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MILITARY HANDBOOK

POLICY AND PROCEDURES FOR PROJECT DRAWING AND SPECIFICATION PREPARATION

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ABSTRACT

Instructions for the preparation of engineering and design project drawings and specifications are presented for the use of in-house designers, engineers- or architects-in-charge (EICs or AICs), and architectural and engineering firms (A/Es). This military handbook includes general design policies, drawing preparation and distribution, specification preparation, and review and approval procedures.

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FOREWORD

This handbook is one of a series developed for instruction on the preparation of Navy facilities engineering and design criteria documents. This handbook uses, to the maximum extent feasible, national and institute standards in accordance with Naval Facilities Engineering Command (NAVFACENGCOM) policy. Do not deviate from MIL-HDBK-1006/1A for NAVFAC project drawings and specifications preparation without prior approval of NAVFACENGCOM Code 15C.

Recommendations for improvement are encouraged from within the Navy, other Government agencies, and the private sector and should be furnished on the DD Form 1426 provided inside the back cover to Commander, Atlantic Division,

Naval Facilities Engineering Command, NAVFAC Code 15C, 1510 Gilbert Street, Norfolk, VA 23511-2699; phone commercial (804) 444-9099.

THIS HANDBOOK SHALL NOT BE USED AS A REFERENCE DOCUMENT FOR PROCUREMENT OF FACILITIES CONSTRUCTION. IT IS TO BE USED IN THE PURCHASE OF FACILITIES ENGINEERING STUDIES AND DESIGN (FINAL PLANS, SPECIFICATIONS, AND COST ESTIMATES). DO NOT REFERENCE IT IN MILITARY OR FEDERAL SPECIFICATIONS OR OTHER PROCUREMENT DOCUMENTS.

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ENGINEERING AND DESIGN CRITERIA PREPARATION

Document Number	Title	Preparing Activity
MIL-HDBK-1006/1A	Policy and Procedures for Project Drawing and Specification Preparation	NAVFAC 15C
MIL-HDBK-1006/2A	Policy and Procedures for Guide Specification Preparation	NAVFAC 15G
MIL-HDBK-1006/3B	Policy and Procedures for Engineering and Design Criteria Manual Preparation	NAVFAC 15C
MIL-HDBK-1006/4	Policy and Procedures for Definitive and Standard Designs and Standard Specifications Preparation	NAVFAC 15C

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POLICY AND PROCEDURES FOR PROJECT DRAWING AND SPECIFICATION PREPARATION

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Section 1: INTRODUCTION

1.1 Scope. This military handbook, MIL-HDBK-1006/1A, provides policy and detailed procedures for developing and revising engineering project drawings and specifications used in construction contracts.

1.2 Purpose of Criteria. NAVFAC criteria are developed to define facilities engineering and design technology, functional and operational requirements, and health and safety for the Navy. Make the maximum effort to adopt local criteria when it applies; however, evaluate the effectiveness of local criteria to ensure quality and consistency before adopting its use in lieu of NAVFAC criteria.

The Navy's engineering and design criteria military handbook program includes discipline-oriented design handbooks on engineering and design technologies, specific facilities engineering, and design criteria for functional requirements. As NAVFAC design manuals (DMs) are revised, they are converted to military handbooks (MIL-HDBKs).

This handbook has been developed to ensure consistency and clarity of project drawings and specifications that form the basis of contracts for the construction of naval shore facilities.

1.3 Project Drawings. Project drawings are the graphical representation of the overall project design. For a typical Military Construction, Navy (MCON) project, the design develops through a number of steps once the facility deficiency is identified and the scope substantiated by the Shore Installations and Facilities Planning and Programming Systems. Other types projects follow a similar process.

1.3.1 First Concept. The project concept is first developed by the local activity and is formalized in DD Form 1391, Military Construction Project Data. This form is reviewed by NAVFACENGCOM Engineering Field Divisions (EFDs) or Engineering Field Activities (EFAs) for requirement validation, technical adequacy of the design solution, and reasonable cost estimate. The project data then becomes a candidate for the MCON Program.

1.3.2 Parametric Estimating and Programming (PEP). When a MCON project is placed in an upcoming FY MCON Program, NAVFACENGCOM is authorized to initiate formal design work to obtain the PEP that goes to Congress (refer to NAVFAC Instruction 11010.14, Project Engineering Documentation (PED) for Proposed Military Construction Projects). At this time, MCON planning and design funds are released to EFDs and EFAs to embark on the initial design. Normally, the PEP will be based on a design effort that is thoroughly defined by stating and translating customer functional needs into quantitative and qualitative design requirements. The team (EFD or EFA, A/E, and customer) works with the documentation gathered to create a responsive schematic project solution during a "squatters" session. The goal is to reach unanimous agreement by the customer and design team on the schematic design. The focus and length of the

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squatter sessions vary with each project. Comprehensive subsoil and utilities investigation is a critical component during this phase. This means that most, if not all, questions relating to user needs and technical considerations (such as energy conservation) will have been resolved prior to detailed Congressional review. Refer to Appendix C for additional information.

1.3.3 UNIFORMAT II and Detailed NAVFAC Cost Estimates. UNIFORMAT II as published by the Construction Specifications Institute (CSI) is now accepted as the standard cost breakdown by NAVFAC. CES will transition to the tri-services detailed estimating system. The next revision of MIL-HDBK-1010 will transition to tri-services cost engineering. Therefore, in this document, both CES systems and UNIFORMAT II are included (Appendices B and D).

1.3.4 Final Design. After authorization, the project proceeds to completion of design, with the end result being a bidding package consisting of drawings, specifications, and a Government cost estimate.

1.4 Cancellation. This military handbook supersedes MIL-HDBK-1006/1 of 31 July 1987.

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Section 2: POLICY

2.1 Criteria

2.1.1 NAVFACENGCOM. The following criteria shall be used for the design of naval shore facilities to the extent required within the criteria. Where requirements are preceded by optional guidance, such as "should," "can," or "may," those requirements are not mandatory. EFDs, EFAs, and A/Es will be allowed the maximum latitude in creative thinking, new concepts, and the use of new materials; however, when deviations from the following mandatory published criteria are considered, prior clearance shall be obtained from NAVFACENGCOM Code 15C criteria managers with documented confirmation:

a) NAVFAC P-272, Definitive Designs for Navy and Marine Corps Facilities;

b) NAVFAC standard drawings;

c) NAVFAC criteria manuals;

d) NAVFAC guide specifications (NFGSs); and

e) NAVFAC modular designs.

2.1.2 Department of Defense (DOD)

a) MIL-HDBK-1190, Facility Planning and Design Guide. MIL-HDBK-1190 is applicable to military construction. Appropriate NAVFAC instructions and other types of publications have been developed to implement, clarify, or supplement the data contained in this manual. The handbook contains policy guidelines issued to installation commanders, staff, and design and construction agents for installation planning, design, construction, and upkeep; and technical guidance, consisting of standards and references.

b) Reference Standards. Standards are issued within DOD in accordance with the basic policy contained in DOD 4120.3-M, Defense Standardization and Specification Program Policies, Procedures, and Instructions. These documents establish the engineering and technical limitations and applications for items, materials, processes, methods, designs, and engineering practices for use with DOD projects. Some standards are mandatory for use within DOD (e.g., MIL-STD-188 series), and these are also issued within DOD in accordance with DOD 4120.3-M.

c) DOD Index of Specifications and Standards (DODISS). Index of DOD adopted non-Government and Government specifications and standards.

2.2 Design Policy. Policies having a direct impact on the design of facilities are included in the documents listed below:

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a) Design Philosophy: MIL-HDBK-1001/1, Basic Architectural Requirements and Design Considerations

b) Appropriate Architecture: MIL-HDBK-1001/1

c) Integrated Design: MIL-HDBK-1001/1 and MIL-HDBK-1190

d) Handicapped Access: MIL-HDBK-1001/1 and MIL-HDBK-1190

e) Fire Protection: MIL-HDBK-1008, Fire Protection for Facilities Engineering Design and Construction

f) Use of Asbestos: OPNAV Instruction 5100.23, Navy Occupational Safety and Health (NAVOSH) Program Manual, MIL-HDBK-1001/1, and NAVFAC Instruction 5100.11, Command Safety and Health Program

g) System Safety Engineering: OPNAV Instruction 5100.24, Navy System Safety Program and NAVFAC Instruction 5100.11

h) Energy Conservation: OPNAVINST 4100.5D, Navy Energy Management, requires compliance with the Energy Policy Act of 1992 and related executive orders such as Executive Order 12902, Energy Efficiency and Water Conservation at Federal Facilities, dated 8 March 1994. Executive Order 12902 sets a new energy consumption reduction goal of 30 percent by the year 2005. The previous goal to which NAVFAC has been designing facilities was 20 percent reduction by the year 2000. For new construction this was being done using guidance provided in NAVFAC letter 1001/04A1/05A1 dated 1 May 1992 and by using Design Energy Targets (DETs) in Draft Chapter 8 of MIL-HDBK-1190. Interim Technical Guidance has been drafted and circulated to approach the Executive Order 12902 requirements by reducing the DETs of Draft Chapter 8 of MIL-HDBK-1190 by 10 percent. Cooperation among the design team of architects, mechanical engineers, and electrical engineers is essential for the Navy to meet the energy budget goals for the year 2005. Among the personal computer programs available on CCB Tools for energy conservation calculations in evaluating facilities designs are ENVSTD and LTGSTD. The architect and mechanical engineer may want to use ENVSTD to evaluate compliance with ASHRAE 90.1 for energy losses through the building envelope (walls, roof, floor, fenestration, etc.). The architect and electrical engineer may want to use LTGSTD to evaluate compliance with ASHRAE 90.1 for electrical lighting loads. ASHRAE 90.1 is the fundamental document for 10 CFR 435 and MIL-HDBK-1190 DETs. Also, the basis for the draft Interagency Task Force position of not drafting additional Federal standard energy budgets is the continued use of ASHRAE 90.1. Use energy efficient design features and new high efficiency products to provide facilities with lowest life cycle costs. Energy efficient architectural features and design strategies (such as solar shading, daylighting, building form, siting) are covered in MIL-HDBK-1001/1. Energy efficient mechanical systems are covered in DM-3.03, Heating, Ventilating, Air Conditioning, and Dehumidification Systems. Energy efficient lighting

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systems, occupancy sensors and LED exit signs are specified in NFGS-16510, Interior Lighting.

i) Safety and Health: NAVFAC Instruction 5100.11

2.3 International System of Units (SI). For measurements on project drawings, beginning with FY97 MCON, BRAC, family housing, and bachelor quarters projects, use SI metric units. Avoid using inch-pound (IP) on drawings except for specific projects identified by the EFD or EFA.

Avoid using both SI and inch-pound measurements on drawings, however conversion tables or equivalence charts may be shown on drawings. Normally, for North Atlantic Treaty Organization (NATO) projects, state dimensions on drawings in SI; only use dual units (both SI and inch-pound) if the regulations of the host country direct dual dimensioning.

SI is the internationally accepted, modernized metric system. The acronym to be used is SI--meaning "system international." Use of the word "metric" is no longer accepted practice. For details of the proper use of SI, refer to NAVFAC Metrication Conversion Policy for Design, Planning, and Design Criteria, and NAVFAC Guide Specifications.

2.3.1 Linear Dimensions. Use meters (m) and kilometers (km) for measurement of long distances and field dimensions. Use millimeter (mm) for measurement of length in building design, construction, and production and for elements of structures where the manufacturer would cite in millimeters; e.g., wallboard panels. Do not use centimeter (cm); cm is to be avoided in building design and construction applications.

2.3.2 Units Less Than Unity. Show SI less than a whole as a decimal with a zero preceding the decimal point (e.g., 0.25 m).

2.3.3 Spacing in Use of SI. Do not use commas in presenting SI. Numbers are broken by a space, three spaces to the right and left of the decimal point. In numbers of four digits on either side of the decimal point, the space is usually not necessary. Leave a space between the number and the SI. When citing SI, do not separate the number and SI on two lines.

2.4 Ownership of Drawings and Specifications. DOD policy is not to acquire exclusive control of contracted plans and specifications. Accordingly, the clause required by the DOD Federal Acquisition Regulations (DFAR) 227.478-2, Acquisition and Use of Plans, Specifications, and Drawings and set forth in DFAR 252.227-7022, Government Rights (Unlimited), shall generally be used. If exclusive control of data relative to design is desired, then the appropriate clause shall be inserted. In accordance with either clause, the Government has unlimited rights in work developed in the performance of the A/E contract.

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2.5 Publication of Drawings. Obtain authority to publish drawings for any purpose from NAVFACENGCOM.

2.6 Computer-Aided Design/Drafting (CADD). The use of computer graphics systems for the design and production of project drawings has resulted in increased productivity and more accurate drawings. A/Es are encouraged to use CADD on Navy work. In some cases, the designer may be required to use CADD.

2.6.1 Design Drawings. Certain projects may be required to be performed using computer graphics. Design drawings may be required in a digital format for use on Navy (or other Government customer) computer systems such as Facilities CAD2, CADD microcomputers and engineering workstations. Acceptable digital formats, media, and standards are specified in the Tri-Service CADD/GIS Standards, Computer-Aided Design and Drafting Architect-Engineer Deliverables.

A design manager may substitute an alternate digital format where deemed necessary with the approval of NAVFAC Code 15C criteria point of contact for the specific facility type. If the primary project work is site-related (e.g., civil engineering), a geographic information system digital format may be substituted. When digital formats are required, the final design database shall be modified by the A/E to incorporate as-built conditions.

2.6.2 CADD Standards. Use of additional standards for computer graphics or standards published by the EFD or EFA are encouraged on CADD designs provided that they do not conflict with the Tri-Service CADD/GIS Standards.

2.6.3 Ownership of CADD Drawings and Data. Whenever design drawings are to be provided in a digital format, the clause set forth in DFAR 252.227-7023, Drawings and Other Data to Become Property of Government, shall generally be used in addition to other clauses required in DFAR 227.478-2.

2.7 Registration. Project drawings and specifications shall be developed under the direction of a registered architect (R.A.) or a professional engineer (P.E.). For overseas projects designed by foreign A/Es, adhere to the country's normal custom of expressing the engineer's or architect's professional status.

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Section 3: DRAWING TYPES

3.1 Scope. Descriptions of the various drawing types that follow apply to drawings prepared under the general direction of NAVFACENGCOM.

3.2 Sketches. Informal drawings may or may not be drawn to scale. Unless required by the EFD or EFA, NAVFACENGCOM, the informal drawings do not need to follow a particular format.

3.3 Schematics. Single- or double-line drawings showing plans and general arrangements and, when required, elevations and sections showing types of construction and the relationship of component parts.

3.4 Renderings. Pictorial delineations of buildings or portions of buildings to show the appearance of the completed facility. Renderings may be black and white or in color, in various media, and on various surfaces. Size and type are dictated by the intended use and the architectural designer's concept of the work.

3.5 Models or Mockups. Use physical models or mockups only when required to define the schematics properly. Refinement should not exceed that required for a solution. Models shall not be prepared for display purposes only. Three dimensional computer graphics models are the preferred cost effective alternative to physical models.

3.6 Conceptual Definitive Designs (DDs). NAVFAC P-272, Part I, contains drawings of typical buildings and structures, classified by Category Codes 100 through 700, which reflect space criteria issued by MIL-HDBK-1190 and NAVFAC P-80, Facility Planning Criteria for Navy and Marine Shore Installations. Refer to NAVFAC P-72, Department of the Navy Facility Category Codes, for a more detailed description of category codes. The drawings provide floor plan arrangements, building sections or elevations, and utility requirements for general guidance to A/E contractors or in-house staff in preparing project designs. The drawings are used in conjunction with NAVFAC design manuals, military handbooks, and guide specifications listed in MIL-BUL-34, Engineering and Design Criteria for Navy Facilities, to develop the project drawings and specifications.

3.7 Prototype Definitive Designs (DDs). NAVFAC P-272, Part II, contains advanced designs where specific control is required to meet standardized functions. The drawings of more complex facilities often required at shore installations are classified generally by category codes in the 800 series. The drawings provide floor plans, equipment layouts, piping diagrams, electrical schematics, and critical requirements for specific guidance in preparing project designs. The drawings are used in conjunction with NAVFAC design manuals, military handbooks, and guide specifications listed in MIL-BUL-34 to develop the project drawings and specifications.

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3.8 Standard Drawings (SDs) and Specifications (NFSSs). These are detailed contract drawings and specifications of selected specialized structures and facilities which are repetitive facility types in the construction program. They are listed in MIL-BUL-34. The drawings form a part of the construction documents requiring only supplemental drawings for adapting the facility to the specific site. Their use is mandatory without change for ammunition facilities, whereas others may be modified as necessary to meet specific requirements. Standard specifications are facility specifications that contain sections covering unique construction which are incorporated verbatim in the project specifications. These sections are supplemented by guide specification sections covering conventional or project-unique features such as concrete or site work.

3.9 Facility Plates. These are single-line schematics, bubble diagrams, or graphics included in the facility-type design manuals to show functional relationships or building layout. Plates of individual rooms may be scaled drawings providing specific detailed information concerning the design of individual rooms within a specific type of facility. The plates may show (1) the location of equipment and furnishings within the room, (2) the location of utilities serving the room (electrical, water, gas, etc.), (3) the location and size of doors and windows, (4) a reflected ceiling plan with location of lighting fixtures, and (5) other technical design information about the room. MIL-HDBK-1006/3, Policy and Procedures for Engineering and Design Criteria Manual Preparation, describes procedures for preparing facility plates.

3.10 Site Adapted Designs. Project drawings and specifications from a prior project may be modified (site adapted) to develop drawings and specifications for another project with similar requirements.

3.11 Project or Contract Drawings. Drawings prepared in-house or by the A/E to show extent of work required by a construction contract. Project drawings and project specifications form the technical portion of a construction contract.

3.12 Quality Control Submissions. Shop drawings, product data, and samples, and other data are submitted by the construction contractor to illustrate some portion of the work. Adherence to MIL-STD-100, Engineering Drawing Practices, is encouraged for shop drawings but is not mandatory. Samples are physical examples illustrating materials, workmanship, or equipment. Samples establish standards by which the work will be judged. Product data are brochures, illustrations, standard schedules, performance charts, and other information submitted by the contractor to illustrate a material, product, or system for some portion of the work.

3.13 As-Built Marked Prints. Upon completion of facilities, the construction contractor or the military construction force is required to provide the Resident Officer in Charge of Construction (ROICC) with marked prints indicating construction deviations from the contract drawings (refer to NAVFAC P-68, Contracting Manual). The information required shall show

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features of the project as-built. The ROICC shall review the marked prints after completion to ensure that exact as-built conditions are reflected. After completion of the project, approved as-built marked-up prints are transmitted by the ROICC to the EFD, EFA, or assigned OICC. For contract drawings prepared by CADD, as-built mark-ups shall be clearly indicated and shall be entered on separate graphics layers.

3.14 Record Drawings. The original contract drawings, corrected in accordance with the marked prints to provide a permanent record of as-built conditions upon completion of the construction work on a project. If a CADD database is provided, the database shall be corrected to the marked and approved prints prior to storage or transfer to the client activity.

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Section 4: DRAWING PREPARATION AND DISTRIBUTION

4.1 Project Drawings. Project drawings shall be complete, accurate, and explicit. Coordinate elements of work properly to ensure that there are no conflicts between disciplines or between drawings and specifications. Provide sufficient detail to show the extent, size, shape, and relationship between materials. Avoid duplication of information on the drawings and in the specifications. Project drawings for repetitive-type facilities should be prepared to enable site adaptation for another facility with minimal revision. To accomplish this, place details pertaining to the individual site such as location map, site plan, extension of utilities, soil boring logs, foundation plans, and foundation details on sheets separate from those containing the basic facility.

4.2 Drawing Preparation Standard. Prepare drawings in accordance with MIL-STD-100.

4.3 Order of Drawings. Arrange drawings for buildings and structures in the following order:

a) Cover sheet, index, abbreviations.

b) Civil (including utility plans, maps, soil borings, demolition).

c) Landscape and irrigation.

d) Architectural (including interior design).

e) Equipment.

f) Structural.

g) Plumbing.

h) Mechanical (including HVAC).

i) Instrumentation and controls.

j) Fire protection.

k) Electrical (including cathodic protection).

4.4 Drawing Sizes and Format. The following should be used for NAVFAC drawings until supplies are exhausted:

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Type	Size (inches)
Flat	17 by 22 - when small sheets are required
Flat	22 by 34 (D size) - preferred size for project and other drawings
Flat	28 by 40 (F size) - option to 22 by 34 (use of this size drawing is discouraged. Obtain prior approval from the EFD or EFA Project Manager

After supplies of D-size and F-size sheets are exhausted, use International Standards Organization for Standardization (ISO) "A" series drawing sheets. (Example: A1 - 841 mm by 594 mm (33.1 inches by 23.4 inches.)

Drawings and specifications should be separate. Avoid putting drawings in specifications and specification data on drawings. When drawing pages are attached to the specification, they shall match the specification page size.

4.5 Line Characteristics. Filming requirements demand that attention be given to opaqueness and uniform weight of lines, ensuring legible reductions and blowups as successive generations of prints are obtained.

4.6 Conventions and Symbols. Use consistently in accordance with the following:

4.6.1 Conventions. For line, section, and sectioning conventions, refer to ANSI Y14.2M, Line Conventions and Lettering. Use the symbols shown in Figure 1 to identify building sections, elevations, wall sections, and details.

4.6.2 Abbreviations. Refer to MIL-STD-12, Abbreviations, for standard abbreviations used on drawings.

4.6.3 Symbols. Conform to current industry practice. NAVFACENGCOM has a library of symbols for CADD which shall be used when project drawings are produced by computer graphics. Consult the EFD or EFA CADD Coordinator for details.

4.7 Lettering

a) Use uppercase lettering except for notes on maps and similar drawings where lowercase lettering may be used.

b) The minimum allowable height of letters shall be free-hand 5/32 (0.156) inch and mechanical or computer graphics 0.125 inch.

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4.8 Dimensioning and Tolerancing. Use ANSI Y14.5M, Dimensioning and Tolerancing.

4.9 General Notes for Drawings. Place general notes a minimum of 3 inches below the space allocated for the revision block when the conventional title block is used. When the vertical title block is used, place notes on the right side of the drawing. General notes for a set of drawings covering one particular type of work are placed on the first sheet of the set. Such notes include, but are not limited to, the following:

4.9.1 Notes for Structural Drawings. These include, when applicable, roof, floor, wind, seismic and other loads, allowable soil pressure or pile bearing capacity, and allowable unit stresses of material used in the design.

4.9.2 Notes for Civil, Structural, Mechanical, Sanitary, Plumbing, Electrical, and Similar Drawings of a Set. Notes shall include, when applicable, references to the following:

a) Criteria (not reference specifications) governing the design;

b) Basic design data on civil, structural, mechanical, sanitary, and electrical systems and facilities;

c) The activity's datum plane, if used; and

d) Vertical and horizontal control, including soundings.

4.9.3 Quality Control (QC). The preparer should review his work prior to each submittal to ensure that it is technically accurate, that it is coordinated within each discipline and among the disciplines, and that it is coordinated with drawings and specifications. The preparer shall perform a structured final quality control review of drawings and specifications prior to final submittal. Continuous review ensures that design solutions are appropriate, project budget integrity is maintained, Government review is timely, and preparer resources are not wasted.

4.9.4 Key Words. Terminology defining products and activities required for the project shall be the same in specifications and on drawings. Since these terms are largely established in guide specifications, follow the key words used in guide specifications on drawings.

4.9.5 Common Errors. Many phrases and statements that are placed on drawings are considered satisfactory in professional architectural and engineering practice, but are not acceptable in the preparation of drawings for NAVFACENGCOM. The following is a list of errors found repeatedly on drawings submitted by A/Es. After each error or group of related errors, there is the correct designation.

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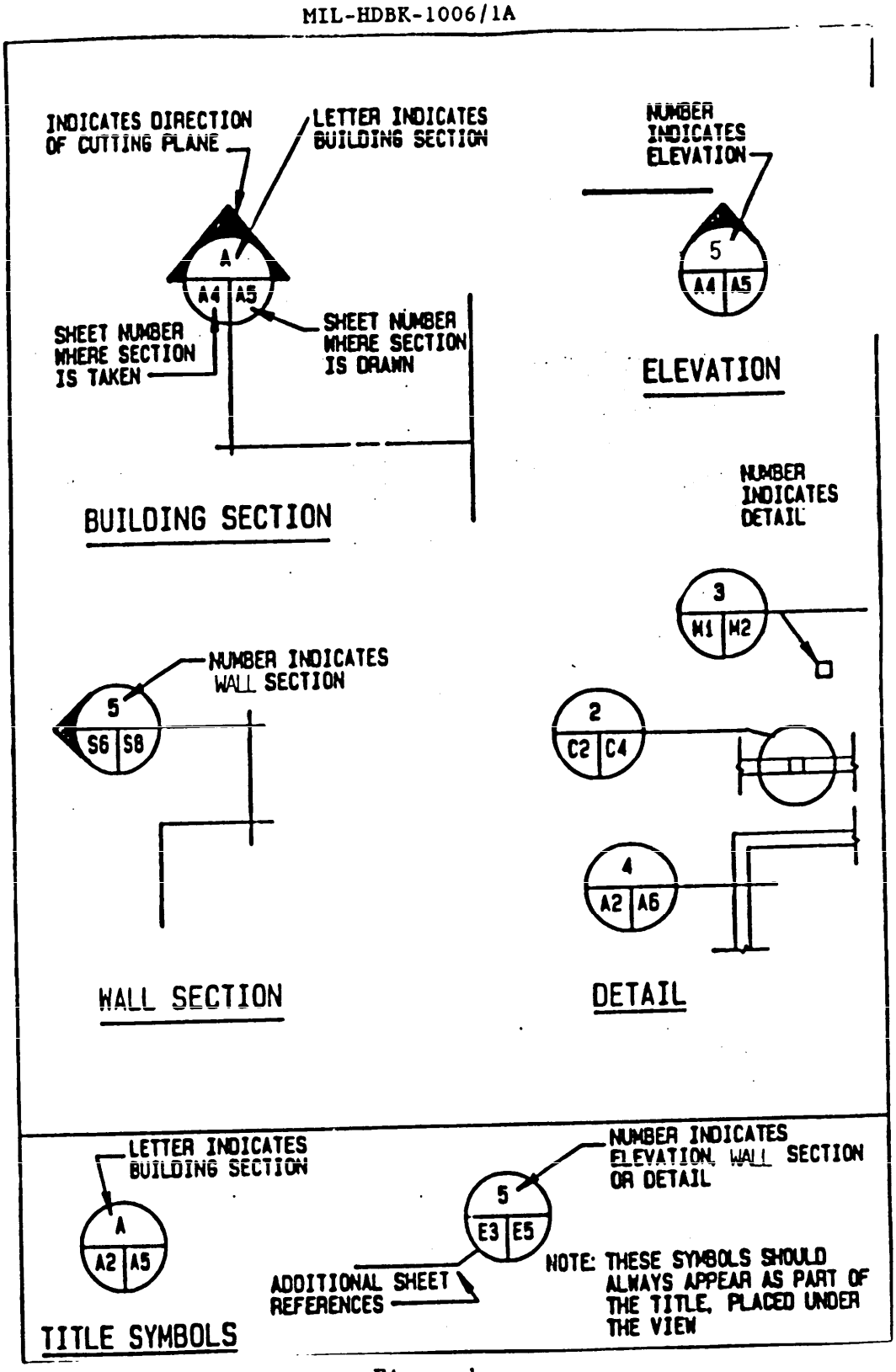

Figure 1
Symbols to Identify Sections, Elevations, and Details

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a) INCORRECT: "As instructed by the Architect" or "As approved by the Architect." This type of wording indicates uncertainty as to what the requirement is.

CORRECT: "As directed."

b) INCORRECT: "By others," "By the Navy," or "By the Navy Facilities Engineering Command." The U.S. Navy and Naval activities represent the U.S. Government.

CORRECT: "By the Government."

c) INCORRECT: "By electrical contractor," "By plumbing contractor," "By the plumber," or "By the elevator contractor." The Government recognizes only the prime contractor; the assignment of work to subcontractors is the prime contractor's responsibility and should not be done by the designer.

CORRECT: Usually no statement is necessary.

d) INCORRECT: "12 ga. zinc-coated steel flashing" or "Copper flashing." Metals are referred to only as metal and not as a particular kind or gage. Type and weight are covered in the specifications.

CORRECT: "Metal flashing."

e) INCORRECT: "Formica." Do not use proprietary names.

CORRECT: "Laminated plastic."

f) Identify work shown on drawings which is not included in the scope of the contract by using the following notations: "Not Included in This Contract," "Not in Contract (NIC)," "By the Government," or "Government Furnished Equipment (GFE)." Use the same terminology consistently throughout the drawings.

g) New versus existing conditions shall be clearly shown.

h) The term "typical" is sometimes overused. Ensure that the work referred to as typical is clearly described on the same drawing that the term is used on or that the drawing it refers to can be easily located.

4.10 Title Blocks. See Figures 2 through 7 for guidance purposes. These figures are not drawn to scale. The title block shall indicate the following:

a) Name and location of the activity,

b) General location of the activity,

g) Generators and other backup power devices.

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c) Project title,

d) Specific features on the sheet,

e) Identifying numbers of the sheet,

f) Specifications and contract numbers (if any),

g) Preparing activity including A/E, if applicable, and

h) Surnames of personnel involved in the preparation of the drawings.

The code identification number "80091" shall appear in the title block of NAVFAC drawings. Decals applied to the back of the drawings shall not be used; they will not reproduce when the drawings are microfilmed. Use the vertical title block format for 22- by 34-inch (D-size) drawings. Use of the vertical title block is optional for 28- by 40-inch (F-size) drawings. See Figures 3 and 6 for guidance.

4.11 Numbering Drawings. Assign one NAVFAC serial drawing number to each drawing and number them consecutively. Each discipline shall start with No. 1 in the title block on the right side (see Figure 2). In the title block at the lower right-hand corner, the total number of sheets in the project set shall be shown beginning with sheet No. 1 of the total number, 2 of total number, etc. If the drawings are part of the specifications, contracts, or requisitions, each drawing shall include the respective numbers of the documents. The minimum height for these numbers is 1/4 inch. The sheet should also bear the letter designating the discipline as follows:

I - Instrumentation and Controls	C - Civil
A - Architectural	S - Structural
M - Mechanical	P - Plumbing
E - Electrical	FP - Fire Protection
L - Landscape	T - Title, Index
EQ - Equipment	

4.11.1 Assignment of NAVFAC Drawing Numbers. The assigned number shall not be used for any other drawing even though the drawing to which it has been assigned may not be used for any purpose. Where extensive revision of any drawing necessitates preparation of a new drawing, a new NAVFACENGCOM drawing number shall be assigned to the new drawing, and cross-reference notes shall be placed directly above or adjacent to the title block as follows:

Old Drawing Note:	New Drawing Note:
THIS DRAWING SUPERSEDED BY DRAWING NO. [_____]	THIS DRAWING SUPERSEDES DRAWING NO. [_____]

No prefixes or suffixes are permitted.

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4.11.2 Obtaining Drawing Numbers. The control of drawing numbers is the responsibility of the individual EFD and EFA commanders. NAVFACENGCOM has issued drawing numbers to EFDs and EFAs within the following limits:

NORTHDIV	2 000 000 to 2 999 999; then 12 000 000 to 12 999 999; then 22 000 000 to 22 999 999
EFA CHES	3 000 000 to 3 999 999; then 13 000 000 to 13 999 999; then 23 000 000 to 23 999 999
LANTDIV	4 000 000 to 4 999 999; then 14 000 000 to 14 999 999; then 24 000 000 to 24 999 999
SOUTHDIV AND EFA MIDWEST	5 000 000 to 5 999 999; then 15 000 000 to 15 999 999; then 25 000 000 to 25 999 999
EFA WEST	6 000 000 to 6 999 999; then 16 000 000 to 16 999 999; then 26 000 000 to 26 999 999
PACDIV	7 000 000 to 7 999 999; then 17 000 000 to 17 999 999; then 27 000 000 to 27 999 999
SOUTHWESTDIV AND EFA NORTHWEST	8 000 000 to 8 999 999; then 18 000 000 to 18 999 999; then 28 000 000 to 28 999 999

NAVFACENGCOM will retain custody of drawing numbers up to and including 1 999 999 and other drawing numbers not assigned. Each EFD and EFA is responsible for issuing, assigning, and recording drawing numbers for its own use or the use of OICCs or activities within its geographical area. Activities shall maintain an assignment record including locations and drawing title of drawing numbers assigned to them. Each activity shall microfiche their drawing record logs at the end of each calendar year (new pages only) and forward the film to the Naval Construction Battalion Center (NCBC), Port Hueneme, CA; Attention CESO Code 156 by 1 March of the following year. A consecutive series of numbers should be assigned to drawings for each project.

