construction support, and construction capital costs.

If a Structure PSR-PDS Cost Estimate is prepared during the PID phase, an APS will be prepared during the PA&ED phase to program PS&E support and construction costs.

Structure PSR-PDS Cost Estimate

The level of engineering detail and effort for developing a PSR-PDS is generally limited to that effort required to develop the work plan for the PA&ED phase and to develop a rough order of magnitude estimate of the construction cost and associated project risks. The construction estimate in the PSR-PDS is not a programming commitment, but it is used to forecast long-range funding needs.

Due to the limited information available at the time of request, the Structure PSR-PDS Cost Estimate should consist of a transmittal memo that outlines the scope of work, project risks, assumptions, and rough order of magnitude cost estimate range for each alternative.

Discussions should be held with the Technical Liaison Engineer (TLE) Structure Design or Structure Liaison Engineer (SLE) in Office of Special Funded Projects, Division of Engineering Services (DES) functional units and Structure Maintenance & Investigations (SM&I), as necessary, to complete the Structure PSR-PDS Cost Estimate study.

Once completed, the Bridge Design Branch will submit the Structure PSR-PDS Cost Estimate transmittal to District with copies to all necessary DES (e.g. Structure Construction) and SM&I functional units.

Structure PSR-PDS Cost Estimate development guidelines and transmittal memo template can be found at the Structure Design intranet site.

Advance Planning Study

APS are prepared by Structure Design at the request of the district and are required for scoping and budget purposes. The district may request several studies to compare alternative project concepts.

The basic objective of an APS is to develop, as early as possible, a feasible type of structure, cost, project risk and controls appropriate for the specific site location. It is important that careful consideration be given to span lengths, structure depths, column locations, foundation types, seismic retrofit, scour mitigation, railing upgrade, approach slabs, falsework requirements, construction clearances and other factors.

Accelerated Bridge Construction (ABC) methods shall be considered to reduce construction impact times, mitigate environmental constraints, or to manage a significant project risk. During the K-phase, ABC should be taken in consideration along with conventional construction methods.

An APS achieves the following:

1. Defines the scope of structure work in the project.
2. Provides the structure depth for setting profile grade lines.
3. Establishes the best cost estimate available at that time.
4. Provides an early opportunity for Structure Design to assist in project conceptualization.
5. Familiarizes Structure Design with projects in the upcoming work load and is used to update the structure status.
6. Describes and documents the project risks and assumptions used in the early concept of the structure.

When preparing an APS for a bridge modification project, refer to guidance provided in Memo to Designer 9-3 on bridge widenings. All bridge modification studies shall be discussed with SM&I. Bridge Inspection Reports should be reviewed for pertinent information. Lengthening and unusual widenings need particularly careful study. Unusual modifications should be discussed with the appropriate technical specialists.

Geotechnical Design should be consulted to determine the appropriate foundation type(s). A request for Structure Preliminary Geotechnical Recommendations shall be submitted to Geotechnical Design as outlined in MTD 1-35.

All studies over a waterway or within a floodplain should be discussed with Structure Hydraulics & Hydrology. A request for Preliminary Hydraulic Recommendations shall be submitted to Structure Hydraulics & Hydrology as outlined in MTD 1-23.

Structures with railroad involvement should be discussed with the District Right-of-Way Railroad Agent regarding non-technical issues (i.e. clearance requirements, future track needs, railroad typical section). Railroad technical issues should be discussed with the Structure Design Railroad Engineering Technical Specialist.

Before including any itemized cost for seismic retrofit work in the APS, documented concurrence shall be obtained from the Office of Earthquake Engineering (OEE) regarding strategy. Only include a cost estimate for seismic restoration in the study if concurrence has been reached with OEE. If concurrence is not reached, then a formal strategy meeting should be held. If mitigation due to liquefaction potential is required, then a formal strategy meeting shall be held to reach concurrence on the proposed scope and identified risks prior to transmittal to the district.

