



CHAPTER VII DESIGN AND CONSTRUCTION (PROJECT DELIVERY)

The purpose of this chapter is to identify the activities involved in designing and constructing or delivering road and parkway projects—from the initial project scoping through the completion of construction. This chapter describes the key processes, procedures, and responsibilities of the staffs of the NPS and the Federal Highway Administration (FHWA), in particular the operating units known as the Federal Lands Highway (FLH) divisions.

A flow chart of the activities necessary to deliver a project (including environmental reviews) and a matrix showing roles and responsibilities for each milestone are included in Appendix K (page 1, page 2) and Appendix L. The flow chart and related matrix describe 3R projects, but are also informative of the 4R process. A separate 4R flow chart is in preparation and will be included in the appendix to this document. An important part of the project development process is the endorsement of a project agreement by the key participants. Appendix M includes a description of a typical project agreement and includes an example and template.

The major stages of the project delivery process and who is responsible are described in the following sections.

A. PROJECT START

Each NPS Regional FLHP Coordinator (Coordinator) holds an annual program meeting to start the project development process each year. Typically, this meeting occurs after regional fund allocations are made. Participants will include FLH division staff, NPS Denver Service Center (DSC) staff, and sometimes representatives from the park units.²⁹ The group considers the multiyear program of projects and comes to agreement on the relative priority to assign projects for implementation (known as “programming”). The group also identifies who needs to be involved in each project at the outset and what other information is needed due to a project’s complexity or specific needs. The next step is for the Coordinator, or the assigned project managers (PM) for the FLH division and the NPS region, to schedule meetings at the relevant parks to review and scope the individual projects scheduled to begin that fiscal year. The NPS project manager may be assigned from the region, the park unit, or the Denver Service Center. The FLH project manager is designated by the Eastern, Central or Western FHL Division, depending on the park unit location.

Under the 1983 agreement between the agencies, the Park Service may choose to do the design work or assign it to Federal Lands Highways. Typically, project design is done by an FLH division, but park units or regions sometimes assign the work within the Park Service. The 1983

agreement also assigned lead responsibility for compliance and landscape architecture to the Park Service, consistent with its overall mission (16 United States Code 1). Best practices for completing environmental compliance documents are referenced in Appendices K, L, Q and R. These practices should be followed regardless of the designation of lead responsibilities.

B. PRELIMINARY ENGINEERING

Preliminary engineering encompasses all the work necessary to take a project from an approved scope to a set of contract documents (plans, specifications, and estimate, or PS&E) ready for advertisement and award. This includes surveying, mapping, subsurface investigation, environmental compliance, acquisition of permits, preliminary and final layout, grading, drainage design, erosion control, traffic control, right-of-way and utility coordination, landscaping design, specifications, estimates, consultant contract administration, bid evaluation, and contract award. NPS project design guidelines are provided in appendix AA. After the contract award the project enters the construction phase.

Reviews are scheduled by the project managers periodically throughout the preliminary engineering process to assess progress of the design work and to ensure resolution of issues that may arise during the development of the PS&E package. The first review covers the preliminary centerline and profile with an approximate design footprint of the project. This review usually occurs when the design is about 15% complete or may occur at the 30% design stage.

The second review, or plan-in-hand review, covers in detail the design criteria used, potential environmental mitigations for each alternative considered, exceptions to standards, and other matters pertinent to the project, including special contract requirements. This review usually occurs when the design is about 30% complete and again for the selected (preferred) alternative at 70% complete.

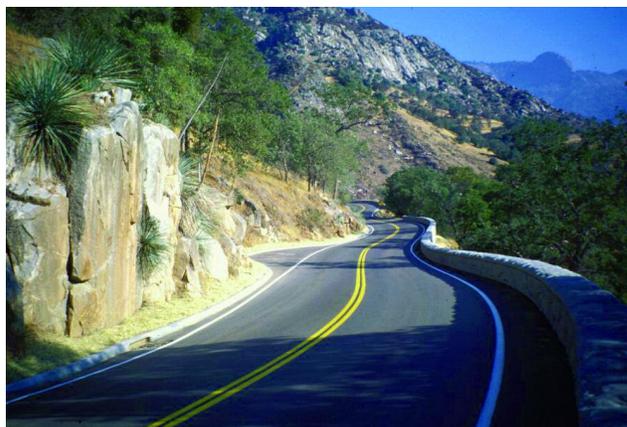
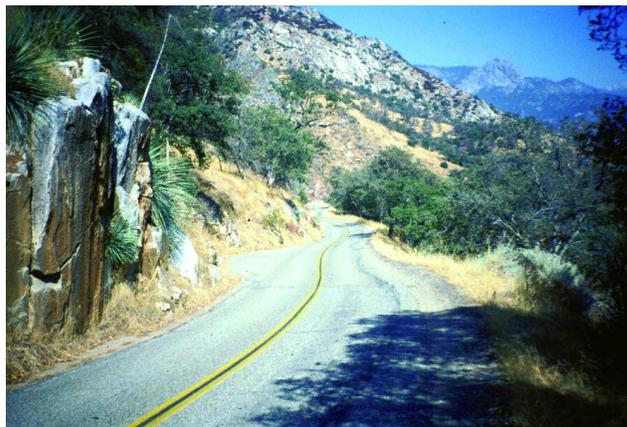
The final design review occurs when the project is approximately 90% to 95% complete. The review provides all cooperating agencies the opportunity to determine if their respective concerns are adequately addressed in the plans and specifications. The NPS project manager and the park superintendent are asked to review and recommend the final design to the NPS regional director for approval.

