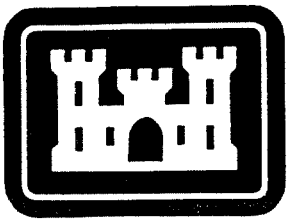

NANP-1110-1-1

US Army Corps of Engineers

New York District

Manual of Standard Procedures for Planning and Design

March 1990

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*This manual supercedes NANP-1110-1-1, dated Februrary 1985.

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INTRODUCTION

A. GENERAL

This Manual of Standard Procedures is both a reference Book and a guide for design performed by and for the U.S. Army Corps of Engineers, New York District.

It contains instructions for preparation of submittals and prescribes policy regarding the sufficiency and content of the design products created. Architects and Engineers (hereinafter referred to as "A/E" or "Designer") shall become thoroughly familiar with the contents presented herein.

In meeting the needs of our customers, the New York District has set for itself the goal of providing the best service of a US Army Engineer District. This requires providing a **QUALITY PRODUCT** in a **TIMELY MANNER.** It assumes that for every project there must exist a three-way relationship that exists between the CUSTOMER, the DISTRICT and the DESIGNER.

1. The immediate CUSTOMER of a facility is a group of people:

   a. The MAJOR COMMAND (MACOM) who determines that the facility is needed to meet mission requirements.

   b. The Using Service (USER) who develops functional requirements for the facility.

   c. The FACILITY ENGINEER who provides maintenance of the facility.

   These people prepare and review the programming documents and the functional requirements of the project.

2. The DISTRICT office is also comprised of several groups:

   a. The QUALITY ASSURANCE SECTION (QAS) of the TECHNICAL SUPPORT BRANCH of the ENGINEERING DIVISION which assists in overall project coordinations and reviews milestone submittals that adhere to applicable design criteria and regulations.

   b. The AREA ENGINEER who manages construction of all projects in his area and reviews project submittals for constructibility.

   c. The PROJECT MANAGER who assures that the scope of the project, as stated in the programming documents, is adhered to, that the requirements of the contract

are fulfilled, and that applicable regulations are complied with.

3. The DESIGNER has the responsibility to provide the finished design products within scope, within cost, and on time. This is accomplished by translating project requirements and governing criteria into Contract Documents, including all necessary submittals required by this Manual.

B. ISSUES IN PROVIDING QUALITY DESIGN PRODUCTS

It is the intent of this Manual to provide a format which encourages the optimal disposition of issues that our Customers want vigorously addressed.

In a joint meeting of all the District's Customers, the following elements were identified as necessary in providing a reasonable standard of care by the design professional. The Designer shall be responsible for focusing on them through milestone submittals which comply with all applicable requirements contained within this Manual.

1. **Economical Design** - Choice of products and systems for buildings shall be limited to those which perform appropriately, economically and work within the overall project design parameters that have been established.

2. **Energy Conservation** - Design will be adjusted to maximize energy efficiency, consistent with program requirements.

3. **Maintainability** - With each successive level of submittal, this issue shall be addressed in increasing detail. Items to be considered include, but are not limited to: ease of replacement of consumables and wearing parts, access to equipment and components concealed behind other materials, and the durability of finishes used.

4. **Flexibility** - The Designer may be required to demonstrate the extent to which a design solution may be revised in order to respond to subsequent mission changes that require revision.

5. **Meeting User Needs** - Necessary functional aspects identified by the User in the Programming Documents shall be addressed.

6. **Technical Adequacy** - At every level of submittal it is essential that the Designer demonstrate an appropriate level of professional service which assures both the technical adequacy of the design products created and the overall coordination of individual A/E disciplines.

C. MANUAL CONTENTS

This Manual is considered a "living" document. Updates will occur periodically as criteria are added or replaced. All users are encouraged to provide appropriate and applicable commentary in order to continue enhancement of the built environment through Project Construction.

SECTION I
GENERAL INFORMATION

A. DESIGNER RESPONSIBILITY

The designer is brought into service to provide high quality technical solutions. The Designer's primary goal and area of responsibility is to translate project requirements, and applicable criteria into project drawings, specifications, analyses and cost estimates, and other contract documents.

The Designer is advised that ANY DESIGN SOLUTION BECOMES HIS if he agrees to complete a design based on a particular solution. Many times the Government will present the Designer with a partially completed design or an initial design solution to a functional problem. It is imperative that the Designer understands that he takes upon himself the full responsibility for any design that he completes, no matter what the circumstance prior to his becoming involved in the project. Limits to the Designer's responsibility, if required, must be explicitly stated in the contract.

The Designer has the responsibility to provide the finished product within scope, within cost and on time. Designers are advised that incomplete or otherwise poor documents are not acceptable, even if scheduling constraints are tight.

After the award of the project the A/E still shall be responsible for providing clarifications and correcting his design as required.

B. QUALITY CONTROL

The professional quality, technical accuracy and the coordination of all designs, drawings, specifications and other services provided by the A/E is of major importance. It is therefore, a requirement for the A/E to have a logical and functional quality control program to assure that errors or deficiencies in all submittals are minimal. To meet this requirement, the A/E will undertake appropriate quality control measures and technical reviews to avoid errors and deficiencies in the design documents prior to submitting them to the Government for review.

The contractual obligations of the A/E to provide complete, well coordinated, and error free documents has far-reaching consequences. In the event possible subsequent damage to the Government results from negligent performance of any of the services to be furnished under the A/E's contract, the A/E will be held liable for such damages. The Government's review efforts in no way relieve the A/E of these contractual

responsibilities. For this reason, an effective quality control plan is very important.

C. PROJECT SCOPE

The scope of a project that is detailed on official programming documents forwarded by HQUSACE and NAD directive (MCA, MCP, NAF, MCAR) or per New York District's directive (OMA), may not be changed without the User making a formal request to higher headquarters. The A/E is not authorized to make scope changes without the approval of the District project manager.

D. BASIC CRITERIA

Basic Criteria pertaining to the design of military construction projects for the Army and Air Force are contained in the following references:

- Architectural and Engineering Instructions (A/E Instructions).
- Air Force Manual AFM 88-15 (for Air Force projects).
- Technical Manual TM 5-800-1 (for Army projects).
- Engineering Regulation ER 1110-345-710, Drawings (both Army and Air Force).
- Fire Protection for Facilities (MIL-HDBK-1008).

(There is an index of all TM 5-800 series included herein as Appendix C).

As appropriate, copies of these manuals and other reference materials will be furnished by the project manager upon request. When designing projects, criteria in these basic references and in the other applicable engineering manuals will be adhered to unless specific exceptions are made thereto in the contract, or otherwise furnished the designer in writing by the District. In event of conflict with the A/E INSTRUCTIONS and other manuals furnished, the A/E INSTRUCTIONS will govern.

E. STANDARD DATA

To the maximum extent possible it is expected that the A/E will follow and use standard data furnished, such as schedule forms, standard drawings and/or standard details. The format and general level of detail for such items as sample quantity take off furnished shall be adhered to. This facilitates review of the project by the District personnel and by personnel of other agencies.

If the program documents call for the use of standard designs, the complete set of standard drawings should be used as the design drawings with site modifications only, unless waived.

The following Army Standard drawings are available for use:

Basic Trainee Barracks
Brigade and Battalion Headquarters
Chapels
Child Development Centers
CIDC Field Operation Buildings
Company Operations Facilities
Enlised Personnel Dining Facilities
Fire Stations
General Purpose Warehouses
Information Systems Facilities (Functional Layout)
Physical Fitness Facilities
Religious Education/Family Life Centers
Tactical Equipment Maintenance Facilities
Troop Issue Subsistence Activity (TISA) Facilities
Unaccompanied Enlisted Personnel Housing (UEPH)
Unaccompanied Officer Personnel Housing (UOPH)
Visiting Officer Quarters (VOQ)
Youth Activity Centers

F. ECONOMIC ANALYSIS

1. An economic analysis shall be required for all new Facility Systems and shall incorporate the requirements of Life Cycle Cost Analyses outlined in ETL 1110-3-332.

2. The designer shall achieve the most economical finished product consistent with acceptable standards of quality. Economy in every element of construction and design will be sought. Types and systems of construction, repetitive elements, stock products, and all other factors will be incorporated to the extent that they will achieve optimum economies with consideration for the functional, operational, and maintenance requirements of the structure. (See SECTION V).

3. Alternative types of structural materials and framing systems shall be considered. The selection of materials and systems for structural framing shall be justified by an economic analysis.

4. To the extent practicable within allowable design costs, the A/E shall establish optimum balance between the first cost and operating and maintenance costs during the planned life of the facility. The reasons for selection of the systems and materials for final design shall be recorded.

G. HANDICAPPED REQUIREMENTS

Provisions for the handicapped shall be in accordance with the Uniform Federal Accessibility standards.

Review will be by Eastern Paralyzed Veterans Assn.
7-20 Astoria Blvd, Queens, NY 11370-1178

H. ADDITIONS OR MODIFICATIONS TO EXISTING STRUCTURES OR FACILITIES

When new work is added to an existing facility or an existing facility is modified, the A/E shall be responsible for determining the adequacy of the existing structure for the additions and/or modifications.

1. Accurate on-the-site measurements shall be taken of existing construction as it affects new construction and remodeling. Demolition of existing construction shall be clearly shown.

2. The A/E shall provide accurate specifications, floor plans, sections, elevations, details, and schedules to completely define the scope of the work as required at each phase.

3. See the STRUCTURAL SECTION for the seismic upgrade requirements for existing structures. The structural engineer shall prepare a narrative report supported by calculations which describes the layout and details of the existing structure, the capability to support new loads, and the degree of strengthening required for the existing facility. This report shall be submitted as part of the structural portion of the concept design brochure.

4. Any field investigations needed will be done in accordance with the "Field Investigations" specifications (INCLOSURE 1).

I. HAZARDOUS AND TOXIC SUBSTANCES

If required by the contracts hazardous and toxic substance abatement engineering related services shall include the following:

1. Survey of the area of work in each building for the identification of asbestos and/or other hazardous and toxic materials.

2. Sampling and identification of suspect materials.

3. Report of findings & recommendations, with photographs.

4. Preparation of asbestos location plan(s), review and coordination with the Government for phasing of the removal plan compatible with the construction schedule.

5. Preparation of construction cost estimates for asbestos abatement and/or hazardous and toxic materials.

6. The A/E shall provide expert assistance to the Government in the evaluation of the contractor removal plan.

NOTE 1: For projects requiring asbestos removal and disposal, designer shall verify with the State in which the project is located whether the State or EPA has jurisdiction, since the EPA has delegated the responsibility to most of the States.

NOTE 2: Designer is also required to submit the survey report to the District as soon as the survey is completed, and to indicate in contract documents its approximate quantity, locations and physical condition.

J. REAL ESTATE

The A/E is responsible for identifying all temporary easements and rights of entry necessary to perform the construction work for this project. This should be done prior to the First design submission. The Government is responsible for obtaining all such easements.

K. ENVIRONMENTAL PERMITS

The A/E is responsible for identifying all environmental permit requirements of EPA, the State and all local jurisdictions. The Government is required to comply with all such regulations. The A/E, either in his basic contract or modification, will be required to do all studies and prepare all documents for submission to the various agencies and make all revisions as necessary.

L. CONSTRUCTION PERMITS

Construction permits are required for all connections to municipal and utility company facilities. The A/E is responsible for performing his work in coordination with all entities having jurisdiction and obtaining the necessary approvals and permits. The A/E shall correct his design if required.

M. DESIGN ANALYSIS

1. **A design analysis** is required for all projects unless otherwise specifically exempted.

2. **A design analysis** is an assembly of all design provisions and calculations applicable to a project summarized in a format appropriate for review, approval, and record purposes. The analysis shall contain parts for each major discipline: Civil, Architectural,

Structural, Mechanical, and Electrical. Fire safety requirements shall be developed under the appropriate discipline: extinguishment and smoke control systems in Mechanical; building construction and exit requirements (life safety) in Architectural; and, detection and alarm systems in Electrical. Each page shall indicate the name and location of the project, the project number and fiscal year. **The design analysis shall be clearly expressed and legible.**

3. **Classified Material** - Every effort shall be made to prepare the design analysis so as to permit it to be an unclassified document with proper references to sources of classified material.

4. **Design Calculations** - Calculations shall be computed and checked by separate individuals. Checking should be accomplished by registered architects and/or engineers as applicable. The names or initials of these individuals shall be indicated on the page or insert carrying the calculation. Presentation shall be clear and legible with a tabulation showing all design loads and conditions. The source of loading conditions, formulas, and references shall be identified. Assumptions and conclusions shall be explained and cross-referencing shall be clear. When a computer program is used, it shall be named and described. This description must be sufficient to verify the validity of methods, assumptions, theories, and formulas, but should not require source code documentation or otherwise compromise proprietary programs.

5. **Use of Existing Design Analyses** - If a standard design or other design is being site adapted and a design analysis exists, the analysis for the new project will include appropriate material from the existing analysis modified to incorporate site adaptations and other essential requirements.

6. **Review and approval** of project design analysis shall coincide with all submittals. For every milestone submittal the design analysis shall provide appropriate level of details without requiring reference back to earlier analysis. When modification of a project is authorized, the analysis shall also be modified to reflect any changed conditions and a revision date affixed.

N. DRAWINGS

The preparation of drawings shall comply with ER 1110-345-710. Drafting of all construction details, legends, dimensions, notes, etc., should be of sufficient size, with care exercised to keep lettering open to allow one-half scale reduction. The cover sheet shall include a vicinity map, location map, schedule of drawings, and general notes and

legends as required.

O. TRADE NAMES AND PROPRIETARY ITEMS

As a general policy, the use of trade names, proprietary items, and the drafting or a specification by adopting a manufacturer's description of a particular commercial article will be avoided. Where a brand name specification is authorized and used as a generic description, the salient characteristics of the product shall be included, so that an "or equal" product can be properly ascertained. The item will be specified by giving its physical characteristics, chemical composition, laboratory test results, performance in actual use, etc., in such a manner as to ensure full and free competition among suppliers in the industry.

P. VALUE ENGINEERING

The COE reserves the right to perform value engineering studies on projects either during or after completion of design. The value engineering studies may be performed by the COE or other Architect-Engineer forces designated by the COE. The COE, at its discretion, may modify A/E contracts to implement any or all design changes resulting from the value engineering studies or the engineering evaluations after completion of design. The Architect-Engineer during the course of his design shall be alert for and shall identify those high-cost low-value items on areas which he considers may be accomplished in other ways and possibly at less cost. During review of the PB's, PDB's, and DD Form 1391 and other design criteria and prior to initiating the design, any potential value engineering items shall be reported to the Project Manager by using NANY Form 851, (INCLOSURE 2 at the end of this section) together with back-up data, including cost estimate and life cycle cost analysis.

Q. STUDIES

All scoping or feasibility studies will be performed in accordance with New York District's "STUDY PROCEDURES" (see Section XI).

R. SITE VISITS

Visits to the project site must be made by all disciplines involved in the particular project in order to establish criteria for the design. Reports of these visits shall be included in the submissions. (See FIELD INVESTIGATIONS, INCLOSURE 1 at end of this section, and paragraph B.2(e) of the Section II -SUBMITTALS).

8. HISTORICAL PRESERVATION

One of the following items will only be required when specified by the A/E Contract:

1. The A/E shall review the subject project for issues of historic preservation or archaeological interest and shall identify them in the concept (35%) submittal, or shall positively state that the subject project is not impacted by these considerations.

2. The A/E shall review the Historic American Building Survey (HABS) card(s) for the affected building(s). A statement of impact or non-impact by the project on the building features identified in the HABS card(s) shall be included in the concept submittal.

3. The A/E shall respond to the installation comments on issues of historic preservation but shall not be responsible for the preparation of submittal documents to the State Historic Preservation Officer (SHPO). A/E service in direct support of Section 106 shall be the subject of a contract modification (see note below).

NOTE: Section 106 of the National Historic Preservation Act of 1965 requires the installation to take into account the effects of renovation or construction projects on properties included in or eligible for the National Register of Historic Places, and prior to an approval of an undertaking, to afford the Advisory Council of Historic Preservation a reasonable opportunity to comment on the undertaking. Army Regulations, (AR420-40 dated 15 April 1984, Subject: Historic Preservation) defining the process by which the installation meets these responsibilities is commonly called the Section 106 Process.

FIELD INVESTIGATIONS

A. PREPARATION (PRIOR TO SITE VISIT)

1. Identify each major work item and the possible design solutions that will be considered for each. Prepare schematics to be marked up in the filed.

2. Identify what specific areas and building systems will be disturbed, or possibly affected by each design solution. Identify areas that require locating closely and verification of size/extent.

3. Plan site visits to investigate specific areas. Contact F.E. and Area Engineer, or pertinent official, describe the applicable portions of item 1 and 2 and the buildings and/or areas where access will be required. Determine if access will require destruction of property and whether replacement is necessary. A meeting with the Project Manager at this time is required.

B. SITE VISITS

1. For each work item in location and for each design option, address attachments needs and strength of existing items used for support, covering or containment.

2. Address construction access and/or demolition problems; items or systems that would be blocked or otherwise adversely affected by the work in this project.

3. Address any phasing, outages or movement of people that would be required and any other item of consequence.

4. Take photos of all major areas. Identify all people upon whose information you will be relying.

C. PREPARATION OF REPORT

Prepare a report incorporating all of the above and include in future submittal of design analysis.

D. FINAL VISIT

After final layouts and equipment sizing has been completed, a detailed verification visit will be made by the A/E to assure all interferences are eliminated and all existing conditions have been taken into account. The results of this visit will be incorporated into the final documents.

VALUE ENGINEERING PROPOSAL	VE No. (Filled in by VEO)

PART A - RECOMMENDATION
(To be filled in by individual)

1. Project Description, Line Item No., Station

2. Construction Feature (Item to be changed)

3. Status of Feature

☐ In design ☐ Under construction or in production ☐ Standard Design

4. Describe proposed change

5. Explain why the item has VE potential

6. Indicate (rough estimate) the amount of savings that will result, i.e, show present cost and proposed cost

Signature	Title and Organization	Date

NANY FORM - 851
Feb 79

INCLOSURE 2

SECTION II
SUBMITTALS

A. DESIGNER REPLIES TO PROJECT REVIEW COMMENTS

The A/E shall annotate the action taken on each comment and shall include the annotated comments with the next submittal packages as indicated in the Contract. If the A/E feels that any comment is inappropriate or in error, he shall contact the District Project Manager within three weeks after the comments are forwarded to resolve the conflict. If the comment is modified or omitted as a result of this coordination then a brief record of the conversation shall be included with the annotated comments. **Further payment will not be made until all comment actions are resolved and incorporated on the contract documents and reviewed by the Project Manager.**

B. SUBMITTAL REQUIREMENTS

Incomplete submittals offered piecemeal can not be reviewed and will be rejected.

The following submittals will only be required when specified by the Designer's contract:

1. **10% Submission**

   This submission will present a listing, broken out by discipline, of the functional requirements found in the programming documents and through interviews with the User.

   There shall be at least 3 architectural solutions to the functional operation of any project involving new buildings or rearrangement of spaces. These will be presented as one line drawings. Provide narrative description of the advantages and disadvantages of every scheme submitted and indicate the recommended scheme.

   Each of the other disciplines involved will make brief narrative descriptions of at least two alternate solutions at this time with preliminary costs for comparison.

   All of the **QUALITY** issues identified in the **INTRODUCTION** (Paragraph B, SECTION I) will be addressed for each alternate.

   Based on a meeting with the User and the Facility Engineer, a preferred solution will be chosen. There

will normally not be a review period prior to the meeting since the intent is to assure an understanding of the Users functional concerns and to get an early agreement on overall direction.

2. **35% Submission**

This submission will present the Designers understanding of the approved solution identified at the 10% submittal and the designer's interpretation of criteria furnished or that which he has obtained or developed by his own efforts for design of the project. All 10% submission agreed-to comments should be incorporated into the 35% submission documents.

THE FORMAT AND CONTENT REQUIRED FOR THE 35% SUBMISSION ARE AS OUTLINED AS FOLLOWS: (Use same Chapter numbers for identification in the brochure; indicate each paragraph and extent of applicability.)

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Chapter III	Civil
	A. Subsurface Exploration and pavement
	B. Site Development
	C. Utilities
Chapter IV	Architectural
Chapter V	Structural
Chapter VI	Mechanical
Chapter VII	Electrical

Chapter I - Introduction. (Provide if required)

Chapter II - General (Shall include the following items. If any of the items is not applicable state so.)

a. **Directive Authorizations** - Give job number, directive authorization number and date, item category number nomenclature, directive scope,

programed dollars and cost identification in Brochure, indicate each paragraph and extent of applicability.

b. **Applicable Criteria** - Design is in accordance with following instructions: List items such as DD Form 1391 data, definitive drawings, if applicable and all other drawings or data furnished for design of project. State whether new design or site adapted from location and FY. List any special instructions cited by the design directive or included in the contract.

c. **Purpose and Function** - State military operational function including its flow. List PDB (Project Development Brochure for Army projects) or PB (Project Book for Air Force projects) and any other official guidance which indicates the users **functional criteria** to be used in the design.

d. **Design Scope** - State project scope. For all buildings show computations for square footage even though the authorized scope may be "man", "1 EA", or other units. Show the computation data in a matrix format. (Computation will be based on outside building dimensions.) Indicate total occupancy. Include Scope of design services to be provided, with required criteria if not cited elsewhere in the report.

e. **Site Visit Reports** - Indicate location of the reports in this submittal. (See paragraph R of SECTION I - GENERAL INFORMATION).

f. **Government-Furnished Equipment** - List equipment to be furnished by the government and identify the installer.

g. **Construction Phasing** - Indicate any known or anticipated phasing requirements.

h. **Waste and Borrow Areas and Haul Routes** - State whether or not they have been designated.

i. **Air and Water Pollution Control** - State whether or not required, and if so, describe equipment and/or manner of meeting pollution abatement standards.

j. **Special Design Issues** - Indicate special problems anticipated, with recommended solution. Cite specifications that will be generated for design improvement or in lieu of OCE guide specifications. Identify items where the designer expects to place design responsibility on the construction contractor.

k. **Inadequate Funds** - If it appears that the project cannot be constructed within allowable funds, the

A/E shall recommend additive bid items, deletion of certain features of the work, or suggest other means of reducing the cost, but still provide a usable facility within acceptable engineering standards. Cost estimate shall be double checked before changes are proposed.

l. **Waivers** - Identify waivers that will be required, such as fire clearance, building spacing, airfield clearances, ammunition/ explosive area, and variances from DOD criteria. State what agency (Federal or Non-Federal) must provide the waiver.

m. **Environmental Permits** - Identify permits required by the Local, State and/or Municipal authorities. State actions taken or anticipated.

n. **Security Provisions** - State over-all security requirements relating to the project.

o. **Economic Analysis** - Provide summary of findings.

p. **Functional Criteria Changes** - Indicate any changes made by user or other agencies. Correspondence and/or minutes of meetings shall be included in this submittal. Indicate the location in this submittal.

q. **Rehabilitation** - If rehab is included in the project, identify any building system that is not being upgraded itself but will be adversely affected by the project work. An example would be the need to raise exposed utilities above hung ceiling.

r. **Explosives Storage** - The design of any installation where explosives are stored or fired requires a review by the Explosives Safety Board in Washington, DC. Indicate the coordination required and completed to date.

s. **Operation & Maintenance** - Indicate any tools or equipment that should be purchased by the user and any O&M items the User should know.

t. **Removal/Demolition**

(1) Indicate extent of any asbestos removal, if applicable.

(2) Extent of any hazardous material and removal requirements.

(3) Indicate any temporary dust/noise protection that will be needed.

(4) Indicate any special safety requirements, such as pedestrian bridge etc.

(5) Special temporary bracing or support requirements should be indicated.

(6) Indicate any utility outages, user personnel relocations or other measures that will disrupt normal user functions.

(7) List of items to be salvaged for the Government and storage location.

u. **Other Special Provision Items** to be listed

(1) Occupancy/use of existing facility during construction and special requirements needed.

(2) Permits required to be obtained by the Contractor, i.e. utility connections, RR or Hwy crossings.

(3) Expected length of job and any interim beneficial occupancy dates.

(4) Burning restrictions.

(5) Sale of timber/disposition of Government property.

(6) Use and cost of utilities/use of Government equipment during construction.

(7) Blasting restriction/explosives storage for the construction.

v. **Historical Preservation** - (See paragraph S of SECTION I).

For Chapters III thru VII requirements see the individual technical sections.

An estimate of construction cost for the project shall be submitted in a separate brochure. (See Section IX).

3. **65% Submission**

The 65% submission shall contain all information developed in the 35% narrative, shall be in essentially the same format updated, and shall reflect all comments from the previous submittal.

See the individual technical sections for the degree of completion expected.

An estimate of the construction cost shall be submitted in a separate brochure. (See Section IX).

4. **Final Submission**

This submission shall be complete in every respect and shall be the Designers best effort to produce a package ready for advertising. **Unchecked or Incomplete submittals offered piecemeal cannot be reviewed and will be rejected.** All drawings shall show the name of the checker and signature of the Principal of the firm responsible for the design as testimony that this submittal has been reviewed and found to be suitable for bidding. After review, all comments shall be incorporated. The president or authorized representative of the firm shall provide a separate signed certification, with the corrected reproducibles, to the effect that all comments have been incorporated into the bid documents.

If required by the Contract a NETWORK ANALYSIS SYSTEM CPM SCHEDULING shall be submitted. (See APPENDIX F).

The A/E shall submit the PROPERTY TRANSFER DD FORM 1354. (See APPENDIX G).

Final complete typed specifications shall be submitted. (See SECTION VIII).

A **shop drawing** submittal list on ENG FORM 4288 (Submittal Register) shall be included in the specifications as a separate entity. (See Section XII).

A/E shall provide a separate list of the government furnished equipment on this project.

The construction cost estimate shall be submitted in a separate brochure. (See Section IX).

See the individual technical sections for all other requirements.

SECTION III
CIVIL

A. SUBSURFACE EXPLORATION AND PAVEMENT DESIGN

1. GENERAL

a. Procedures for subsurface exploration and field testing shall be as specified in the New York District's Standard Specifications for Subsurface Exploration and Field Testing, October 1980, unless indicated otherwise.

b. The geotechnical report will present factual data concerning corrosion control, soil bearing capacities, and settlements for the various foundation methods and may include recommendations for the method or procedure required.

c. Foundation design shall comply with the requirements of TM 5-818-1.

2. 35 % DESIGN SUBMITTALS

a. A statement of general soil conditions with a full outline of soil exploration and testing to include available adjacent boring information.

b. Discuss the geometric features of the paved areas such as widths of traffic lanes, shoulders, parking areas and walks. Data relating to the design such as type, volume, and composition of traffic, vertical and horizontal controls and class and category of road or street shall be included.

c. The preliminary pavement design analysis will include calculations for pavement sections along with cost analyses and other factors that can lead to a specific choice. Critical pavement details will be included. The pavement section will be designed in accordance with the requirements in the Technical Manuals TM 5-822-2,4,5,6,7,8, 5-809-12, and 5-818-2.

d. Provide drawings showing the boring locations and logs of boring.

3. 65% DESIGN SUBMITTALS

a. Drawings and design analysis should be updated to include incorporation of design review comments from the 35% design effort.

b. Submit annotated guide specifications for review. Where guide specifications are not available, technical provisions must be prepared to supplement the work shown on the contract drawings, or other state or commercial standard specifications can be used.

4. FINAL DESIGN SUBMITTALS

a. Design Analysis

(1). It is particularly important that complete subsurface information; such as, dates, elevations, depth to rock and groundwater, drilling equipment used, and the presence of unsatisfactory materials, etc., be presented to the contractor for bidding purpose.

(2). Show design calculations including selection of design wheel loads, material, and type of construction and class of each type of paving. Attach a copy of "Pavement Design" or Geotechnical Report to cover items in the design calculations.

(3). For projects that involve supply, collection, and/or distribution utility conduits, rigid or flexible, support with calculations the trench design (bedding, initial backfill, and final backfill) for each one of the pipe options given in the USACE Guide Specifications. The trench design is to be based on American Water Works Association Standards, or American Society of Civil Engineers Manuals and Reports on Engineering practice, as applicable; a trench cross section for each one of the pipe option is to be shown on the drawings. A Soil Classification of the native soil, including as a minimum: identification, gradation, group symbol, and Atterberg limits, is to be made part of the supporting data of the trench design. Any deletion of a pipe option, as called for in the USACE Guide Specifications, must be supported with complete engineering calculations; the engineering based justification for the deletion of the pipe option must also be narrated in the Analysis of Design. Since controlled compaction is required during construction, hydraulic consolidation of bedding or backfill (initial or final) material is **not** to be allowed.

b. Drawings

(1). Soil informations obtained from field logs, laboratory tests and geologist's logs should be presented on the contract drawings in the form of final boring logs and explanatory notes.

(2). Paving: Show the locations, elevations, and dimensions of all roads, street, walks, pads, open storage areas, runways, aprons, taxiways, over-runs. Indicate different surfaces and pavement sections with symbols and notes. Provide details showing joints, curbs, gutters, signs, sealants, sidewalks and pavement sections. For rigid pavements spot elevations shall be provided at each joint intersection. Include all elements of the pavement with depths and compaction density requirements. Clearly show joint layout, thickened edges, location of tie-down anchors, markings and striping.

c. Specifications

See paragraph B, SECTION VIII.

B. SITE DEVELOPMENT

1. 10% DESIGN SUBMITTALS

a. **Siting:** Describe site conditions including existing topographic features and improvements affecting or relating to the proposed site work.

b. **Orientation:** Discuss reasons for facility orientation. Address such factors as prevailing winds, existing structures, adjacent site conditions, solar loads and future development areas.

c. For other requirements, refer to SECTION: SUBMITTALS.

2. 35% DESIGN SUBMITTALS

a. General:

For survey requirements see APPENDIX E.

The location of new facility will conform to the installation's master plan approved by HQDA (DAEN-MCE-P).

(1). Natural characters of the site will be preserved to the greatest extent feasible, and integrated into the site plan. Existing features such as ground forms, rock outcroppings, trees, water, and masses will be retained and enhanced as assets that compatibly relate facilities with their natural setting. These features should be used to advantage to provide interesting changes in grade, pleasant views and vistas, and to enhance the environment by preserving them as natural low maintenance areas. To create such an environment, buildings will be carefully sited to

avoid excessive grading and massive movement of earth.

(2). Large utility elements such as cooling towers, transformers, and substations will be located and designed to minimize their visual impact and be compatible with character of their settings.

(3). **Site Circulation -**

(a). An efficient pedestrian circulation will be provided between the proposed facility, parking areas, and other functionally related facilities, both on-site and adjacent to the project area.

(b). Separate vehicular and pedestrian circulation will be provided to the maximum extent feasible. Convenient and safe access must be provided for deliveries, garbage collections, fire fighting equipments, and other essential services. The streetscape and walkway systems will be designed to provide safe and comfortable pedestrian access. Streets, parking areas, and walks should be suitably planted and lighted.

(4). Include all computations for curves, alignment, sight distance, stopping and passing sight distance and superelevation.

(5). **Parking** - The appropriate number of parking stalls for non-organizational vehicles will be provided in accordance with the Architectural and Engineering Instructions. Perimeter, median, and island screen planting in parking areas will be provided to control the adverse visual impact. For heavy snow areas, the screens must be set back from the pavement areas to accumulate drifts, the island planting and curbing should be avoided for easy snow removal.

(6). **Sidewalks** - Sidewalks will be designed to handle the expected type and volume of pedestrian traffic. Elaborate sidewalk layouts will be avoided.

(7). **Grading, Storm Drainage, Road Geometry and Routing -**

Design will take into consideration the following objectives:

(a). Economical development of suitable building sites.

(b). Proper grading for collection and disposal of storm water.

(c). Preservation of the natural character of the terrain by minimum disturbance of existing ground.

(d). Reasonable balance of cut and fill.

(e). Avoidance of wavy profiles in streets and walks.

(f). Avoidance of unsightly earth banks requiring costly erosion-control measures.

(g). Avoidance of steps in walks.

(h). Maximum consideration of existing trees and wooded areas.

(i). Keeping finished grades as high as practicable where rock is encountered close to the surface to reduce cost of utility trenching.

(8). **Fencing** - Describe the type and height of fences and gates. The description shall include features such as outriggers, barbed wires or tape and gate controllers.

(9). **Dust and Erosion Control** - Include a statement of the proposed type and method of accomplishing dust and erosion control and extent of area treated.

(10). **Railroads** - Include the track layouts, type of rails; ballast; geometry and routing; drainage facilities; operating agency and/or regulating agency.

(11). **NPDES Permit** - In projects where wastewater is discharged into the navigable waters, the NPDES permit will be referenced in the narrative description or design analysis.

(12). **Narrative Description**

List all applicable function (PDB, Design Guide, etc.) and design (TM's, ETL's, etc.) criteria.

(a). Describe existing site conditions.

(b). Discuss the most effective use and adaptation of the selected site for the proposed facility. Give reasons for facility orientation, set-back, horizontal and vertical locations, driveway and

sidewalk locations and width, and parking area locations and sizes.

(c). Briefly explain other siting considerations, such as reversal of standard plan, and functional and esthetic relationship with surroundings.

(d). Discuss the proposed drainage design including rainfall intensity and return period, concentration times, infiltration rates, tributary areas, method of computation, and the reasons behind the selection.

(13). List guide specifications to be used and unique specification if any.

(14). List informations needed to complete final design.

b. Drawings

(1). General Requirements.

(a). Scales shall be selected to avoid overcrowded and cluttered conditions on the drawings (generally 1" = 30' or larger). Preparation of all work shall be for one-half size reduction unless instructed otherwise.

(b). Orientation of plans shall be consistent with the north arrow-pointed toward the top of the sheet or towards the left when necessary.

(c). Waste and borrow area and haul routes should be shown on location maps, if applicable.

(d). Provide vicinity and location map indicating only the general relationship between the proposed facility and major existing structures and/or streets, to facilitate identification of the proposed site.

(2). Site Plan

(a). Show proposed facility with layout dimensions and road stationing.

(b). Show demolition or relocation requirements as applicable. Separate demolition plans may be required for areas where large demolition works are involved.

(c). Show sufficient horizontal and vertical control to clearly indicate the proposed siting of the facility in relation to existing features.

(d). Show finished floor elevation(s) and other critical spot elevations, if any.

(e). Show sidewalks, roads, loading docks, ramps, service roads, and parking areas (number spaces) with ingress and egress.

(f). Show the fencing including type and height and width of gates.

(3). Grading Plan

(a). Show finished contours to indicate the general grading scheme and drainage pattern.

(b). Drainage should be indicated by arrows. Indicate approximate sizes and type of pipes to be used for culverts and storm drains.

(c). Show riprap including areas to be covered as required.

(d). Show the tentative clearing and grubbing limits.

(4). Landscaping Plan

(a). Show existing trees that are to be protected and saved.

(b). Where subsurface drainage systems are used, show the type of systems, size of pipes, and sump pits.

3. 65% DESIGN SUBMITTALS

65% submittal for design analysis, drawings, and specifications shall be in accordance with the requirements specified in A.3. of SECTION III.

4. FINAL DESIGN SUBMITTALS

a. Design Analysis

(1). General

Design analysis shall contain the detailed description of site work including layout for buildings, roads, streets, and parking facilities. Indicate criteria followed in siting

such as data from Using Agency and Corps of Engineers technical manuals. Include parking spaces provided, widths of streets, roads, etc., and basis of design. In addition, fully justify any deviations from Corps of Engineers criteria contained in TM 5-822-2, TM 5-822-3, and Architectural Engineering Instructions.

(2). Landscaping

Include a statement of need and justification for proposed landscaping, and description of existing and proposed plantings. State any unusual climatic or soil conditions or local factors which affect the design or selection of plant species.

If landscaping is not to be included in the project or to be accomplished by others, include a statement to that effect. Design criteria shall conform to TM 5-830-1, 2, 3, and 4.

(3). Storm Drainage

Show all the computations used for determining the design flow and pipe sizes (including all options in pipe materials). List rainfall intensity, return period, concentration times for each drainage area and the infiltration factors used. Provide an analysis of each new culvert and of existing culverts which are used in the designing. Show adequacy of existing drainage area which shows the principal water courses and the location, size and invert elevation of existing and proposed new drainage facilities including surface ditches, storm sewers, and culverts.

Include design of storm water detention, oil/water separator where required. Provide drainage area maps for systems that drain into or through the project area. Inlets and inlet grates used in paved areas must be "bicycle safe".

(4). Erosion and Sedimentation Control, and Storm Water Detention.

The Architect Engineer shall, in the early stages of design, contact state, county, and local authorities and include in the Feasibility Study, Concept or Early Preliminary Design Analysis, requirements for erosion and sedimentation control and storm water detention.

(a). Architect Engineers are required to prepare design analysis, plans and

specifications for storm water detention where required by local authorities.

(b). Include statement of proposed type and method of providing erosion control, reasons for selection, extent of area

b. Drawings

(1). Site Plan

Show the dimensions of all new work and the relation of new work to existing facilities. The new work will be located by coordinates or other definite means. Only one bench mark will be used except where a very large area is involved. Indicate the bench mark location, elevation, and description. Provide a north arrow and at least two horizontal control points. Clearly locate on-site borrow and spoil areas. Indicate possible future construction using short dashed lines, if any.

Stationing and curve data are required for road or street layout as applicable. Include complete legend.

(2). Grading and Storm Drainage Plan

Provide a north arrow and show the grading and drainage conditions including swales, direction of drainage, point of discharge, and ditches using notes, symbols, spot elevations and contours. Provide finished grades for new work and show existing topography.

Show inlets (with grate elevation), manholes, valves, hydrants, headwalls, etc. Also show any other feature of work which will appear on the ground surface.

Provide sections showing the relationship between existing ground and finished grades, pavements, shoulders, ditches, swales, curbs, gutters, buildings and other structures. Provide a minimum of one cross-section in each direction through a building and site development area.

Sizes of existing and new lines with new inlet and manhole numbers are also shown. Roof drain lines to storm drains must also be shown. In addition, all storm drain pipings from storm water detention must be included.

(3). Landscaping Plan

The plan shall be clearly delineated and

dimensioned where necessary to insure the proper location of plants, lawn divider strips and similar items. The plan list shall have the botanical and common name, quantity, container size or caliper and spread of the plants specified. Header board detains, planting and staking details shall be shown. Lawn areas, where specified, shall be clearly defined. The planting plan shall be a separate drawing. Where erosion control seeding and special treatment for erosion control is required, the areas shall be well described and delineated. Show the layout of the sprinkler system location the heads, pipe, sizes, valves, backflow preventer and connection to main. If no landscaping is required, so state.

(4). Profiles, Sections, and Details

Profiles for storm drains must show:

(a). Existing and finished grade.

(b). Manholes, inlets, headwalls, etc... with numbers (corresponding to those shown on grading and drainage plan).

(c). Top and invert elevations.

(d). Size, length, and gradients of all lines.

(e). Elevations of all existing and new utility crossings.

c. Specifications

See paragraph B, SECTION VIII.

C. <u>UTILITIES</u>

1. 10% DESIGN SUBMITTALS

a. Provisions of utility connections essential to efficient operation and maintenance of the project should be considered to assure close coordination in the design of the various utility lines.

b. State type of utilities required for the project.

c. For other requirements, refer to SECTION: SUBMITTALS.

2. 35% DESIGN SUBMITTALS

a. Design Analysis

(1). General - Include narrative describing proposed utilities. Tieing into existing municipal utilities must be coordinated with the Authority having jurisdiction. List all permits and easements or right-of-way requirements that must be met.

(2). Water Distribution -

(a). Develop basic and controlling water demands and show required residual pressures. Include fire, domestic and industrial average and/or peak demands as applicable. Show adequacy of distribution system to supply controlling demands; include information basic to this determination, such as known hydrant flow tests and/or computations. State whether additional fire hydrants are needed and indicate the recommended location of each hydrant. If the water requirements for the project are considerable, state whether a determination has been made regarding the capability of the existing system to meet the additional demand or if further analysis is needed.

(b). For service lines, distribution main extensions and new distribution systems, state the proposed friction coefficient, approximate controlling elevations, special material requirements and any special features of the design such as pressure reducing or regulation valves.

(3). Water Supply (including sources, treatment, storage, pumping, and transmission and distribution lines) for new systems or additions.

(a). Give basic information such as population, capacity factor, per capita allowances, industrial and irrigation requirements and fire demands.

(b). To the extent required for project purposes, provide information on type, condition, and adequacy of existing units such as wells, pumps, reservoirs, etc., and current water use. If these items are already described in an existing report, give summary statement and appropriate reference.

(c). In describing proposed works, include functional design concepts basic to selection of type of units, materials,

economy of operation, controls, etc. Provide statement of tentative sizes or capacities of major components, any critical elevations or dimensions, and essential related items as estimated from preliminary computations.

(d). For new sources, include data on existing supplies and alternatives for new sources such as wells and surface supplies. Provide data for all proposed water wells and test drilling programs with full explanation of factors affecting choice of location, type, diameter, depth, and important related characteristics.