4.12 Drawing Revisions. Make revisions of drawings according to the requirements of MIL-STD-100. Provide a revision block on NAVFAC project drawings. The revision block shall include a separate column, "PREPARED BY." This column shall be used to indicate the organization that prepared the revision. The layout of the modified revision block shall be as shown in Figure 8. Where revisions to a drawing result in the preparation of a new drawing, a new NAVFAC drawing number shall be assigned and new approval signatures and registration seals shall be placed on the drawing.

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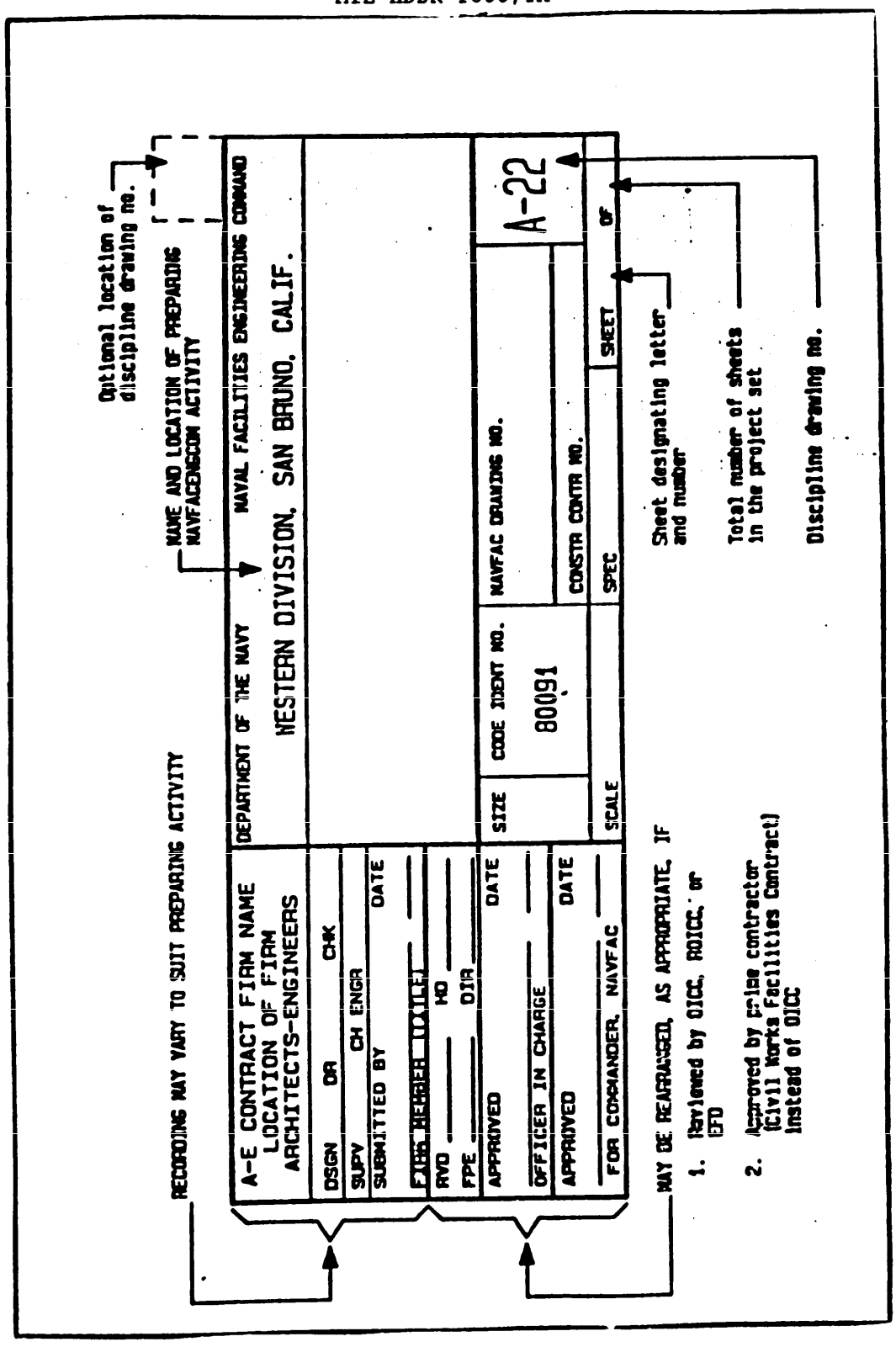

Figure 2
Title Block for Drawings Prepared by an A/E

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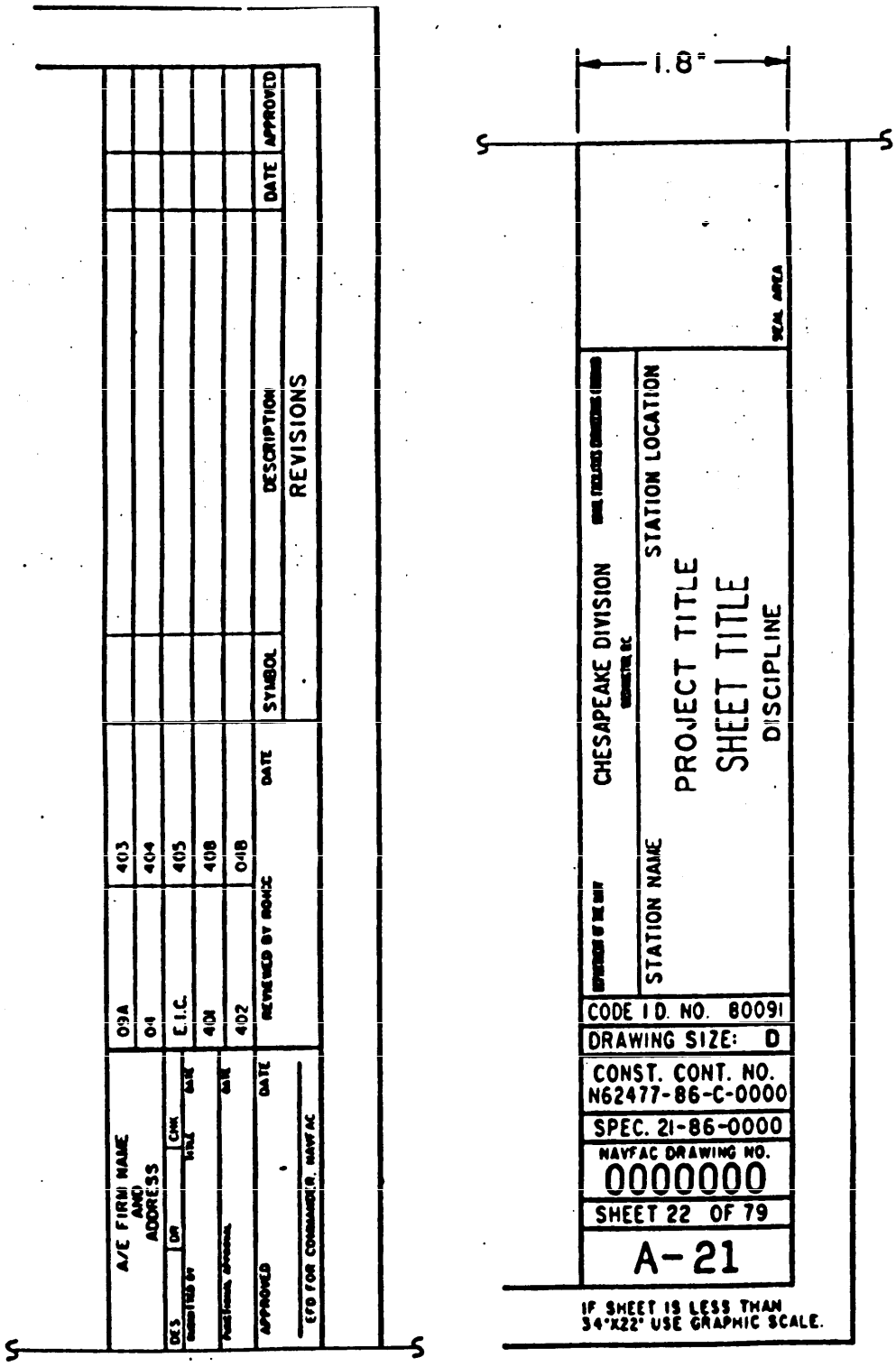

Upper Portion

Lower Portion

Figure 3
Vertical Title Block for Drawings Prepared by an A/E

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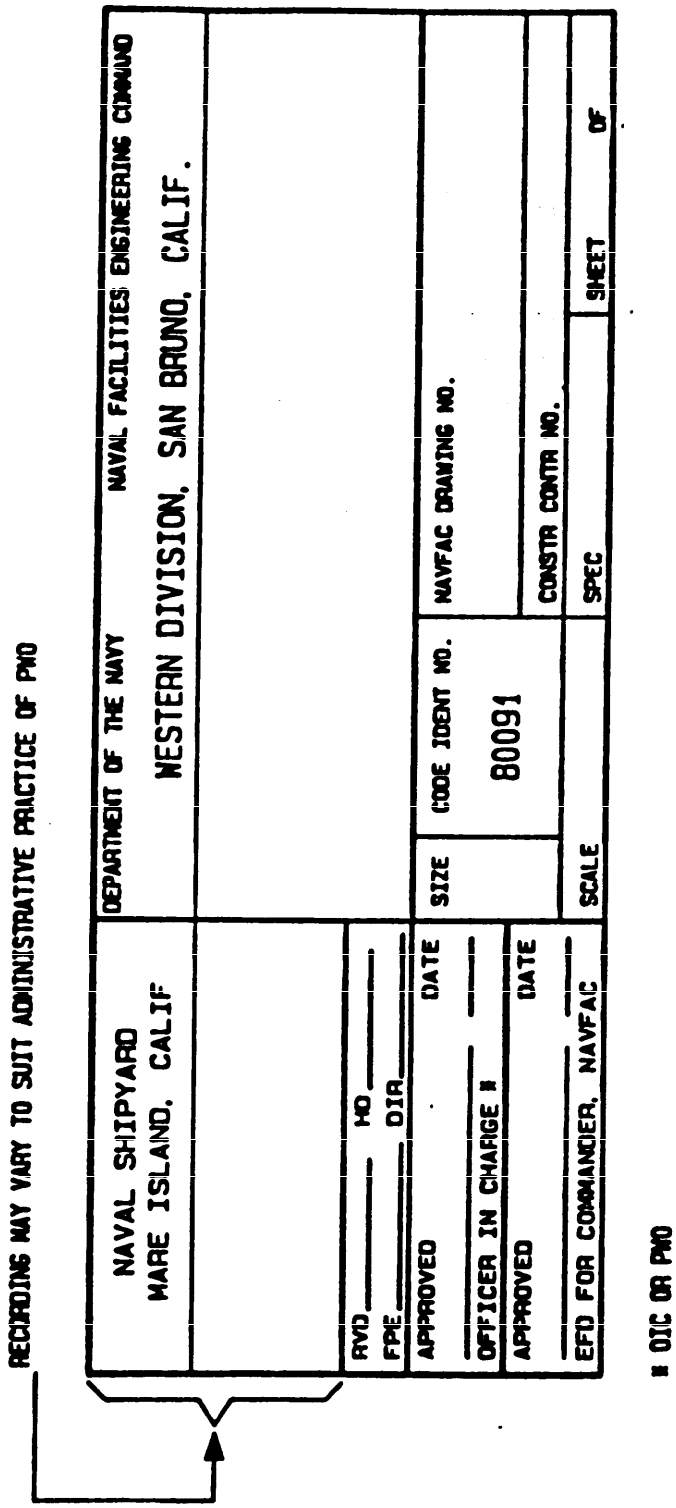

Figure 4
Title Block for Drawings Prepared by an Activity and Requiring EFD, EFA, or OICC Approval on Behalf of the Commander, NAVFACENGCOM

areas between floors through... are constructed with interlight

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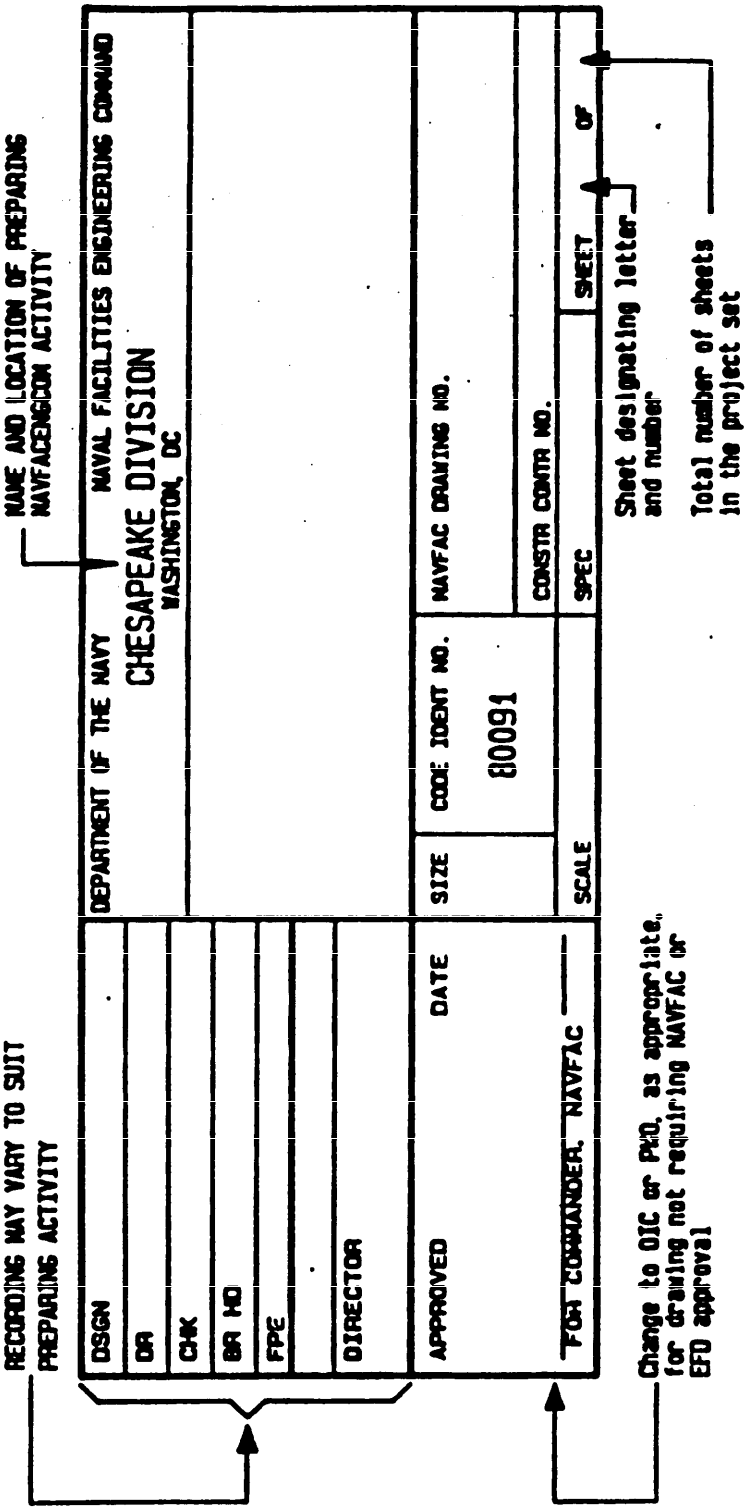

Figure 5
Title Block for Drawings Prepared by NAVFACENGCOM or NAVFACENGCOM Activity

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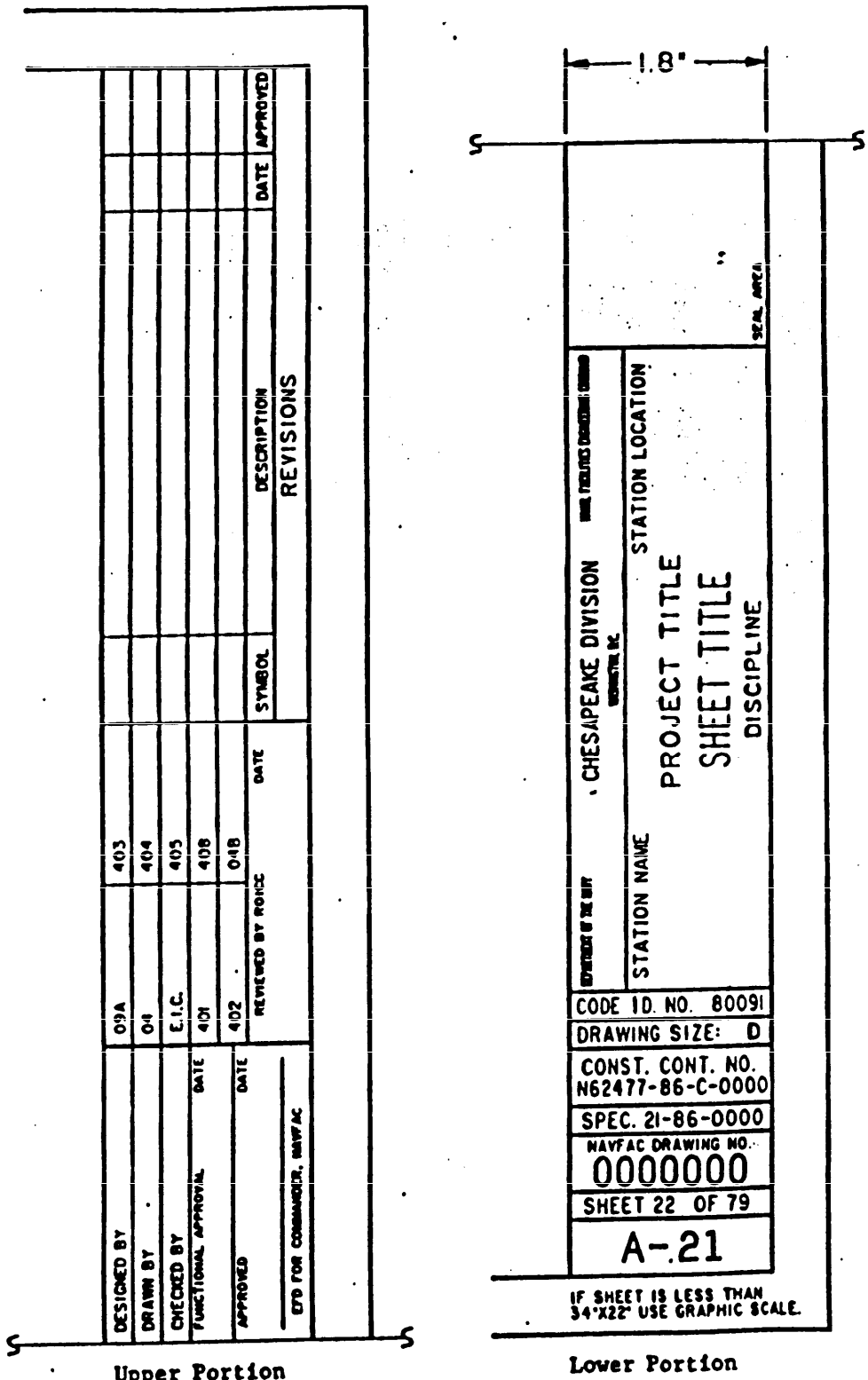

Upper Portion

Lower Portion

Figure 6
Vertical Title Block for Drawings Prepared by
NAVFACENGCOM or NAVFACENGCOM Activity

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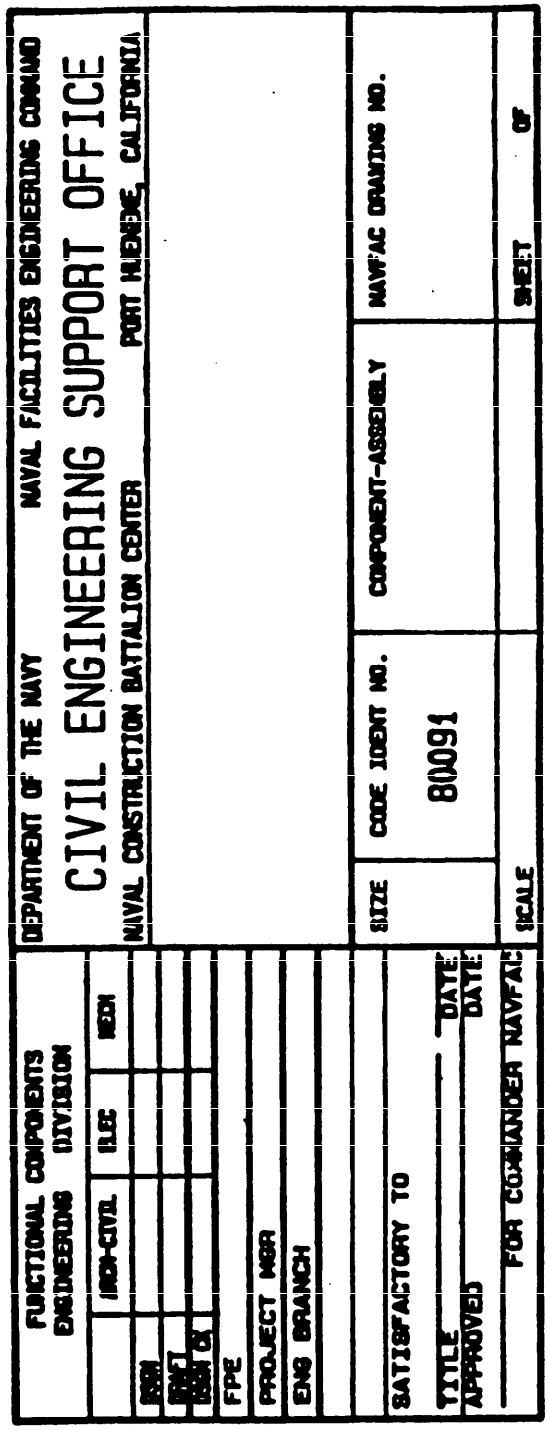

Figure 7
Title Block for Drawings Prepared by NCBC Requiring Approval
on Behalf of the Commander, NAVFACENGCOM
(To Be Used for Advanced Base Drawings)

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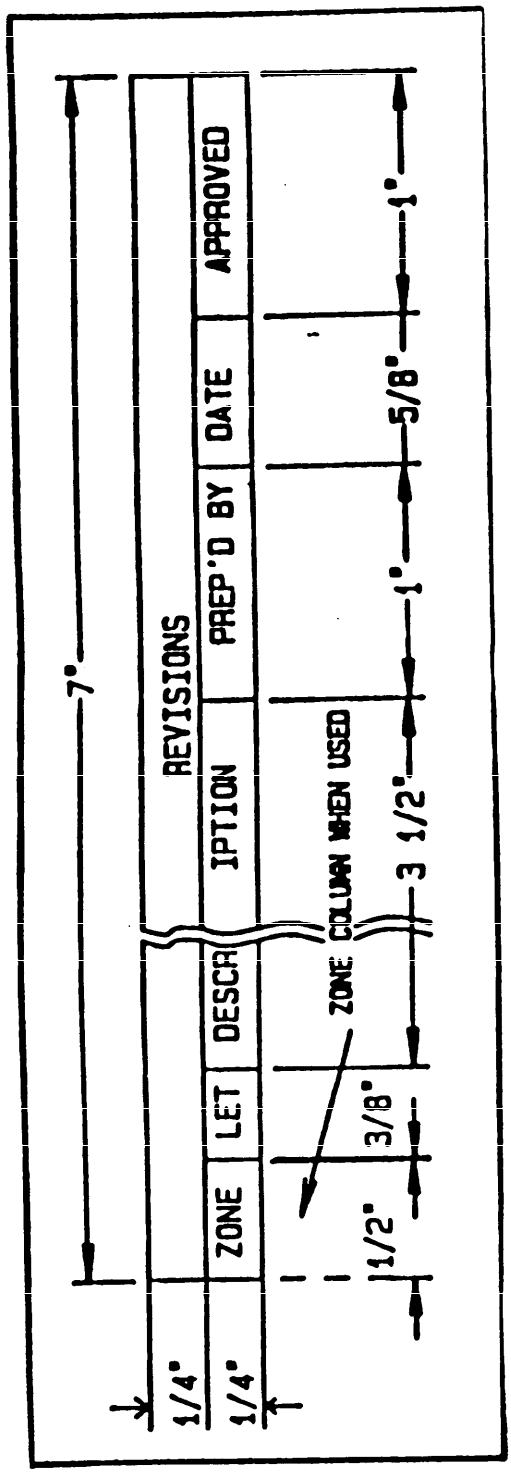

Figure 8
Revision Block For Drawings

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4.13 Security Classification and Notation. For engineering drawings requiring security classification, conform to the requirements of DOD 5220.22-M, Industrial Security Manual for safeguarding classified information. No word, symbol, or combination which would disclose information in an established security category shall be used in drawing titles.

4.14 Reproducibility. Reproductions shall conform to requirements of MIL-D-5480, Data, Engineering and Technical: Reproduction Requirements for. For normal applications, drawings should be made on polyester plastic (Mylar, Celanar, etc.) film, with pencils of sufficient density or with ink to ensure clear reproductions.

a) Reproducibles shall be provided on 0.003- to 0.005-inch polyester plastic film by photographic methods for the following types of drawings:

(1) Important structures for which considerable duplication is expected,

(2) Drawings of complicated designs,

(3) Drawings that may require extensive changes during preparation, and

(4) Drawings provided to the Government when the A/E retains the originals.

b) Reduced copies shall be direct-reading reproductions of a finished size, not smaller than one-half of the size of the original.

4.15 Graphic Scale. NAVFAC drawings are to be provided with graphic scales, one for each scale used on the drawing. Locate graphic scales at the lower right corner, with the words "Graphic Scales" directly over them. The correct graphic scales shall be shown prominently on each drawing, as drawings are reduced in size and are not always in exact scaled proportions.

4.16 Distribution of Drawings. Copies of drawings shall be issued as follows:

a) Full-size prints to Government officials and employees when reduced-size prints are unsuitable for the required use.

b) Half-size prints to prospective bidders, but full-size prints can be purchased if desired (refer to NAVFAC P-68).

c) Full-size prints to Contractor. Half-size prints can be provided when suitable for the required use.

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d) Forward one set of full-size prints for engineering drawings, dredge surveys, and reports for overseas ocean engineering projects to:

Director
Defense Mapping Agency (DMA)
Hydrographic/Topographic Center
ATTN: SD (SDSCH)
4600 Sangamore Road
Bethesda, MD 20816-5003

4.17 Record Drawings. Record drawings shall be provided for permanent facilities including primary utility systems.

4.17.1 Filming. Upon completion of record drawings, the approved original shall be filmed and distributed as indicated in Table 1. After filming of the approved originals, reproducibles and previous films of the construction drawings shall be destroyed, except for the project drawing films or reproducibles filed with the contract records. Record drawings in contract files are inviolate and shall not be changed.

4.17.2 Marking. Each record drawing shall be plainly marked by a stamp or lettering adjacent to the title block, in the following manner:

RECORD DRAWING
DATE [_____]

4.17.3 Historical File. A historical file of record drawings, NAVFAC Record Drawing Film File, is maintained at the NCBC, Civil Engineer Support Office (CESO), Code 156, Port Hueneme, CA 93043. Design offices shall send 35-mm aperture card film of record drawings to the historical file. Film submitted shall be batched and secured by project. Each batch shall have a cover sheet or lead card that identifies the project by EFD or EFA, country or state, city, activity, facility (and building number, if appropriate), and NAVFAC contract number (if appropriate). The minimum identification on each individual film is as follows:

a) NAVFAC drawing number,

b) Activity,

c) Facility,

d) Date of record drawing approval,

e) Card number, total cards,

f) Discipline, and

g) Unit identification code (UIC).

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Table 1
Drawing Distribution Chart

DRAWING TYPE	SUBMITTED BY	COPIES FURNISHED	DISTRIBUTION
Contract (Construction) and Revisions	EFD/EFA/OICC	Original Tracing Full-Size Reproducibles	EFDs/EFAs/OICCs Contract or Plan File Station/ Activity (and ROICC or PWO)
Record	EFD/EFA/OICC	Original Tracing or Transparencies	Station/Activity (PWO or PWC as applicable)
		35-mm Microfilm: Silver Negative	NCBC, Port Hueneme NAVFAC Record Drawing Film File CESO Code 156 EFD/OICC Plan Files
Shop Drawings or Product Data	EFD/EFA/OICC Activity	Original, Copies, or Microfilm	Station/Activity - EFD, EFA, or OICC
Advanced Base	NCBC, Port Hueneme, CA	Original Tracing	NCBC, Port Hueneme (Code 155)
		Half-size Reproducibles	NAVFACENGCOM, NCBC, Gulfport, MS, LANTDIV, PACDIV

Film submitted in a format other than the one described above shall be returned for compliance.

4.17.4 Original Drawings. Original record drawings shall be retained in the permanent custody of the Station Commanding Officer or Public Works Center (PWC) Commanding Officer for stations supported by PWCs and should thereafter be maintained in a current status by local forces.

4.17.5 Disposition. Refer to par. 8.6.

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Section 5: PROJECT SPECIFICATION PREPARATION

5.1 Policy. Project specifications shall describe the performance of the work in a concise and coherent manner. Specifications shall state Government essential needs and describe conditions that may affect the project. The person responsible for preparing the project specification shall use a NFGS as a manuscript if one is available. If there is no NFGS, research existing DOD and Federal criteria to avoid duplication and ensure criteria sharing with the other agencies when their criteria satisfies the functional requirements of the Navy. Use the Construction Criteria Base (CCB) and MIL-BUL-35, Matrix of Guide Specifications for Facilities Construction - Federal and Private to ensure comprehensive review of existing data. The person responsible for preparing the project specification shall review this manual and personally contact the Specifications Branch (Code 406) at the beginning of each new project to ascertain that the guidance is current.

5.1.1 Coordination of Specifications and Drawings. Drawings and specifications shall be coordinated to preclude inconsistencies or ambiguities between project specifications and drawings. Basically, drawings should illustrate the extent, size, shape, and generic types of materials and the relationship between materials. Specifications should describe the materials, their quality and installation requirements, and the method of construction. Review the drawings during preparation and after their completion to ensure that materials and systems appearing on the drawings have been covered in the specification, that there is no conflict between the specification and drawings, and that requirements to accomplish work are adequately covered in detail on the drawings or described in the specifications. Conversely, those preparing the drawings should review the specifications to ensure complete coordination. For this purpose, the note at the beginning of each NFGS related to the information to be shown on drawings, the drawing coordination note, is a useful checklist. Use of specification coordination is encouraged as a communication vehicle from the specifier to the designer. Conflicts and duplications between drawings and specifications shall be avoided. Terminology (key words) used in specifications and drawings shall be identical.

5.1.1.1 Precedence of Specifications. FAR 52-236-21, Specifications and Drawings for Construction, states in part:

> "Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing."

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5.1.1.2 Cross-Reference to Drawings. FAR 52-236-21 states:

> "Where 'as shown,' 'as indicated,' 'as detailed,' or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise."

5.1.2 Proprietary Specifications. FAR 10.002 and 36.202 ban use of restrictive or proprietary requirements unless it is established conclusively that no substitute will serve the purpose. From time to time, a situation arises in which only a single product can perform the required function, or there is only one manufacturer for a product for which no other product can economically perform the function. In such cases, a request for authorization to specify the proprietary product shall be forwarded promptly to a Level 1 Contracting Officer, together with the pertinent facts of justification to avoid delay in the work. If such authorization is granted, the item should be specified by manufacturer's name and catalog number, followed by "Notwithstanding Any Other Provision of the Contract, No Other Product Will Be Accepted" or language of similar import. This statement is necessary to override the contract clauses that permit substitution of any supposedly equal product.

5.1.3 "Or Equal" Specifications. Specifying items by naming acceptable commercial products followed by the words "Or Equal" shall be permitted under the following conditions:

a) There are no Government specifications for the item,

b) The item is a minor part of the construction project,

c) The item cannot be adequately described because of technically involved construction or composition.

In each instance, a minimum of three manufacturers shall be included in the description followed by the words "Or Equal." The essential features of the item shall also be set forth in sufficient detail to establish the basis upon which the equality of nonlisted products will be determined.

5.1.4 Unrestricted Bidding. Specifications for procurements shall state only the actual minimum needs of the Government and describe the materials and installation so as to encourage maximum competition in bidding. Eliminate, insofar as possible, any restrictive features that might limit acceptable offers to one supplier's product or to the products of a relatively few suppliers.

