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DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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MANUAL TRANSMITTAL SHEET

Subject

9102 – Facility Design (Public)

1. Explanation of Materials Transmitted: This release revises BLM Manual Section 9102 with the latest updates and current policy on the responsibilities, policies, and procedures for Facility Design.

2. Reports Required: None.

3. Material Superseded: Facility Design Rel. 9-322

4. Filing Instructions: File as directed below.

REMOVE	INSERT
All of Facility Design (Rel 9-322) (Total: 33 pages)	All of 9102 (Total 24 sheets)

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Contents

1. Overview

1.1. Purpose

This manual section contains the responsibilities, policies, and procedures for design used within the Bureau of Land Management (BLM) to manage resources and facilities.

1.2. Objectives

The objectives are to:

A. Identify the role each organizational unit plays in providing architectural and engineering expertise for facility design within the BLM.

B. Provide direction for the most efficient use of design skills throughout the BLM.

1.3. Authority

See Manual 9100 Facility Planning, Design, Construction, and Maintenance, Section .03 - Authority and Appendix A – Abstract of Authorities Cited.

1.4. Responsibility

The responsibilities described below are commensurate with the responsibilities identified in Manual Section 9100.04 Facility Planning, Design, Construction, and Maintenance – Responsibility and Manual Section 1203 – Delegation of Authority, Appendix 1.

A. The Chief, Engineering and Asset Management Policy Branch (Washington Office (WO)), Division of Business Resources, is responsible for:

1. Developing and overseeing the BLM policies and procedures for accomplishing the design of all facilities constructed on BLM public lands, including but not limited to:

a. Value Engineering (VE).
b. Development and participation in Technical Procedure Reviews.
c. Americans with Disabilities Act/Architectural Barriers Act (ADA/ABA) and Section 504 of the Rehabilitation Act of 1973 and 43 CFR part 17.
d. BLM Sustainable Buildings Implementation Plan.
e. BLM Construction Investment Review Board (CIRB).
f. Credentialing and certification.
g. Five-Year Deferred Maintenance/Capital Improvement Planning Guidance.

2. Participating in setting the BLM priorities for the design of BLM facilities.

3. Developing guidance for the BLM 5-year Deferred Maintenance/Capital Improvement Plan.

B. The Chief, Branch of Architecture and Engineering (A&E), Division of Business Services, National Operations Center (NOC), is responsible for:

1. Providing designs of facilities and major structures when states do not have the capability or capacity to do so, when requested by the state engineers, or their designated representative.

2. Providing comprehensive, independent engineering reviews of designs prepared by other BLM offices or architect engineer (AE) firms, when requested by the state engineers, or their designated representative.

3. Providing construction contract administration assistance on facilities and major structures when states do not have the capability or capacity to do so.

4. Providing development and administrative assistance for National AE contracts, upon request.

5. Developing operation and maintenance manuals for facilities, when requested by state engineers, or their designated representative.

6. Providing architecture or engineering scarce/specialized skills not typically available to the state, district, or field offices, when requested by state engineers, or their designated representative.

7. Preparing, providing, and approving AE technical operational support and guidance on standard specifications.

8. Review and approval of designs prepared by the NOC.

9. Preparing, providing, and approving AE technical operational support and guidance on computer aided drafting (CAD) standards.

10. Providing expertise, coordination, and operational oversight of BLM-wide Engineering Programs for Bridge Safety, Seismic Safety, Accessibility, Energy and Water Conservation (Sustainability), Commissioning, Value Engineering, and Compliance Assessment - Safety, Health, and the Environment.

11. Ensuring that only qualified designers are assigned to the BLM facilities being designed within the NOC.

12. Assisting the WO in developing guidance for the BLM Five-Year Deferred

Maintenance/Capital Improvement Plan.

13. Providing independent engineering reviews, as requested by the contracting officer (CO), of solicitations for the construction and maintenance of facilities issued through the NOC.

C. The state engineer in each state is responsible for:

1. Providing guidance and support to the districts in design and review of the BLM facilities and non-BLM facilities, constructed on BLM lands.

2. Participating in the setting of state priorities for the design of the BLM facilities.

3. Providing assistance to district or field offices, upon request.

4. Ensuring that a comprehensive engineering technical review is conducted for all facility designs.

5. Review of the NOC or contracted designs to ensure compatibility with the scope and needs of management.

6. Approving district-designed facilities when other than BLM standard drawings and specifications are used.

7. Review and approval of state office prepared designs.

8. Reviewing solicitations for the construction and maintenance of facilities issued through the state office or the NOC.

9. Identifying and requesting necessary architecture and engineering assistance.

10. Ensuring that only qualified designers are assigned to BLM facilities being designed within the state.

11. Recommending improvements and revisions to standard drawings and guide specifications.

12. Identify projects that projects over the $1,000,000 threshold and other projects over $500K which are appropriate, receive a VE study.