(4). Water Treatment - Where water treatment is included as part of a project, the designer shall provide a copy of the water analysis and describe the elements of the design including the capacities and number of units, monitoring equipment and controls. The alternatives that were considered and the reason for selecting the design over the alternatives shall be discussed demonstrating how the design will correct the objectionable characteristics of the water.

(5). Sewage Systems -

(a). Sewage Collection - Discuss peak and average flow determinations for building connections, individual sewer lines and force mains based upon population data, measurements or computations from the number of fixture units. Indicate controlling elevations and compliance with velocity and size criteria. Confirm adequacy of existing sewers to carry additional flow.

(b). Provide basic information, such as population, capacity factor, per capital flows, quantity and nature of waste, etc., as applicable and develop required size and capacity for sewage lift stations.

(c). Describe type of proposed system and pipe materials. Discuss nature of industrial wastes. Industrial-type wastes should be segregated and treated separately as general rule, but inclusion with sanitary wastes may be considered, if justified. Unless quantity is small and disposal will be tile field drain or filtration and evaporation from pond, include need for data concerning State requirements for pollution control.

(d). Sewage treatment - Where waste treatment is included in the job, explain the degree of treatment required to meet the applicable discharge standards. A complete description of the nature of the waste shall be included. Describe the elements of the design including the capacities and number of units, monitoring equipment and controls. The alternatives that were considered and the reason for selecting the design over the alternatives shall be discussed demonstrating how the design will achieve the treatment goals. Pilot plant testing programs which are to be conducted will be described, and in the case of land treatment including septic system, soil testing program will be developed and described. Provide a copy of the NPDES permit as required.

(6). Gas Lines

(a). Explain existing systems to determine their adequacy for supplying the demands of proposed additions.

(b). Provide statement on type of construction, proposed materials, required flows, pressure drop, and tentative pipe sizes.

(7). Heat Distribution Systems and Other Utilities

(a). Provide statement on type of construction, proposed materials, type of system, and heating loads including supply temperature and operating pressure calculation.

(8). Corrosion Mitigation - For each new project with utilities systems and/or metallic structures that are buried, submerged, or in contact with either the ground or a substance which may be corrosive, a preliminary survey will be made by the District or Architect-Engineer (depending on contractual provisions) to determine the need for corrosion protection. If the Architect-Engineer determines further tests are required, this recommendation will be presented to the USACE project manager. Submit a summary of the conclusions on the need of protection against corrosion.

(9). List guide specifications to be used and unique specification if any.

(10). List informations needed to complete final design.

b. Drawings

(1). General

Utilities shall be shown on a separate utility plan from the grading, paving, and drainage plan, unless otherwise approved.

(2). Utility Plans

(a). Scale will be same as site plans.

(b). Show floor elevation and other critical spot elevations.

(c). Show utility demolition requirements as applicable.

(d). Show exterior utility layout with location of all existing and proposed utility services and points of connection. Show tentative sizes.

(e). Show sufficient horizontal and vertical control to clearly indicate the proposed utilities in relation to existing features.

(f). Show existing and proposed fire hydrants, fuel oil storage tanks, and oil/water separators, if applicable.

3. 65% DESIGN SUBMITTALS

65% Design Submittals for design analysis and drawings, and specifications shall be in accordance with the requirements specified in A.3. of SECTION III.

4. FINAL DESIGN SUBMITTALS

a. Design Analysis

(1). Water Distribution and Service Lines

Furnish the flow requirements, line sizes, friction factors, head loss, water velocities, and line pressures for each option in pipe materials. Provide fire flow test data or other measurements upon which the calculations are based. Show calculations demonstrating the ability of the water distribution and service lines to deliver the required pressure and quantity of water.

(2). Sewage Collection Systems

Show the population or fixture unit basis for computing expected flows. Show peak and average expected or measured flows and any factors used in estimated flows. Provide the flows, sizes, slopes and velocities of each line segment. In addition, for lift stations, show required head, volume of wet well, cycle times at peak and average flows, and pump controls. Provide a graph showing the intersection of the system head curve and the pump characteristic curve(s). Indicate the pump operating point, HP, efficiency. Make provisions for standby power.

Major items of equipment shall be described with sufficient clarity to permit a definite selection for cost estimating purposes from manufacturer's catalog data.

Locate sewage collection mains by the topography of the site to keep excavation for these lines to a minimum.

(3). Water and Sewage Treatment

List all criteria used for the design of each treatment process and operation. Furnish all calculations showing the design of the processes and operations including the hydraulic and organic loading. Provide a hydraulic profile of the treatment plant.

(4). Septic Tank and Tile Field

Design septic systems in accordance with TM 5-814-3, Domestic Wastewater Treatment, or where permitted by regulatory authority, the governing state design criteria.

b. Drawings

(1). Show all existing to remain and new pipes with sizes (such as water, sewer, storm drain, heat distribution, and gas lines), valves, manholes, fire hydrants, service boxes, inlets, culverts, headwalls and cleanouts. Provide a north arrow on the utilities site plan and show the relation between the utilities and roads, buildings, sidewalks, etc. Indicate the invert elevations and points of entry to buildings for utility lines. Do not show lengths of utility runs on plan sheets.

(2). Profiles shall be provided for wastewater collection lines, force mains, water supply and

heat distribution lines. Show existing and new topography on both plan and profile. Profiles will also be provided to show adequate cover in areas of varying topography. The profiles shall show minimum cover and required excavation and backfill depths, new and existing utilities, invert elevations, stationing, surface features such as roads, curbs, sidewalks, etc., and appurtenances to the utility system.

(3). Furnish details of all features such as valves, manholes, fire hydrants, service boxes, inlets, headwalls, cleanouts, thrust blocks, pipe encasements, frames, grates, covers, steps, etc. For treatment facilities provide details for treatment units. Show all inplant lines and process piping. In congested areas or in areas or in areas where data is unclear as to the exact location of utilities, the utilities drawings should contain the following note:

> "Locations and elevations of utilities are given to the extent of information available. Where elevations are not given at points of existing utilities crossings, such elevations shall be determined by the contractor and reported to the Contracting Officer. When unknown lines are exposed, their location and elevation shall likewise be reported."

c. Specifications

See paragraph B, SECTION VIII.

SECTION IV
ARCHITECTURAL

A. **10% SUBMITTAL** (See SECTION II)

B. **35% SUBMITTAL REQUIREMENTS**

1. GENERAL

Provide general description describing type of building, number of stories, basement, etc., and include items such as: loading docks, covered and uncovered porches, entrance ramps, recessed entries as applicable.

2. DESIGN ANALYSIS

The basic purpose is to create a quality design, for living and working environment for military, civilian, and visiting personnel. Focus will be given to the interrelationships of buildings, open spaces, and existing features to assure that an interesting and attractive atmosphere is provided. The desired end result is an efficient design that would be energy sensitive, aesthetically pleasing, and easy to construct and maintain. The design will be within the programed amount and the project scope. The facility will be designed to allow or provide free access for the handicapped or certification for waiver will be provided in accordance with the Architectural and Engineering Instruction, Chapter 7 (latest edition).

a. Architectural Design Solution:

(1) List functional criteria from programming documents, technical manual, engineering technical letters and architectural and engineering instructions, and design guides.

(2) In narrative form, designer should state reasons for basic solutions proposed, choice of specific materials, architectural treatment, and brief statement on other solutions considered, but rejected, with reasons therefore. Refer to drawings, if needed. Show bubble diagram(s) indicating functional relationships. Provide the following information:

(a) Floor system describing slab on grade, joist etc. Indicate story height.

(b) Exterior design describing type of walls, roofing, windows, doors, miscellaneous (sunshade, porches, entry dock, canopies and wing walls, special treatment, etc.)

(c) Interior design: Describe type of walls, doors, layout of equipment and furnishings, miscellaneous features such as special hardware, computer floors, sound control, clean-room, elevators and draft curtains. Provide a tabular room finish schedule; including floor finish, base, wainscot, walls, ceiling and ceiling height.

b. Security Provisions: Provide description of intrusion detection systems to be implemented and in which sensitive areas such as: mail room, arms storage, pharmacy room, communication room, etc., and also indicate any special locking device.

c. Fire Protection Analysis: A fire protection analysis will be submitted as part of the design analysis and shall be in accordance with Mil Handbook 1008, NFPA 101 (National Fire Protection Association), UBC (Uniform Building Code), (latest editions). The A/E is also required to submit the fire protection code analysis by using the format in INCLOSURE 1 at the end of this SECTION. In cases of code conflict the most stringent applies and COE project manager shall be informed for further clarification.

d. Area Computation: Gross area of structure and net area breakdowns for each floor will be provided in the design analysis.

e. Handicapped Requirements: Indicate if the facility has provisions for the handicapped. The facility shall conform with Uniform Federal Accessibility Standards, latest edition.

3. DRAWINGS

a. New or Addition: Floor plans shall reflect the interrelationship between existing buildings and additions.

(1) Floor plans: Shall indicate major dimensions, room identification, door and window openings, building orientation, room by room area square footage tabulation for 1391 comparisons, and other special features. Floor plan for each floor. (Dimensional grid system will be provided where structural column and beam framing systems are used. The drawing must carry a dimensional grid system carefully coordinated with structural

drawings and dimensional line strings on the architectural drawing must be broken and tied to this structural grid control system as they pass through it. Take overall control dimensions at same points on architectural and structural drawings).

(2) Elevations: Shall indicate doors, windows, control joints, height and number of stories, roof slope, exterior finish material, and other special features.

(3) Building sections: Shall indicate at least two cross sections, longitudinal and transverse, height and number of stories, special focal points showing mechanical rooms, computer rooms and lobby.

(4) Typical wall section: Drawing shall show from foundation to roof section. Roof and wall individual material thickness shall be dimensioned for U-value requirement as indicated on the design analysis. Identify interior and exterior finish material, floor to floor height and number of stories.

(5) Roof plan: Shall indicate type of roof, slope, drainage and additional relief drain (for flat roof provide cricket) if required, roof equipment location and penetrations, walkway, access, valleys, and ridges.

(6) Fire protection plan:

(a) A separate fire prevention and life safety floor plan drawing(s) shall be submitted for all projects that are:

- Places of assembly, or
- Educational or institutional type facilities, or
- Sleeping quarters, or
- Commissaries or any other buildings exceeding 10,000 square feet in gross area, or
- Three stories or greater above grade.

(b) Drawing shall show at least the following items of interest to fire protection and life safety personnel. This drawing(s) is to be labelled to be used as a reference only. A statement is to be made on the drawing that it is not a part of the

contract drawing and that all information contained is called for elsewhere. The drawing is to be essentially 100% complete at the time of initial submittal. The drawing will be part of the final Architect/Engineer contract drawings.

- Location of hourly fire rated walls and smoke partitions.
- Location of exit paths and the maximum travel distance of each. Location of exit signs and emergency lighting (NFPA 101, latest edition).
- Fire hazard of contents and occupancy classification.
- Building construction type as to its fire resistance capability (UBC, latest edition).
- Number of person occupancy per room (by symbol p10 within the ellipse) (NFPA 101, latest edition).
- Capacity of means of egress (NFPA 101, Chapter 5, section 5-3.3 Egress capacity, latest edition).
- Location of hand-held fire extinguishers, and fire extinguisher and hose cabinets.
- Provide location and description of automatic sprinkler system.
- Provide type of system (wet, dry, foam, etc.), density of coverage (gpm/ft^2) and minimum applicable area.
- Location of stand-pipe systems.
- Location of all smoke and fire detectors and description of their type.
- Location of manual fire alarm stations.
- Description of any special fire protection features.
- Note: If an existing fire door is to be replaced, the frame should also be replaced.

b. Rehabilitation: All items listed shall be part of submittal whenever applicable as per project scope requirement:

(1) Floor plan: Major dimensions, demolition plan showing existing to remain, existing to be removed, existing to be removed and relocated, and new items. Space identification both existing and new, door and window openings both existing and new, legend to reflect existing to remain, existing to be removed and relocated, and new, floor plan for hazardous material removal and general notes. Preferred scale is

(2) Elevation: Exterior elevation: Identify items to be removed, to remain, to be reworked and new, such as doors, windows, penetrations, finish, height and number of stories, and roof. Interior elevation: Identify items to be removed, to remain, to be reworked and new, doors, windows, penetrations, finish, height, walls, equipment and other special features such as computer floor, ramps, caseworks, etc.

(3) Building section: Shall be provided whenever applicable.

(4) Typical wall section: Shall be provided whenever applicable.

(5) Roof plan: Shall be provided whenever applicable.

(6) Fire protection plan: See requirement on paragraph B.3.a.(6) above.

c. Pre-fabricated Building:

(1) Narrative design criteria: shall be provided describing the type of building, number of stories, and type of materials.

(2) Floor plan: Door and window openings, room identifications, major dimensions and floor type.

(3) Elevation: Door and window openings, locations of penetrations, floor to floor height, roof slope and finish material.

d. Definitive, Standard, and Site Adaptive Drawings:

(1) Definitive drawings do not include sufficient information for use in construction, but establish basic functional features in preparation of final project design. The following revisions may be required when definitive drawings are used.

(a) Change dimensions to fit modular design.

(b) Change fenestration and other features pertinent to adaptation to local climatic conditions.

(c) Modify for compliance with Life Safety Code and handicap criteria.

(d) Change shape and interior arrangement of building as required to conform to site or topographic requirements or tie to existing building.

(e) Provide vestibules when required.

(f) Modify exterior elevations including roof slopes to comply with current criteria including compatibility with architectural theme.

When definitive drawings are used it is not permissible to increase the gross area, or add, omit or effect a major change in area allotted to the various functions of the building. Approved programmed scopes will not be exceeded. (Note: Drawing presentation shall be in the same format as "new" on paragraph B.3., Drawings, 35% submittal).

(2) Standard drawings: Standard drawings are working drawings issued by the Corps of Engineers to establish uniform standards in scope and quality for structures likely to be repeated in several locations. All possible local variations with respect to siting, foundation conditions, earthquake forces, topography and climatic conditions cannot be anticipated. When standard drawings are used for a design, applicable portions of those drawings will be used to the maximum extent practicable. Structural or architectural changes will be made only if specifically authorized in the directive or design instructions. From time to time the Chief of Engineers publishes general changes to design criteria by means of Engineering Technical Letters (ETL's), revised Technical Manuals (TM's) and Guide Specifications. Modifications of previously issued standard drawings to reflect these changes for project (final) drawings is both authorized and required. Otherwise, project documents will be prepared by modification of the standard documents for site, seismic and climatic conditions only. The following further defines the above instructions.

(a) The following revisions to standard drawings shall be made where applicable without further approval:

- Increase depth of footings and foundations to depth of frost line.

- Redesign footings for local soil conditions.

- Add elevation figures to drawings to relate plans to local bench marks.

- Revise heating, air conditioning or insulation requirements due to climatic conditions. Provide for admission of combustion air to furnace rooms and rooms containing diesel or gasoline engine-driven equipment.

- Redesign for seismic loads when structure was not designed to resist seismic forces.

(b) Items that are not dependent on local conditions shall not be revised without prior approval of OCE.

(3) Site adaptive (existing working) drawings other than standard drawings discussed hereinbefore are working drawings previously prepared for a specific installation, under the supervision of this or another District, and changes are required to be adapted for a specific site. Normally, any specific changes to be made in site adaptive drawings will be called out in the scope of work and discussed at the pre-design conference. All sheets shall have COE standard borders and title blocks. Drawings will be corrected as hereinbefore required for standard drawings, except as follows:

(a) Army projects: Drawings will also be corrected to meet detailed requirements of the current COE Guide Specifications and Technical Manuals.

(b) Air Force projects: Drawings will be required to be changed to meet current criteria contained in COE Guide Specifications, AFM 88-15, current AF ETL's, or AF Manuals, unless stated in the scope of work. However, if new guide specifications are edited as part of the site adaptive work, drawings will be corrected to agree. (Example: Revising the masonry reinforcing

details to a more stringent seismic zone.)

e. The scale shall be as follows:

(1) Floor Plans - 1/8"=1'-0"; for enlarged portion of plan; use 1/4"=1'-0" or 1/2"=1'-0" depending on the size of area to be enlarged.

(2) Elevations - 1/8"=1'-0"; for enlarged portion of elevation use 1/4"=1'-0" or 1/2"=1'-0" depending on the size of elevation to be enlarged.

(3) Building sections - 1/8"=1'-0".

(4) Typical wall sections - 3/4"=1'-0"; for spot details as appropriate for clarity use 1 1/2"= 1'-0" or 3"=1'-0".

(5) Details and miscellaneous details - 3/4"= 1'-0"; for spot details as appropriate for clarity use 1 1/2"=1'-0" or 3"=1'-0".

(6) Roof plan - 1/16"=1'-0".

(7) Fire protection plan - 1/8"=1'-0".

4. SPECIFICATIONS

See paragraph B, SECTION VIII.

C. 65% SUBMITTAL REQUIREMENTS

1. GENERAL

This submittal will constitute incorporation and correction from previous comments proceeding to a more detailed submittal. This submittal is usually an Air Force requirement, or for Army projects if stipulated on the contract.

2. DESIGN ANALYSIS

Design analysis shall be updated, revised as required and shall include the degree of compliance to previous comments. Fire protection analysis shall be updated, and revised to reflect review comments.

3. DRAWINGS

Plans, elevations, building sections, wall sections and detail drawings shall be substantially complete. This submittal shall include windows, doors, details and schedules, exterior building treatment and special items, i.e. lobbies, toilets. Submit updated fire protection plans.

4. SPECIFICATIONS

See paragraph B, SECTION VIII.

D. FINAL SUBMITTAL REQUIREMENTS

1. GENERAL

Whether 65% submittal is provided or not, all previous comments shall be resolved prior to proceeding to final submittal.

2. DESIGN ANALYSIS

Design analysis shall be updated, revised as required and shall include the degree of compliance to previous review comments. If 65% submittal is not provided, fire protection analysis shall be updated, and revised to reflect review comments.

3. DRAWINGS

a. New or Addition:

(1) Floor plan: Dimensions and referencing symbols on drawing shall be complete for biddability and constructibility. Floor plan shall show expansion, construction, control joints, separation joints, and seismic joints between the existing buildings and additions. Reference all section or elevation cutting lines on plan to appropriate drawing on which the section or elevation is shown. Final drawing shall include large scale plans of mechanical room, kitchen and serving area, break room, toilets, showers, dining area, laundry room, stairs enclosure, main entrance lobby, ramps, elevators, dumbwaiter, chutes and conveyors, and dedicated computer room. All fixtures, equipments and furnishings shall be located by dimensions. For toilets/showers plumbing fixtures, provide proper symbols for handicapped. Movable partitions shall be shown and noted on floor plan.

(a) Walls (exterior and interior) shall be drawn to scale showing thickness and control dimensions, wall type symbols to coordinate with wall type drawing schedule, typical wall detail cutting section and elevation referencing symbols and walls fire rating.

(b) Door openings shall be dimensioned. Provide referencing symbols and type to

match drawing and schedule. Door shall be assigned with type grouping numbering system, preceded by letter "D". Location of door opening on critical and tight condition, provide string of dimensions. Show all door swings. Whenever door swings out on a tight access corridor, doors shall be in conformance with NFPA 101, Chapter 5, section 5-2.1.4.2 (latest edition). Door opening in masonry will be dimensioned from opening where set is masonry constructions. Centerline dimensions are acceptable for frame construction. Door openings in masonry should work to modular masonry units where possible.

(c) Window opening shall have complete string of dimensions. Provide referencing symbols and type to match detail drawing and schedule. Window type will be assigned a number preceded by letter "W". Windows shall work to modular structural units where possible. All window openings in masonry will be dimensioned from opening to opening. Dimension in frame construction shall be centerline to centerline.

(d) Room numbering: Every room will be assigned a separate number and this number will be clearly indicated on plans. This number will be generally assigned as follows:

Basement	001 thru 099
First Floor	100 thru 199
Second Floor	200 thru 299

Room numbers shall be clearly consecutive as possible, beginning with the principal entry area and progressing counter-clockwise through the plan. Spaces added by revision should be given the number of the primary or nearest room followed by the letter "A", or if more than one additional space, "B", and so forth.

(e) Miscellaneous items to be shown on floor plan are the following: drinking fountain for handicapped, telephone booth, fire extinguisher and hose cabinets, vending machine and lockers. Items not in contract shall be shown in dotted lines and with the initials "N.I.C.".

(2) Elevations - shall show complete dimensions, floor to floor heights, number of stories, fenestration, and to finished grades. Show

location of seismic and control joints, separation joints between existing and addition, doors and windows, gutters, louvers, roof vents, canopies, platforms, downspouts and splash blocks, wall lights, etc.; including visible structural frame, masonry panels and difference in material sufficiently to portray a complete picture of the structure. Indicate wall expansion joint locations where applicable, as set forth in TM 5-809-3 and according to the notes to the specification writer attached to the masonry guide specification. Utilize steel lintels and bond beams in concrete masonry units construction where possible. Avoid cast-in-place lintels and sills at door and window openings. Door sills at grade may be cast-in-place. Indicate and note, on all elevations of mechanical and electrical appurtenances such as; louvers, roof ventilators, and wall lights. Provide complete identification of all finished material and color. Final drawing shall include large scale of interior elevations of toilets, showers, kitchen and serving area or breakroom, dining area and laundry area. For exterior elevation showing main entrance canopy at lobby and other special exterior features. Indicate all fixtures, equipments, and furnishings located by dimensions. Height of handicapped fixtures and caseworks or cabinets shall be in conformance with Uniform Federal Accessibility Standards (UFAS) latest edition. Elevation views labelling shall be indicated by the following: NORTH, SOUTH, EAST and WEST elevation.

(3) Building section: Provide at least one longitudinal and one transverse sections through the entire building. The sections must be carefully selected to show the greatest amount of assembly information. The sections shall be completely noted, and shall include ductwork, furred ceilings, and all other items cut by section which are part of the contract. The cut lines must be shown on floor plan and cross-referenced to the section. Provide complete dimensions, ceiling and floor to floor height and number of stories.

(4) Typical wall sections (exterior and interior): Drawing must be presented in more detail manner in comparison with 35% or 65% submittal. Drawing will indicate complete dimensions, material and color finish, floor to floor height, ceiling height, foundation showing finish grade and perimeter insulation, thickness dimensions of walls, doors and windows showing head, sill and threshold, type of floor slab and ceiling, roof showing joist, deck, insulation,

roof type and finished material, method of roof securement, slope, flashing, gutters and downspout, scuppers and parapet. Provide typical wall sections cutting thru walls, doors and windows.

(5) Details shall be cross-referenced to plan and elevations. Group and plan the detailing to avoid scattering of details. Keep all details grouped together which occur in a specific area. All details must be completely dimensioned and identified, indicating materials and finishes. Items for which shop drawings are to be furnished should be detailed accordingly, showing materials, scope, size/limitations, etc. Connections to surrounding surfaces, structural specialties, finish connections, etc., are to be completely detailed. Items for which shop drawings are not required must be completely detailed and noted, to provide accurate job assembly at fabrication, and connection to surrounding finishes and surfaces. Include typical wall sections, etc., in sufficient number to convey adequately the intended construction. In general, all items and special fabrication or assembly requirements must be completely detailed, dimensioned, noted and cross-referenced to the plans, sections and elevations. Items to be detailed, stairs, elevators, dumbwaiters, chutes and conveyors, ramps, smoke barrier, fire doors, curtains, exterior entrance pads and steps, ladders, caseworks or built-in cabinets, and for other items in contract for clarity. Final drawings shall show typical details of movable partitions, doors and windows, detail of control, expansion and construction joints in concrete. Provide detail plan of column showing finished covering. Provide miscellaneous details such as roof scuttle, caulking joint shapes (full scale). Provide applicable connections details between existing and addition.

(6) Reflected ceiling plan: Reflected ceiling plans shall be provided to show adequately the ceiling design and pattern. Show control and expansion joints in ceiling when they occur. Ceiling plan shall address seismic requirement as per TM 5-809-10, Chapter 9. Final drawing shall show details of special acoustical treatment and other special type of ceiling. Ceiling plan shall provide the following:

(a) Type of ceiling, exposed and drop ceiling indicating material finish and height of ceiling above finished floor.

(b) Floor plan indicating grid system for acoustical ceiling, plaster and gypsum board finish, showing all mechanical grilles, lighting, ceiling access openings and fire rating if required.

(c) Typical connection detail of hung ceiling such as acoustical, plaster, gypsum board and wood. Provide detail showing seismic structural support in accordance with TM 5-809-10, Chapter 9.

(d) Indicate tile starting point for acoustical tile ceiling. Dimensioned for lights, access openings, and mechanical grilles for the following ceiling finish: plaster, gypsum board and wood.

(e) Coordinate drawing with electrical and mechanical drawings.

(f) Provide cross-reference symbols for all cutting sections.

(7) Roof plan and details shall indicate mechanical equipment and vents, roof drains and relief drains, roof slope, type of roof, crickets, etc. Cross-reference to where flashings and curbs are detailed for roof penetrations, including mechanical and electrical features. Roof plan shall be provided with complete dimensions. Detail shall show roof eaves and rake edges, drain and relief drain, parapet and rail, skylight or clerestory opening, scuttle, roof ridge and valley. Roof plan shall indicate roof access and walk pavers.

(8) Signage: Provide detail drawing showing elevation, installation and finish material both for interior and exterior signage, whenever applicable to the project scope contract requirements.

(9) Schedules:

(a) Door schedules: A tabular door schedule will be included on final drawings. Every door shall be assigned by group type numbering system preceded by letter "D". Door numbers shall be as nearly consecutive as possible, by floor beginning with the principle entrance and progressing counterclockwise through the plans. An elevation drawing of each type of door identified by an upper case letter will be provided. Details of each frame type will be shown and each type will be identified.

Corresponding fire rating labelling shall be indicated as per NFPA 80 (latest edition). Provide lintel schedule. Schedule shall reflect door and room numbers, finish, fire rating labelling, description, door size and height, frame, lintel type, hardware sets, and remarks.

(b) Window schedule: A tabular schedule of windows will also be included. Each window type will be assigned a number preceded by letter "W". Elevation drawing of each type of window will be provided along with pertinent details. Every window will be clearly indicated by type on elevation drawing. Window frame shall be shown identified and detail. Provide lintel schedule. Window schedule shall reflect the following: window number, description, finish, window opening, frame, lintel type and remarks.

(c) Wall schedule: Schedule of wall type shall be cross-referenced on the floor plan. Detail drawing per wall type shall be provided including special wall feature finish and fire rating. Detail shall include connection of wall type to the underside of structure or ceiling finish, especially walls that are designated fire rated. Wall shall be designated by geometric standard symbols and numbers. Wall type shall include thickness dimensions and material finished identification.

(d) Room finish schedule: A tabular schedule indicating room names and numbers, floor finish, wall finish, ceiling finish and height, door and window trim material finish and remarks. For small jobs these schedules may be placed on the plan sheet. Provide paint finish system notes which stipulates areas to receive paint, for example: enamel, natural finish, etc. Coordinate with the final specifications which shall cover the application of the various paint materials involved to the types of surfaces. Provide abbreviation for finish.

(e) Paint and color finish schedule: For Army facilities colors shall be in accordance with TM 5-807-7, for Air Force facilities colors shall be in accordance with AFR 88-15 and as per Federal Standard 595a. Interior scheduled items will include all items, or materials requiring finish and

paint color selections, including, but not limited to floors, base, wainscot, walls, ceilings, trim, doors, windows, cabinet work, counter tops, glazed tile (ceramic or structural), venetian blinds, drapery, toilet partitions, acoustical treatment including types of attachment or suspension systems, mechanical or electrical items exposed in finish work, border and field in resilient tile and other applicable type material, feature walls, etc. Exterior scheduled items will include all items or materials requiring finish and paint or color selections, including but not limited to walls (including window walls, feature items, signs, etc.), soffits, fascia, trim metal work, concrete or special treatment of concrete, roofing, windows, doors, glass, wall panels, facing material, structural or mechanical or electrical items exposed to view, etc. For pre-fabricated and factory finished items manufacturer's standard colors may be used. Coordination between the drawings and the specification shall be made relative to color and pattern of finishes.

(f) Medical facilities schedule: Hospital and clinic, dental and dispensary casework, furnishings and equipment schedule shall be in accordance with TM 5-838-2.

(g) The Food Preparation and Food Service Equipment Schedule shall include identification numbers for each piece of equipment (same number to be used throughout the architectural, mechanical, electrical drawings for identification), equipment name or nomenclature, approximate size, type of mounting (floor, table, wall, etc.), utility requirements (steam, electricity, gas, water, sewage connection, etc.), size or ratings of service required (pipe sizes, circuit ratings). Identify and note whether each item is to be Contractor furnished and installed, or Government furnished and Contractor installed, or Government furnished and installed or other logistic responsibility.

(h) Signage schedule: Whenever required by contract, provide tabular schedule showing room name location and sign number, size, type and color. Provide detail per sign type including dimensions and materials description. Provide notes.

(10) General notes: Provide notes clearly, concise and complete to conform with the drawing.

b. Rehabilitation: All items listed below shall be part of final submittal, whenever applicable to the project requirements.

(1) Floor plan: Continuation from 35% or 65% submittal to more detail and complete drawing for biddability and constructibility. Drawing shall stand by itself to avoid confusion and changed orders during construction. For clarity on space or area modification provide large scale floor plan; examples toilets/showers, kitchen and serving area and other areas required on the contract. Drawing shall be completely dimensioned. Provide complete floor plan of hazardous material removal.

(2) Elevation: , both exterior and interior whichever is applicable. For clarity provide large scale of interior and exterior elevations.

(3) Building section: Continuation from 35% or 65% submittal to more detail and complete drawing Cutting section shall be concentrated only in areas or spaces where contracts call for.

(4) Details: All applicable details for modifications to existing structures shall be provided. Complete details of plans, sections and elevations shall be provided and correctly cross-referenced to plans and elevations. Details shall be grouped together to avoid scattering. Item for shop drawing shall be detailed accordingly showing materials, scope, size, limitations, connections of surrounding surfaces, structural specialties, finish, etc. Details shall include doors and windows, walls, connection between new and existing, caseworks or built-in cabinets, stairs, ramps, railings, column enclosures and other miscellaneous details. Details applies whichever is applicable.

(5) Reflected ceiling plan: Ceiling plan shall be provided complete with dimensions including all modification to the existing ceiling structure. Ceiling plan shall reflect mechanical and electrical items indicating existing to be removed, to be replaced, to remain and new, with appropriate legend symbol. Provide cross-referencing for detail cutting section and details. Provisions for seismic on ceiling shall be addressed in accordance with TM 5-809-10. Modification to existing ceiling shall indicate type of ceiling materials and finish. Provide

notes to conform with the drawing.

(6) Fire protection plan: Fire protection plan and analysis shall be updated in accordance with the previous comments (this will be done on final drawing, if 65% submittal is not required).

(7) Roof plan and details: For roof modification or alteration demolition plan shall be detailed and completely noted. Plan shall indicate items to be removed, to be relocated, to remain and new. Provide correct cross-referencing on the plan, only item within the contract. Provide type of roof. Details to be provided whichever is applicable are: roof and relief drain, mechanical vent penetration, roof eaves and rake edges, roof scuttle, parapet and railing, flashing and roof curbs, valleys and ridges, crickets. Identify all materials and finishes, either existing or new.

(8) Schedules: Schedules of the following items shall be provided on final submittal: door, window, wall, room finish, food preparation and food equipment, paint and color finish, medical facilities and signage.

(9) General notes: General notes shall be provided complete and shall conform with the drawings and specifications.

c. Pre-fabricated Building: Continuation of 35% or 65% submittal but more detailed information to guide or help the manufacturers on the pre-fab design of building. A/E or designer shall provide complete specification based on CEGS latest specification listings. A/E shall provide a note on drawing, indicating that fire protection requirement shall be the responsibility of the manufacturers in accordance with Mil-Handbook 1008, 30 April 1985, NFPA 80 and 101, and UBC (latest editions). A/E shall provide note for manufacturers that detail scale shall be 3/4"=1'-0" and for clarity use scale 1 1/2" or 3"=1'-0".

d. Interior Design: Interior design applies on some special type project such as hospital and clinic, dental, dispensary, dining hall and child care center, and other buildings if required in contract.

(1) Floor plan: layout showing partitions, door openings, equipment and furnishings, finish material and color. Miscellaneous or unusual features such as the following: special hardware, computer floors, sound control, clean-room, elevators, draft curtain, etc.

(2) Room finish schedule: A tabular room finish schedule including room number, floor base, wainscot, walls, ceiling and ceiling height.

(3) Color Boards: Provide color board if in contract.

(a) Color Boards shall be submitted in a standard 8-1/2" x 11" three-ring binder. Fold-outs may be employed to 25 1/2" x 33" as long as they refold with the standard binder. The number of color boards shall be as called for in the project scope. If pre-finished textured metal panel boards are required, samples shall be submitted with the boards.

(b) Actual material samples shall be displayed showing color, texture, pattern, finish, thickness, etc. These samples shall be large enough to indicate true patterns. However, care should be taken to present materials in proportion to that which will actually be installed in a given situation. Samples shall be organized by color schemes with a separate sample for each scheme. The schemes shall be coordinated by room names and numbers shown on the architectural floor plans. Colors shall be labeled with generic color names.

e. Definitive, Standard and Site Adaptive Drawings:

(1) Definitive drawings: Final submittal shall be complete reflecting all revisions from previous comments on the following drawing: floor plan, elevations, building sections, typical wall sections, fire protection plan. Final submittal shall provide complete drawings on details, miscellaneous details, schedules, roof plan and details, reflected ceiling plan and details, signage and details, and general notes. Complete modification as per site condition.

(2) Standard drawing shall reflect a complete true picture of specific standard drawing use as per site condition modification.

(3) Site adaptive (existing working) drawings shall be a complete drawing with all the required modification as per site condition.

f. Legends and Abbreviations: Legend of symbols and abbreviations shall be clear, concise and complete.

3. SPECIFICATIONS

The A/E shall provide final typed specifications.

a. The Architectural specifications shall be developed from the COE guide specifications (latest editions) and recognized industry or trade standards. Instructions to the specification writer with each guide specification shall be strictly adhered to and drawing shall reflect the materials and methods required by the guides.

b. A/E or designer shall provide a complete final "unique" specifications for sections not listed on the COE guide specification listing.

c. A/E shall verify that items specified "as indicated" or "where indicated" are in fact indicated on contract drawings.

d. Also, see paragraph B of SECTION VIII.

ITEM	NFPA 101-1988	MIL HDBK 1008	UBC	A/E INST. DESIGN CRITERIA	COMMENTS
1. OCCUPANCY	DORMITORY (CH. 4 - 1.6; 16 - 1.3.1 AND 17 - 1.3.1)	RESIDENTIAL GROUP R-1 (2.1.4.7)	GROUP R-1 (1201)	HOUSING FACILITY	
2. CONSTRUCTION TYPE R'QD	NONE (16 - 1.6)	. TYPE I OR II FIRE RESISTIVE (2.1.3; 2.2.1; 2.2.2) . FM APPROVED CLASS I ROOF DECK R'QD DUE TO INSULATION & PARAPET (2.7.2.2; 2.8; 2.3.1.4)	TYPE I OR II FIRE RESISTIVE (TABLES 5C & 5D)	SEE UBC (CHAPTER 9-5)	. EXISTING CONSTRUCTION APPEARS TO MEET AT LEAST TYPE II F.R. . FOLLOW UBC FOR NEW CONST: . 4 HR EXT. WALLS . 2 HR FLOORS, COLUMNS & INT. BEARING WALLS . 1 HR ROOF

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SAMPLE ONLY

ITEM	NFPA 101-1988	MIL HDBK 1008	UBC	A/E INST. DESIGN CRITERIA	COMMENTS
3. HEIGHT AND AREA LIMITATIONS	N/A	FOLLOW UBC (2.2.1; 2.2.2)	. UNLIMITED FOR TYPE I . 29,900 SQ FT BASE AREA FOR TYPE II F.R. - 1 STORY . MAXIMUM 59,800 SQ FT FOR MULTI-STORY BLDG GROSS AREA (W/OUT SPKLRS) . MAXIMUM OF 119,600 SQ FT FOR TYPE II F.R. W/SPKLRS . 12 STORIES MAXIMUM (1202; 505; 506; 507; TABLES 5C & 5D	FIRE AREAS NOT LIMITED FOR TYPE I OR II F.R. CONSTRUCTION FOR THIS OCCUPANCY USE GROUP (CH. 9-5(b)-1)	. ABOUT 23,200 SQ FT/FLOOR WITH 3 FLOORS = 69,600 SQ FT . PROPOSED TYPE II F.R. BLDG AREAS EXCEED 59,800 SQ FT AND THEREFORE REQUIRES AUTO SPRINKLER SYSTEM SINCE NOT MORE THAN 2 SIDES (AT BEST) ARE ACCESSIBLE AND WOULD NOT INCREASE AREA LARGE ENOUGH FOR PROPOSED BLDG AREA
4. FIRE DEPT ACCESS - INTERIOR AND EXTERIOR	N/A - CODE PROVIDES INTERIOR ACCESS DUE TO EXITING PROVISIONS	MINIMUM TWO STAIRS OR NONCOMBUSTIBLE LADDERS TO ROOF (2.10)	REQUIRES ACCESS TO AT LEAST ONE SIDE OF BLDG (504)	N/A	. ROADWAY TO SOUTH SIDE OF BLDG MUST BE MAINTAINED OF ADEQUATE WIDTH FOR FIRE DEPT FIRE APPARATUS

SAMPLE ONLY

INCLOSURE 1

ITEM	NFPA 101-1988	MIL HDBK 1008	UBC	A/E INST. DESIGN CRITERIA	COMMENTS
5. BUILDING SEPARATION AND EXPOSURE PROTECTION	N/A	NOT REQUIRED WHEN BLDG FIRE AREAS ARE MET (2.3.1.2)	N/A - SEE MIL HDBK 1008	N/A	
6. OCCUPANT LOAD	200 SQ FT/PERSON GROSS FLOOR AREA OR MAXIMUM EXPECTED NO. OCCUPANTS (16-1.7)	SEE NFPA 101 (2.5)	N/A	SEE NFPA 101 (CH. 9-3)	ABOUT 23,200 SQ FT/FLOOR YIELDS 116 PERSONS PER FLOOR - THEREFORE 2 EXITS/FLOOR ARE SUFFICIENT FOR EXIT CAPACITY
7. MEANS OF EGRESS	FOLLOW CHAPTER 16 & 5 (16-2.1.1) . DOORS AND ENCLOSED STAIRS ACCEPTABLE (16-2.2.2; 16-2.2.3 . 1 HR FIRE RATED ENCLOSURE OF STAIRS W/1 HR SELF-CLOSING OR AUTOMATIC CLOSING DOORS (16 - 2.2.1.2; 5 - 1.3.1; 5 - 2.1.8; 16 - 3.1.1) . INTERIOR CORRIDOR WALLS MINIMUM 1 HR FIRE RATING W/OUT FIRE SPRINKLERS OR 30 MINUTES WITH FIRE SPKLRS. 20 MIN. FIRE DOOR ASSEMBLY (DOOR, FRAME & HARDWARE) FOR ALL CASES (16 - 3.6) . MINIMUM 44" CORRIDOR WIDTH (16 - 2.3.3) . AT LEAST 2 EXITS FOR ALL FLOORS (16 - 2.4.1) . MAXIMUMK 50 FT. COMMON PATH OF TRAVEL & DEADEND WHEN FULL SPRINKLER PROT. (16 - 2.5)	SEE NFPA 101 (2.5.1)	N/A	SEE NFPA 101 (CH. 9-3)	5 - 3.3.1 REQUIRES EGRESS CAPACITY OF COMPONENTS IN MEANS OF EGRESS TO BE: . 3 INCHES/PERSON FOR STAIRS . 2 INCHES/PERSON FOR LEVEL COMPONENTS (DOORS & CORRIDORS) --- CAPACITY OF 44" STAIR IS (44 INCHES/.3 IN./PERSON) = 147 PERSONS AND OF 44" CORRIDOR IS (44" DIVIDED BY .2"/PERSON) = 220 PERSONS AND 36" DOOR INTO STAIRS (34" CLEAR WIDTH IS 34 DIVIDED BY .2") = 170 PERSONS. THEREFORE, 147 PERSONS IS CAPACITY FOR EACH EXIT. 5 - 2.2.2.1 REQUIRES MINIMUM 44" STAIR WIDTH