5.1.5 Warranty Clauses. Ordinarily, warranty clauses are not included in specifications. A warranty clause is any provision that modifies terms of the normal 1-year warranty required by the contract clause. There are two classes of exceptions. First, in rare instances, it is acceptable to extend the

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period of the warranty based on the judgement of the designer, if the industry routinely provides such extended periods of warranty and the unusually complex nature of the product makes the provision cost effective on a life-cycle basis, or if NAVFAC guide specifications suggest the extension. Second, it is possible to add terms to a warranty, but only in the rarest of circumstances and with written approval of a Level 1 Contracting Officer or when NAVFAC guide specifications indicate such an extension has been reviewed and approved by a Level 1 Contracting Officer.

5.1.6 Experience Clauses. Ordinarily, experience clauses are not included specifications (refer to NAVFAC P-68). Experience clauses include requirements based on quantity or duration of experience, either of the Contractor or the Contractor's staff performing particular functions. These clauses do not include objectively determined skills or training level tested in the project. Do not use experience clauses except those contained in NAVFAC guide specifications.

5.1.7 Contract Parties. Do not designate part of the work to be performed by a particular subcontractor (e.g., the plumbing contractor). The Government recognizes only one Contractor (the prime or general contractor), and it is the Contractor's responsibility to divide up the work. The project specification should refer only to the Contractor and to the Contracting Officer, except to refer to other work not included in the contract.

5.1.8 Conflicts With the Contract Clauses. Do not repeat the contract clauses in project specifications. The contract clauses in the contract contain requirements which affect the general conduct of the work in the contract. If these are randomly modified within the specifications, it tends to weaken or void the contract clauses.

5.1.9 Contractor Direction. Avoid the term "the Contractor shall." The Contractor is responsible for performing the work as shown and specified; therefore, there is no reason to use the phrase. Speak only to the Contractor, not the supplier or manufacturer. The Contractor cannot be directed through the manufacturer or supplier or vice versa. Stating "the manufacturer shall provide [_____]," could be interpreted as simply informing the Contractor that a party other than the Contractor is responsible, comparable to "the Government shall provide [_____]." Likewise, there is usually no reason to differentiate between actions expected of the "Contractor" and the Contractor's various suppliers; to attempt to do so borders closely on an assignment of work. Avoid using the specification to instruct the Contracting Officer.

5.2 Available Specifications. Considerable data are available to facilitate the preparation of project specifications and are included in a series of guide specifications covering most major elements of construction. Referenced specifications offer criteria for materials, equipment, and test methods. NFGSs and the specifications and standards referenced in them are listed in MIL-BUL-34.

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5.2.1 NAVFAC Guide Specifications (NFGSs). Guide specifications are manuscripts which are prepared for editing and incorporation into the contract documents of a specific construction project. A guide specification describes products and materials and the work necessary to incorporate them into a construction project. A guide specification facilitates the preparation of project specifications by standardizing products and processes and their order of presentation, allowing easy editing to adapt the guide specification to specific project requirements. Guide specification and project specification sections describe in detail the following:

a) Product or system to be provided,

b) Salient design features or performance requirements of the product or system,

c) Quality of that product or system,

d) Methods used to ensure the quality, including on-site and off-site testing,

e) Method to be used to incorporate the product or system into the project, and

f) Other features and functions necessary.

NFGSs, though mandatory for use in preparing project specifications, shall be tailored as necessary to suit the work actually required by the specific project, including tailoring for metric or inch-pound projects. In addition, guide specifications should be modified and edited to reflect the latest proven technology, materials, and methods.

5.2.1.1 EFD and EFA Regional Guide Specifications. Regional specifications are limited in number and scope to selected subjects such as summary of work and contain a majority of local requirements. Regional specifications are used in the same way as the NFGSs except that they are used only in the area of the EFDs or EFAs jurisdiction. Regional specifications are always numbered the same as the NFGS that has been used as a basis for the regional specification. A capital letter representing the EFD or EFA precedes the specification number (e.g., NFGS-S-07516, Aggregate Surfaced Coal Tar Built-Up Roofing, Southern Division, or NFGS-L-02510, Bituminous Concrete Pavement, Atlantic Division).

5.2.1.2 Valid Guide Specifications. There is only one valid guide specification for a particular area at any time. It will be either an NFGS, or in a few instances, an EFD or EFA regional guide specification with the latest revision date of approval by NAVFACENGCOM. The latest revision date automatically cancels specifications of the same number with a previous date.

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5.2.2 DOD Guide Specifications for Military Family Housing. These specifications are no longer being maintained. They are a source of information for DOD Family Housing Standards, but because of their age, they should not be used as manuscripts for project specifications.

5.2.3 NAVFAC Standard Specifications (NFSSs). Standard specifications are for a small group of specialized structures that are required to meet rigid operational requirements of management commands and bureaus. An example of a standard specification is NFSS-M21, Magazine, Earth Covered Circular Composite Arch.

5.2.4 NAVFAC Short Form Guide Specifications. NAVFAC short form guide specifications are used in preparing project specifications for small projects, repair, or maintenance work. They may also be used for minor elements or small quantities of work in larger projects at the discretion of the architect/engineer in charge. A short form specification is as complete in scope as a basic NFGS series specification but less detailed. The short form assumes the Contractor does not need detailed installation instructions. If a more detailed specification is required, begin preparing a project specification using the NFGS basic series specifications. An example of a short form guide specification is NFGS-SF-05500, Metal Fabrications.

To warrant using short form specifications to prepare a project specification, a project must be low in risk as well as small in size. Small projects are also often characterized by a small design team, a single phase design process, and a brief construction period. A small project with a high risk, such as a clean room remodel, should still begin with using a basic NFGS series specification.

5.2.5 Reference Specifications. The majority of materials and equipment are covered by adequate specifications, which shall be referenced appropriately in project specifications. Referencing these documents in project specifications ensures procurement of economical facility components and services while considerably reducing verbiage required to state such requirements. The following types of reference standards are discussed in order of precedence.

5.2.5.1 Non-Government Standards. Non-government standards are the preferred references in NAVFAC specifications. They may be developed by consensus of a standard body or trade associations.

a) Technical Society Specifications. Technical society specifications include the requirements of several elements of the community that have an interest in the development and use of these documents. These elements include producers, consumers, and those representing the general public interest who actively participate in the work of such societies.

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b) Trade Association Specifications. Trade association specifications contain the requirements among the companies within a given industry.

5.2.5.2 Commercial Item Descriptions (CIDs). CIDs are a form of simplified product purchase descriptions for commercial off-the-shelf and commercial-type products for repetitive acquisition purposes. CIDs are a preferred alternative to detailed Federal specifications. CIDs are brief and performance oriented. They rely predominately on voluntary standards and are stated in such a way as to provide adequate competition among acceptable commercial items. They include functional and performance requirements in the form of key salient characteristics, as required to define quality levels or intended application. CIDs are Federal documents administered by the General Services Administration (GSA).

5.2.5.3 Federal Specifications and Standards. Federal specifications contain precise descriptions for materials, products, or services used by Federal agencies. Federal standards contain precise descriptions of processes required by Federal agencies.

5.2.5.4 Military Specifications and Standards. Military specifications contain precise descriptions to cover items or services with features that meet special DOD requirements. Military standards contain precise descriptions of processes required by DOD.

5.3 SPECSINTACT and CCB. NAVFACENGCOM uses a specifications format and processing system called "SPECSINTACT," an acronym for "Specifications-Kept-Intact." The operating system allows several time-saving features including creation of an outline specification; paragraph renumbering; printing without notes; reference verification; bracket removal check; and printing of the reference standards list, a submittal register, and a report which lists test requirements and actions of interest to the Contracting Officer. The operating system also records a precise editing record and ensures maintenance of the project specification as last edited. SPECSINTACT is a part of CCB, and is published quarterly in the form of compact disks with read-only memory (CD-ROM) which contain the text of the NFGSs, reference specifications cited in the NFGSs, and other criteria related to facilities construction.

5.4 Guidance for Preparing Specification Sections. Project specifications shall be based on NAVFAC guide specifications, augmented with EFD and EFA regional guide specifications. These specifications have been coordinated thoroughly with industry and tested by use in many projects and only require appropriate editing. Changes to the requirements should be made only when backed by sound engineering justification. Ensure that changes do not result in proprietary or unreasonable requirements.

5.4.1 Use of Guide Specifications. Prepare the project specification section by using the appropriate guide specification included in the quarterly

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edition of CCB which is current at the beginning of the prefinal design, and modify the guide specification to fit the project. Portions of the guide specification that cover work not included in the project shall be deleted. When portions of the work involved are not covered in a guide specification, additional requirements shall be added to the project specification, as necessary, using language and format similar to that employed in the guide specification. Use guide specifications only as manuscripts and do not reference them in project specifications. Do not combine work covered by various NFGSs into one section unless the work is of a minor nature.

5.4.2 Use of SPECSINTACT. Prepare NAVFAC project specifications utilizing SPECSINTACT format and, if the contract requires, utilizing the SPECSINTACT operating system.

5.4.3 Application of CSI Recommendations. NFGSs shall conform to the CSI 16-division system and three part sectional outline as presented in Construction Specifications Institute (CSI) MP-2-1, Masterformat--Master List of Titles and Numbers for the Construction Industry and CSI MP-2-2, Section Format respectively, as modified in MIL-HDBK-1006/2, Policy and Procedures for Guide Specification Preparation for NAVFACENGCOM use. Base specification sections on the CSI recommendations in regards to number, title, parts, order of information, and article titles.

5.5 General Organization and Format of Project Specifications. Format and general organization for project specifications are outlined in pars. 5.5.1 through 5.7.14.

5.5.1 Organization. Every project specification shall have a cover sheet (refer to Appendix D). A table of contents as produced by SPECSINTACT shall follow the cover sheet and shall list each section contained in the project specification.

5.5.1.1 Solicitation Package Cover Sheet. A project title page is included on the CCB and may be used in accordance with local practice.

5.5.1.2 Organization of Bidding Requirements and Contract Requirements. Bidding and contract requirements are normally formulated and included in the solicitation by a Contract Specialist. Do not include the NFGSs (Sections 00021 through 00830) available for these requirements in the specifications table of contents. These NFGSs are listed individually in a separate table of contents for the solicitation package. Local procedures may require that the specification writer prepare one or more of these sections, such as Section 00501, List of Drawings.

5.5.2 Sources for Sections. Prepare sections based on NFGSs, NFGSs Short Form (SF), or EFD or EFA regional guide specifications. Where there is no appropriate NFGS, an original section shall be prepared and numbered in accordance with CSI MP-2-1. Prepare specifications in the required format and ensure that magnetic media submission requirements are met if facilitated by

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use of the CCB which, in turn, uses SPECSINTACT, a high-powered specifications processing system that streamlines and automates the entire specifications writing process. Equipment components necessary to participate consist mainly of a CD-ROM reader, personal computer, keyboard, monitor, and printer and software disks including Volkswriter (Version 3 or 4).

5.5.3 Format. The final printout of project specifications shall be single-spaced on one side of 8-1/2- by 11-inch white bond paper. When project specifications are reproduced for formal advertising, the specifications are printed on both sides of 8-1/2- by 11-inch sheets. Colored sheets may be used for identification of different sections.

5.5.3.1 Specification Numbering. Project specifications are to be identified by use of the number of the contract of which the specifications are a part, modified as follows:

a) The first six digits of the contract number will be replaced by the corresponding two-digit number representing the NAVFACENGCOM office handling the project as follows:

04 NORTHERN DIVISION, NAVFACENGCOM and EFA MIDWEST
05 ATLANTIC DIVISION, NAVFACENGCOM
06 SOUTHERN DIVISION, NAVFACENGCOM
11 SOUTHWEST DIVISION, NAVFACENGCOM
12 EFA WEST and EFA NORTHWEST
14 OICC MIDPAC
21 EFA CHESAPEAKE
25 HEADQUARTERS, NAVFACENGCOM
33 EFA MED
40 PACIFIC DIVISION, NAVFACENGCOM
41 OICC MARIANAS
42 OICC FAR EAST
67 OICC TRIDENT
69 OICC KINGS BAY

b) The instrument identification "C" will be dropped. For example, a contract numbered N62477-75-C-0001 would contain a specification identified as Specification No. 21750001 for EFA Chesapeake.

5.5.3.2 Layout. Figure 9 is an example of a project specification section illustrating the proper layout. For specific layout, refer to any NFGS on the SPECSINTACT operating system.

5.5.3.3 Paragraph Numbering. SPECSINTACT allows four tiers of information identified with paragraph numbers. The text of the section begins with Part 1, General, and the first paragraph is article numbered 1.1. Subsequent articles are consecutively numbered 1.2, 1.3, 1.4, etc. Paragraphs are

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numbered 1.1.1, 1.1.2, etc.; 1.2.1, 1.2.2, etc. Subparagraphs are identified as 1.1.1.1, 1.1.1.2, etc. Below these tiers, designate untiered requirements as described in par. 5.7.3.

5.5.3.4 Sentence Construction. Use the simple imperative mood for clear and concise wording (e.g., "Apply two coats of paint to each exposed surface."). This style is used for instructions covering installation of products and equipment. The indicative mood, passive voice requires the use of "shall" in almost every statement and can cause unnecessary wordiness. Use the indicative mood, passive voice where necessary to emphasize a point or where the simple imperative mood is not appropriate (e.g., "Molded members shall be clean cut, straight, and true..."). Reduce verbiage in a specification, wherever possible, without loss of meaning or content. Streamline paragraphs by listing materials, reference standards, or specifications, and other itemized information as shown in the following example:

"Portland Cement: ASTM C 150, Type 1
Aggregate: ASTM C 33."

5.5.3.5 Sketches. Generally, include sketches and drawings on the project drawings and not in the specifications. When sketches are to become pages of the specifications, they shall be drawn on sheets that match the specification's page size and placed at the end of the section referenced. The page area used for the sketch (including the title) shall be the same window size as that for a project specification. Sketches shall contain the same numbering and identification data as required for typed pages and shall be cross referenced in the technical paragraphs. Sketches shall have EFD or EFA approval prior to inclusion in specifications.

5.5.4 Division 0 Sections. General policy is for the EFD or EFA Contracts Office to prepare Division 00 sections, with the exception of NFGS-00501, List of Drawings, which should be prepared by the designer.

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REPLACE/REPAIR GENERATOR 05900221

SECTION 15501

HEATING, VENTILATING, AND COOLING SYSTEMS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AIR MOVEMENT AND CONTROL ASSOCIATION, INC. (AMCA)

AMCA 000 1983 (Rev. 1986) Xxxx Xxxxxxx Xxxxxxxxx Xxxxxxxx Xxxxxxx Xxxxxxxxxxxx

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 00 1990 Xxxxxxx Xxxxxx Xxxxxx Xxxxxx Xxxxxxx

UNDERWRITERS LABORATORIES INC. (UL)

UL 00 1984 (R 1989) Xxxxxx Xxxxx Xxxxxxxxx Xxxx Xxxxxxx Xxxxxxx Xxxxxx

1.2 SUBMITTALS

1.2.1 SD-02, Manufacturer's Catalog Data

a. Xxxxxx xxxxxx xxxxx

b. Xxxx xxxxxxx

1.2.2 SD-04, Drawings

a. Xxxxx

b. Xxxxxx xxxxx

Xxxxxx xxxxx xxxx xxx xxxxx. Xxxxxx xx xxxxx xxx x xxxxxxxx xxxxxxxx xxxx.

Figure 9
Example of Project Specification Page Layout

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5.5.5 Division 1 Sections. Division 01 shall include the appropriate contents of NFGS-01010, Summary of Work, NFGS-01025, Measurement and Payment, NFGS-01100, Special Project Procedures, NFGS-01310, Progress Schedules, NFGS-01311, Contractor Prepared Network Analysis System, NFGS-01400 or NFGS-SF-01400, Quality Control, NFGS-01500, Construction Facilities, NFGS-01560, Temporary Controls, and NFGS-01700, Project Closeout. Additionally, NFGS-01011 through NFGS-01014, which are sections regarding special conditions for selected sites, shall be included when appropriate. Section 01730, Operation and Maintenance Data, shall be tailored and used in projects which require the submission of operation and maintenance (O&M) data. The EFD or EFA will determine whether NFGS-01400 or NFGS-SF-01400 will be used. Include any additional section of a general requirement nature rather than a technical nature in Division 01.

5.5.6 Demolition and Removals. Generally, specify only in a separate section entitled "Demolition and Removals." Do not specify removals and relocations in the technical sections. The technical sections shall include only new work. In the section entitled "Demolition and Removals," the paragraphs describing items to be relocated should reference the appropriate technical section, if there is one, for the installation of the item in its new location. When light fixtures are to be relocated, a statement should be included in the paragraph on relocating light fixtures to the effect that relocated light fixtures shall be installed in the new locations in accordance with the applicable requirements of Section 16402, Interior Wiring Systems.

5.6 References

5.6.1 Referenced Specifications. In the selection of a reference specification, choose the most adequate document. In accordance with the FAR, nationally recognized industry and technical society specifications shall be used whenever practical to ensure that the requirements are compatible with current industrial practices and manufacturing resources. When use of nationally recognized industry standards is not practical, Contractors shall be required to use materials and equipment satisfying good commercial standards available from local commercial sources. Nationally recognized industry and technical society specifications and standards are first in order of precedence, followed by good commercial standards. The Department of the Navy Standards Improvement Program Policy states that the use of Military Specifications and Standards is authorized as a last resort, only with an appropriate waiver. Contact the EFD or EFA Technical Standards Specialist with questions related to Federal and Military Specifications listed in NAVFAC criteria.

5.6.2 General Rules for References. When documents are referenced in project specifications, the following rules shall apply:

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a) List publications referred to in the paragraph entitled "References" at the beginning of each section of the project specification, by number and complete title, including addenda, amendments, errata, and approval dates. List in the "References" paragraph only those publications referred to in the technical paragraphs of the section. Delete publications not referenced. List the date and revision letter, as appropriate, of the current edition of the referenced publications. Do not use general identification such as "the issue in effect on the date of the solicitation."

b) When a publication is referenced in other than the "References" paragraph, identify the applicable or nonapplicable portions of the publication, whichever is more appropriate, to avoid misinterpretation by the Contractor of the intent of the reference. Include only the basic number and specifics such as type and grade and not the revision or other change identification when referencing specifications.

c) Avoid reference to specific paragraphs within the specification except for unusual cases, since it limits the requirements to the paragraphs referenced.

d) Avoid repeated references to a specification within the same section.

e) Carefully read notes regarding the use of the referenced specifications.

f) When only a few requirements of a referenced specification are applicable, the requirements should be included in the project specification and the reference should be omitted.

5.6.3 Cross-Referencing to Other Sections. Avoid cross-referencing to other sections in the text of a section. Cross-reference only to clarify the relationship of the requirements within or between specification sections and to avoid inconsistencies or repetition. While cross-references are convenient, their use may become a source of error when changes are made in one guide specification but not in another. When other sections are referenced, include the section number and title. Do not include the "NFGS" prefix. Note the following example:

"Section 09900, 'Painting'"

5.6.4 Cross-Referencing to Articles and Paragraphs. Avoid cross-referencing to articles or paragraphs within a project specification. However, where absolutely unavoidable, use the following wording (in this context, use the word "paragraph" for articles and paragraphs): "...the paragraph entitled '(title of paragraph)'." Never refer to the article or paragraph by number; use the title only. Avoid repetition of article or paragraph titles within a project specification, especially when cross-referencing.

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5.7 Language and Style

5.7.1 Comprehension Level. Specifications are utilized, ultimately, by construction tradesmen. Therefore, write project specifications for a high school graduate level of comprehension.

5.7.2 Using Parallel Construction. Use identical style in both parts of a compound subject or verb, or in a series of nouns, adverbs, or prepositional phrases.

INCORRECT: Perform tests to determine strength and establishing quality.

CORRECT: Perform tests to determine strength and establish quality.

INCORRECT: heating, ventilation, and air conditioning

CORRECT: heating, ventilating, and air conditioning

5.7.3 Listing Multiple Requirements. List multiple requirements in lieu of writing long sentences requiring extensive punctuation. Designate the list alphabetically with lowercase letters followed by a parenthesis. If a sublisting within a listing is required, list the requirements in the sublisting numerically with numbers enclosed in parentheses. Capitalize the first word in each listing, place a space between each listing and sublisting, and insert a period after the last listing. Adhere to the following format:

a) [First requirement]

b) [Second requirement]

(1) [First subrequirement under second requirement]

(2) [Second subrequirement under second requirement]

c) [Third requirement.]

5.7.4 Avoiding Pronouns. Avoid using pronouns. Repeat the noun, if necessary, to avoid misinterpretation.

5.7.5 Phraseology

5.7.5.1 Respecting Contract Clause and Division 1 Requirements. Avoid phrases which conflict with contract clauses or Division 1 requirements or name a part that is not involved in the contract. Do not use phrases such as:

a) At no additional expense to the Government

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b) At the expense of the Contractor

c) Tests and inspections shall be conducted in the presence of the Contracting Officer. (Requiring notice of a pending test is the appropriate means to encourage the witnessing of a test.)

d) The Contracting Officer reserves the right

e) The work consists of

f) The subcontractor shall

g) The architect

5.7.5.2 Avoiding Open-Ended Requirements. Avoid using open-ended, undefined requirements such as:

a) As may be required

b) As necessary

c) An approved type

d) As directed

e) As approved

f) Subject to approval

g) Satisfactory to the Contracting Officer

h) Etc.

The Contractor cannot predict in advance what will be required, necessary, directed, approved, or satisfactory and, thus, must assume the risk of what will be acceptable. This risk translates into a higher bid price to cover the risk. Furthermore, various bidders will be bidding on a different basis, each with associated risk factors reflected in the amounts bid.

Another example of an open-ended requirement is: "Provide core samples, as required." In this instance, bids must be based on coring 100 percent of the depth of each hole. If depths of geologic structures are unknown or the core samples required cannot otherwise be defined, estimate the percentage of the hole length for which cores will be required. For example: "Provide core samples of 60 percent of hole depth."

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5.7.5.3 Not Using Escape Phrases

a) "Unless otherwise specified" is often used to indicate an alternative course of action. It can result in problems because it is impossible to determine how or where something will be specified otherwise. If used, the phrase must be clarified by providing a definition and a specific reference to another part of the guide specification. The phrase shall not be used to refer to another guide specification.

b) Do not place upon the Contractor the responsibility for the possible inaccuracy in, or the lack of, information on the part of the Government. For example, never use sentences similar to "Although the drawings indicate approximately the conditions that are likely to be found, bidders should satisfy themselves as to the actual conditions, for while they are believed to be as shown, the Government does not guarantee the accuracy of the information given, and the bidder shall assume all responsibility in the use of such." The Government is responsible for furnishing accurate and sufficient information to bidders and Contractors.

5.7.5.4 Avoiding Indeterminate Words and Phrases. Specificity is essential; replace indeterminate phrases with wording conveying specific intent. Examples of indeterminate words or phrases are:

a) First class workmanship

b) Securely

c) Thoroughly

d) Suitable

e) Properly

f) Good working order

g) Neatly

h) Carefully

i) Installed in a neat and workmanlike manner

j) Intended purpose

k) Not limited to

l) Highest quality

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5.7.5.5 Providing for Limitation. When limitation is required, use "not greater than" or "maximum" or "not less than" or "minimum" to express degrees of limitation.

5.7.6 Vocabulary

5.7.6.1 Misused Words. Misused words lead to misinterpretation and can result in litigation. If in doubt, refer to a dictionary, preferably unabridged, or a dictionary of construction terms for proper usage. Do not use slang or undefined terms. Review the following list of misused words.

"Amount" and "Quantity": Use "amount" when writing about money. Use "quantity" when writing about numbers, linear measure, area, and volume.

"Any," "Every," and "All": "Any" can mean a limited number selected at the discretion of the Contractor. In specification writing, "all" and "every" is implied, unless stated otherwise. Avoid using "any," "every," and "all."

"Balance" and "Remainder": "Balance" refers to money. "Remainder" is "that which is left over."

"Either" and "Both": "Either" implies a choice between two options. Do not use "either" when the intent is "both."

"Flammable" and "Inflammable": These words are synonymous. However, use "flammable" in lieu of "inflammable."

"Furnish," "Install," and "Provide": "Furnish" is to acquire and deliver. "Furnish" does not imply "install." "Install" is to place in position for service or use. "Install" does not imply "furnish." "Provide" is to "furnish" and "install."

"Insure," "Assure," and "Ensure": "Insure" is to issue or procure an insurance policy. "Assure" is to give confidence or convince. "Ensure" is to make certain. In most cases, use "ensure" when referring to actions of the Contractor.

"Replace": Use "Remove existing and provide new" if that is the intent.

"Shall," "Should," and "Will": Use "shall" in reference to work required of the Contractor. Do not confuse "shall" and "should"; "should" does not require work of the Contractor. Use "will" to express a declaration of purpose on behalf of the Government.

5.7.6.2 Compound Words. Do not use compound words such as "hereinbefore" and "hereinafter." The author of a project specification may use "herein" to

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refer to other requirements contained within the project specification. However, make the reference explicit, further identified by the article or paragraph title.

5.7.6.3 Navy Jargon. Do not use Navy jargon.

5.7.6.4 Avoiding Unnecessary Articles. Omit articles, such as "the," "a," and "an," when sentences would not be awkward or lose their intent.

5.7.7 Hyphenated Compounds. Where two or more hyphenated compounds have a common, basic element and this element is omitted in all but the last term, the hyphens are retained, e.g., "4- by 8-inch plate." (Note the space after "4-.")

5.7.8 Underlining and Capitalizing for Emphasis. Do not underline or capitalize for emphasis. Requirements are equally important in obtaining the desired product or service.

5.7.9 Capitalization of Certain Terms. Capitalize "Contractor," "Contracting Officer," "Government," and classification terms, e.g., "Type," "Grade," and "Class."

5.7.10 Footnotes. Do not use footnotes.

5.7.11 Exponents, Subscripts, and Superscripts. Avoid the use of exponents, subscripts, or superscripts. Spell out the appropriate word or term.

5.7.12 Numbers. Spell out numbers under 10, but use figures for numbers 10 and greater. However, units of time and measurement are always expressed in figures, except for "one" and "zero," which are always spelled out when used singly. Do not repeat a spelled out number with a figure in parentheses, e.g., "nine (9)."

5.7.13 Decimals and Fractions. Fractions serving as adjectives shall be expressed in the following form: "1 1/2-inch"; not "1-1/2 inch" or "1-1/2-inch." Fractions expressed as nouns shall be expressed in the following form: "1 1/2 inches"; not "1-1/2 inches," or "1-1/2 inches."

5.7.14 Abbreviations and Symbols. Use only standard abbreviations. Do not use abbreviations with more than one meaning. Spell out the meaning of unfamiliar abbreviations the first time they are used in the guide specification, followed by the abbreviation in parentheses. Thereafter, use only the abbreviation. Avoid using symbols such as % (percent), ' (foot), " (inch), ° (degrees), and # (pound) because these symbols frequently have more than one meaning. Symbols, however, may be used in tables.

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Section 6: DRAWING AND SPECIFICATION REVIEW AND APPROVAL

6.1 Review and Approval Procedures

6.1.1 Program Dynamics. Due to the continuing increase of construction costs, it is the mandate of Congress and Office of the Secretary of Defense that military construction projects be designed, bid, and constructed as rapidly as possible. This exerts continuing pressure toward maximum efficiency of the design process. Although reviews are necessary to ensure that designs meet both user functional requirements and NAVFACENGCOM technical requirements, these reviews shall be carried out in the least possible time. This will ensure the minimum adverse cost effect on the individual project, as well as on the entire yearly group of MCON projects assigned to NAVFACENGCOM EFDs and EFAs. Customer inputs on a project late in the design process may have to be given less than optimum attention for the financial benefit of projects in the same program year.

6.1.2 Review and Approval of Project Drawings

6.1.2.1 Schedules and Reviews

a) Drawings, specifications, and cost estimates shall be reviewed in regular phases. The magnitude of technical review and number of phases will vary with the type of project. Since the A/E is responsible for the technical design, the reduction of detailed technical review can save significant time and allow an early construction contract award, lower cost, and earlier beneficial occupancy of the facility. Generally, the work will consist of schematic, first (approximately 35-percent completion), second (100-percent completion), and final (completion) phases, except for MCON projects which require a Parametric Estimating and Programming (PEP) submittal.

b) Required engineering studies and analyses such as energy analysis and life-cycle cost studies should take place during the first (35-percent) design phase, and the design documents as outlined in Appendix A should be developed for the facility ultimately to be constructed. Comments on the functional aspects of the design shall be resolved by the EFD or EFA to the satisfaction of the activity or shall be brought to the attention of the major claimant, systems command, or NAVFACENGCOM not later than the 35-percent design stage.

c) The design process for MCON projects has been revised to include a PEP submittal in lieu of the 35-percent submittal. The PEP is the final budget document for a project. It represents about 15 percent of the design but also includes all the studies and analyses performed at the 35-percent design phase. Each activity shall be thoroughly consulted during PEP preparation and shall be required to sign off on the final PEP. Refer to Appendix C for an example of a PEP.

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6.1.2.2 Liaison Between Activity and EFD or EFA. There should be adequate liaison between the activity and the EFD or EFA through participation by appropriate activity personnel in review of design through the 35-percent design stage. The EFD or EFA Design Division is responsible for architectural and engineering aspects of the project to ensure reasonable facility cost appropriate for the functions to be performed. The activity, together with the systems command or major claimant as deemed necessary, shall review the functional aspects of the facility design developed by the EFD or EFA. Required changes shall be resolved not later than the 35-percent design stage. Change of functional requirements after the 35-percent design stage seriously affects the completion date and design cost of the project. When the 35-percent design is complete, it should be submitted to the user or customer activity for review and acceptance as to the functional requirements of the user. If purely technical comments are offered by the user, the ultimate responsibility of NAVFACENGCOM for these features should be explained.

6.1.2.3 Reviews for Health Hazards During Facilities Design Process. For facilities projects that require industrial hygiene technical assistance and that involve potential health hazards such as toxic materials, non-ionizing radiation, noise, or other health hazards, consult the appropriate Naval Medical Command (NAVMEDCOM) activity listed below. The NAVMEDCOM activity is required to participate in design reviews and reviews of plans and specifications for these projects. The reviewing activity and reviewer shall be identified on documents and drawings. The NAVMEDCOM activity will ensure that engineering designs properly consider and provide for adequate environmental controls for the elimination of health hazards. Use this review process for medical facility designs in excess of $1 million.

European Region, London, England
Northeast Region, Great Lakes, IL
National Capital Region, Bethesda, MD
Southeast Region, Jacksonville, FL
Mid-Atlantic Region, Norfolk, VA
Northwest Region, Oakland, CA
Southwest Region, San Diego, CA
Pacific Region, Barbers Point, HI

6.1.2.4 Quality Assurance of A/E-Produced Plans and Specifications. In addition to the normal technical adequacy review, the EFD or EFA shall develop and implement a procedure to establish that the A/E has accomplished the required final coordination review. Perform at least a spot-check of the interdisciplinary coordination of the final plans and specifications. Require the A/E to include the final coordination review check-set of plans and specifications with the final submittal. If the spot-check or other procedure indicates inadequate QC by the A/E, or if design errors or omissions are found, return the plans and specifications to the A/E for rework. Do not process payment for final plans and specifications until adequate QC has been accomplished by the A/E. Do not, except under unusual circumstances and with careful documentation, direct a specific correction or make a correction with

r return until approved by the ... evacuated, they may pe

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in-house personnel, thereby possibly assuming responsibility for the design. Specifically evaluate the A/Es QC performance in both the post-design completion and the post-construction completion A/E performance evaluations for consideration in future selection actions.

6.1.2.5 Seabee Projects. Projects scheduled for accomplishment by naval construction forces shall be reviewed at the 35-percent design stage by Commander Naval Construction Battalions, U.S. Atlantic Fleet (COMCBLANT) or by Commander Naval Construction Battalions, U.S. Pacific Fleet (COMCBPAC), as appropriate, for construction methods and procedures only.

6.1.2.6 Scope Changes. At the earliest possible stage of design, the EFD or EFA shall notify the activity and the major claimant or systems command in writing of any potential need for scope changes. The notification shall include a description of the changes, with assessment of the impact of the changes on the facility, a revised cost estimate, and the appropriate follow-on actions required. The EFD or EFA letter shall include information pertaining to the potential scope changes in accordance with the requirements of NAVFAC Instruction 11010.49, Limitations on Scope Change, Cost Variation and Reprogramming of a Military Construction Project, and address the CWE.

