

Guide for Architectural - Engineering Firms

A-E GUIDE



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EFD/SOUTHWEST EFA/WEST EFA/NORTHWEST
NAVAL FACILITIES ENGINEERING COMMAND

Foreword

1. The purpose of this guide is to supplement the Architect-Engineer (A-E) Scope of Work, Naval Facilities Engineering Command instructions and related Department of Defense design criteria. The guide is intended to be a ready source of reference of information to help improve the quality of our end products. Members of A-E firms performing engineering and design services for the Department of the Navy, Southwest Division, Naval Facilities Engineering Command, should read the guide and become familiar with its contents.
2. I want to personally emphasize our commitment to quality design and cost consciousness, and to give you my views on your responsibility as a designer for the Department of Defense. There is significant national attention being paid these days to government spending and cost overruns, and, like other defense spending, military construction is receiving its share of scrutiny. All of us involved with military construction programs must reaffirm our efforts to manage our projects wisely, to be quality conscious, and to eliminate any cost overruns or excesses. The facilities we design are our most visible product, so unless our designs are functional, conservative, and economical, we leave ourselves open for criticism. Any time we exceed the programmed amount for our projects, we risk being viewed as "another defense cost overrun indicative of poor management and/or inadequate engineering." The Navy Department and other Department of Defense agencies insist on quality construction that will meet the user's needs with a minimum of initial cost and future maintenance. These requirements must originate with a quality design.
3. You are a key member of our team. Members of the Southwest Division staff will work with you at any stage of the project to answer questions and provide additional guidance to assure complete, professional end products result. A-E firms assume full responsibility for the technical accuracy and professional adequacy of any work or materials which they furnish under a contract with Southwest Division. Your submittals will be reviewed by the Navy only to verify conformance with the authorized scope and applicable Department of Defense design criteria and verify that construction may be completed within the authorized funding limits.
4. I encourage your firm to present comments to my design staff in any areas that you feel could result in less bureaucracy and more efficient engineering and design contract management. Our ultimate goal is to provide our customers with cost effective, quality facilities, that are easy to use and to maintain. Suggestions in this or any other areas which can improve our processes and contribute to the continued harmonious relationship between the A-E community and this command will be gratefully received.

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RECORD OF REVISIONS

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CHAPTER 1. GENERAL REQUIREMENTS

1.1 GENERAL

This A-E Guide including Attachments, by reference in the negotiated "Statement of Architect-Engineer Services (Attachment A to the Contract)", forms part of the Architect-Engineer (A-E) contract. The A-E Guide provides policies, procedures and instructions applicable to A-E firms performing design and other Architectural-Engineering services under contracts awarded by the Department of the Navy, Southwest Division (SWDIV), Naval Facilities Engineering Command. The "Statement of Architect-Engineer Services" will indicate the specific required services.

1.2 DEFINITIONS

- a. Activity: Marine Corps Base (MCB), Marine Corps Air Station (MCAS), Shipyard, Naval Station, Depot, Training Center, Field, Station or Center.
- b. (ACE): Activity Civil Engineer
- c. (ALnO): Activity Liaison Officer: Acting as the single point of contact with the ACE. Monitors the business relationship between the client and NAFVAC, focusing on continual improvements, early detection of issues, and opportunities for new business.
- d. Alternate Contracting Officer's Technical Representative (ACOTR): The person appointed in writing by the Procurement Contracting Officer (PCO). The appointed ACOTR is the alternate, or backup, when the Contracting Officer's Technical Representative (COTR) is unavailable.
- e. Area Focus Team: (Sometimes referred to as Activity Focus Team) The component department or team within the Command with the technical responsibility for the accomplishment of design programs.
- f. Assistant Resident Officer in Charge of Construction (AROICC): A naval officer who is responsible to the ROICC for the administration and surveillance of construction contracts at an activity.
- g. Contracting Officer (CO): The prime point of contact within the Government on all contractual matters for the A-E. The Contracting Officer is the only Government official empowered to authorize changes to the contract.
- h. Change Order Requests (COR): Documents prepared when it becomes necessary to change/modify/alter the plans and/or specifications during the construction period.