INCLOSURE 1

SAMPLE ONLY

ITEM	NFPA 101-1988	MIL HDBK 1008	UBC	A/E INST. DESIGN CRITERIA	COMMENTS
7. CONT'D	. MAXIMUM 50 FT. COMMON PATH OF TRAVEL & DEADEND WHEN FULL SPRINKLER PROT. (16 - 2.6.1) . MAXIMUM 200 FT. TRAVEL DISTANCE W/SPRINKLERS (16 - 2.6.1) . EMERGENCY LIGHTS & EXIT SIGNS REQUIRED (16 - 2.8 & 16 - 2.9 - FOLLOW CHAPTERS 5-8 & 5-9)				5 - 2.2.3.6 REQUIRES SIGNS @ EACH LEVEL INDICATING FLOOR, TERMINUS OF TOP & BOTTOM & I.D. OF STAIR 16 - 2.10.2 REQUIRES A LUMINESCENT OR SELF-LUMINOUS EXIT SIGN BE PLACED ON EACH EXIT DOOR BETWEEN 6" & 8" A.A.F.
8. PROTECTION OF VERTICAL OPENINGS (STAIRS/ SHAFTS/ETC.)	. MINIMUM 1 HR FOR STAIRWAYS, ELEVATOR SHAFTS & MECHANICAL SHAFTS, ETC. (16 - 3.1.1) . FIRESTOP ALL POKE-THRU'S ESPECIALLY UTILITY (HVAC, ELECTRIC, PIPING, ETC.) FOLLOWING A FIRESTOP SYSTEM TO MEET ASTM E-814 (6 - 2.3.4.2)	FOLLOW NFPA 101 (2.4)	N/A	FOLLOW NFPA 101 (9-6c)	
9. PROTECTION FROM HAZARDS	. BOILER/HEATER/MECHANICAL, STORAGE AND SIMILAR ROOMS REQUIRE 1 HR ENCLOSURE OR AUTOMATIC SPRINKLER PROTECTION W/WALLS AND DOORS DESIGNED TO RESIST PASSAGE OF SMOKE (NO RATING R'QD) (16 - 3.2)	. TRASH STORAGE SHALL BE 2 HR ENCLOSED PLUS SPRINKLERS (3-4)	N/A	STORAGE ROOMS AND MECHANICAL EQUIPMENT ROOMS REQUIRE MINIMUM 1 HR ENCLOSURE (9-6c)	

SAMPLE ONLY

INCLOSURE 1

ITEM	NFPA 101-1988	MIL HDBK 1008	UBC	A/E INST. DESIGN CRITERIA	COMMENTS
10. INTERIOR FINISH	. CLASS A FOR STAIRS . CLASS A OR B FOR CORRIDORS AND LOBBIES . CLASS A, B OR C ALL OTHER SPACES . CLASS B PERMITTED IN STAIRS AND CLASS C ALSO PERMITTED IN CORRIDOR DUE TO FULL SPRINKLER PROTECTION (16 - 3.3.1 & 6 - 5.7.1) . CLASS I, II OR NO RATING INTERIOR FLOOR FINISH IS PERMITTED DUE TO SPRINKLER PROT. (16 - 3.3.2 & 6 - 5.7.2) . USES NFPA 255 (ASTM E84) FOR WALLS/CEILINGS & NFPA 253 FOR FLOOR FINISHES	. CLASS A ONLY FOR ALL EXITS AND CORRIDORS . CLASS A OR B ALL OTHER AREAS. CLASS C, D & E NOT PERMITTED . SMOKE DEVELOPED RATING NO GREATER THAN 50 FOR CLASS A AND NO GREATER THAN 100 FOR CLASS B . CORRIDOR CARPET & UNDERLAYMENT MUST HAVE CRITICAL RADIANT FLUX OF .50 WATTS/SQ. CCM OR HIGHER (2.6.2.1 & 2.6.2.3)	N/A	SAME AS MIL HDBK 1008 EXCEPT PERMITS CLASS C FINISH ON WALLS AND CEILINGS IF 10% OR LESS OF TOTAL AREA AND SPRINKLER PROTECTION IS PRESENT (9-6d)	CLASS A ONLY IN EXITS AND CLASS A OR B ALL OTHER SPACES

SAMPLE ONLY

INCLOSURE 1

ITEM	NFPA 101-1988	MIL HDBK 1008	UBC	A/E INST. DESIGN CRITERIA	COMMENTS
10. CONT'D		. NO CELLULAR PLASTICS . USES ASTM E-84 FOR WALLS AND CEILINGS AND FED. TEST METHOD 372 FOR CORRIDOR CARPETS			
11. SMOKE BARRIERS, SMOKEPROOF ENCLOSURES AND OPERABLE WINDOWS	. SMOKE BARRIERS NOT REQUIRED DUE TO SPRINKLER PROTECTION (16 - 3.7.1 EXCEPTION #1) . SMOKEPROOF ENCLOSURES NOT REQUIRED DUE TO ENCLOSED MULTIPLE EXIT STAIRS (16 - 2.2.1.1) . OPERABLE WINDOWS NOT REQUIRED DUE TO SPRINKLER PROTECTION (16 - 4.1)	FOLLOW NFPA 101 (4.2.1.1)	N/A	FOLLOW NFPA 101 (9-3)	. TWO SMOKE BARRIERS PER FLOOR ARE BEING PROVIDED TO ADD AN ADDITIONAL LEVEL OF SAFETY . OPERABLE WINDOWS ARE BEING PROVIDED AS PART OF PROGRAM

SAMPLE ONLY

INCLOSURE 1

ITEM	NFPA 101-1988	MIL HDBK 1008	UBC	A/E INST. DESIGN CRITERIA	COMMENTS
12. FIRE ALARM SYSTEM, SMOKE DETECTION AND SUPERVISORY SERVICE	. MANUAL PULL STATIONS AT EXITS . SMOKE DETECTION IN CORRIDORS NOT REQUIRED DUE TO SPRINKLER PROTECTION . SPRINKLER WATERFLOW ALARM AND SUPERVISORY SERVICE INCLUDING FIRE PUMP SUPERVISION . AUXILIARY FUNCTIONS SUCH AS AUTOMATIC DOOR RELEASE, HVAC SHUTDOWN . IMMEDIATE AUTOMATIC OCCUPANT NOTIFICATION AND FIRE DEPARTMENT NOTIFICATION . ANNUNCIATOR PANEL MUST BE LOCATED AS APPROVED BY LOCAL AHJ (FIRE DEPARTMENT FOR THIS ISSUE). . SINGLE STATION SMOKE DETECTORS (120 VOLT) FOR EACH SLEEPING ROOM - NOT CONNECTED TO BLDG. FIRE ALARM (16 - 3.4; 7-6).	. SAME AS NFPA 101 EXCEPT: . SMOKE DETECTORS CONNECTED TO BLDG FIRE ALARM REQUIRED IN ALL INTERIOR CORRIDORS & LOUNGES, W/OUT EXCEPTION . ALARM SIGNALS (EXCEPT ROOM SMOKE DETECTORS) MUST TRANSMIT SIGNALS TO A CENTRAL STATION (OR FIRE DEPT) (4.2.1.1; 6.1.4.3; 7.1 & 7.2 & 7.3)	N/A	FOLLOW MIL HDBK 1008 AND NFPA 101 - REQUIRES FIRE ALARM SYSTEM, SMOKE AND/OR HEAT DETECTION (9-2b, c, d, e)	. HEAT DETECTORS WITHIN CADET ROOMS OR OTHER LOCATIONS WILL NOT BE PROVIDED DUE TO FULL SPRINKLER PROTECTION WITH WATERFLOW ALARM TO FIRE ALARM SYSTEM. THE SPRINKLER SERVES AS THE HEAT DETECTOR. THIS IS PERMITTED BY LIFE SAFETY CODE (NFPA 101-1988 CH. 7 - 7.1.3) AND MEETS INTENT OF ETL 1110-3-324 DATED 25 AUGUST 1981 AS REFERENCED FROM NANP-1110-1-1 (NYD CDE) SECTION V-7(d)

SAMPLE ONLY

INCLOSURE 1

ITEM	NFPA 101-1988	MIL HDBK 1008	UBC	A/E INST. DESIGN CRITERIA	COMMENTS
13. AUTOMATIC FIRE SPRINKLER PROTECTION	. NOT REQUIRED, BUT PERMITS VARIOUS ITEMS IN BLDG (I.E. - EXIT TRAVEL DISTANCES, INTERIOR FINISHES, SMOKE/FIRE BARRIERS, ETC.) TO BE DELETED OR INCLUDED (16 - 3.5.1; 16 - 2.6.1; 16 - 2.7; 16 - 3.4.4.1; 16 - 3.6.1; 16 - 3.7.1; 16 - 4.1)	. FULL SPRINKLER PROTECTION REQUIRED TO TO MEET BLDG. FIRE AREAS FOR PROPOSED CONSTRUCTION TYPE, NO. STORIES AND OCCUPANCY AND FOR LIFE SAFETY CONSIDERATIONS (2.2.1; 6.1.2)	REQUIRED DUE TO FIRE AREA (504, 505, 506)	REQUIRED DUE TO OCCUPANCY AND LIFE SAFETY CONSIDERATIONS (9-2a)	COMPLETE FIRE SPRINKLER PROTECTION IS NECESSARY FOR LIFE SAFETY, PROPERTY PROTECTION AND TO MEET PROJECT CRITERIA. IT IS ALSO NECESSARY DUE TO VERY LIMITED FIRE DEPT ACCESS FOR FIRE FIGHTING AND RESCUE AND THE RAPID FIRE GROWTH ASSOCIATED WITH RESIDENTIAL FIRES.
14. FIRE STANDPIPE SYSTEM	NOT REQUIRED FOR THIS OCCUPANCY (16 - 3.5)	NOT REQUIRED (6.4.1)	N/A	SHOULD BE EVALUATED WHEN REASONABLE ACCESS TO BUILDING BY FIRE DEPT HOSE LINES IS PRECLUDED (9-2f).	FIRE STANDPIPES NOT REQUIRED BY PROJECT CRITERIA. HOWEVER, DUE TO LIMITED FIRE DEPT ACCESS, 1-1/2 INCH FIRE VALVES WITHOUT HOSE AND SUPPLIED BY SPRINKLER SYSTEM PIPING WILL BE PROVIDED IN EACH STAIR @ EACH FLOOR WITH WATER SUPPLY AND SYSTEM REQUIREMENTS TO MEET NFPA 13 SPRINKLER SYSTEM PROVISIONS. 2-1/2 INCH VALVES WILL NOT BE PROVIDED.

SAMPLE ONLY

INCLOSURE 1

ITEM	NFPA 101-1988	MIL HDBK 1008	UBC	A/E INST. DESIGN CRITERIA	COMMENTS
15. PORTABLE FIRE EXTINGUISHERS PROTECTION	AT ALL HAZARDOUS AREAS ONLY (16 - 3.5.4) (I.E. - EXIT TRAVEL DISTANCES, INTERIOR FINISHES, SMOKE/FIRE	THROUGHOUT FACILITY IN ACCORDANCE WITH NFPA 10 (6.8)	N/A FIRE AREA (504, 505, 506)	N/A LIFE SAFETY CONSIDERATIONS (9-2a)	COMPLETE FIRE SPRINKLER PROTECTION IS NECESSARY FOR LIFE SAFETY, PROPERTY PROTECTION AND TO MEET PROJECT CRITERIA.
16. WATER MAIN SYSTEM AND FIRE HYDRANTS	. NOT REQUIRED BUT UNDERGROUND FIRE SERVICE SUPPLY REQUIREMENTS INDIRECTLY REFERENCED FROM (7-7) WHICH INDICATES NFPA 13 AND THEN NFPA 24 TO BE FOLLOWED.	. FIRE HYDRANT(S) REQUIRED FOR FIRE SERVICE USE . UNDERGROUND SYSTEM MUST FOLLOW NPPA 24 AND HAVE CAPACITY FOR AT LEAST A 750 GPM FIRE FLOW (5.8 & 5.1.4)	N/A	ANY INSTALLATION MUST FOLLOW NFPA STANDARDS AND MIL HDBK 1008 (9-1)	VERY LIMITED FIRE DEPT ACCESS FOR FIRE FIGHTING AND RESCUE AND THE RAPID FIRE GROWTH ASSOCIATED WITH RESIDENTIAL FIRES.
14. FIRE STANDPIPE SYSTEM	NOT REQUIRED FOR THIS OCCUPANCY (16 - 3.5)		N/A	SHOULD BE EVALUATED WHEN REASONABLE ACCESS TO BUILDING BY FIRE DEPT HOSE LINES IS PRECLUDED (9-2f).	FIRE STANDPIPES NOT REQUIRED BY PROJECT CRITERIA. HOWEVER, DUE TO LIMITED FIRE DEPT ACCESS, 1-1/2 INCH FIRE VALVES
					SPRINKLER SYSTEM PIPING WILL BE PROVIDED IN EACH STAIR @ EACH FLOOR WITH WATER SUPPLY AND SYSTEM REQUIREMENTS TO MEET NFPA 13 SPRINKLER SYSTEM PROVISIONS. 2-1/2 INCH VALVES WILL NOT BE PROVIDED.

SAMPLE ONLY

INCLOSURE 1

SECTION V
STRUCTURAL

A. STRUCTURAL DESIGN CRITERIA

1. All buildings and structures shall be designed for wind, snow, and live and dead loads in accordance with TM 5-809-1/AFM 88-3, CHAPTER 1.

2. Design in areas subject to typhoons and hurricanes shall comply with the requirements of TM 5-809-11/AFM 88-3, CHAPTER 14. These requirements apply to all areas in which the design wind speed as determined by TM 5-809-1/ AFM 88-3, CHAPTER 1, exceeds 90 mph.

3. New designs and/or site adaptations shall conform to Seismic Design for Buildings, TM 5-809-10/AFM 88-3, CHAPTER 13, except that new essential facilities in zone 3 or greater shall conform to TM 5-809-10-1/ AFM 88-3, chapter 13, section A. Wind and seismic forces shall be calculated for all structures regardless of the Zone. The various portions of the building shall be designed to resist the force which produces the more critical stress, and/or deflection as applicable.

4. Seismic upgrading of existing buildings shall comply with the requirements of TM 5-809-10-2/AFM 88-3, Chapter 13, Section B.

5. See the Appendices for a list of guide specifications, manuals, Engineer Technical Letters, to be utilized. Other data as referenced in Section I "GENERAL INFORMATION are applicable as required.

6. All masonry and concrete walls shall be designed to resist applicable gravity, seismic and wind loads except that reinforcing for masonry walls shall not be less than that required by TM 5-809-10/AFM 88-3, CHAPTER 13.

7. All piping system loads to be hung from the roof or floors shall be coordinated with the Mechanical designer and proper inserts shall be called for on the drawings.

8. Deflection of metal roof deck shall not exceed 1/240 of the span under the uniform distributed design live load or when subjected to 200-pound temporary concentrated load applied to 1-foot width of the deck when placed at the midpoint of the end span. All spans are to be considered center to center of supports.

9. When steel framing is used, drawings shall show steel column base details, location of movement connections and

the forces and movement required to detail the connection.

10. All reinforced concrete sections shall be detailed in accordance with the "Manual of Standard Practice for Detailing Reinforced Concrete Structures" by the American Concrete Institute (ACI 315).

11. The structural engineer shall be responsible for insuring that all mechanical and electrical equipment is properly supported and that all architectural features are adequately framed and connected.

12. The design analysis shall contain a lateral force summary which lists those portions of the building for which design was controlled by seismic.

13. Guide specifications CEGS - 03301 "Concrete for Building Construction (Minor Requirements)" will generally be used when the concrete requirements are small and of a minor nature.

14. See TM 5-805-3 for allowable types and options of roof deck system. The type and options shall be specified.

15. Guide Specifications Section 05060 "Welding, Structural," shall be used with Type 1 and 3 construction as defined by AISC where there is a large amount of welding or where the welding is of a critical nature. "Normal" welded connections are covered by the provisions of guide specifications Section 05120 "Structural Steel".

16. Building slabs on grade not subject to significant wheel loadings (e.g., a forklift truck having a gross weight in excess of 5000 pounds) to heavy concentrated loads or to static uniform loads in excess of 400 psf will be designed in accordance with paragraph 11 of TM 5-809-2/AFM 88-3, CHAPTER 2. Building slabs on grade which are subjected to loads that exceed those outlined above shall be designed, reinforced and jointed as specified in TM 5-809-12/AMF 88-3, CHAPTER 15.

17. Steel joists shall be loaded as much as practical at panel points. All drawings showing monorails, hoists and special items shall have a support detail and notes specially specifying that the joists shall be loaded at panel points. The location shall be coordinated with the Architectural, Mechanical, and Electrical drawings to assure that they do not conflict with locations. Point loads of more than 50 lbs are not allowed between panel points unless the panel is specially designed for a heavier load.

18. Technical Manuals, Engineering Regulations, and other technical design criteria frequently references ACI, AISC, MBMA codes and other standards with specific

dates, such as MBMA 1981. Since many codes and standards are revised more frequently than the criteria references, the A/E shall use the latest edition of the codes, standards, etc., available at the time of award of his contract regardless of the dates specified in the referenced criteria.

19. All lintels shall be coordinated with the architect and shown on the architectural drawings.

20. For the design of metal buildings see specification section CEGS-13120. Indicate the design for the architectural drawings.

21. **Seismic Design:** Your attention is invited to paragraph 4-7 of the Technical Manual "TM 5-809-10/AFM 88-3 Chapter 13, special seismic detailing i.e. separation of structures, seismic joints. Subparagraph 4-7b(1) covers an example that is found in many one story industrial buildings with a relatively flexible frame. The subparagraph states "At one end of the industrial building, it is desired to provide a small office section with stiff exterior or interior walls. The office unit is relatively much stiffer than the rest of the building. If these two units are tied together, the horizontal force of the entire structure will be delivered to the small stiff unit which may be incapable of resisting such large forces (or excessive torsion may be developed in the larger structure). Extensive damage has been observed from past earthquakes which can be attributed to the omission of such separation. A separation between the two units will be required in such cases." The above example also can be applied to combinations of high and low building sections and buildings with odd configurations. It is required that the seismic design considerations be taken early in the design of the building and be submitted with the concept design.

B. 10% SUBMITTAL REQUIREMENTS

See paragraph B1, SECTION II - SUBMITTALS.

C. 35% SUBMITTAL REQUIREMENTS

1. STRUCTURAL NARRATIVE

a._ **General Description** - Provide a description of the structure. Indicate the number of stories, type of roof, and any special items such as porches, skylights, basements.

b. **Design Criteria and Code** - List the design criteria and codes that will be used in the design.

c. **Structural System** - Describe how the proposed structural system is to function and trace the vertical and lateral loads as they are transferred from the various load resisting elements to the foundation. Describe the materials to be used for the diaphragm and seismic joint location.

d. **Floor and Roof System** - Describe the structural components of the floor and roof systems.

e. **Walls** - Describe the interior and exterior walls and partitions.

f. **Foundations** - Describe the foundation system and explain why that system was chosen. For buildings on piles indicate the type of piles, the approximate depth, and the capacity of the piles.

g. **Design Loads and Design Factors** - List the live loadings to be used include floor loads, wind, snow, earthquake etc. State the seismic zone and the seismic factors. Provide backup data for all loads assumption. List the floor live loads for different usage.

For example: Computer room -- 150 psf
Corridor (first floor) -- 100 psf

h. **Site Adapts** - Where standard drawings or other drawings are to be site adapted the structural narrative shall:

(1). List the design loads for the proposed site.

(2). Fully described the structural revisions necessary to site adapt the existing design.

(3). Briefly describe the proposed foundation system selected for the structure. The economic justification and description of the structural system shall not be required. The design analysis and outline specifications shall be prepared as specified below except that the design load calculations and seismic analysis shall not be required for site adaptations where the wind speed and seismic zone for the existing design is identical to that of the proposed site.

i. **Outline Structural Specifications** - The structural engineer shall review the list of guide specifications provided in Appendix A, and shall list those sections he proposed to use.

2. **DESIGN ANALYSIS**

a. Calculate the wind loads for the various parts of

the structure. Both positive and negative pressures will be calculated. Indicate the controlling pressures.

b. Calculate the roof snow loads and snow drifts.

c. Perform an analysis of the effect of seismic loadings. The engineer shall compare the lateral loads due to seismic with the comparable loads produced by wind forces. The engineer shall provide a tabular summary which lists those portions of the building for which design was controlled by seismic forces. Indicate how the lateral forces are resisted i.e. using shear walls, braced frames, or moment frame etc.

d. Provide the calculations required to prepare the marked-up drawings.

e. Provide economic justification and back up calculations for 3 alternate structural system (including the recommended scheme).

f. See paragraph M, SECTION I, GENERAL INFORMATION for additional design analysis requirements.

3. **DRAWINGS**

Provide marked-up architectural drawings showing the orientation of columns, location of shear walls, brace frames, moment frames, and typical spacing of the joist/trusses and/or beams. Typical sections through the roof and floor framing shall be provided.

For a building on piles the architectural marked-up drawing shall show the location of the piles.

4. **SPECIFICATIONS**

See paragraphs B, SECTION VIII.

D. 65% SUBMITTAL REQUIREMENTS

All 35% submittal comments shall be resolved prior to proceeding with the 65% submittal.

1. **NARRATIVE AND DESIGN ANALYSIS**

a. The design analysis which accompanies the submittal shall be substantially complete.

The design analysis shall include all the information and calculations previously provided in previous submissions revised together with revised/updated calculations and additional design analysis to more adequately cover the design effort. This design

analysis shall include but not be limited by the following:

(1). A final narrative which provides the references, design provision, design loads, assumed allowable stresses, and a brief description of the structure to include type of foundation, type of framing, and method of transferring lateral loads to the foundation and any allowance for future loads.

(2). A synopsis of special design criteria or requirements provided as a result of site visits or correspondence with the Corps of Engineers' Project Managers. Copies of any letters or minutes of meetings which provide structural guidance not otherwise contained in this manual should be included with this section of the design analysis.

(3). Calculations of snow, wind, seismic loads for final design to include distribution of these loads to the load resisting elements. Also temperature, vibration, uplift and any other significant load or stress.

(4). Design calculations for roof decks, floor deck, slab, beams, joists, girders, and columns, etc. as applicable.

(5). Design calculations for horizontal diaphragms and bracing to include shear transfer connections.

(6). Design calculations for exterior cladding (masonry, steel, or precast concrete etc.) for bearing defection, flexure, shear, and overturning as appropriate.

(7). Design calculations for shear walls and bracing.

(8). Design calculations for foundations based on bearing values determined by analysis of borings, or test loads, will be complete except for design of reinforcing.

b. This submittal shall include structures such as utility vaults, tanks, retaining walls, tank hold down pads, or similar exterior work. These structures are the responsibility of the structural engineer.

c. For site adaptations where the original design loads are equal to or greater than those at the proposed site, the design analysis shall include a brief statement to that effect and the requirements

of item (8) as described above. Where the original design loads are less than the loads required for the proposed site, the design analysis shall include items (1) through (8) as described above. Site adaptations shall be checked for seismic, wind, snow, and mechanical equipment load changes.

d. See paragraph M, Section I, GENERAL INFORMATION, for additional design analysis requirements.

2. **DRAWINGS**

For new designs, including additions and/or modifications to existing structures, drawings shall show:

a. Foundations plans, framing plans for each floor, and roof plans for buildings. Grid lines on center lines of columns shall be indicated on the plans for buildings framed with columns and beams. Design live loads, soil bearing pressures, and working stress for the various materials incorporated in the design shall be shown on the applicable drawings.

b. Reference cuts shall be provided on foundation, floor, and roof framing plans and provide at least 75% of the sections required.

c. Layout of floor joints in slabs on grade. Layout of construction, control and expansion joints in foundation, floor, and roof framing.

d. Plans and section of structures other than buildings.

e. Additional sections and details as required to illustrate any special items or methods of framing for which approval is sought.

f. All modifications to existing construction.

g. Notes specifying all live loads, allowable stress of materials, snow, wind, seismic data, codes used with type of construction specified - working stress, ultimate strength, etc. (ACI), (AISC) any other pertinent data necessary to clarify the drawings and simplify construction. Note that Technical Manuals (TM's) or Government publications shall not be referenced on the drawings.

3. **SPECIFICATIONS**

Marked-up structural specifications shall be submitted for review. See paragraph B, SECTION VIII.

E. FINAL SUBMITTAL REQUIREMENTS

All 65% submittal comments shall be resolved prior to proceeding with the final submittal.

1. **DESIGN ANALYSIS**

The design analysis shall be complete and checked. See Paragraph M of SECTION I - GENERAL INFORMATION for additional design analysis requirements.

2. **DRAWINGS**

a. Foundation drawings shall show the footings, depth of footings, type of subgrade allowable soil bearing value for which the footings have been designed and the strength of concrete to be used. Structural framing drawings shall show design live loads and design stresses of materials, and all other pertinent plans, sections, details and notes to present a complete picture of the construction required.

b. Drafting and lettering shall comply with approved standards and there shall be a clear definition between new and existing items.

c. **Final drawing shall be checked by the checker who checks the design analysis.** Structural drawings shall be coordinated with the Architectural, Civil, Mechanical, and Electrical drawings, and with the specifications. Dimensions, schedules, sections, and details, shall be completely checked. Designers and checkers shall sign the title blocks.

d. The items listed below shall always be included on the drawings where they are applicable to the particular structure:

(1). Complete framing plan.

(2). Roof framing details including details of any openings in roof as well as all special loads with weight values and location fully dimensioned.

(3). Detail of roof framing at eave and rake edges.

(4). Intermediate floor framing plans and stair details.

(5). Special loading required for construction.

(6). Column, footing, beam base plate, and slab schedules. (Column loads at top of footings and at each floor shall be shown).

(7). Foundation plan including any notes relative to special foundation treatment required and cross references to proper specifications section.

(8). Foundation sections and details including fill material and final grade.

(9). Layout and details of expansion, construction, and seismic joints in floor slabs; horizontal and vertical joints in walls; and joints in footings.

(10). Typical and special sections as required.

(11). Layout and detail of exterior entrance pads, ramps, docks and steps.

(12). Details or references of special structural items required for utilities and other trades (machinery bases, anchoring, cranes, elevators, piles, etc.) with all relevant loads.

(13). General and special notes as required, but the term "by others" shall not be used. Items of work shown but not existing, and which are **not** in the construction contract shall be indicated by the abbreviation "N.I.C.".

(14). All applicable details for additions and/or modifications to existing structures.

(15). General notes shall show the seismic zone and the seismic coefficients for each structural system or part.

(16). Details of recessed and embedded items shall be shown.

(17). Details of supports for heavy concentrations of piping, cables and equipment shall be shown. It shall **not** be left for the construction contractor to design.

3. **SPECIFICATIONS**

Submit final typed specifications. See paragraph B, SECTION VIII.

SECTION VI
MECHANICAL

A. MECHANICAL SYSTEM DESIGN CRITERIA

1. BASIC DESIGN CRITERIA

ARCHITECTURAL AND ENGINEERING INSTRUCTIONS(AEI) is the prime design manual. The various manuals of the TM 5-810 series supplement it for Army Projects, and AFR 88-15 for Air Force Projects.

In event of conflicts, the prime design manual governs; or if unable to determine, contact the N.Y. Dist. Office. These manuals will be requested by the Architect/Engineer for each project.

2. HVAC CONTROL SYSTEMS

For Army Projects, HVAC Control Systems shall be prepared in accordance with new guide specification CEGS-15950 and TM-5-815-3.

For Air Force Projects, HVAC Control Systems shall comply with ETL 83-1, Design of Control Systems for HVAC.

3. ENERGY CONSERVATION

Designer shall develop independent energy conserving analysis to provide a design which complies with **DESIGN ENERGY TARGETS** in **AEI.** The fact that design meets **DESIGN ENERGY TARGETS** must not preclude the incorporation of all cost effective energy conservation applications. The energy reductions shall be compared against their effect upon construction and operational costs.

Followings are the examples of alternatives to be analyzed coordinating with other disciplines:

a. Various building configurations.
b. Various building orientations.
c. Other solar 'features', i.e., skylights for electrical lighting reduction; increased thermal insulation; optimum window shading orientation and glazing; shading by landscaping; etc.
d. Various type of HVAC systems.
e. Utilization of existing central heating or cooling plants vs. new individual heating or cooling systems within new facility.
f. Various types of lighting systems.

4. ENERGY MONITORING AND CONTROL SYSTEM (EMCS)

a. For all new buildings, consideration shall be given to the possibility to connecting EMCS to existing EMCS. If no EMCS exists, it shall be so stated.

b. A project validation shall be performed in accordance with the requirements of specific instructions to designer. This validation will represent the concept design analysis and shall include Life Cycle Cost Analysis compared to all reasonable local control options.

c. Drawings

(1) Exterior transmission system drawings shall be prepared which indicate the general cable layout or telephone interface. These drawings shall be in adequate detail to show FID and MUX locations and their interconnection to the central site.

(2) Building drawings shall be provided to show the general extent of sensor installations and major equipment locations.

(3) Interface or new central site drawings shall be provided to indicate the scope of the tie-in or the configuration of new equipment.

d. Specifications - Schedule shall be provided which will locate each sensor to be installed, define its purpose, and list item of equipment to which it is attached.

e. Existing Sytems - Designer will address the problem of any available system (software and hardware) components being restrictive information. He shall address the condition and status of all existing loop controls, i.e. thermostats, electric valves, dampers etc. He must inform the District as to the required work to this existing item to make the new EMCS system perform as designed.

5. FIRE PROTECTION

a. The current requirements of NFPA 90A and 90B will be incorporated in all heating and air conditioning system designs except that corridors shall not be used as a supply return or exhaust air plenum irrespective of the type of occupancy.

b. The design and analysis for sprinkler systems shall be in strict accordance with MIL-HDBK 1008 and requirements of NFPA Standards.

c. The sprinkler design parameters will be shown on plans. For design of sprinkler system, a complete sprinkler layout without pipe sizes shall be shown on plans. A note to this effect "That final pipe sizing shall be as per sprinkler manufacturer's hydraulic calculations" shall be placed on plans.

6. NOISE CONTROL

Noise control in mechanical equipment rooms and heating plants shall conform to requirements of TM 5-805-4.

7. SEISMIC PROVISIONS

All projects will include appropriate provision for the protection of mechanical piping, equipment and underground utilities against damage from seismic events.

B. 10% SUBMISSION REQUIREMENTS

The narrative will address the brief description of alternative solution to major system which designer will evaluate for 35% SUBMISSION.

C. 35% SUBMISSION REQUIREMENTS

1. DESIGN ANALYSIS

Computer program may be used for heating and cooling load calculations, economic analysis/life cycle cost analysis, solar analysis, etc., however, these must be industry accepted methods. Summaries of printouts shall be clearly interpreted and discussed.

a. Heating, Ventilating and Air Conditioning

(1) Design conditions

* Inside and outside temperature/humidity.
* Personnel load.
* 'U' factors of walls, ceilings & roofs.
* Equipment load (if any).
* Ventilation requirements and any other special conditions.

(2) Type of systems with full descriptions

* Justification of system selection based on Life Cycle Cost Analysis.
* Energy conservation features.
* Zoning and control description.
* Justification of connecting to or using any existing system.

(3) Calculations

* 'U' value calculations for wall & roof: Determined to meet Design Energy Targets.
* Heating & cooling load calculations.
* Ventilation load calculations.
* Equipments sizing calculations.

b. Plumbing

(1) Type of system with full descriptions

* Type of water heater and storage tank, and design temperature.
* Type of pipe, whether insulated, concealed or exposed.

(2) Cold water and hot water demand calculation.

c. Fire Protection - Indicate type of sprinkler system, NFPA classification of occupancies, design area, density (GPM/SF), available water pressure and flow.

d. Economic Analysis / Life Cycle Cost Analysis - All design decisions which may utilize alternative systems and/or equipment shall be evaluated on Life Cycle Cost Analysis. This analysis and report will be performed in accordance with ETL 1110-3-332.

e. Energy Conservation Analysis

(1) Solar Analysis - Solar analysis will be prepared for all MCA projects in accordance with ETL 1110-3-302.

(2) Design Energy Budget - Energy budget shall be performed in accordance with AEI. Designer is required to comment in detail on ease or difficulty of meeting Design Energy Targets for each building within the project.

(3) Energy Conservation Investment Program - Validations and revalidations to determine compliance with ECIP criteria shall be performed in accordance with ETL 1110-3-332.

2. DRAWINGS

Single line layout of ductwork and piping, and equipments layout shall be shown on floor plans.

3. SPECIFICATIONS

List of guide specifications to be used shall be included in design analysis. See paragraph B, SECTION VIII.

D. 65% SUBMISSION REQUIREMENTS

The 65 % design submission will contain all information developed in the 35 % design submission, and reflect all comments from the user and the district as well.

1. DESIGN ANALYSIS

Design analysis shall clearly show calculated capacities of all major items of mechanical equipment. Analysis shall include the copy of manufacturer's catalog cuts of equipments used for layout purposes, and shall show weights of major items of equipments which are needed for structural design. Selected equipments characteristics shall not be restricted to any one manufacturer, but competitive among at least three major manufacturers.

2. DRAWINGS

a. Double line drawing is required for all ductwork shown in tight space and mechanical equipment room.

b. Floor plan layouts will show the location of all items of equipment, pipes & duck size, and fixtures. All floor mounted equipments such as boilers, pumps, etc., will be provided with a minimum 6 inch house keeping pad.

c. Enlarged part plan of mechanical equipment room: This plan will clearly indicate by dotted lines the space required for tube pulling on such items as boilers, chillers, condensors, etc. Sufficient room will be allowed for maintenance, coil removal, filter removal, etc., on other equipments.

d. Equipments schedule shown in schedule.

e. Plumbing fixture schedule will indicate the size of pipe connections (cold water, hot water, waste, and vent).

3. SPECIFICATIONS

See paragraph B, SECTION VIII.

E. FINAL SUBMISSION REQUIREMENTS

The coordination of all design, drawings and specifications, is of major importance, and it has been far-reaching consequences. For this reason, the District urges designers to coordinate his work with other disciplines prior to the final submission. The poor coordinated submittal will lead designers to resubmittal.

1. DESIGN ANALYSIS

The final design analysis will be refinement of 35 % and 65 % design analysis. The design analysis will be updated to include any changes brought by review comments.

a. Design analysis will show applicable referances for design assumptions not found in common referance manuals.

b. The complete tabulation of cooling loads will be provided. Psychrometric charts for all air handling systems with cooling are required.

c. Determination of pump heads will be based on complete take off of friction losses and static heads. The copies of manufacturer's catalog cuts including pump performance curves will be provided for all pumps selected.

d. Plumbing piping analysis will clearly show the main and branch loads in terms of 'fixture unit' as well as flow rate and supply pressure.

e. Determination of static pressure on fans and air handling units will be based on complete take off of static losses. All fouling factors will be shown in computations. All automatic valve control factors will be given.

f. HVAC analysis will include a summary sheet to show the final capacity of the each piece of equipment including manufacturer's names and models used for layout. The weight of each equipment will be included in the summary and the mechanical designer will inform the structural designer of the selection in order to properly design the structure.

2. DRAWINGS

Final drawings will be the refinement and completion of 35 % and 65 % drawings. All comments made on the 35 % and 65 % design submission shall be incorporated in the final drawings.

a. Where crowded conditions exist due to close proximity of other phases of work, sufficient sections and elevations will be shown to indicate clearly the exact location of the particular item in relation to other items.

b. The numbers of elevations and details will be sufficient to allow construction and installation of the work without the additional design work by the contractor.

c. Where equipment connection details are shown, indicate all required valve, trim, gauges and fittings required. Coordinate with specification requirements and make sure that valve, fitting, etc., which are specified to be furnished with each piece of equipment are included in the detail.

d. Location of equipment, piping and ductwork shall be completely coordinated with other features of project; architectural, structural, electrical, etc.

e. Performance characteristics for all items of mechanical equipment will be placed in carefully prepared equipment schedule. Equipment characteristics specified in "Note" fashionn, or in random locations on the drawings are not acceptable.

f. Description of control sequence of operation shall be shown on plans.

3. SPECIFICATIONS

a. Items not covered, or only partially covered in guide specifications, shall be fully specified.

b. The subparagraphs of "Electrical Work" shall be carefully coordinated with electrical section of the specifications. There shall be no conflicts as to which section covers starters, controls, or wiring; and no conflicts as to the type of starters required for the individual items of equipment.

c. Control sequence shall not be restrictive to either pneumatic, electric or electronic controls.

d. Special care will be given to the compatibility of components, for example, the burner should suit the boiler; the combustion control should suit the burner type selected.

e. For additional information see SECTION VIII.

SECTION VII
ELECTRICAL

A. ELECTRICAL SYSTEM DESIGN CRITERIA

1. BASIC DESIGN CRITERIA

US Army Corps of Engineers Architectural and Engineering Instructions is the prime design manual. For Air Force projects AFR 88-15 supplements it. For Army projects various manuals in the TM 5-811 series supplement it. In case of conflict the Architectural and Engineering Instructions governs or if unable to determine, contact the New York District office.

2. ENERGY CONSERVATION

The serious national energy shortage and fuel cost increase are of great concern to the Department of Defense. Full engineering considerations shall be given to achieve energy conservation. Several considerations to achieve energy conservation are described in the Architectural and Engineering Instructions and in ETL 110-3-282.

3. DESIGN ANALYSIS

a. Design Analysis shall be in accordance with ER 1110-345-700.

b. All designs shall be based on the most energy conservative and economical plan consistent with the pertinent criteria, instructions and engineering manuals.

4. STANDARD DRAWINGS

Drawing No. 40-06-04, "Lighting Fixtures", is a more commonly required electrical details reference.

5. GUIDE SPECIFICATIONS

The appropriate section of guide specifications will be utilized by the A/E for each project. The designer shall pay special attention to "GENERAL AND TECHNICAL NOTES" included with each section of guide specification.

6. COORDINATION OF WORK

Coordinate lighting layout, space requirements, conduit routing and the like with architectural, structural and mechanical design elements. Exterior electrical

distribution systems will be coordinated with other exterior utility design and site work elements.

7. DEMOLITION

In addition to the requirements indicated hereinafter, the drawings must clearly indicate the extent of any removals to be performed. Demolition work must be clearly distinguishable from any items which are to remain and new work. Items which are to be salvaged and returned to the Government must be identified on the drawings and listed in specification section 02050 DEMOLITION.

B. 10% SUBMISSION REQUIREMENTS

For 10% submission requirements see Section II paragraph B.1.

C. 35% SUBMISSION REQUIREMENTS

1. DESIGN ANALYSIS

a. Provide a trip report of the visit to the site; list user requirements and the scope of work. Provide a statement explaining the source of information (name and title) concerning the capacity of existing circuits and any directions received.

b. Exterior Electrical Distribution System:

(1) Provide a narrative description of the exterior electrical lighting and distribution system according to the format indicated by paragraphs V and VI in the "Electrical Concept Design Narrative" (page VII-17). Any items listed that are not applicable to this project may be deleted and any items applicable that are not listed must be shown including justification for the system chosen.

(2) Provide electrical characteristics (voltage, phase, number, and size of conductors) for power supply and/or primary and secondary lines at the point of delivery and extensions. Indicate characteristics and standards of design for overhead or underground lines.

(3) An economic analysis will be provided for design of 208 volt systems larger than 500 KVA or serving motors larger than 25 horsepower.

(4) Estimate the total connected load and resulting demand load by applying demand and diversity factors for loads involved. Indicate type, number of units, KVA capacity, and primary

and secondary voltages of the transformer installations proposed, including primary and secondary connections of transformers. Also show primary and secondary voltage drop and size of primary and secondary distribution conductors proposed to serve the load.

(5) Indicate intensity and type of exterior lighting proposed (street lighting, security lighting, or parking lot lighting) and provide illumination level calculations.

c. Interior Electrical Distribution System:

(1) Provide a narrative description of the electrical systems or a list of requirements for "site adaptation" of existing standard design drawings and specifications according to the format indicated by paragraphs I-IV in the "Electrical Concept Design Narrative" (page VII-17). Any items listed that are not applicable to the project may be deleted and any items applicable that are not listed must be shown.

(2) Include a concept lighting schedule showing room name and/or number, lighting intensity proposed, type of fixture (by standard drawing number or designated type), voltage, and basis of design such as I.E.S., etc. Use the table as shown on page VII-15, and provide illumination level calculations.

(3) Include a concept special power outlet schedule showing room name and/or number, phase, voltage, amps, frequency, classification, and NEMA configuration. Use the Table as shown on page VII-16.

d. The outline specifications shall consist of a listing of specification titles which shall be used. USACE Guide Specifications shall be listed first, followed by titles for which there are no USACE Guides. If the specification sections for which there are no USACE guides are already developed, such as sections which are to be tailored from other projects, untailored copies may be included or attached. (See SECTION VIII).

e. Additional information or material required to complete design shall be listed, or a statement shall be made that none is needed.

f. Include a statement reflecting coordination with the local communications-electronics officer. State his name, the date contacted and all pertinent information received.

g. Energy conservation measures shall be implemented (see ETL 1110-3-282). The electrical designer shall be a team member for energy budget preparation and shall provide necessary information to the architect and mechanical designers for inclusion in the energy budget.

h. A bibliography shall be included listing all applicable reference material (technical manuals, engineering technical letters, etc.) to insure compliance with acceptable directive instructions.

