The Design Process

The FDOT design process includes a number of important steps. Key parts to this process are discussed in this section. The PM must know this process and be able to use it effectively.

Verification of PD&E

An important early step is to verify commitments affecting design, made during the PD&E phase as documented in the PD&E and the Preliminary Engineering Reports. Many of these commitments (i.e., landscaping, and other aesthetic enhancements) require local agencies to fund them in whole or in part and also usually written maintenance agreements. The Design Project Manager is responsible for following through with these commitments during the Design Phase.

The design phase may overlap the PD&E phase, which can result in a decrease in production time, efficiencies in data collection, public involvement, engineering design, and better overall project consistency. When overlapping these phases, both the PM and the PD&E PM must work closely to ensure commitments and issues are addressed.

When the Design Phase overlaps the PD&E Phase, the PM must verify the Federal Highway Administration's concurrence with the Location Design Concept Acceptance (LDCA) prior to advancing the project beyond the Phase II (60%) submittal. Work beyond the Phase II submittal is considered Final Design, and Federal Regulations prohibit advancing into Final Design prior to LDCA receipt.

The PM must coordinate with the PD&E PM, or the District Environmental Management Office to ensure the project has received LDCA. The PM will need to convey this information to the District Federal Aid staff in the District Work Program Office if there are federal funds in the design phase. This verification can take place at any point during the design process prior to acceptance of the Phase II submittal.

Phase Submittals and Reviews

Many of the activities necessary to complete the design of a project are outlined in ***FDM 111***. This chapter, the Final Engineering Design Process, describes the activities to prepare contract plans and specifications that can be used to bid and construct the project with a minimum of field changes, delays, and cost overruns. The PM must be familiar with the activities described in this chapter to ensure the proper completion and assembly of a contract plans package.

The PM is usually the person responsible for determining the plan phase reviews required for a project and ensuring that the reviews are completed. The PM is responsible for the adequacy of the design submittals and for the coordination of reviews between the Department and the consultant. *Design Submittals,* ***FDM 120***, provides an overview of most of the various items of information which may be required from different sections or departments during the design process. Projects may not require submittals at all phases to meet project objectives. The PM should determine the appropriate phase submittals for each project. Some reasons to adjust phase reviews on a project include project complexity, production schedules, political commitments, and the availability of information within the specific stage of the project.

The ***FDM***, ***Part 3 and Part 9***, sets forth requirements for the preparation and assembly of contract plans for FDOT projects. The information applies to the preparation of contract plans for both roadways and structures design projects. The consultant, or Engineer of Record (EOR), is responsible for the design plans. However, as already noted, the PM is usually responsible for coordinating the plan phase submittal reviews. *Sequence of Plans Preparation*, ***FDM 301 & 901***,

provides a systematic design process for preparing plans and performing the required phases of review and revision to ensure technically correct and clear plans. The PM should be familiar with the information provided in this chapter.

Some simple projects may need only a 15% and a 90% phase submittal. Sometimes, additional or intermediate submittals may be required to ensure the progress of a project. Examples would be a 15% submittal, usually defined as horizontal and vertical alignment, and a 45% submittal, usually defined as addition of drainage details and design approaches to the maintenance of traffic. Coordination with all potential reviewers for intermediate submittals is important so they understand the purpose and intent of the intermediate phase submittals.

The initial phase submittal should identify need for Design Exceptions and Design Variations, and this information should be updated with each subsequent submittal. Please see the ***FDM 122*** for more information on these important documents.

Submittal requirements should be determined early and included in the consultant scope of services. The Quality Control (QC) plan and sufficiency checklists can be used to ensure the completeness of any particular phase submittal. Refer to ***FDM 124*** for more information on the QC process.

All reviewers do not need to see all phase submittals. To bring conclusion to any submittal, review comments must be addressed and final resolution of any issues achieved. Coordination with all reviewers can expedite the process. Decisions reached should be documented and communicated to the review team.

All review comments should go to the PM, who is responsible for transmittal to the consultant. The PM should identify conflicting comments and resolve them as necessary. A comment resolution meeting may be held to deal with comments and responses that require resolution. The consultant PM should work to resolve all engineering-related issues by Phase II (60%) submittal, especially if the project requires new right of way. NOTE: Districts all use a Web-based Electronic Review Comment (ERC) system to facilitate and manage the review and comment process.

The FDOT PM should manage the review process and ensure that the consultant is not delayed because of late reviews. Likewise, it is the consultant project manager's responsibility to ensure that the project's scheduled review times are not compromised by late or incomplete submittals.

Plans Processing

The PM's objective in a design project is to complete the plans, specifications and estimate (PS&E) so that a contract can be advertised and awarded for the construction of the project. The *Plans Processing and PS&E Submittal Package Revisions,* ***FDM 131 & 132***, describes in general terms the critical activities required to process the PS&E for letting. It identifies the transmittal forms, certifications and other documents prepared by the District and the various offices involved in processing a PS&E package. This chapter also outlines the revision process and the steps to resubmit a project that has been withdrawn from letting. It is also the PM's responsibility to ensure any electronic submittals are checked and comply with the Department's CADD requirements for electronic deliverables.

Specifications: As with other major aspects of a project, the preparation of the project specifications package is an important step. An understanding of the governing order of contract documents will aid in understanding the process. This information can be found in Section 5.2, of the ***FDOT Standard Specifications for Road and Bridge Construction***. The rule of thumb is that the most project-specific documents take precedence over the least project-specific documents. Coordination with the District Specifications Department will aid in the production of this document.

Certain pay items trigger the need for Technical Special Provisions (TSPs) to be generated. TSPs need to be identified as early as possible during the design to allow for proper review prior to final submittal. The TSPs, signed and sealed by the engineer who developed them, are included in the Specifications Package.

Some projects require the use of Developmental Specifications. *Developmental Specifications* are specifications developed around a new process, procedure, or material approved for limited use by the State Specifications and Estimates Office. These specifications are signed and sealed by the FDOT's professional engineer responsible for authorizing their use and monitoring their performance in the field. The PM is responsible for obtaining this authorization.

The current specifications workbook should be obtained from the District Specifications Department prior to beginning the process. Since the development of these workbooks is a continuing process, it is important to have the most recent edition.

Project Cost: The project cost of construction must be completed at each phase to ensure compliance with the Work Program. The engineering design project cost process is discussed in ***FDM 123***. The engineer's estimate of construction cost and contract time is one of the last activities performed on a design project. To do a quality project cost, the engineer must have the following material available:

- Complete plans, including all components
- Complete specifications, including supplemental specifications and special provisions
- Design Standards, referenced to the key sheet of the contract plans
- Utility work schedules
- Basis of Estimates Manual

The specifications establish the method of measurement, basis of payment, and pay items for work specified. The Master Pay Item List contains design aids, notes, and computation information to aid the engineer in preparing the project cost.

Engineer's Report: The engineer's report, often called the Project Design Documentation, should be included with all phase submittals on major projects. It should include information from any project development stages that occurred prior to the design phase along with the backup information and calculations for the project design, correspondence, certifications and overall cost for the project. It should be well organized and referenced so that anyone seeking information from it can find it quickly and easily.