- i. Command: Southwest Division (SWDIV), Naval Facilities Engineering Command.
- j. Construction Cost Limitation (CCL): That portion of the project budget allocated for the construction of the primary and supporting facilities. See ECC.
- k. Construction Quality Control Program: System of construction quality control as required by Contract Clause entitled "Inspection of Construction" or specification General Paragraph titled "Contractor Quality Control (CQC)".
- l. Contracting Officer's Technical Representative (COTR): The person appointed in writing by the Procurement Contracting Officer (PCO). The appointed COTR is the focal point and primary contact between the A-E contractor and all government representatives regarding all technical matters and contractor performance issues. Work shall not begin on any contract without written authorization from the Contracting officer.
- m. Estimated Construction Cost (ECC): That portion of the project budget allocated for the construction of the primary and supporting facilities. This term, if used, is synonymous to CCL.
- n. Engineering Services (ES): Engineering Services are A-E services for other than design effort. They include engineering investigations, studies, surveys, soils investigations, inspections and/or reports.
- o. Environmental Documentation (ED) Includes Environmental Assessments (EA) and Environmental Impact Statements (EIS).
- p. Military Construction (MCON): Major Military Construction projects specifically authorized by Congress for the benefit of the Navy and Marine Corps.
- q. Naval Facilities Engineering Command (NAVFACENGCOM): Headquarters, Alexandria, Virginia.
- r. Officer in Charge (OIC): Will be understood to mean Officer in Charge on A-E contracts for the organization initiating the contract.
- s. Officer in Charge of Construction (OICC): Represents the Commander in the administration of construction contracts.
- t. Operation and Maintenance, Navy (O&M,N): Within the context of this A-E Guide, identifies a funding source for Navy facilities construction, repair and maintenance. The corollary funding source for the Marine Corps is O&M,MC.

- u. Parametric Cost Estimate (PCE): The process designed to develop Military Construction (MILCON) projects to a point where they can be properly defined and estimated for the Military and Congressional programming, approval, and appropriation process.
- v. Primary Facility: The building(s), structure(s) or system(s) designated as the major quantitative unit of measure of the facilities, including appurtenances and utility lines to a point five feet beyond the perimeter of the building.
- w. Procedure I: A-E contracts administered by the Command.
- x. Procedure II: A-E contracts awarded by the Command and administered by the Command OIC or the designated ROIC.
- y. Project Architect (PA): Same as Project Leader. (See definition below).
- z. Project Documentation: Engineering and Cost documentation used in support of military construction projects during the budget review process.
- aa. Project Engineer: Same as Project Leader. (See definition below).
- ab. Project Leader (PL): The Command designated point of contact and communication on day-to-day technical and AE performance matters associated with the administration of the A-E contract. The PL is responsible for project scope and budget. This position was formerly called the (DM) Design Manager or Project Manager (PM). Sometimes, we refer to the PL as Project Architect (PA) or Project Engineer (PE).
- ac. (SCE): Staff Civil Engineer for a specific military installation.
- ad. Resident Officer in Charge (ROIC): Designated by the OIC to administer A-E and other types of contracts, not involving construction at a specific station or activity, usually the activity Public Works Officer.
- ae. Resident Officer in Charge of Construction (ROICC): Designated by the OICC to administer and provide surveillance/inspection for construction contracts at a specific station or activity.
- af. Resident Project Design Engineer (RPDE): The architect or engineer at a field activity designated by the ROIC to administer a specific A-E contract under Procedure II.

ag. Scope of Work (SOW): The "STATEMENT OF ARCHITECT-ENGINEER SERVICES" (Attachment A to the contract) which delineates the general extent of the A-E's services and the special requirements of a given project.

ah. Southwest Division (SWDIV): This terminology includes:

1. Engineering Field Division (EFD) Southwest - San Diego, CA
2. Engineering Field Activity (EFA) Northwest - Poulsbo, WA
3. Engineering Field Activity (EFA) West - San Bruno, CA

ai. Special Project: Defined by OPNAVINST 11010.20F. The terminology used by the Navy for O&M,N funded projects, as differentiated from MCON. Primarily for minor construction and for repair and maintenance of real property.

aj. Station, or User Activity: The Station or Activity responsible for operating the completed facility.

ak. Supporting Facilities: The utilities, paved areas and site development within the project limits, but beyond five feet (1,500 mm) outside of the building perimeter, which are required to support a complete and usable primary facility. Special foundations, i.e., pilings, engineered fill, unusually high-cost construction features and demolition may also be included in supporting facilities.