2. PRELIMINARY DRAWINGS

Provide preliminary electrical drawings to include but not be limited to the following items:

a. Exterior:

(1) Provide an electrical site plan indicating all existing and proposed support utility lines required to serve the project including electrical primary and secondary power supply lines, transformers, telephone and other communications lines. It shall also show all roads, driveways, parking areas and any other items necessary for functional and operating adequacy. Clearly indicate the contract limits regarding who will make interconnections to existing utilities.

(2) Poles and equipment to be relocated or removed.

(3) Location of any new or relocated electrical equipment.

b. Interior:

(1) Location of power distribution and lighting panels.

(2) Lighting fixtures lay-out.

(3) Location of power outlets, motors and other electrical equipment.

(4) One line diagram including service equipment, feeders and panels.

(5) Names and numbers of all rooms and work areas as shown on architectural drawings.
(6) Telephone system consisting of conduits, and outlets.

D. 65% SUBMISSION REQUIREMENTS

This submittal shall consist of Design Analysis, drawings and marked-up specifications as described below.

1. DESIGN ANALYSIS

Updated and revised 35% submission design narrative and calculations where applicable and in addition:

a. Short circuit calculation.
b. Voltage drop calculation.
c. Feeders calculation.

2. PRELIMINARY DRAWINGS

Provide preliminary (65%) electrical drawings to include but not be limited to the following items:

a. Exterior:

(1) Exterior electrical layout - Other new or existing utilities, i.e.- water, gas, sewage, shall be shown to prevent conflicts with the electrical work.

(2) Location and type (aerial or underground) of all new primary and secondary lines, transformers and service drops. Clearances from buildings shall be in accordance with the National Electric Safety Code.

(3) Accurate location and sizes of the existing lines including poles and transformers from which power is to be obtained.

(4) Proposed wire sizes and transformer sizes.

(5) On large projects where underground systems are used the A/E shall furnish prints of the site showing communications service connection points at each building. Exterior communications raceways will be coordinated with the user communications-electronics officer and will be incorporated by the A/E in the final design.

b. Interior:

(1) Attachment point for service drop.

(2) Designate expansion and seismic joints, fire rated walls and ceilings.

(3) Location of main distribution panel and electrical/mechanical room layout.

(4) Location and type of lighting fixtures to be installed in each area, and quantity of each type of fixture. Special provisions will be made for lamp replacement in high-bay areas such as gymnasiums, handball and squash courts, hangars, shops and indoor swimming pools.

(5) The standard lighting fixture details as indicated on Drawing No. 40-06-04 may be referred to by sheet number only. If modification of details is necessary, provide a description of the intended modifications or details of special fixtures to be provided.

(6) Special features such as clock system, fire alarm system, exit lighting system, communications facilities, etc.

(7) Riser diagrams showing service equipment feeders and panels and estimated sizes of these and other similar items.

(8) Indicate the type of wiring system proposed (conduit, EMT, cable, underfloor raceways, bus duct) and whether wiring system is exposed or concealed.

(9) Provide an interior telephone system where required. Communications requirements shall be coordinated with the user communications-electronics officer.

(10) Location, electrical characteristics, and horsepower (if applicable) of electrical equipment.

(11) Define the limits of any hazardous areas, describing the applicable vertical and horizontal limits of the hazard and identifying each hazardous location by the Class, Division, and Group as defined by the National Electrical Code (NEC). Designation of either specific maximum operating temperatures of equipment or temperature ranges will also be indicated.

3. MARKED-UP SPECIFICATIONS

a. Prepare marked-up specifications based on the applicable guide specifications.

b. Where no guide specification sections or standard specification sections are provided, prepare a new specification from available criteria and instructions giving all pertinent material characteristics.

c. Also, see SECTION VIII.

E. FINAL SUBMITTAL REQUIREMENTS

1. DESIGN ANALYSIS

Design Analysis will be prepared in accordance with the 35%/65% submission requirements using the actual designed lighting and power equipment and the following requirements which apply also to the previous submissions.

a. Design narrative - A description of the general parameters, functional and technical requirements, objectives and provisions of the design shall be described. A summary of economic factors influencing the choice of lighting, power, fire alarm and detection, and communications systems used in the project will be provided along with an indication of how initial and life cycle costs were considered.

b. Design calculations and presentments shall support design considerations as follows:

(1) Lighting calculations shall determine maintained footcandle (fc) levels in all areas. Method of computation for interior areas shall normally be the zonal cavity method as described in the I.E.S. handbook. Other methods for specific applications shall be used when necessary for the particular design. Exterior area lighting, floodlighting, and security lighting computations shall follow accepted methods described in the I.E.S. handbook. All parameters necessary to properly specify and apply the luminaires shall be determined in the Design Analysis. When the lighting design is not based on luminaires contained in the Drawing 40-06-04 standards, then catalog cuts of all lighting fixtures and luminaires upon which the design is based shall be included in the Design Analysis along with manufacturer's name and catalog number of two additional fixtures which will meet the design requirements. Where required by specific instructions, a life cycle cost analysis shall be performed to support the choice of illumination sources. Provide a summary of the lighting calculations using the table shown on page VII-14.

(2) Short-circuit calculations shall be performed to insure that the rating of all proposed protective equipment intended to break current at other than fault levels shall have an interrupting rating at system voltage sufficient for the current that must be interrupted. In all cases, available symmetrical short-circuit current at the service equipment shall be indicated. If more accurate data is not

available, assume infinite bus on the primary and also consider motor contribution to fault current. Short-circuit calculations shall be carried out to the point where all protective elements are demonstrated to be properly rated to withstand potential faults and/or safely interrupt faults as required. Ground fault protection coordination shall be determined and time-current settings shall be calculated in all cases where ground fault protection is required.

(3) Voltage drop calculations shall be performed for service, all feeders and on worst-case branch circuits supplied by each panelboard and switchboard. Tables, curves, and short-cut methods obtained from accepted sources such as Industrial Power Systems Data Book by General Electric or A/E Data Book by Westinghouse may be used. The source of the data must be referenced.

(4) Existing loading data shall be furnished where connections are made to existing transformers or load centers including method of determining the availability of sufficient capacity to carry the additional loads.

(5) Summary of all connected loads, demand factors and demand loads by circuit number for each panel and switchboard shall be provided. This includes spare circuits.

example:

PANEL A

Circuit Number	Watts Connected Load	Demand Factor	Watts Demand
1	1200	100%	1200
2	1500	30%	450
3	(Spare - Est Load Depends on circuit)		750
			2400W

(a) Provide a summary of panel and switchboard demand loads, feeder sizes, diversity between panels, main switch fuse or circuit breaker trip rating, service entrance or service drop sizes, and transformer sizes.

(b) Each motor branch circuit and motor protective device shall be computed in accordance with the requirements of the National Electrical Code (NEC).

(c) In computing sizes of feeders and transformers, consideration shall be given to the demand loads of blocks of loads and the use of appropriate diversities between the demands to determine realistic diversified demand for these components. Where the nature of loading cycles are known, oil filled transformer ratings shall be based on ANSI Standard C57.91 rating factors to allow for the most economical design.

(d) Ambient-temperature or conductor grouping factors considered in the selection of equipment and/or conductor sizes shall be indicated.

(6) Provide calculations for sizing emergency power supply units (diesel generator, UPS, etc.).

(7) The basis for all design assumptions, formulae, and equations used in the Design Analysis shall be identified.

(8) When computerized calculations are utilized, the Design Analysis will include description of design methods, including assumptions, theories and technical formulas employed. Present copies of input data and output listings, annotated in a language understandable by personnel not familiar with computer systems, and accompanied by diagrams and notations of sufficient detail to facilitate manual checks of final results. Computer programs employed will be described so that the general methods of solution and program limitations are identified.

(9) Trade names are not allowed on the contract plans and specifications. However for lighting fixtures and other equipment such as motor control centers, switchgear, bus duct, transformers (where special features are required), special receptacles, etc, the current manufacturer and catalog number of the equipment will be indicated in the Design Analysis.

(10) On projects involving interconnection with the utility company's facilities the necessary coordination documents and permits will be included in the Design Analysis.

2. FINAL DRAWINGS

Provide final electrical drawings to include but not be limited to the following items:

a. Exterior:

(1) Final exterior electrical drawings shall have details showing clearances from communications circuits, clearance between circuits of same voltage and circuits of different voltages, and distances from transformers and other equipment and buildings.

(2) Provide sufficient construction details on the contract drawings for the exterior work, clearly distinguishing new from existing construction.

(3) Provide construction details for the overhead and underground distribution systems and pole mounted area lighting, including tabulation of the pole lines with all required equipment and guying.

b. Interior:

(1) A fixture schedule on the drawings. Use format of Lighting Fixture Schedule, page VII-19. Coordinate with "Architectural" work in providing details on architectural drawings for recessed luminaires in fire rated ceilings. For luminaires not selected from the OCE Standard Drawing No. 40-06-04 provide details on the drawings (see paragraph 3.c below).

(2) Complete electrical wiring details.

(3) Riser diagram indicating connections and wiring to main switch, distribution, power and lighting panels including the anticipated short-circuit fault currents. Power system protective relays, together with any safety mechanical key and/or electrical interlocks, shall be indicated. Device function numbers shall be in conformance with ANSI and it's proposed function described on drawings.

(4) Sufficient details for mounting fixtures and equipment.

(5) Horsepower ratings of all motors shall be shown including kilowatt (KW) ratings for hermetically sealed motors.

(6) Provide on the drawings panel schedules as shown on pages VII-12/13.

(7) Provide complete riser diagrams for fire alarm, telephone, public address, intercom and other communication systems including all devices as shown on floor plans with their locations

indicated.

(8) Designation of all rooms and areas as shown on architectural and other drawings.

(9) Energy usage and demand meters will not be provided for all facilities. Provisions for the installation of such meters will be made where authorized by HQDA (DAEN-ECE-E) WASH, DC. for Air Force projects authorization will be obtained from HQUSAF/LEEEU, WASH, DC.

(10) The limits of all hazardous areas shall be clearly defined on the drawings. Class, Division , Group and designation of either specific maximum operating temperatures of equipment or temperature ranges per the National Electrical Code (NEC) shall be described for each hazardous area. Where specific hazardous locations sections of the NEC are determined to apply to various designs, the applicable NEC specific location article shall be referenced by note on the drawings. For example an Army Tactical Equipment Shop would be required to meet the requirements of Article 511 - Commercial Garages, Repair and Storage.

(11) Provide anchoring details for electrical equipment in required seismic zones.

3. **FINAL SPECIFICATIONS**

a. Items not covered, or only partially covered in guide specifications, shall be fully specified.

b. Special equipment shall be thoroughly described. Insure adequate coordination with "Architectural" work for recessed mounted lighting fixtures supported through a suspended ceiling system for required seismic zones.

c. For each luminaire of the Lighting Fixture Schedule, for which there is no corresponding sheet of Drawing No. 40-06-04, provide a detail on the drawings, and provide a description in the specifications similar to the description format contained on the several sheets of Drawing No. 40-06-04.

d. Also, see SECTION VIII.

CKT BRKR PANEL SCHEDULE

PANEL _____ ; TYPE: _____ ; _____ VOLTS ___ Ø ___ ; ☐ WITH GROUND BAR

EQUIP: INTERRUPTING RATING _____ KA, RMS, SYM; _____ A MAINS; _____ MCB

MOUNT: ☐ FLUSH ☐ SURFACE; LOCATION: _____

DEVICE			BRANCH CIRCUIT			PHASE LOAD (VOLT-AMPS)			BRANCH CIRCUIT			DEVICE		
AMPS TRIP	POLES		LOAD SERVED AND LOCATION	VOLT-AMPS	NO	ØA	ØB	ØC	NO	VOLT-AMPS	LOAD SERVED AND LOCATION		POLES	AMPS TRIP
					1				2					
CONNECTED KVA TOTALS →														

NOTE - FOR ALL SCHEDULES, CIRCUIT BREAKER FRAMES SHALL BE AS FOLLOWS:

A	10 - 100A
A	110 - 225A
A	250 - 400A
A	450 - 100

SWITCH & FUSE PANEL SCHEDULE

PANEL ______ ; TYPE: ______ ; ______ VOLTS___ Ø ___ ; ☐ WITH GROUND BAR

EQUIP: INTERRUPTING RATING ____ KA, RMS, SYM; ____ A MAINS; ______ MAIN SWITCH

MOUNT: ☐ FLUSH ☐ SURFACE; LOCATION: ______

DEVICE			BRANCH CIRCUIT			PHASE LOAD (VOLT-AMPS)			BRANCH CIRCUIT			DEVICE		
AMPS FUSE	POLES	AMP SWITCH	LOAD SERVED AND LOCATION	VOLT-AMPS	NO.	ØA	ØB	ØC	NO.	VOLT-AMPS	LOAD SERVED AND LOCATION	AMPS FUSE	POLES	AMP SWITCH
					1				2					
			CONNECTED KVA TOTALS →											

Table I. Electrical Requirements Calculations.

Area				Design foot-candle	(1) C.U.	(2) M.F.	Req'd. design lumens	Fix-ture type	Lamps No.-Watts	Actual(3)	
Designation	Room index	Width	Lgth							Lumens	Foot-candle

(1) C.U. = Coefficient of utilization

(2) M.F. = Maintenance factor

(3) Actual foot-candle = Design foot-candle X $\frac{\text{Actual lumens}}{\text{Required lumens}}$

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1 Apr 66 (local reproduction authorized)

CONCEPT LIGHTING SCHEDULE				
Room and/or Number	Foot Candles	Fixture		Basis of Design
		Type	Voltage	

CONCEPT SPECIAL POWER OUTLETS SCHEDULE						
Room and/or Number	Phase	Voltage	Amps	Frequency (Hz)	Hazardous Classification	NEMA Configuration

ELECTRICAL CONCEPT DESIGN NARRATIVE OUTLINE

I. GENERAL:

- A. Estimated Demand Load:
  - Demand Load Summary
- B. Hazardous Locations.
- C. Lighting Protection.
- D. Design Criteria.
- E. Seismic Requirements.
- F. EMCS Design Considerations.
- G. Work Required for "Site Adapt."
- H. Electrical Design Consideration for Physically Handicapped.

II. INTERIOR LIGHTING:

- A. General.
- B. Task.
- C. Accent.
- D. Emergency and Exit Lighting.
- E. Special.

III. INTERIOR POWER:

- A. General.
- B. Emergency.
- C. Special.

IV. SPECIAL SYSTEMS (INTERIOR):

- A. Telephone.
- B. Intercom System.
- C. Sound Masking System.
- D. Paging, P.A., and Background Music Systems.
- E. Security System.
- F. C.C.T.V. and M.A.T.V.
- G. Clock and Program Bell System.
- H. EMCS.
- I. Fire Alarm System.

V. EXTERIOR LIGHTING:

- A. Parking Area Lighting.
- B. Security Lighting.
- C. Special Lighting.

VI. EXTERIOR POWER:

- A. Transformer.
- B. Duct System.
- C. Service Entrance.
- D. Parking Area Lighting Power.

CONNECTED LOAD				
LOAD		KVA		TOTAL
		1 Ø	3 Ø	
LIGHTS				
RECEPTACLES				
POWER	HEATING			
	VENTILATING			
	AIR CONDITIONING			
	OTHER			
TOTAL				

(Assume Horsepower Equals KVA)

LIGHTING FIXTURE SCHEDULE

ROOM DESIGNATION OR FIXTURE MARK	* TYPE	VOLTS	DWG 40-06-04		LAMPS		** MOUNTING	REMARKS
			TYPE	SHEET NO	NO	WATTAGE		

NOTE TO DESIGNER: For fixture marks use capital letters A, B, etc. and letter each corresponding fixture symbol on the "Electrical Floor Plans" accordingly.

* Types I, FL, MV, SV, HPS, MH

** Mounting: Surface Ceiling/Wall
Pendant
Recessed
Pole

SECTION VIII
SPECIFICATIONS

A. GENERAL

1. All specifications shall be prepared from Corps of Engineers' Guide Specifications (CEGS) furnished by the District unless the A/E is instructed otherwise. The following types of specifications are frequently used and referred to:

a. **CEGS** - Guide specifications prepared by the Office, Chief of Engineers (OCE), will be prepared by the A/E in a manner to supplement the project drawings only to the extent necessary.

b. **Standard Design Specifications** - Standard technical specifications prepared and distributed by a design agency such as the Office, Chief of Engineers, which have been prepared to accompany standard drawings for various facilities. These are complete, detailed specifications for standard designs (such as 10 Chair Dental Clinic, 150 Man Barracks, 1000 Man Theater, etc.) that normally only require revisions to bring them up to latest criteria prior to advertising the project.

2. The A/E will also prepare sections of project specifications for items of work not covered by applicable CEGS.

3. An index of the OCE guide specifications is included as Appendix A to this manual. The A/E can order guide specifications from the District by using the OCE guide number and title, or the A/E can obtain the CCB-SPECSINTACT system which has been adopted by the Corps of Engineers for preparing Military Construction projects specifications.

The Construction Criteria Base (CCB) is a fully indexed database, the computerized equivalent of an entire engineering library loaded on a single 4.7-inch Compact Disk (CD). SPECSINTACT is an advanced construction specification building and processing system, which allows access to all guide specifications on the CCB. For additional information or costs call (202) 347-5710.

4. The guide specifications, including the notes at the end of each section, shall be reviewed before starting the drawings and again before preparing the specifications. See ER 1110-345-720 for criteria,

guidance and limitations not covered by these standard procedures.

5. The A/E shall use the guide specifications listed under Part Two - INDEX OF GUIDE SPECIFICATIONS FOR MILITARY CONSTRUCTIONS (APPENDIX A) for all military projects, except Family Housing. Guide specifications for these projects are listed in Part Three of the index and their use is limited to these type of projects. If a required subject is not listed in Part Two of the Index, and is listed in Part One, Index of specifications for Civil works construction, the A/E may use the particular guide specification from this list. If the subject is not found in either of these lists the A/E shall prepare his own specification from commercial or trade association standards.

6. As a general policy, the use of trade names, proprietary items, and the drafting of a specification by adopting a manufacturer's description of a particular commercial article will be avoided. (See ER 1110-345-100.) When it is necessary to specify materials or equipment other than by reference to a document generally known to and used by the industry, minimum requirements will be stated in one of the following ways: (1) in terms of physical characteristics, chemical composition, laboratory test results, performance in actual use, or any combination of these as applicable, in such manner as to ensure full and free competition; or (2) by use of trade names qualified by specific identification such as manufacturers' model numbers or catalog numbers, and further qualified with the words "or approved equal." However, experience indicates that a "trade name or approved equal" description is appropriate only if used with discretion. Therefore, before this method is used, guidance should be obtained by letter or phone call.

B. SUBMITTAL REQUIREMENTS

1. 35% Submission: The A/E shall provide for each discipline a list of specification sections he intends to use. These lists shall be included in the respective chapters of the 35% submittal.

2. 65% Submission: A separate book containing the mark-up specification for the project shall be submitted for review.

3. Final Submission: The specifications shall be typed, shall include the completed SPECIAL PROVISIONS and ENGINEERING FORM 4288, and shall be ready for advertising. In case 65% submission is not required in the contract, the A/E shall provide copies of annotated guide specifications along with the typed format.

C. INSTRUCTIONS FOR DRAFTING AND TYPING SPECIFICATIONS

1. **GENERAL:** It is desired that the following standardized style of paragraph spacing, numbering, etc., be followed by A/E firms insofar as practicable. The following instructions and comments are issued for the information of the stenographers and typists as well as the technical personnel who are responsible for the final appearance and form of the specifications.

2. **MARGINS:** The letter-size paper used by the Government measures 8-1/2" x 11", as used commercially. The margin shall be as follows:

   a. **Top and Bottom:** Typing starts 1-1/4 inches from top of page and ends 1-1/2 inches from bottom of page. The page number is typed 3 lines below. (This may be modified to complete a section or paragraph; provided, however, that the variance does not exceed 3 lines.)

   b. **Side Margins:** The margin is 1-1/4 inches wide.

3. **SPACING:** The text is always single-spaced with double spacing between paragraphs, subparagraphs and to set off heading of tables and listings. Two spaces are used after "periods" except in abbreviations such as U.S. Government, ft., cu. yd. etc., in which case only one space is used.

4. **TITLES:** Each part, section and paragraph must have a title. Subparagraph titles is optional, however, the usage should be consistent throughout all sections. This office has found that persons drafting sections have a tendency to omit paragraph and subparagraph titles. Typists are, therefore, cautioned to be on the alert for such omission.

   a. **Parts or Sections:** Titles of parts and sections are centered, typed entirely in capitals, and are double-spaced between lines. The first line of the text starts on the third line below the lower line of a title as in the **following sample:**

SECTION 02201

EXCAVATION, FILLING, AND BACKFILLING FOR BUILDINGS

PART I - GENERAL

1. APPLICABLE PUBLICATIONS:

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b. **Paragraphs and Subparagraphs:** Titles of paragraphs are typed entirely in upper case, without underscoring. Titles of subparagraphs are typed with major words capitalized and are underscored. (Underscoring is continuous; i.e., not broken for each word of title.) Paragraphs and subparagraphs are numbered as outlined in paragraph 5.

5. **NUMBERING:** Each section, paragraph or subparagraph shall be numbered.

a. **Sections:** Grouping of the technical sections shall conform to the format developed by the Construction Specifications Institute (CSI). Sections based on OCE guide specifications shall be assigned to CSI-format divisions.

b. **Paragraphs:** The number/period system is used for paragraph identification. Under this system each paragraph and subparagraph is numbered consecutively using a period to separate the number representing each breakdown. The number/period system is as follows:

1.
2.
2.1
2.2
2.3
2.3.1
2.3.2
2.3.2.1
2.3.2.2
3.

c. **Pages:** It is intended that the section number be prefixed to the page numbers, for example the second page of specs section 02201 will be indicated as 02201-2.

6. **INDENTATION:** Paragraph and subparagraph numbers are uniformly indented two letter spaces. The paragraph title will begin two spaces after the number regardless of the length of the number.

7. **MISCELLANEOUS:**

a. The words "Contracting Officer", "Architect-Engineer", "Federal", and "Government" are always capitalized.

b. Words are hyphenated according to syllables; however, when the division occurs before the last syllable of two letters, no division is made. Likewise, no hyphenation is made after the first syllables consisting of only two letters. Words should not be hyphenated between pages.

c. When a paragraph or subparagraph must be divided at the bottom of a page, at least two lines should be typed at the bottom of the page and two at the top of the next page. Paragraphs and subparagraphs containing less than four lines should not be divided.

d. On the last page of each section of Technical Provisions, a row of five asterisks will be typed two lines below the completion of the last paragraph.

SECTION IX
COST ESTIMATE

A. PURPOSE

To establish uniform guidance in the methods, procedures, and format for the preparation of fair and reasonable construction cost estimates for military projects.

B. GENERAL DEFINITIONS

Current Working Estimate (CWE):
A CWE is the sum of the construction cost estimate plus allowance for contingencies and construction supervision, inspection and overhead (SIOH). A CWE is prepared at each stage of the design process to monitor funding and to control design alternatives which will effect overall project costs.

Code A Estimate (10%):
When required by this contract, the Code A estimate is an order-of-magnitude estimate based on limited conceptual project information.

Code B Estimate (35%):
This an early design, concept or preliminary type estimate. A detailed breakdown of the work shall be listed and described whenever possible. Quantities shall be based on the maximum extent possible on take-off; remaining quantities shall be based on assumptions intended to assure an adequate overall estimate. In a Code B estimate, there is always inherent risk and uncertainties associated at this level of detailed design. Therefore, the Cost Engineer shall include the appropriate level of design contingency and noted it in the summary sheet to reflect the incompleteness of design. Partial backup data (e.g. - quantity computation, catalog references, quotation, etc.) shall be furnished as backup information. Also, breakout the indirect costs and identify the percentages used for each element.

65% Estimate:
When required by this contract, this submission is an in-progress design review. The level of detail will be somewhere between a Code B and Code C estimate.

Code C Estimate (Final):
This is a final design type estimate. A detailed breakdown of the work shall be listed that reflects the drawings and specifications. Complete quantity take-off and computation shall be furnished. Indirect costs shall include overhead broken out into its detailed elements, percentage profit used, bond class and cost. Insurance and taxes on labor should be a part of the labor cost or as a percentage of the

total labor cost. The back-up data shall include pertinent information such as vendor quotaton, cost reference books used, judgements applied, sequencing, phasing, productivity calculations, and other associated items that supports the cost estimate.

C. GENERAL INSTRUCTIONS

Estimating philosophy and methodology:
All costs which a prudent, experienced contractor would be expected to incur should be included in each construction cost estimate. Further, each estimate should be developed as accurately as possible and be based upon the best information available. The cost estimate will in all aspects represent the "fair and reasonable" cost to the Government. A listing of facts, known construction tasks, and supplemental judgements form the basis of the estimate at each stage of design. This provides a realistic approach to estimating and creates a historic trail of project cost development.

Degree of Detail:
The level of detail in each stage of the estimate will be commensurate with the level of detailed design. Basically, a construction cost estimate consists of three parts: (1) descriptions of work to be accomplished (tasks), (2) a quantity of work required for each task, and (3) a cost for each tasked quantity. This is commonly referred to as unit pricing. Lump sum pricing is not acceptable without description and quantification and will not be acceptable in final construction estimate.

Rounding figures:
Rounding costs in construction cost estimates is desirable and should be performed consistently. The following guidance is presented for standardization.

a. Each line of pricing in the estimate should be in dollar and cent.

b. Summation of direct costs should be carried to the nearest whole dollar.

c. Total CWE costs should be rounded to the nearest hundred dollars for projects of less than $500,000.

d. Total CWE costs should be rounded to the nearest thousand dollars for projects greater than $500,000.

Safeguarding/security of estimates:
CWE's should be handled by the estimator in a discretionary manner. Access to each estimate and its contents will be limited to those persons whose duties require knowledge of

the estimate. The final Government estimate will be designated **"FOR OFFICIAL USE ONLY"** unless a higher security classification is warranted. Each final estimate submitted to the Government must be accompanied by an "Estimate Cover Sign-off Sheet". A sample of this cover sheet is shown toward the end of this section. The signature should be those who have had access to the total amount of the estimate.

Quantity Takeoff:
When the construction tasks are identified, a quantity survey is taken. This quantity take-off should include, as accurately as possible, all facts and judgments that the cost engineer gathers from the engineering and design data and relate this takeoff in standard units of measurement. The amount of quantitative detail that can be calculated into each task is commensurate with the detail of design. Calculations beyond detail in design is often necessary to determine a price or complete the overall scope of work within the estimate. In such cases, (1) the basis for the calculations should be explained, (2) any contingency calculations clearly shown, and (3) quantities determined by engineering judgment noted for later reconciliation upon design refinement. During construction, there is a certain quantity of materials which is normally wasted and lost as a result of cutting, fitting, handling, or contamination. All these and other reasonable losses should be considered. For uniformity, and to preserve the unit pricing structure, it is recommended that waste and loss be considered by increasing quantity. Lump sum pricing is not allowed in the final estimate because it is neither conclusive or persuasive.

Types of Costs:
All estimates based on detailed design will be developed separating the direct cost of labor, construction equipment, and materials & supplies. Direct labor cost should have included insurance and taxes (e.g. - workmens compensation, federal unemployment tax, state unemployment tax, social socurity tax, fringe benefits, vacation time, etc.) Insurance and taxes can also be added toward the end of each main section. In either case, the percentage used or a calculation of how insurance and taxes on labor was derived must be shown in the estimate. Applicable indirect costs and profit will be added to reflect construction cost. A reserve for construction contingencies and construction supervision and inspection overhead (SIOH) will be added to determine the current working estimate (CWE). For new construction projects, the contingency reserve is set at 5% and for alteration type projects, the contingency can be as high as 10%. The SIOH is currently set at 6%.

Subcontracted Work:
In every major construction job, the prime contractor will

subcontract specialty items such as plumbing, heating, electrical, roofing, etc. This specialty items are more effectively performed by a subcontractor. Therefore, the CWE should show a summary sheet of subcontracted work to include the total direct cost and indirects. A percentage of prime markup should be added to the total subcontracted work.

Indirect Costs:
Indirect costs are those costs that cannot be attributed solely to a single segment of work. Overhead, profit, bond, and escalation (for future cost growth). The two main catergories of overhead are general conditions (job overhead) and office overhead. Toward the end of this section is shown a suggested list of overhead items.

D. SUBMITTAL REQUIREMENTS

Forms for Detailed Cost Estimates:
There are five forms which have been developed for the purpose of aiding the estimator in uniformly presenting and preparing detailed construction cost estimates. A set of the blank forms are included at the end of this section.

Organization of Cost Estimate:
The cost estimate shall be organized as follows:

A. An estimate Cover Sign-Off Sheet shall be submitted, followed by a Summary Sheet. Subtotals from each System Summary Sheet are forwarded to the Summary Sheet.

B. A System Summary Sheet, Building Cost shall be provided for each building.

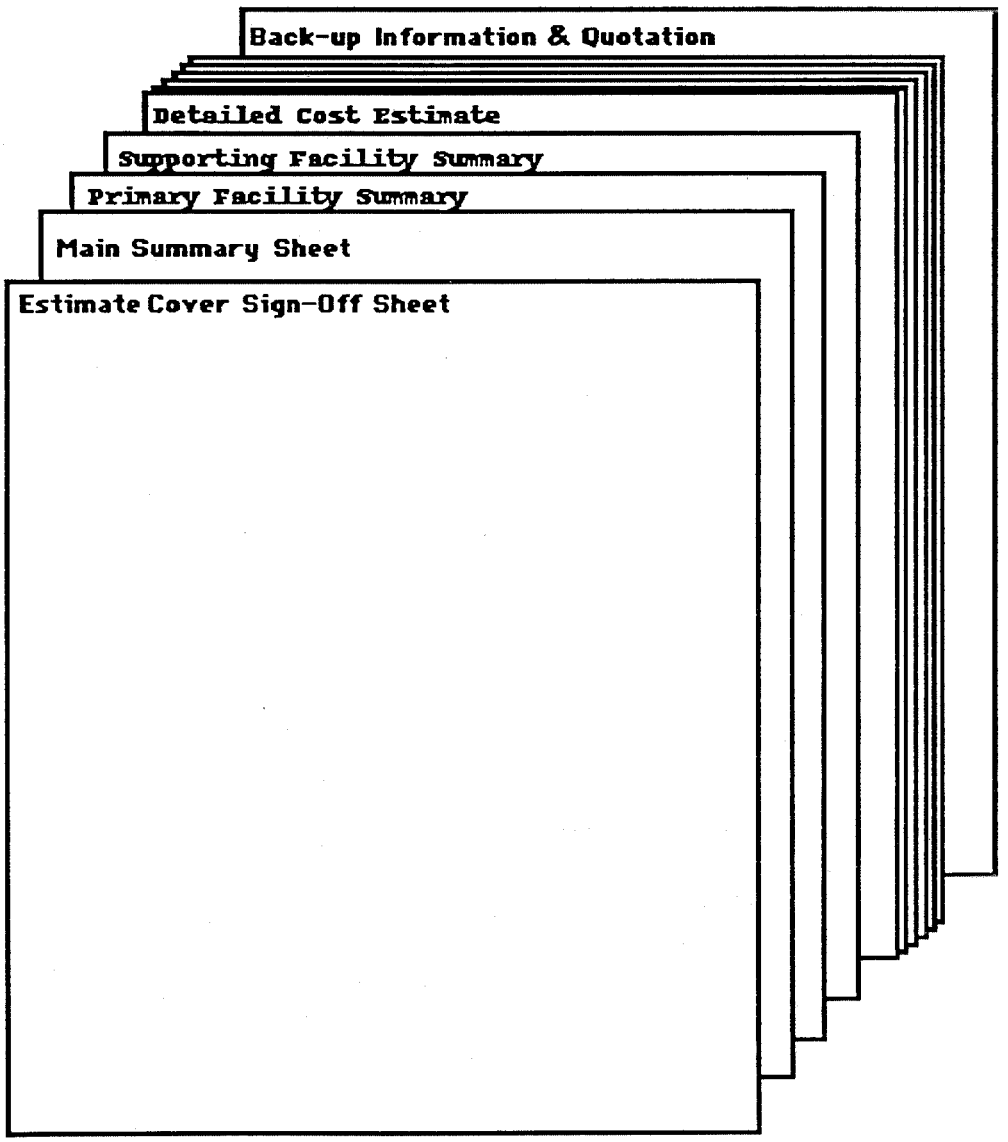
C. A System Summary Sheet, Site and Utilities shall be provided.

D. Unit Cost Estimate sheets shall be provided to support the System Summary Sheets.

E. All pertinent back-up information to support the estimate.

The cost estimate should be arranged in the sequence shown on page IX - 5.

Organization For Cost Estimate



Sample Estimate Cover Sign-Off Sheet

US Army Corps of Engineers

New York District

Project Title:

Project Location:

Project Number:

To the best of my knowledge the integrity of this estimate has been maintained in full compliance with AR 340-17, "FOR OFFICIAL USE ONLY"

This enclosed submittal conforms to the A-E's scope of work and the A-E's Standard Procedures Manual.

Architect-Engineer (A-E) Firm: Phone No.

Responsible A-E Representative: Phone No.

(Sample of Main Summary Sheet)

Project Title: Date Prepared:

Location: Est. By:

Project Number: Status of Design:

PRIMARY FACILITIES

(_____SF) ..... $
(_____SF) .....
(_____SF) .....

Total Buildings ..... $

SUPPORTING FACILITIES ..... $

Total Contract Cost ..... $

Contingencies During Construction (%) ..

Subtotal ..... $

Supervision & Administration (%) .....

Current Working Estimate ..... $

ADDITIVE ITEMS

A1 .....
A2 .....
A3 .....

Total Additive Contract Cost ..... $

Contingencies During Construction (%) ..

Subtotal ..... $

Supervision & Adminstration (%) .....

Total Additives CWE ..... $

Total CWE including All Additives ..... $

Based on Midpoint of Construction During _____ Month, Calendar Year, 19 ___.

(Sample of Primary Facility Summary Sheet)

SUMMARY SHEET, BUILDING

Project Title:
Location:
Date Prepared: Estimated By:

Acct. No.	Description	From Page	Total Cost
02	SITEWORK		
03	CONCRETE		
04	MASONRY		
05	METALS		
06	WOOD & PLASTICS		
07	INSULATION		
08	DOORS & WINDOWS		
09	FINISHES		
10	SPECIALITIES		
11	EQUIPMENT		
12	FURNISHINGS		
13	SPECIAL CONSTRUCTION		
14	CONVEYING SYSTEM		
15	MECHANICAL		
16	ELECTRICAL		

Direct Cost $ _____

Overhead (GC & HO) __%

Subtotal $ _____

Profit __%

Subtotal $ _____

Bond __%

Subtotal $ _____

Escalation (to the midpoint of construction) _____

Subtotal

Building Total Contract Cost (Rounded) $

(Summary of Supporting Facility Summary Sheet)

SUMMARY SHEET, SITE WORK

Project Title:
Location:
Date Prepared: Estimated By:

Description	From Page	Total Cost
CLEARING AND DEMOLITION		
EARTHWORK		
UTILITY, SEWER		
UTILITY, DRAINAGE		
UTILITY, GAS		
UTILITY, WATER		
PAVING, BITUMINOUS		
PAVING, CURBS & GUTTERS		
PAVING, SIDEWALKS & PADS		
SITE IMPROVEMENTS & SPECIALTIES		
FENCES & GATES		
LANDSCAPING		
ELECTRICAL		
OUTSIDE LIGHTING		
COMMUNICATIONS		
Direct Cost		$
Overhead (GC & HO) __%		
Subtotal		$
Profit __%		
Subtotal		$
Bond __%		
Subtotal		$
Escalation (to the midpoint of construction)		
Subtotal		$
Sitework Total Contract Cost (Rounded)		$

SAMPLE DETAILED COST ESTIMATE

On the proceeding pages is samples of a Detailed Cost Estimate. Please note that the estimate should be prepared separating the primary facility from the supporting facility. Also, the primary facility should be assembled in numerical order using the **Construction Specifications Institue's** index system.

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO. DACA86-83-B-0010	EFFECTIVE PRICING DATE APRIL 83	DATE PREPARED 18 MARCH 83
PROJECT ENGINEERING MAINTENANCE BLDG.	☐ CODE A ☐ CODE B ☐ CODE C	DRAWING NO.	SHT 1 OF 1
LOCATION FORT CROCKETT, KY.	☒ OTHER FINAL	ESTIMATOR F.S.	CHECKED BY H.J.

	TASK DESCRIPTION B.I. 1 - E.M. BUILDING	QUANTITY No. Of Units	QUANTITY Unit Meas	LABOR MH/Unit	LABOR Total Hrs	LABOR Unit Price	LABOR Cost	EQUIPMENT Unit Price	EQUIPMENT Cost	MATERIAL Unit Price	MATERIAL Cost	TOTAL	SHIPPING Unit Wt	SHIPPING Total Wt
	DIV. 02 SITEWORK													
	02221 EXCAVATION - TRENCHING													
1202	FOOTINGS BY HYD. EXCAV	123	CY	.03	4	0.81	100	0.27	33	-	-	133	-	-
7002	COMPACTION BY VIB. PLATE	211	CY	.08	17	1.18	249	0.04	8	-	-	257	-	-
	02222 STRUCTURAL EXCAV.													
3203	FOUNDATION EXCAV. BY HAND	169	CY	2.34	395	37.09	6260	0.33	56	-	-	6316	-	-
4102	BACKFILL DUMPED BY MACHINE	51	CY	.02	1	0.42	21	0.22	11	-	-	32	-	-
4202	COMPACTION BY VIB. PLATE	51	CY	.20	10	3.25	166	0.11	6	-	-	172	-	-
	02225 BULK EXCAVATION													
3101	HAULING (1.25 MI)	211	CY	.03	6	0.50	106	0.39	82	-	-	188	-	-
3103	HAULING (6.20 MI)	110	CY	.06	7	1.00	110	0.79	87	-	-	197	-	-
	02611 CRUSHED STONE PAVING													
7001	GRADED BASE COURSE	211	CY	.06	13	1.11	234	0.47	99	17.92	3781	4114	-	-
	TOTAL THIS SHEET				453		7,246		382		3,781	11,409		

DA FORM 5418-R, APR 85

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO. DACA86-83-B-0010	EFFECTIVE PRICING DATE APRIL 83	DATE PREPARED 18 MARCH 83
PROJECT ENGINEERING MAINTENANCE BLDG.	☐ CODE A ☐ CODE B ☐ CODE C	DRAWING NO.	SHT 1 OF 2
LOCATION FORT CROCKETT, KY.	☒ OTHER FINAL	ESTIMATOR F.S.	CHECKED BY H.J.

	TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
	B.I. 1 - E.M. BUILDING	No. Of Units	Unit Meas	MH/Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
	DIV. 03 CONCRETE													
	03110 STRUCTURAL FORMWORK													
1112	WALL FOOTINGS (2 USES)	1033	S.F	.07	72	1.34	1384	0.04	41	0.45	465	1890	-	-
1122	COLUMN FOOTINGS (2 USES)	517	S.F	.09	47	1.55	801	0.04	21	0.45	233	1055	-	-
1202	GRADE BEAMS (2 USES)	1550	S.F	.07	109	1.34	2077	0.04	62	0.60	930	3069	-	-
2512	INTERIOR WALL FORMS *	4445	S.F	.12	533	2.24	9957	0.06	267	0.52	2311	12535	-	-
* 2541	(MOD.-ADD 10% TO CREW FOR EXTERIOR WALLS)													
	03210 REINFORCING STEEL													
1003	#3 - GRADE 60 FOOTING	1.1	TON	12.73	14	279.09	307	2.73	3	467.27	514	824	-	-
2003	#3 - GRADE 60 WALLS	3.1	TON	12.73	39	279.03	865	2.73	8	613.64	1902	2775	-	-
	03220 WELDED WIRE FABRIC													
1004	W4 x W4 FLOORS	12648	SF	.01	126	0.15	1897	0.002	25	0.16	2024	3946	-	-
	03302 CONC. ADMIX													
1002	SET RETARDER	528	CY	-	-	-	-	-	-	1.89	1100	1100	-	-
	03305 CONC. CURING													
1004	SPRAYED MEMBRANE	16512	SF	.002	33	0.04	660	-	6	0.01	162	828		
	-													
	TOTAL THIS SHEET				973		17,948		433		9,641	28,022		

DA FORM 5418-R, APR 85

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO.: DACA86-83-B-0010
EFFECTIVE PRICING DATE: APRIL 83
DATE PREPARED: 18 MARCH 83
PROJECT: ENGINEERING MAINTENANCE BLDG.
☐ CODE A ☐ CODE B ☐ CODE C
DRAWING NO.:
SHT 2 OF 2
LOCATION: FORT CROCKETT, KY.
☒ OTHER FINAL
ESTIMATOR: F.S.
CHECKED BY: H.J.

	TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
	B.I 1 - E.M. BUILDING	No. Of Units	Unit Meas	MH/Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
	DIV. 03 CONCRETE										*(SEE BACKUP FOR QUOTE)			
	03311 STRUCTURAL CONC.													
1121	FOOTING BY CRANE & BUCKET	51	CY	.81	41	15.12	771	5.67	289	57.51	* 2933	3993	-	-
1162	SLAB ON GRADE BY C&B	535	CY	.54	289	9.45	5056	3.51	1878	57.51	* 30768	37702	-	-
1241	WALLS BY CRANE & BUCKET	47	CY	.81	38	13.50	635	5.13	241	52.92	2487	3363	-	-
4104	BROOM FINISH FLOOR	7912	SF	.01	79	0.25	1978	0.02	158	-	-	2136	-	-
5003	NON-MET. FLOOR HARDENER	7912	SF	.01	79	0.20	1582	0.01	79	0.04	316	1977	-	-
	03520 3" CONC. ROOF DECK													
1208	POURED PERLITE 1-6 MIX	13046	SF	.01	130	0.18	2348	0.01	130	0.50	6523	9001	-	-
	TOTAL THIS SHEET				656		12370		2775		43027	58172		
	TOTAL SHEET 1 OF 2				973		17948		433		9461	27842		
	TOTAL DIV. 03 CONCRETE				1629		30318		3208		52488	86014		
	~~TOTAL THIS SHEET~~													

DA FORM 5418-R, APR 85

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO. DACA86-83-B-0010	EFFECTIVE PRICING DATE APRIL 83	DATE PREPARED 18 MARCH 83
PROJECT ENGINEERING MAINTENANCE BLDG.	☐ CODE A ☐ CODE B ☐ CODE C	DRAWING NO.	SHT 1 OF 3
LOCATION FORT CROCKETT, KY.	☒ OTHER FINAL	ESTIMATOR F.S.	CHECKED BY H.J.

	TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
	B.I.1 - E.M. BUILDING	No. Of Units	Unit Meas	MH/Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
	DIV. 15 MECHANICAL													
	15061 STEEL PIPE													
1105	1½" GALV. SCH. 40	56	FT	.23	13	5.02	281	0.09	5	2.35	132	418	-	-
1106	2" GALV. SCH. 40	72	FT	.29	21	6.26	451	0.11	8	3.14	226	685	-	-
2102	¾" BLACK - SCH. 40	463	FT	.15	69	3.30	1528	0.06	28	0.71	329	1885	-	-
	15062 CAST IRON PIPE													
1003	4" SOIL - BELL & SPIGOT	466	FT	.42	196	9.12	4250	0.16	75	3.21	1496	5821	-	-
1203	4" SANITARY TEE	97	EA	2.48	241	53.48	5188	0.92	89	10.57	1025	6302	-	-
	15063 COPPER TUBING													
1003	¾"	59	FT	.22	13	4.57	270	0.08	5	1.05	62	337	-	-
1004	1"	43	FT	.26	11	5.60	241	0.09	4	1.45	62	307	-	-
1007	2"	46	FT	.41	19	8.75	403	0.15	7	3.81	175	585	-	-
1023	¾" TEE	12	EA	1.00	12	22.42	269	0.42	5	0.50	6	280	-	-
1024	1" TEE	6	EA	1.33	8	28.83	173	0.50	3	2.17	13	189	-	-
1047	2" 90° ELBOW	4	EA	1.00	4	20.25	81	0.25	1	3.00	12	94	-	-
	15086 VACUUM BREAKERS													
1001	½" NPTM BRASS	3	EA	.33	1	10.00	30	0.33	1	8.33	25	56	-	-
	TOTAL THIS SHEET				608		13,165		231		3,563	16,959		

DA FORM 5418-R, APR 85

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO.: DACA86-83-B-0010
EFFECTIVE PRICING DATE: APRIL 83
DATE PREPARED: 18 MARCH 83
PROJECT: ENGINEERING MAINTENANCE BLDG.
☐ CODE A ☐ CODE B ☐ CODE C
DRAWING NO.:
SHT 2 OF 3
LOCATION: FORT CROCKETT, KY.
☒ OTHER FINAL
ESTIMATOR: F.S.
CHECKED BY: H.J.

	TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
	B.I. 1 - E.M. BUILDING	No. Of Units	Unit Meas	MH/Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
	DIV. 15 MECHANICAL										*(SEE BACKUP FOR QUOTE)			
	15101 GATE VALVES													
1104	3/4" BRONZE 125 LB	15	EA	.47	7	10.07	151	0.20	3	13.00	195	349	-	-
1105	1" BRONZE 125 LB	2	EA	.50	1	10.50	21	-	-	16.50	33	54		
	15400 METERING & RELATED PIPING													
	2½" WATER METER	1	EA	7.0	7	150.00	150	3.00	3	838.00	* 838	991	-	-
	15424 WATER HEATERS													
1105	82 GAL 4000 WATTS	1	EA	6.0	6	134.00	134	2.00	2	257.00	257	393	-	-
	15430 PLUMBING FIXTURES													
1121	WALL HUNG WATER CLOSET	6	EA	2.33	14	50.17	301	0.83	5	215.67	1294	1600	-	-
1511	WALL HUNG LAVATORIES	6	EA	2.33	14	50.17	301	0.83	5	153.67	922	1228	-	-
1621	CAST IRON SERVICE SINK	1	EA	3.00	3	57.00	171	1.00	1	378.00	378	436	-	-
	15510 SPRINKLER EQUIP.													
1222	CONCEALED WET TYPE	110	EA	6.90	759	145.00	15963	2.73	300	46.64	5130	21393	-	-
	(PRICE / HEAD)													
	15830 ROOF VENTILATOR													
1021	BELT DRIVE 2830 CFM	6	EA	3.67	22	19.86	411	1.33	8	852.00	* 5112	5591	-	-
	TOTAL THIS SHEET				833		17,549		327		14,159	32,035		

DA FORM 5418-R, APR 85

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO. DACA86-83-B-0010	EFFECTIVE PRICING DATE APRIL 83	DATE PREPARED 18 MARCH 83
PROJECT ENGINEERING MAINTENANCE BLDG.	☐ CODE A ☐ CODE B ☐ CODE C	DRAWING NO.	SHT 3 OF 3
LOCATION FORT CROCKETT, KY.	☒ OTHER FINAL	ESTIMATOR F.S.	CHECKED BY H.J.

TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
B.I. 1 - E.M. BUILDING	No. Of Units	Unit Meas	M H / Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
DIV. 15 MECHANICAL													
TOTAL SHEET 1 OF 3				608		13165		231		3563	16959		
TOTAL SHEET 2 OF 3				833		17549		327		14159	32035		
TOTAL DIV. 15 MECHANICAL				1441		30714		558		17722	48994		
~~TOTAL THIS SHEET~~													

DA FORM 5418-R, APR 85

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO. DACA86-83-B-0010	EFFECTIVE PRICING DATE APRIL 83	DATE PREPARED 18 MARCH 83
PROJECT ENGINEERING MAINTENANCE BLDG.	☐ CODE A ☐ CODE B ☐ CODE C	DRAWING NO.	SHT 1 OF 4
LOCATION FORT CROCKETT, KY.	☒ OTHER FINAL	ESTIMATOR F.S.	CHECKED BY H.J.

	TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
	B.I 1 - E.M. BUILDING	No. Of Units	Unit Meas	MH/Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
	DIV. 16 ELECTRICAL													
	16110 RACEWAYS													
5001	PLUG IN STRIP	394	FT	.09	35	2.20	867	0.01	4	1.94	764	1635	-	-
	16111 CONDUITS													
1101	½" GALV. STEEL CONDUIT	6890	FT	.05	345	1.32	9095	0.01	69	0.67	4616	13780	-	-
1103	½" BUSHING SET	860	EA	.29	249	7.20	6192	0.04	34	0.21	181	6407	-	-
1121	1" GALV. STEEL CONDUIT	164	FT	.08	13	1.93	317	0.01	2	0.99	162	481	-	-
1123	1" BUSHING SET	8	EA	.38	3	9.63	77	0.02	1	0.50	4	82	-	-
1151	2" GALV. STEEL CONDUIT	49	FT	.14	7	3.35	164	0.02	1	1.67	82	247	-	-
1152	2" ELBOW	5	EA	.80	4	21.40	107	0.20	1	5.83	29	137	-	-
1153	2" BUSHING SET	10	EA	.70	7	16.70	167	0.10	1	1.60	16	184	-	-
	16120 WIRE AND CABLE													
1102	NO. 12 AWG - THW SOLID	28215	FT	.01	282	0.18	5079	0.001	28	0.03	846	5953	-	-
1501	NO. 8 AWG - THW STRANDED	689	FT	.01	7	0.24	165	0.001	1	0.10	69	235	-	-
1515	500 MCM - THW	164	FT	.05	8	1.18	194	0.01	2	2.43	399	595	-	-
5104	NO 22 AWG TELEPHONE	650	FT	.02	13	0.41	269	0.001	1	0.26	171	441	-	-
	TOTAL THIS SHEET				973		22,693		145		7,339	30,177		

DA FORM 5418-R, APR 85

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO. DACA86-83-B-0010	EFFECTIVE PRICING DATE APRIL 83	DATE PREPARED 18 MARCH 83
PROJECT ENGINEERING MAINTENANCE BLDG. ☐ CODE A ☐ CODE B ☐ CODE C	DRAWING NO.	SHT 1 OF 4
LOCATION FORT CROCKETT, KY. ☒ OTHER FINAL	ESTIMATOR F.S.	CHECKED BY H.J.

	TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
	B.I. 2 - SITEWORK	No. Of Units	Unit Meas	MH/Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
	DIV. 02 SITEWORK													
	02212 EMBANKMENT-COMPACTION & SHAPING													
1002	8" LIFT W/ VIB. ROLLER	4945	CY	.002	10	0.05	247	0.10	495	-	-	742	-	-
	02221 EXCAVATION-TRENCHING													
1102	BY GRADALL 1 C.Y.	82	CY	.04	3	0.56	46	0.63	52	-	-	98	-	-
1302	BY HYD. EXCAV. 1 C.Y.	1521	CY	.02	30	0.35	532	0.20	304	-	-	836	-	-
5003	BACKFILL BY F.E. LOADER	654	CY	.02	13	0.44	288	0.27	177	-	-	465	-	-
	02222 STRUCTURAL EXCAVATION													
3401	TRIM EXCAV. BOTTOM-BY HAND	3918	SF	.02	78	0.25	980	0.02	78	-	-	1058	-	-
4101	BACKFILL BY HAND	8	CY	.63	5	10.38	83	0.13	1	-	-	84	-	-
4104	BACKFILL BY LOADER	804	CY	.02	16	0.44	354	0.27	217	-	-	571	-	-
4201	COMPACT W/ AIR TAMPER	1530	CY	.25	383	4.04	6181	0.71	1086	-	-	7267	-	-
	02225 BULK EXCAVATION													
	4.7 MILE HAUL-(STONE)	289	CY	.07	20	1.06	306	2.01	581	-	-	887	-	-
1202	EXCAV. BY SMALL DOZER	15844	SF	.002	32	0.05	792	0.02	317	-	-	1109	-	-
2332	EXCAV. BY 2½ C.Y. F.E. LOADER	289	CY	.01	3	0.20	58	0.17	49	-	-	107	-	-
2342	EXCAV. BY 3½ C.Y. F.E. LOADER	3959	CY	.01	40	0.15	594	0.17	673	-	-	1267	-	-
3102	0.4 MILE HAUL - (FILL)	4709	CY	.02	94	0.33	1554	0.62	2920	-	-	4474	-	-
	TOTAL THIS SHEET				727		12015		6950			18965		

DA FORM 5418-R, APR 85

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO. DACA86-83-B-0010	EFFECTIVE PRICING DATE APRIL 83	DATE PREPARED 18 MARCH 83
PROJECT ENGINEERING MAINTENANCE BLDG.	☐ CODE A ☐ CODE B ☐ CODE C	DRAWING NO.	SHT 2 OF 4
LOCATION FORT CROCKETT, KY.	☒ OTHER FINAL	ESTIMATOR F.S.	CHECKED BY H.J.

	TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
	B.I. 2 - SITEWORK	No. Of Units	Unit Meas	MH/Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
	DIV 02 SITEWORK													
	02412 WOOD SHEETING													
1001	SHORING - 8' DEEP EXCAV.	7352	SF	.12	882	2.01	14778	0.29	2132	1.21	8896	25806	-	-
	02455 DUCTILE IRON PIPE													
	TAPPED CAP	1	EA	1.00	1	21.00	21	3.00	3	59.00	59	83	-	-
1002	6" DIA. D.I. PIPE	75	FT	.23	17	4.48	336	0.64	48	5.65	424	808	-	-
1003	8" DIA. D.I. PIPE	190	FT	.26	49	5.23	994	0.74	141	8.34	1585	2720	-	-
1102	6" - 90° ELBOW	1	EA	3.00	3	56.00	56	8.00	8	109.00	109	173	-	-
1303	8" - 22½° ELBOW	1	EA	4.00	4	71.00	71	10.00	10	139.00	139	220	-	-
1406	8"x4" MECH. JOINT TEE	1	EA	5.00	5	105.00	105	15.00	15	203.00	203	323	-	-
1416	12"x8" MECH. JOINT TEE	1	EA	8.00	8	157.00	157	22.00	22	389.20	389	568	-	-
	02460 A.C. PRESSURE PIPE													
	8"x6" A.C. WYE	1	EA	3.00	3	65.00	65	9.00	9	340.00	340	414	-	-
	6" A.C. 22½° ELBOW	1	EA	3.00	3	54.00	54	8.00	8	106.00	106	168	-	-
	STERILIZE & TEST LINES	332	FT	.01	3	0.30	100	0.53	176	0.01	3	279	-	-
1001	4" DIA. 150 PSI A.C. PIPE	39	FT	.10	4	1.86	73	0.25	10	3.00	117	200	-	-
1002	6" DIA 150 PSI A.C. PIPE	66	FT	.09	6	1.95	129	0.27	18	3.96	261	408	-	-
1003	8" DIA 150 PSI A.C. PIPE	213	FT	.10	21	1.95	415	0.27	58	6.01	1280	1753	-	-
	TOTAL THIS SHEET				1009		17354		2658		13911	33923		

DA FORM 5418-R, APR 85

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO.: DACA86-83-B-0010
EFFECTIVE PRICING DATE: APRIL 83
DATE PREPARED: 18 MARCH 83
PROJECT: ENGINEERING MAINTENANCE BLDG.
☐ CODE A ☐ CODE B ☐ CODE C
DRAWING NO.:
SHT 3 OF 4
LOCATION: FORT CROCKETT, KY.
☒ OTHER FINAL
ESTIMATOR: F.S.
CHECKED BY: H.J.

	TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
	B.I. 2 SITEWORK	No. Of Units	Unit Meas	MH/Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
	DIV. 02 SITEWORK													
	02555 WATER DISTRIBUTION SYSTEM													
1304	2" DIA COPPER TUBING	66	FT	.08	5	1.21	100	0.02	1	10.96	723	824	-	-
3002	6" DIA. C.I. GATE VALVE	1	EA	8.00	8	158.00	158	2.00	2	282.00	282	442	-	-
3003	8" DIA. C.I. GATE VALVE	1	EA	11.00	11	226.00	226	32.00	32	397.00	397	655	-	-
	02560 WASTE WATER COLLECTION													
4001	4' DIA. M.H. TOP (PRECAST)	1	EA	3.00	3	56.00	56	11.00	11	118.00	118	185	-	-
4014	2' SQ. FRAME & COVER	1	EA	3.00	3	57.00	57	11.00	11	212.00	212	280	-	-
5203	4' DIA. x 8' DEEP M.H. (PRECAST)	1	EA	13.00	13	223.00	223	42.00	42	711.00	711	976	-	-
	02611 CRUSHED STONE PAVING													
1001	PREPARE SUBBASE	15844	SF	.003	48	0.07	1109	0.03	475	-	-	1584	-	-
2001	GRADED BASE COURSE	27	CY	.04	1	1.11	30	0.48	13	17.63	476	519	-	-
2112	6" CRUSHED BASE	289	CY	.04	12	0.69	199	0.62	179	17.92	5179	5557	-	-
	02612 BITUMINOUS CONCRETE PAVING													
1401	HOT MIX SURFACE COURSE	183	TON	.22	40	3.87	708	1.33	243	24.35	4456	5407	-	-
1402	PRIME COAT	15866	SF	.001	16	0.01	159	0.003	48	0.04	635	842	-	-
	TOTAL THIS SHEET				160		3025		1057		13189	17271		

DA FORM 5418-R, APR 85

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COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO. DACA86-83-B-0010	EFFECTIVE PRICING DATE APRIL 83	DATE PREPARED 18 MARCH 83
PROJECT ENGINEERING MAINTENANCE BLDG.	☐ CODE A ☐ CODE B ☐ CODE C	DRAWING NO.	SHT 4 OF 4
LOCATION FORT CROCKETT, KY.	☒ OTHER FINAL	ESTIMATOR F.S.	CHECKED BY H.J.

	TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
	B.I. 2 - SITEWORK	No. Of Units	Unit Meas	MH/Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
	DIV. 02 SITEWORK													
	02620 CURBS & GUTTERS													
2001	6" CURB × 24" GUTTER	318	FT	.30	95	5.47	1739	0.08	25	5.07	1612	3376	-	-
	02630 SIDEWALK													
3200	2" THICK CONC. PATIO BLOCKS	1690	SF	.07	118	1.69	2011	0.01	17	2.33	3938	5966	-	-
	TOTAL THIS SHEET				213		3750		42		5550	9342		
	TOTAL SHEET 3 OF 4				160		3025		1057		13189	17271		
	TOTAL SHEET 2 OF 4				1009		17354		2658		13911	33923		
	TOTAL SHEET 1 OF 4				727		12015		6950		-	18965		
	TOTAL DIV. 02 SITEWORK				2109		36144		10707		32650	79501		
	~~TOTAL THIS SHEET~~													

DA FORM 5418-R, APR 85

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO. DACA86-83-B-0010	EFFECTIVE PRICING DATE APRIL 83	DATE PREPARED 18 MARCH 83
PROJECT ENGINEERING MAINTENANCE BLDG.	☐ CODE A ☐ CODE B ☐ CODE C	DRAWING NO.	SHT OF
LOCATION FORT CROCKETT, KY.	☒ OTHER FINAL	ESTIMATOR F.S.	CHECKED BY H.J.

	TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
	B.I 2 - SITEWORK	No. Of Units	Unit Meas	MH/Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
	DIV 03 CONCRETE													
	03110 FORMWORK													
1011	SLAB ON GRADE-EDGE FORM	26	FT	.04	1	1.22	26	0.04	1	0.35	9	36	–	–
	03210 REINFORCING STEEL													
1001	#3-GRADE 50 FOR SLABS	.5	TON	13.04	7	279.55	140	2.27	1	445.45	223	364	–	–
	03220 WELDED WIRE FABRIC													
1001	W1.4 x W1.4	43	SF	–	–	0.12	5	–	–	0.05	2	7	–	–
	03311 STRUCTURAL CONCRETE													
1164	3000 PSI BY DIRECT CHUTE	.7	CY	.01	1	4.29	3	–	–	45.71	32	35	–	–
1711	3000 PSI LOST BANK	41	CY	.32		5.30		0.23		50.85			–	–
	03411 MISC. PRECAST ITEMS													
	PAVER SUPPORT SLAB	3	EA	15	45	334.67	1004	63.33	190	350.00	1050	2244	–	–
	TOTAL THIS SHEET				54		1178		192		1316	2686		

DA FORM 5418-R, APR 85

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO. DACA86-83-B-0010	EFFECTIVE PRICING DATE APRIL 83	DATE PREPARED 18 MARCH 83
PROJECT ENGINEERING MAINTENANCE BLDG.	☐ CODE A ☐ CODE B ☐ CODE C	DRAWING NO.	SHT OF
LOCATION FORT CROCKETT, KY.	☒ OTHER FINAL	ESTIMATOR F.S.	CHECKED BY H.J.

	TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
	B.I. 2 SITEWORK	No. Of Units	Unit Meas	MH/Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
	DIV. 15 MECHANICAL													
	15063 COPPER TUBING													
1047	TYPE L - 2" - 90° ELBOW	1	EA	1.00	1	20.00	20	-	-	3.00	3	23	-	-
	15109 HYDRANTS													
2202	6" SAFETOP MODEL	1	EA	14.00	14	301.25	301	5.00	5	261.00	261	567	-	-
	TOTAL THIS SHEET				15		321		5		264	590		

DA FORM 5418-R, APR 85

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO. DACA86-83-B-0010	EFFECTIVE PRICING DATE APRIL 83	DATE PREPARED 18 MARCH 83
PROJECT ENGINEERING MAINTENANCE BLDG.	☐ CODE A ☐ CODE B ☐ CODE C	DRAWING NO.	SHT OF
LOCATION FORT CROCKETT, KY.	☒ OTHER FINAL	ESTIMATOR F.S.	CHECKED BY H.J.

	TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
	B.I. 2 SITEWORK	No. Of Units	Unit Meas	MH/Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
	DIV. 16 ELECTRICAL													
	16111 CONDUITS													
3141	4" SCHED. 40 - DUCT BANK	2297	FT	.06	138	1.39	3193	0.21	482	2.05	4709	8384	-	-
3144	4" BASE SPACER	25	EA	.16	4	3.72	93	0.56	14	0.28	7	114	-	-
5145	4" INTER. SPACER	25	EA	.12	3	2.49	62	0.36	9	0.20	5	76		
	16120 WIRE & CABLE													
3105	#4/0 AWG - 15 KV - SHIELDED	591	FT	.04	24	0.21	538	0.14	83	3.75	2216	2837	-	-
	TOTAL THIS SHEET				164		3836		588		6937	11411		

DA FORM 5418-R, APR 85

SAMPLE BACK-UP DATA SUPPORTING THE ESTIMATE

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO. DACA86-83-B-0010	EFFECTIVE PRICING DATE APRIL 83	DATE PREPARED 18 MARCH 83
PROJECT ENGINEERING MAINTENANCE BLDG	☐ CODE A ☐ CODE B ☐ CODE C	DRAWING NO.	SHT OF 5
LOCATION FORT CROCKETT, KY.	☒ OTHER FINAL	ESTIMATOR F.L.	CHECKED BY C.M

TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
INDIRECT COST SUMMARY	No. Of Units	Unit Meas	MH/Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
SUPERVISION/MANAGEMENT											30750		
OFFICE MANAGEMENT											38000		
ENGINEERING											20500		
SAFETY & SECURITY											2550		
EQUIP. MAINTENANCE											9000		
OPERATING SUPPLIES											1350		
INSURANCE											1400		
MONEY COSTS											990		
HOME OFFICE COSTS											7700		
EQUIPMENT MOBILIZATION											3000		
CAMP FACILITIES											3400		
CAMP SITEWORK											2500		
TEMPORARY UTILITIES											1400		
CONSTRUCTION SUPPORT											5150		
TOTAL INDIRECT COSTS											129690		
						INDIRECT	=	129690 / 699835 =	18.54	% - USE	18.6%		
TOTAL THIS SHEET													

DA FORM 5418-R, APR 85

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COST ESTIMATE ANALYSIS

PROJECT ENGINEERING MAINTENANCE BLDG	INVITATION NO./CONTRACT NO DACA86-83-B-0010	EFFECTIVE PRICING DATE APRIL 83	DATE PREPARED 18 MARCH 83
LOCATION FORT CROCKETT, KY.	☐ CODE A ☐ CODE B ☐ CODE C ☒ OTHER FINAL	DRAWING NO.	SHT 2 OF 5
		ESTIMATOR F.L.	CHECKED BY C.M

TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
	No. Of Units	Unit Meas	MH/Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
INDIRECT COSTS													
SUPERVISION/MANAGEMENT													
PROJECT MANAGER	6	MO			@	3000					18000		
GEN. SUPERINTENDANT	5	MO			@	2550					12750		
SUBTOTAL											30750		
OFFICE MANAGEMENT													
OFFICE MANAGER	5	MO			@	2500					12500		
BOOKKEEPER	5	MO			@	2300					11500		
PAYROLL CLERK	5	MO			@	1000					5000		
TYPISTS	6	MO			@	1500					9000		
SUBTOTAL											38000		
ENGINEERING													
PROJECT ENGINEER	5	MO			@	2600					13000		
SURVEYORS	0.5	MO			@	5000					2500		
DRAFTERS	1	MO			@	1000					1000		
SCHEDULERS	6	MO			@	400					2400		
QUALITY CONTROL ENGR	0.5	MO			@	2400					1200		
LAB TECHNICIAN	0.5	MO			@	800					400		
SUBTOTAL											20500		
TOTAL THIS SHEET													

DA FORM 5418-R, APR 85

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO. DACA86-83-B-0010	EFFECTIVE PRICING DATE APRIL 83	DATE PREPARED 18 MARCH 83
PROJECT ENGINEERING MAINTENANCE BLDG	☐ CODE A ☐ CODE B ☐ CODE C	DRAWING NO.	SHT 3 OF 5
LOCATION FORT CROCKETT, KY.	☒ OTHER FINAL	ESTIMATOR F.L.	CHECKED BY C.M

TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
INDIRECT COSTS	No. Of Units	Unit Meas	MH/Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
SAFETY & SECURITY													
FIRE PROTECTION	3	MO			@	450					1350		
SHOES	20	EA			@	40					800		
HARDHATS	20	EA			@	20					400		
SUBTOTAL											2550		
EQUIP. MAINTENANCE													
MECHANICS	5	MO			@	1800					9000		
SUBTOTAL											9000		
OPERATING SUPPLIES													
OFFICE & ENGINEERING	6	MO			@	300					1800		
POSTAGE	6	MO			@	25					150		
SUBTOTAL											1350		
INSURANCE													
ALL RISK	0.2	%	OF	CONTRACT							1400		
SUBTOTAL											1400		
TOTAL THIS SHEET													

DA FORM 5418-R, APR 85

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO. DACA86-83-B-0010	EFFECTIVE PRICING DATE APRIL 83	DATE PREPARED 18 MARCH 83
PROJECT ENGINEERING MAINTENANCE BLDG	☐ CODE A ☐ CODE B ☐ CODE C	DRAWING NO.	SHT 4 OF 5
LOCATION FORT CROCKETT, KY.	☒ OTHER FINAL	ESTIMATOR F.L.	CHECKED BY C.M

TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
INDIRECT COSTS	No. Of Units	Unit Meas	M H / Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
MONEY COSTS													
INTEREST	15000	x 1.1%	PER	MO. x	6 MO.						990		
SUBTOTAL											990		
HOME OFFICE COSTS													
LABOR	1.1%	OF	CONTRACT AMT.								7700		
SUBTOTAL											7700		
EQUIPMENT MOBILIZATION													
MOBILIZATION	5	VEH	ICLES @		100	+ 45 TONS MISC. @ $40					2300		
DEMOBILIZATION	30	%	OF	MOBILIZATION							700		
SUBTOTAL											3000		
CAMP FACILITIES													
OFFICE TRAILER	1	EA			@	3000					3000		
CONSTRUCTION TOILETS	3	x 6	MO.	x $22							400		
SUBTOTAL											3400		
TOTAL THIS SHEET													

DA FORM 5418-R, APR 85

COST ESTIMATE ANALYSIS

INVITATION NO./CONTRACT NO. DACA86-83-B-0010	EFFECTIVE PRICING DATE APRIL 83	DATE PREPARED 18 MARCH 83
PROJECT ENGINEERING MAINTENANCE BLDG	☐ CODE A ☐ CODE B ☐ CODE C	DRAWING NO.	SHT 2 OF 5
LOCATION FORT CROCKETT, KY.	☒ OTHER FINAL	ESTIMATOR F.L.	CHECKED BY C.M

TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
INDIRECT COSTS	No. Of Units	Unit Meas	MH/Unit	Total Hrs	Unit Price	Cost	Unit Price	Cost	Unit Price	Cost		Unit Wt	Total Wt
CAMP SITE WORK													
FENCES	500	FT			@	3					1500		
SIGNS	2	EA			@	250					500		
DUST CONTROL	50	HR			@	10					500		
SUBTOTAL											2500		
TEMPORARY UTILITIES													
ELECTRIC	6	MO			@	100					600		
WATER	6	MO			@	25					150		
SEWER	6	MO			@	25					150		
TELEPHONE	6	MO			@	250					1500		
SUBTOTAL											2400		
CONSTRUCTION SUPPORT													
FENCED STORE YARDS	1000	SF			@	1					1000		
MECHANICAL STORES	500	SF			@	7					3500		
PAINT STORES	200	SF			@	7					1400		
PHOTO LAB	5	MO			@	50					250		
SUBTOTAL											6150		
TOTAL THIS SHEET													

DA FORM 5418-R, APR 85

CONSTRUCTION COST ESTIMATE WORKSHEET	DATE PREPARED 15 MARCH 83.	SHEET 1 OF 1
PROJECT ENGINEERING MAINTENANCE BUILDING		
LOCATION FORT CROCKETT, KY.		
PLAN NO. C-4	ESTIMATOR F. S.	CHECKED BY H. J.

SITEWORK

QUANTITY TAKE-OFF

DA FORM 5421-R, APR 85

OVERHEAD CHECKLIST

A. SUPERVISION/MANAGEMENT

Project Manager
General Superintendant
Area Superintendant
Civil Superintendant
Carpenter Superintendant
Mechanical Superintendant
Electrical Superintendant

B. ADMINISTRATION

Contract Administrator
Comptroller
Administrative Clerks
Personnel Manager
Personnel Clerks

C. OFFICE MANAGEMENT

Office Manager
Interpreter
Accountant
Bookkeeper
Timekeeper
Pay Master
Payroll Clerks
Stenographer
Typists
Clerks
Mail Clerk
Messengers
Reproduction Operation

D. ENGINEERING

Project Engineer
Civil Engineer
Mechanical Engineer
Electrical Engineer
Field Engineer
Surveyors
Office Engineer
Draftsmen
Engineering Clerks
Cost Estimator
Cost Engineer
Chief Planning Engineer
Planners and Schedulers
Quality Control Engineer
Inspectors
Construction Laboratory Technicians

E. PURCHASING AND CONSTRUCTION STORES

Chief Purchasing Agent
Purchasing Agent
Buyers
Expeditors
Traffic Manager
Travel Clerks
Shipping Clerks
Inventory Control Manager
Inventory Control Clerks
Chief Warehouse Manager
Receiving Clerk
Chargeout Clerk
Material Clerk
Tool House Labor
Common Labor
Typist
Clerk

F. SAFETY AND SECURITY

Safety Engineer
Safety Clerk
Security Chief
Security Officer
Watchman and Guard
Fire Chief
Fire Equipment and Extinguishers
Shoes
Hardhats
Protective Items

G. EQUIPMENT MAINTENANCE AND MOTOR POOL

Master Mechanic
Mechanics
Mechanic Helpers
Spare Parts Manager
Parts Clerk
Motor Pool Manager
Service Truck Driver
Motor Pool Equipment Operator
Motor Pool Driver
Common Labor
Motor Pool Vehicle Operator and Maintenance
Equipment Maintenance Vehicles:
  Fuel Truck and Labor
  Lube Truck and Labor

H. TEMPORARY UTILITIES

Power - Operation and Maintenance
Water - Operation and Maintenance
Sanitary - Operation and Maintenance
Telephone - Maintenance
Telex - Maintenance
Intercom - Maintenance
Radio - Maintenance
Freight on Materials

I. FACILITY OPERATIONS

Camp Manager
Chefs and Cooks
Kitchen Help
Janitors
Maintenance and Repair Crew
Doctor and Nurses
Clerk and Typists

J. OPERATING SUPPLIES

Food
Personnel
Janitorial and Cleanup
Office and Engineering
Camp Maintenance and Repair
Medical
Reproduction and Photography
Postage
Freight on Supplies

K. COMPUTER AND DATA PROCESSING

Program Costs
Input Labor Technicians
Computer Expense

L. MISCELLANEOUS COSTS

On-Site Training Programs
Craft Qualifications
Start-Up Programs
Projected Delays -
  Weather
  Degrees
  Logistics
Project Travel
  On-Site
  Off-Site
Rest and Recuperation Travel
Maintenance of Completed Facilities until Turnover
Periodic Construction
  Site Cleanup
Haul Road Maintenance
Emergency Air Freight
Spare Parts Inventory
Saudi Customs

M. INSURANCE

Builder Risk Insurance
Equipment Floater Insurance
Liability Insurance
Marine Insurance
Other Insurance

N. MONEY COSTS

Interest Costs for Financing
Bond Costs
Bank Letters

O. HOME OFFICE COSTS

Home Office Labor
Home Office Travel
General and Administrative

P. PERSONNEL MOBILIZATION

Recruiting Costs
Travel (1 way)
Family Travel (1 way)
Household Goods Shipment

Q. EQUIPMENT MOBILIZATION

Equipment Own/Operate During Mob
Equipment Standby
Initial Assembly and Setup
Freight and Shipping

R. CAMP FACILITIES - (READY FOR MOVE-IN, INCLUDING FURNISHINGS TRANSPORTATION)

Housing
Messing/Food
Office - Contractor
Office - CE
Construction Toilets
Medical Facilities
Commercial Stores

S. TEMPORARY SUPPORT DURING MOBILIZATION

Housing
Food

T. CAMP SITE WORK

Roads and Parking
Fences
Lighting
Signs
Dust Control

U. TEMPORARY UTILITIES

Electrical System
Water System
Sanitary Waste System
Telephone System
Telex System
Radio System

V. CONSTRUCTION SUPPORT

Storage Yards
Stores/Workshops -
- Electrical
- Mechanical
- Carpentry
- Paint/Flammable

Warehouses
Testing Laboratory
Guard Shacks
POL Dispensing Station
Water Storage
Explosives Storage
Photographic Laboratory
Concrete Batch Plant Erection
Block Plant Erection
Concrete Pipe Plant Erection
Precast Plant Erection
Asphalt Plant Erection
Project Roads

SET OF BLANK FORMS FOR THE PREPARATION OF THE CONSTRUCTION COST ESTIMATE

CONSTRUCTION COST ESTIMATE WORKSHEET For use of this form, see TM 5-800-2; the proponent agency is USACE.	DATE PREPARED	SHEET OF
PROJECT		
LOCATION		
PLAN NO.	ESTIMATOR	CHECKED BY

☆ U.S. GOVERNMENT PRINTING OFFICE : 1985 O - 476-843

WAGE RATE CALCULATIONS

For use of this form, see TM 5-800-2; the proponent agency is USACE.

EFFECTIVE PERIOD	
PROJECT	OPERATIONAL SHIFTS
LOCATION	ESTIMATOR / CHECKED BY

LABOR COST

CRAFT DESCRIPTION	BASIC HOURLY WAGE RATE	OVERTIME		SUB-TOTAL (b + d)	TAXES & INS		SUB-TOTAL (e + g)	FRINGE BENE-FITS	TRAVEL OR SUB-SIST	TOTAL HOURLY COST (h + i + j)
		% OF (b)	AMT.		% OF (e)	AMT.				
a	b	c	d	e	f	g	h	i	j	k

DA FORM 5420-R, Apr 85

CREW AND PRODUCTIVITY WORKSHEET

For use of this form, see TM 5-800-2; the proponent agency is USACE.

DATE PREPARED	
PROJECT	PREPARED BY / CREW REF NO.
LOCATION	CHECKED BY

CREW COMPOSITION

WORK TYPE	WORK SCHEDULE	SPECIAL INFORMATION

CREW DESCRIPTION	NO. REQUIRED IN CREW	LABOR COST		EQUIPMENT COST	
		HOURLY* RATE ($/HR)	TOTAL FOR CREW ($/HR)	HOURLY RATE ($/HR)	TOTAL FOR CREW ($/HR)
TOTALS	MANHOURS		LABOR COST		EQUIPMENT COST

CREW PRODUCTIVITY

WORK TASK	PRODUCTIVITY RATE UNIT/HR	LABOR		EQUIPMENT $/UNIT	COMMENTS
		MH/UNIT	$/UNIT		

* Including fringe benefits

DA FORM 5419-R, Apr 85

COST ESTIMATE ANALYSIS

For use of this form, see TM 5-800-2; the proponent agency is USACE.

PROJECT	INVITATION/CONTRACTOR	EFFECTIVE PRICING DATE	DATE PREPARED
LOCATION	CODE *(Check one)* ☐ A ☐ B ☐ C ☐ OTHER _____	DRAWING NO.	SHEET OF SHEETS
		ESTIMATOR	CHECKED BY

TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIAL		TOTAL	SHIPPING	
	NO. OF UNITS	UNIT MEAS	MH UNIT	TOTAL HRS	UNIT PRICE	COST	UNIT PRICE	COST	UNIT PRICE	COST		UNIT WT	TOTAL WT
TOTAL THIS SHEET													

DA FORM 5418-R, Apr 85

SECTION X
AMENDMENTS AND
CONSTRUCTION CONTRACT MODIFICATIONS

A. INSTRUCTIONS FOR PREPARATION OF AMENDMENTS

1. GENERAL

a. An amendment is a document by which revisions and additions are incorporated into published bidding materials (specifications and drawings) prior to opening of bids. Amendments are published by the District and are furnished to all prospective bidders who have received bidding materials.

b. Federal regulations require that bidders be given ample time for the necessary assimilation of the materials contained in the amendment, and that the material is received by the bidder at least **10 calendar days prior to bid opening date.**

c. A/E shall submit the amendment **no later than three weeks prior to date of bid opening.**

2. SPECIFICATIONS

a. Changes to the published specifications are made by instructing the bidders to change, add, delete or substitute items, in the material he has already received. The amendment shall be made by replacing entire pages only.

b. All amendment pages and attachments should include the particular amendment number at the bottom of each sheet.

3. DRAWINGS

a. Revisions to drawings are made by issuing revised drawings (to be made a part of the contract) with the amendment. The drawings shall comply with the following:

(1). All revisions under any reissue of drawing(s) will be triangled at the point of revisions and will carry the same revision number, which shall be shown in the column named "Revision" in the revision block. Changes shall be circled on the back of the drawing sheet. A brief description of the revision will be entered above "Description" in the drawing revision block

as illustrated by Revision 1 & 2 (triangles 1 & 2) in EXHIBIT A of this Section. "GENERAL REVISIONS" will be entered above "Description" when revisions are too extensive to describe.

(2). For sheets to be added by amendment the revision block shall **not** be triangled, the words "New Sheet Added by Amendment" shall be entered above "Description", and the revision block shall be dated and initialed.

(3). Sheets deleted by amendment shall be shown as "Deleted" on drawing index sheet.

b. All drawings revised and/or added by a particular amendment shall have the same date in the revision block.

4. **COST ESTIMATE**

Submit the updated cost estimate.

B. INSTRUCTIONS FOR PREPARATION OF CONTRACT MODIFICATIONS

1. **GENERAL**

a. Modifications to contracts are high priority items and should be acted upon without delay. Timely preparation of contract documents to accompany the modification package will prevent undue delay in construction schedules. Upon receipt of design requirements of a proposed modification, the A/E will proceed with preparation of the necessary changes or additions. The complete package will be forwarded to the Project Manager for finalization and subsequent implementation by Construction Division.

b. Modifications to the contract may be accomplished by application of one or more of the District's methods described below. Formulating a clear, concise, and accurate modification package cannot be overemphasized.

2. **DRAWINGS**

a. The preferred method of modifying the contract documents is to revise an existing drawing. Each modification should be properly triangled, described, dated, and initialed by the A/E. See Exhibit A for general format.

b. Adding a sketch to the existing set of contract drawings is an alternate method of accomplishing desired changes. However, the use of sketches to amend contract drawings shall be kept to a minimum. The sketch should be large enough, whether to scale

or not, to assure easy reproduction for field use and record purposes.

c. Occasionally a modification requires preparation of one or more new sheets because of the magnitude of the change. Care should be exercised in assigning sheet and plate numbers to new drawings. For example, if a new sheet is to be inserted between existing sheets 19 and 20, the proper identification would be sheet 19A. Note that triangles are necessary when adding a new drawing to a contract set.

3. **SPECIFICATIONS**

The A/E shall provide revisions or additions to the specifications as required.

4. **QUANTITIES TAKE-OFF**

The A/E shall submit the quantities take-off.

EXHIBIT A
(Page 1 of 1)

Revision	Description		Date	Approved
2 1	GENERAL REVISIONS	AMENDMENT 2	8 AUG 89	
1 3	REVISED SECTION A-A AND ADDED DETAIL B	AMENDMENT 1	24 JUL 89	

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

Designed by:

Drawn by:

Checked by:

Submitted by:

ARCHITECT ENGINEER

US Army Corps of Engineers

Reviewed by:

SECTION CHIEF

Approval Recommended:

CHIEF, ENGINEERING DIVISION

Sheet reference number:

Date:

Concurred:

CHIEF, DESIGN BRANCH

Approved by:

COLONEL, C. E., DISTRICT ENGINEER

Scale:

Sheet __ __of__ .

NOTES:
WHEN REVISING DRAWINGS IN ACCORDANCE WITH AMENDMENTS, USE THE FOLLOWING PROCEDURE:

A. USE THE TRIANGLE SYMBOL 1 AT POINTS OF REVISION ON THE DRAWING. DO NOT OVERUSE THE TRIANGLE ON ONE VIEW: USE THE SYMBOL ONCE AT THE SUBTITLE OF THE SECTION, PLAN, ETC., WHEN REVISING A VIEW EXTENSIVELY. CIRCLE CHANGED AREA, DETAIL, ITEM ON THE BACK OF THE DRAWING.