13. Ensuring that CAD drawings are maintained to BLM standards.

14. Developing the state Five-Year Deferred Maintenance/Capital Improvement Project Plans and participating in the BLM annual review.

D. The district manager or field manager, as appropriate, is responsible for:

1. Ensuring completion of facility survey and design by providing or obtaining engineering assistance to assure adequacy of design for all facilities constructed on public lands.

2. Ensuring project designs are within available funds.

3. Ensuring design prepared by either the NOC personnel or AE firms are compatible with the scope, budget, and needs of management.

4. Ensuring facility designs for force account and special employment programs are prepared and compatible with scope, budget and needs of management.

5. Ensuring that district personnel are adequately instructed in operation and maintenance procedures for facility systems.

6. Recommending projects plans to the state engineer for the BLM Five-Year Deferred Maintenance/Capital Improvement Project Plan.

E. The Director, National Interagency Fire Center (NIFC), is responsible for:

1. Ensuring completion of the NIFC survey and design by providing or obtaining engineering assistance to assure adequacy of design for all facilities constructed on public lands.

2. Ensuring project designs are within available funds.

3. Ensuring design prepared by either the NOC personnel or AE firms are compatible with the scope, budget, and needs of management.

4. Developing and approving the NIFC Five-Year Deferred Maintenance/Capital Improvement Project Plans and participating in the BLM annual review meeting.

F. The district engineer, field engineer, zone engineer, or other engineer as designated by the responsible line manager, is responsible for:

1. Ensuring completion of facility survey and design by providing or obtaining engineering assistance to assure adequacy of design for all facilities constructed on public lands.

2. Ensuring project designs are within available funds.

3. Ensuring design prepared by either the NOC personnel or AE firms are compatible with the scope, budget, and needs of management.

4. Developing facility designs for force account and special employment programs.

5. Ensuring that district personnel are adequately instructed in operation and maintenance procedures for facility systems.

6. Developing Five-Year Deferred Maintenance/Capital Improvement Project Plans and providing to the district/field office manager.

1.5. Policy

See also Manual Section 9100.05 Facility Planning, Design, Construction, and Maintenance – Policy. It is the BLM policy that:

A. Facility designs receive a comprehensive independent engineering review prior to issuance of the solicitations or beginning construction.

B. Environmental compliance shall be incorporated into the design of BLM facilities.

C. Provisions for ADA/ABA and Section 504 of the Rehabilitation Act of 1973 and 43 CFR Part 17 are to be incorporated in BLM facilities.

D. Facilities shall be designed using energy conservation principles, incorporating energy-efficient components, providing a safe and healthy environment for employees and the visiting public. Facilities greater the $2,000,000 shall incorporate the BLM Sustainable Buildings Implementation Plan.

E. Energy and water consuming facilities shall be designed to meter consumption of individual buildings. Additional Federal regulations that must be adhered to include:

1. EPAct 2005 Section 103. Electrical energy use in Federal buildings shall be metered with advanced meters "...for the purposes of efficient energy use and reduction in the cost of electricity used in such buildings..." by October 1, 2012. Advanced meters or metering devices must upload stored data at least daily and measure the consumption of electricity at least hourly. Current the BLM policy is to install advanced meters on all BLM-owned facilities that use more than $20,000 of electricity per year.

2. EISA 2007 Section 434(b). In addition to installing advanced metering for electricity use, each Federal agency shall provide for equivalent advanced metering of natural gas and steam no later than October 1, 2016.

F. All deferred maintenance and construction projects will be submitted through the Five-Year Deferred Maintenance/Capital Improvement Plan process, with the exception of congressionally mandated projects.

G. All deferred maintenance and construction projects will be submitted and approved

through the CIRB, with the exception of congressionally mandated projects.

H. All facilities shall incorporate the principles described in the Guidelines for the Quality Built Environment.

I. A registered professional engineer must give final approval to designs of major structures and/or those that affect public health and safety.

J. All projects greater than $1,000,000 requires a value engineering review.

1.6. File and Records Maintenance

The various reports, studies, plans and specifications, calculations and narrative(s) generated during the design process of a project are to be filed in a project design file. This file is established for the use of the facility and shall be maintained in the office responsible for administering that facility. Files are arranged, maintained, and disposed of in conformance with the appropriate BLM records schedule in accordance with Manual Section 1270 – Records Administration.

1.7. Relationship to the BLM Planning Systems.

The design process outlined in this manual section normally begins after the Activity Plan has been prepared. However, facility design cannot begin until the design narrative has been completed.

1.8. Intergovernmental Cooperation

BLM facilities are generally designed in conformance with Federal, state, and local laws, codes, and regulations, including land use plans.