1.3 PRE-NEGOTIATION CONFERENCES

The A-E is invited, at their own option and expense, to attend Pre-negotiation meetings and conduct site visits to review and clarify the scope of work and to become acquainted with the project site.

1.4 A-E DESIGN/PERFORMANCE AWARDS

1.4.1 Naval Facilities Engineering Command Design Awards Program

a. NAVFACINST 506I.7. "Awards Programs for Design and Related Activities", dated 6 January 1997. This instruction establishes NAVFAC policy for all of its organizational elements, encouraging participation, as appropriate, in the NAVFAC Design Awards Program, as well as in the design awards programs and competitions of other agencies and organizations. The program is intended to recognize specific achievements by NAVFAC personnel, and by Architects, Engineers, Planners and other professionals accomplishing design work under contract for NAVFAC, which demonstrates and promotes design excellence with respect to both the built and natural environment.

b. Guidance provided is applicable to design endeavors, undertaken on behalf of any customer by NAVFAC Headquarters, engineering field divisions (EFDs), engineering field

activities (EFAs), public works centers (PWCs), other organizational elements of NAVFAC, and contractors working under the direction of NAVFAC, that include the following: (a) all design activities, including the design of the land, the design of facilities, and the design of supporting physical infrastructure; (b) all design products, including master plans, site development and land use plans, landscape development plans, designs for new facilities, designs involving the reutilization of existing facilities, and planning, engineering and design studies of all types; and (c) all design management activities and products that develop, establish, implement or sustain design excellence, including policies, programs, processes, and educational activities.

c. Design Awards Programs and Competitions of Other Agencies and Organizations. Design awards programs and competitions are conducted by a wide variety of other federal agencies, professional societies, industry organizations, individual manufacturers of building products, publications, and other entities. NAVFAC, as well as its design contractors, are often eligible to participate in these programs and competitions. Normally, entry into these programs and competitions can occur without any involvement of NAVFAC Headquarters or other higher echelon offices. Where assistance or coordination is needed, however, it will be provided through the Office of the Associate Director for Design, Code 15D at NAVFAC Headquarters

1.4.2 Other Awards Programs Related to NAVFAC's Facilities Business.

a. NAVFAC's recognition of contractors for performance in excess of contract requirements has long been a part of the NAVFAC Industrial Incentive Plan (IIP) for Contractors. This recognition is based upon one or more of the following: (a) a better product; (b) speed of accomplishment; (c) significant savings to the government; or (d) cooperation beyond the terms of the contract. Under the NAVFAC IIP procedures, two types of awards are possible: (a) the "Certificate of Appreciation," awarded by the Commander/Commanding Officer of a field activity; and (b) the "Commander's Certificate of Commendation," awarded by the Commander of NAVFAC. These awards are available for any contracting initiative, not just for those associated with facilities. The criteria for their issuance does not focus on the aesthetic quality or functional aspects of a completed facility, but, instead, focus on excellence in the contracting process itself.

b. Specifications Awards. The NAVFAC Specifications Award Program was implemented to recognize and reward achievement of NAVFAC staff and Architect-Engineer contractors for construction specifications of superior quality. Details regarding participation are available from Code 151 at NAVFAC Headquarters. This is a follow-on program to the Construction Specifications Institute (CSI) Specifications Competition. Entries into the CSI competition are automatically considered for the NAVFAC program.

1.5 A-E EVALUATION

1.5.1 A-E Performance Evaluation

The performance of the A-E will be evaluated at the completion of the design and at the completion of construction. The evaluation is used in the selection process for future projects and is available to all Government Contracting Agencies.

1.5.2 Interim A-E Evaluation

In addition to the final performance evaluation, an interim A-E evaluation may be issued for unsatisfactory work or performance. An interim evaluation allows for response and an opportunity to improve performance prior to the final evaluation.

NOTES

CHAPTER 2. GENERAL PERFORMANCE REQUIREMENTS

2.1 GENERAL

The Architect-Engineer (A-E) has the responsibility to ascertain what information is available from existing Navy records and what assistance can be provided by the Navy. It shall be the responsibility of the A-E to obtain all additional information necessary to accomplish the work. Exceptions to this requirement are as stipulated in Chapter 3, Paragraph: "Field Investigations".