B. USE THE FIRST SPACE IN THE REVISION BLOCK AND IDENTIFY IT AS REVISION 1 DETERMINE THE NUMBER OF LOCATIONS WHERE THE REVISION IS MADE AND ADD IT NEXT TO THE TRIANGLE: 1 3.

C. DATE AND INITIAL ALL AMENDMENTS.

EXHIBIT A
REVISION BLOCK
(AMENDMENTS)

SECTION XI
STUDY PROCEDURES

A. GENERAL

The study report should become the single source of information for the required scope of work information and contain authoritative justification for future construction projects. **The information supplied should be self-sufficient in developing a proposal for design without further study, investigation, or field verification.** The report should be written in clear and concise language in such a way that it could be reviewed by a technical as well as a managerial individual.

A logical decision trail should be obvious at all times so that a reviewer can reconstruct and therefore verify each step from observation through conclusion with a minimum of effort. The studier should recognize that this study is the application and extension of Architectural and Engineering science. As such it will include research, presentation, discussion and revisions, as necessary to come to a logical conclusion. Incomplete or inadequate reports shall be resubmitted without additional payment.

In order to obtain reliable results the study shall be coordinated with the using agency to ensure that the level of activity at the facility is sufficient during the period of field observation, interviews and/or tests. A statement of insufficient activity or lack of sufficient data will not be accepted. Notification of any visits/tests at least a week prior to their occurrence will be required.

B. REPORT

The report should contain the following items in a format that most facilitates use and understanding.

1. **Table of Contents.**

2. **Summary** - A brief statement of scope, problems encountered, and recommended solutions.

3. **Scope** - A full statement of work to be accomplished including the initial purpose, any reason for change and the study applicability.

4. **Glossary** - A listing of definitions of items used in the statement of scope and throughout the report.

5. **Methodology** - A statement of all assumptions; a listing of guidelines, authorities and regulations and how they were used; a statement of what, if any tests, interviews and other field studies were conducted; a statement of alternate design/analysis methods considered and the reasons for the final choice.

6. **Bibliography** - This may be either a separate section or interspersed throughout the report. It should include the applicable sections of the authorities and regulations that items are being compared against or are being recommended to be designed in accordance with. Quotations should be provided as necessary for clarity. It should be organized so that the criteria sited and the item in question can be easily matched.

7. **Background** - This section should include consideration of any prior reports, studies, tests and other historical data that tend to support or disagree with the problem or need as stated in the scope.

8. **Existing Conditions** - Provide full technical and functional description of the existing facility or system(s) to be studied as well as any supporting facilities and utilities that must be considered for a full solution.

9. **Details of Field Observations** -

(a). Identification of study testing personnel and their qualifications.

(b). Schedule of visits/tests accomplished.

(c). Level of activity during inspections and other pertinent site conditions.

(d). Interviews shall include: date; identification of those involved by name and position; extent to which reliance was placed on the remarks made; sources of information used by the interviewed person such as duty; logs, diary etc.

(e). Locate, by means of plans and/or system flow diagrams, the areas investigated.

(f). Tabulations of all tests, showing required and actual results.

10. **Problems** - Identify all problems found.

11. **Alternative Solutions** - Itemize all practical alternatives available for repair and/or improvement. These shall include support facilities/utilities. State pro's and con's of each alternative, including constructibility/phasing considerations.

12. **Economics** - Estimate the construction cost for each alternative. Analyze the present worth of maintenance and repair over the expected life of each alternative. Assume no salvage value unless it is very obvious that salvage will be significant.

13. **Index.**

14. **Appendices** - Include pertinent data, signed and dated as required, which support text of study.

C. SUBMISSION

1. An Initial identification of applicable criteria, (15%) submission, in draft form, that would include a statement of scope, proposed methodology, background information, existing conditions and any problems found or anticipated should be made prior to any detailed field work being done. A proposed schedule of visits and tests should also be submitted at this time.

2. An interim, 65% submission, should be made after completion of all proposed visits, and tests, that includes all test results. Additional tests and analyses may be required as a result of the review. The alternative solutions should be listed with only "order of magnitude" estimates of cost. Decision on which alternates to pursue will be accomplished at the review.

3. A draft final, 90% submission, should be made that includes all items as listed in paragraph B REPORT.

4. The final submission shall incorporate the review comments.

SECTION XII
SUBMITTAL REGISTER AND SHOP DRAWINGS

A. GENERAL

The term "shop drawing" as used herein will be interpreted to mean catalog cuts, certificates, samples, test procedures and data, and any other items required for submission. The submittal register (ENG Form 4288) is a list of required submittals which is used by the Government, Architect-Engineer (A/E), and Contractor to control submittals. It is prepared during the project design, and included in the contract documents. Shop drawings are submitted during construction and are reviewed and processed by the A/E. Submittals are classified as "government approved" or "information only." Submittals which will always require government approval are: extensions of design, critical materials, deviations, or those involving equipment that must be checked for compatibility with the entire system. All submittals not requiring government approval are for information only. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction", government-approved submittals are considered to be "shop drawings" whereas information-only submittals are not.

B. PREPARATION OF THE SUBMITTAL REGISTER (4288)

The A/E shall prepare the 4288 as indicated below and shall be included in the final submission. Such submissions not containing completed 4288's will not be approved. A blank and a completed ENG Form are included at end of this section for reference.

1. The A/E shall fill in columns "c" thru "o".

2. List all items for submission of Form 4288. All items indicated to be submitted in (unedited) Corps of Engineers guide specifications (which should be used to form the basis for technical sections of contract specifications) shall be included in 4288 unless there are to be no such items in the specific project. Indicate the name and/or description of each item in the "d" column of the 4288. Listings are to be as detailed as possible. Use specific tags as indicated on schedules (as shown on contract documents) such as "AHU-1", "Fixture Type K", "Door Type 1", etc. Include as required any other clarifying information such as where the item will be used, etc.

3. Fill in the specification section and paragraph number which indicates the requirement for the submittal

or where the item is specified.

4. Check type of submittal in the box beneath the appropriate subheading such as "Shop Drawing", "Certificate", etc.

A "Government Approved (columns "e" thru "m") item is one considered an extension of design and therefore approval is required by the designer (A/E) before the Contractor will order or install the items. In addition, if any item listed on the 4288 is indicated in (unedited) Corps of Engineers guide specifications as being for approval (or not specifically designated "for information"), then it must be listed on the project 4288 as a "Government Approved" items. Items for "Information Only" are normally required to be submitted by the Contractor to the Resident Engineer (RE), who will check them for contract compliance. For items other than samples, a copy will be sent to the A/E. This type of submission requires no action by the A/E, however comments relevant to the submitted item may be made informally (by telephone or mail) to the Resident Engineer, and are encouraged. Samples normally will fall into the "Information Only" category and will be sent to the Resident Engineer. However, no samples will be forwarded to the A/E unless requested.

The A/E may, at his option, require that he be the approver of the aesthetic features of major sample submissions, e.g., facing stone or precast panel finish, or any other items. In this case he is to place a "check mark" in the appropriate box within the "Type of submittal" and "Government Approved" columns. Coordination between the A/E and Resident Engineer on such items may be required. Such items must be approved in the same time frame as required for other approval items.

5. There shall **not** be a mix of "Information Only" items and "Government Approved" items on one line.

C. REVIEW AND PROCESS OF SHOP DRAWING ITEMS SUBMITTED FOR "GOVERNMENT APPROVAL"

1. General

The A/E shall perform a technical review and processing of all shop drawings indicated for "Government Approval" on the 4288 for the project, and shall recommend to the RE his approval or disapproval of the items submitted. The A/E shall allow in his proposal for the review and processing of an additional 15 percent of the number of items indicated on the 4288, to allow for additional items submitted by the Contractor for approval, and resubmitted items. Items submitted to the A/E for review and processing must be acted upon immediately and

returned to the Contracting Officer or his designee within 15 days of receipt.

2. **Procedure**

The procedure for shop drawing review is as follows:

a. The Contractor will submit to the A/E seven copies of shop drawings and completed ENG 4025 with each transmittal, (a blank 4025 is included for reference). The A/E shall check that each item submitted is listed separately on the 4025 and should correspond to the items as listed on the 4288. The A/E shall also check that the 4025 indicates the Contractor's name and address, contract number, contract title and location and transmittal number. Minor corrections to the 4025 and reproduction of a small number of sheets of shop drawings if necessary shall be done by the A/E to expedite the shop drawing process. The A/E shall screen shop drawings submitted and use good judgement to determine the items most critical to the progress of the project and shall review and process the transmittal(s) on which these items appear on a priority basis.

b. The A/E shall review the shop drawings against the contract documents, and <u>determine the appropriate action code;</u>

"A" - <u>Approved as submitted</u>. Item submitted are approved subject to plans and specifications. Contractor will order and install or build items as submitted.

"B" - <u>Approved, except as noted on drawings</u>. Resubmission not required. Contractor must write appropriate annotations on each copy of shop drawings. If necessary, additional sheets may be used, but A/E must mark "see attached" on shop drawings. In any case qualifying annotations must be clearly indicated. Resubmission of "B" items is not required.

Contractor will order, install or build items as submitted subject to annotations, plans and specifications.

"C" - <u>Approved except as noted, resubmission required</u>. A/E must annotate same as for "B" action. Contractor will <u>not</u> order and install items submitted. This category is used where the Contractor may have made an incomplete submission (such as part of a system) but rather than returning with "no action", the A/E reviews what was submitted and returns the shop drawings with

annotations for the Contractor's information. A resubmission will be made by the Contractor and the A/E will render subsequent action code upon receipt of complete submittals.

"E" - Disapproved. The A/E determines that the submitted items do not comply with contract documents, and are unacceptable. The A/E must prepare a letter addressed to the Contracting Officer indicating where each item deviates from the contract documents, citing specification section, paragraph number, drawing number, detail, etc. For "E" actions, the Contractor will not order, install or build the items submitted. A resubmission by the Contractor and subsequent re-review of such items by the A/E will be required.

"G" - Other. The action must be specified by the A/E. This category is typically used for "No Action" - a situation where the Contractor's submittal is grossly incomplete or inappropriate. The A/E must be justified in the use "No Action" since it delays the shop drawing process (and the contract) which could lead to a delay claim by the Contractor. Coordination by the A/E with the Contracting Officer before using the "No Action" category is encouraged.

c. The A/E shall enter action code Form 4025 (last column).

d. The A/E shall mark up shop drawings by labeling item number (per 4025) and transmittal number of each item, stamping or otherwise indicating the action (i.e. "Approval Recommended, Disapproved", etc.) and by indicating name of firm, date, and signature of reviewer on each item.

e. The A/E shall retain for his files one copy of all shop drawings, annotations, notes on letters and on 4025.

f. The A/E shall fill in on his copy of the 4288 for the project, the date that the submittal was received, the action code, and any remarks (last 3 columns). The transmittal number is to be entered into the "Remarks" column, such as "X4" for transmittal number 4, etc. If a resubmittal will be required, split the last 3 columns horizontally to leave room for entering the information the next time is submitted.

g. The A/E shall fill out ENG Form 4026. (See blank form attached) Inclosures is equal to the number of items. Under "Comments" (block 1), indicated if a letter is attached. At the bottom fill in item number and action code for each item. Continue on additional sheet or split boxes) as required. Indicate marks as required.

h. The A/E shall send one copy of the 4026 with all remaining copies of 4025's and shop drawings to the Resident Engineer. Samples will be tagged inventoried and stored in A/E's office only if this has been agreed to by RE and A/E. Otherwise, send all samples to RE.

D. PROCESSING OF "INFORMATION ONLY" ITEMS BY A/E

Review of "Information Only" items is normally done by the RE, who will send a copy of such shop drawings to the A/E for his files. If in the course of handling such an item the A/E discovers that it does not comply with contract documents or is imcompatible with previously submitted items, the A/E is to initiate telephone contact with the RE to alert him of these unacceptable items. The RE will then take appropriate action with the Contractor as required to resolve any problems.

SUBMITTAL REGISTER

CONTRACT NUMBER

TITLE AND LOCATION

CONTRACTOR

SPECIFICATION SECTION

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFORMATION ONLY	GOVERNMENT APPROVED	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN-MENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x

ENG FORM 4288, Aug 89 (ER 415-1-10) EDITION OF APR 84 IS OBSOLETE Page _____ of _____ Pages (Proponent CEMP-CE)

SAMPLE FORM 4288

SUBMITTAL REGISTER

TITLE AND LOCATION

CONTRACT NUMBER

CONTRACTOR

SPECIFICATION SECTION 03300

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL									CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED	INFORMATION ONLY	GOVERNMENT APPROVED	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN-MENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
		3.1	SHOP DRAWINGS	✓										✓									
		3.2	CERTIFICATE OF																				
			COMPLIANCE					✓					✓										
		3.3	MIX PROPORTIONS FOR																				
			EACH CLASS OF CONCRETE							✓				✓									
		7.2	PUMPING DESIGN																				
			MIX							✓				✓									
		8	SAMPLING & TESTING																				
			DURING CONSTRUCTION						✓			✓	✓										
		20	QUALITY CONTROL									✓	✓										

ENG FORM 4288, Aug 89 (ER 415-1-10) EDITION OF APR 84 IS OBSOLETE

Page _____ of _____ Pages

Proponent CEMP-CE

SAMPLE FORM 4288

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE

(Read instructions on the reverse side prior to initiating this form)

DATE

[ ] NEW SUBMITTAL
[ ] RESUBMITTAL

Section I — REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (This section will be initiated by the contractor)

TO:	FROM	CONTRACT NO.	TRANSMITTAL NO.
			PREVIOUS TRANS. NO. (If any)
SPECIFICATION SEC. NO. (Cover only one section with each transmittal)	PROJECT TITLE AND LOCATION		

ITEM NO. a.	DESCRIPTION OF ITEM SUBMITTED (Type, size, model number, etc.) b.	MFG. OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. (See instruction No. 8) c.	NO. OF COPIES d.	CONTRACT REFERENCE DOCUMENT		VARIATION (See instruction No. 6) g.	FOR C E USE CODE h.
				SPEC. PARA. NO. e.	DRAWING SHEET NO. f.		

REMARKS

I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as otherwise stated.

NAME AND SIGNATURE OF CONTRACTOR

Section II — APPROVAL ACTION

INCLOSURES RETURNED (List by Item No.)	NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY	DATE

SAMPLE FORM 4025 (Front)

U.S. GOVERNMENT PRINTING OFFICE: 1984-457-821/28020

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.

2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No." This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.

3. The "Item No." will be the same "Item No." as indicated on ENG Form 4288 for each entry on this form.

4. Submittals requiring expeditious handling will be submitted on a separate form.

5. Separate transmittal form will be used for Shop Drawings submitted under separate sections of the specifications.

6. A check shall be placed in the "Variation" column when a submittal is not in accordance with the plans and specifications - also, a written statement to that effect shall be included in the space provided for "Remarks".

7. Form is self-transmittal; letter of transmittal is not required.

8. When a sample of material of Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" in column c, section I.

9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in section I, column h, to each item submitted. In addition they will ensure inclosures are indicated and attached to the form prior to return to the contractor.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

A – Approved as submitted

B – Approved, except as noted on drawings. Resubmission not required.

C – Approved, except as noted on drawings. Refer to attached sheet resubmission required.

D – Will be returned by separate correspondence

E – Disapproved (See attached)

F – Receipt acknowledged

G – Other (Specify)

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

SAMPLE FORM 4025 (Back)

ROUTING OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE FOR APPROVAL

(Used to route ENG Form 4025 with items attached. Not to become a part of the Contractor's record.)

	TO:	FROM:	DATE
1			

The attached items listed on ENG Form 4025 are forwarded for approval action.

CONTRACT NUMBER	CONTRACTOR
TRANSMITTAL NUMBERS	PROJECT TITLE AND LOCATION

COMMENTS *(Attach additional sheet, if necessary.)*

NO. OF INCL.	TYPED NAME AND TITLE	SIGNATURE

	TO:	FROM:	DATE
2			

COMMENTS *(Attach additional sheet, if necessary.)*

NO. OF INCL.	TYPED NAME AND TITLE	SIGNATURE

	TO:	FROM:	DATE
3			

COMMENTS *(Attach additional sheet, if necessary.)*

NO. OF INCL.	TYPED NAME AND TITLE	SIGNATURE

	TO:	FROM:	DATE
4			

The following action codes are given to items listed on ENG Form 4025:

ACTION CODES

A - APPROVED AS SUBMITTED.

B - APPROVED, EXCEPT AS NOTED ON DRAWINGS. RESUBMISSION NOT REQUIRED.

C - APPROVED, EXCEPT AS NOTED ON DRAWINGS. REFER TO ATTACHED SHEET. RESUBMISSION REQUIRED.

D - WILL BE RETURNED BY SEPARATE CORRESPONDENCE.

E - DISAPPROVED (SEE ATTACHED)

F - RECEIPT ACKNOWLEDGED

G - OTHER *(specify)*

ACTION CODES TO BE INSERTED IN COLUMN G, SECTION I, ENG FORM 4025 *(Attach sheets, when required.)*

ITEM NO. *(Taken from ENG Form 4025)*								
CODE GIVEN								

REMARKS

NO. OF INCL.	TYPED NAME AND TITLE	SIGNATURE

ENG FORM 1 NOV 74 4026 EDITION OF NOV 66 MAY BE USED.

★U.S.GPO:1987-0-721-818

SAMPLE FORM 4026

APPENDIX A

APPENDIX A

DEPARTMENT OF THE ARMY
U. S. Army Corps of Engineers
Washington, D. C. 20314-1000

CEEC-ES

EP 310-1-5

Pamphlet
No. 310-1-5

Military Publications
INDEX OF GUIDE SPECIFICATIONS

1. Purpose. This pamphlet provides an index of guide specifications.

2. Applicability. This pamphlet applies to all HQUSACE/OCE elements and all field operating activities (FOA) having Civil Works and/or Military Programs responsibility.

3. Index of Guide Specifications. This index is a current list of published guide specifications. A revised index is issued semiannually. This index contains the following six parts:

Part One	Index of Guide Specifications for Civil Works Construction
Part Two	Index of Guide Specifications for Military Construction
Part Three	Index of Guide Specifications for Military Family Housing
Part Four	Deleted
Part Five	Index of Guide Specifications for Mobilization Construction
Part Six	Cancellations and Supersessions

4. Use of Guide Specifications. Use of Military Construction guide specifications is described in ER 1110-345-720. Use of Civil Works guide specifications is described in ER 1110-2-1200.

FOR THE COMMANDER:

PAT M. STEVENS IV
Colonel, Corps of Engineers
Chief of Staff

This pamphlet supersedes EP 310-1-5, 15 Jul 87

PART ONE

INDEX OF GUIDE SPECIFICATIONS FOR CIVIL WORKS CONSTRUCTION¶

NUMBER	TITLE (& Approx Pages)	DATE	LATEST AMENDMENT (& Date)
CE-1102	Dredging (11)	Apr 60	
CE-1103	Photogrammetric Mapping and Complementary Field Surveys (52)	Nov 65	1(Mar 66)
CE-1104	Aerial Photography for Photogrammetric Mapping, Photo Maps and Mosaics (26)	Mar 66	
CE-1201	Subsurface Drilling, Sampling and Testing (34)	Apr 61	
CE-1301	Clearing (10)	Sep 69	
CE-1304.04	Piling; Concrete, Precast (15)	Apr 52	1(Apr 56)
CE-1305.01	Foundation Drilling & Grouting (29)	Oct 59	3(Apr 72)
CE-1305.02	Tunnel Grouting (22)	Nov 59	1(May 64)
CE-1307	Relief Wells (33)	Feb 72	
CE-1308	Stone Protection (Slopes & Channels) (22)	Jul 58	2(Jul 62)
CE-1309	Levees (44)	Mar 68	1(Nov 69)
CE-1404.04	Insulated Wire and Cable (For Hydraulic Structures) (13)	Aug 81	
CE-1506	Vertical Lift Crest Gates (55)	Jul 53	6(Oct 63)
CE-1507.01	Tractor Gates - Broome Type (94)	Jun 50	
CE-1602	Dam Gantry Cranes (153)	Apr 75	
CE-1603	Draft Tube Gantry Cranes (132)	Aug 81	
CE-1604.01	Indoor Electrically Operated Traveling Crane for Hydroelectric Power Plants (Alternating Current) (103)	Jan 74	
CE-1604.02	Indoor Electrically Operated Traveling Crane for Hydroelectric Power Plants (Direct Current) (112)	Apr 73	

CE-1701	Elevators for Dams Geared Type (A-C) (39)	Apr 65	2(Jul 67)
CE-1907	Electrical Equipment (For Gate Hoists) (52)	Sep 69	
CE-2201.01	Hydraulic Turbines - Francis Type (145)	Oct 80	
CE-2201.02	Hydraulic Pump-Turbines Francis Type (138)	Mar 69	
CE-2201.03	Hydraulic Turbines Kaplan Type (152)	Mar 69	
CE-2201.06	Governors for Hydraulic Turbines and Pump-Turbines (83)	Apr 81	
CE-2202.01	Hydraulic-Turbine-Driven Alternating Current Generators (156)	Sep 80	
CE-2203	Power Transformers (89)	Dec 82	
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CE-2205.02	13.8 kV Metal-Clad Switchgear, Generator Neutral Grounding Equipment and Metal-Enclosed Bus (55)	Apr 84	
CE-2205.05	Auxiliary Power Distribution Centers (45)	Jul 83	
CE-2206	Carbon Dioxide Fire Extinguishing Equipment (For Hydroelectric Power Plants) (33)	Jun 79	
CE-2207	Insulating Oil, Electrical (10)	Mar 79	
CE-2301	Electric Motors--3 Phase, Vertical Induction Type (For Flood-Control Pumping Stations) (27)	Jun 82	
CE-2302	3-Phase Vertical Synchronous Type 1500 Horsepower and Above (For Flood Control Pumping Stations) (33)	Feb 83	
CE-2303.01	Pumps-Vertical Propeller Type (69)	Feb 80	
CE-4000	Lump-Sum Contract for Engineer Services for Design of Hydroelectric Power Plant (65)	Aug 74	
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CW-02219	Foundation Preparation (14)	Mar 81	
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CW-03230	Stressing Tendons and Accessories for Prestressed Concrete (14)	May 86	
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CW-05562	Sector Gates (16)	Mar 85	
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CW-09940	Painting: Hydraulic Structures and Appurtenant Works (131)	Aug 89	
CW-15346	Lubrication System for Local Flood Protection Pumping Units (12)	Apr 89	

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CW-16427	480-Volt Station Service Switchgear and Transformers (56)	Jan 87

PART TWO

15 March 1990

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01000		CEGS General Notes (3)	Nov 88	
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01020		CEGS Template (3)	Nov 88	
01300		Submittals (9)	Nov 88	
01305		Submittal Procedures (5)	Dec 89	
02050	*	Demolition (7)	Feb 83	1(Sep 85)
02110		Clearing and Grubbing (7)	Jul 89	
02201	*	Excavation, Filling and Backfilling for Buildings (13)	Oct 88	
02210		Grading (15)	Dec 88	
02222		Excavation, Trenching, and Backfilling for Utilities Systems (17)	Jul 89	
02225		Earthwork for Roadways, Railroads, and Airfields (20)	Jul 89	
02232		Select-Material Subbase Course (11)	Mar 89	
02233		Graded-Crushed-Aggregate Base Course (15)	Mar 89	
02234		Subbase Course (15)	Mar 89	1(Oct 89)
02235		Limerock Base Course (14)	Nov 88	
02236		Dry-Bound Macadam Base Course (15)	Jan 89	1(Oct 89)
02237		Water-Bound Macadam Base Course (16)	Feb 89	
02238		Bituminous-Stabilized Base Course, Subbase, or Subgrade (19)	Feb 89	
02239		Portland Cement-Stabilized Base or Subbase Course (22)	Feb 89	1(Oct 89)
02240		Lime-Stabilized Base Course, Subbase, or Subgrade (20)	Feb 89	
02241		Stabilized-Aggregate Base Course (17)	Feb 89	

02242		Bituminous Base Course (17)	Mar 89	
02360		Steel H-Piles (13)	Jan 89	
02361		Round Timber Piles (13)	Jul 89	
02362		Prestressed Concrete Piling (25)	Feb 89	
02363		Cast-In-Place Concrete Piles, Steel Casing (15)	Feb 89	
02365		Piling: Composite, Wood and Cast-In-Place Concrete (15)	Jul 89	
02366		Precast Concrete Piling (14)	Jul 89	
02371		Auger-Placed Grout Piles (14)	Jul 89	
02377	*	Contractor Option for Pressure Injected Concrete Footings (9)	Sep 86	1(Sep 88)
02383		Drilled Foundation Caissons (Piers) (14)	Apr 89	
02450		Railroads (33)	Dec 89	
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02515	*	Concrete Pavements for Roads and Airfields (68)	Oct 83	8(Mar 88)
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02552		Bituminous Binder and Wearing Courses (Central-Plant Cold-Mix) (19)	Feb 89	
02553		Bituminous Macadam Wearing Course (Penetration Method) (19)	Feb 89	
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02559		Bituminous Prime Coat (11)	Jan 89	1(Aug 89)
02560		Bituminous Seal Coat, Spray Application (16)	Dec 88	
02561		Asphalt Slurry Seal (15)	Apr 89	
02562	*	Porous Friction Course for Airfields and Roads (19)	Sep 84	4(Mar 88)
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02710		Subdrainage System (23)	Feb 89	1(Feb 90)
02711		Foundation Drainage System (12)	Apr 89	1(Feb 90)
02720		Storm-Drainage System (37)	Jan 89	1(Jan 89)
02730		Sanitary Sewers (19)	Jan 89	2(Feb 90)

02732	Force Mains and Inverted Siphons; Sewer (19)	Jun 89	
02751	Pneumatic Sewage Ejectors (12)	Nov 89	
02752	Siphons, Dosing (6)	Jan 89	
02831	Fence, Chain-Link (9)	Jan 89	1(Aug 89)
02835	Vehicle Barriers (15)	Apr 89	
02935	Turf (22)	Nov 88	
02950	Trees, Shrubs, Ground Covers, and Vines (23)	Jan 89	
03100	Structural Concrete Formwork (7)	Nov 88	
03200	Concrete Reinforcement (7)	Nov 88	
03250	Expansion Joints, Contraction Joints, and Waterstops	Dec 88	
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03301	Concrete for Building Construction (Minor Requirements) (10)	Jul 89	
03330	Cast-In-Place Architectural Concrete (7)	Mar 89	
03414	Precast Roof Decking (6)	Mar 89	
03450	Precast Architectural Concrete (12)	Nov 88	
03510	Roof Decking, Cast-In-Place Low Density Concrete (9)	Jan 89	
03550	Precast/Prestressed Concrete Floor and Roof Units (6)	Mar 89	
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05120	Structural Steel (8)	Apr 89	1(Nov 89)
05210	Steel Joists (5)	Nov 88	2(--- 89)
05300	Steel Decking (11)	Oct 89	
05500	Miscellaneous Metal (17)	Jan 89	1(Feb 90)
06100	Rough Carpentry (25)	Feb 89	1(Jan 90)
06200	Finish Carpentry (14)	Feb 89	

07111		Elastomeric Membrane Waterproofing (9)	Apr 89	
07112		Bituminous Waterproofing (8)	Dec 88	1(Oct 89)
07140		Metallic Oxide Waterproofing (10)	Mar 89	
07160		Bituminous Dampproofing (7)	Dec 88	1(Feb 90)
07220		Roof Insulation (14)	Nov 88	1(Oct 89)
07240		Exterior Insulation and Finish System (11)	Dec 88	1(Oct 89)
07265	*	Spray-Applied Fireproofing (8)	Sep 85	5(Jun 88)
07270		Firestopping (6)	Dec 89	
07311		Roofing, Strip Shingles (6)	Feb 89	1(Feb 90)
07413		Metal Roofing and Siding, Plain (14)	Mar 89	1(Feb 90)
07415		Metal Roofing and Siding, Factory-Color-Finished (16)	Jul 89	
07510		Built-Up Roofing (14)	Nov 88	
07530		Elastomeric Roofing (EPDM) (8)	Dec 88	1(Jan 90)
07540		Elastomeric Roofing, Fluid Applied (8)	Dec 88	
07550		Protected Membrane Roofing (9)	Dec 88	1(Oct 89)
07555		Polyvinyl Chloride (PVC) Roofing (9)	Jan 89	
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07920		Caulking and Sealants (13)	Mar 89	
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08201		Wood Doors (12)	Mar 89	
08312		Sliding Metal Doors (12)	Mar 89	
08313		Aluminum Sliding Glass Doors (6)	May 89	
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08331		Metal Coiling Counter Doors (7)	Apr 89	

08353	Accordion Doors and Partitions, and Operable Partition (7)	Mar 89	
08360	Sectional Overhead Doors (14)	Feb 89	
08365	Vertical Lift Doors (9)	Apr 89	
08510	Steel Windows (6)	Dec 88	
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08521	Aluminum Environmental Control Windows (7)	Apr 89	
08610	Wood Windows (6)	Dec 89	
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08620	Polyvinyl Chloride (PVC) Windows (6)	Jan 89	
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08701	Hardware: Prison-Locking Devices (13)	Apr 89	
08810	Glass and Glazing (9)	Dec 88	1(Oct 89)
08840	Plastic Glazing (5)	Apr 89	
09200	Lathing and Plastering (22)	Nov 88	1(Oct 89)
09215	Veneer Plaster (12)	Mar 89	
09225	Stucco (11)	Jan 89	1(Oct 89)
09250	Gypsum Wallboard (11)	Dec 88	1(Oct 89)
09310	Ceramic Tile (16)	Apr 89	
09411	Bonded Terrazzo (8)	Feb 89	1(Oct 89)
09421	Terrazzo Tile (8)	Mar 89	
09431	Conductive Resinous Terrazzo Flooring (6)	Apr 89	
09433	Conductive Sparkproof Industrial Resinous Flooring (7)	Jan 89	
09445	Resinous Terrazo Flooring (7)	Mar 89	
09510	Acoustical Ceilings (10)	Jan 89	1(Nov 89)
09560	Wood Strip Flooring (7)	Apr 89	
09570	Hardwood Parquet Flooring (5)	Jan 89	
09650	Resilient Flooring (7)	Nov 88	1(Oct 89)
09655	Resilient Athletic Flooring (10)	Aug 89	

09675	Conductive Vinyl Flooring (7)	Dec 88	
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09900	Painting, General (37)	Feb 89	
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10270	Raised Floor System (16)	Nov 88	
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10615	Demountable Partitions (7)	Dec 88	
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11022	Doors; Fire-Insulated, Record-Vault (5)	Dec 88	
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11181	Incinerators, Packaged Controlled Air (40)	Apr 89	
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11350	Sludge-Collecting Equipment (34)	Nov 89	

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11380	Sludge-Digester Gas, Heating, and Mixing System (26)	Dec 89	
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11391	Continuous Loop Reactor Wastewater Treatment System (40)	Jan 89	
11400	Food Service Equipment (51)	Mar 89	1(Dec 89)
11500	Air Pollution Control (47)	Feb 89	
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12540	Venetian Blinds, Draw Curtains, and Window Shades (5)	Nov 88	
12710	Theater Chairs (10)	Apr 89	
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13210	Elevated Steel Water Tank (16)	Jan 89	
13211	Pressure Vessels for Storage of Compressed Gases (24)	Jul 89	
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13290	Composting Toilet (15)	Mar 89	1(Feb 90)
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13814		Building Preparation for Energy Monitoring and Control Systems (EMCS) (20)	Apr 89	1(Dec 89)
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14240		Elevators, Hydraulic (40)	Nov 88	1(Oct 89)
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14630		Cranes Electric Overhead Traveling, Top Running and Underhung 30 Ton Max (45)	May 89	1(Oct 89)
15052		Welding Pressure Piping (20)	Dec 88	1(Jan 90)
15250		Thermal Insulation for Mechanical Systems (37)	Jul 89	1(Feb 90)
15300		Sprinkler Systems, Fire Protection (29)	Jan 89	1(Feb90)
15365		Halon 1301 Fire Extinguishing System (20)	Jul 89	
15386	*	Trickling Filter (14)	Apr 88	1(Aug 88)
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15405		Plumbing, Hospital (114)	Sep 89	
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15557		Forced Hot Water Heating Systems; Oil, Gas or Dual Fired (66)	Aug 89	1(Dec 89)
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15561		Central Steam Generating System - Combination Gas and Oil Fired (84)	Jun 89	1(Feb 90)

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15563		Large Steam Heating Systems (Solid- and Multi-Fuel Fired) (66)	Aug 89	
15564		Steam Heating Systems; Oil or Gas or Oil/Gas Fired (71)	Jul 89	
15565		Heating System; Gas-Fired Heaters (13)	Mar 89	1(Jan 90)
15566		Warm Air Heating System (44)	Feb 89	1(Dec 89)
15650		Central Refrigeration System (For Air-Conditioning System) (54)	Dec 88	
15652		Cold Storage Refrigeration Systems (68)	Jul 89	
15653		Air-Conditioning System (Unitary Type) (107)	Jul 89	1(Feb 90)
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15709	*	Heat Distribution Systems Outside of Buildings Concrete Shallow French Systems (73)	Nov 83	6(Jun 88)
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15895		Air-Supply and Distribution System (For Air-Conditioning System) (103)	Jun 89	
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16115		Underfloor Raceway System (Cellular Steel Floor) (14)	Feb 89	
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16225		Stationary Steam Turbine Generators (46)	Mar 89	
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16264	Generating Units, Diesel-Electric, Stationary 10-99 kW, with Auxiliaries (37)	Mar 89	
16311	Main Electric Supply Station (97)	Dec 89	
16370	Electrical Distribution System, Aerial (41)	Dec 89	
16375	Electrical Distribution System, Underground (50)	Dec 89	
16415	Electrical Work, Interior (60)	Jul 89	
16505	Protective Lighting System (33)	Dec 89	
16610	Uninterruptable Power System (UPS) (22)	May 89	
16640	Cathodic Protection System (Sacrificial Anode) (18)	Dec 88	
16641	Cathodic Protection System (Steel Water Tanks) (16)	Feb 89	
16642	Cathodic Protection System (Impressed Current) (24)	Mar 89	
16665	Static Electricity Protection System (7)	Jul 89	
16670	Lightning Protection System (15)	Dec 88	1(Jan 90)
16721	Fire Detection and Alarm System (25)	Dec 88	1(Jan 90)
16722	Fire Alarm Reporting System, Radio Type (21)	Mar 89	
16741	Telephone System, Inside Plant (27)	Jun 89	1(Aug 89)
16742	Telephone System, Outside Plant (24)	Jul 89	
16750	Nurse Call System (28)	Jul 89	
16753	Wireline Data Transmission Media for Security Systems (18)	Dec 89	
16754	Fiber Optics Data Transmission Media for Security Systems (24)	Dec 89	
16755	Signaling System, Doctor's Paging (13)	May 89	
16760	Intercommunication System (15)	Jun 89	
16766	Central Dictation System (13)	Apr 89	
16770	Radio and Public Address Systems (16)	Jul 89	
16781	Master Antenna Television System (28)	Apr 89	
16790	Stand-Alone One-Way Radio Control System (15)	Mar 89	1(Dec 89)

16792	Wire Line Data Transmission System (15)	Jul 89	
16794	Coaxial Cable Data Transmission System (12)	Jun 89	
16795	Fiber Optics Data Transmission System (18)	Jun 89	
16797	One-Way Radio Control for Energy Monitoring and Control System (EMCS) (15)	Jul 89	
16798	Two-Way Radio Data Transmission System (20)	Mar 89	1(Dec 89)
16855	Electric Space Heating Equipment (16)	Dec 88	

* Indicates specifications not yet published in SPECSINTACT format.