2. Design Process

The design process is part of a systematic sequence of planning, design, and construction steps that, when followed, should produce a quality facility. As defined in the BLM's Guidelines for a Quality Built Environment, "each step in the process should flow smoothly into the next, and ensure that informed decisions and approvals are made in a sequential order." The design process consists of three distinct phases of work: pre-design, preliminary design and construction contract documents.

2.1. Design Phases

The work accomplished under each phase of design is summarized as follows:

A. Pre-Design: This phase is critical to ensuring that all requirements of a project are identified in the project narrative. During the pre-design phase, design concepts and alternatives are explored and developed, and a preferred alternative is generally selected.

B. Preliminary Design: During the preliminary design phase, the preferred alternative is refined, and material and system selections are made to ensure their appropriateness, and detailed construction cost estimates are prepared, such that basic decisions about the contracting methods and procedures can be made prior to preparation of the construction contract documents.

C. Construction Documents: Detailed drawings, specifications, and cost estimates are further refined and developed during the construction document stage, and the final construction contract documents are completed. The final independent government estimate (sometimes called the "IGE") is prepared and summarized in the same format as the Contract Bid Schedule.

Sequential Design Activities - Illustration 1, defines the tasks which may be considered during the design process.

2.2. Methods of Accomplishing Design.

As described in the Federal Acquisition Regulation (FAR) Part 36, there are many methods of accomplishing facilities designs for the BLM. The primary methods of design used by the BLM are discussed below:

A. Design–Bid–Build. First, either an AE firm is selected to design the project or the design is done with in-house (BLM) resources. The design work will include preparing specifications, drawings, construction cost estimate, and supporting documents during the first phase of the work. The project is then bid based on contract documents and a detailed

estimate of construction costs or "IGE." Once the design is approved by the BLM, it is advertised for competitive bids, and a contract is awarded to a construction firm to build the project based on the complete detailed design. If design services are contracted to an AE firm, the design firm cannot be selected as the construction contractor. The designer may only assist in the construction administration phase of work under a separate contract with the government.

B. Design-Build. In the design-build process, one firm is selected to perform both design and construction. This process may be accomplished through one of the following:

1. The use of two-phase design-build selection procedures (FAR Part 36).

2. Source selection/competitive negotiations (FAR Part 15).

3. Sealed bidding (or two-step sealed bidding) (FAR Part14).

A construction firm will typically subcontract the design, but will perform the construction phase themselves. This type of contract is often performed by joint ventures. Although a facility is designed during the design-build contracting, the 6% statutory fee limitation is not applicable to the design-build process.

C. Design Competition. Design competition is a type of design-bid-build; however, it is addressed separately in the FAR. Design competition is normally used in unique situations involving prestige projects, such as the design of memorials and structures of significant national significance. In design competition, firms or individuals are requested to submit a conceptual design of what the project will look like, and the selection is made based upon competitive evaluation factors in the Request for Proposal. Use of competition must be approved by the BLM Director or a designee.

2.3. Sources

Facility design is accomplished by in-house, by contract, or by other agreements.

A. In-house. BLM designs shall be accomplished by skilled staff trained in the specific project type. For example, a structural or bridge engineer would be trained and knowledgeable in the design of bridges.

B. Contract. Facilities may be designed by AE firms. This design service requires the same procedures as a design created by BLM employees. Architectural and engineering services may include:

1. All professional services directly associated with the production and delivery of drawings, specifications, and cost estimates to be used in the construction contract.

2. Site specific information such as: field surveys, property boundary surveys,

rights-of-way surveys, flow gauging, and specialized geotechnical investigations. Employment of consultants, and travel expenses are included in obtaining this information.

C. Other Agreements. Some facilities may be designed by others, such as the Federal Highway Administration (FHWA). When designed by others, the BLM maintains design approval responsibility. Design by this method requires the same procedures as if the design were produced by BLM employees.

2.4. Special Design Requirements

Various regulations and requirements affect the design of the BLM facilities.

A. Quality Built Environment A quality built environment displays many attributes, including:

1. Responsive to place and setting.
2. Environmentally and culturally sustainable.
3. Functional and attractive to both staff and visitors.
4. Universally accessible.
5. Economically responsible, including long-term operations and maintenance.
6. Beneficial to the public health and well-being.

B. Accessibility. Provisions for users with disabilities must conform to the ADA/ABA and Section 504 of the Rehabilitation Act of 1973 and 43 CFR Part 17. Provisions for individuals with disabilities are to be incorporated into the design of BLM facilities. The entire system must be evaluated as part of the design.

C. Energy Conservation. Facilities being designed must comply with all applicable Federal energy regulations, including:

1. EPAct 2005 Section 109. New Federal buildings (commercial or residential) shall be designed such that they consume 30% less energy (20% less for renovations) than buildings that meet the requirements of ASHRAE 90.1-2004 or the 2004 IECC (International Energy Conservation Code), where life-cycle cost effective.