2.2 STATEMENT OF ARCHITECT-ENGINEERING SERVICES

Attachment A of the Contract is furnished to the A-E prior to fee negotiations. The Statement of Architect-Engineering Services will be the basis for negotiation of fee and resulting formal contract. **The A-E must restrict actions to the negotiated Statement of Architect-Engineering Services.** The Statement of Architect-Engineering Services sets forth:

- a. Project Scope in terms of facility description.
- b. Construction Cost limitation
- c. Basis of A-E effort in terms of services to be provided.
- d. Schedule of submittals.
- e. Special considerations.

2.2.1 Deviations and Changes In The Statement Of A-E Services.

Any deviation from the Statement of Architect-Engineering Services must be discussed with the PL and approved by the Contracting Officer prior to A-E performance. Where a change in A-E services is justified, the Contracting Officer will issue a Contract Modification to the "Statement of A-E Services", and following successful A-E negotiations, will issue a Formal Contract Modification.

2.2.2 Precedence

In the case of conflict between the "Statement of A-E Services" and the A-E Guide, the Statement of A-E Services shall govern. The A-E Guide shall govern over its referenced criteria. Conflicts between the contract documents shall be promptly brought to the attention of the Contracting Officer for clarification.

2.2.3 Quality Assurance

The basic A-E responsibilities are identified in MIL-HDBK-1006/1A and the **FAR clause 52.236-23 entitled "RESPONSIBILITY OF THE ARCHITECT-ENGINEER"**

CONTRACTOR (APR 1984)" and to the NAVFAC clauses 5252.236- (9300 through 9310), pertaining to the A-E Contract Clauses.

2.2.4 A-E Quality Assurance

The heart of quality assurance is a formalized Total Quality Management program. The A-E shall maintain written quality control procedures and shall follow those procedures to the extent that, in the A-E's professional judgement, the procedures are appropriate for the projects' specific circumstances. The A-E shall also maintain a current set of procedures in their office and shall make them available to the Navy for its' review, during normal working hours.

The contractual obligation of the A-E to provide professional quality, technical accuracy, and coordination of all designs, specifications and other services is extremely important and has far reaching consequences. Ambiguity, omissions, and uncertainties on construction contract drawings and in specifications generally result in higher bids and increased numbers of field change orders. Liability for A-E design errors and omissions will be pursued. The A-E is expected to conduct his/her own independent and thorough review of all plans and specifications and other required data prepared by the A-E prior to any scheduled submittal to, or review by, SWDIV. This independent Quality Assurance review shall be for the purpose of eliminating errors, interferences, and inconsistencies between all design disciplines, inconsistencies between drawings and specifications, and for the incorporation of criteria, review comments and guide specifications, as appropriate.

2.2.5 Command Review

The Command does not provide detailed checking and/or coordination services.

A-E submittals will be reviewed by the Command only to the extent necessary to establish conformance with the authorized statement of A-E services and applicable Navy design criteria, and to establish reasonable assurance that work can be completed within funds authorized. The A-E shall accept full responsibility for the technical accuracy and professional quality of all work and material which are furnished under a contract with the Command.

2.3 LIAISON BETWEEN A-E AND THE COMMAND

The A-E shall designate an individual who will be directly responsible for the contract. The Command will assign a Project Leader (PL)/Project Architect (PA)/Project Engineer (PE) and a Contract Specialist (CS), and will identify an Activity Civil Engineer (ACE). Technical liaison between the A-E and the Command will be through the Project Leader (PL). Contractual liaison shall be through the Contract Specialist (CS).

2.4 NOTICE TO PROCEED

The A-E is authorized to proceed with the work only upon receipt of a written Contract or Contract Modification issued by the Contracting Officer.

2.5 PROJECT COST LIMITATION

The A-E shall promptly notify the Contracting Officer in writing if it becomes evident that the project being designed will exceed the Construction Cost Limitation (CCL), or the Estimated Cost of Construction (ECC). (See also Chapters 8 & 9 - Additive Bid Items.)

2.6 REVIEW COMMENTS

2.6.1 Review Comments Resolution

The A-E is responsible for the resolution and incorporation of government comments into the project design. The A-E, after reviewing and incorporating comments, shall return a copy of the comment sheet, Exhibit 2-A, to the PL, annotated in the right hand column (clearly, if hand written) to indicate action taken, as well as returning any marked sheets with annotated responses. The responses shall include one of the following two (2) standard statements, plus clarifying remarks, explaining the rationale for the choice.