1. Project Scoping and Agreement

Staffs of the NPS region and FLH division meet at the park unit for the initial scoping of the project. The purpose of the scoping meeting is to discuss the general project parameters, project location (starting and ending points), persons involved, and potential issues or specific project concerns. The nature and extent of the project determines who will be involved, but everyone who will need to take action to deliver the project should be included: the project managers for both agencies; maintenance and environmental compliance staff, the superintendent, and other park staff; DSC staff; the design consultant; and regional representatives, usually the Coordinator.

The project agreement (PA) describes the specific project requirements (scope), schedule, budget, and duties to be performed by the principal partners. Best practices for preparing project agreements are found in Appendix M. There are three types of project agreements, as follows:

- a. **Preliminary Project Agreement (PA)**—This document is prepared immediately after the scoping meeting. The project agreement confirms the project purpose and need and the issues known at



the time of scoping. The project agreement also documents the steps required to start project design and develop a better understanding of what is required. Preliminary project agreements are temporary documents and are not meant to be amended; they are signed by the project team. These preliminary agreements are then uploaded to the Park Roads and Parkways Transportation Allocation and Tracking System (PTATS)³⁰ to allow initial design funds (up to \$35,000) to be obligated to enable project work to begin while a comprehensive project agreement is prepared.

- b. **Comprehensive PA**—This document typically is prepared one to six months after the scoping meeting, when the project manager(s) can determine who will be doing what (roles); what will be produced (products and services); when these will occur (project schedule); and how much project planning, design, and construction will cost (project budget). The project scope should reflect issues that are fully developed, with problems and initial solutions identified. The comprehensive project agreement also commits the team to methods of resolving differences by including a decision escalation matrix, which identifies the individuals and timeframes for deciding a course of action.

The comprehensive project agreement enables all project funds to be authorized, which generally requires a higher level of signatories, such as the NPS regional director and FLH division engineer; the superintendent and project managers usually endorse the agreement, but in some NPS regions and divisions this endorsement authority is delegated. The comprehensive project agreement should be amended when scope, schedule, staffing, or budget change. The various types of amendments are described in detail in the guidance included in Appendix M.

- c. **Construction Amendment to the Comprehensive PA**—A comprehensive project agreement prepared early in the design life of a project is often less accurate about events late in the project development process. An amendment of the project agreement to accurately document the construction phase of a project is advisable. The purpose of this amendment is to identify the new roles and responsibilities that will be in place during the construction process as well as to affirm the scope of the project.

2. Project Management

Project management is an essential function in the development and implementation of construction projects. Because the two agencies are co-owners of the PRP Program delivery process, both agencies will assign a project manager to each project.³¹ Typically, the NPS project manager is responsible for environmental compliance, landscape architecture, and revegetation of disturbed sites, while the FLH division project manager is responsible for design and construction. However, if the Park Service is delivering the entire project, then all the responsibilities of design and construction are the Park Service's responsibility. The project manager is responsible for: managing the details of the project (scope, schedule, and budget); providing leadership by anticipating problems before they become serious and taking preventive action to mitigate their effects; ensuring effective communication; and ensuring that all the people involved in project delivery are on track, including any A/E (architectural and/or engineering) consultants.

Although project managers are usually not responsible for the actual delivery of a project element, they are responsible for

- developing the project agreements
- scheduling and facilitating design review meetings
- developing scopes of service for A/E contractors
- ensuring that all project development and technical services are in place
- being knowledgeable about general project details and sensitive issues
- managing the project schedule and budget
- managing the project scope
- being knowledgeable about program requirements and ensuring project compliance with the requirements
- understanding and implementing the project direction established by park and regional management
- building relationships with the client
- building relationships within the project team
- acting as an advocate for the project
- obtaining the endorsement of all stakeholders
- ensuring effective communication
- making presentations about project progress if required during regional work sessions

3. Design and Compliance Processes

If the project is to be delivered on schedule, the design process must be synchronized with the environmental compliance process (since the compliance process informs or influences the preferred alternative), revegetation planning, and landscape architectural design work. If one



activity gets significantly ahead or behind schedule, it can adversely affect project decision-making and budget. Refer to the matrix in Appendix L for a description of the major design and compliance activities, their sequence, and their interface with other NPS activities.