6.1.2.7 ROICC Review of Contract Documents. The ROICC shall review the plans and specifications at the 35-percent and 100-percent submissions. The review shall be limited to project constructability (e.g., site problems, existing obstructions or proposed utilities, new construction methods, proposed contract time for construction, omissions, discrepancies, and coordination problems that could lead to change orders or construction difficulties).

6.1.2.8 NAVFACENGCOM Review of Field Documents. Contract drawings and specifications prepared under the direction of the EFD or EFA are reviewed and given final approval by the EFD or EFA. Review by NAVFACENGCOM will be made only when requested by the EFD, EFA, or NAVFACENGCOM. Such reviews will be limited to review for conformance to Government criteria.

6.1.2.9 Bid Packages. After EFD or EFA approval of the completed design, a complete bidding package shall be delivered to the user or customer and the ROICC. It is desirable to provide the user or customer with a final briefing on the content and function of the design.

6.1.2.10 Marine Corps. Thirty-five percent preliminary drawings, specifications, and cost estimates (refer to Appendix A) for Marine Corps-funded projects shall be submitted to Commandant, U.S. Marine Corps (CMC), Code LFF, for review as to compliance with functional requirements. One set shall be furnished to the Marine Corps installation, one set to CMC, and one set to NAVFACENGCOM for information. Comments on or approval of the functional aspects of the design shall be made by letter, and discrepancies resolved by the EFD or EFA to the satisfaction of CMC. One complete set of the final drawings (half-size preferred), specifications, and cost estimates

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shall be sent to CMC, the Marine Corps installation, and NAVFACENGCOM for information concurrent with advertisement of the project for bids.

6.1.2.11 Space and Naval Warfare Systems Command (SPAWAR). There are two types of drawings for SPAWAR projects: (1) drawings of the building, site, and other facilities and (2) drawings for electronic and other equipment to be installed within the building. Although Type (2) drawings are sometimes prepared by SPAWAR, both types should bear standard NAVFAC title blocks and drawing numbers. On drawings that require SPAWAR approval, a box shall be appended to the left of the title block for SPAWAR signature and a space provided for SPAWAR cross-reference drawing number.

6.1.2.12 Civil Works Contracts. NAVFACENGCOM or the delegated EFD or EFA approves drawings and specifications prepared for civil works subcontracts. Civil works contract drawings shall be assigned NAVFAC drawing numbers and shall be approved and signed as "Satisfactory to" the prime contractor of the particular Navy industrial plant for whose use the facility is provided.

6.1.2.13 Reviews for Adequacy of Physical Security Measures. In accordance with OPNAVINST 5530.14B, each EFD or EFA shall ensure that the activity security officer or provost marshall participates in the design process and review stages of new construction projects and physical security enhancement projects.

6.1.2.14 Approval by Other Government Organizations. Approval of drawings for projects of other Government organizations or approval of modifications or revisions of drawings prepared by such organizations shall be required as follows:

a) When NAVFAC drawings are prepared for construction projects for other Government departments or agencies, fully developed schematics shall be submitted to these departments or agencies for formal approval and signature. Drawings prepared by or under the direction of NAVFACENGCOM shall be approved by that Government organization for functional and operational sufficiency. Approval by other Government departments or agencies shall be indicated by appropriate signature in a "Satisfactory to" supplementary block located in accordance with Figure 10.

b) When definitive, standard, or project drawings of other Government departments or agencies are used by NAVFACENGCOM for design of projects for those departments or agencies, any modifications or revisions made to such drawings shall be approved by the department or agency concerned, unless NAVFACENGCOM has been authorized otherwise.

6.1.3 Signatures Required. Before drawings and specifications are submitted for formal approval, the drawings and specifications shall be signed by the individuals directly responsible for the accuracy and sufficiency of the data included therein.

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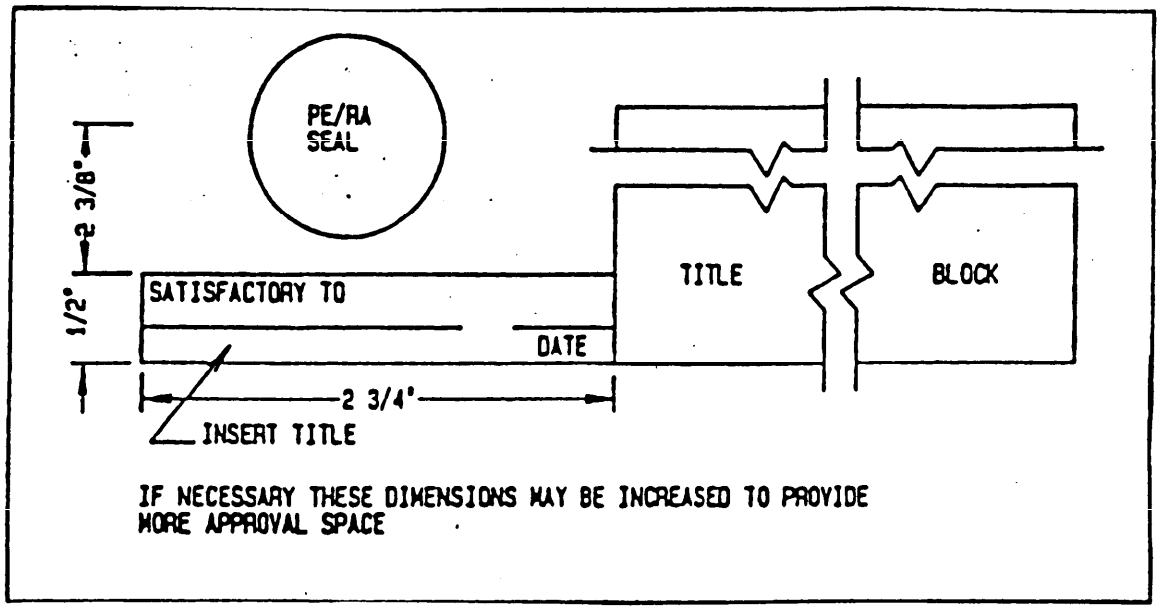

Figure 10
Supplementary Block

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6.1.3.1 Drawings Prepared In-House. Designers, draftsmen, and checkers shall letter their surnames in the space provided on each drawing of their direct concern. The designer and checker shall not be the same person. Applicable drawings shall be approved and signed by the EFD or EFA fire protection engineer. Branch heads shall sign their surnames on each drawing as their approval of their particular discipline. Only registered professional engineers or registered architects shall be authorized to certify technical adequacy, and their professional status (P.E. or R.A.) shall be indicated with the signature. The EFD, EFA, or OIC design directors shall sign their surnames on the title or index drawing sheet of the project drawings. Drawings prepared by NAVFACENGCOM, EFDs, EFAs, OICs, OICCs, PWCs, Civil Engineer Support Office (CESO), NCBC, or Public Works Departments (PWDs) may be stamped with the registration seal of the design director or the individual responsible for the design when the seal is authorized by the state where the project is to be constructed.

6.1.3.2 Project Specifications Prepared In-House. Place the surnames of the preparers on the cover sheet. The Specifications Branch Head or other designated official shall sign or initial the cover sheet.

6.1.3.3 Drawings Prepared by an A/E. NAVFAC drawings prepared by an A/E shall be signed by A/E employees with responsibility comparable to NAVFACENGCOM individuals described in par. 6.1.3.1 and signed in the same manner. The engineer or architect signing the drawings shall be registered in the state of record for the A/E or the state of the proposed construction as a P.E. or R.A. In addition, the drawings shall be signed by a responsible person of corporate status in the A/E and may be stamped with his or her registration seal when the seal is authorized by the state where the project is to be constructed.

6.1.3.4 Project Specifications Prepared by an A/E. The surnames of the preparers shall be placed on the cover sheet. The cover sheet shall be signed by A/E employees with responsibility comparable to NAVFACENGCOM individuals described in par. 6.1.3.1. Also, the cover sheet shall be signed by a corporate member of the A/E or by a responsible individual with corporate responsibility. The EFD or EFA Specifications Branch Head shall sign the "Approved by" line on the cover sheet.

6.1.3.5 Formal Approval by or for the Commander, NAVFACENGCOM. Authority and responsibility for formal approval of drawings and specifications by or for the Commander, NAVFACENGCOM, shall be vested in the following authorized officials and shall be restricted to officials registered as professional engineers and architects.

a) NAVFACENGCOM. The Assistant Commander for Engineering and Design or the Deputy Assistant Commander.

b) EFDs and EFAs. The Commander or Commanding Officer, Deputy Commander or Executive Officer, Head of the Acquisition Department, or the

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Director of the of the Acquisition Department, or the Director of the Design Division to the monetary level stipulated in their delegation of signature authority.

c) OICC (ROICC). The designation carries with it the authority and responsibilities indicated in NAVFAC P-68, unless otherwise indicated by NAVFACENGCOM.

6.1.4 Title Block. The proper title block format for drawings should be selected from the title block illustrations. (See Figures 2 through 7.) A proper approval signature shall appear on the title or index drawing sheets and on the cover sheet of the specifications. Individual drawings in each design package may be signed by the formal approval authority or the name and title of the authority may be stamped on each of these drawings.

6.2 Construction Submittals

a) The A/E or in-house design office shall be tasked to provide the Contracting Officer with a list of shop drawings proposed for review.

b) The design EIC or AIC, the Construction Division, and the Field Contract Administration AOIC shall carefully review the list to ensure that the A/E or in-house design office reviews only those shop drawings that have an impact on design. Included should be drawings showing structural connectors, installation details of structural members, and others that relate to structural strength, integrity of a system, or the safety of personnel, or drawings that are of significant design or cost importance.

c) For both NFGS-01400 and NFGS-SF-01400, submittals shall be approved by the Contractor's Quality Control Manager, unless indicated to be approved by the Government. The method used to indicate that Government approval is required is to place a "G" following any such submittals. The "G" shall be tokenized as *G*\ so that the submittals will be automatically inserted onto the submittals register by the SPECSINTACT system. Approval of submittals by the Quality Control Manager does not preclude subsequent review by the Government as a quality control measure. Submittals reserved for Government approval should consist of those items that the designer considers to be of special importance because of the complexity of certain design features, the critical nature of certain life safety features, or the necessity to maintain control of certain project features.

d) Specifications shall list the submittal types and products or services to be the subject of the submittal. Do not repeat information contained in NFGS-01300 in the technical sections.

e) Submittals being reviewed by the Government shall be given promptly to the A/E or in-house design office for review and approval. Drawings shall be reviewed for compliance with the contract documents. Fire protection systems shall be approved by a qualified fire protection engineer.

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Structural systems shall be approved by a registered structural engineer. Results of the review should be provided to the Contracting Officer within 2 weeks after receipt of submittals by the A/E or in-house design office.

f) The procedures between NAVFACENGCOM and the Contractor shall be as required in the contract documents; procedures for QC are included in Section 01400. Procedures within NAVFACENGCOM shall be described as follows:

6.2.1 Approval

a) When the EFD, EFA, or OICC is the approving office, a copy of each approved submittal is retained by the EFD, EFA, or OICC. A duplicate may be sent to the activity concerned.

b) When the local activity is the approving office, the activity retains a copy of each approved submittal and transmits a duplicate to the OICC, EFA, or EFD.

c) When submittals for a given contract have been approved, the drawings are assembled in a set and bound in a folder or folders. One NAVFAC drawing number is assigned to each folder; if more than one folder is used for a given contract, a separate number shall be assigned to each folder.

6.2.2 Submittals Stamp

a) Arrangement. Stamps shall be arranged as follows:

I HEREBY CERTIFY THAT THE (EQUIPMENT) (MATERIAL) (ARTICLE) SHOWN AND MARKED IN THIS SUBMITTAL IS THAT PROPOSED TO BE INCORPORATED WITH CONTRACT NUMBER [_____], IS IN COMPLIANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATION, CAN BE INSTALLED IN THE ALLOCATED SPACES, AND IS SUBMITTED FOR GOVERNMENT APPROVAL. GOVERNMENT APPROVAL OF PROPOSED VARIATION, IF ANY, IS RECOMMENDED.

CERTIFIED BY SUBMITTAL REVIEWER _____, DATE _____
(Signature when applicable)

CERTIFIED BY QC MANAGER _____, DATE _____
(Signature)

b) Approval Categories. Four types of stamps shall be used. The approval category for each type shall read as follows:

(1) "APPROVED" or "APPROVED AS SUBMITTED"

(2) "APPROVED AS NOTED" authorizes Contractor to proceed with work as noted provided the Contractor takes no exception to the notations.

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(3) "REVISE AND RESUBMIT" or "DISAPPROVED" indicates the submittal is incomplete or does not comply with design concept or requirements of contract documents and shall be resubmitted with appropriate changes.

(4) "NOT REVIEWED" indicates submittal has been previously reviewed and approved, is not required as a submittal, does not have evidence of being reviewed and approved by the Contractor, or is not complete. Submittal will be returned with an explanation of the reason it was not reviewed. Returned submittals deemed to lack review by the Contractor or to be incomplete shall be resubmitted with appropriate action, coordination, or change.

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Section 7: CONTRACT CHANGES

7.1 Scope. The general information listed here is applicable to contract drawings and all sections of the contract specifications.

7.2 Types of Changes. Changes before contract award are amendments and changes after contract award are modifications. Numbers are assigned in numerical order as required. Amendment numbers are prefixed by three ciphers, for example, the first amendment shall be numbered "0001." Modification numbers begin with a "P" followed by five digits, for example, the third modification shall be "P 00003."

7.3 Change Numbers. Change numbers are assigned by the Contract Division of the EFD or EFA. Changes prepared by the A/E shall provide a blank space for insertion of the number by the EFD or EFA. The EFD or EFA Contract Division shall prepare a cover sheet, Standard Form (SF) 30, Amendment of Solicitation/Modification of Contract, for changes; therefore, the first page of the change's text shall be page number "2." Changes shall be typed on bond paper and submitted with bond original and one copy.

7.4 Cost Estimate. Changes shall be accompanied by detailed cost estimates to indicate changes in construction cost of the project or to substantiate a statement of no change in cost. Cost information shall be given in unit costs, not as lump sum items, where appropriate. Proposed modifications shall be accompanied by a detailed cost estimate that can be used in the negotiation of change orders.

7.5 Change Format. Changes should follow the same order as the contract specifications with each change item referencing the appropriate section and paragraph by number and title. Some typical examples follow.

7.5.1 Adding a Specification Section. In the "Contents" under "Division 9, Finishes," add: "09310 Tile Work." This section is attached to this amendment.

NOTE: The section to be added is prepared in the normal manner as a separate section, with the exception that the amendment number appears opposite the specification number at the bottom of each page.

7.5.2 Changing Contract Drawings

7.5.2.1 Adding Drawings

EXAMPLE: SECTION 00501 LIST OF DRAWINGS

1.2 CONTRACT DRAWINGS

Add the following drawings to the list of drawings, making a total of 16 drawings:

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EFD DWG NO.	NAVFAC DWG NO.	TITLE
365191	4265191	Revised Floor Plan - Area A
365192	4265192	Lighting Fixture Details

NOTE: Some EFDs do not use EFD drawing numbers. Sheet numbers of the above added drawings are entered as 15 of 16 and 16 of 16. For information on assignment of NAVFAC drawing numbers, refer to par. 4.11.1.

7.5.2.2 Revising Drawings

EXAMPLE: SECTION 00501 LIST OF DRAWINGS

1.2 CONTRACT DRAWINGS

The following drawings bearing revision dates supersede previously issued drawings bearing the same number and title.

NAVFAC DWG NO.	TITLE
4265191	Foundation Plan, Revised [Date]
4265192	Floor Plan, Revised [Date]

NOTE: Complete the "Revisions" block in upper right corner of drawings with letter designation, description, name of preparer, and date. The "Approved" block shall be completed by the EIC at the EFD or EFA. Note revisions by distinctive symbols at the appropriate locations on the drawings. Prior to initiating new drawings or revised drawings, coordinate with the EIC at the EFD or EFA to ensure that adequate time is available prior to bid opening.

7.5.2.3 Written Changes to Drawings

EXAMPLE: SECTION 00501 LIST OF DRAWINGS

1.2 CONTRACT DRAWINGS

Changes shall be made to the prints of the drawings as follows: Drawings shall not be revised, and new prints shall not be issued at this time:

NAVFAC DWG NO.	TITLE
4265191	Plan and Details

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DESCRIPTION OF CHANGE

On foundation plan notes, note No. 3, change "the bottom of footing..." to "The top of footing...".

7.5.2.4 Sketch Sheets. When written changes to the drawings are not feasible, letter-size sketches may be issued by amendment. Details and other information shown on the sketch sheet shall be coordinated with the drawings. The title block shall contain the same information as the title block on project drawings.

EXAMPLE: SECTION 00501 LIST OF DRAWINGS

1.2 CONTRACT DRAWINGS

Changes shall be made to the prints of the drawings as follows: Drawings shall not be revised, and new prints shall not be issued at this time.

NAVFAC DWG NO.	TITLE
4265191	Site Plans and Details

DESCRIPTION OF CHANGE

Add details "Revisions to Utility Site Plan" and "Detail of Intercepter Catch Basin" as shown on Sketch A, accompanying this amendment.

7.5.3 Changing Contract Specifications

7.5.3.1 Adding Paragraphs or Subparagraphs

EXAMPLE: SECTION 03300 CAST-IN-PLACE CONCRETE

1.2 SUBMITTALS

Add the following paragraph:

1.2.1 SD-05, Design Data

a. Concrete mix design G

Submit for each type of concrete included in the work.

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7.5.3.2 Word Changes

EXAMPLE: SECTION 15530 REFRIGERANT PIPING

2.1.1.2 Copper Pipe and Fittings: In Line 7, delete "bronze" and substitute "galvanized steel."

7.5.3.3 Omitting Paragraphs or Subparagraphs

EXAMPLE: SECTION 02511 BITUMINOUS HOT MIX PAVEMENT

2.2 ASPHALT CEMENT

Delete this paragraph in its entirety and substitute the following:

2.2 NOT USED

7.6 Contract Amendment. Contract amendments are issued by the EFD or EFA. Note the following:

a) The cover page, SF 30, is prepared by the EFD or EFA.

b) The solicitation number and page number appear in the upper right-hand corner of the page. The solicitation number is the same as the construction number except that "C" is replaced by "B."

c) The specification number and the amendment number appear at the bottom center of the page.

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Section 8: RETENTION OF DATA

8.1 Survey Data and Design Computations. Design for public works is based on survey notes, subsurface investigation data, manual computations, digital and analog computer computations, pile-driving records, pertinent diagrams and sketches, and similar data. Data shall be recorded and preserved for use with future requirements.

8.1.1 Basis of Design. Bind basis of design separately from other materials. Refer to Appendix B for additional information using the CES Cost Model Questionnaire. Refer to Appendix D for preliminary specifications and basis of design using UNIFORMAT.

8.1.2 Survey Notes. Field survey notes may be recorded in standard bound hard-backed survey books or loose-leaf binders, appropriately lettered to indicate items such as project title, location, and contract number (if project was contracted). Survey notes taken by an A/E should be turned in with the 100-percent design submission. Survey notes shall be retained by EFDs and EFAs for a period of not less than 10 years. Some survey notes shall be retained for the life of the station, e.g., for boundary surveys and periodic soundings of navigable waters. Field notes for strictly limited construction projects which are based on arbitrary data and horizontal references can be destroyed in a short period after construction.

8.1.3 Subsurface Investigation Data. Subsurface investigation data, prepared in accordance with commercial practices, shall be suitably bound with cardboard binders or other material sufficient in weight to provide adequate protection for the contents. A separate binder shall be used for each project. Binder covers shall be appropriately identified and the data retained by EFDs and EFAs.

8.1.4 Computations. Design computations, diagrams, and sketches shall be set down either in books or loose-leaf binders. These books or binders shall be identified by the project title, location, contract number, and serial number. If computation books contain computations for more than one project, an up-to-date index shall be provided at the front of each book. Computation books by A/Es shall contain computations only for the given contract.

8.1.4.1 Books. When specially provided books are required or selected, the using activity shall assign a serial number to every computation book used.

8.1.4.2 Loose-leaf Binders. When loose-leaf binders are selected, the binders shall contain information as specified in pars. 8.1 through 8.1.4. Normally, a separate binder shall be used for each project. Binder covers shall be appropriately identified as specified in pars. 8.1.2 and 8.1.4. Sheets shall be of good quality, preferably cross-section paper with a 10 by 10 grid, punched for binding, each 8-1/2 by 11 inches in size.

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8.1.4.3 Retention. Completed books and binders may be retained in hard copy or filmed to reduce storage space and filed and retained permanently by NAVFACENGCOM, EFAs, and EFDs. Once filmed, destroy the hard copy.

8.1.5 Computer Computations. Digital computers may be used without advance approval; however, use of an analog computer requires advance approval by NAVFACENGCOM. Where computations are made with the aid of digital computers, the following shall be furnished along with other information determined to be necessary by the Contracting Officer:

a) Pertinent input data.

b) Pertinent output results.

c) Summary and definitions of input and output terminology.

d) Documentation of the program used, including a written summary of program intent, engineering methods, assumptions, limitations, formulas, and numerical methods used.

e) Description of the method used to verify and check results.

f) If the computer program was created or obtained for the purpose of solving a problem as part of this contract, then the Contractor shall provide a listing of the program in the language used in its development.

(1) Input data, output, summaries, outlines, and documentation shall be clearly marked, sequenced, and identified with program title, computer, date, responsible person, contract title, contract number, and structural part. In cases where the furnished information is not in standard computer form, submission shall be in accordance with par. 8.1.4.

(2) Retention of the furnished information shall be in accordance with par. 8.1.4, with computer data retained in suitable environmental condition.

8.1.6 Pile Driving Records. Prepare pile driving records on NAVFAC Form 4-11013/11, Pile Driving Record, and retain records permanently in EFD or EFA files.

8.2 Contract Files

8.2.1 Prior to Contract Award. For contracts, one set of film negatives, 35-millimeter aperture cards, shall be placed in contract records files, unless the activity (EFD, EFA, or OIC) maintains a file of reproducibles of drawings in plan files. In such instances, it will not be necessary to file film negatives in contract record files.

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8.2.2 Contract Change Orders. A change order is a means of ordering variations, changes, and additions to the work under contract. Film or reproducible drawings in the contract record or plan files provide a permanent record of drawings prior to the contract change order. A film negative or reproducible of revised drawings shall be placed in contract record or plan files for each change order issued.

8.2.3 Submittals. Upon completion of the contract, one set of submittals shall be retained by the EFD or EFA, and one set shall be furnished to the commanding officer of the activity concerned. For fire protection systems, three sets of submittals should be sent to the activity (Public Works, Public Works Maintenance, and the Fire Department). The EFD or EFA can film submittals to reduce filing space. Once shop drawings are filmed, file the film and retain as stated in par. 8.1.4.3. Once filmed, destroy the originals.

8.3 Transmittal of Original Drawings. Original drawings shall be sent by registered mail. The transmitting office shall temporarily retain transparencies or photographic reproducibles of the original drawings until receipt of the originals has been confirmed.

8.4 Drawing Files. EFDs and EFAs maintain a film system for record drawings. A historical file of permanent facilities is maintained at the NCBC, CESO Code 156, Port Hueneme, CA, for disaster purposes only.

8.5 Film System. Field activities shall use the 35-mm film aperture card system for construction, shop, advanced base, and record drawing purposes. Microfilm shall conform to MIL-STD-399, Microfilm Formats. Format 3 shall be used for 35-mm film aperture cards. Aperture cards shall be identified similar to Figure 11 or punched, if desired, in accordance with MIL-STD-804, Formats and Coding of Aperture, Camera, Copy, and Tabulating Cards. Films shall be made from original drawings whenever possible. Filmed reproductions shall conform to the following requirements:

a) MIL-M-9868, Microfilming of Engineering Documents, 35 mm, Requirements for;

b) MIL-C-9877, Cards, Aperture;

c) MIL-M-38761, Microfilming and Photographing of Engineering/Technical Data and Related Documents: PCAM Card Preparation, Engineering Data Micro-Reproduction System, General Requirements for, Preparation of; and

d) MIL-HDBK-303, Micro-Reproduction of Engineering Documents.

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8.5.1 Aperture or Copy Card Data. The filming contractor should:

a) Preserve and package aperture or copy cards containing 35-mm negative in accordance with commercial practice and in a manner that affords protection against corrosion, deterioration, and physical damage during direct shipment to the receiving activity.

b) Furnish aperture or copy cards as required by MIL-STD-399 and identify cards in accordance with MIL-STD-804 or indicate sheet number, total number of sheets in the set of drawings, and the NAVFAC drawing number.

c) Upon receipt of aperture or copy cards, place the balance of the required information similar to Figure 11 on the cards by the originating office prior to distribution.

8.5.2 Filing. A responsible custodian of files should be designated to keep a proper record of the receipt, issue, loan, and return of drawings and films in custody.

8.5.3 Security Measures. Security shall be exercised in accordance with the following:

a) OPNAV Instruction 5510.1, Department of the Navy Information and Personnel Security Program Regulation.

b) DOD 5220.22-R, Industrial Security Regulation.

c) DOD 5220.22-M.

8.6 Disposal of Drawings. Custody of drawings shall be as stipulated in Table 1. Eventual disposition of drawings shall be as provided in SECNAV Instruction 5212.5, Disposal of Navy and Marine Corps Records.

8.6.1 Records. The EFD, EFA, and OICC shall maintain accurate records of original drawings transferred to a Federal Records Center (FRC), PWC, or PWD. Maintenance of these records can be delegated to a PWC or PWD by the EFD or EFA.

8.6.2 Drawings for Demolished Structures and Disestablished Naval Activities. Provide disposal in accordance with SECNAV Instruction 5212.5, with the exception that when a disestablished activity is transferred to an agency or party beyond naval authority, the pertinent drawings shall be forwarded to such agency or party. NAVFACENGCOM shall be advised of such transfers.

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35-MM FILM ENVELOPE

EFD/EFA/ACTIVITY/LOCATION | NAVFAC DRAWING NO.

CONTRACT NUMBER | SHOP DWG. _____ BID DWG. _____ RECORD | SHEET ___ OF ___ | DATE OF DRAWING

TITLE OF DRAWING

DRAWING DESCRIPTION, BUILDING NUMBER, CATEGORY CODE, OTHER (AS APPLICABLE)

CONTRACTOR NAME AND ADDRESS

SECURITY CLASSIFICATION

NOTE: OVERALL ENVELOPE NOT TO EXCEED 5 IN. BY 8 IN. WITH OPENING ON THE RIGHT

Figure 11
Sample Film Envelope

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APPENDIX A
EXAMPLE OF 35-PERCENT FACILITY DESIGN REQUIREMENTS

NOTE: For additional information, refer to the A/E Guide for the EFD or EFA that has jurisdiction.

1. The design submission shall include, as a minimum, the following:

   a. 35-percent complete project drawings,

   b. An outline project specification,

   c. A preliminary cost estimate,

   d. Backup data as required by this appendix.

2. Drawings shall contain, as a minimum, the following information:

   a. Site plans showing existing and new site features including buildings, pavements, and utilities; survey controls; grading and storm drainage; and boring logs.

   b. Architectural floor plans showing complete functional layout, room designations, pertinent features and dimensions, columns, and built-in equipment, and provisions for accessibility for the handicapped.

   c. Elevations showing openings, type and extent of building finishes, and finish grade at building.

   d. Building sections indicating relationship of various levels, floor to floor materials.

   e. Preliminary finish schedule indicating proposed finishes.

   f. Tabulation of net areas for spaces limited by criteria or program.

   g. Tabulation of gross building area by floors and total building. Delineate areas computed with small-scale, single-line dimensioned drawings.

   h. Justification for deviation from areas or requirements contained in criteria or program, or deviation from approved concept drawings.

   i. Preliminary furniture layouts showing that adequate wall space, circulation area, etc., are being provided to accommodate the intended use of the space as follows:

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APPENDIX A (Continued)

(1) Spaces requiring specific accommodations (example: 200-seat assembly room).

(2) Typical Bachelor Enlisted Quarters (BEQ) bedroom, showing location of wardrobes, and providing optional single- and double-bunking plans.

(3) Major spaces with multi-purpose use requirements that will require significantly different furniture arrangements for different uses.

(4) Where building design dictates special design furniture, schematic details sufficient to define the nature and extent of special items should be included. This applies whether special design furniture items will be included in plans and specifications or procured as collateral equipment.

(5) Repetitive spaces that form a major component of the design. (Show typical layout for BEQ bedrooms, school classrooms, etc.)

j. Interior mechanical and electrical data showing central heating and cooling plant and electrical distribution details, including the following:

(1) Energy analysis;

(2) Design criteria;

(3) Heating and cooling source;

(4) Design analysis and energy studies;

(5) Location of major equipment (for plumbing, show fixture locations, and basic riser diagrams);

(6) System diagrams, including ventilation systems;

(7) Control diagram for mechanical systems; and

(8) Line diagrams for electrical, electronics, and telecommunications systems.

k. Exterior mechanical and electrical documentation and data showing central heating and cooling plant and electrical distribution details to include the following:

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APPENDIX A (Continued)

(1) Plant loads;

(2) Plant capacity;

(3) Plant floor plan and general arrangement;

(4) System diagram;

(5) Fuel storage general arrangement;

(6) Route of existing exterior heat, power, communications, and fire-alarm systems, including capacities; and

(7) Routing and capacities of new systems.

1. Civil and structural details and data showing the following:

(1) Boring plans and logs;

(2) Type of foundation system planned. Allowable soil bearing if spread footings are to be used;

(3) Design loads (live load, wind, seismic, etc.);

(4) Explosive safety (identify threat and give distance or negative statement);

(5) Type of structural system and kind of materials to be used; and

(6) Fallout shelter statement.

3. The outline specification shall show what items of work will be included in the project specification. The specification shall be arranged in the 16-division format of CSI sequentially by section number. Include in this submittal the number, title, and date of the guide specification being used to prepare each project specification section covered by a NFGS. List the major materials or systems selected for each section, whether or not based on a guide specification. When based on the guide specification, this list may be an edited version of the scope note of the guide specification. List all 16 divisions. Where there is no work required in a particular division, include the statement "No Work in This Division" under the division heading.

4. Project design cost estimates are required with drawings and specifications and should reflect current costs as estimated from the drawings, design computations, basis for design, and specifications. For those elements of the project where status of design does not permit a

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APPENDIX A (Continued)

firm or reasonably accurate take-off of the quantities or firm pricing of individual items of work, lump-sum costs based on available data may be included. The basis of these costs such as cost per square foot of building, per square yard of pavement, or per mechanical or electrical fixture shall be given. Lump sum costs shall be kept to a minimum.

5. Submissions shall substantiate by economic analysis (life cycle cost) all alternatives examined and shall include brief statements of the rationale for the various selections.

6. Energy conservation aspects of design resulting from investigation of the complete energy system must be discussed. Brief statements shall be included that cost-effective systems and features are incorporated, based on life cycle cost, such as heat recovery, sunshades, and control devices.

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APPENDIX B
SAMPLE BASIS OF DESIGN REPORT

The following is an example of format and content for the "BASIS OF DESIGN REPORT." Ensure that this report is coordinated with the 35-percent outline specification.

I. DESIGN AREA TABULATION

The project gross area shall not exceed that stipulated by the authorized scope of work without prior approval. In the basis of design, the A/E shall provide a complete area breakdown tabulation for gross and net areas to conform to scope and statutory criteria compliance. A supplemental drawing indicating method of area take-off shall accompany the area tabulation. Subsequent revised area tabulation submittals at the 100 percent and final stages of project development shall be required.

II. ELEMENTS

Provide a description of the major design features. The following Cost Model Questionnaire (refer to MIL-HDBK-1010) is a guide and checklist to identify major design features of the primary facility and supporting facilities. Each design feature (numbered by CES Systems) indicates minimum information to be provided. The completed questionnaire is to be included in the Basis of Design Report.

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APPENDIX B (Continued)

Project Title _____

Location _____

Contract Number _____

P# _____ FY _____ Date _____

Completed by _____

Phone Number _____

COST ENGINEERING SYSTEM (CES)
COST MODEL QUESTIONNAIRE

APRIL 1991

000 Building Construction Gross Building Area (SF) _____

Function or Category Code	% or Area
_____	_____
_____	_____
_____	_____

Where a single building includes areas of significant cost variation as identified by category code or functional area, show a breakdown by function or category code. Show area in sq. ft. or by percentage to nearest 5%.