Inaccuracies in preliminary structure costs may occur because the costs associated with traffic handling have not been anticipated. To insure that traffic handling is given proper consideration in the early design stages, identify traffic handling and falsework assumptions on the studies. Usually, one of the following conditions will prevail. The applicable note should be placed on the detail sheet.

1. Traffic will be routed around construction site.
2. Traffic will pass through construction site.
   a. No falsework allowed over traffic.
   b. Stage construction required.
   c. Falsework openings required.

In preparing an APS the following guidelines need to be followed for Caltrans in-house design projects:

1. They should be prepared promptly. Completion dates will be indicated on the transmittal letter by the TLE. Changes to the completion date should be discussed with District and the TLE.
2. In general, the APS plan sheet should be 11x17 format
3. The plan sheet should follow standard detailing practice. Complicated interchanges warrant special treatment.
4. The APS should be independently checked and then approved by the Design Branch Chief.
5. The choice of structure type should be based on criteria covered in Bridge Design Aids, Section 10, and in the Guidelines for Preparation of Advance Planning Study (http://onramp.dot.ca.gov/hq/des/sd/project_engineering_resources.html), and in the ABC Decision Making Guidance (http://onramp.dot.ca.gov/hq/des/spi/structure_quality_management/abc/index.html), if applicable.

6. The amount of information shown will vary somewhat with the stage at which the study is prepared. Ideally, the following should be indicated:
   - Structure length, width and type
   - Span lengths
   - Structure depth
   - Bridge rail type
   - Temporary railing requirements
   - Column locations
   - Foundation types
   - Falsework requirements
   - Vertical clearance
   - Horizontal clearances for construction operations (see MTD 21-19)
   - Aesthetic requirements
   - Roadway widths
   - Stage Construction
   - Location and slopes of cuts or fills
   - Slope Paving
   - Approximate existing ground line
   - North arrow
   - Roadway stationing
   - Retaining walls
   - Bridge removal, if required
   - Seismic Retrofit
   - Approach slabs
   - Environmental area designation if project located in Area II or III. (see MTD 8-2)
   - Corrosion control measures if project located within marine atmosphere (see MTD 10-5)
   - Quiet pavement requirements, if any
   - Project risk list: (http://onramp/hq/projmgmt/index.jsp?pg=65)

Note that the ideal study indicated above is sometimes not possible. Information may not be available at time of request; time requirements may preclude careful study; decisions may not yet have been made, etc. Under such conditions, preparers must either delay response, if acceptable, or more typically prepare a study incorporating whatever risks and assumptions that is necessary. Preparers should document, both in drawings and in transmittal memos, the basis for the study and the associated cost.

When the APS design is finished, a constructability review as outlined in MTD 1-31 must be conducted.

The assigned Bridge Design Branch shall submit the plan sheet and complete quantities to the Cost Estimating Branch for pricing. When completed, the Cost Estimating Branch will return the cost estimate to the Bridge Design Branch. The Bridge Design Branch will then submit the formal APS transmittal to District with copies to all necessary DES (e.g. Structure Construction) and SM&I functional units.

There is a continued emphasis on cost controls at all levels of the organization. The Districts are being held accountable for project cost increases. Therefore, it is very important that we, as consultants to the Districts, provide the best planning cost estimate as possible. Scope changes often lead to cost increases or schedule delays. The Design Branch is expected to produce studies for all alternatives that are viable for PS&E design.

If assumptions are found to be incorrect prior to the design stage, the APS scope and cost shall be updated promptly. APS that are updated, either for details changes or cost escalation, shall show a revision date. Distribution of updated studies should follow the same procedure as the original distribution.

APS development guidelines, transmittal memo templates and constructability review procedures can be found on the Structure Design intranet site.
http://onramp.dot.ca.gov/hq/des/sd/project_engineering_resources.html

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