15 March 1990

CHANGES TO CEGS DATABASE
(Between December 1989 and April 1989)

The 15 March 1990 index lists all guide specifications in the CEGS database as of that date. For the benefit of users who want to know the \@changes which have occured during the quarter@\ the following list is provided:

UDATED DOCUMENTS:

CEGS NUMBER	TITLE (& Approx Pages)	DATE	LATEST NOTICE
02239	Portland Cement-Stabilized Base or Subbase Course (22)	Feb 89	1(Oct 89)
02710	Subdrainage System (23)	Feb 89	1(Feb 90)
02711	Foundation Drainage System (12)	Apr 89	1(Feb 90)
02730	Sanitary Sewers (19)	Jan 89	2(Feb 90)
03300	Concrete for Building Construction (31)	Dec 88	1(Dec 89)
04200	Masonry (29)	Mar 89	1(Dec 89)
05055	Welding, Structural (12)	Nov 88	1(Dec 89)
05061	Ultrasonic Inspection of Weldments (27)	Jan 89	1(Jan 89)
05062	Ultrasonic Inspection of Plates (25)	Dec 88	1(Feb 90)
05120	Structural Steel (8)	Apr 89	1(Nov 89)
05500	Miscellaneous Metal (17)	Jan 89	1(Feb 90)
06100	Rough Carpentry (25)	Feb 89	1(Jan 90)
07160	Bituminous Dampproofing (7)	Dec 88	1(Feb 90)
07311	Roofing, Strip Shingles (6)	Feb 89	1(Feb 90)
07413	Metal Roofing and Siding, Plain (14)	Mar 89	1(Feb 90)
07530	Elastomeric Roofing (EPDM) (8)	Dec 88	1(Jan 90)
08110	Steel Doors and Frames (9)	Feb 89	1(Feb 90)
09510	Acoustical Ceilings (10)	Jan 89	1(Nov 89)
10430	Exterior Signage (15)	Apr 89	2(Feb 90)
10800	Toilet Accessories (12)	Jan 90	
11182	Incinerators, Medical Waste (26)	Feb 89	2(Feb 90)

11212	Pumps: Water, Vertical Turbine (38)	Mar 89	1(Feb 90)
11400	Food Service Equipment (51)	Mar 89	1(Dec 89)
13080	Seismic Protection for Mechanical, Electrical Equipment (22)	Jan 89	1(Dec 89)
13090	X-Ray Shielding (16)	Nov 88	1(Feb 90)
13290	Composting Toilet (15)	Mar 89	1(Feb 90)
13814	Building Preparation for Energy Monitoring and Control Systems (EMCS) (20)	Apr 89	1(Dec 89)
15052	Welding Pressure Piping (20)	Dec 88	1(Jan 90)
15250	Thermal Insulation for Mechanical Systems (37)	Jul 89	1(Feb 90)
15300	Sprinkler Systems, Fire Protection (29)	Jan 89	1(Feb90)
15488	Gas Piping Systems (17)	Jan 89	2(Feb 90)
15557	Forced Hot Water Heating Systems; Oil, Gas or Dual Fired (66)	Aug 89	1(Dec 89)
15558	Forced Hot Water Heating Systems, Solid Fuel- and Multifuel-Fired (76)	Jul 89	1(Dec 89)
15561	Central Steam Generating System - Combination Gas and Oil Fired (84)	Jun 89	1(Feb 90)
15562	Heating and Utilities Systems, Central Steam (41)	Jul 89	1(Jan 90)
15565	Heating System; Gas-Fired Heaters (13)	Mar 89	1(Jan 90)
15566	Warm Air Heating System (44)	Feb 89	1(Dec 89)
15653	Air-Conditioning System (Unitary Type) (107)	Jul 89	1(Feb 90)
15654	Commissary Refrigeration System (23)	Sep 89	1(Feb 90)
15935	Ventilation and Exhaust Systems (67)	Jun 89	1(Feb 90)
16670	Lightning Protection System (15)	Dec 88	1(Jan 90)
16721	Fire Detection and Alarm System (25)	Dec 88	1(Jan 90)
16790	Stand-Alone One-Way Radio Control System (15)	Mar 89	1(Dec 89)
16798	Two-Way Radio Data Transmission System (20)	Mar 89	1(Dec 89)

ADDED DOCUMENTS

CEGS NUMBER	TITLE (& Approx Pages)	DATE	LATEST NOTICE
02685	Gas Distribution System (24)	Feb 90	
15556	Forced Hot Water Heating Systems Using Water Steam Heat Exchangers (46)	Jan 90	and

DELETED DOCUMENTS

CEGS NUMBER	TITLE (& Approx Pages)	DATE	LATEST NOTICE
02711	Gas Distribution System (18)	May 87	
15601.2	Heating System; Forced-Hot-Water, High Temperature Water Heat Exchanger and Steam Heat Exchanger (38)	Sep 85	

PART THREE

INDEX OF GUIDE SPECIFICATIONS FOR
MILITARY FAMILY HOUSING

NUMBER	TITLE	DATE	REVISIONS
2.1	Demolition and Removal	1 Jul 66	
2.2	Clearing, Stripping and Rough Grading	1 Jul 66	1-1 Jul 70
2.3	Excavating, Filling and Backfilling for Buildings	1 Jul 66	1-1 Jul 70
2.4	Excavating, Trenching, and Backfilling for Utilities	1 Jul 66	2-1 Jul 70
2.5	Foundation Drains	May 85	
2.6	Soil Treatment for Termite Control	1 Jul 66	1-1 Jul 70
2.7	Topsoiling, Finished Grading, Seeding and Sodding	1 Jul 66	1-1 Jul 70
2.8	Planting of Trees, Shrubs and Vines	1 Jul 66	
2.9	Pavement Bases	May 85	
2.10	Concrete Paving, Curbs and Gutters, and Sidewalks	1 Jul 66	1-1 Dec 67 2-1 Jul 70
2.11	Bituminous Surfaces	May 85	
2.12	Street Markings and Signs	1 Jul 66	
2.13	Fencing	1 Jul 66	1-1 Jul 70
2.14	Storm Drainage System	May 85	
2.15	Lawn Sprinkler System	1 Jul 66	
3.1	Concrete Work	1 Jul 66	1-1 Jul 70
4.1	Masonry Work	1 Jul 66	
5.1	Structural Steel	1 Jul 66	
5.3	Miscellaneous Metal Work	1 Jul 66	1-1 Jul 70
6.1a	Rough Carpentry and Framing	1 Jul 70	
6.2a	Exterior Millwork, Siding and Trim	1 Jul 70	

NUMBER	TITLE	DATE	REVISIONS
6.3a	Interior Millwork, Finish and Trim	1 Jul 70	
6.4a	Building Insulation	1 Jul 70	
6.5	Gypsum Wallboard Construction	1 Jul 66	1-1 Jul 70
6.6	Glued Laminated Structural Timber	May 85	
7.1	Waterproofing and Dampproofing	1 Jul 66	1-1 Dec 67
7.2a	Roofing, Built-Up	1 Jul 70	
7.3	Roofing, Shingles	1 Jul 66	1-1 Jul 70
7.4	Sheet Metal Work	1 Jul 66	
7.5	Calking	1 Jul 66	
7.6	Weatherstripping	1 Jul 66	1-1 Dec 67
7.7	Aluminum Siding With Factory Applied Paint Finish	1 May 68	
7.8	Aluminum Siding With Factory Laminated Polyvinyl Fluoride Film Finish	1 Jul 70	
7.9	Aluminum Siding With Factory Applied Premium Paint Finish	1 Jul 75	
7.10	Solid Vinyl Siding	1 Jul 75	
7.11	Steel Siding with Factory Applied Paint Finish for Wood Frame Buildings	May 82	
8.1a	Steel Doors and Frames	1 Jul 70	
8.2a	Aluminum Sliding Glass Doors	1 Jul 70	
8.3	Wood Doors and Frames	1 Jul 66	1-1 Dec 67
8.4	Wood Windows and Sidelights	1 Jul 66	
8.5	Steel Windows	1 Jul 66	
8.6a	Aluminum Windows and Jalousies	1 Jul 70	
8.7a	Storm Doors and Sash	1 Jul 70	
8.8	Screens and Screen Doors	1 Jul 66	
8.9	Glass and Glazing	1 Jul 66	1-1 Jul 70

NUMBER	TITLE	DATE	REVISIONS
8.10	Garage Doors	1 Jul 66	
8.11	Accordion-Type Doors and Partitions	1 Jul 66	
9.1	Lathing and Plastering	1 Jul 66	1-1 Dec 67
9.2	Exterior Stucco	1 Jul 66	
9.3a	Ceramic Tile	1 Feb 74	
9.4	Wood Floors	1 Jul 66	
9.5a	Resilient Floor Covering	1 Jul 70	
9.6	Monolithic Terrazzo Flooring	1 Jul 66	
9.7a	Painting, General	1 Jul 70	
9.8	Vinyl Coated Wall Covering	1 Jul 66	
10.1	Finishing Hardware	1 Jul 66	
10.2	Bath Room Accessories	1 Jul 66	1-1 Dec 67 2-1 Jul 70
10.3	Kitchen Cabinets and Equipment	1 Jul 66	1-1 Dec 67 2-1 Jul 70
11.1a	Exhaust and Ventilating Systems	1 Dec 67	1-1 Jul 70
11.2	Garbage Disposers (and Dishwashers)	1 Jul 66	1-1 Dec 67 2-1 Jul 70
12.1	Venetian Blinds	1 Jul 66	
12.2a	Shades and Draw Curtains	1 Jul 70	
15.1a	Plumbing	1 Jul 70	
15.2	Heating, Forced Warm Air, Oil Fired	1 Jul 66	1-1 Dec 67 2-1 Jul 70
15.3	Heating, Forced Warm Air, Gas Fired	1 Jul 66	1-1 Dec 67 2-1 Jul 70
15.4	Heating, Hot Water, Interior Distribution	1 Jul 66	
15.5	Heating, Hot Water, Oil Fired	1 Jul 66	1-1 Jul 70
15.6	Heating, Hot Water, Gas Fired	1 Jul 66	1-1 Jul 70

NUMBER	TITLE	DATE	REVISIONS
15.7	Heating, Hot Water, Conversion Equipment From Central System	1 Jul 66	
15.8	Gas Fitting, Interior	May 85	
15.9	Gas Distribution System, Exterior	1 Jul 66	1-1 Dec 67
15.10	Water Distribution System	1 Jul 66	1-1 Dec 67
15.11	Water Treatment System	1 Jul 66	
15.12	Water Storage Tanks	1 Jul 66	
15.13	Sanitary Sewerage System	1 Jul 66	
15.14	Sewage Treatment Plant	1 Jul 66	
15.15	Sewage Lift Station	1 Jul 66	
15.16a	Air Conditioning, Mechanical	1 Jul 70	
16.1a	Electrical, Interior	1 Jul 70	
16.2a	Electrical Distribution	1 Jul 70	
16.3a	Street Lighting	1 Jul 70	
16.4	Master Television Antenna System	1 Jul 66	
16.5	Heating, Electrical	1 Jul 66	

PART FIVE

INDEX OF GUIDE SPECIFICATIONS FOR
MOBILIZATION CONSTRUCTION

NUMBER	TITLE	DATE
MOGS-02190	Earthwork	Jun 83
MOGS-02221	Excavation, Trenching, and Backfilling for Utilities Systems	Jun 83
MOGS-02230	Excavation, Embankment, and Preparation of Subgrade for Roadways, Railroads, and Airfields	Jun 83
MOGS-02233	Graded-Crushed-Aggregate Base Course	Jun 83
MOGS-02234	Subbase Course	Jun 83
MOGS-02235	Limerock Base Course	Jun 83
MOGS-02238	Bituminous-Stablized Base Course, Subbase or Subgrade	Jun 83
MOGS-02239	Portland Cement-Stablized Base or Subbase Course	Jun 83
MOGS-02240	Lime-Stabilized Base Course, Subbase, or Subgrade	Jun 83
MOGS-02241	Stabilized-Aggregate Base Course	Jun 83
MOGS-02360	Steel H-Piles	Jun 83
MOGS-02361	Round Timber Piles	Jun 83
MOGS-02365	Piling; Composite, Wood and Cast-in-Place Concrete, Uniform Taper and Constant Section	Jun 83
MOGS-02366	Piling; Concrete, Precast	Jun 83
MOGS-02410	Subdrainage System	Jun 83
MOGS-02430	Storm-Drainage System	Jun 83

NUMBER	TITLE	DATE
MOGS-02444	Fence, Chain-Link	Jun 83
MOGS-02450	Concrete Sidewalks and Curbs and Gutters	Jun 83
MOGS-02515	Concrete Pavement for Roads and Airfields	Jun 83
MOGS-02530	Playing Surfaces for Outdoor Sports Facilities	Jun 83
MOGS-02550	Bituminous Pavement Treatments	Jun 83
MOGS-02552	Bituminous Binder and Wearing Courses (Cold-Mix)	Aug 83
MOGS-02556	Bituminous Intermediate and Surface Courses (Central-Plant Hot-Mix)	Jun 83
MOGS-02575	Resurfacing of Rigid Pavements with Thin, Bonded Rigid Overlays	Jun 83
MOGS-02711	Gas Distribution System	Jun 83
MOGS-02713	Water Lines	Jun 83
MOGS-02722	Sewers; Sanitary, Gravity	Jun 83
MOGS-02724	Force Mains; Sewer	Jun 83
MOGS-02730	Water Wells	Aug 83
MOGS-02750	Heat-Distribution Systems Outside of Buildings	Jun 83
MOGS-02850	Railroads	Jun 83
MOGS-03302	Concrete	Aug 83
MOGS-05121	Structural Steel	Aug 83
MOGS-05501	Miscellaneous Metal	Aug 83
MOGS-11210	Pumps; Water, Centrifugal	Jun 83
MOGS-11210.1	Pumps; Water, Vertical Turbine	Jun 83
MOGS-11231	Chlorine-Feeding Machines (Fully Automatic, Semiautomatic, and Nonautomatic)	Jun 83
MOGS-11231.1	Hypochlorite-Feeding Machines	Jun 83

NUMBER	TITLE	DATE
MOGS-11233	Water Softeners, Cation-Exchange (Sodium Cycle)	Jun 83
MOGS-11302	Ejectors; Sewage, Pneumatic	Jun 83
MOGS-11310	Pumps; Sewage and Sludge	Jun 83
MOGS-11360	Sludge-Collecting Equipment	Jun 83
MOGS-11375	Air-Supply and Air-Diffusion Equipment for Sewage Treatment Plants	Jun 83
MOGS-11390	Prefabricated Biological Wastewater Treatment Plant	Jun 83
MOGS-11393	Trickling Filter	Jun 83
MOGS-13412	Elevated Steel Water Tanks	Jun 83
MOGS-13413	Steel Standpipes and Ground Storage Reservoirs	Jun 83
MOGS-16311	Main Electric Supply Station	Jun 83
MOGS-16401	Electrical Distribution System, Aerial	Jun 83
MOGS-16402	Electrical Distribution System, Underground	Jun 83
MOGS-16640	Cathodic Protection System (Sacrificial Anode)	Jun 83
MOGS-16641	Cathodic Protection System (Steel Water Tanks)	Jun 83

PART SIX

CANCELLATIONS AND SUPERSESSIONS

NUMBER	TITLE	DATE
CE-1101.01	Nontechnical Contract Provisions (Cancelled)	Apr 81
CW-03230	Stressing Tendons and Accessories for Prestressed Concrete (Superseded by CW-03230, May 86)	Oct 77
CE-05563	Tainter Gates and Anchorages (Superseded by CW-05563, Apr 88)	May 77
CEGS-02724	Force Mains and Inverted Siphons: Sewer (Superseded by CEGS-02724, Apr 88)	Apr 81
CEGS-08840	Acrylic Plastic Glazing (Superseded by CEGS-08840, Mar 88)	Mar 83
CEGS-09403	Resinous Terrazzo Flooring (Superseded by CEGS-09403, Mar 88)	Oct 83
CEGS-09430	Conductive Resinous Terrazzo Flooring (Superseded by CEGS-09430, May 88)	Aug 83
CEGS-11171	Incinerators, Packaged Controlled Air (Superseded by CEGS-11171, May 88)	Dec 81
CEGS-11231	Chlorine-Feeding Machines (Fully Automatic, Semiautomatic and Nonautomatic) (Superseded by CEGS-11231, Apr 88)	Mar 82
CEGS-11233	Water Softners, Cation-Exchange (Sodium Cycle) (Superseded by CEGS-11233, Apr 88)	Feb 82
CEGS-11400	Food Service Equipment (Superseded by CEGS-11400, May 88)	Jul 83
CEGS-13946	Building Preparation for Energy Monitoring and Control System (EMCS) (Superseded by CEGS-13946, Apr 88)	Jul 85
CEGS-13947	Energy Monitoring and Control System (EMCS) Large System Configuration (Superseded by CEGS-13947, Mar 88)	Feb 87
CEGS-13948	Energy Monitoring and Control System (EMCS) Medium System Configuration (Superseded by CEGS-13948, Mar 88)	Feb 87

NUMBER	TITLE	DATE
CEGS-13949	Energy Monitoring and Control System (EMCS) Small System Configuration (Superseded by CEGS-13949, Mar 88)	Feb 87
CEGS-13950	Energy Monitoring and Control Systems (EMCS) Micro System Configurations (Superseded by CEGS-13950, Mar 88)	Apr 87
CEGS-15310	Ejectors; Sewage, Pneumatic (Superseded by CEGS-15310, Apr 88)	Jun 78
CEGS-15386	Trickling Filter (Superseded by CEGS-15386, Apr 88)	Jun 78
CEGS-15390	Hydraulic Fluid Power Systems (Superseded by CEGS-15390, Mar 88)	Oct 81
CEGS-15601.1	Central High Temperature Water (HTW) Generating Plant and Auxiliaries (100) (Superseded by CEGS-15601.1, Apr 88)	Aug 82
CEGS-15602.1	Central Steam-Generating System, Coal-Fired (100) (Superseded by CEGS-15602.1, Apr 88)	Aug 82
CEGS-16115	Underfloor Raceway System (Cellular Steel Floor) (Superseded by CEGS-16115, May 88)	Dec 81
CEGS-16642	Cathodic Protection System (Impressed Current) (Superseded by CEGS-16642, May 88)	Jun 81
CEGS-16760	Intercommunications System (Superseded by CEGS-16760, Feb 88)	Sep 81
CEGS-16762	Signaling System, Doctor's Paging (Superseded by CEGS-16762, Apr 88)	Jul 80
CEGS-16766	Central Dictation System (Superseded by CEGS-16766, Mar 88)	May 83
CEGS-16770	Radio and Public Address Systems (Superseded by CEGS-16770, Feb 88)	May 83
CEGS-16781	Master Television Antenna System (Superseded by CEGS-16781, Feb 88)	Apr 81
CEGS-16792	Wire Line Data Transmission System (Superseded by CEGS-16792, Apr 88)	Feb 85

APPENDIX B

APPENDIX B

ENGINEER TECHNICAL LETTERS

Pub. No.	Part	Prop.	Title	Pub. Date
TL 1110-1-61		CEEC-EG	Use of Government-Furnished Diamond Bits and Reaming Shells in Contract Drilling	19 May 75
TL 1110-1-69		CEEC-EB	Method of Installing ShanklessSurvey Discs by Bonding with Epoxy Resins	14 May 73
TL 1110-1-85		CEEC-ED	Concrete Bridge Deck Systems	30 Jun 76
TL 1110-1-86		CEEC-EB	Cellular Concrete as a Temporary Support Measure in Underground Excavation	23 Aug 76
TL 1110-1-92		CEEC-EG	Use of Water Reducing Admixture in Concrete Paving Construction	18 Feb 78
TL 1110-1-97		CEEC-ED	Change in Name of National Vertical Control Net	31 Oct 78
TL 1110-1-106		CEEC-EA	Computer Program CFRAME for Structural Analysis	23 Jun 80
TL 1110-1-115		CEEC-ED	Computer Program CTABS80 for Three-Dimensional Analysis of Building System	10 Feb 82
TL 1110-1-118		DAEN-ZC	Use of Asbestos Containing Materials	27 May 83
TL 1110-1-120		CEEC-ED	Use of Surface Coatings on Archtectural Concrete	21 Mar 84
TL 1110-1-121		CEEC-ED	Glass Fiber Reinforced Concrete (GFRC) Used as Exterior Building Panels	30 Sep 85
TL 1110-1-122		CEEC-EB	Reliability Evaluation of Water Distribution System Components	31 Dec 85
TL 1110-1-124		CEEC-EG	Double Bituminous Surface Treatment for Pavements	25 May 84
TL 1110-1-125		CEEC-EG	Guidance for Fuel Resistant Sealers for Pavements	4 May 84
TL 1110-1-126		CEEC-EG	Use of Roller Compacted Cconcrete for Horizontal Construction	25 Jan 85
TL 1110-1-127		CEEC-ED	Use of Flyash in Concrete	17 Aug 84
TL 1110-1-128		CEEC-EG	Developments in Pavement Design and Construction	14 Sep 84
TL 1110-1-129		CEEC-EG	Use of Engineering Fabrics and Asphalt Rubber Interlayers to Minimize Reflective Cracking in Pavements	15 Dec 85
TL 1110-1-130		CEEC-EG	New Joint Sealer Specification for Portland Cement Concrete and Bituminous Concrete Pavement	27 Dec 85

Pub. No.	Part	Prop.	Title	Pub. Date
TL 1110-1-131		CEEC-ED	Use of Pressure Injected Epoxy in Repairing Wooden Structures	11 Apr 86
TL 1110-1-132		CEEC-EA	Occupational Safety and Health Standards	30 Sep 86
TL 1110-1-133		CEEC-EB	Global Positioning System Surveying Services	15 Oct 86
TL 1110-1-134		CEEC-EB	Energy Efficiency at Water Supply Pumping Stations	24 Apr 87
TL 1110-1-135		CEEC-ET	Bullet Resisting Glazings	31 Jul 87
TL 1110-1-136		CEEC-ET	Fragment Retention Film for Glass	31 Jul 87
TL 1110-1-138		CEEC-EG	Standard Penetration Test	31 Mar 88
TL 1110-1-140		CEEC-EG	Pavement Design for Roads, Streets, and Open Storage Areas	15 Jul 88
TL 1110-1-141		CEEC-EG	Thickness Design of Roller-Compacted Concrete Pavements for Airfields, Roads, Streets, and Parking Areas	29 Jan 88
TL 1110-2-2		CEEC-ED	Emergency Gates for Reservoir Outlet Structures	21 Feb 66
TL 1110-2-18		CEEC-ED	Standardization of Parapet Type Handrails for Navigation Locks	8 Mar 67
TL 1110-2-22		CEEC-ED	Design of Navigation Lock Gravity Walls	19 Apr 67
TL 1110-2-25		CEEC-ED	Reinforcement Around Lock Culverts and other Water Passages	15 May 67
TL 1110-2-41		CEEC-EH	Skewed Entrance for High-Head Conduits	9 May 68
TL 1110-2-52		CEEC-EH	Erosion Downstream from Stilling Basin End Sills	26 Aug 68
TL 1110-2-69		CEEC-ED	Permanent Marking of Monolith Numbers of Outlet Tunnels and Conduits for Dams	31 Oct 69
TL 1110-2-80		CEEC-ED	Permanent Marking of Monolith Numbers on Dams and NavigationLocks	22 Dec 69
TL 1110-2-81		CEEC-EH-D	Upstream Quadrant Shape for Spillway Crests of High OverflowDams	16 Jan 70
TL 1110-2-84		CEEC-ED	Alternate Conduit Gate Control Structures	13 Mar 70
TL 1110-2-88		CEEC-ED	Arch Dam Design	15 Apr 70
TL 1110-2-96		CEEC-ED	Adjustable Anchorage of Tainter Gate Side Rubbing Plates	5 Jun 70

Pub. No.	Part	Prop.	Title	Pub. Date
TL 1110-2-117		CEEC-ES	Spillway Tainter Gate Vibrations at Navigation Projects	24 Mar 71
TL 1110-2-120		CEEC-EH-D	Additional Guidance for Riprap Channel Protection CH 1	14 May 71
TL 1110-2-140		CEEC-EG	Classification of Explosives and Blasting Agents and Firing Times of Blasting Caps	1 Feb 72
TL 1110-2-152		CEEC-EG	Analyzing and Reporting Instrumentation Data for Earth and Rock-fill Dams	3 Jul 72
TL 1110-2-158		CEEC-EH-D	Design Guidance-Converging Spillway Chutes	29 Sep 72
TL 1110-2-163		CEEC-EH-D	Scour Gages for Erodible Channels of Floodway with Intermittent Flow	24 Oct 72
TL 1110-2-182		CEEC-EB	Two-Step Formal Advertising	31 Jan 74
TL 1110-2-185		CEEC-ED	Inspection and Evaluation of Highway Bridges	13 May 74
TL 1110-2-194		CEEC-EH-D	Gabion Channel Control Structures	30 Oct 74
TL 1110-2-196		CEEC-EG	Cooperative with State Geological Surveys	29 Nov 74
TL 1110-2-206		CEEC-EB	Format for Civil Works Construction Contract Specifications	31 Oct 75
TL 1110-2-208		CEEC-ED	Damage to Stilling Basins by Construction Debris	23 Jan 76
TL 1110-2-211		CEEC-EH-D	Drop Intake Structures	31 Oct 77
TL 1110-2-214		CEEC-EG	Tiltmeter Groove Spiral Meter	16 Mar 76
TL 1110-2-215		CEEC-ED	Concrete Culverts and Conduits	5 May 76
TL 1110-2-217		CEEC-ED	Stoplog Seals	9 Jul 76
TL 1110-2-223		CEEC-EH-D	Navigation Lock Sill Depths & Hydraulic Loads on Gates	30 Jun 77
TL 1110-2-224		CEEC-ED	Drawings of Channel Surveys Furnished to United States CoastGuard	30 Jun 77
TL 1110-2-226		CEEC-EE	Hydroelectric Plant Control	19 Dec 77
TL 1110-2-227		CEEC-EB	The Evaluation of Dam Safety	13 Jan 78

Pub. No.	Part	Prop.	Title	Pub. Date
TL 1110-2-228		CEEC-EB	Improving Federal Dam Safety	28 Feb 78
TL 1110-2-230		CEEC-EH-Y	Hydrologic & Hydraulic Engineering for Survey Investigations	15 May 78
TL 1110-2-231		CEEC-E	Initial Reservoir Filling Plan	30 Mar 79
TL 1110-2-232		CEEC-EB	Wastewater Management Studies Sewage Lagoons at Recreation Areas	19 May 78
TL 1110-2-235		CEEC-ED	Design Criteria - Paved Concrete Flood Control Channel	30 Jun 78
TL 1110-2-239		CEEC-EH-W	Nitrogen Supersaturation	15 Sep 78
TL 1110-2-244		CEEC-EH-W	Water and Wastewater Laboratory Quality Control	14 May 79
TL 1110-2-247		CEEC-ED	Lock Wall Accessories	31 Dec 79
TL 1110-2-250		CEEC-EB	Waste Water Management StudiesEvaluation of In-Pond Alum Addition to Upgrade Lagoon Effluent	25 Jun 80
TL 1110-2-251		CEEC-EH-W	Preparation of Water Control Manuals	14 Mar 80
TL 1110-2-252		CEEC-EH-W	Quality Control of Water Quality Field Sampling	30 Jun 80
TL 1110-2-253		CEEC-EH-W	Measurement of Dissolved Gasesto Determine the Degree of Nitrogen Supersaturation	26 Jun 80
TL 1110-2-254		CEEC-ED	Finite Element Analysis - Interpretation and Documentation Guidelines	31 Dec 80
TL 1110-2-256		CEEC-ED	Sliding Stability for Concrete Structures	24 Jun 81
TL 1110-2-257		CEEC-EG	Pitfalls in the Use of Linament Analysis for Fault Identification	20 Feb 81
TL 1110-2-258		CEEC-ED	Use of Roller Compacted Concrete in the Corps of Engineers	13 Apr 81
TL 1110-2-259		CEEC-EB	Interim Guidance on Use of Maps Computer Program for Water Supply and Conservation Studies	30 Apr 81
TL 1110-2-260		CEEC-EB	Dual Cropping Procedure for Slow Infiltration of Land Treatment of Municipal Waste-water	12 Mar 81
TL 1110-2-261		CEEC-EB	Wastewater Management Studies Evaluation of Innovative/ Alternative Treatment Technologies	20 Feb 81

Pub. No.	Part	Prop.	Title	Pub. Date
TL 1110-2-262		CEEC-EB	Health Aspects of Land Treatment	27 Feb 81
TL 1110-2-263		CEEC-EB	Surveying and Mapping Precise Survey Measurements of Dams	15 Apr 81
TL 1110-2-266		CEEC-ED	Watertight Joints in Corrugated Metal Pipes Under Levees	28 Aug 81
TL 1110-2-271		CEEC-ED	Use of Epoxy Filler Compound	15 Apr 82
TL 1110-2-274		CEEC-EH-Y	Flood Risk Analysis	1 Jun 82
TL 1110-2-276		CEEC-ED	Structural & Geotechnical Design Considerations for Addition of Hydropower Facilities at Existing Corps of Engrs Project	21 Jan 83
TL 1110-2-279		CEEC-EB	Modifications to Maps ComputerProgram for Water ConservationCosts	31 Jan 83
TL 1110-2-281		CEEC-EH-W	Reservoir Contaminants	17 Jun 83
TL 1110-2-282		CEEC-EG	Rock Mass Classification Data Requirements for Rippability	30 Jun 83
TL 1110-2-283		CEEC-EG	Rock Mass Classification for Tunnel Support	31 May 83
TL 1110-2-284		CEEC-EH-D	1982 Hydraulic Design Conference	5 Feb 85
TL 1110-2-285		CEEC-ED	Tilt Measuring Instruments	29 Jul 83
TL 1110-2-286		CEEC-EG	Use of Geotextiles Under Riprap	25 Jul 84
TL 1110-2-289		CEEC-EH-D	Ship and Tow Simulators	5 Dec 83
TL 1110-2-290		CEEC-EH-D	Low Head Navigation Dam Stilling Basin Design	31 Oct 83
TL 1110-2-292		CEEC-EH-D	1983 Coastal Engineering Hydraulic Design Conference	29 Feb 84
TL 1110-2-293		CEEC-EH-D	Entrance Channel Infill Rates	15 Mar 84
TL 1110-2-294		CEEC-EB	Reduction in Water Loss	5 Feb 85
TL 1110-2-295		CEEC-EH-D	Ice Control on Miter Gate Arms	20 Jul 85
TL 1110-2-296		CEEC-EH-D	Floating Breakwater Prototype Test Program	7 Jul 86
TL 1110-2-297		CEEC-EB	Evaluation of Existing Water Distribution Systems	20 Jun 86

Pub. No.	Part	Prop.	Title	Pub. Date
TL 1110-2-298		CEEC-EH-W	Contracting Guideleines for Water Quality and Other Chemical Analyses	10 Nov 86
TL 1110-2-299		CEEC-EH-D	Overtopping of Flood Control Levees and Floodwalls	22 Aug 86
TL 1110-2-300		CEEC-EG	Characterization and Measurement of Dicontinuities in Rock Slopes	31 Oct 83
TL 1110-2-301		CEEC-EG	Interim Procedure for Specifying Earthquake Motions	26 Aug 83
TL 1110-2-303		CEEC-ED	Earthquake Analysis and Design of Concrete Gravity Dams	23 Aug 85
TL 1110-2-305		CEEC-EH-D	Determing Sheltered Water Wave Characteristics	16 Feb 84
TL 1110-2-306		CEEC-EG	Automated Data Acquisition, Geotechnical Instrumentation	29 May 87
TL 1110-2-307		CEEC-ED	Flotation Stability Criteria for Concrete Hydraulic Structures	20 Aug 87
TL 1110-2-308		CEEC-EH-D	Rubble-Mound Trunk Buttressing Stone and Toe Berm Stability	29 Jan 88
TL 1110-2-309		CEEC-EH-W	Water and Wastewater Laboratory Inspections	5 Feb 88
TL 1110-2-310		CEEC-ED	Stability Criteria for Existing Concrete Navigation Structures on Rock Foundations	17 Dec 87
TL 1110-2-311		CEEC-EE	Fire Protection--Hydroelectric Power Plants	29 Feb 88
TL 1110-2-312		CEEC-ED	Strength Design Criteria for Reinforced Concrete Hydraulic Structures	10 Mar 88
TL 1110-2-313		CEEC-EE	Hydraulic Design Guidance for Rectangular Sumps of Small Pumping Stations with Vertical Pumps and Ponded Approaches	29 Apr 88
TL 1110-2-314		CEEC-ED	Lock Wall Rehabilitation	31 Aug 88
TL 1110-2-316		CEEC-EG	Data Base for Automated Geotechnical Instrumentation	15 Nov 88
TL 1110-2-317		CEEC-EE	Selecting Reaction-Type Hydraulic Turbines and Pump Turbines and Hydroelectric Generators and Generator-Motors	15 Dec 88
TL 1110-2-520		CEEC-EB	Wastewater Management Studies Operation of Package TreatmentPlants and Sewage Lagoons	20 Jun 80

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TL 1110-2-521		CEEC-EB	Wastewater Management Studies Aquaculture for Wastewater Treatment	30 Apr 81
TL 1110-2-522		CEEC-EB	Wastewater Recycle/Reuse Systems for Recreation Areas	10 Jun 81
TL 1110-2-524		CEEC-EB	Stormwater Runoff from Overland Flow Land Treatment Systems	20 Jan 82
TL 1110-2-526		CEEC-EB	Crop Management for Overland Flow Wastewater Treatment Systems	16 Jul 82
TL 1110-2-527		CEEC-EB	Wastewater Management Studies,Alternative Wastewater Disinfection Methods for Corps of Engineers Recreation Areas	25 Jun 82
TL 1110-2-528		CEEC-EB	Nitrogen Removal in WastewaterTreatment Lagoons and in Land Treatment Storage Ponds	12 Aug 83
TL 1110-2-529		CEEC-EB	Land Treatment Wastewater Application in Forest Ecosystems	15 Oct 82
TL 1110-2-530		CECW-OM	Field Applications of Polyethylene Pipe in Dredging	15 Dec 86
TL 1110-2-531		CEEC-E	Sediment Resuspension Characteristics of Selected Dredges	26 Nov 84
TL 1110-3-202		CEEC-EG	Energy Conservation - MilitaryConstruction Paving Program	7 Feb 74
TL 1110-3-254		CEEC-EE	Use of Electric Power for Comfort Space Heating	25 Aug 76
TL 1110-3-259		CEEC-EA	28 - Chair Dental Clinic Standard Design	17 Jan 77
TL 1110-3-263		CEEC-EG	Design of All-Bituminous Concrete (ABC) Pavements	22 Mar 77
TL 1110-3-282		CEEC-EE	Energy Conservation	10 Feb 78
TL 1110-3-288		CEEC-EG	Asphaltic Concrete Airfield Pavements	14 Aug 78
TL 1110-3-301		CEEC-ED	Entrance Doors to Heater-Boiler Rooms	11 Jan 79
TL 1110-3-302		CEEC-EE	Evaluation of Solar Energy	14 Mar 79
TL 1110-3-310		CEEC-EG	Use of Precast Concrete Block Pavements	17 Jun 79
TL 1110-3-311		CEEC-EG	Joint Sealant for Airfield Pavements	10 Oct 79
TL 1110-3-320		CEEC-ED	Airfield Pavement Evaluation	25 Sep 80
TL 1110-3-324		CEEC-ED	Fire Detectors for Bachelor Quarters	25 Aug 81

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TL 1110-3-325		CEEC-EE	Compromising Emanations (TEMPEST) Considerations for Military Construction Projects	31 Aug 81
TL 1110-3-326		CEEC-EM	General Criteria Standards for Army Medical Facilities	25 Sep 81
TL 1110-3-328		CEEC-ED	Computer Program CBARCS for Designing Structures to Resist the Effects of Accidental Explosions	20 Oct 81
TL 1110-3-339		CEEC-EG	General Planning/Design Criteria for Sanitary Control of Swimming Facilities	28 Feb 83
TL 1110-3-340		CEEC-ET	Fire Protection Criteria	4 Apr 83
TL 1110-3-341		CEEC-EE	Installation of Permanent Utility Meters	31 May 83
TL 1110-3-343		CEEC-EE	Automatic Transfer (and By-Pass/Isolation Switches, CEGC-16272	22 Jul 83
TL 1110-3-346		CEEC-EE	Air-to-Air Unitary Heat Pumps	17 Oct 83
TL 1110-3-347		CEEC-EE	Hazardous Transformer Dielectrics	28 Nov 83
TL 1110-3-351		CEEC-EG	State Highway Specifications for Airfield Pavements	10 May 84
TL 1110-3-354		CEEC-EE	Direct Digtal Control of Heating, Ventilation, & Air Conditioning (HVAC) System	7 Dec 84
TL 1110-3-355		CEEC-EM	Design Criteria for Medical and Dental Facilities	24 Oct 84
TL 1110-3-356		CEEC-EG	Hydropower Generation Utilizing Wastewater Treatment Plant Effluent	3 Jun 85
TL 1110-3-360		CEEC-EG	Hazardous Waste Storage Criteria	15 May 85
TL 1110-3-361		CEEC-EM	Design Criteria for Medical and Dental Facilities (Medical Gas Systems)	17 May 85
TL 1110-3-362		CEEC-EM	Telephone Systems for MCA Funded Medical Facilities	29 Jul 85
TL 1110-3-363		CEEC-ES	Uniformity of Construction Contract Specifictions	29 Jul 85
TL 1110-3-364		CEEC-ES	Storm Windows	26 Jul 85
TL 1110-3-365		CEEC-EG	Vehicle Maintenance Facilities & Pollution Control (Vehicle Maintenance Cleaning and Servicing)	5 Sep 85

Pub. No.	Part	Prop.	Title	Pub. Date
TL 1110-3-367		CEEC-EG	Trace Organic Compounds in Potable Water Supplies	20 Oct 86
TL 1110-3-368		CEEC-ET	Earth-Covered Magazine Standard Designs	28 Mar 86
TL 1110-3-369		CEEC-EG	Selecting and Specifying Asphalt Cements	28 Mar 86
TL 1110-3-370		CEEC-EM	Gross Floor Area Calculation for Medical Facilities	25 Apr 86
TL 1110-3-371		CEEC-EM	General Planning and Design Criteria Standards for Medical Facilities	2 Oct 86
TL 1110-3-372		CEEC-EE	Incorporation of Military Construction, Army (MCA) Funded Information Systems Into MCA Projects	16 Jan 87
TL 1110-3-374		CEEC-EB	Prevention of Nosocomical Infections During Hospital Rehabilitation/Construction	16 Mar 87
TL 1110-3-375		CEEC-EE	National Electric Code, NFPA No. 70-1987	20 Mar 87
TL 1110-3-376		CEEC-EE	Telephone Systems	15 May 87
TL 1110-3-377		CEEC-EM	Medical Facilities Design Criteria	19 Jun 87
TL 1110-3-378		CEEC-EE	National Electrical Safety Code	28 Aug 87
TL 1110-3-379		CEEC-EM	Compressed Air and Vacuum System Guidance for Air Force Dental Facilities	30 Nov 87
TL 1110-3-380		CEEC-EG	Standard Distribution of Military Airfield Pavement Design and Evaluation Information	29 Jan 88
TL 1110-3-381		CEEC-EG	Airfield Pavement Design	29 Jan 88
TL 1110-3-382		CEEC-EB	Design of Nuclear Facilities to Facilitate Decommissioning	29 Jan 88
TL 1110-3-383		CEEC-EE	Heat Distribution Systems Outside of Buildings	19 Feb 88
TL 1110-3-384		CEEC-EE	Double-Ended Substations	17 Feb 88
TL 1110-3-385		CEEC-EI	Land Use Planning--Installation Master Plan	19 Feb 88
TL 1110-3-386		CEEC-EE	Line Sectionalizer Switches	26 Feb 88

Pub. No.	Part	Prop.	Title	Pub. Date
TL 1110-3-387		CEEC-EE	Procedures for Implementation of Energy Monitoring & Control Systems Special Action Group Information Paper	22 Jul 88
TL 1110-3-388		CEEC-EE	Procedures for Implementation of Energy Monitoring and Control Systems Design Criteria	30 Jun 88
TL 1110-3-389		CEEC-ED	Guidelines for Design and Construction - Fire Protection and Detection Systems	3 Jun 88
TL 1110-3-390		CEEC-EE	Transportation Planning -- Installation Master Plan	10 Jun 88
TL 1110-3-391		CEEC-EM	Revised Air Conditioning Criteria for Medical Facilities	30 Sep 88
TL 1110-3-392		CEEC-EA	Entry Points/Access Control Points	21 Dec 88
TL 1110-3-393		CEEC-EG	Design of Surfaced Areas	28 Oct 88
TL 1110-3-395		CEEC-ES	Army Aviation Lighting	15 Dec 88
TL 1110-3-398		CEEC-EM	Security Engineering Criteria for Medical Facilities	16 Dec 88
TL 1110-3-399		CEEC-EE	Data Transmission Media for Energy Monitering and Control Systems and Intrusion Detection Systems	30 Dec 88

APPENDIX C

EIRS BULLETIN
86-04

TECHNICAL MANUALS

Up-to-Date Index:

a. Problem: Technical manuals in the TM 5-800-series, which are used in the design of military facilities, are indexed in DA Pamphlet 310-4, along with hundreds of other publications which do not pertain to design of military facilities. It is difficult to establish the current date of TM 5-800-series manuals using the pamphlet, changes to the pamphlet, and circulars announcing changes to various DA documents.

b. Solution: The attached up-to-date index of TM 5-800-series technical manuals should be used to establish currency of technical manual files. Requests for technical manuals should follow normal publication supply procedures.