20	Number of Floors	_____	EA
21	Floor to Floor Height	_____	LF
22	Length - Nearest Foot	_____	LF
23	Width - Nearest Foot	_____	LF
25	Irregular - Yes/No	_____	
26	Building Perimeter	_____	LF

40 Describe any known special considerations; scheduling, security, asbestos removal, hazardous materials, etc.

50 Finish floor elevation above existing grade - nearest foot _____ LF

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APPENDIX B (Continued)

000 Building Construction Summary

Includes the total cost of all systems 001 through 499. Total building cost to the 5-foot line. This system is not to be used for estimate preparation.

OVERHEAD

001 Field Overhead Total Cost Lump Sum

Includes Project Manager, Superintendent, Timekeeper, Field Engineer, Clerical Staff, Field Offices, Utilities, Field Storage, and any other field incurred cost necessary to administer the project in the field. For projects outside the United States includes shipping, transportation of personnel per diem and temporary housing.

002 Home Office Overhead Total Cost Lump Sum

Includes the portion of Home-office costs allocated to the project being priced.

003 Contractor Quality Control Total Cost Lump Sum

Includes costs for the Field Contractor Quality Control Staff. Testing requirements are included with other systems as applicable.

*011 Additive 1 Total Cost Lump Sum

Includes all costs associated with Additive item 1 as described in the specifications. When an additive is a separate building or involves substantial work it may be advisable to run a separate estimate to develop the cost and transfer only the total to the master estimate.

*Typical for all Additive and Deductive items.

041 OMSI Total Cost Lump Sum

Includes costs associated with preparation of an Operation and Maintenance Service Instruction.

042 PCAS Total Cost Lump Sum

Includes costs associated with Post Contract Award Services.

043 Contingencies Total Cost Lump Sum

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APPENDIX B (Continued)

Includes contingency allowance. The contingency entered is not an estimating contingency but a contingency for change orders.

044 SIOH Total Cost Lump Sum

Includes an allowance for government administration of the construction contract. Supervision, Inspection, and Overhead.

BUILDING SYSTEMS INTERIOR

GENERAL CONSTRUCTION

111 Foundation Ground Floor Sq Ft

Includes excavation and backfill for foundation and basement construction, pile caps, footings, grade beams, piers, foundation walls, basement walls, fill under floor slabs, and all required construction to the first floor elevation, excluding all structural floor slabs, ground slabs, basement structural framing, piling, special foundations and soil treatment.

See 84X for removing unsuitable materials and 816 for surcharging.

	Footing Depth from Existing Grade	
__01 Spread Footings	__11	__ 21 Borrowfill 1'
__02 Thickened Slab	__12	__ 22 Borrowfill 2'
__03 Pile Foundation	__13	__ 23 Borrowfill 3'
__04 Caissons	__14	__ 24 Borrowfill 4'
__05 Continuous wall footing	__15	__ 25 Borrowfill 5'
__06 Grade Beams		__ 26 Borrowfill over 5'

**** For convenience pilings are described with building foundations.
**** Price under the supporting facilities.

911 Land Piling-Drives Length of Piling Lin. Ft.

	Length of Piling
__ 02 Timber	__ 20 Under 25'
__ 03	__ 21 26'- 35'
__ 04 Concrete 10' Sq	__ 22 36'- 45'
__ 05 Concrete 12' Sq	__ 23 46'- 55'
__ 06 Concrete 14' Sq	__ 24 56'- 65'
__ 07	__ 25 66'- 75'
__ 08 Steel	__ 26 76'- 85'
	__ 27 86'- 95'
	__ 28 Over 95'

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APPENDIX B (Continued)

112 Slab on Grade — Slab on Grade — Sq Ft.

Includes all ground slabs and vapor barrier, waterproofing, wire mesh, capillary fill, and soil treatment. Includes ground slab, reinforcing steel, waterproofing and soil treatment for structural slab placed on fill is used as form. Borrow fill under slab is included in System 111.

		Thickness Floorload 30 Under 100 PSF
__ 01 Floating	__ 11 Under 6'	
__ 02 Grade Beam Supported	__ 12 6'	__ 30 Under 100 PSF
__ 03 Pile Supported	__ 13 8'	__ 31 101-200 PSF
	__ 14 Over 8'	__ 32 201-300 PSF
		__ 33 301-400 PSF
		__ 34 401-500 PSF
		__ 35 Over 501 PSF

113 Structural — Gross Bldg. Area — Sq. Ft

Includes structural frame consisting of skeleton frame of building, i.e., columns, girders, cantilevered members extending beyond exterior walls, and fireproofing. Excludes framing in direct support of floor or roof construction.

__ 01 Bearing Wall	__ 10 Seismic Zone 0	__ 32 Roofload 20 PSF
__ 02 Steel Framing	__ 11 Seismic Zone 1	__ 33 Roofload 30 PSF
__ 03 Concrete Cast n Place	__ 12 Seismic Zone 2	__ 34 Roofload 40 PSF
__ 04 Wood	__ 13 Seismic Zone 3	__ 35 Roofload 50 PSF
__ 05	__ 14 Seismic Zone 4	__ 36 Roofload 60 PSF
__ 06 Concrete Precast		__ 37 Roofload 70 PSF
__ 07 Air Inflatable	__ 21 Windload 80 mph	__ 38 Roofload 80 PSF
	__ 22 Windload 92 mph	
	__ 23 Windload 103 mph	
	__ 24 Windload 115 mph	
	__ 25 Windload 127 mph	

114 Supported Floor — Supported Floor — Sq. Ft.

Includes construction of structurally integrated or independently supported floors, i.e., steel decking, joists, beams, slabs, precast concrete decking with topping steel reinforcing and other related items to provide a complete structural floor. Excludes applied finishes.

	Floorload	Span
	__ 30 Under 40 PSF	__ 40 Under 26'
__ 01 Concrete Cast in Place	__ 31 41-60 PSF	__ 41 26'-35'
__ 02 Concrete on Steel Joint	__ 32 61-80 PSF	__ 42 36' 45'

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APPENDIX B (Continued)

__ 03 Concrete on Steel Framing
__ 04 Precast Concrete
__ 05 Wood

__ 33 81-100 PSF
__ 34 101-150 PSF
__ 35 151-200 PSF
__ 36 201-250 PSF
__ 37 251-300 PSF
__ 38 Over 300 PSF

__ 43 46'-55'
__ 44 56'-65'
__ 45 66'-75'
__ 46 Over 76'

If more than one entry give percentage of each - nearest 10%.

115 Stairs — Number of Risers — Each

Includes interior and exterior stairs, landings, platforms, and railings.

__ 01 Exposed
__ 02 Enclosed
__ 03
__ 04
__ 05 Exterior
__ 06 Interior

__ 10 Concrete
__ 11 Steel
__ 12 Galvanized
__ 13 Painted

__ 20 Closed Riser
__ 21 Open Riser
__ 22 Steel Pan
__ 23 Checkered Plate
__ 24 Grate

116 Roof Structure — Roof Area — Sq. Ft.

Includes construction of structurally integrated or independently supported roofs, i.e., precast concrete roof slabs, concrete topping, steel decking, joists, beams. Roofing is included in 141.

Framing
__ 01 Conc Cast in Place
__ 02
__ 03 Precast Hollow Core
__ 04 Precast Concrete
__ 05 Wood
__ 06 Steel Joist
__ 07 Steel Framing
__ 08

Deck
__ 20 Other
__ 21 Steel
__ 22 Conc Slab
__ 23 Wood
__ 24 Gypsum

Span
__ 40 Under 26'
__ 41 26'-35'
__ 42 36-45'
__ 43 46'-55'
__ 44 56'-65
__ 45 66'-75'
__ 46 Over 76'

117 Pre-Engineered Building — Gross Bldg. Area — Sq. Ft.

Includes steel frame, siding, roofing, insulation, doors, windows, and all other work normally furnished by the pre-engineered building subcontractor. Does not include sliding or roll-up doors.

__ 01 Eave height under 12'
__ 02 Eave height 12-20'
__ 03 Eave height over 20

__ 10 Seismic Zone 0
__ 11 Seismic Zone 1
__ 12 Seismic Zone 2

__ 32 Roofload 20 PSF
__ 33 Roofload 30 PSF
__ 33 Roofload 40 PSF

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APPENDIX B (Continued)

__ 04

__ 13 Seismic Zone 3
__ 14 Seismic Zone 4

__ 34 Roofload 50 PSF
__ 35 Roofload 60 PSF
__ 36 Roofload 70 PSF
__ 37 Roofload 80 PSF

__ 21 Windload 80 mph
__ 22 Windload 92 mph
__ 23 Windload 103 mph
__ 24 Windload 115 mph
__ 25 Windload 127 mph

118 Vault — Gross Floor Area — Sq. Ft.

Includes walls, ceiling construction and floor slab. Only includes work incurred to construct vault. See system 452 for vault door.

__ 01 Concrete
__ 02 Reinforced CMU

119 Write-In System

ARCHITECTURAL

141 Roofing — Roof Area — Sq. Ft.

Includes roof curbing, roof insulation, roofing, gravel stops, gutters, and downspouts, flashing, skylights, roof-access hatches, and other related roofing items. Roof structure is included in 116.

Surface

__ 10
__ 11 Built-up
__ 12 Shingles
__ 13 Elast.
__ 14 Spread
__ 15 Metal Roofing
Surface

Insulation

__ 21 U = 0.04
__ 22 U = 0.05
__ 23
__ 24

__ 20 U = 0.03

142 Exterior Walls — Exterior Wall Area — Sq. Ft.

Includes bearing or non bearing walls from inside rough wall to outside finish, wall, parapet walls, damp proofing, flashing, insulation water-proofing, balcony walls, and handrails. Includes exterior finishes, caulking and painting.

Ext. Surface

__ 01 Brick
__ 02 CMU

Backup

__ 21 CMU
__ 22 Wood Studs

Height

__ 30 Under 12'
__ 31 12'- 20'

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APPENDIX B (Continued)

__ 03 Drivit
__ 04 Metal Panels
__ 05 Stucco
__ 06 Wood
__ 07 Conc Cast In Place
__ 08 Precast Concrete
__ 23 Steel Studs
__ 24 Conc Cast in Place
__ 25 Precast Concrete
__ 26 Furring
__ 32 over 20'

If more than one height is shown give percentage of each - nearest 10%.

143 Interior Walls — Interior Wall Sq. Ft.

Includes partitions, bearing or non bearing walls, extending from floor-to-floor or floor-to-ceiling excluding finishes. Includes masonry walls, steel or wood stud walls, studs only and excludes painting, gypsum board, or other applied finish.

__ 01 Concrete
__ 02 Steel Studs
__ 03
__ 04 Concrete Cast in Place
__ 05 Wood Studs

Height
__ 21 8'
__ 22 9'
__ 23 10'

If more than one entry under height, give percentage of each nearest 10%. Give narrative description of type and size of rooms.

144 Interior Finishes — Gross Building Area Sq. Ft.

Includes finishes applied to floors, walls, ceilings, stairs and ramps such as; wall covering, resilient flooring tile, terrazzo, wood, carpeting, acoustical tile, plaster, paint, gypsum board, suspended ceiling systems, caulking, and all related trim work.

__ 01 Gypsum Board
__ 02 CMU
__ 03 Ceramic Tile
__ 04 Wood Panels
__ 05 Plaster
__ 06 Vinyl Wall Covering

Floor
__ 11
__ 12 Ceramic Tile
__ 13 Quarry Tile
__ 14 Carpet
__ 15 Concrete
__ 16 Terrazzo
__ 17 Special Toppings
__ 18 VCT

Ceiling
__ 21 Acoustical
__ 22 Gypsum Board
__ 23 Plaster
__ 24 Concrete
__ 25 Spray on

145 Doors — Surface Area one Side Sq. Ft.

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APPENDIX B (Continued)

Includes all exterior and interior doors, frames, hardware, caulking, and painting, see 45X for 451 Hangar Doors, 452, Vault Doors, and 453 Blast Doors.

__ 01 Hollow Metal Exterior (Steel or Aluminum)
__ 02 Alum Entrance Store Front
__ 03 Folding
__ 04 Roll Up
__ 05 Overhead
__ 06
__ 08 Wood Interior
__ 09 Hollow Metal Interior

146 Windows Surface Area One-Side Sq. Ft.

Includes windows, glazed wall systems, glazing, caulking, and painting.

Windows	Special
__ 11 Double Hung	__ 20 Reglazing
__ 12 Projected	__ 21 Bullet Proof
__ 13 Casement	__ 22 Hardware
__ 14 Sliding	__ 23 Thermal Break
__ 15 Storm	
__ 16 Awning	
__ 17 Jalousie	

147 Specialties Gross Bldg. Area Sq. Ft.

Includes chalk tack boards, signs and plaques, flag poles, telephone enclosures, ladders, lockers, storage shelving, toilet and bath accessories, fireplaces, compartments and cubicles, movable partitions, identifying devices, protective covers, postal specialties, scales, exterior sun control devices, and wardrobe specialties, excluding special mechanical or electrical equipment.

__ 01 Wardrobes
__ 02 Jail
__ 03 Clean Room
__ 04 Case Work
__ 05 Dark Rooms
__ 06
__ 07 Loading Dock
__ 08
__ 09 Wire Partitions
__ 10 Metal Walkways
__ 11 X-Ray

Give estimating qualities for required ITEMS OF SIGNIFICANT COST. List shown is not complete. Detailing of toilet accessories and partitions is not required. Very large items may be more suited to using a write-in-system.

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APPENDIX B (Continued)

148 BEQ Wardrobes — Number — Each

Includes furnishing and installing prefabricated wardrobes and chests for BEQs.

__ 01 With Chest
__ 02 Without Chest

149 Write-in System

DEMOLITION INTERIOR

171 Demolition Interior — Gross Building Area Sq. Ft.

Include all interior building demolition connected with new construction or alterations. Also include any work on or in, the exterior wall. Do not include complete building demolition, see System 84X.

__ 01 Complete Interior Partition
__ 02 Complete Interior Finishes
__ 03 Complete Interior Mechanical
__ 04 Complete Interior Electrical
__ 05 Complete Interior of Bldg 01 thru 04

172 Asbestos Removal Interior — Total Cost Lump Sum

Includes cost for removal of asbestos from any interior areas of buildings to be rehabilitated. Includes all costs for sealing off areas, asbestos removal, monitoring, testing, disposal, charge areas, disposal suits, respirators, and other related costs. (See System 844 for asbestos removal, exterior.)

__ 01 Pipe Insulation_LF
__ 02 Equipment Insulation_SF

173 - 175 Write-in Systems

PLUMBING

211 Plumbing-Domestic — Number of Fixtures Each

Includes water supply and treatment, waste water disposal and treatment plumbing equipment, fixtures, and trim, and insulation, i.e., hot and cold water pipes, waste, soil and vent pipes, hot water heaters, water coolers, and floor drains.

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APPENDIX B (Continued)

__ 01 Flush Tank WC floor mntd.
__ 02 Flush Tank WC Piping wall mntd
__ 03 Flush Valve WC floor mntd.
__ 04 Flush Valve WC wall mntd.
05 Water Heater Electric
06 Water Heater Steam
07 Instantaneous W.H. Elec.
08 Instantaneous W.H. Steam
__ 09 Mop Sink
__ 10 Urinal
__ 11 Lavatory
__ 21 Tub
__ 22 Shower Fiberglass
__ 23 Shower Receptor
__ 24 Shower Multi-head
__ 25 Emergency Shower
__ 26 Emergency Eyewash
__ 27 Emergency Shower/ Eyewash
__ 31 Saltwater Flush
__ 32 Gray-water Flush
__ 33 Acid Resistant
__ 34 Fixture Rough-Ins
__ 35 Solar DHW
__ 50 Cast Iron
__ 51 PVC

Note: Refer to MIL-HDBK-1010 to determine number of fixtures for systems 211 and 213

212 Domestic Hot Water Solar Capacity MBTH

Includes piping, solar panels, supports and controls necessary for solar heated domestic hot water system. Does not include piping normal to system.

213 Roof Drainage Number of Drains Each

Includes roof drains, pipes and fittings.

214 - 216 Write-in Systems

SPACE CONDITIONING

221 Heating, Ventilation, and Air Conditioning Capacity MBTU or Tons

Includes heading, ventilating and air conditioning systems, i.e., heat generating equipment, refrigeration, air distribution, piping, controls and instrumentation, and insulation.

221 HVAC

__ 01 Chilled Wtr Recip. Air Cooled
__ 02 Chilled Wtr Recip. Water Cooled
__ 03 Chilled Wtr Centrif. Air Cooled
__ 04 Chilled Wtr Centrif. Water Cooled
__ 05 Direct Expansion
__ 11 VAV Single Duct
__ 12 TAB
__ 13 AHU w/duct
__ 14 Computer Rm DX
__ 15 Computer Rm CW
__ 16 Roof Top
__ 17 H&V Units
__ 18 Pkgd thru the wall
__ 19 Dual duct
__ 24 Bldg, Htng Plant HW, gas
__ 25 Bldg, Htng Plant steam, gas
__ 26 Bldg Htng Plant Elec.
__ 27 Base Plant Steam
__ 28 Base Plant HW
__ 29 Base Plant HTHW

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APPENDIX B (Continued)

Air Cooled
__ 06 Heat Pump Air Cooled
__ 07 Heat Pump Water Cooled
__ 08 Chilled Water Steam Absorption
__ 09 Chilled Water Rotary (Screw)
__ 10 Fan Coil Units
__ 20 Bldg Htng Plant HW oil
__ 21 Bldg Htng Plant Steam oil
__ 22 Bldg Htng Plant Hot air oil
__ 23 Bldg Htng Plant Hot air, gas
__ 30 Heat Reclaim
__ 31 Fixture Radiation & Unit Htrs.
__ 40 Power Roof Exh Fans
__ 41 Inline Exh Fans
__ 42 Inline Supply Fans
__ 43 Power Roof Supply Fans
__ 44 Wall Exhaust Fans

Give tonnage, refer to MIL-HDBK-1010 if better information is not available. If building contains partial A/C, use systems 222 and 223 for each respective area.

222 Air Conditioning Capacity Tons

Includes air conditioning systems, i.e., refrigeration, air distribution, piping, controls and instrumentation, and insulation.

__ 01 Chilled Wtr Recip. Air Cooled
__ 02 Chilled Wtr Recip. Water Cooled
__ 03 Chilled Wtr Centrif Air Cooled
__ 04 Chilled Wtr Centrif Water Cooled
__ 05 Direct Expansion Air Cooled
__ 06 Heat Pump Air Cooled
__ 07 Heat Pump Water Cooled
__ 08 Chilled Water Steam Absorption
__ 09 Chilled Water Rotary (Screw)
__ 10 Fan Coil Units
__ 11 VAV Single Duct
__ 12 TAB
__ 13 AHU w/duct
__ 14 Computer Rm DX
__ 15 Computer Rm CW
__ 16 Roof Top
__ 17 H&V Units
__ 18 Pkgd through the wall
__ 19 Dual duct
__ 20 Power Roof Exh Fans
__ 21 Inline Exh Fans
__ 22 Inline Supply Fans
__ 23 Power Roof Sup Fans
__ 24 Wall Exhaust Fans

223 Heating and Ventilation Capacity MBTH

Include heating, ventilating systems, i.e., heating generating equipment, air distribution, piping, controls and instrumentation, and insulation. See System 224 for ventilation only.

__ H&V Units HW, oil
__ 02 Unit Heat
__ 03 Fin Tube Radiation
__ 10 Power Roof Exh Fans
__ 11 Inline Exh Fans
__ 12 Inline Supply Fans
__ 13 Power Roof Supply Fans
__ 20 Bldg, Htng Plant
__ 21 Bldg, Htng Plant Steam, oil
__ 22 Bldg, Htng Plant

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APPENDIX B (Continued)

__ 04 Cabinet Unit Heaters
__ 05 Unit Htrs & Fin Tube Radiation
__ 06 Roof Top H&V
__ 07 Duct Mntd. Coils
__ 14 Wall Exhaust Fans

Hot Air, oil
__ 23 Bldg, Htng Plant Hot air, gas
__ 24 Bldg, Htng Plant HW, gas
__ 25 Bldg Htng Plant Steam, gas
__ 26 Bldg Htng Plant Elec.
__ 27 Base Plant Steam
__ 28 Base Plant HW
__ 29 Base Plant HTHW

224 Mechanical Ventilation — Fan Capacity CFM

Includes fans, supports, duct work and controls for a mechanical ventilation system. See System 223 for combined heating and ventilation.

__ 10 Power Roof Exhaust Fans
__ 11 In line Exhaust Fans
__ 12 In Line Supply Fans
__ 13 Power Roof Supply Fans
__ 14 Wall Exhaust & Fans

225 Dehumidification — Capacity PPH

Includes equipment, duct work and controls for dehumidification system. Use system 221 or 222 where dehumidification is an integral part of an air conditioning system.

__ 01 Desiccant
__ 02 Refrigeration
__ 11 Regenerative
__ 12 Non-Regenerative

226 Heating, Solar — Collector Area Sq. Ft.

Includes piping, solar panels, supports, and controls necessary for a solar-heated building heating system. Does not include work normal to the building and included under system 221 or 223. (See note under system 212)

__ 02 Heating
__ 03 Heating & Domestic HW
__ 11 Glycol
__ 12 Water

227 Write-in System

WEIGHT HANDLING EQUIPMENT

231 Bridge Cranes — Capacity Tons

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APPENDIX B (Continued)

Includes--Crane rails, bridge, hoists, trolleys, and electrification. Power supply at hoist area only.

__ 01 Span under 50'	__ 10 Capacity under 10 T	__ 21 Run Under 50'
__ 02 Span 51-75'	__ 11 Capacity 10-20 T	__ 22 Run 50-100'
__ 03 Span over 75'	__ 12 Capacity 20-30 T	__ 23 Run over 100'
	__ 13 Capacity 30-40 T	
	__ 14 Capacity over 40 T	

232 Monorails Capacity Tons

Includes rail, hoist, trolley and electrification, and air supply. Power supply a hoist area only.

__ 01 Manual	__ 10 Capacity under 5 T	__ 21 Run under 50'
__ 02 Electric	__ 11 Capacity 5-10 T	__ 22 Run 50 to 100'
__ 03 Air Operated	__ 12 Capacity over 10 T	__ 23 Run over 100'

233 Fixed Hoist Capacity Tons

Includes hoists, support electrifications and air supply. Power supply at hoist area only

__ 01 Manual
__ 02 Electric
__ 03 Air Opened

234 Vehicle Lifts Capacity Tons

Includes lift, pit, electrification and air supply. Power supply at hoist area only.

__ 10 Capacity under 5 T
__ 11 Capacity 5-10 T
__ 12 Capacity over 10 T

235 Elevators Number of Stops Each

Passenger or freight elevators including conveyor cab, doors, controls, and rails.

__ 01 Electric	__ 11 Passenger
__ 02 Hydraulic	__ 12 Freight
__ 03	

236 Escalators Flights Each

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APPENDIX B (Continued)

Includes equipment and power supply at escalator area.

237 Conveyors Capacity Tons/hr

Includes equipment, foundations, controls and power supply at conveyor area only.

238 Write-in System

SPECIAL MECHANICAL PIPING

241 Vacuum Capacity CFM

Includes vacuum pump, piping, connectors, and controls. (Industrial or medical.)

__ 01 Medical
__ 02 Industrial
__ 03

242 Oxygen Outlets Each

Includes piping, tanks, and accessories.

243 Nitrogen Outlets Each

Includes piping, tanks, and accessories.

244 Compressed Air Capacity CFM

Includes air compressors, dryers, after coolers, piping, controls, valves, gauges, and filters.

__ 01 Low Pressure 150 below
__ 02
__ 03 High Pressure 151 up

245 Interior Steam Capacity PPH

Includes steam generator, piping, and outlets. Does not include steam source that serves other uses. Do not use this system for steam heating.

__ 01 High Pressure
__ 02 Medium Pressure
__ 03 Low Pressure
__ 04
__ 05 Chemical Treatments
__ 11 Oil Fired
__ 12 Electric Fired
__ 13 Prefabricated Stack
__ 14 Fire Tube
__ 15 Water Tube
__ 20 Fuel Oil Storage

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APPENDIX B (Continued)

__ 06 Feed Water Equipment
__ 07 With Condensate Return
__ 08 Without Condensate Return
__ 16
__ 17 Controls

246, 247 Write-in Systems

SPECIAL MECHANICAL OTHER

251 Dust Collection — Capacity CFM

Includes equipment supports and duct work associated with an interior dust collection system.

252 Engine Exhaust — Fan Capacity CFM

Includes door exhaust ports, fans, and exhaust duct (flexible and rigid).

__ 01 Overhead
__ 02 Underfloor
__ 03 Through Door

253 - 255 Write-in Systems

INTERIOR FIRE PROTECTION

271 Sprinklers — Gross Area Sprinkled Sq. Ft.

Includes sprinkler pipe, fittings, valves, pumping equipment, tanks, sprinkler heads, and controls.

__ 01 Dry
__ 02 Wet
__ 03 Preaction
__ 04 Deluge
__ 10 Light Hazard
__ 11 Ordinary Hazard
__ 12 Extra Hazard
__ 13
__ 14 Includes Booster Pump

272 AFFF (Aqueous Film Forming Foam) — Area Protected Sq. Ft.

Includes equipment, piping, and controls necessary for an AFFF System. Includes storage tanks and foam when only the facility being priced is served.

__ 01 Deluge
__ 03 Pre-action
__ 03
__ 04 Oscillating Monitors
__ 11 with 100% Back-up Storage
__ 12 without 100% Back-up Storage
__ 13 Bladder Tanks
__ 14 Standard Tank, Pump, Proportioner

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APPENDIX B (Continued)

__ 05 Heat Detection
__ 06 Ultraviolet/Infrared Detection
__ 15
__ 16 6% Concentration
__ 17 3% Concentration

273 Carbon Dioxide — Storage Capacity — Pounds

Includes storage cylinders, hose reels, piping, nozzles, and controls.

__ 01 Hose Reel
__ 02 Flooding Area
__ 03 Flooding Total
__ 04

274 Halon — Storage Capacity — Pounds

Includes storage cylinder, controls, piping, and nozzles.

__ 01
__ 02

275 Fire Alarm — Gross Bldg Area — Sq. Ft.

Includes control panels, power supplies, detectors, manual alarm devices, conduit, and wire.

__ 01 Manual
__ 02 Automatic Detectors
__ 03 Mechanical & Electrical
__ 04 Extend Existing

276,277 Write-in Systems

POWER LIGHTING

311 Power — Connected Load — KW

Includes all interior distribution for power and special electrical systems, i.e., switchboards, transformers, motor controls, distribution switches, motor starters, feeders, branch-circuit wiring and devices, panels, and lightning protection. Exclude all interior distribution for lighting fixtures and emergency lighting, i.e., light fixtures, panels, branch circuit wiring, and devices for lighting.

__ 01 120/208
__ 02 277/480/120/208
__ 03 277/480
__ 04 120/240

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APPENDIX B (Continued)

__ 05 Alteration to Existing
__ 09 Explosion Proof

312 Lighting Gross Bldg. Area Sq Ft

Includes all interior lighting fixtures, exit and emergency lighting, branch circuit wiring, conduit, and devices for light fixtures only. Panels are included in System 311.

__ 01 Incand, Fluor, HID (Standard Spec) w/Bat-Op Emerg.
__ 02 Special System
__ 03 High Ind Discharge (HID) High Bay
__ 04 High Ind discharge (HID) Low Bay
__ 05 Explosion Proof

313 400 HZ Converter Capacity KW

Includes frequency changer, control system, wire, conduit, and devices to install a 400 HZ power system.

__ 01 Solid State
__ 02 M G Set

314 Direct Current Converter Capacity KW

Includes rectifier battery charger, battery bank, wire, conduit, and devices to install a direct current power system.

__ 01 Rectifier

315 Uninterruptible Power Supply (UPS) Converter Capacity KVA

Includes battery bank, rectifier, and static inverter for solid state equipment and flywheel, motor, generator, and battery bank for rotary equipment plus all associated wiring, conduit, switches, panels, and switchgear.

__ 01 Static

316 Electrical Generators Equipment Capacity KW

Includes diesel, gas and gasoline engines, day tanks, valves, piping and fittings, generators, operating and synchronizing controls, transfer switches, and wiring.

__ 01 Intermittent
__ 02 Continuous

__ 30
__ 31 120/240V, 1PH, 60HZ

__ 40
__ 41 600 RPM

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APPENDIX B (Continued)

__ 03 Electrical
__ 04 Gas
__ 05 Diesel
__ 06 Turbine
__ 07
__ 10 Overhaul existing units
__ 11 Generators GFM
__ 21 Integral Radiators
__ 22 Remote Radiators

__ 32 120/208V, 3PH, 60HZ
__ 33 277/480V, 3PH, 60HZ
__ 34 347/600V, 3PH, 60HZ
__ 35 4160V/2400V, 3PH 60HZ
__ 36 11.5/6.5KV, 3PH, 60HZ

__ 42 720 RPM
__ 43 900 RPM
__ 44 1200 RPM
__ 45 1800 RPM

317, 318 Write-in Systems

SPECIAL ELECTRICAL PROTECTION

321 Grounding — Gross Building Area Sq. Ft.

Includes cable, ground rods, clamps and connections for grounding system.

__ 01 Lightning Grounding
__ 02 Electronic Grounding
__ 03 Protective Grounding

322 Lightning Protection — Gross Building Area Sq. Ft.

Includes base plate, lightning mast, concrete foundations, ground rods, cables, and connections for a complete building lighting protection system.

323 - 326 Write-in Systems

SPECIAL ELECTRICAL/ELECTRONICS

331 Security Detection — Gross Bldg Area Sq Ft

Includes control panels, power supplies, detectors, alarm stations, alarm devices, wire, and conduit.

__ 01 Intrusion Alarm for Access Control
__ 02 Access Control
__ 03 TV Camera & Monitor
__ 04 Conduit
__ 05 Conduit & wire

If layout is not available describe area covered, where does alarm sound etc. Also describe intended function of system.

332 Energy Monitoring and Control System — Points of Controls Each

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APPENDIX B (Continued)

Includes control panels, devices, wiring, and conduit.

__ 01 Local Control
__ 02 Remote Control

333 Computer Communication Cable Run Lin. Ft.

Includes wiring, cable tray, and devices necessary for a complete computer communication system.

334 - 336 Write-in Systems

COMMUNICATION

341 Telephone Gross Bldg. Area Sq. Ft.

Includes control panels, devices, wire, and conduit.

__ 01 Government Owned System
__ 02 Conduit Only
__ 03 Conduit & Wire

342 Intercom Gross Bldg. Area Sq. Ft.

Includes master stations, substations, control panels, speakers, wire, and conduit. Includes System 344 public announcement when it is combined with the intercommunication system.

__ 01 Theater Sound
__ 03 Two-way communication listening
__ 04 Special System (Describe)
__ 05 Includes PA Systems
__ 06 Conduit
__ 07 Conduit & Wire
__ 08 Leased System
__ 09 Government Owned System

343 Television Gross Bldg. Area Sq. Ft.

Includes antenna, booster amplifiers, circuit wiring, conduit, cameras, control consoles, and monitors.

__ 01 Government Owned System
__ 02 Leased Cable System
__ 03 Conduit Only
__ 04 Conduit & Wire

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APPENDIX B (Continued)

344 Public Announcement — Gross Bldg. Area — Sq. Ft.

Includes master stations, substations, control panels, speakers, wire, and conduit. See System 342 for combined intercommunication and Public Announcement systems.

__ 01 Government Owned System
__ 02 Conduit only
__ 03 Conduit & Wire

345 Master Clock — Number of Outlets — Each

__ 01 Government Owned Systems
__ 02 Conduit & Wire

Includes wire, conduit, and devices for a master clock system.

346,347 Write-in System

4XX Special Equipment

Note: Equipment may be obtained for various funding sources and by different procurement methods. See Standard System Descriptions 4x5 - 4x6 Use: Install Government Furnished Equipment to allow for contractor cost of installation for Government furnished equipment; use Government furnished Equipment to allow for the cost of procuring equipment when financed from construction funds.

MEDICAL EQUIPMENT

411 Hospital Equipment — Gross Bldg. Area Sq. Ft.

Includes contractor furnished and installed built-in hospital equipment. Mechanical and electrical work are not included.

412 Dental Equipment — Number of Chairs — Each

Includes contractor furnished and installed built-in dental equipment. Mechanical and electrical work are not included.

413, 414 Write-ln Systems

415 Install Government Furnished Medical Equipment

416 Government Furnished Medical Equipment

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APPENDIX B (Continued)

FOOD SERVICE EQUIPMENT

421 Food Service Equipment — Pieces of Food Service Equip — Each

Includes contractor furnished and installed built-in food service equipment.

