

## CHAPTER I

### GENERAL

#### TABLE OF CONTENTS

1. PURPOSE
  - 1.1 Scope
  - 1.2 Application
2. GENERAL
3. METRIC UNITS
4. DESIGN POLICY
  - 4.1 Reference
  - 4.2 HQUSACE Design Policy
  - 4.3 CESWD Design Policy
  - 4.4 Programming and Budgeting
  - 4.5 Design-Bid-Build with A-E's as Design Agents
  - 4.6 Design-Build with a single Contractor
5. PROJECT CRITERIA
  - 5.1 Functional Criteria
  - 5.2 Economic Criteria
  - 5.3 Environmental Criteria
  - 5.4 Technical Criteria
6. TYPES OF DESIGN
  - 6.1 New Design
  - 6.2 Site Adapted Designs
  - 6.3 Standard Designs
  - 6.4 DA Standard Designs
  - 6.5 Renovation Projects and Additions
7. SPECIAL INSTRUCTIONS

## CHAPTER I

### GENERAL

1. **PURPOSE**: The purpose of the Architectural and Engineering Instruction Manual (AEIM) is to provide general design guidance to Architect Engineers (A-E's) working as design agents providing services, designs, construction drawings and specifications pursuant to a contract with Corps of Engineers District Offices located in the Southwestern Division. These Instructions are written for the purpose of assisting designers in the preparation of design documents for military construction and, in as far as is applicable, for civil works construction. The AEIM format is for design using design-bid-build acquisition method as defined in paragraph 4.5 of this chapter. Design guidance in the AEIM is also generally applicable to District design performed by "in-house" Corps of Engineers designers. Technical criteria are also applicable as required by the project Request for Proposal (RFP) for design accomplished under the design-build method as defined in paragraph 4.6 of this chapter. A project RFP may include Performance and/or Prescriptive specifications which allow/require technical criteria that do not follow usual Corps of Engineers design-bid-build criteria. The submittal procedures covered in the AEIM generally do not apply to design-build, except as required by the RFP.

1.1 **Scope**: AEIM contents are limited in scope to technical rather than management aspects of design. Not included in this document are such subjects as: project design management, progress milestones and scheduling, quality control/assurance (except as noted in paragraph 4.3 of this chapter), review procedures, value engineering, handling of classified information, and other procedural/managerial types of instructions and requirements for military design. Contractual requirements for these and other subjects are in Appendix "A", Scope of Services, to the standard contract for Architect Engineer design services.

1.2 **Application**: These instructions apply to the Southwestern Division District Offices and Architect-Engineers working as independent contractors for the Corps of Engineers.

2. **GENERAL.** This chapter covers general design policy, criteria, and types of design. Specific policy and criteria are covered in other AEIM chapters for each major design discipline that typically participates in a project design and in chapters addressing requirements for drawings, specifications, design analyses, and other documents typically produced during the design process.

3. **METRIC UNITS** used throughout this document are the International System of Units (SI) adopted by the U.S. Government. New construction and products that are manufactured to metric dimensions or have an industry recognized metric designation are given in hard metric SI values. In other cases both metric SI units and English inch-pound (I-P) measurement is indicated by a SI value followed by the I-P value in parenthesis. The SI value is a mathematical approximation of the I-P value and the I-P value shall govern over the metric measurement. In general, text metric units are in meters for numbers larger than one meter and millimeters for numbers smaller than a meter. On the plates, dimensions of plans, sections, details, member sizes, etc. are in millimeters except as noted.

4. **DESIGN POLICY.** Policies are published in various documents including Engineering Regulations (ER), Army Regulations (AR), Public Laws, Executive Orders, Design Guides (DG), Department of Defense Directives, Policy Memoranda, Engineering Technical Letters (ETL), Unified Facilities Criteria (UFC), and others. Most of those applicable to the Corps of Engineers Army MILCON program are available through the Internet at <http://www.usace.army.mil/techinfo/engpubs.htm>. To get Air Force Manuals, Technical Letters, and Pamphlets the best source is the CCB at <http://www.ccb.org>. Some AF guidance is available from the Air Force Publications web site at <http://www.afcee.af.mil/Publications/ETLs/default.html>. AF Design Guides are available at <http://www.afcee,brooks.af.mil/>.

4.1 **Reference:** References listed below are basic policy documents and others are referenced in other AEIM chapters.

4.1.1 ER 1110-345-100. Design Policy for Military

Construction.