2. EISA 2007 Section 433. New Federal buildings and Federal buildings undergoing major renovations shall be designed such that fossil fuel-generated energy consumption is reduced (as compared with such energy consumption by a similar building in fiscal year 2003).

3. EISA 2007 Section 434. Each Federal agency shall ensure that major replacements of installed equipment (such as heating and cooling systems), or renovation or expansion of existing spaces employ the most energy-efficient

designs, systems, equipment, and controls that are life-cycle cost effective.

4. EISA 2007 Section 523. 30% of the domestic hot water heating energy use in new Federal buildings and Federal buildings undergoing major renovations shall be offset with solar water heating equipment, where life-cycle cost effective.

5. Executive Order 13514. Federal agencies must ensure that all new Federal buildings entering the design phase in 2020 or later are designed to achieve zero net energy use by 2030. New construction, major renovations, or repair or alteration of Federal buildings must comply with the Guiding Principles, and at least 15% of existing agency buildings and leases (above 5,000 gross square feet) must meet the Guiding Principles by fiscal year 2015, with the agency making annual progress towards 100% compliance across its building inventory.

D. Fish and Wildlife Concerns. The design should consider the impacts the facility has on fish and wildlife, migration routes, habitat fragmentation, and particularly on sensitive species and their habitats, and both local and physical factors that affect the location and construction of a project. Fences, culverts, and other potential barriers to wildlife must be designed in a manner to ensure wildlife and fish passage.

E. Safety and Health. Facilities being designed, regardless of the method of accomplishment, must have safety features as an integral part of the design. Designers must be familiar with the safety standards found in 29 CFR 1910 – Occupational Safety and Health Standards as they apply to the particular type of facility being designed. Construction activities and signing must conform to 29 CFR 1926 – Safety and Health Regulations for Construction.

2.5. Maintenance Considerations During Design

The designer of a facility should consider the cost of maintenance and the expertise of personnel who will maintain the facility. The personnel who are involved in the maintenance of a facility should be involved in the review of the design to provide operational feedback to the designer.

A. Materials and Equipment. As materials are selected during the design of a facility, consider the maintenance characteristics of the materials and equipment specified. Both initial cost and maintenance costs of the materials are considered. It is possible that a high initial cost may be offset by low maintenance costs. The materials and equipment selected must be the most economical for the life of the project. Equipment and materials should be selected to match the skill level of personnel performing the maintenance and operation of the facility. For example, complicated mechanical equipment is not desirable when the skills necessary to maintain the system are not available.

B. Sustainability. To promote the health of the public and our employees and minimize

potential impacts of our mission activities on the environment, each office of the BLM will incorporate sustainable and high-performance design principles in the planning, acquiring, siting, designing, building, operating, maintaining and decommissioning of all facilities.

"Executive Order (EO) 13514 requires Federal agencies take actions "ensuring that at least 15 percent of the agency's existing buildings (above 5,000 gross square feet) and building leases (above 5,000 gross square feet) meet the Guiding Principles by fiscal year 2015 and that the agency makes annual process toward 100-percent conformance with the Guiding Principles for its building inventory." After the issuance of EO 13514, the Guiding Principles were revised and reissued in December 2008 to clarify how they specifically apply to existing buildings versus new construction/major renovations. The five Guiding Principles for existing buildings are:

i. Employ Integrated Assessment, Operation, and Management Principles
ii. Optimize Energy Performance
iii. Protect and Conserve Water
iv. Enhance Indoor Environmental Quality
v. Reduce Environmental Impact of Materials

2.6. VE Study

The BLM shall follow the guidance contained in the Department Manual (369 DM 1) on VE and Analysis. Construction projects that meet or exceed $1,000,000 require a VE study. VE for construction projects exceeding $500,000 is recommended, but not required.

A. VE Considerations During Design. VE is defined as the well-organized process of evaluating an item, a project, a process or system for the purpose of achieving the required function at the optimum value and cost. VE is not a simple cost cutting technique where performance, reliability, quality, maintainability, or safety of the project is sacrificed. The objective of Value Engineering is to reduce costs while maintaining the required performance and functionality of the facility or project. In planning a VE study, keep in mind that the logical point to conduct a study occurs midway through design development (typically around 30 percent), although the characteristics of a project may dictate otherwise.

B. VE Team. The optimum VE study team consists of team members with interdisciplinary skills specific to the project. A trained VE leader and at least half or more of the team members should have completed the basic 40 hour VE training. Individuals directly involved with the design of the project should not be used as team members, although they should be available "on Call" to answer questions.

2.7. Design Responsibilities

The design responsibilities and related actions are described in Table 1 - Design Responsibility Table.

2.8. Design Review

A review of the facility design by both technical and management personnel is conducted at predetermined points during the design process. Management reviews the design to determine if it meets the user objectives identified in the design narrative. Reviews shall include project cost and schedule, environmental compatibility, and esthetics. The staff specialists/engineers determine if the design meets facility life requirements and is technically adequate. A design is inadequate if it fails to satisfy safety, environmental, health, and fire protection requirements. These reviews are done to the degree consistent with the size and complexity of the facility.