422 -425 Write in Systems

425 Install Government Furnished Food Service Equipment

426 Government Furnished Food Service Equipment

MISCELLANEOUS EQUIPMENT

431 Chapel Equipment — Gross Bldg. Area — Sq. Ft.

Includes contractor furnished and installed built-in chapel equipment.

432 Movie Theater Equipment — Gross Bldg. Area — Sq. Ft.

Includes contractor furnished and installed built-in equipment for showing films, such as projection booth windows, curtains, and projection screens.

Small rear projection screens should be included under 491 Other Equipment.

433 Rifle Range Equipment — Firing Lanes — Each

Includes targets, guides, baffles, and bullet stops.

434 Laboratory Equipment — Number Pieces — Each

Includes case work, benches, testing equipment apparatus, and other equipment designated as laboratory equipment. Mechanical and electrical work not included.

435 Install Government Furnished Equipment

436 Government Furnished Laboratory Equipment

437 Waste Disposal Equipment — Equipment Capacity — PPH

Includes built-in compactors, incineration, and shredders with installation cost. Enclosures, mechanical, and electrical work not included.

use of such. The Government is responsible for furnishing accurate and

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APPENDIX B (Continued)

438 Write-in System

SPECIAL WAREHOUSE EQUIPMENT

441 Special Warehouse Equipment Bldg. Area Sq. Ft.

Includes built-in storage racks and conveying systems, in rack special sprinkler system, dock leveler, dock door seals, and rubber bumpers with installation cost. Building mechanical and electrical work not included.

442 - 444 Write-in Systems

445 Install Government Furnished Warehouse Equipment

440 Government Furnished Warehouse Equipment

SPECIAL CONSTRUCTION

451 Hanger Doors Surface Area One Side Sq. Ft.

Includes tracks, guides, operators doors, and controls. Does not include structural steel supports, concrete. Electrical work at door only.

01 Sliding	10 Manual
02 Vertical Lift	11 Power Operated

452 Vault Doors Number Each Size

Includes vault door and frame.

453 Blast Doors Surface Area On Side Sq. Ft.

Includes doors, frames track, operators, and controls.

Span (TNT Equivalent)	Charge Weight	Distance
__ 01	__ 11	__ 21
__ 02 3 feet	__ 12 0 - 10 LB	__ 22 0 - 20 FT
__ 03 5 feet	__ 13	__ 23
__ 04 10 feet	__ 14 10 - 500 LB	__ 24 20 - 100 FT
__ 05 15 feet	__ 15	__ 25
__ 06 20 feet	__ 16 Over 500 LB	__ 26 Over 100 FT

454 Raised Floor Area of Raised Floor Sq. Ft.

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APPENDIX B (Continued)

Includes floor system, panel covering such as carpet, ramps, steps, closure panels, cable cutouts, and air flow panels, with installation cost. Railing to be a specialty item.

455 Radio Frequency Shielding — Surface Area Shielded — Sq. Ft.

Includes wall floors and ceiling panels, doors, filters, filter cabinets, wave guides, and enclosures for telephone, cypher locks, and fire alarm pull box with installation costs. Mechanical and electrical services not included.

__ 01	__ 10 Spray on Metal	__ 20
__ 02 Interference	__ 11 Foil Backed Gyp Board	__ 21
__ 03	__ 12 Wire Mesh	__ 22 20 Db
__ 04 Tempest	__ 13 Copper Sheet	__ 23
__ 05	__ 14 Aluminum Sheet	__ 24
__ 06 Hemp	__ 15-Single Sheet Steel	__ 25 50 Db
	__ 16 Steel Prefab Room	__ 26
	__ 17 Stainless Steel	__ 27
	__ 18	__ 28 80 Db
		__ 30 100 Db

456 Bowling Lanes — Number of Lanes — Each

Includes lanes and installation with pinsetter, returns, and other associated equipment.

__ 01 New	__ 10 W/O Auto Pin Setter
__ 02 Refinished	__ 11 W/ Auto Pin Setters

457 Paint Spray Booth — Floor Area — Sq. Ft.

Includes booth and equipment procured with booth. Mechanical and electrical hookup at booth area included.

458 Write-in System

OTHER EQUIPMENT

491 Other Miscellaneous Equipment — Total Cost — Lump Sum

Includes special equipment not included above. Also refer to System

147 Specialties.

492 Snow Melting Area — Protected — Sq. Ft.

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APPENDIX B (Continued)

__ 01 Electrical
__ 02 Glycol
__ 03 Geothermal

495 Install Government Furnished Miscellaneous Equipment

496 Government Furnished Miscellaneous Equipment

Describe any equipment not shown elsewhere that is purchased from construction funds. Usually this is either from equipment purchased by the Government and furnished to the construction contractor, or it is furnished and installed under a separate contract. Also show, if not shown elsewhere equipment not from construction funds for which installation costs will be required.

499 Building work not included elsewhere Total Cost Lump Sum

Used when partial data is loaded and it is desirable to combine several systems of no historical value. (Rehabilitation and Alteration projects are the ones for which this system is normally used; very seldom, if ever, is this used for new work.)

SUPPORTING FACILITIES

(Systems 500 through 999)

Note 1. Show the following criteria suitable for the applications of historical cost; under each applicable system heading.

a. Size (assume if unknown) and length of utility runs. Include storm drainage requirement. Indicate valves, fire hydrants, manholes, catch basins and other significant extras. Depth of cut (when over 4 feet) and dewatering requirements must be shown.

b. Area and assumed section for paved areas. Identify each type and section variation.

c. Description of work required for grading, cut and borrow. Describe assumed nature of materials to be moved. If rock excavation is required, state assumptions on removal requirements (e.g., rip, blast, etc.).

d. Indicate approximate quantities of clearing and grubbing in acres, and whether heavy, medium, or light.

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APPENDIX B (Continued)

e. Describe any functional features required outside the building 5-foot line such as: sewage lift stations, wash racks and water tanks, and unsuitable soil conditions.

f. If hazardous materials are present, state type, extent and method of disposal.

g. See System 911 for Land Piling-Driven.

EXTERIOR ELECTRICAL
SUPPORTING FACILITIES

511 Electrical Distribution, Primary Length of Run Lin. Ft.
Size

Includes overhead power distribution, i.e., poles, crossarms, insulators, guying, terminations, lightning protection, wire and cable, and underground distribution, i.e., excavation and backfill, concrete encased duct bank, direct burial duct, manholes, handholes, cable, terminations, stress cones, and grounding. All for primary distribution to transformer or substation.

__ 01 Underground
__ 02 Overhead

512 Electrical Distribution Secondary Length of Run Lin. Ft.
Size

Includes overhead power distribution, i.e., poles, crossarms, insulators, guying, terminations, lightning protection, wire and cable, and underground distribution, i.e., excavation and backfill, concrete encased duct bank, manholes, handholes, cable, terminations, stress cones, and grounding.

__ 01 Overhead
__ 02 Pad Mounted

513 Substation/Transformer Capacity KVA

Includes overhead transformer, i.e., fuse cutouts, transformers, substation, including concrete fence, steel framing, fencing and enclosure, and pad mounted transformer, i.e., disconnect services, transformers, substation including concrete steel framing, fencing, and enclosure.

__ 01 Overhead
__ 02 Pad Mounted

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APPENDIX B (Continued)

514 Area Lighting — Number of Fixtures Each

Includes poles, fixtures, excavation and backfill, concrete work, wire, duct, and conduit.

__ 01 Incandescent
__ 02 High pressure sodium
__ 03 Low pressure sodium
__ 04 Mercury vapor
__ 05 Other

__ 11 Overhead Distribution
__ 12 Underground Distribution

515 Airfield Lighting — Length of Run Lin. Ft.

Includes excavation and backfill, duct, conduit, devices, transformer, relays, and wiring necessary to install the airfield lighting.

516 Lightning Protection — Point of Protection Each

Includes base plate, lighting mast, concrete foundations, ground rods, cables, and connections for a complete exterior lightning protection system.

517, 518 Write-in Systems

EXTERIOR COMMUNICATION

521 Fire Alarm — Length of Run Lin. Ft.

Includes excavation, backfill, duct, conduit, devices, and wire necessary to install an exterior fire alarm system.

522 Security Alarm — Length of Run Lin. Ft.

Includes excavation and backfill, duct, conduit, and junction boxes. Wiring cable, devices, and their installation are not MCON funded.

523 Communication, Telephone — Length of Run Lin. Ft.

Includes excavation and backfill, duct, conduit, devices and wire necessary to install an exterior communication system.

524 Exterior EMCS — Length of Run Lin. Ft.

Includes cable, duct, conduit necessary for EMCS systems outside the building 5-foot line.

525, 526 Write-in Systems

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APPENDIX B (Continued)

EXTERIOR MECHANICAL

541 Heat Distribution, Overhead — Length of Run Lin. Ft. / Size

Includes supports, piping, insulation, and valves to install overhead steam/condensate and hot water distribution systems outside the 5-foot line.

__ 01 Concrete supports
__ 02 Timber supports

542 Heal Distribution Underground — Length of Run Lin. Ft.

Includes excavation, backfill, manholes, supports, piping insulation, and valves to install underground steam/condensate and hot water distribution systems outside the 5-foot line.

__ 01 # of Manholes
__ 02 Size of manholes

543 Chilled Water Distribution — Length of Run Lin. Ft. / Size

Includes excavation, backfill, manholes, supports, piping, insulation, and valves to installed chilled water distribution systems outside the 5-foot line.

544 Condensate Collection (only) — Length of Run Lin. Ft. / Size

Includes excavation, backfill, manholes, supports, piping, and valves to install a condensate collection system.

545 Gas Distribution — Length of Run Lin. Ft. / Size

Includes excavation, backfill, piping, valves, and other miscellaneous work to install a complete gas system outside the 5-foot line.

546 Compressed Air Distribution — Length of Run Lin. Ft. / Size

Includes excavation, backfill, piping, valves, and devices to install a complete compressed air distribution system outside the 5-foot line.

547 Fuel Distribution — Length of Run Lin. Ft. / Size

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APPENDIX B (Continued)

Includes excavation, backfill, piping, pipe coatings, valves, and devices to install a complete fuel distribution system outside the 5-foot line.

548 Exterior Foam System — Length of Run Lin. Ft. / Size

Include distribution piping, foam storage and proportioning equipment, booster pump, and emergency power.

		Distribution
__ 01 Bladder Tanks	__ 11 Above Ground	
__ 02 Standard Tanks	__ 12 Below Ground	
Amps, Proportioner	__ 13	
__ 03 100% Back-up Storage	__ 14	
__ 04 Less than 100%	__ 15 6% Concentration	
Back-up Storage	__ 16 3% Concentration	
__ 05 Water Booster Pump		
__ 06 Emergency Generator		

549 Write-in System

EXTERIOR WATER DISTRIBUTION

551 Water Distribution — Length of Run Lin. Ft. / Size

Includes complete potable water distribution system, i.e., utility service connection, fire hydrants, excavation and backfill, pipe, valves, and fittings. Use when domestic and fire water System 552 are combined in one line.

__ 01 Fire hydrants
__ 02 Fittings (C.I.)
__ 03 Tapping sleeves & valves
__ 04 Valves

552 Fire Protection

Water Distribution — Length of Run Lin. Ft. / Size

Includes complete fire water distribution system, i.e., utility service connection fire hydrants, excavation and backfill, pipe, valves, and fittings.

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APPENDIX B (Continued)

__ 01 Fire hydrants
__ 02 Fittings (C.I.)
__ 03 Tapping sleeves & valves
__ 04 Valves

553 Salt Water Distribution — Length of Run Lin. Ft. / Size

Includes complete salt water distribution system, i.e., utility service connections, fire hydrants, excavation and backfill, pipe, valves, and fittings.

554 Sanitary Sewers — Length of Run Lin. Ft. / Size

Includes complete sanitary sewer system, i.e., utility service connections, excavation and backfill, sheeting and shoring, dewatering, pipe and fittings, manholes, cleanouts, septic disposal and process, and acid waste system outside the 5-foot line.

555, 556 Write-in Systems

__ 01 Manholes
__ 02 Cleanouts
__ 03 Dewatering
__ 04 Sheeting

Bulk Storage

561 Fuel Storage, Bulk — Capacity BBL

Include tanks, foundation, coatings, fire protection, and level controls. Does not include piping or other special foundation work.

__ 01 Underground
__ 02 Above ground

562 Fuel Storage, Ready Issue — Capacity GAL

Includes excavation, backfill, gravel fill, concrete, tie downs, tanks, accessories, piping at tank, coatings, and monitoring wells. (Does not include long runs of supply piping.)

__ 01 Underground
__ 02 Above ground

563 Water Storage — Capacity GAL

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APPENDIX B (Continued)

Includes ground level and elevated storage tanks, foundation, coatings, lighting, valves, and piping required at tanks. Does not include piling or other special foundations work.

564 - 566 Write-in Systems

__ 01 Ground level
__ 02 Elevated

FUELING

571 Vehicle Fueling — Number of Outlets — Each

Includes concrete island, pumps, piping to 5-foot of tank and electrical work to panel.

__ 01 Single products pump
__ 02 Dual products pump

572 Aircraft Fueling — Number of Hydrants — Each

Includes hydrants, filter, supports, loading arms, piping, and canopy. System includes truck loading stand for loading of fueling trucks.

573 Marine Fueling

Includes hydrants, filters, supports, loading arms, piping, and canopy.

574 - 576 Write-in Systems

PUMPING

581 Fuel Pumping Station — Pump Capacity — GPM
Bldg size

Includes all work to install a complete fuel pumping station to the 5-foot line. Includes excavation and backfill, pit, pump, piping, valves, structure and electrical work at pump, and other miscellaneous work.

__ 01 Above ground
__ 02 Below ground

__ 11 Reinforced concrete
__ 12 Masonry
__ 13 Pre engineered
__ 14 Other

582 Water Pumping Station — Pump Capacity — GPM
Bldg size

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APPENDIX B (Continued)

Includes all work to install a complete water pumping station to the 5-foot line. Includes building, pit excavation and backfill, piping, pumps, electrical, and other miscellaneous work.

__ 01 Above ground
__ 02 Below ground

__ 11 Reinforced concrete
__ 12 Masonry
13 Pre engineered
14 Other

583 Fire Booster Pump

Pump Capacity GPM
Bldg size

Includes all work to install a complete water booster pumping station to the 5-foot line, if within a separate building. If pump is contained within the primary building, include in System 271. Includes pump, piping valves, electrical work at pump, and other miscellaneous work to install a complete fire booster pump.

__ 01 Above ground
__ 02 Below ground

__ 11 Reinforced concrete
__ 12 Masonry
__ 13 Pre engineered
__ 14 Other

584 Sewage Pump Station

Pump Capacity GPM
Bldg size

Includes all work to install a complete sewage pumping station to the 5-foot line. Includes building, wet well, dry well, excavation and backfill, piping, pumps, electrical, and other miscellaneous work.

__ 01 Above ground
__ 02 Below ground

__ 11 Reinforced concrete
__ 12 Masonry
__ 13 Pre engineered
__ 14 Other

585 Sewage Lift Station

Pump Capacity GPM
Bldg size

Includes all work to install a complete sewage lift station to the 5-foot line. Includes structure, wet well, excavation and backfill, piping, pumps, electrical, and other miscellaneous work.

__ 01 Above ground
__ 02 Below ground

__ 11 Reinforced concrete
__ 12 Masonry
__ 13 Pre engineered
__ 14 Other

586 Write-in System

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APPENDIX B (Continued)

TREATMENT FACILITY

591 Water Treatment — Capacity (Million gal/day) MGD

Includes excavation, backfill, piping, pumps, equipment, controls, and other necessary accessories to install a complete water treatment system.

592 Domestic Sewage Treatment — Capacity (Million gal/day) MGD

Includes excavation, backfill, piping, pumps, equipment, controls, and other necessary accessories to install a complete domestic sewage treatment system.

593 Industrial Waste Treatment — Capacity (Million gal/day) MGD

Includes excavation, backfill, piping, pumps, equipment, controls, and other necessary accessories to install a complete industrial waste treatment system.

594 - 596 Write-in System

EQUIPMENT BUILDING

611 Mechanical Equipment Building — Gross Bldg. Area Sq. Ft.

Includes all work to construct a mechanical equipment building as part of a larger building project. Includes building construction, mechanical, and electrical work.

612 Electrical Equipment Building — Gross Bldg. Area Sq. Ft.

Includes all work to construct an electrical equipment building as part of a larger building project. Includes building construction, mechanical, and electrical work.

613 - 615 Write-in Systems

SUPPORTING STRUCTURES MISCELLANEOUS

621 Security Gate — Opening Width Lin. Ft.

Includes mechanically operated gate, foundation, supports, operating mechanism controls, and electrical work at gate.

622 Guard House — Gross Bldg. Area Sq. Ft.

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APPENDIX B (Continued)

Includes structure, canopy, apron curb, lighting, and mechanical and electrical work. Use for entrance gate structure as well as other guard house. This system is not intended for large structures that are a primary facility.

623 - 625 Write-in System

POLLUTION ABATEMENT STRUCTURES

641 Oil Water Separators — Capacity — Gal.

Includes excavation, backfill, concrete structure, miscellaneous metals, thru wall piping, and other work necessary to install a complete oil water separator.

642 Electro-Static Precipitator — Air Flow — SCFM

Includes all work to install precipitator. Includes breeching (inlet and outlet), structural supports, control system, and ash hopper.

__ 01 2 Field
__ 02 3 Field
__ 03 4 Field
__ 04 5 Field
__ 05 6 Field
__ 11 3 Feet/Second
__ 12 4 Feet/Second
__ 13 5 Feet/Second
__ 14
__ 15 Single Stage
__ 16 Two Stage

643 - 645 Write-In Systems

SHOP SUPPORT STRUCTURES

651 Vehicle Grease Rack — Number of Vehicles Racks — Each

Includes all work necessary to install an exterior grease rack. Includes excavation, backfill, concrete, miscellaneous metal, and other required items.

652 Vehicle Wash Platform — Number of Vehicles Bays — Each

Includes all work to install a complete vehicle wash platform. Includes excavation, backfill, paving, piping, accessories, and electrical work to edge of platform. Does not include distribution piping.

653 - 656 Write-in Systems

AIRCRAFT CLEANING FACILITY

661 Aircraft Washing Facility — Paved Area — Sq. Yd.

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APPENDIX B (Continued)

Includes paving, drainage, water supply, washing equipment controls, and other necessary items to install a complete aircraft washing facility. Do not include access paving or long utility supply runs.

662 Aircraft Rinsing Facility — Paved Area — Sq. Yd.

Includes paving, drainage, water supply rinsing equipment, controls, and other necessary items to install a complete aircraft rinsing facility. Do not include access paving or long utility supply runs.

663 - 666 Write-in Systems

SITE PREPARATION & IMPROVEMENTS
ROADS

711 Concrete Roads — Paved Area — Sq. Yd.

Includes concrete paving, curbs, curbs and gutters, subgrade preparation, fine grading, compaction, sub-base course, base course, edge forms, concrete reinforcement, finishing, expansion and control joints, rails and barriers, wheels stops, and pavement.

__ 01 Thickness (PVMT)
__ 02 Reinforcing
__ 03 Curbs & gutter
__ 04 Thickness (subgrade)

712 Flexible Roads — Paved Area — Sq. Yd.

Includes bituminous concrete paving, tack and seal costs, curbs, curbs and gutters, subgrade preparation, fine grading, compaction, sub-base course, base course, wearing course, finish course, rails and barriers, wheels stops, and pavement markings.

__ 01 Thickness (PVMT)
__ 02 Reinforcing
__ 03 Curbs & gutter
__ 04 Thickness (subgrade)

713 Overlay Road — Paved Area — Sq. Yd. — Thickness

Includes flexible paving overlay of existing roads. Includes cleaning, sweeping, leveling courses, minor patching, tack coat, and pavement marking.

714 Flexible Roads — Paved Area — Sq. Yd.

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APPENDIX B (Continued)

Includes bituminous surface treatment over existing pavement or base course. Includes cleaning, sweeping, minor patching, tack or prime coat, and pavement marking.

715 Flexible Roads — Paved Area — Sq. Yd.

Includes slurry seal over existing road. Includes cleaning, sweeping, minor patching, and pavement marking.

716, 717 Write-In Systems

PARKING

721 Flexible Roads — Paved Area — Sq. Yd.

Includes concrete paving, curbs, curbs and gutters, fine grading, compaction, sub-base course, base course, edge forms, concrete reinforcement, curbing, finishing, expansion and control joints, rails, and barriers, wheel stops, and pavement markings.

__ 01 Thickness (PVMT)
__ 02 Reinforcing
__ 03 Curbs & gutter
__ 04 Thickness (subgrade)

722 Flexible Parking — Paved Area — Sq. Yd.

Includes bituminous concrete paving, tack and seal coats, curbs and gutters, fine grading, compaction, sub-base course, base course, wearing course, finish course, rails and barriers, wheel stops, and pavement markings.

__ 01 Thickness (PVMT)
__ 02 Reinforcing
__ 03 Curbs and gutter
__ 04 Thickness (subgrade)

723 Flexible Parking — Paved Area — Sq. Yd. Thickness

Includes flexible paving overlay of existing parking areas. Includes cleaning, sweeping, leveling course, minor patching, tack coat, and pavement marking.

724 Flexible Parking — Paved Area — Sq. Yd.

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APPENDIX B (Continued)

Includes bituminous surface treatment over existing pavement or base course. Includes cleaning, sweeping, leveling courses, minor patching, tack or prime coat, and pavement marking.

725 Slurry Seal Parking — Paved Area — Sq. Yd.

Includes slurry seal over existing parking area. Includes cleaning, sweeping, minor patching, and pavement marking.

726, 727 Write-in Systems

WALKS

741 Concrete Walks — Paved Area — Sq. Yd.

Includes concrete paving, base course, edge forms, concrete reinforcement finishing, edging, and exterior steps.

742 Bituminous Walks — Paved Area — Sq. Yd.

Includes bituminous paving, base course, edging, and exterior steps.

743 Special Walks — Paved Area — Sq. Yd.

Includes brick paving, limestone paving, flagstone paving, other paving materials, base course, and exterior steps.

744 - 746 Write-in Systems

AIRCRAFT PARKING CONCRETE

751 Concrete Runaways — Paved Area — Sq. Yd.

Includes concrete paving, curbs, curbs and gutters, subgrade preparation compaction, base course, sub-base course, edge forms, reinforcing, finishing, expansion and control joints, rails and barriers, wheel stops, and pavement markings when constructed for aircraft runways.

__ 01 Thickness (PVMT)
__ 02 Reinforcing
__ 03 Curbs and gutter
__ 04 Thickness (subgrade)

752 Concrete Taxiways — Paved Area — Sq. Yd.

Includes concrete paving, curbs, curbs and gutters, subgrade preparation compaction, base course, sub-base course, edge forms,

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APPENDIX B (Continued)

reinforcing, finishing, expansion and control joints, rails and barriers, wheel stops, and pavement markings when constructed for aircraft taxing.

__ 01 Thickness (PVMT)
__ 02 Reinforcing
__ 03 Curbs and gutter
__ 04 Thickness (subgrade)

753 Concrete Aprons Paved Area Sq. Yd.

Includes concrete paving, curbs, curbs and gutters, subgrade preparation compaction, base course, sub-base course, edge forms, reinforcing, finishing, expansion and control joints, rails and barriers, wheel stops, and pavement markings when constructed for aircraft parking.

__ 01 Thickness (PVMT)
__ 02 Reinforcing
__ 03 Curbs and gutter
__ 04 Thickness (subgrade)

754 Concrete Runaways Paved Area Sq. Yd.

Includes removing and replacing individual slabs, partial slab removal and replacements, spall repairs, full depth repairs, and other miscellaneous patching.

__ 01 Full depth repair
__ 02 Spall repair
__ 03 Corner break
__ 04 Other

755 Concrete Runaways Paved Area Sq. Yd.

Includes cleaning and resealing joints and cracks repairs.

757, 758 Write-in Systems

AIRCRAFT PAVING FLEXIBLE

Includes bituminous concrete paving, curbs, curbs and gutters, subgrade preparation, compaction, base course, sub-base course, wearing course, finish course, rails and barriers, wheel stops, and pavement markings when constructed for aircraft runways.

__ 01 Thickness (PVMT)
__ 02 Reinforcing

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APPENDIX B (Continued)

__ 03 Curbs and gutter
__ 04 Thickness (subgrade)

762 Flexible Taxiways — Paved Area — Sq. Yd.

Includes bituminous concrete paving, curbs, curbs and gutters, subgrade preparation, compaction, base course, sub-base course, wearing course, finish course, rails and barriers, wheel stops, and pavement markings when constructed for aircraft taxing.

__ 01 Thickness (PVMT)
__ 02 Reinforcing
__ 03 Curbs and gutter
__ 04 Thickness (subgrade)

763 Flexible Aprons — Paved Area — Sq. Yd.

Includes bituminous concrete paving, curbs, curbs and gutters, subgrade preparation, compaction, base course, sub-base course, wearing course, finish course, rails and barriers, wheel stops, and pavement markings when constructed for aircraft parking.

__ 01 Thickness (PVMT)
__ 02 Reinforcing
__ 03 Curbs and gutter
__ 04 Thickness (subgrade)

764 Concrete Runaways — Paved Area — Sq. Yd.

Includes removing and replacing small area of flexible paving including sub-base course, base course, tack of prime coat, and surface material.

__ 01 Full depth repair
__ 02 Surface repair

765 Aircraft Paving Overlay — Paved Area — Sq. Yd. — Thickness

Includes flexible overlays of aircraft paving. Includes cleaning, sweeping, minor patching, tack coat, and pavement markings.

766 Aircraft Slurry Seal — Paved Area — Sq. Yd.

Includes slurry seal applied over existing aircraft paving. Includes cleaning, sweeping, minor patching, tack coat, and pavement markings.

767, 768 Write-in Systems

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APPENDIX B (Continued)

INCIDENTAL PAVING WORK

Includes bituminous and concrete milling with removal and/or disposal cost. Savings from recycled materials should be reflected in our systems.

772 - 776 Write-in Systems

EARTHWORK

811 Earthwork — Volume — Cu. Yd.

Includes site grading, site excavation, soil stabilization, soil treatment, and site clearing.

812 Borrow — Volume in Place — Cu. Yd.

Includes all work to provide off site borrow material compacted in place.

813 Topsoil, Seed, Sod — Area Graded — Sq. Yd.

Includes fine grading and leveling, fertilizer and limestone application, spreading and leveling topsoil, seeding, mulching, and sodding.

814 Landscaping — Area Planted — Sq. Yd.

Includes trees, shrubs, ground covers, and planters.

815 Site Irrigation — Number Sprinkler Heads — Each

Includes underground piping, sprinkler heads, and controls to install site irrigation system.

816 Surcharge — Fill in Surcharge — Cu. Yd.

Includes cost for obtaining, placing, monitoring, and removing to disposal area all required surcharge. If used for site fill does not include cost of compaction.

817 Earth Replacement — Earth Replaced (In place Measurement) — Cu. Yd.

Includes all cost for temporary environmental protection work required due to clearing, grubbing, earthwork, or other related work. (Measure to nearest tenth of acre).

818 Environmental Protection — Area Protected — Acres

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APPENDIX B (Continued)

Includes all cost for temporary environmental protection work required due to clearing, grubbing, earthwork, or other related work. (Measure to nearest tenth of acre.)

819 Write-in System

SITE IMPROVEMENT

821 Site Improvements — Area Developed — Sq. Yd.

Includes retaining walls, terrace and perimeter walls, signs, site furnishings, fountains, pools and watercourse, flagpoles, and other miscellaneous related items.

822 - 825 Write-in Systems

SITE PREPARATION

831 Site Dewatering (Major) Header — Pipe — Lin. Ft.

Includes all costs for site dewatering where the dewatering is a major item and is required for several systems. Includes furnishing, installing, operating, and removal of well pointing system.

832 - 835 Write-in Systems

DEMOLITION

841 Remove Utilities — Length Or Run — Lin. Ft.
Sizes

Includes excavation, utility removal, capping, and backfill as required to remove existing utility lines.

842 Remove Paving and Slabs — Area Removed — Sq. Yd.
Thickness

Includes removal and disposal of material from both bituminous and portland cement concrete paved areas.

843 Remove Structures — Structure Volume — Cu. Ft.

Includes complete cost for removal of structure, foundation, and interior equipment. Removal of hazardous material si not included. See Systems 844 and 845.

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APPENDIX B (Continued)

__ 01 Wood
__ 02 Masonry
__ 03 Concrete
__ 04 Pre-engineered
__ 05 Other

844 Remove/Dispose of Asbestos (Exterior) Total Cost Lump Sum

Includes costs for removal of asbestos from any exterior areas including buildings to be demolished. Included are costs for sealing off areas, asbestos removal, monitoring testing disposal, change areas, disposal suits, respirators, and other related costs (See System 172 for Interior asbestos removal.)

__ 01 Pipe
__ 02 Siding
__ 03 Insulation
__ 04 Roofing

845 Remove/Dispose of P.C.B. Total Cost Lump Sum

Includes costs for removing and disposing of P.C.B. contaminated areas. Included are costs for sealing off area, removal of contaminated materials, monitoring, testing change area, disposal, suits, respirators, disposal, and other related costs.

846 Remove/Dispose of Contaminated Earth Earth Removed Cu. Yd.

Includes cost of removing and disposing of existing industrial and hazardous materials.

847 Write-in Systems

STORM DRAINAGE

851 Storm Drainage Piping Length of Run Lin. Ft.
Size

Includes utility service connections, excavation and backfill, sheeting and shoring, dewatering, pipe and fittings, manholes, catch basins, curb inlets, dry walls, ditches and culverts, retention ponds, and headwalls.

__ 01 Concrete
__ 02 Corrugated metal
__ 03 Other

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APPENDIX B (Continued)

852 Box and Arch Culvert — Length of Culvert — Lin. Ft.
Size

Includes excavation, backfill, forming, concrete, reinforcing steel accessories, steel arch, and bedding materials.

853 Drainage Facing Materials — Surface Area — Sq. Yd.
Type

Includes stone riprap, fabrics, and other materials used as facing materials for outfalls and slope protection from storm water runoff.

854 - 856 Write-in Systems

FENCING

861 Fencing (Perimeter) — Length of Fence — Lin. Ft.
Height

Includes footings, posts, fencing materials, gates, and turnstiles for perimeter fencing. Includes station perimeter and individual facility. Does not include fencing for fields in Systems 872, 874, 875. See 621 for mechanically operated security gate.

__ 01 Gates
__ 02 Barb Wire

862 Fencing (Alarm) — Length of Fence — Lin. Ft.
Height

Includes footings, posts, fencing materials, gates, and turnstiles. When fence is part of a security alarm system.

863 - 865 Write-in Systems

RECREATION EQUIPMENT / FIELDS

871 Playground Equipment — Pieces of Equipment — Each

Includes swings, slides, and other items of recreation-type equipment for children's playgrounds.

872 Playing Field Equipment — Pieces of Equipment — Each

Includes costs for playing filed equipment not show elsewhere.

873 Tennis Courts — Number of Courts — Each

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APPENDIX B (Continued)

Include paving, fencing, lighting, and nets for a complete tennis court.

874 Softball/Baseball Fields — Number of Fields Each

Includes grading, topsoil and seeding drainage, infield, dugouts, fencing, and lighting as required for a complete softball or baseball field.

875 Football/Soccer Fields — Number of Fields Each

Includes grading, topsoil and seeding, drainage, fencing, goals, benches, and lighting as required for a complete football or soccer field.

876, 877 Write-in System

HEAVY CONSTRUCTION
SPECIAL BUILDING FOUNDATIONS

911 Land Piling - Driven — Length of Piling Lin. Ft.

Piling driven from land-based equipment used for building foundations or bulkhead tieback systems. Includes mobilization and demobilization, pile cutoff, and piling. Includes pile tests if not a separate bid item.

**** For SYSTEM LAND PILING-DRIVEN ****
**** See Under Foundations (System 111) in Building Systems ****

912 CAISSONS — Number of Caissons Each

Includes excavation, concrete, and reinforcing for foundation caissons.

__ 01 Cased
__ 02 Uncased
__ 03 Other
__ 11 50 - 100 Tons
__ 12 101 - 150 Tons
__ 13 151 - 200 Tons
__ 14 Other

SPECIAL BUILDING FOUNDATIONS

913 Pressure Injected Footings — Number of Footings Each

Includes drilling, concrete, and reinforcing a complete pressure injected footing system.