To finance work in any stage of a project, the region, park unit, FLH division, and DSC staff agree to costs for their part of the required work. Once the parties agree, funds are assigned (approved) as requested through PTATS. When funds other than NPS-appropriated funds are used, reimbursable agreements are executed between the agencies. These agreements are coordinated with both agencies' staff to ensure that proper documentation and billing occur, but funds are kept separate for accounting purposes. (See Chapter VI for detailed information on how to fund projects.)

C. CONSTRUCTION ENGINEERING

Construction engineering encompasses all work necessary to oversee the construction of the project from the point that the contract is awarded to the completion of construction and project acceptance. This includes such items as contract administration, construction inspection, and materials testing. The FLH division is typically the contracting office and responsible for the construction phase. However, when the Park Service decides to take responsibility for construction, the same basic procedures and requirements described below are followed.

1. Contract Administration

For construction projects, the FLH project manager may remain involved to clarify project design issues, but a contracting officer's technical representative (COTR, or for the Park Service contracting officer's representative or COR) or the project engineer will usually be on-site during construction. These individuals typically report direct-

ly to the construction operations engineer (COE). In this capacity, the construction operations engineer has authority for executing and administering FLH construction activities.³³ In general, all inspectors and other subordinates act on behalf of the contracting officer's technical representative, project engineer, and construction operations engineer, who in turn work directly with the contracting officer.

Because authority to agree to contract modifications or changes is reserved to the contracting officer, NPS contact with the contractor on contract issues should be exclusively through the contracting officer's technical representative, project engineer, construction operations engineer, or the contracting officer, as stated in the project agreement. The point to note here is that NPS personnel within a park **may not** direct the contractor in any way in regards to actions that may suggest the commitment of government funds. This does not preclude the Park Service from dealing directly with the contractor on non-contract issues, such as overweight permits, pollution regulations, speeding enforcement, or other park safety or resource issues. Proper communication channels for construction projects are usually discussed in detail with the contractor and all other interested parties during the pre-construction meeting.

The project manager or the project engineer should ensure that appropriate NPS staff (park, region, and possibly Denver Service Center) are closely involved in any significant discussions and decisions affecting the project. This is true from the initial design phases through the construction process. Significant changes that affect the amount of money needed to complete the project should be coordinated with the FLH programming section and the Coordinator. Under the 1983 agreement, contract changes also require the approval of the NPS regional director. Regardless of who is responsible for the construction phase, the Park Service—often through the Denver



Service Center—monitors construction and adherence to environmental commitments and the final PS&E and/or other agreements such as the revegetation of areas disturbed by the construction activity.

2. Construction Inspection

The project engineer is responsible for verifying and documenting that the project is constructed in conformity with the plans and specifications and in compliance with the terms of the contract. To accomplish this, the project engineer must conduct periodic inspection and testing as each phase or element of the work is completed.

Unless otherwise provided for in the plans or specifications, construction methods and sources of materials are the contractor's option as long as the end product fulfills the specified requirements and the contractor works only within the specified project limits. (In no circumstance, however, is the contractor allowed to borrow from a park source unless this has been previously agreed to.) The project engineer has the authority to reject both unsatisfactory workmanship and materials.

Qualified FLH staff, NPS staff, or contract inspectors will perform the construction inspection. Contract inspectors may confirm and document that the contractor is complying with the terms of the contract. The contract inspector may NOT provide direction to the construction contractor, or take any other action that could be construed as committing the government, although their recommendations to the project engineer, construction operations engineer, or contracting officer may result in corrective actions.

3. Materials Testing

Specific requirements for all materials are stated in the contract. The contractor is required to maintain an adequate inspection system and perform inspections to ensure that materials conform to the contract requirement. The project engineer or project inspectors should witness all testing when possible and should at least review all test reports for accuracy and completeness.

4. Environmental Monitoring

The environmental commitment summary describes all environmental requirements that were identified in the preliminary engineering phase. All natural and cultural resource commitments that are relevant to the construction work are included in the contract and are monitored by assigned FLH and NPS staff.

5. Revegetation

Any commitments to revegetation of the site, which are made as part of the preliminary engineering, are managed by the Park Service, primarily the Denver Service Center. The commitments may be a part of the construction contract or may be a separate action.