A. Comprehensive Independent Engineering Review. Designs shall receive comprehensive independent engineering reviews at key milestones to assure that professional techniques and procedures were applied. This includes the accuracy of the drawings, specifications, and estimates. Consistency of reviewers reduces the possibility of inconsistent comments. In addition to marked-up drawings and specifications, the reviewer prepares written comments in the following format:

1. Lead-In Paragraph. A lead-in paragraph pertaining to the overall quality of the drawings, specifications, and design standards is required.

2. Recommended Changes. This listing includes items the reviewer feels should be changed; but, if not accomplished, would not necessarily result in an inadequate design. The purpose of this part of the review is to point out alternatives that may not have been considered. These items are recommendations and should be give full consideration by the designer.

3. Required Changes. The reviewer makes a listing of items, if any, that must be corrected. These may be the result of mathematical error, incorrect interpretation of data, invalid assumptions, improper application of various formulas, new developments in a particular field, code violations, etc. These items must be corrected unless engineering facts indicate otherwise. If the reviewer and designer cannot agree upon changes, the problem is arbitrated by the next higher level of responsibility prior to solicitation or beginning work.

4. Copy of Marked-up Drawings and Specifications. A copy of the marked-up drawings and specifications should accompany the written comments under separate cover to help report and clarify the review findings. Many of the comments and corrections shown on the mark-up may be minor and should not be repeated in the written review findings.

5. Designer Feedback to Reviewer. The designer reviews comments made by the reviewer and provides feedback, or action, to resolve recommended and required

changes.

2.9. Communication During Construction

Close coordination between design and construction personnel is essential to assure that the design intent is carried out and that site/field conditions acquired during construction are incorporated into the design. A lack of communication among designers, builders, and inspectors may cause problems during project construction. Designers should be involved in the construction process in order to assure that site/field conditions are compatible with design conditions.

3. Specifications

The specifications provide, in writing, the engineering and technical requirements which may or may not be shown on the drawings. Specifications, in some form, are required for all work, services, or commodities, ranging from the simplest fence to a complex building or recreation site. All BLM construction specifications are to be written in the Construction Specification Institutes (CSI) format, except bridge specifications, which are written using the format of the current edition of the "Standard Specifications for Roads and Bridges on Federal Highways" (FP). Road contracts can be in either CSI or FP format.

3.1. Relationship Between Drawings and Specifications.

The specifications are the written instructions to the builder. The drawings are the pictorial instructions showing the physical detail of the work. The drawings and specifications should clearly define the units and details of the work to be performed.

3.2. General Provisions.

These portions of the specifications are designed for use when work is accomplished by contract. They establish the terms of the relationship between the BLM and the contractor. When work is accomplished by means other than contracting, these provisions of the specifications are usually not applicable. In the BLM practice, the CO prepares the administrative provisions.

3.3. Technical Specifications

Technical specifications are prepared separately from the general provisions. These specifications are normally prepared by the designer. Technical specifications describe, in writing, the minimum quality and standards of materials, processes, and workmanship that are required to be acceptable.

3.4. Guidelines for Specification Writing.

Specifications must present a clear, complete, and accurate written description of the government's minimum requirements.

A. Basic Rules. There are several basic rules that apply to the use of specifications and drawings.

1. Complementary Information. The specifications and drawings complement each other. Therefore, what is included in one need not be repeated in the other. Repetition of information should only be used for clarity and should be kept to an absolute minimum to avoid the possibility of error or ambiguity.

2. Equal Applicability. A standard rule is that if something is included in either the

specification or drawings, but not in both, it applies to both. For example, a drawing shows a vent fan, but a written description is not found in the specifications. The fan is still a contract requirement and must be installed by the contractor.

3. Specifications Govern. In the case of discrepancy between the drawings and the specifications, the specifications take precedence.

B. Preparation. Considering the general rules set forth in 3.4A – Basic Rules, the specification writer and designers must be familiar with the techniques involved in the proposed project or job. They also need to know what is needed in order to assure that the Government's minimum requirements are met.

C. Reference Specifications. These specifications are incorporated by reference rather than by being shown. These are published specifications and standards which are available to many users. They may be prepared by commercial and industrial agencies, and many are prepared by Federal agencies, including the BLM. There are reference specifications published by the various building industries, trade industries, and testing organizations. All of these reference specifications show the preferred method of testing materials, minimum quality standards, and other information which can be used by a designer. Such specifications should be used whenever possible as they apply to BLM work or commodities.

1. Proper Use of Reference Specifications. Proper use can eliminate many hours of original writing and minimize the intrusion of legal and technical error into an otherwise good specification. Reference specifications must be carefully reviewed by the designer to assure that the BLM's minimum requirements are adequately covered.