__ 01 Cased
__ 02 Uncased
__ 03 Steel Pipe
__ 04 Other
__ 11 50 - 100 Tons
__ 12 101 - 150 Tons
__ 13 151 - 200 Tons
__ 14 Other

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APPENDIX B (Continued)

914 Vibroflotation — Number of Locations — Each

Includes specialized vibratory probe for penetration and extraction, and furnishing and placing sand backfill.

__ 01 Sand
__ 02 Stone
__ 03 Other

__ 11 50 - 100 Tons
__ 12 101 - 150 Tons
__ 13 151 - 200 Tons
__ 14 Other

915 Chemical Soil Stabilization — Number of Locations — Each

Includes grouting equipment and specialized chemicals for injection into unstable sub-surface materials.

__ 01 Cement
__ 02 Lime
__ 03 Flyash
__ 04 Other

916 Dynamic Consolidation — Number of Locations — Each

Includes equipment, consolidation effort, sand, backfill, and testing.

917 Piling - Cast-in Place — Length of Piling — Lin. Ft.

Includes drilling, casing concrete, and reinforcing for a complete cast-in-place piling system.

__ 01 Cased
__ 02 Uncased
__ 03 Steel Pipe
__ 04 Auger Cast
__ 05 Concrete Filled
__ 06 Other

__ 11 0 - 50 Tons
__ 12 51 - 100 Tons
__ 13 101 - 150 Tons
__ 14 Other

RAILROAD

921 Track Work - Railroad — Length of Track — Lin. Ft.

Includes subgrade preparation, ballast, ties, rail, switches, and other accessories for a complete track system.

922 - 925 Write-in Systems

MARINE STRUCTURES PIERS

931 Piling - Marine — Length of Piling — Lin. Ft.

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APPENDIX B (Continued)

Piling driven from floating equipment or land equipment used to support piers or similar waterfront structures. Includes mobilization and demobilization, pile cutoff and piling. Includes pile tests if not a separate bid item.

932 Dolphins — Number of Dolphins — Each

Includes piling, cap and accessories for a complete dolphin.

933 Med Mooring — Total Cost — Lump Sum

Includes chain, anchors, buoys and other accessories for a complete Med mooring.

934 Pier Deck — Area of Deck — Sq. Ft.

Includes mobilization and demobilization, cast-in-place or precast concrete pile caps, trench sections, deck panels, manholes or transformer vaults, embedded conduit, drains, and expansion joints.

935 Fenders — Length of Fender — Lin. Ft.

Includes mobilization and demobilization, wales, chocks, fender piles, rubber fenders, pneumatic fenders, and associated hardware.

936 Pile Clusters — Number of Clusters — Each

Includes piles and accessories required for a complete pile cluster.

937 Marine Specialties — Total Cost — Lump Sum

Includes mobilization and demobilization, bollards, cleats, brows, camels, oil booms, and other marine specialties.

935 Write-in System

MARINE STRUCTURES SPECIALS

941 Bulkheads/Seawalls — Total Face Area — Sq. Ft.

Includes mobilization and demobilization, sheet piles, concrete cap, relieving platform, and tieback system.

942 Erosion Protection Marine — Area Covered — Sq. Yd.

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APPENDIX B (Continued)

Includes mobilization and demobilization, filled bags, concrete and asphalt surfaces, ground mats, sand fences, precast structural items (dolos, tetrapads, etc.), and filter cloth.

943 Riprap (Marine) Area Covered Sq. Yd.

Includes bed preparation, all layers of stone, and other required work to place riprap for slope protection from wave action.

944 - 946 Write-in Systems

MARINE REPAIRS

951 Underdeck Repair Total Cost Lump Sum

Includes mobilization and demobilization, repair of cracks, spalls, beam and cap repairs.

952 Pile Repairs Marine Length Repaired Lin. Ft.

Includes costs for removal and replacement of existing concrete including forms and reinforcing and repair for timber piling. All for marine structure.

953 - 957 Write-in Systems

DREDGING

961 Mobilization/Demobilization Dredging Total Cost Lump Sum

Includes outfitting and moving equipment to and from site, dike work, spillways, pipeline laying, and other work not directly associated with actual moving of dredged materials.

962 Hydraulic Dredging Volume Cu. Yd.

Includes costs for actual moving of material by hydraulic means from in-place location to disposal area.

963 Bucket Dredging Volume Cu. Yd.

Includes pumping of material from scow to disposal area.

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APPENDIX C
EXAMPLE OF PARAMETRIC ESTIMATING AND PROGRAMMING (PEP)

NOTE: For additional information, refer to MIL-HDBK-1010 and the PEP instruction for the EFD or EFA that has jurisdiction.

A PEP is a document prepared to support approval of programming and appropriation cycles by Congress for MCON projects. The PEP shall consist of the following elements:

1. Updated DD Form 1391 (see Figure C-1 or C-2) with SF Cost Development Sheet and Supporting Facilities Backup.

2. Estimate Summary Sheet (see Figure C-3).

3. Project Special Considerations Checklist (see Figure C-4).

4. Sketches or partially completed full-size drawings, such as location plan, site plan, utilities site plan, schematic floor plans of each floor for buildings, and elevations (see Figures C-5 through C-8).

5. Project Description following either CES Cost Model Questionnaire or CSI UNIFORMAT as applicable, and describing in narrative the elements of the construction covered in the design and cost estimate. Although less detail is acceptable, the categories outlined in the Basis of Design (Appendix B) and the Preliminary Specifications (Appendix D) are the appropriate order for the project description.

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1. COMPONENT	FY 1994 MILITARY CONSTRUCTION DATA	2. DATE
NAVY		1 SEP 91

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
NAS OCEANA, VIRGINIA BEACH, VIRGINIA	WEAPONS SYSTEM TRAINER ADDITION

5. PROGRAM ELELMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
	171-351	P-178	3,650

9. COST ESTIMATE

ACF: .92 ITEM — ESCALATED TO: 1 NOV 94	U/M	QUANTITY	UNIT COST	COST ($000)
WEAPONS SYSTEM TRAINER ADDITION	SF	25,480	112.60	2,869
BUILDING	SF	25,480	103.26	(2,631)
BUILT-IN EQUIPMENT	LS			(238)
SUPPORTING FACILITIES	LS			428
SPECIAL FOUNDATION FEATURES (A)	LS			(105)
ELECTRICAL UTILITIES (B)	LS			(181)
MECHANICAL UTILITIES (C)	LS			(42)
ROADS, PARKING, SIDEWALKS (D)	LS			(22)
SITE IMPROVEMENTS (E)	LS			(73)
DEMOLITION (F)	LS			(5)
SUBTOTAL				3,297
CONTINGENCY (5%)				165
TOTAL CONTRACT COST				3,462
SUPERVISION, INSPECTION, OVERHEAD (6.0%)				208
TOTAL REQUEST				3670
TOTAL REQUEST ROUNDED				3650
EQUIPMENT PROVIDED FROM OTHER APPROPRIATIONS (NON ADD)				(184)

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Two story 25,480 SF steel frame and masonry building as an addition to existing Building No. 140. The pile foundation will support concrete pile caps and grade beams. The roof will be metal deck with insulation on metal bar joist for the majority of the roof; However, the trainer, mechanical, electrical, and hydraulics areas will have concrete over metal deck. The roofing system will be a single-ply membrane. The exterior walls will be exterior finishing system over masonry, interior walls to be masonry. Raised floor systems on first and second floor for computer/equipment areas. This building will provide for future first and second floor expansions. There are requirements for IDS, fire sprinkler, fire alarm, and security alarm systems. The supporting systems includes; pile foundations, mechanical and electrical distribution systems, area lighting, parking areas, sidewalks and landscaping.
(Air Conditioning: 125 Tons)

11. REQUIRMENT: 141,400 SF ADEQUATE: 38,381 SF SUBSTANDARD: 17,878 SF

PROJECT:

Provides an applied instruction building addition to house one weapons systems trainer used to train pilots and flight officers. This project supports the improved F-14 aircraft. (New mission)

REQUIREMENT:

A building addition to house weapons systems trainer scheduled for delivery beginning in 1994. Oceana is the homeport for all Atlantic Fleet F-14A fighter aircraft. The F-14 is the linch-pin of the carrier battle group's air defense. The F-14A was introduced in 1972 and has proven to be a very effective and potent weapon system. It's primary mission is to intercept, at long ranges enemy bombers poised to attack the battle group with air-to-surface missile. The F-14 technologies may have been compromised because of

DD 1391

Figure C-1
Sample DD Form 1391 With Single Primary Facility

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APPENDIX C (Continued)

1. COMPONENT NAVY	FY 1994 MILITARY CONSTRUCTION PROJECT DATA	2. DATE 01 SEP 91
3. INSTALLATION AND LOCATION MARINE CORPS BASE, CAMP LEJEUNE, NC	4. PROJECT TITLE ELECTRONICS/COMMUNICATIONS MAINT	
5. PROGRAM ELEMENT	6. CAT CODE 217-10	7. PROJECT NUMBER P-541	8. PROJECT COST ($000) 1,950

9. COST ESTIMATES

ACF: 92 ITEM	ESCALATED TO: 01 NOV 94	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITY		SF	8,058	123.98	999
ELEC/COMM MAINT SHOP - BLDG A		SF	3,300	115.76	(382)
BUILT-IN EQUIPMENT, BLDG A		LS			(42)
ELEC/COMM MAINT SHOP - BLDG B		SF	4,758	99.41	(473)
BUILT-IN EQUIPMENT, BLDG B		LS			(102)
SUPPORTING FACILITIES		LS			754
ELECTRICAL UTILITIES (B)		LS			( )
MECHANICAL UTILITIES (C)		LS			(181)
ROADS, PARKING, SIDEWALKS (D)		LS			(304)
SITE IMPROVEMENTS (E)		LS			(144)
DEMOLITION (F)		LS			(117)
ASBESTOS REMOVAL (G)		LS			(7)
SUBTOTAL					(1)
CONTINGENCIES (5%)					1,753
TOTAL CONTRACT COST					88
SUPERVISION, INSPECTION, OVERHEAD (6%)					1,841
TOTAL REQUEST					110
TOTAL REQUEST (ROUNDED)					1,951
EQUIPMENT PROVIDED FROM OTHER APPROPRIATIONS (NON ADD)					1,950
EQUIPMENT PROVIDED FROM OTHER APPROPRIATIONS (NON ADD)					58

10. DESCRIPTION OF PROPOSED CONSTRUCTION: CONSTRUCT 1 STORY ELEC/COMM MAINT SHOPS W/REINFORCED CONCRETE FOUNDATIONS, CONCRETE FLOOR SLABS, MASONRY CONSTRUCTION W/METAL ROOF JOIST SYSTEM, METAL DECKING, RIGID INSULATION & ROOFING SYSTEM, & SUPPORT SYSTEMS, E.G., AC, STEAM, COMPRESSED AIR, 60/400 CYCLE ELECTRICAL POWER SUPPLY & GROUNDING, RFI SHIELDING, ISOLATED CIRCUITS EMERGENCY EYEWASH STATIONS, EXPLOSION-PROOF ELECTRICAL DEVICES, TRENCH DRAINS & FLOOR DRAINS, VEHICLE LIFTS, OVERHEAD COILING DOORS, TELEPHONE SYSTEMS, FIRE ALARM SYSTEMS, SPRINKLER SYSTEM, MONORAILS, PLUMBING SYSTEMS, SITE WORK INCLUDING EXTERIOR PAVEMENTS, AREA LIGHTING, FENCING, VEHICLE WASH RACKS, 60-FT ANTENNA TOWER, & UTIL SERVICE CONNECTIONS. (AC: 26 TONS)

Figure C-2
Sample DD Form 1391 With Multiple Primary Facility

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P. NO. : P-178 FY 94

TITLE: WEAPONS SYSTEM TRAINER ADDITION
DATE OF ESTIMATE: 01 SEP 91
LOCATION: NAS, OCEANA, VIRGINIA BEACH, VA
DESIGN STATUS (%): COST CERT
PREPARED BY: R. O. ESTRELLA
DATE ESCALATED TO: 01 NOV 94
A.C.F.: 0.92
ESCALATION FACTOR (%): 13%

DESCRIPTION	UM	QUANTITY	UNIT COST	ESCALATED COST ROUNDED	COST TRANSFRD TO 1391
PRIMARY FACILITY	SF	25,480	112.60	2,869,000	2,869,000
WEAPONS SYSTEM TRAINER ADDITION					
SUPPORTING FACILITIES					428,000
SPECIAL FOUNDATION FEATURES					105,000
911 LAND PILING	LF	7,360	14.28	105,000	
ELECTRICAL UTILITIES					181,000
511 ELECTRICAL DISTRIBUTION - PRIMARY	LF	748	111.76	84,000	
512 ELECTRICAL DISTRIBUTION - SECONDARY	LF	75	60.10	5,000	
513 ELECTRICAL SUBSTATION	kVA	750	121.26	91,000	
523 COMMUNICATION, TELEPHONE	LF	110	10.58	1,000	
MECHANICAL UTILITIES					42,000
541 STEAM DISTRIBUTION	LF	90	247.74	22,000	
551 WATER DISTRIBUTION	LF	20	220.94	4,000	
554 SANITARY SEWER	LF	440	35.72	16,000	
ROADS, PARKING, SIDEWALKS					22,000
555 CONCRETE TRENCHWAY	LF	135	98.84	13,000	
721 CONCRETE PARKING	SY	80	77.17	6,000	
741 CONCRETE SIDEWALKS	SY	180	16.10	3,000	
SITE IMPROVEMENTS					
811 EARTHWORK	CY	1,800	7.41	13,000	
812 BORROW	CY	25,00	10.42	26,000	
813 TOPSOIL, SEED	SY	600	8.55	5,000	
814 LANDSCAPING	SY	270	24.66	7,000	
818 ENVIRONMENTAL PROTECTION	ACRE	2	2000.00	4,000	
851 STORM DRAINAGE	LF	800	22.18	18,000	
DEMOLITION					5,000
844 REMOVE/DISPOSE ASBESTOS	LS	1	5000.00	5,000	

TOTAL CONTRACT COST W/O CONTINGENCY	3,297,000
CONTINGENCY (5%)	165,000
TOTAL CONTRACT COST	3,462,000
SIOH (6%)	208,000
TOTAL BUDGET COST	3,670,000
TOTAL BUDGET COST ROUNDED	3,650,000

Figure C-3
Estimate Summary Sheet

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PROJECT SPECIAL CONSIDERATIONS CHECKLIST

P-NO P-444 PROJECT TITLE GENERAL WAREHOUSE

LOCATION NAVAL SUPPLY CENTER, NORFOLK, VIRGINIA

Place a Check (\/) by each statement that is applicable.

POLLUTION PREVENTION, ABATEMENT, AND CONTROL (Check One)
This project causes environmental pollution which will be abated by:
\/ Corrective measures included as part of this project.
_____ Related Project Number _____.

ENVIRONMENTAL IMPACT (Check One)
\/ A preliminary environmental assessment (PEA) or an environmental impact statement (EIS) has been prepared and indicates the subject project will have no significant impact on the environment.
_____ A (PEA)/(EIS) has been prepared and indicates the subject project will have a significant impact on the environment and has been addressed in project planning and design.

PRESERVATION OF HISTORICAL SITES AND STRUCTURES
_____ The proposed project will have an effect on a district, site, building, structure, object, or setting listed in the Natural Register of Historic Places as indicated on the attached paper.

DESIGN FOR ACCESSIBILITY OF PHYSICALLY HANDICAPPED PERSONNEL
\/ Provisions for physically handicapped personnel will not be provided because: This facility requires occupants of only able-bodied military personnel.

FLOODPLAIN MANAGEMENT AND WETLANDS PROTECTION
_____ Executive Orders 11988 and 11990 apply and have been accommodated.

"NEW START" CRITERIA FOR COMMERCIAL OR INDUSTRIAL ACTIVITIES PROGRAM
_____ The project is a new start in accordance with OMB Circular A-76 and has been approved by the Assistant Secretary of the Navy.

INTERGOVERNMENTAL COORDINATION
_____ OMB Circular A-95 applies and coordination of the project with state and area-wide clearinghouses and agencies has been accomplished.

PLANNING IN THE NATIONAL CAPITAL REGION
_____ The siting and configuration of the project have been submitted to the National Capital Planning Commission for approval.
_____ The project has been approved by the Commission of Fine Arts and Advisory Council on Historic Preservation. Approval by the National Capital Planning Commission is pending.

NATO INFRASTRUCTURE PROGRAM
_____ Prefinancing under NATO procedures is planned for this project.

LIFE CYCLE COST ANALYSIS
_____ A life cycle cost analysis has been performed for this project.

Figure C-4
Project Special Considerations Checklist

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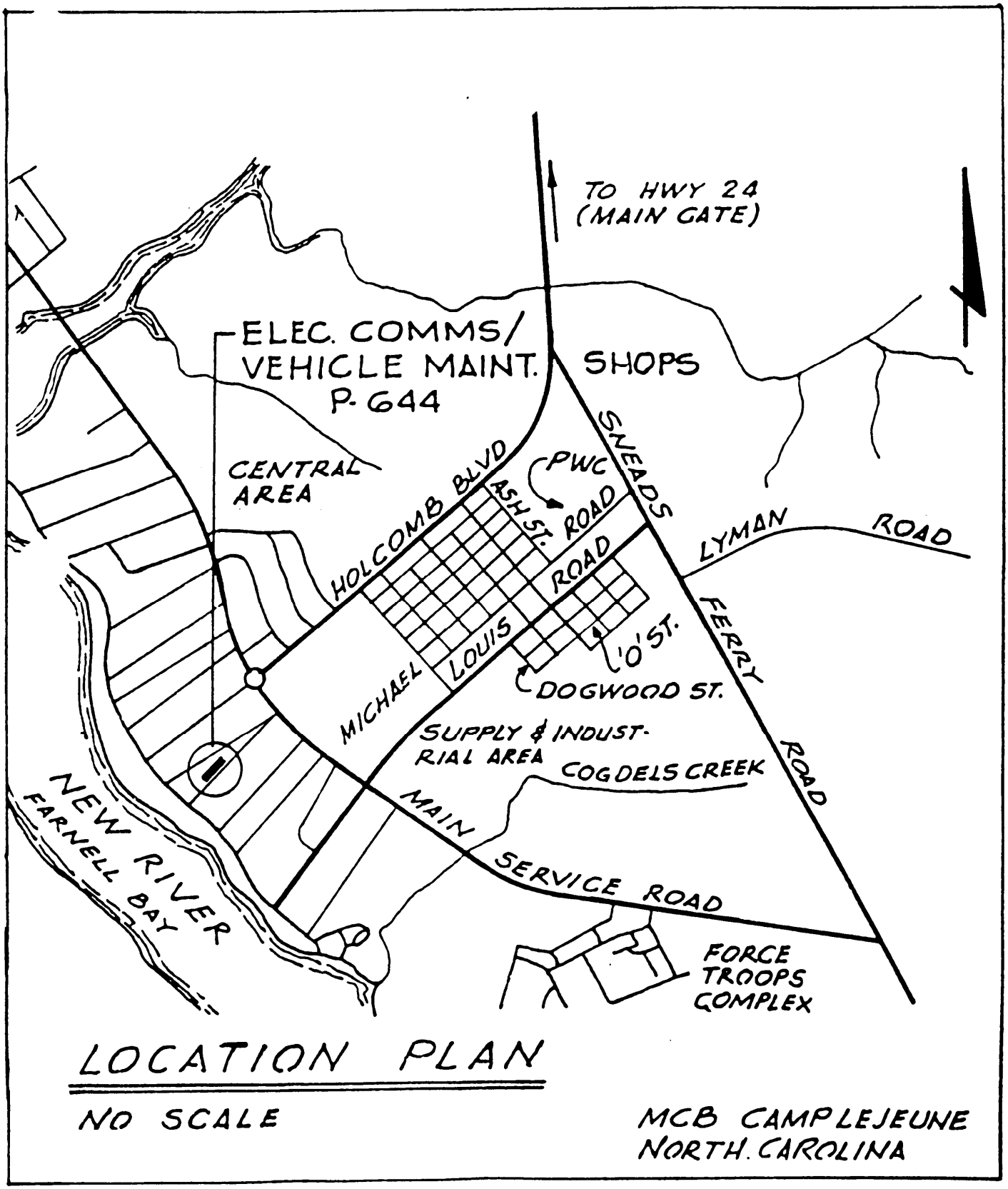

Figure C-5
Location Plan

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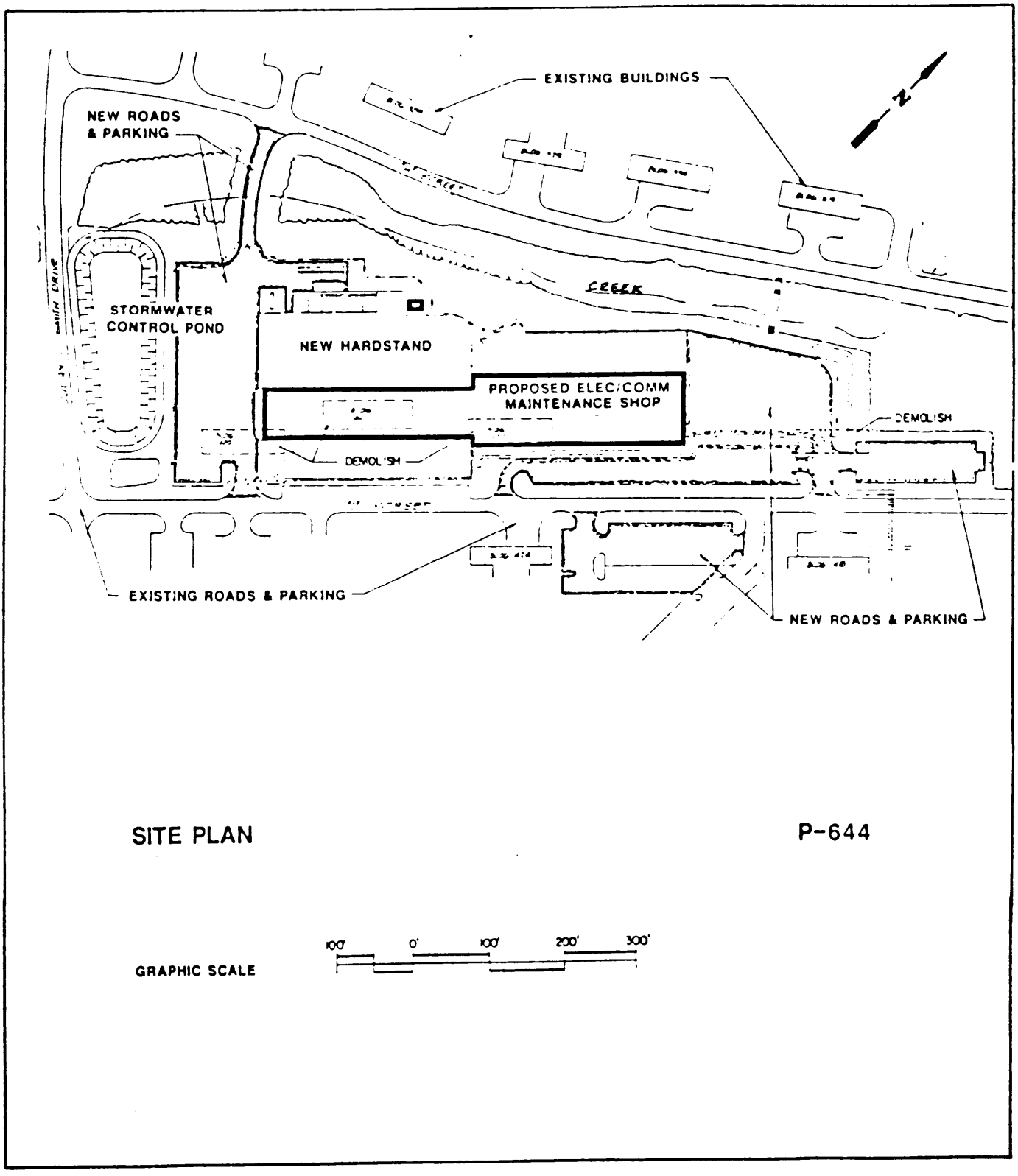

Figure C-6
Site Plan

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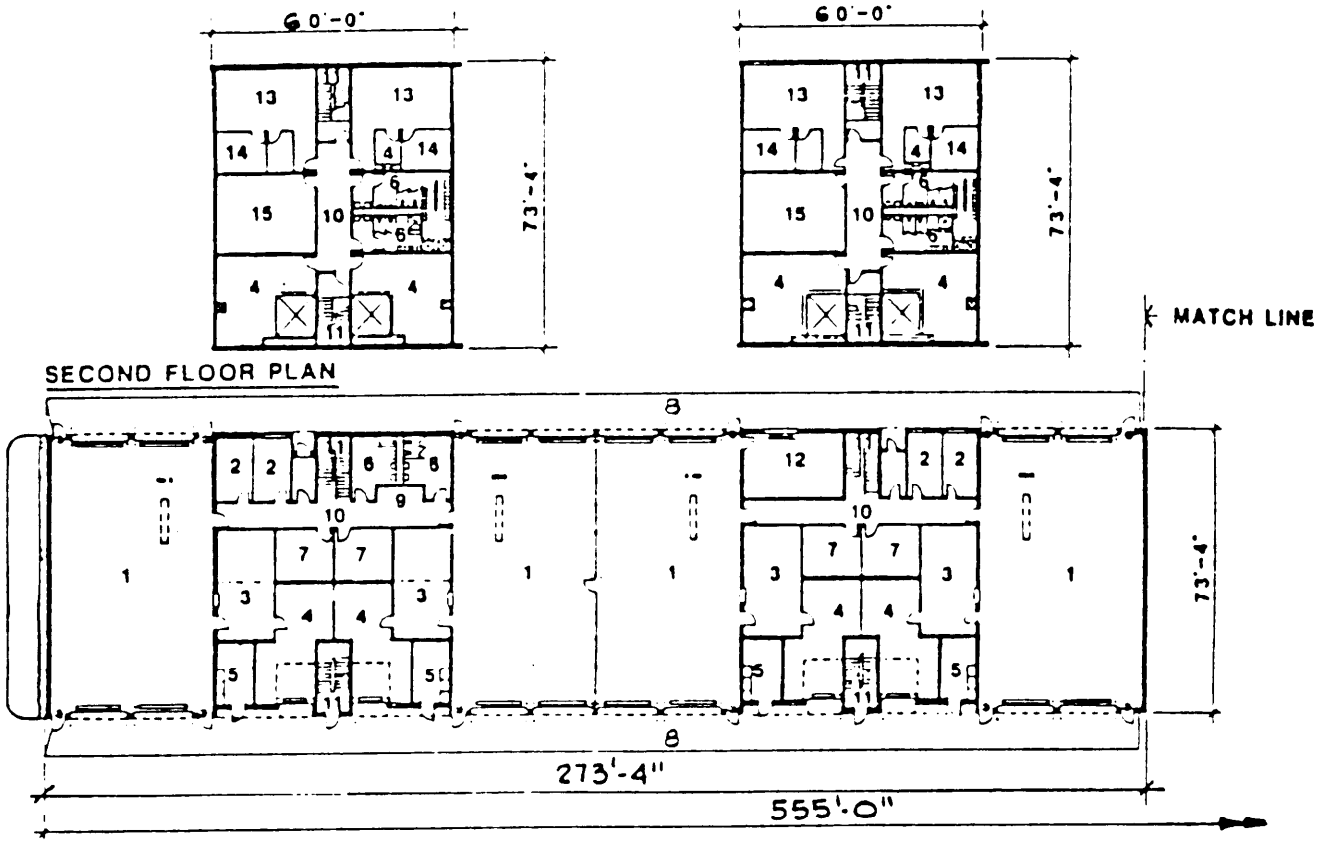

LEGEND

1. VEHICLE MAINTENANCE BAY
2. DISPATCH
3. TOOL ROOM
4. STORAGE
5. BATTERY ROOM
6. TOILET
7. TECHNICAL LIBRARY
8. APRON
9. VENDING
10. CORRIDOR
11. STAIR
12. TIRE SHOP
13. ADMINISTRATION
14. OFFICE
15. CLASSROOM

GRAPHIC SCALE

0 10 20 30 40 50 60

Figure C-7
Floor Plan

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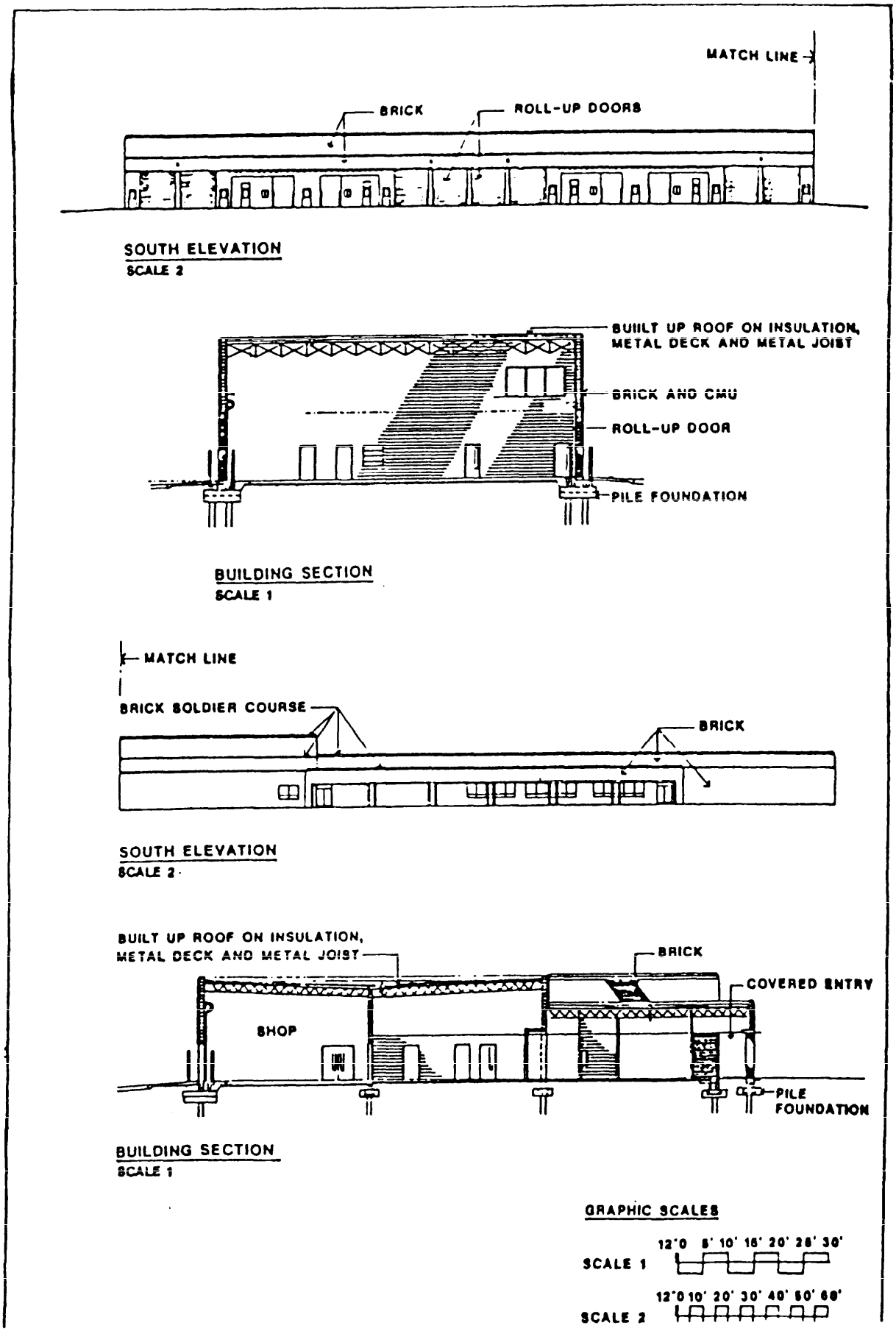

Figure C-8
Elevations

...ieht diameter. Consider long radius curves only where substantial ... equiva...

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APPENDIX D
PRELIMINARY SPECIFICATIONS

Preliminary specifications are documents that are required as the planning and design of facilities progresses. These specifications include:

(1) In Design-Build solicitations which are based on a broad set of performance requirements, the presentation of those performance requirements. This technical package is the same so far as format regardless of the contracting method - source selection, two-step, or two-phase sealed bid (the "Newport" method). In the "Newport" method, these broad performance requirements are mixed with specification sections containing final construction requirements. An example of this use appears below.

(2) The Basis of Design incorporated into the Schematic Package of the Preliminary Engineering Phase (PEP) of a project's development. An example of this use appears below.