4.1.2 Military Handbook MIL-HDBK 1190, for Air Force designs.

4.1.3 ER 1110-1-12. USACE Engineering and Construction Quality Management.

4.1.4 Architectural and Engineering Instructions(AEI). Cost Control During Design (Design-To-Cost)

4.1.5 EC 2002-6. Metric Design Policy

4.1.6 UFC 1-200-01. Design: Design General Building Requirements

4.2 **Headquarters, U.S. Army Corps of Engineers (HQUSACE) design policy** is established by ER 1110-345-100, Design Policy for Military Construction. Directives and accompanying program/project data will be issued through HQUSACE to respective regional Division Commanders. Except for standard designs and elements of medical and housing programs, the design responsibilities of HQUSACE are delegated to Division and District Commanders.

4.2.1 **U.S Army Corps of Engineers Metric Design Policy.** Projects shall be designed, and plans and specifications shall use the metric system of measurement. Metric design policy is in EC 2002-6, requirements for use in the design and for drawings are addressed in ER 1110-345-700, and Corps of Engineers Guide Specification UFGS Section 01415, Metric Measurements, covers the requirements for metric measurements in project specifications. EIRS Bulletin No. 97-01 gives additional guidance on use of metric products. Additions/modifications to existing facilities may be in the English system of units to match the units used in the original facility construction if directed by the supervising district.

4.3 **Southwestern Division design policy** is based upon the above references and standards that have been adopted based on lessons learned and good engineering practice. The CESWD staff (CESWD-MTE) implements design provisions referenced above as applicable within the region.

4.3.1 District staffs perform all the technical requirements for each phase of design for "in-house" project designs from the earliest design submittal thorough final contract drawings. Districts are responsible for establishing and executing Quality Management Plan (QMP) and project design Quality Control Plans (QCP), including independent technical review, for projects designed by their staff. ER 1110-1-12 and District Standard Operating Procedures contain requirements for QMP and QCP.

4.3.2 Architect-Engineer (A-E) as contract design agents perform design services for work contained in the Scope of Work in the A-E design contract. The A-E is responsible for providing and executing a Design Quality Control Plan (QCP) for their design. The QCP shall be submitted with the fee proposal. Key components of a QCP are given in ER 1110-1-12 and District Standard Operating Procedures available from the District Technical Leader (TL). The A-E shall include in the QCP a time-scaled bar chart or Critical Path Method design schedule showing the sequence of events involved in performing tasks to accomplish the design within the specified time period. The supervising district will serve in a consultative capacity in accordance with the A-E Scope of Work and A-E Contract for A-E project designs providing guidance on technical project criteria and resolution of technical issues involving criteria. The supervising district will perform Quality Assurance to verify that the A-E produces a quality design within the established schedule and budget.

4.3.3 Southwestern Division staff will execute Quality Assurance to assure that quality designs are being accomplished for designs performed by district "in-house" personnel. The Southwestern Division issues regional design criteria and serves in a technical consultative capacity when requested.

4.4 **Programming and Budgeting.** Using services prepares (or contracts for preparation of) the basic programming and budgeting documents for congressional funding and authorization of the construction project. These documents describe the general functional requirements for the project and provide a basis for funding. These documents are to be reviewed for adequacy by the district prior to issue to the design A-E. Although the design agent has the responsibility for the preparation of their design, the Using Services have

final authority concerning functional requirements of the project.

**4.5 Design-Bid-Build with A-E's as design agents.** A-E's as design agents under Title I provide design services to the contracting officer for timely completion of a quality design. Basic responsibilities are set forth in Appendix "A" to the A-E design contract. General guidance is presented in the references in paragraph 4 above, and this manual, the AEIM, covers regional design procedures. Specific criteria will be covered by project design and engineering instructions and project criteria as discussed in paragraph 5 below.

**4.6 Design-Build with a single contractor.** The design-build acquisition method uses a single contractor to perform both design and construction. Basic design-build responsibilities for this method are in ER 1180-1-9, Design-Build Contracting, the document Design Build Instructions (DBI) For Military Construction and UFC 4-721-11.1 Unaccompanied Enlisted Personnel Housing (UEPH) Complexes. The Request For Proposals (RFP) for the project will include project criteria including submittal requirements and functional and design technical performance criteria in accordance with TI 800-03, Technical Requirements for Design-Build. Specific A-E's responsibilities, when developing a RFP, shall be defined in the A-E design contact for the project and through coordination with district Technical Leader (TL) for the district supervising the contract for the project. The following guide specifications have been updated to contain options for Design-Build contracting.

UFGS-01320A "Project Schedule"

UFGS-01330 "Submittal requirements"

UFGS-01451A "Contractor Quality Control"

**5. PROJECT CRITERIA.** The following forms of criteria will be used. Project criteria will be made available through the assigned district Technical Leader (TL) or obtained by the A-E from the Internet.