When the specification meets BLM needs, the designer simply selects available options and lists the number of the specification and its source. If the BLM’s requirements call for deviations from portions of the specification, refer to the section number affected and describe the deviation in detail. Care must be taken to assure that a deviation does not cause a conflict within the specifications as a whole. When a reference is made to other source specifications, the inspector must have access to those specifications. Refer to the fewest number of specification sources possible. Do not refer to specification sources that are not well known and universally used. The preferred source is industry standards. It is often better and simpler to include the applicable portion of a reference specification in the narrative than to refer to a specification from an outside source.

4. Construction Drawings

Construction drawings provide physical dimension layouts, assembly details, and installation instructions for the work to be accomplished. The designer shall refer to the National CAD Standards and the BLM Supplemental Guide to the National CAD Standards for drawing protocols.

4.1. Approval

More than one approving signature may be needed. The signature and title of the engineer responsible for the design must appear on the drawing. The signatures and titles of other staff specialists, as appropriate, may also appear on the drawing. Approval signatures indicate that professional techniques and procedures were applied to the design.

5. Cost Estimates.

Cost estimates are prepared for the work that is to be accomplished. Cost estimates are used to determine the cost to the government for completing the work. They are based upon the most economical and efficient manner of performing the work. See TR-9101-1 Five-Year Deferred Maintenance/Capital Improvement Planning Guidance.

5.1. Classes of Construction Cost Estimates.

A. Class A - Construction Drawings and Specifications Complete - This estimate is based on complete quantity take-off from completed construction drawings and on specifications ready for a competitive bid. It reflects the best available estimate of construction costs based on a competitive bid situation.

B. Class B - Design Development Complete - This estimate is based on the development of the selected alternative and tentative bid schedule items, either lump sum or unit price. It uses quantities based on design drawings. At the end of design development, the project should be developed in sufficient detail to demonstrate that the design will fulfill the functional and technical requirements of the project. This is the first time in the planning and design process where a project construction cost estimate is accurate enough to support a budget request.

C. Class C - Planning Complete - This estimate is a conceptual cost estimate based on square footage or other unit cost of similar construction. The project identification/feasibility process should result in a description of facility goals, objectives, and needs and the information needed to evaluate the feasibility of the project and provide a preliminary project cost range and initial project schedule. This description is used to request future planning and engineering design funds only. The engineering design process is considered approximately 15 percent complete at the end of this schematic design.

D. Class D - Pre-Planning Complete - This estimate is based on a tentative project design with project size and complexity that is still experiencing significant development.

5.2. Total Estimated Construction Cost

Use the following steps to determine this cost:

Step 1. Determine the *Estimated Construction Cost*. This cost includes all contractor labor, material, and equipment costs associated with the construction of the project.

Step 2. Determine *Construction Overhead*. This cost is typically 15% of the *Estimated Construction Cost.*

Step 3. Determine *Construction Profit*. The *Construction Profit* is typically 10% of the *Estimated Construction Cost.*

Step 4. Determine *Commissioning.* The *Commissioning* is typically 2% of the cost of the individual commissionable equipment. For complete building construction, 0.8 – 1.0 % of the *Estimated Construction Cost* is typically used, depending on the complexity of the facility. Commissioning would be used for projects that would have commissionable assets. These assets might include major mechanical, electrical or plumbing systems.

Step 5. Determine *Estimating Contingency*. *Estimating contingency* is required to adjust the cost for circumstances not foreseen. To determine the contingency the following percentages, based on the Class of Estimate shown below, shall be multiplied by the sum of the *Estimated Construction Cost, Construction Overhead, Construction Profit,* and *Commissioning Costs:*

Class A Estimate	5%
Class B Estimate	10%
Class C Estimate	15%
Class D Estimate	20%

Step 6. The *Total Estimated Construction Cost* is the sum of the *Estimated Construction Cost, Construction Overhead, Construction Profit, Commissioning* and *Estimating Contingency*. These costs are used to determine the Government Construction Cost Estimate. The Project Bid Schedule is determined by separating similar elements of a construction project to allow further definition of construction costs within a contractor's construction cost estimate.