D. NET CONSTRUCTION

Net construction is the amount of money programmed for construction expenses of a project. The multiyear program of projects indicates the total net construction amount for each project. Approximately 60% to 65% of the regions' fiscal year allocation is programmed for construction. The items described below are construction expenses that must be covered by the net construction amount for a project. (This description assumes that Federal Lands Highways oversees construction; when the Park Service is responsible the same considerations pertain.)

1. Obligation of Funds

The FLH division obligates funds for construction when the PS&E documents are completed and endorsed by the NPS regional director and the FLH division engineer and funds are certified as available. The amount obligated is the engineer's estimate, incentives, and up to a 5% contingency. (However, a different point of obligation is used when NPS-appropriated funds are used, which is discussed in Chapter VI, section D.)

2. Construction Contract Award

When the contract is awarded, the obligation is adjusted to the award amount. If excess funds were obligated under paragraph C.1. above, they will be de-obligated. If additional funds are required to award the contract, the Coordinator will determine whether to program additional money from current-year funds or to not award the contract.

3. Contract Modifications

Contract modifications are negotiated to change the contract and make adjustments to the contract amount. Only contracting officers acting within the scope of their warrant are authorized to execute contract modifications on behalf of the contracting office.

Once the need for a contract modification has been identified, the project engineer should coordinate very closely with all of the parties who may have an interest in the modification. The NPS region approves all contract modifications. Substantial contract modifications³³ require

review and approval by both the region and NPS Washington Office (WASO).

Funds for proposed modifications can originate from two places:

- a. **Funds from within the Contract**—These are project funds that will not be used due to quantity underruns or unused incentives. Even though funds for a modification are provided by “within the contract” sources, the project manager must coordinate with the FLH programming staff and the Coordinator to ensure proper tracking of funds.
- b. **Funds from outside the Contract**—These are funds that are in addition to what has been obligated for the project. The project manager must coordinate with the FLH programming staff to ensure that funds are available. The FLH programming staff will work with the Coordinator to determine the source of the needed funds. Contract modifications may affect other projects in the current fiscal year or future projects.

4. Quantity Overruns

When an overrun on an estimate clearly will impact the budget of the project, the construction operations engineer notifies the contracting officer and the FLH programming staff as soon as possible so that appropriate adjustments can be made. FLH programming staff will confer with the Coordinator to determine the source of funds. (This process is described in more detail in Chapter VI, section D.4.)

5. Right-of-Way

Right-of-way acquisition is generally not needed on PRP projects. When right-of-way is needed, park staff usually coordinate the acquisition.

6. Utilities

Utility work is done through reimbursable agreements. The Federal Highway Administration usually coordinates the reimbursable agreements for utility work.

7. Traffic Control

Traffic control plans are developed in preliminary engineering and must be implemented by the contractor, the park, or both, as indicated in the plan. Traffic control requires close cooperation with the park in any case.

8. Archiving As-Built Plans/Drawings

The contractor is required to submit two sets of as-built plans to the FLH division construction branch at the completion of a construction project. These are “hard copies” (paper copies) at the present time.

After the as-built plans are verified as accurate by the FLH division construction branch, they are sent to the FLH project development branch. The FLH division project development branch creates an electronic version of the as-built plans. They are responsible for archiving and distributing the plans.

For PRP projects, the distribution to the National Park Service will include the following:

- a. the park unit in which the work was done (one hard copy and one electronic version)
- b. the NPS Denver Service Center, c/o Technical Information Center (one hard copy and one electronic version)

The Technical Information Center is responsible for archiving the plans in the appropriate format for NPS use.

²⁹ Park or park unit refers to the about 390 national park system properties, such as national parks, seashores, monuments, trails, historic sites, battlefields, etc.

³⁰ The PTATS database currently resides on a site administered by the database development contractor. In the future, the database will be accessible through the NPS Intranet. The current site location is www.dtec.com/flhp. See Appendix F for the PTATS Operating Manual. PTATs was initially known as the Master Budget Sheet, or MBS.

³¹ In some cases, regions have used a single project manager, but typically the project manager responsibility is shared by the two agencies.

³² It should be noted that although only the contracting officer may make contractual commitments for the government, some construction operations engineers do have limited warrants, say for changes up to \$25,000. The contracting officer is the ultimate person responsible for making not only the financial contractual commitments on behalf of the government, but may also direct the contractor to certain actions, stop work, etc. Of course, the contracting officer is advised by the field people observing and interacting with the contractor on a daily basis (contracting officer's technical representative, contracting officer's representative, project engineer, construction operations engineer).

³³ Substantial is defined as 5% of net construction cost, or a modification that, in combination with earlier or anticipated modifications, will equal or exceed 5% of net construction.