**5.1 Functional Criteria** are established by the Using Service and may be furnished in the form of a DD Form 1391. If the project design has proceeded beyond the initial design phase then submittals such as Charratte documentation

brochures are available. The Using Service and District Project Manager shall assure that sufficient data is furnished concerning personnel capacities and occupancies, operational requirements, access and clearances, life safety and future expansion prior to initial pre-design or site conference. Subsequent to the initial conference, the design agent or A-E shall confirm any missing or questionable data by discipline to expediently proceed with design. Basic space allowances and operational standards are outlined in the references given in paragraph 4 above.

5.2 **Economic Criteria** include both program authorization (project cost limitation) and scope allowance (space limitation) which will be set forth in the funding documents, Project Description and Scope approved by Congress and/or project design or engineering instructions. It is the A-Es responsibility to design the project within these limitations or report to the TL as early as practicable that the project cannot be designed within the authorized program and scope limitations.

5.3 **Environmental Criteria** may be included in the DD Form 1391, however, it is the designer's responsibility to confirm and complete this criteria at the Pre-Design Conference and/or site investigations and to establish any natural, physical or social conditions which would affect the design and to present the design response to such conditions in the project design analysis. Additional guidance on environmental criteria is in Chapters IX and XII in this AEIM.

5.4 **Technical Criteria** for specific design subjects are the responsibility of the design agency and shall be furnished by the TL for the project in the form of AEIM and CESWD Criteria Letters. The AEIM has a chapter giving design guidance for each major design discipline as follows: Civil Chapter II, Architectural Chapter III, Structural Chapter IV, Mechanical Chapter V, Electrical Chapter VI, Geotechnical Chapter XIII, with additional criteria in Chapter IX. Tri-Service Unified Facilities Criteria Technical criteria (UFC) should be used when available. UFC 1-200-01 references IBC and other government and nongovernment standards and criteria as a basis for design criteria. When UFC criteria is not available, HQUSACE Technical Manuals (TMs), Engineering Instructions (EI), Technical Instructions (TI) and Engineering Technical letters (ETL) should be used. These can

be obtained from the Internet at <http://www.usace.army.mil/techinfo/egpubs.htm>. If additional technical criteria or documents are needed, the A-E shall request the information from the District TL.

6. **TYPES OF DESIGN**. Project Criteria will direct use of varying levels of developed design documents to be used for project economy and standardization as follows:

6.1 **New Design** shall normally be based upon DD Form 1391, Charratte documentation brochures, if one was conducted or documents providing budgetary and programming data. This data is generally developed for project cost estimates (PCE) for funding and establishing general functional relationships for project authorization. Since these documents normally require comprehensive development, designers shall confirm design parameters and design flexibility.

6.2 **Site Adapted Designs** are actual as-built project documents and field standards to be utilized for project design. It should be recognized that most site-adapt documents furnished for project design will require various levels of design development to meet regional, local and project conditions. The use of these documents may range from basic definitive layouts to complete working documents for construction. The A-E contract or project documents shall, therefore, specify the level of site-adaptation expected and explicitly set-forth special design latitude for revising the documents. Where the site-adapted design conflicts with environmental design conditions and sound architectural and engineering practice, the designer shall present recommendations for modifications required to the supervising district Technical Leader for approval action. Refer to the Drafting Chapter for revisions to title blocks.

6.3 **Standard Designs** are national and regional repetitive project documents which are to be utilized as completely as practicable for project design conditions. Analyses of foundations, structural and mechanical systems are normally authorized. Revisions and deviations beyond these shall be reported and submitted for approval through the Technical Leader in the supervising district, to HQUSACE.

6.4 **DA Standard Designs** essentially consist of standard floor plans, typical building sections and special site

requirements, without any detailed design developed. Designs are at about the 10% stage. These designs are developed in accordance with ER 15-1-25, USACE Facilities Standardization Committee. Standard design packages are available for about 13 different Army facilities with about 15 others under development. Use of these standards for Army projects is mandatory and will be required by the DD 1391 form. When required, the A-E should request the Standard from the Technical Leader in the supervising district. Deviations from these standards are not permitted without waiver approval.

**6.5 Renovation Projects and Additions** to existing construction are the most difficult to assess for funding and design. Therefore, it is very important for the designer to make thorough site investigations and evaluate project criteria. Establishing the amount of renovation and additional new construction to achieve the optimum balance of improvements at the pre-concept stage requires careful design and construction coordination.

7. **SPECIAL INSTRUCTIONS.** A-E contract documents may emphasize significant items directly pertinent to the project or which require special attention for design quality and review coordination. Essential instructions are provided in this manual.