Illustration 1 - Sequential Design Activities

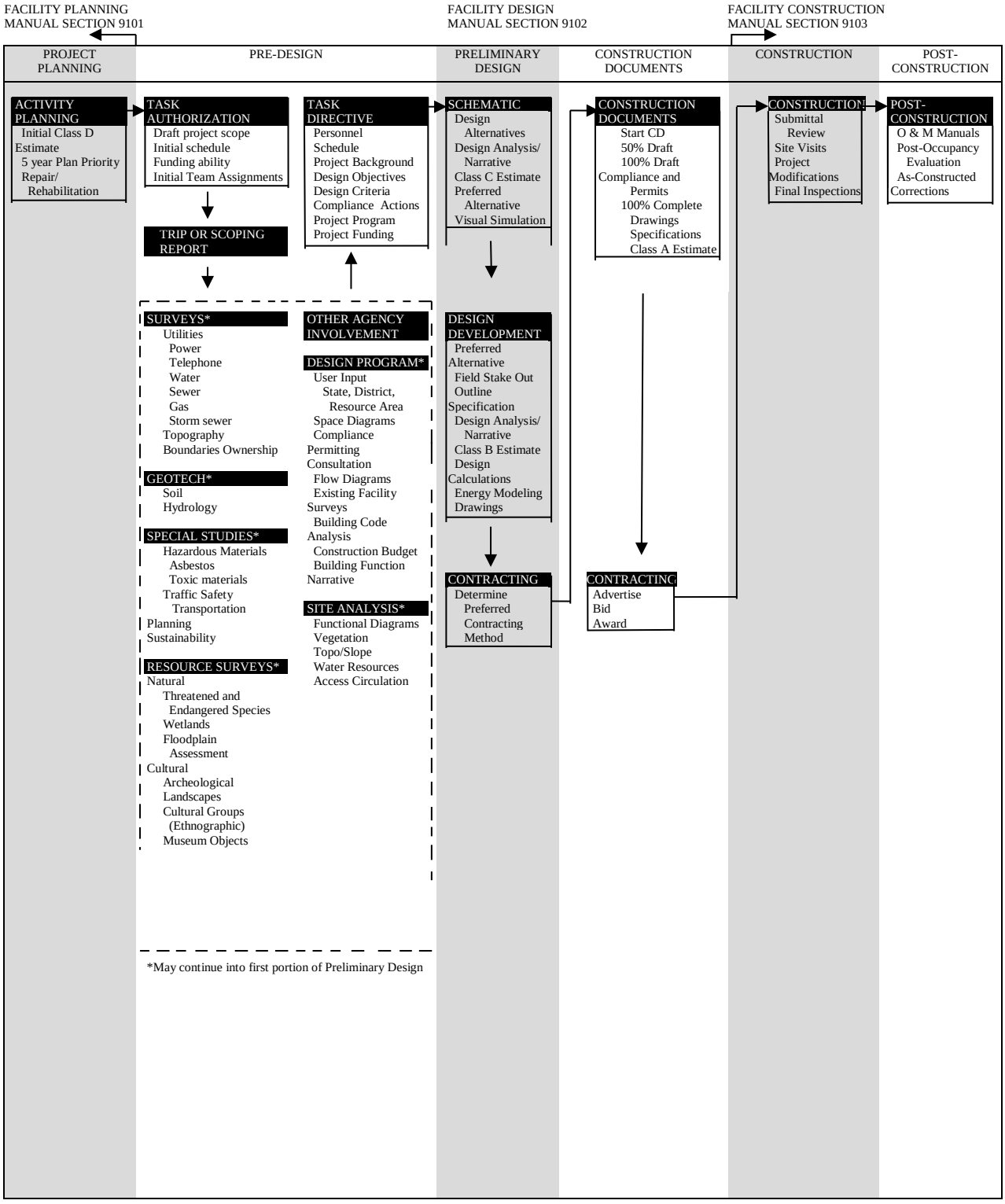

Illustration 2- Design Responsibility Flow Chart

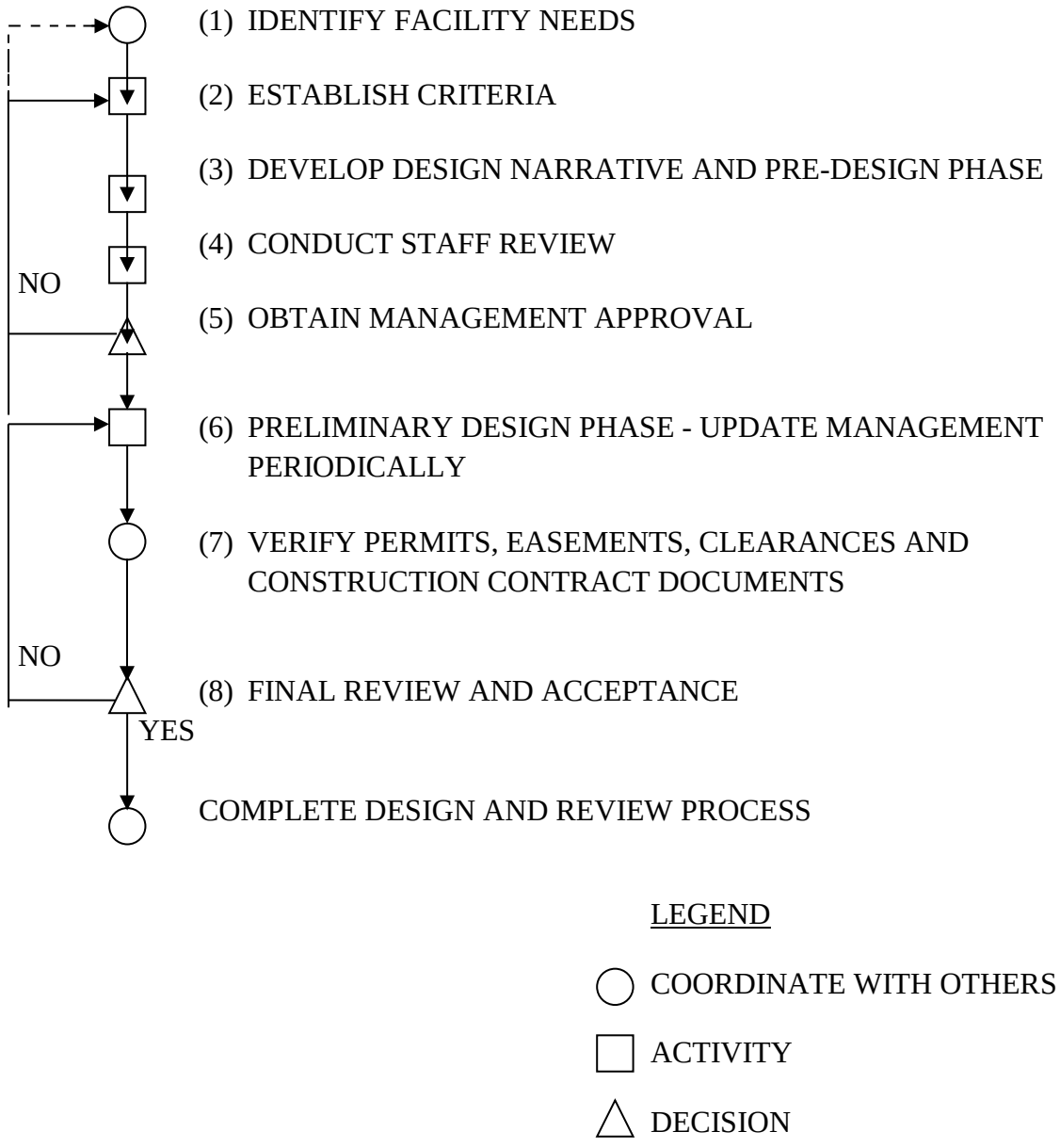

Table 1- Design Responsibility Table

Responsible Office/Official	Step	Action
Originators	1.	Identify Facility Needs. Determine the need for a facility through the Bureau Planning System. See Manual Section 9100 – Facility Planning, Design, Construction, and Maintenance - Architect's and Engineer's Role in the Land Use Planning System, and Manual Section 9101 – Facility Planning.
Originators	2.	Establish Criteria. In consultation with engineers, interdisciplinary teams, and managers, develop the design criteria. Submit requirements to designers. See Manual Section 9101 – Facility Planning.
Designers	3.	Develop Design Narrative and Pre-Design Phase. Develop the Design Narrative to determine the type of facility to be designed. Select the design standards which are adjusted for other considerations such as erosion prevention, legal right-of-way, safety, esthetics, environmental stipulations, user requirements, and construction costs unique to the area to develop conceptual plans. Prepare the conceptual plans which may be minimal or complex, depending on the scope and nature of the project. See Manual Section 9101 – Facility Planning.
Originators	4.	Conduct Staff Review. Consult technical personnel, the user, designers, and management to determine if the conceptual plans meet the requirements and are technically feasible.
Managers	5.	Obtain Management Approval. When satisfied with the concept and technical feasibility of the project are developed, proceed with management approval.
Managers	5a.	If not satisfied, return to Step 2 for reassessment and a fresh start. This may include a field review and a reexamination of the facility needs and management's requirements.
Managers	5b.	If the project had previously been identified as a candidate project for a VE study, timeframes and focus of the study should be identified.
Designers/Interdisciplinary Teams	6.	Preliminary Design Phase. Proceed with the development of the facility design. Obtain management, engineers, and interdisciplinary team review at the predetermined stages identified in the Design Narrative. VE or investment analysis would normally be completed during this phase.
Designers/Interdisciplinary Teams	7.	Verification of Permits, Easements, Clearances and Construction Contract Documents. Check with staff

		specialists to ensure items such as easements, water rights, permits, budgeting, inter-governmental clearances, and National Environmental Policy Act have been or are being obtained before beginning Construction Contract Documents. Prior to completion of the Final Design a comprehensive independent engineering review shall be completed
Managers	8.	Final Review and Acceptance. Technical managers review design to ensure that the facility is technically adequate. Administrative managers assure that the end product will meet management's requirements. If approving, obtain appropriate signatures on title sheet. Submit drawings, specifications, and an IGE to the CO.
Managers	8a.	If disapproving, return to designers who consider management recommendations, incorporate into the design, and repeat the process.