(3) In Design-Build solicitations which are based on a building program, the portion of the Statement of Work dealing with the physical product which is being sought.

The basis of organizing these preliminary specifications at the Naval Facilities Engineering Command is based on the elements of the facility. These specifications shall follow the numbering titling of Uniformat, as published by the Construction Specifications Institute (CSI). The first level of this classification system is:

A: Substructure
B: Shell
C: Interiors
D: Services
E: Equipments and Furnishings
F: Other Building Construction
G: Building Sitework
Z: General Requirements

TYPICAL SOLICITATION PACKAGE
MIXED DESIGN-BUILD (PERFORMANCE) AND FINAL (PRESCRIPTIVE) REQUIREMENTS

The following is an example of the solicitation package for a project including both elemental (broad performance-based) requirements and final specification sections, with complete construction requirements, which is typically used in the "Newport" method:

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APPENDIX D (Continued)

Cover Page

Bidding Requirements

Includes solicitation form (00020)

Includes information to bidders (00100) in sealed bid projects

Includes information for proposers (00150) in negotiated contracts

Includes selection factors (00160) in two-step process

Contract Forms and Conditions of the Contract

Includes the award form (00500) through wage rate determination (00830)

Specifications

Specification Title Page

Table of Contents (generated from SPECSINTACT)

Performance sections based on elements (building systems), with 5-digit Uniformat numbers (A1010 through Z1030)

Prescriptive sections based on work units (products or activities), with 5-digit Masterformat numbers (01010 through 16999)

BASIS OF DESIGN

The following is an abbreviated example of a typical Basis Design in UNIFORMAT II. For additional information, refer to CSI MP-2-4, Uniformat Interim Edition 1992. Where the text is a list of the possible elements to specify in the Section, the precise requirements should be applied:

A SUBSTRUCTURE

A10 FOUNDATIONS

A1010 STANDARD FOUNDATIONS

Wall Foundations, Column Foundations

A1020 SPECIAL FOUNDATIONS

Driven Piles, Bored/Augured Piles, Shoring and Underpinning, Dewatering, Raft Foundations, Cofferdams, Other Special Foundations

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APPENDIX D (Continued)

A1030 SLABS ON GRADE

Standard Slabs On Grade, Structural Slabs On Grade, Inclined Slabs On Grade, Trenches, Pits and Bases, Subdrainage Systems, Perimeter Insulation, Other Slabs On Grade

A20 BASEMENT CONSTRUCTION

A2010 BASEMENT EXCAVATION

Excavation for Basement, Backfill and Compaction, Excavation Support Systems, Other Basement Excavation

A2020 BASEMENT WALLS

Basement Wall Construction, Basement Wall Vertical Waterproofing, Basement Wall Dampproofing, Basement Wall Vapor Retarders and Insulation, Basement Wall Interior Skin, Other Basement Walls

B SHELL

B10 SUPERSTRUCTURE

B1010 FLOOR CONSTRUCTION

Floor Structural Frame; Structural Interior Walls Supporting Floors; Floor Decks, Slabs, and Sheathing; Balcony Floor Construction; Mezzanine Construction; Ramps; Floor Construction Vapor Retarders, Air Barriers, and Insulation; Floor Construction Fireproofing; Floor Construction Firestopping; Other Floor Construction

B1020 ROOF CONSTRUCTION

Roof Structural Frame; Structural Interior Walls Supporting Roofs; Roof Decks, Slabs, and Sheathing; Canopies, Roof Construction Vapor Retarders, Air Barriers, and Insulation; Roof Construction Fireproofing; Roof Construction Firestopping; Other Roof Construction

B20 EXTERIOR CLOSURE

B2010 EXTERIOR WALLS

Exterior Wall Exterior Skin; Exterior Wall Construction; Exterior Wall Vapor Retarders, Air Barriers, and Insulation; Exterior Wall Interior Skin; Exterior Wall Assemblies; Parapets; Exterior Louvers, Grilles and Screens; Exterior Protection Devices for Openings; Exterior Balcony Walls and Railings; Exterior Soffits; Other Exterior Walls

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APPENDIX D (Continued)

B2020 EXTERIOR WINDOWS

Exterior Standard Windows, Storefronts, Glazed Curtain Walls, Exterior Special Windows

B2030 EXTERIOR DOORS

Exterior Entrance Doors; Exterior Utility Doors, Large Exterior Special Doors, Special Use Exterior Doors, Exterior Gates, Other Exterior Doors

B30 ROOFING

B3010 ROOF COVERINGS

Deck Vapor Retarder and Insulation, Shingles and Roofing Tiles, Manufactured Roofing, Manufactured Roofing, Membrane Roofing, Traffic Coatings, Horizontal Waterproofing, Sheet Metal Roofing, Flashing and Sheet Metal, Roof Specialties and Accessories, Manufactured Exterior Specialties

B3020 ROOF OPENINGS

Skylights, Other Roof Openings

C INTERIORS

C10 INTERIOR CONSTRUCTION

C1010 INTERIOR PARTITIONS

Interior Fixed Partitions, Interior Demountable Partitions, Interior Operable Partitions, Interior Balustrades and Screens, Interior Windows, Interior Glazed Partitions and Storefront, Interior Partition Firestopping, Other Interior Partitions

C1020 INTERIOR DOORS

Interior Swinging Doors, Interior Entrance Doors, Interior Fire Rated Doors, Interior Sliding and Folding Doors, Interior Large Doors, Interior Special Use Doors, Interior Gates, Other Interior Doors

C1030 INTERIOR SPECIALTIES

Visual Display Boards, Compartments and Cubicles, Interior Louvers and Vents, Service Wall Systems, Wall and Corner Guards, Fireplaces and Stoves, Interior Identifying Devices, Pedestrian Control Devices, Lockers, Postal Specialties, Storage Shelving, Telephone Specialties, Toilet and Bath Accessories, Scales, Wardrobe and Closet Specialties, Other Interior Specialties

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APPENDIX D (Continued)

C20 STAIRWAYS

C2010 STAIR CONSTRUCTION

Cast-in-place Stair Construction, Precast Concrete Stair Construction, Metal Stair Construction, Wood Stair Construction, Fire Escapes, Other Stair Construction

C2020 STAIR FINISHES

Tile Stair Finishes, Terrazzo Stair Finishes, Stone Stair Finishes, Unit Masonry Stair Finishes, Resilient Stair Finishes, Carpet Stair Finishes, Special Flooring Stair Finishes, Stair Treatment, Stair Railings, Stair Soffits, Stair Construction Special Coatings, Stair Construction Painting

C30 INTERIOR FINISHES

C3010 INTERIOR WALL FINISHES

Concrete Wall Finishes, Wood Wall Paneling, Lath and Plaster Wall Finishes, Gypsum Board Wall Finishes, Tile Wall Finishes, Terrazzo Wall Finishes, Stone Facing Wall Finishes, Acoustical Wall Treatment, Special Wall Finishes, Wall Carpet, Special Interior Wall Coatings, Interior Wall Painting , Wall Coverings

C3020 INTERIOR FLOOR FINISHES

Concrete Floor Finishes, Tile Floor Finishes, Terrazzo Floor Finishes, Wood Flooring, Stone Flooring, Unit Masonry Flooring, Resilient Flooring, Carpet Flooring, Special Flooring, Access Flooring, Floor Treatment, Floor Painting

C3030 INTERIOR CEILING FINISHES

Concrete Ceiling Finishes, Wood Ceiling Paneling, Lath and Plaster Ceiling Finishes, Gypsum Board Ceiling Finishes, Acoustical Ceiling Treatment, Special Ceiling Surfaces, Special Ceiling Coatings, Interior Ceiling Painting

D SERVICES

D10 CONVEYING SYSTEMS

D1010 VERTICAL TRANSPORTATION SYSTEMS

Dumbwaiters, Elevators, Escalators, Lifts

D1020 OTHER TRANSPORTATION SYSTEMS

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APPENDIX D (Continued)

Moving Walks, Aircraft Passenger Loading Systems

D1030 OTHER CONVEYING SYSTEMS

Material Handling Systems, Hoists and Cranes, Turntables, Scaffolding

D20 PLUMBING SYSTEMS

D2010 PLUMBING FIXTURES

Water Closets, Urinals, Lavatories, Sinks, Showers, Bathtubs, Basins, Drinking Fountains/Coolers, Other Plumbing Fixtures

D2020 DOMESTIC WATER DISTRIBUTION

Water Supply Piping Systems, Water Supply Equipment, Water Supply Insulation

D2030 SANITARY WASTE SYSTEMS

Waste and Vent Piping Systems, Waste Plumbing Specialties, Waste Plumbing Equipment, Waste Plumbing Insulation

D2040 RAIN WATER DRAINAGE SYSTEMS

Rain Water Drainage Piping Systems, Rain Water Drainage Specialties, Rain Water Drainage Insulation

D2050 SPECIAL PLUMBING SYSTEMS

Compressed Air Systems, Deionized Water Systems, Distilled Water Systems, Fuel Oil Systems, Gasoline Dispensing Systems, Helium Gas Systems, Liquified Petroleum Gas Systems, Lubricating Oil Systems, Natural Gas Systems, Nitrous Oxide Gas Systems, Oxygen Gas Systems, Reverse Osmosis Systems, Vacuum Systems, Acid Waste Systems, Pool and Fountain Equipment and Piping

D30 HEATING, VENTILATING, AND AIR CONDITIONING (HVAC) SYSTEMS

D3010 FUEL SUPPLY SYSTEMS

Oil Supply Systems, Gas Supply Systems, Coal Supply Systems, Other Fuel Supply Systems

D3020 HEAT GENERATION SYSTEMS

Steam Boilers, Hot Water Boilers, Furnaces, Fuel-Fired Heaters, Auxiliary Equipment, Other Heat Generation Systems

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APPENDIX D (Continued)

D3030 HEAT REJECTION SYSTEMS

Absorption Water Chillers, Centrifugal Water Chillers, Reciprocating Water Chillers, Rotary-Screw Water Chillers, Cooling Towers and Liquid Coolers, Refrigerant Compressors and Condensers, Heat Pumps, Other Heat Rejection Systems

D3040 HEAT DISTRIBUTION SYSTEMS

Air Distribution Systems, Steam Distribution Systems, Hydronic Distribution Systems, Special Exhaust Systems, Other Heat Distribution Systems

D3050 HEAT TRANSFER

Heat Exchangers, Package Terminal Air Conditioning Systems (PTAC), Air Coils, Humidifiers, Dehumidifiers, Terminal Heat Transfer UniEnergy Management and Conservation Systems, HVAC Control Systems, HVAC Sequence of Operation, Gas Purging Systems, Other HVAC Controls and Instrumentation

D3070 SPECIAL HVAC SYSTEMS AND EQUIPMENT

Solar Energy Collection, Conversion, and Storage

D3080 HVAC SYSTEMS TESTING, ADJUSTING, AND BALANCING

Mechanical Systems Testing, Adjusting, and Balancing; Piping Systems Testing, Adjusting, and Balancing; Air Systems Testing, Adjusting, and Balancing

D40 FIRE PROTECTION SYSTEMS

D4010 FIRE PROTECTION SPRINKLER SYSTEMS

Wet Pipe Fire Sprinkler Systems, Dry Pipe Fire Sprinkler Systems, Pre-Action Fire Sprinkler Systems, Combination Dry Pipe and Pre-Action Fire Sprinkler Systems, Deluge Fire Sprinkler Systems

D4020 STANDPIPE AND HOSE SYSTEMS

Fire Protection Standpipe; Fire Protection Valves, Hoses, and Cabinets

D4030 FIRE PROTECTION SPECIALTIES

Fire Extinguishers, Cabinets, and Accessories; Fire Blankets and Cabinets, Wheeled Fire Extinguisher Units

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APPENDIX D (Continued)

D4040 SPECIAL FIRE PROTECTION SYSTEMS

Foam Extinguishing Systems, Carbon Dioxide Extinguishing Systems, Halogen Agent Extinguishing Systems, Dry Chemical Extinguishing Systems

D50 ELECTRICAL SYSTEMS

D5010 ELECTRICAL SERVICE AND DISTRIBUTION

Main Electrical Transformers, Secondary Electrical Transformers, Main Electrical Switchboards, Interior Electrical Distribution Transformers, Electrical Branch Circuit Panelboards, Enclosed Electrical Circuit Breakers, Motor Control Centers

D5020 LIGHTING AND BRANCH WIRING

Electrical Branch Wiring, Interior Lighting

D5030 COMMUNICATION AND SECURITY SYSTEMS

Alarm and Detection Systems, Clock and Program Systems, Voice and Data Systems, Public Address and Music Systems, Television Systems, Other Communication and Security Systems

D5040 SPECIAL ELECTRICAL SYSTEMS

Uninterruptible Power Supply Systems, Packaged Engine Generator Systems, Battery Power Systems, Cathodic Protection, Electromagnetic Shielding Systems, Lightning Protection Systems, Unit Power Conditioners

D5050 ELECTRICAL CONTROLS AND INSTRUMENTATION

Electrical Systems Controls, Lighting Control Systems, Electrical Instrumentation

D5060 ELECTRICAL TESTING

Electrical Systems Testing

E EQUIPMENT AND FURNISHINGS

E10 EQUIPMENT

E1010 COMMERCIAL EQUIPMENT

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APPENDIX D (Continued)

Security and Vault Equipment, Teller and Service Equipment, Registration Equipment, Checkroom Equipment, Mercantile Equipment, Commercial Laundry and Dry Cleaning Equipment, Vending Equipment, Office Equipment

E1020 INSTITUTIONAL EQUIPMENT

Ecclesiastical Equipment, Library Equipment, Theater and Stage Equipment, Instrumental Equipment, Audio-Visual Equipment, Detention Equipment, Laboratory Equipment, Medical Equipment, Mortuary Equipment

E1030 VEHICULAR EQUIPMENT

Vehicular Service Equipment, Parking Control Equipment, Loading Dock Equipment

E1040 OTHER EQUIPMENT

Maintenance Equipment; Solid Waste Handling Equipment; Food Service Equipment; Residential Equipment; Unit Kitchens; Darkroom Equipment; Athletic, Recreational, and Therapeutic Equipment; Planetarium Equipment; Observatory Equipment; Agricultural Equipment

E20 FURNISHINGS

E2010 FIXED FURNISHINGS

Fixed Artwork, Fixed Casework, Window Treatment, Fixed Floor Grilles and Mats, Fixed Multiple Seating, Fixed Interior Landscaping

E2020 MOVABLE FURNISHINGS

Movable Artwork, Furniture and Accessories, Movable Rugs and Mats, Movable Multiple Seating, Movable Interior Landscaping

F OTHER BUILDING CONSTRUCTION

F10 SPECIAL CONSTRUCTION

F1010 SPECIAL STRUCTURES

Air Supported Structures, Pre-Engineered Structures, Other Special Structures

F1020 INTEGRATED CONSTRUCTION

Integrated Assemblies, Special Purpose Rooms, Other Integrated Construction

F1030 SPECIAL CONSTRUCTION SYSTEMS

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APPENDIX D (Continued)

Sound, Vibration, and Seismic Construction; Radiation Protection; Special Security Systems; Other Special Construction Systems

F1040 SPECIAL FACILITIES

Aquatic Facilities, Ice Rinks, Site Constructed Incinerators, Kennels and Animal Shelters, Liquid and Gas Storage Tanks, Other Special Facilities

F1050 SPECIAL CONTROLS AND INSTRUMENTATION

Recording Instrumentation, Building Automation Systems, Fire Suppression and Supervisory Systems, Other Special Controls and Instrumentation

F20 SELECTIVE DEMOLITION

F2010 BUILDING ELEMENTS DEMOLITION

Minor Demolition for Remodeling, Selective Structural Demolition

F2020 HAZARDOUS COMPONENTS ABATEMENT

G BUILDING SITEWORK

G10 SITE PREPARATION

G1010 SUBSURFACE INVESTIGATION

Standard Penetration Tests, Seismic Investigation

G1020 SITE CLEARING

Sod Stripping, Clearing and Grubbing, Shrub and Tree Removal

G1030 SITE DEMOLITION AND RELOCATIONS

Building Demolition, Site Elements Demolition, Structure Relocation, Utility Relocation

G1040 SITE EARTHWORK

Grading; Excavating, Backfilling, and Compacting; Soil Stabilization; Slope Protection and Erosion Control; Earth Dams

G1050 HAZARDOUS WASTE REMEDIATION

G20 SITE IMPROVEMENTS

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APPENDIX D (Continued)

G2010 ROADWAYS

Roadway Base Courses, Flexible Roadway Pavement, Roadway Unit Pavers, Rigid Roadway Paving, Roadway Curb and Gutter, Roadway Appurtenances

G2020 PARKING LOTS

Parking Lot Base Courses, Flexible Parking Lot Pavement, Parking Lot Unit Pavers, Rigid Parking Lot Paving, Parking Lot Curb and Gutter, Parking Lot Appurtenances

G2030 PEDESTRIAN PAVING

Pedestrian Paving Base Courses, Flexible Pedestrian Pavement, Pedestrian Unit Pavers, Rigid Pedestrian Paving, Exterior Steps

G2040 SITE DEVELOPMENT

Fountains, Fences and Gates, Recreational and Sports Facilities, Site and Street Furnishings, Exterior Signs, Footbridges and Underpasses, Flagpoles, Covers and Shelters

G2050 LANDSCAPING

Irrigation Systems; Shrub and Tree Transplanting; Soil Preparation; Lawns and Grasses; Trees, Plants, and Ground Covers; Landscape Maintenance

G30 SITE PLUMBING UTILITIES

G3010 SITE WATER SUPPLY AND DISTRIBUTION SYSTEMS

Water Wells, Site Domestic Water Distribution Systems, Site Fire Protection Water Distribution Systems

G3020 SITE SANITARY SEWER SYSTEMS

Site Sanitary Sewerage, Septic Systems, Site Sanitary Sewerage Equipment, Sewage Ponds

G3030 SITE STORM SEWER SYSTEMS

Site Storm Sewerage, Site Storm Sewer Appurtenances, Site Storm Sewerage Equipment, Storm Water Ponds and Reservoirs

G3040 SITE FUEL DISTRIBUTION SYSTEMS

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APPENDIX D (Continued)

Site Gas Distribution Systems, Site Oil Distribution Systems, Other Site Fuel Distribution Systems

G3050 SITE SPECIAL PLUMBING SYSTEMS

Industrial Waste Systems, Other Special Site Plumbing Systems

G40 SITE HVAC UTILITIES

G4010 SITE STEAM DISTRIBUTION SYSTEMS

Site Steam Piping Systems, Site Steam Distribution Equipment

G4020 SITE HYDRONIC DISTRIBUTION SYSTEMS

Site Hydronic Piping Systems, Site Hydronic Distribution Equipment

G50 SITE ELECTRICAL UTILITIES

G5010 SITE ELECTRICAL DISTRIBUTION

Site Electrical Substations, Site Electric Power Distribution Lines, Site Electric Power Distribution Equipment

G5020 SITE LIGHTING SYSTEMS

Area Site Lighting Systems, Security Site Lighting Systems, Other Site Lighting Systems

G5030 SITE COMMUNICATIONS AND SECURITY SYSTEMS

Site Alarm and Detection Systems, Site Voice and Data Systems, Site Television Systems, Site TV Security Monitoring Systems, Site Security Sensor Systems, Other Site Communications and Security Systems

G5040 OTHER SITE ELECTRICAL UTILITIES

Cathodic Protection Systems

G60 OTHER SITE CONSTRUCTION

G6010 SERVICE TUNNELS

G6020 OTHER SITE SYSTEMS AND EQUIPMENT

Z GENERAL

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APPENDIX D (Continued)

Z10 GENERAL REQUIREMENTS

Z1010 ADMINISTRATIVE GENERAL REQUIREMENTS

Summary of Work, Allowances, Alternates/Alternatives, Coordination, Project Meetings, Regulatory Requirements, References

Z1020 PROCEDURAL GENERAL REQUIREMENTS

Measurement and Payment, Modification of Procedures, Field Engineering, Identification Systems, Special Project Procedures, Submittals, Quality Control, Material and Equipment, Facility Startup/Commissioning, Contract Closeout, Maintenance

Z1030 TEMPORARY FACILITIES AND TEMPORARY CONTROLS

Temporary Facilities, Temporary Controls

Z20 BIDDING REQUIREMENTS, CONTRACT FORMS, AND CONDITIONS

Z2010 BIDDING REQUIREMENTS

Pre-Bid Information, Instructions to Bidders, Information Available to Bidders, Bid Forms, Supplements to Bid Forms

Z2020 CONTRACT FORMS

Agreement Forms, Bonds and Certificates

Z2030 CONDITIONS

Addenda, General Conditions, Supplementary Conditions

Z90 PROJECT COST ESTIMATE

Z9010 LUMP SUM

Z9020 UNIT PRICES

Z9030 ALTERNATES/ALTERNATIVES

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APPENDIX E
SPECIFICATION COVER SHEET

Preceding Section 01010 in each project specification, include the specification cover sheet. Following Figure D-1, prepare a specification cover sheet for use as a camera-ready master of the first page of the project specification. Substitute appropriate information where the sample has underlines with identifying numbers. Do not include the identifying numbers, the words "Figure D-1 Sample Specification Cover Sheet," or underlines in the final manuscript. Fill in the following at the identifying numbers listed:

1. Appropriate engineering field division.
2. Military location of the division.
3. Specification number.
4. UIC and construction contract number.
5. Type of appropriation, such as "MCON."
6. Exact name of project.
7. Military location of the project.
8. Geographic location of the project.
9. Specification number.
10. Signature of principal of A/E firm or follow local procedures for in-house work.

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APPENDIX E (Continued)

DEPARTMENT OF THE NAVY
(1) _____ DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
(2)

SPECIFICATION NO:
(3) _____

CONTRACT NO:
N_____-_____-C_____(4)

APPROPRIATION:
(5)

(TITLE OF PROJECT) (6)
(FILL IN)
at the

(MILITARY LOCATION) (8)
(FILL IN)

(GEOGRAPHIC LOCATION) (8)
(FILL IN)

DESIGN BY:

_____(FIRM NAME)_____

_____(FULL ADDRESS)_____

SPECIFICATION PREPARED BY:

Architectural:	Civil:	Structural:
_____	_____	_____
Electrical:	Mechanical:	Other:
_____	_____	_____

DATE: _____

SPECIFICATION APPROVED BY: _____ DATE: _____
(10)

21-_____-_____
(9)

Figure E-1
Sample Specification Cover Sheet

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APPENDIX F
LIST OF ACRONYMS

A/E	Architectural and Engineering Firm
AIA	American Institute of Architects
AIC	Architect in Charge
BEQ	Bachelor Enlisted Quarters
CADD	Computer-Aided Design/Drafting
CCB	Construction Criteria Base
CD-ROM	Compact Disks With Read-Only Memory
CESO	Civil Engineer Support Office
CID	Commercial Item Description
CMC	Commandant, U.S. Marine Corps
COMCBLANT	Commander Naval Construction Battalions, U.S. Atlantic Fleet
COMCBPAC	Commander Naval Construction Battalions, U.S. Pacific Fleet
CSI	Construction Specifications Institute
CWE	Current Working Estimate
DD	Definitive Design
DFAR	DOD Federal Acquisition Regulations
DM	Design Manual
DOD	Department of Defense
DODISS	DOD Index of Specifications and Standards
DXF	Data Interchange File
EFA	Engineering Field Activity
EFD	Engineering Field Division
EIC	Engineer in Charge
EMG	Engineering Microcomputer Graphics
FRC	Federal Records Center
GEMS	Graphics Engineering Mapping Systems
GFE	Government Furnished Equipment
GSA	General Services Administration
HVAC	Heating, Ventilating, and Air Conditioning
IGES	Initial Graphic Exchange Specification
MCON	Military Construction, Navy
MD	Modular Design
MEDS	Modular Engineering Design System
MIL-HDBK	Military Handbook

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APPENDIX F (Continued)

NATO	North Atlantic Treaty Organization
NAVMEDCOM	Naval Medical Command
NAVOSH	Navy Occupational Safety and Health
NCBC	Naval Construction Battalion Center
NFGS	NAVFAC Guide Specification
NFSS	NAVFAC Standard Specification
NIC	Not in Contract
OICC	Officer in Charge of Construction
O&M	Operation and Maintenance
P.E.	Professional Engineer
PED	Project Engineering Documentation
PEP	Parametric Estimating and Programming
PHA	Preliminary Hazard Analysis
PHL	Preliminary Hazard List
POL	Petroleum, Oil, and Lubricant
PWC	Public Works Center
PWD	Public Works Department
PWO	Public Works Office
QC	Quality Control
R.A.	Registered Architect
RAC	Risk Assessment Code
RHA	Requirements Hazard Analysis
ROICC	Resident Officer in Charge of Construction
SD	Standard Design
SF	Short Form (refers to type of NFGS)
SI	International System of Units
SPAWAR	Space and Naval Warfare Systems Command
SPECSINTACT	Specifications-Kept-Intact
UIC	Unit Identification Code

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REFERENCES

NOTE: THE FOLLOWING REFERENCED DOCUMENTS FORM A PART OF THIS MANUAL TO THE EXTENT SPECIFIED HEREIN. USERS OF THIS HANDBOOK SHOULD REFER TO THE LATEST REVISIONS OF CITED DOCUMENTS UNLESS OTHERWISE DIRECTED.

FEDERAL/MILITARY SPECIFICATIONS, STANDARDS, BULLETINS, HANDBOOKS, AND NAVFAC GUIDE SPECIFICATIONS AND P-PUBLICATIONS:

Unless otherwise indicated, copies are available from the Naval Publications and Forms Center, Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

Department of Defense Index of Specifications and Standards (DODISS).

BULLETINS

MIL-BUL-34	Engineering and Design Criteria for Navy Facilities.
MIL-BUL-35	Matrix of Guide Specifications for Facilities Construction - Federal and Private

GUIDE SPECIFICATIONS

NFGS-01010	Summary of Work.
NFGS-01025	Measurement and Payment.
NFGS-01100	Special Project Procedures.
NFGS-01311	Contractor Prepared Network Analysis System.
NFGS-01400	Quality Control.
NFGS-01500	Construction Facilities.
NFGS-01560	Temporary Controls.
NFGS-01700	Project Closeout.
NFGS-01730	Operation and Maintenance Data

P-PUBLICATIONS

P-68	Contracting Manual.
P-72	Department of the Navy Facility Category Codes.

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P-80	Facility Planning Criteria for Navy and Marine Shore Installations.
P-272	Definitive Designs for Navy and Marine Corps Facilities.

MILITARY SPECIFICATIONS

MIL-C-9877	Cards, Aperture.
MIL-D-5480	Data, Engineering and Technical: Reproduction Requirements for.
MIL-D-28000	Digital Representation for Communication of Product Data: IGES Application Subsets and IGES Application Protocols.
MIL-M-9868	Microfilming of Engineering Documents, 35 mm, Requirements for.
MIL-M-38761	Microfilming and Photographing of Engineering/ Technical Data and Related Documents: PCAM Card Preparation, Engineering Data Micro-Reproduction System, General Requirements for, Preparation of.

STANDARDS

MIL-STD-12	Abbreviations for Use on Drawings, and in Specifications, Standards and Technical Documents.
MIL-STD-100	Engineering Drawing Practices.
MIL-STD-399	Microfilm Formats.
MIL-STD-804	Formats and Coding of Aperture, Camera, Copy, and Tabulating Cards.

HANDBOOKS

MIL-HDBK-303	Micro-Reproduction of Engineering Documents.
MIL-HDBK-1001/1	Basic Architectural Requirements and Design Considerations.
MIL-HDBK-1006/2	Policy and Procedures for Guide Specification Preparation

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MIL-HDBK-1006/3	Policy and Procedures for Engineering and Design Criteria Manual Preparation.
MIL-HDBK-1008	Fire Protection for Facilities Engineering Design and Construction.
MIL-HDBK-1010	Cost Engineering: Policy and Procedures
MIL-HDBK-1021/2	General Concepts for Airfield Pavement Design.
MIL-HDBK-1190	Facility Planning and Design Guide.

OTHER GOVERNMENT DOCUMENTS AND PUBLICATIONS:

DOD 4120.3-M	Defense Standardization Program (DSP) Policies and Procedures.
DOD 5220.22-M	Industrial Security Manual for Safeguarding Classified Information.
DOD 5220.22-R	Industrial Security Regulation.
DD Form 1391	Military Construction Project Data.
NAVFAC 4-11013/11	Pile Driving Record.
Standard Form 30	Amendment of Solicitation/Modification of Contract

(Unless otherwise indicated, copies are available from Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120 ; private organizations may purchase DOD 4120-3-M from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

DOD Federal Acquisition Regulations (FAR).

(Unless otherwise indicated, copies are available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

OPNAV 5100.23	Navy Occupational Safety and Health (NAVOSH) Program Manual.
OPNAV 5100.24	Navy System Safety Program.
OPNAV 5510.1	Department of the Navy Information and Personnel Security Program Regulation.
OPNAV 5530.14	Department of the Navy Physical Security and Loss Prevention.

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(Unless otherwise indicated, copies are available from Department of the Navy, Chief of Naval Operations, Washington, DC 20350.)

NAVFAC 5100.11 NAVFACENGCOM Safety and Health Program.

NAVFAC 11010.14 Project Engineering Documentation (PED) for Proposed Military Construction Projects.

NAVFAC 11010.49 Limitations on Scope Change, Cost Variation and Reprogramming of a Military Construction Project.

(Unless otherwise indicated, copies are available from Commander, Naval Facilities Engineering Command, 200 Stovall Street, Alexandria, VA 22332-2300.)

SECNAV 5212.5 Navy and Marine Corps Records Disposition Manual.

(Unless otherwise indicated, copies are available from the Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120 .)

NFSS-M21 Magazine, Earth Covered Circular Composite Arch

(Unless otherwise indicated, copies are available from the Naval Facilities Engineering Command Field Division that has cognizance over the specific project.)

NON-GOVERNMENT PUBLICATIONS:

AMERICAN NATIONAL STANDARDS INSTITUTE, INC. (ANSI)

ANSI Y14.2M Line Conventions and Lettering.

ANSI Y14.5M Dimensioning and Tolerancing.

(Unless otherwise indicated, copies are available from American National Standards Institute, Inc. (ANSI), 1430 Broadway, New York, NY 10018.)

CONSTRUCTION SPECIFICATIONS INSTITUTE (CSI)

MP-2-1 Masterformat--Master List of Titles and Numbers for the Construction Industry.

MP-2-2 Section Format.

(Unless otherwise indicated, copies are available for Government activities from Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120; private organizations may purchase copies of CSI MP-2-1 and MP-2-2 from Construction Specifications Institute, 601 Madison Street, Alexandria, VA 22314-1791.)

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GLOSSARY

A/E. A private contractor with architects and engineers qualified to prepare Navy documents.

Criteria. Manuals, military handbooks, guide specifications, definitive designs, standard designs, and other related guidance published to promote quality facilities engineering, design, construction, and maintenance.

Engineer- and Architect-in-Charge (EIC/AIC). Person from the preparing activity in charge of work for development or revision of criteria. This person is presently or is developing into the NAVFACENGCOM expert for criteria being developed or revised.

Facilities Technology. Requirements necessary to ensure that each discipline oriented component system within the facility is current with the state of the art; e.g., HVAC and potable wastewater removal.

Functional Requirements. Requirements necessary to ensure that a particular facility continually meets the objective of the function for which it was constructed.

Government. Naval Facilities Engineering Command acting in the interest of the U.S. Navy and Department of Defense.

Life Cycle. Time required for the function under analysis to continue operating; e.g., a 40-year building life.

Life-Cycle Cost. Determination, evaluation, and presentation of costs incurred by and in a facility being engineered or designed. Includes costs of planning, designing, engineering, constructing, operating, and maintaining the facility. Maintenance includes costs of doing business in the facility; e.g., wages and salaries.

Scope of Work. Description of services required of the preparer of engineering and design project drawings and specifications.

State of the Art. The scientific and technical level attained at a given time.

CUSTODIAN
NAVY-YD2

PREPARING ACTIVITY
NAVY-YD2

PROJECT NO.
FACR-1121

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER	2. DOCUMENT DATE (YYMMDD)
	MIL-HDBK-1006/1A	950615

3. DOCUMENT TITLE
Policy and Procedures for Project Drawing and Specification Preparation

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

a. NAME	b. TELEPHONE (Include Area Code)	
COMMANDER NAVFACENGCOM	(1) Commercial (804) 444-9970	(2) AUTOVON 564-9970
c. ADDRESS (Include Zip Code) ATTN RICHARD R. PARADIS CODE 04A4 1510 GILBERT STREET NORFOLK, VA 23511-2699	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	