TECHNICAL MANUALS

TM PUB NUMBER	TITLE	CH	PUB DATE	PROPT
TM 5-785-1	Engineering Weather Data		7/ 1/1978	ECE-E
TM 5-800-1	Construction Criteria for Army Facilities		9/10/1974	ECE-A
TM 5-800-2	Cost Estimates:Military Construction		6/12/1985	ECE-S
TM 5-800-3	Project Development Brochure	1	7/15/1982	ECE-I
TM 5-801-1	Historic Preservation:Administrative Procedures		11/ 1/1975	ECE-A
TM 5-801-2	Historic Preservation:Maintenance Procedures		2/ 1/1977	ECE-A
TM 5-803-1	Installations Plng:Principles & Procedures		11/ 5/1970	ECE-I
TM 5-803-10	Planning & Design of Outdoor Sports Facilities		10/ 1/1975	ECE-I
TM 5-803-11	Children's Play Areas & Equipment		1/13/1969	ECE-I
TM 5-803-12	Planning & Design of Outdoor Recreational Fac	1	10/ 1/1975	ECE-I
TM 5-803-2	Environmtl Protection Plng in the Noise Environmt		6/15/1978	ECE-I
TM 5-803-4	Planning of Army Aviation Facilities		7/15/1983	ECE-I
TM 5-803-5	Installation Design		3/ 1/1981	ECE-I
TM 5-803-6	Installations Site Planning of Community Centers		4/11/1973	ECE-I
TM 5-803-7	Airfield & Heliport PLanning Criteria		5/12/1981	ECE-I
TM 5-804-2	Solar Energy Systems	1	8/15/1982	ECE-E
TM 5-805-1	Standard Practice for Concrete Military Structures	2	5/ 1/1982	ECE-C
TM 5-805-12	X-Ray Shielding	1	10/15/1980	ECE-S
TM 5-805-13	Raised Floor System	1	9/ 1/1981	ECE-S
TM 5-805-14	Roofing Design	2	3/31/1966	ECE-S
TM 5-805-3	Roof Decking Systems		7/15/1981	ECE-S
TM 5-805-4	Noise & Vibration Control for Mechanical Equipment		12/30/1983	ECE-E
TM 5-805-6	Calking and Sealing		1/31/1985	ECE-S
TM 5-805-7	Welding:Design Procedures & Inspection		5/20/1985	ECE-D
TM 5-805-8	Builder's Hardware	2	7/15/1982	ECE-S
TM 5-805-9	Power Plant Acoustics		12/30/1983	ECE-E
TM 5-807-10	Signage		12/ 1/1983	ECE-A
TM 5-807-7	Color For Buildings	2	7/15/1974	ECE-H
TM 5-809-1	Load Assumption for Buildings	1	3/28/1986	ECE-D
TM 5-809-10	Seismic Design for Buildings		2/15/1982	ECE-D
TM 5-809-10-1	Seismic Design Guidelines for Essential Bldgs		2/27/1986	ECE-D
TM 5-809-11	Dsgn Crit Faclts Subject to Typhoons & Hurricanes	1	6/21/1983	ECE-D
TM 5-809-12	Concrete Flr Slabs on Grade Subjctd to Heavy Loads	1	4/ 1/1977	ECE-C
TM 5-809-2	Concrete Structural Design for Buildings		9/31/1984	ECE-D
TM 5-809-3	Masonry Structural Design for Buildings	2	8/ 1/1982	ECE-D
TM 5-809-4	Steel & Aluminum Structural Design for Buildings		2/15/1983	ECE-D
TM 5-809-5	Wood Structural Design for Buildings	1	6/ 1/1983	ECE-D
TM 5-809-6	Structural Design:Structures other than Buildings	1	1/16/1984	ECE-D
TM 5-809-8	Metal Roofing and Siding	1	3/ 5/1984	ECE-D
TM 5-809-9	Structural Design for Thin-Shell Roof Construction		6/ 1/1983	ECE-D
TM 5-810-1	Mechanical Design:Heating Ventilating Air Conditioning		8/15/1983	ECE-E
TM 5-810-2	High Temperature Water Heating Systems		9/12/1984	ECE-E
TM 5-810-3	Mech Refrig & Ventltn in Cold Storage Facilities	1	8/16/1982	ECE-E
TM 5-810-4	Compressed Air	1	12/ 1/1982	ECE-E
TM 5-810-5	Plumbing		11/ 1/1982	ECE-E

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TM PUB NUMBER	TITLE	CH	PUB DATE	PROPT
TM 5-810-6	Nonindustrial Gas Piping Systems	1	9/ 1/1982	ECE-E
TM 5-810-7	High Pressure Gas & Cryogenic Systems	1	7/15/1983	ECE-E
TM 5-811-1	Electric Power Supply & Distribution		9/12/1984	ECE-E
TM 5-811-2	Electrical Design:Interior Electrical System	1	9/ 1/1983	ECE-E
TM 5-811-3	Electrical Design:Lightng & Static Elec Protection		3/29/1985	ECE-E
TM 5-811-4	Engineering & Design:Corrosion Control	1	8/ 1/1982	ECE-E
TM 5-811-5	Army Aviation Lighting	2	6/ 6/1980	ECE-E
TM 5-811-6	Electric Power Plant Supply		1/20/1984	ECE-E
TM 5-811-7	Electrical Design:Cathodic Protection		4/22/1985	ECE-E
TM 5-812-2	Firestopping		1/15/1986	ECE-D
TM 5-813-1	Water Supply:General Considerations	1	7/15/1965	ECE-B
TM 5-813-2	Water Supply:Water Sources	1	7/ 2/1958	ECE-B
TM 5-813-3	Water Supply:Water Treatment		9/16/1985	ECE-B
TM 5-813-4	Water Supply:Water Storage		9/20/1985	ECE-B
TM 5-813-5	Water Supply:Water-Distribution Systems	2	1/31/1963	ECE-B
TM 5-813-6	Water Supply:Water Supply for Fire Protection	3	7/ 2/1958	ECE-B
TM 5-813-7	Water Supply for Special Projects		3/20/1975	ECE-B
TM 5-814-1	Gravity Sewers & Appurtenances		3/ 4/1985	ECE-B
TM 5-814-2	Pumping Stations & Force Mains		3/15/1985	ECE-B
TM 5-814-3	Domestic Wastewater Treatment		11/17/1978	ECE-B
TM 5-814-5	Sanitary Landfill		8/15/1983	ECE-B
TM 5-814-7	Hazardous Waste Land Disposal/Land Treatment Faclt		11/29/1984	ECE-B
TM 5-814-8	Evaluation Criteria Guide for Water Pollution etc		7/30/1976	ECE-B
TM 5-815-1	Air Pollution Control Systems for Boilers & Incin	1	11/15/1980	ECE-E
TM 5-815-2	Energy Monitoring & Control Systems	1	6/ 1/1983	ECE-E
TM 5-818-1	Soils & Geology Procedures for Foundation Dsgn etc		10/21/1983	ECE-G
TM 5-818-2	Pavement Design for Seasonal Frost Conditions		1/22/1985	ECE-G
TM 5-818-3	Pavement Evaluation for Frost Conditions		12/20/1966	ECE-G
TM 5-818-4	Backfill for Subsurface Structures		6/ 1/1983	ECE-G
TM 5-818-5	Dewatering and Groundwater Control	1	11/15/1983	ECE-G
TM 5-818-6	Grouting Methods & Equipment	1	2/27/1970	ECE-G
TM 5-818-7	Foundations In Expansive Soils	1	9/ 1/1983	ECE-G
TM 5-820-1	Surface Drainage Facilities Airfield & Heliports		4/ 1/1977	ECE-G
TM 5-820-2	Subsurface Drainage facilities for Airfields		3/30/1979	ECE-G
TM 5-820-3	Drainage Erosion Control Struct Airflds & Heliprts	1	1/30/1978	ECE-G
TM 5-820-4	Drainage for Areas other than Airfields	1	10/14/1983	ECE-G
TM 5-822-2	GPs & Geom Dsgn Rds Sts Walks & Open Storage Areas		4/ 1/1977	ECE-G
TM 5-822-4	Soil Stabilization for Pavements	1	4/ 1/1983	ECE-G
TM 5-822-5	Flex Pavements Rds Sts Walks & Open Storage Areas		10/ 1/1980	ECE-G
TM 5-822-6	Rigid Pavements Rds Sts Walks & Open Storage Areas	1	4/ 1/1977	ECE-G
TM 5-822-7	Standard Practice for Concrete Pavements		9/15/1975	ECE-G
TM 5-822-8	Bituminous Pavements - Standard Practice		12/10/1971	ECE-G
TM 5-822-9	Repair Rigid Pavements Using Epoxy Resin Grout etc		1/ 3/1978	ECE-G
TM 5-823-2	Airfield-Heliport Flexible Pavement Design	2	8/30/1958	ECE-G
TM 5-823-3	Army Airflds-Helprts Rigid & Overlay Pavement Dsgn	2	10/10/1968	ECE-G

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TM PUB NUMBER	TITLE	CH	PUB DATE	PROPT
TM 5-823-4	Army Airflds-Helprts O & M Facilities	1	1/ 3/1977	ECE-G
TM 5-824-1	Airflds other than Army:Gps for Airfield Design		4/ 1/1977	ECE-G
TM 5-824-3	Rigid Pavements for Airfields other than Army	2	12/ 7/1970	ECE-G
TM 5-824-4	Airfields other than Army:Arfld O&M Facilities	1	4/29/1961	ECE-G
TM 5-825-2	Flexible Pavement Designs for Airfields		8/ 1/1978	ECE-G
TM 5-826-1	Army Airflds Pavement:Eval Concpts Table Contents		10/15/1979	ECE-G
TM 5-826-2	E&D:Army Airfield Flexible Pavement Evaluation		2/22/1980	ECE-G
TM 5-826-3	E&D:Army Airfield Rigid Pavement Evaluation		2/22/1980	ECE-G
TM 5-826-4	Army Airfield-Heliport Pavement Reports	1	2/22/1980	ECE-G
TM 5-827-1	Airfield Pavement Evaluation Concepts		3/15/1981	ECE-G
TM 5-827-2	Flexible Airfield Pavement Evaluation	1	4/ 1/1981	ECE-G
TM 5-827-3	Rigid Pvmt for other than Army Airfields Evaluatn	1	2/15/1959	ECE-G
TM 5-830-2	Establishment of Herbaceous Ground Cover	1	9/ 1/1983	ECE-I
TM 5-830-3	Dust Control		9/30/1974	ECE-G
TM 5-830-4	E&D:Planting & Maint of Trees Shrubs etc		6/15/1976	ECE-I
TM 5-838-2	Army Health Facility Design		3/ 1/1981	ECE-M
TM 5-840-2	Storage Facilities:Storage Depots	1	12/ 1/1983	ECE-G
TM 5-841-2	Space Planning Guide TDA Consldtd Maint Facilts		12/ 1/1980	ECE-A
TM 5-842-2	Laundries & Dry Cleaning Plants		1/20/1986	ECE-E
TM 5-844-1	Courier Station	1	1/12/1979	ECE-A
TM 5-845-2	Convertible Mobile Home Communities		7/31/1974	ECE-A
TM 5-848-1	Gas Distribution	1	12/ 1/1982	ECE-E
TM 5-848-2	Handling of Aircraft & Automotive Fuels	1	1/ 1/1984	ECE-E
TM 5-848-3	Ground Storage of Coal		3/ 1/1984	ECE-G
TM 5-849-1	Pile Driving Equipment		5/ 1/1982	ECE-G
TM 5-850-1	Engineering & Design of Military Ports	1	2/15/1963	ECE-G
TM 5-850-2	RR Design & Construction at Army & AF Instltns		7/ 1/1980	ECE-G
TM 5-852-1	Arctic & Subarctic Construction:General Provisions		2/25/1966	ECE-B
TM 5-852-2	A&S Construction:Site Selection & Development		7/ 8/1966	ECE-I
TM 5-852-3	A&S Construction:Runway & Road Design		10/29/1954	ECE-G
TM 5-852-4	A&S Construction:Foundations for Structures		10/15/1983	ECE-G
TM 5-852-5	A&S Construction:Utilities		10/ 1/1954	ECE-B
TM 5-852-6	A&S Construction:Calc Methods Depths of Freeze etc		1/ 5/1966	ECE-G
TM 5-852-7	Surface Drainage Dsgn Airflds/Helprts in A&S Regns		4/15/1981	ECE-G
TM 5-852-8	A&S Construction:Terrain Evaluation in A&S Regns		7/15/1963	ECE-G
TM 5-852-9	Arctic & Subarctic Construction:Buildings		7/23/1971	ECE-B
TM 5-853-1	Designing for Security		8/15/1983	ECE-T
TM 5-855-1	Fundamentals of Protective Design(Non-Nuclear)		7/19/1965	ECE-T
TM 5-855-2	Pro Dsgn: Pro Chem & Bio Agnts & Rad Flt		1/19/1961	ECE-T
TM 5-855-4	Heat & Air Conditioning of Underground Facilities		11/30/1959	ECE-T
TM 5-855-5	Nuclear Electromagnetic Pulse(NEMP) Protection		2/15/1974	ECE-T
TM 5-857-1	E&D:Dsgn U I in Rock Gen Pln Considerations		1/ 1/1961	ECE-T
TM 5-857-2	E&D:Dsgn U I in Rock Tunls & Linings		1/ 1/1961	ECE-T
TM 5-857-3	E&D:Dsgn U I in Rock Spc Layouts & Excvtn		4/ 1/1961	ECE-T
TM 5-857-4	E&D:Dsgn U I in Rock Pen & Explosn Effects		7/31/1961	ECE-T

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TM	PUB NUMBER	TITLE	CH	PUB DATE	PROPT
TM	5-857-5	E&D:Dsgn U I in Rock Protctve Feat & Utilities		7/ 1/1961	ECE-T
TM	5-858-1	Resist Nuc Weap Eff-Fac Sys Engineering		10/31/1983	ECE-T
TM	5-858-2	Resist Nuc Weap Eff-Weap Effect		7/ 6/1984	ECE-T
TM	5-858-3	Resist Nuc Weap Eff-Structures		7/ 6/1984	ECE-T
TM	5-858-4	Resist Nuc Weap Eff-Shock Sys		6/11/1984	ECE-T
TM	5-858-5	Resist Nuc Weap Eff-Air En etc		12/15/1983	ECE-T
TM	5-858-6	Resist Nuc Weap Eff-Hard Verif		8/31/1984	ECE-T
TM	5-858-7	Resist Nuc Weap Eff-Facilities Support System	1	10/15/1983	ECE-T
TM	5-858-8	Resist Nuc Weap Eff-Illus Exam		8/14/1985	ECE-T

APPENDIX D

APPENDIX D

Cross Reference A.F. Manuals To Army TM'S

USACOE TM No.	Air Force Manual No.	Title
None	**P 88-1**	Open messes
None	**M 88-2**	AF Design Manual, Definitive Designs of Air Force Structures.
	R 88-3	Air Force Contract Construction.
5-809-1	Chapter 1	Load Assumptions for Buildings.
5-809-2	Chapter 2	Concrete Structural Design for Buildings.
5-809-3	Chapter 3	Masonry Structural Design for Buildings.
5-809-4	Chapter 4	Structural Steel, Structural Aluminum, Steel Joists, and Cold-Formed Steel for Buildings.
5-809-5	Chapter 5	Wood Structural Design for Buildings.
5-805-1	Chapter 6	Standard Practice for Concrete for Military Structures.
5-818-1	Chapter 7	Procedures for Foundation Design of Buildings and Other Structures.
5-809-8	Chapter 8	Metal Roofing and Siding.
5-809-9	Chapter 12	Thin Shell Construction.
5-809-10	Chapter 13	Seismic Design for Buildings.
5-809-11	Chapter 14	Design Criteria for Facilities in Areas Subject to Typhoons and Hurricanes.
5-809-12	Chapter 15	Concrete Floor Slabs on Grade subjected Heavy Loads.
	M 88-4	
5-840-1*	Chapter 1 (None)	Cold Storage - Facilities.
5-805-8	Chapter 2	Builder's Hardware.
None	Chapter 3	None

5-805-6*	Chapter 4 (None)	Calking and Sealing.
None	Chapter 5	Criteria for AF Clean Facility & Construction.
5-805-14*	Chapter 6 (None)	Roofing Design.
5-805-7*	Chapter 7 (None)	Welding Design Procedures, and Inspection.
5-807-6*	Chapter 8 (None)	Criteria for Design Features to Make Buildings and Facilities Accessible to and Usable by the Physically Handicapped.
5-805-13	Chapter 9	Raised Floor Systems.
None	Chapter 10	Criteria for A. F. precision measurement equipment laboratory Design & construction.
	M 88-5	
5-820-1	Chapter 1	Surface Drainage Facilities for Airfields and Heliports.
5-820-2	Chapter 2	Drainage and Erosion Control-Subsurface Drainage Facilities for Airfield Pavement.
5-820-3	Chapter 3 (None)	Drainage and Erosion - Control Structures for Airfield and Heliports.
5-820-4	Chapter 4	Drainage for Areas Other Than Airfields.
5-818-4	Chapter 5	Backfill for Subsurface Structures.
5-818-5	Chapter 6	Dewatering and Groundwater Control for Deep Excavations.
	M 88-6	
5-824-1	Chapter 1	Airfield Pavement Design General Provisions and Criteria.
5-824-2 & 5-825-2*	Chapter 2	Airfield Flexible pavements Air Force.
5-824-3	Chapter 3	Rigid Pavements for Airfield Other Than Army.
5-818-2	Chapter 4	Pavement Design for Seasonal Frost Conditions.
None	Chapter 5 (None)	None

5-824-4*	Chapter 6	Pavement Recycling.
None	Chapter 7	Standard Practices for Sealing joints & cracks in Airfield pavement.
5-822-7	Chapter 8	Standard Practice for Concrete Pavements.
5-822-8*	Chapter 9	Bituminous Pavements Standard Practice.
	M 88-7	
5-822-6	Chapter 1	Rigid pavements for Roads, Streets, Walks and Open Storage Areas.
5-850-2	Chapter 2	Railroad Design and Construction at Army and Air Force Installations.
5-822-5	Chapter 3	Flexible Pavements for Roads, Streets, Walks and Open Storage Areas.
5-822-4	Chapter 4	Soil Stabilization for Roads and Streets.
5-822-2	Chapter 5	General Provisions and Geometric design for Roads, Streets, Walks and Open Storage Areas.
	M 88-8	
5-810-1*	Chapter 1 (None)	Heating, Ventilating and Air Conditioning.
5-810-3	Chapter 2	Mechanical Refrigeration and Ventilation in Cold-Storage Facilities.
5-810-4	Chapter 3	Compressed Air.
5-810-5	Chapter 4	Plumbing.
5-810-6	Chapter 5	Gas Fitting.
	M 88-9	
5-811-1	Chapter 1	Electrical Power Supply & Distribution.
5-811-2	Chapter 2	Electrical Design - Interior Electrical System.
5-811-3	Chapter 3	Lightning static Electricity Protection Systems.
5-811-4*	Chapter 4 (None)	Electrical Corrosion Control.

	M 88-10	
5-813-1	Chapter 1	Water Supply General Considerations.
5-813-2	Chapter 2	Water Sources.
5-813-3	Volume 3	Water Supply, Water Treatment.
5-813-4*	Volume 4	Water Supply,Water Storage.
5-813-5*	Chapter 5	Water Distribution Systems.
5-813-6*	Chapter 6	Water Supply for Fire Protection.
5-813-7	Chapter 7	Water Supply for Special Projects.
	M 88-11	
5-814-1	Volume 1	Sanitary and Industrial Waste Water Collection Gravity.
5-814-2*	Volume 2	Sanitary and Industrial Waste-Water Collection Pumping Stations Force Mains.
None	Volume 3	Domestic Wastewater Treatment.
5-814-3*	Chapter 3 (None)	Sewage - Treatment Plants.
5-814-4*	Chapter 4	Incineration.
5-814-5*	Chapter 5 (None)	Sanitary Fill.
5-814-6	Chapter 6 (None)	Industrial Waste.
	M 88-12	
5-848-1	Chapter 1	Gas Distribution.
5-848-2*	Chapter 2 (None)	Storage, Distribution and Dispensing of Aircraft and Automatic Fuels.
5-848-3*	Chapter 3 (None)	Ground Storage of Coal.
5-810-7	Chapter 4	High - Pressure Gas and Cryogenic systems.
None	**M 88-13**	Construction Inspector's Guide.
None	**M 88-14**	Visual Air Navigation Facilities.
None	**M 88-15**	Air Force Design Manual.
None	**R 88-16**	Standards for Marking Airfields.
	R 88-17	

5-830-1*	Chapter 1 (None)	Planting Design.
5-830-2	Chapter 2	Establishment of Heraceous Ground Cover.
5-830-3	Chapter 3	Dust Control.
5-830-4	Chapter 4	Planting and Establishment of Trees, Shrubs and Ground Covers Vines.
None	**R 88-18**	Air Force Regional Civil Engineers.
	M 88-19	
5-852-1	Chapter 1	Arctic and Subarctic Construction General Provisions.
5-852-2	Chapter 2	Arctic and Subarctic Construction Site Selection and Development.
5-852-3*	Chapter 3	Arctic and Subarctic Construction Runway and Road Design.
5-852-4	Chapter 4	Arctic and Subarctic Construction Foundations for Structures.
5-852-5*	Chapter 5	Arctic and Subarctic Construction Utilities.
5-852-6	Chapter 6	Calculation Methods for Determination of Depths of Freeze and Thaw in Soils.
5-852-7	Chapter 7	Surface Drainage Design for Airfields and Heliports in Arctic and Subarctic Regions.
5-852-8*	Chapter 8 (None)	Terrain Evaluation in Arctic and Subarctic Regions.
5-852-9	Chapter 9	Arctic and Subarctic Construction Buildings.
5-805-9	**M 88-20**	Power Plant Acoustics.
5-844-1	**M 88-21**	Courier Station Design
None	**M 88-22**	Structures to Resist the Effects of Accidental Explosion.
None	**P 88-23**	Family support Center Design.
	M 88-24	
5-827-1	Chapter 1	Airfield Pavement Evaluation Concepts.
5-827-2	Chapter 2	Flexible Airfield pavement Evaluation.

5-827-3	Chapter 3	Rigid Airfield Pavement Evaluation - Air Force.
5-818-3	Chapter 4	Pavement Evaluation for Frost Conditions.
None	M 88-25	Family Housing Design.
None	P 88-26	Construction for Secure Conference Rooms.
	P 88-27	Catholic Protection Testing and Instruments.
None	R 88-28	High Temperature Water Heating Systems.
5-785	M 88-29	Engineering Weather Data.
5-803-11	M 88-30	Children's Play Areas and Equipment.
None	R 88-31	Selecting A-E Firms
5-818-6	M 88-32	Grouting Methods and Equipment.
None	R 88-33	Planning Design of Outdoor Sports Facilities.
None	M 88-34	Field Engineering Handbook Expedient Methods.
None	R 88-35	Sealing Joints in Airfields Pavements.
5-815-2	m 88-36	Energy Monitoring and Control Systems (EMCS).
5-805-4/5-805-9	M 88-37	Noise and Vibration Control for Mechanical Equipments.
None	M 88-38	None
None	M 88-39	None
None	P 88-40	Sign Standards.
None	P 88-41	Interior Design.
None	P 88-42	Planning Guide for the Design of Dining Facilities.
None	M 88-43	Installation Design.
None	M 88-44	None
None	M 88-45	Civil Engineering Corrosion Control-Cathodic Protection Design.
None	P 88-46	Multipurpose Recreation Facilities.

None	P 88-47	Bowling Centers.
None	P 88-48	General Libraries.
None	M 88-49	None
None	P 88-50	Criteria for design and construction of Air Force Health Facilities.
None	P 88-51	Design Guide for Gymnasiums, Field Houses, and Indoor Sports Complexes.
None	P 88-52	Design Guide for Swimming Pools.
None	P 88-53	Design Guide for Youth Centers.
None	P 88-54	Design Guide for Arts & Crafts Centers.

89 - FACILITY CONSTRUCTION

None	R 89-1	Design and Construction Management.
None	R 89-2	AF Form 378, USAF Construction Program Interpretation.
None	M 89-3	Materials Testing.
None	M 89-25	Family Housing Construction.

Miscellaneous

TB-420.8	M 85-44	Heating, Cooling, Ventilating Handbook.
5-683	M 91-17	Facilities Engineering Electrical Interior Facilities (Not for A/E's)
None	M 88-26	Family Housing Design.
None	P 88-27	Cathodic Protection Testing and Instruments.
None	R 88-28	High Temperature Water Heating Systems.
None	M 88-29	Engineering Weather Data.
None	M 88-30	Children's Play Area and Equipment.
None	R 88-31	Selecting Architect-Engineer (A-E) Firms for Professional Services by Negotiated Contracts.

* Air Force Manual not currently available at New York District. Use Army Technical Manual at this time.

APPENDIX E

APPENDIX E

SURVEYS

SPECIFICATIONS AND SCOPE OF WORK FOR THE SURVEY ARE AS FOLLOWS:

a. **CONTROL SURVEYS.** Required control surveys will be completed by conventional survey methods. Elevations will be established by differential level runs. Angular measurements will be made using one second theodolites and distances will be measured using electronic distances measuring equipment. All surveys will be adjusted to the existing Base horizontal coordinate System and vertical datum.

b. **FIELD CLASSIFICATION SURVEYS.** Field classification surveys will be conducted to the extent necessary to provide the following information of the topographic maps:

1. Location of buildings, roads, and utilities. The locations and sizes of the utilities shall be coordinated with the existing base utility maps and verified in the field.
2. Rim and invert elevations of sanitary manholes, storm manholes and inlets.
3. Rim elevations of electric manholes.
4. Locations of utility poles, fences, fire hydrants, gas and water valves.
5. Spot elevations.
6. Finished floor elevations and basement elevations of existing buildings.
7. Type of pavement surface and ground cover.
8. Location and size of trees, extent of heavily wooded areas.
9. Easements, Survey base line and tie-in points.

d. **FINAL MAP SHEETS.** Final map sheets will be 26 inches x 38 inches in overall size. The original manuscripts shall be prepared in pencil or ink on stable base mylar material, 0.004 inch thickness. Each sheet will show appropriate title information and north arrow. Map contents will include the showing of roads,paths,trails,streets, sidewalks,walls,fences,medians,rails,manholes,inlets, trees, etc. Which have been identified and located by field survey. Final map scale will be 1-inch 20 feet with contours at intervals of 1 foot, plus spot elevations and finished floor elevations of existing buildings. Spot elevations will be systematically placed so that a true representation of the ground surface is maintained. All elevations will be shown to the nearest tenth of a foot. Elevations on all paved areas will be shown to the nearest hundredth of a foot.

SURVEYS

d. (cont'd) Existing contours will be shown as dashed lines. Lettering may be free hand. (All notes, sketches, drawings, etc. developed during the course of the project shall be submitted).

e. **SURVEY ACCURACY.** Horizontal survey accuracy will meet the standard of Third Order, Class I with the horizontal traverse having a closure of 1 in 10,000 or better. Vertical survey accuracy will meet the standard Second Order, Class 2 with the vertical control having a closure equal to 1.3 millimeters X, K or better, where K is the horizontal distance of the survey traverse in kilometers.

Elevations taken during the field classification surveys shall be obtained to the nearest one hundredth (.01) of a foot and recorded.

f. **MAP ACCURACY.** Horizontal accuracy of the completed maps will be such that ninety (90) percent of all planimetric features on the finished maps will be accurate to within at least on fortieth (1/40) of an inch of their true coordinate position, as determined by test surveys and none of the features will be misplaced on the finished maps by more than one twentieth (1/20) of an inch from their true coordinate position.

g. Vertical accuracy of the completed maps will be such that ninety (90) percent of the elevations determined from the contours of the finished topographic maps will have an accuracy with respect to true elevation of on quarter (1/4) contour interval or better and remaining ten (10) percent of such elevations will not be in error by more than half (1/2) contour interval. In checking elevations taken from the map, the apparent vertical error may be decreased by assuming a horizontal displacement of one fortieth (1/40) of an inch.

h. Accuracy of spot elevations will be to the nearest tenth (0.1) of a foot.

i. **COMPLETION OF WORK.** All work is to be completed within 30 calendar days after receipt of notice to proceed. All information developed by the contractor during the course of this work will be property of the United States Government, acting through the Corps of Engineers, New York District and such information will not be released to others without the express, written permission of the Corps of Engineers.

APPENDIX F

APPENDIX F

A/E PREPARED NETWORK ANALYSIS SYSTEM
CPM SCHEDULING

___ ___ The A/E shall submit with the final submission, a CPM schedule for the project indicating construction milestones and long lead items. The CPM schedule will be in sufficient detail to accurately estimate the proper construction duration. The A/E shall retain the services of a construction scheduling consultant if not staffed to provide this service. The CPM schedule will conform to the following requirements:

1. The progress schedule to be prepared by the A/E shall consist of a network analysis system (NAS) as described below. In preparing this system, the scheduling of construction is the responsibility of the A/E. The requirements for the system is included to assist the Government in appraising the reasonableness of the proposed schedule. Additionally, the network system will form the basis for the evaluation of the A/E prepared cost estimate.

2. The development and updating of the NAS will be by the critical path method and will be computer generated using PMS II, Aldergra (CPM) system or Primavera software om IBM PC compatible equipment. Other computer software will be considered subject to the approval of the Contracting Officer provided that the Contractor can provide input data which can interface with the above software and IBM PC computers.

3. The NAS shall consist of logic diagrams, mathematical analysis, and other data specified herein. Each facility shall be separately identifiable in the network system, and a summary network system shall be provided which shows each facility as a separate item. facility completion dates shall be shown in the detailed system as well as in the summary.

a. Logic diagrams shall show the order and interdependence of activities and the sequence in which the work is to be accomplished as planned by the A/E. The basic concept of the network analysis diagram will be followed to show how the start of a given activity is dependent on the completion of preceding activities and its completion restricts the start of following activities. The description duration shall be shown for each activity. The critical path shall be clearly indicated and the required completion dates shall be accurately shown.

b. Each facility shall be shown in the network system in sufficient detail to show how the major features of work such as but not limited to: layout, site preparation, footings, below grade plumbing, masonry, structural steel, roofing, electrical , mechanical , carpentry, painting, flooring, etc. In addition, procurement of critical long lead items including the submittal approval and delivery times shall be included in detail when affecting progress and facility required completion dates. The number of activities assigned and the degree of detail will be subject to the approval of the Contracting Officer. It shall be such that the progress of work on each activity can be measures and reported separately.

c. A summary network system shall be provided for the entire contract. It shall shown each facility as the one or more activities as necessary to reflect their interdependence. Each activity in the summary network shall have durations that are consistent with the detailed work. The summary network shall reflect the overall progress of each project and the overall progress of the contract.

d. A separate mathematical analysis shall be provided for each facility and for the summary diagram. The mathematical analysis shall include a tabulation of each activity shown on the network diagrams. The following information will be furnished as a minimum for each activity:

i. Preceding and following event numbers.
ii. Activity description
iii. Estimated duration of activities.
iv. Earliest start and finish dates. (by calendar date)
v. Latest start and finish date. (by calendar date.)

e. The analysis shall list the activities in sorts of groups as follows:

i. By the preceding event number from the lowest to the highest and then in order of the following event number.

ii. By the amount of slack, then in order of preceding event and then in order of succeeding event numbers,

iii. In order of the latest finish dates and then in order of preceding event and then in order of succeeding event numbers.

f. In addition to the logic diagrams and mathematical analysis an early finish and late finish for each facility shall be provided.

4. REVIEW:

The A/E shall participate in a review and evaluation of the proposed NAS by the Government.

Any revision necessary as a result of this review shall be re-submitted for approval by the Government within ten (10) calendar days after the conference. The schedule will then be again reviewed as a completely new submission and necessary revision again made within ten (10) calendar days. The approved schedule shall then be the schedule to be used by the A/E for planning, organizing and phasing the work. If the A/E thereafter determines that major changes are required to the approved schedule, the A/E shall notify the Government in writing of the cause of the change and the anticipated schedule impact.

5. DEFINITIONS:

a. A change may be considered of a major nature if the time estimated to be required or actually used for an activity or the logic of sequence of activities is varied from the original plan to a degree that there is reasonable doubt as to the effect on the contract completion date(s). Changes which affect activities with adequate slack time shall be considered as minor changes, except that an accumulation of minor changes may be considered as a major change when their cumulative effect might affect the contract completion date(s).

b. Float or slack is defined as the amount of time between early start date and the late start day, or the early finish date and the late finish date, or nay of the activities in the NAS schedule. Float or slack is not the time for the exclusive use of or benefit of either the Government or the Contractor.

APPENDIX G

APPENDIX G

DD Form 1354

Property Transfer
Table of Contents

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1.	General	1
2.	Preparation of DD 1354 for Army Projects	1
3.	Preparation of DD 1354 for Air Force Projects	2
4.	Sample DD Form 1354 for Army Projects	3
5.	DD Form 1354 Checklists for Army Projects	5

PROPERTY TRANSFER

DD FORM 1354

1. GENERAL

The DD Form 1354, Transfer and Acceptance of Military Real Property, is a document used for the transfer of all (rehab or new) completed construction projects to the using agency (the installation). The transfer of construction to the using agency is simultaneous with the acceptance of that construction from the contractor.

The designer is not responsible for preparing the final DD Form 1354, however, the designer is responsible for providing input. The Army Force have different requirements and procedures for developing DD Form 1354. The designer's responsibilities will differ depending on which using agency for which the project is being designed.

2. PREPARATION OF DRAFT DD 1354 FOR ARMY PROJECTS

The designer is responsible for preparing a draft DD 1354 as part of the final submittal for Army projects. The final DD form 1354 is prepared by the Districts Resident Engineer.

The Project Manager will provide the designer with a DD 1354 listing all reportable components and sub-facilities for the project as identified from the DD 1391 project description. (Copy of form attahced). Items will be listed by Army category codes. These are numbers used by the Army to classify various types of facilities, supporting facilities, and components of facilities.

The designer will complete the DD Form 1354 by filling in block 20 (number of units), block 23 (total quantity), block 24 (cost), block 25 (drawing numbers), and block 26 (remarks). This is to be submitted with the advance final plans, specifications, cost estimate and design analysis.

The designer will verify that all components and sub-facilities as listed by the Project Manager are applicable.

The designer will contact the Project Manager concerning any components and sub facilities for the project which are not listed on the DD 1354, as provided to the A/E but which the A/E considers as applicable. The Project Manager will determine the applicability of such items.

The designer will then revise the DD 1354 to reflect Government review comments/instructions. This will then be submitted with the final (originals) plans and specifications.

3. PREPARATION OF DD FORM 1354 CHECKLIST FOR AIR FORCE PROJECTS

For Air Force projects the designer is required to prepare a DD Form 1354 Checklist (attached).

This checklist will be used during construction of the project by the using agency. The using agency utilizes the DD Form 1354 Checklist to provide the New York District Resident Engineer Office (REO) with a detailed list of information required on the final DD Form 1354. The final DD Form 1354 is prepared by the REO.

The DD Form 1354 Checklist is prepared by the designer during the final (90 percent) design phase of the project. Since final costs normally are not known at this time, the costs shown on the checklist should be the best available estimate at the time of preparation. The designer should provide all requested data on the checklist pertaining to that particular design project.

The designer will submit the DD Form 1354 Checklist as part of the 90 percent design documents. The designer will then revise the checklist to reflect Government review comments/instructions. The original checklist (revised if necessary) will then be submitted as part of the final (100 percent) design documents.

TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY

PAGE 1 OF PAGES

1. FROM: (Installation/Activity/Service)	2. OPERATING UNIT	3. DISTRICT CODE	4. OPERATING AGENCY	5. DATE	6. JOB NUMBER	7. SERIAL NUMBER	8. CONTRACT NUMBER
					NAF 1544 30		DACA61-

9. TO: (Installation/Activity/Service)	10. OPERATING UNIT	11. DISTRICT CODE	12. OPERATING AGENCY	13. ACCOUNTING NUMBER	14. ACCOUNTABLE OFFICE NUMBER	15. TYPE OF TRANSACTION		16. PROJECT NUMBER
						A [X] NEW CONSTR. [ ] EXISTING FAC. [ ] CAPITAL IMP. [ ] OTHER (Specify)	B [X] BENF/O [ ] PHYSICAL COM. [ ] FINAN. COM. [ ] OTHER (Specify)	

ITEM NO. 17	CATEGORY CODE 18	FACILITY (Category description) 19	NO. OF UNITS 20	TYPE 21	UNIT OF MEAS. 22	TOTAL QUANTITY 23	COST 24	DRAWING NUMBERS 25	REMARKS 26
1.	740-22	Skill Development Center	1	P	SF	21,000			
2.	124-70	Heating Fuel Oil Storage	1	P	GA				
3.	132-52	Cable Vault		P	EA				
4.	135-10	Communication Lines	1	P	MI				
5.	812-30	Exterior Lighting	1	P	LF				
6.	812-42	Underground Elec. Dist.	1	P	LF				
7.	812-60	Distribution Transformer	1	P	KY				
8.	821-22	Heating Plant	1	P	MB				
9.	826-12	Refrigeration (A/C)	1	P	TN				
10.	832-10	Sanitary Sewer	1	P	LF				
11.	842-10	Water Pipe Line, Potable	1	P	LF				
12.	852-15	Parking Area, NonOrgn VEH	1	P	SY				
14.	871-10	Storm Sewer	1	P	LF				
15.	880-10	Fire Alarm System	1	P	BX				
16.	880-40	Instrusion Alarm System	1	P	BX				Govt. Furnished Contractor Installed Alarm of Govt. Furnished Safe.
17.	880-50	Automatic Sprinklers System	1	P	BX				

27. STATEMENT OF COMPLETION: The facilities listed hereon are in accordance with maps, drawings, and specifications and change orders approved by the authorized representative of the using agency except for the deficiencies listed on the reverse side.

TRANSFERRED BY (Signature) | DATE

TITLE (Area Engr./Base Engr./DPWO)

28. ACCEPTED BY (Signature) | DATE

TITLE (Post Engr./Base Civ. Engr./Navy Rep.) | 29. PROPERTY VOUCHER NUMBER

DD FORM 1 NOV 61 1354

SAMPLE DD FORM 1354
FOR
ARMY PROJECTS

30. CONSTRUCTION DEFICIENCIES

31. REMARKS

INSTRUCTIONS

This form has been designed and issued for use in connection with the transfer of military real property between the military departments and to or from other government agencies. It supersedes ENG Forms 290 and 290B *(formerly used by the Army and Air Force)* and NAVDOCKS Form 2317 *(formerly used by the Navy)*.

Existing instructions issued by the military departments relative to the preparation of the three superseded forms are applicable to this form to the extent that the various items and columns on the superseded forms have been retained. Additional instructions, as appropriate, will be promulgated by the military departments in connection with any new items appearing hereon.

With the issuance of this DD form, it is not intended that the departments shall revise and reprint manuals and directives simply to show the number of this DD form. Such action can be accomplished through the normal course of revision for other reasons.

DD FORM 1354 CHECKLIST

FOR

AIR FORCE PROJECTS

1. **General Data Required:**

   a. **Building:**

Category Codes	Nomenclature	Total Cost	Total SF

(1) Outside dimensions:

(a) Main building SF _____

(b) Wings SF _____

(c) Offsets SF _____

(2) Number of Floors: _____

(3) Construction:

(a) Foundations (such as concrete) TYPE _____

(b) Floors (such as wood, concrete) TYPE _____

(c) Walls (such as wood siding) TYPE _____

(d) Roof (such as built-up, shingle) TYPE _____

(4) Utilities entering building:

(a) Water (size of pipe) _____

(b) Gas (size of pipe) _____

(c) Sewer (size of pipe) _____

(d) Electric (phase, voltage, wire, connected load) _____

b. Systems in Building:

(1) Fire Protection:

Category Code	Nomenclature	Unit of Measure	Amount	Cost	Description
880-211	Closed Head Auto Sprinklers	SF			
		HD			
880-212	Open Head Deluge System	SF			
		HD			
880-221	Auto Fire Detection System	SF			
		EA			
880-222	Manual Fire Alarm System	EA			
880-231	CO_2 Fire System	EA			
880-232	Foam Fire System	EA			
880-233	Other Fire System	EA			
880-234	Halon 1301 Fire System	EA			

(2) Security:

Category Code	Nomenclature	Unit of Measure	Amount	Cost	Description
872-841	Security Alarm System	EA			

c. Plants in Building:

Category Code	Nomenclature	Unit of Measure	Amount	Cost	Description
890-126	A/C Window Units	TN			
		SF			
890-125	A/C Plt Less than 5 TN	TN			
		SF			
890-121	A/C Plt 5 to 25 TN	TN			
826-122	A/C Plt 25 to 100 TN	TN			
826-123	A/C Plt Over 100 TN	TN			
821-115	Heating Plt 750/3500 MB	MB			
821-116	Heating Plt Over 3500 MB	MB			
811-147	Electric Emergency Power Generator	KW			
	Storage Tank for Heating	GA			
	Or Generator Fuel	TYPE FUEL			

2. Specialized Buildings:

a. Shops:

Category Code	Item	UM	Amount	Description
	Air Compressors	HP		
	Hoists, Cranes (Fixed)	TN		
	Hydraulic Lifts	TN		
	Emergency Shower			
	Fixed Spray Paint Booth			
890-158	Load and Unload Platform	SF		
832-255	Industrial Waste Main	LF		
890-144	Compressed Air Dist	LF		

b. Chapel:

Category Code	Item	UM	Amount	Description
	Pews	EA		
	Altars	EA		
	Lecterns	EA		
	Pulpit	EA		

c. Theater:

Category Code	Item	UM	Amount	Description
	Theater Seats Secured to:			
	Floor	EA		
	Fire Screens	EA		

d. Billeting Buildings:

Category Code	Item	UM	Amount	Description
	Built-in Household Dishwasher	EA		
	Garbage Disposers	EA		
	Built-in Domestic Ranges and Ovens	EA		
	Range Canopy with Exhaust Fan	EA		
	Water Softener, Household Type	EA		

d. Real Property Installed Equipment:

Item	Size	Amount	Description
Evaporative Coolers	CFM		
Hot Water Heater			
Exhaust Fan			
Lavatory			
Commode			
Urinal			
Utility Sink			
Refrigerated Drinking Fountain			
Heating Plt Under 750 MB	MB		
Forced Air Heating			
Other Heating			
Dehumidifiers			
Elevators			
Theater-type Seats Secured to Floor			
Other			

e. Related Facilities:

Category Code	Nomenclature	UM	Amount	Cost	Description
812-223	Prim Distr Line OH	LF			
	Transformers	KVA			
	Power Poles	LF			
812-224	Sec Distr Line OH	LF			
812-225	Prim Distr Line UG	LF			
812-226	Sec Distr Line UG	LF			
812-926	Exterior Lighting (Street or Parking area Lights)	EA			
824-464	Gas Mains	LF			
831-169	Sewage Septic Tank	KG			
832-266	Sanitary Sewer	LF			
842-245	Water Distr Mains	LF			
843-315	Fire Hydrants	EA			
851-143	Curbs & Gutters	LF			
851-145	Driveway	SY			
851-147	Road	SY			
		LF			
852-262	Vehicle Parking	SY			
871-183	Storm Drain	LF			
872-247	Fence, Security	LF			
872-248	Fence, Interior	LF			
852-289	Sidewalk	SY			
890-187	Utility Vault (four or more transformers)	SF			
135-583	Tel Duct Facility	LF			
135-586	Tel Pole Facility	LF			

e. MWR Buildings:

Category Code	Item	UM	Amount	Description
	Dishwashers, Built-in	EA	_____	_____
	Walk-in Refrigerators, Built-in	EA	_____	_____
	Garbage Disposal Unit	EA	_____	_____
	Range Canopy with Exhaust System	EA	_____	_____
	PA Systems, Built-in	EA	_____	_____
	Vault, Built-in	EA	_____	_____
	Stage and Auditorium Curtain, Stage, Auditorium	EA	_____	_____
	Playground Equipment Permanently affixed	EA	_____	_____
	Bowling Alley Lanes, Approaches, Ball Returns	LA	_____	_____
	Load & Unload Platforms	SF	_____	_____

f. Post Office:

Category Code	Item	UM	Amount	Description
	Post Office Lock Boxes	EA	_____	_____

g. Other Structures. Generally, the checklist for "Related Facilities" and Real Property Installed Equipment can be used.

3. Addition to Existing Building or Facility. Use the checklist at paragraph 1 above but pay close attention to f and g below.

	YES	NO
a. Outside dimensions of addition.	_____	_____
b. Foundation.	_____	_____
c. Floor.	_____	_____
d. Walls.	_____	_____
e. Roof.	_____	_____
f. Utility plants or systems added, replaced, or removed.	_____	_____
g. Real property installed equipment removed, added, or replaced.	_____	_____

4. Alteration or Rehabilitation of a Building or Facility:

	YES	NO
a. Demolition costs.	_____	_____
b. Addition or deletion of related facilities.	_____	_____
c. Addition or deletion of porches, sheds, balconies, mezzanines, etc.	_____	_____
d. Real property installed equipment (RPIE) removed, installed, or replaced with a larger or smaller unit.	_____	_____