- a. Agree with comment. See sheet/detail number for change. (This notation indicates the comment will be incorporated as recommended.)
- b. Disagree with comment. Provide the name of PL and date contacted, and state reason for nonconcurrence. (If already covered in the design, please identify location where information may be found in the submittal.)

2.6.2 Review Comment Presentation Options

At the option of the PL, other methods of review comments and resolution of the comments may be used, in accordance with one of the following presentation methods:

- a) Automated Review Management System (ARMS): The ARMS program provides a management tool for the collection, resolution and storing of comments generated during the design/construction of a project. The program can be accessed and installed through SPECSINTACT CD ROM, "Disk C". (Developed by Construction Engineering Research Laboratory and the Army Corps of Engineers, Sacramento District.)
- b) Design Review Comments (DRC): The DRC program also provides a management tool for the collection, resolution and storing of comments generated during the design/construction of a project. (Developed by Chesapeake EFA, and distributed by the PL.)

c) Revcom Format for Non Success Users: This is a "Word" program file. It is a tool for collection, resolution and sorting of comments generated during design/construction of a project. (Developed by Southwest Division.)

2.7 TECHNICAL ADMINISTRATION AUTHORITY (PROCEDURES I & II)

Contract administration will be designated Procedure I or Procedure II in the Statement of A-E Services.

2.7.1 Procedure I

The COTR is the prime point of contact for the Government on all technical matters. **The A-E is cautioned to perform no work relative to the contract without written authorization of the Contracting Officer.**

2.7.2 Procedure II

Authority for the technical administration of A-E contracts is delegated to the Activity ROIC. Development of the scope of work, selection of the A-E, negotiation and award of the A-E contract, and negotiation and award of changes will be on the same basis as Procedure I. The A-E will submit invoices to the ROIC. After contract award, liaison with the A-E will be by the ROIC through the RPDE at the specific Station. Changes in the Statement of A-E Services may not be authorized at the Station level under PROCEDURE II. When required, a change in the Statement of A-E Services will be approved by the OIC and a modification to the A-E contract negotiated and issued by this Command.

2.8 CONTACTS WITH COMMERCIAL UTILITIES

The A-E, if necessary for the design of the project, shall contact appropriate utility company representatives to determine the source, location and characteristics of the required utility service. Any such contacts shall be coordinated through the PL and shall be made on an information basis only.

2.9 BASE PASSES & SECURITY CLEARANCES

The PL will facilitate the issuance of base passes. The PL will also facilitate visits to classified areas and security clearances to handle classified material if required.

2.10 PROJECT DOCUMENTATION

The A-E shall provide a written report of all conferences, telephone conversations, progress reviews, special meetings and site visits to the PL within ten calendar (10) days following each action. All items affecting contract terms shall be sent to the assigned contract specialist. All correspondence shall reference the project title, project number,

project location and the A-E contract number. When submittals or similar bulky items are forwarded under separate cover, a copy of the forwarding letter or any related correspondence shall be included in the package.

2.11 A-E RELEASE OF INFORMATION PROHIBITED

The A-E shall not release any information pertinent to a project under design or construction to any publication, in any public speeches, or in any other manner without first obtaining clearance and a release in writing from the Command. All material for which clearance is desired shall be submitted in duplicate. During the bidding period, all requests made to the A-E by prospective bidders for clarification or intent of drawings and specifications and all questions relative to bidding forms, bonds and contract forms shall be referred to the Command telephone number contained in the "PRE-BID SITE VISITATION" paragraph of the specification documents. **The A-E shall provide no information to bidders.**

2.12 AVAILABLE SITE INFORMATION VERIFICATION

All available documentary information at the Command relative to existing conditions at the site of the construction will be made available to the A-E by the PL. Site information not available at the Command should be obtained by the A-E from the cognizant activity Public Works Office or Public Works Center. **It shall be the A-E's responsibility to thoroughly research and verify all available information and data relative to site conditions so that unexpected interferences will not occur during the construction of the facility.** Single copies of all pertinent and available Command drawings may be ordered from Plan Files and Technical Records through the PL at no cost.

2.12.1 A-E Verification.

It is the A-E's responsibility to evaluate and to verify all information obtained from existing drawings even if marked "As-Built" or "Record Drawing" and to make visual inspections and field measurements as necessary to properly prepare construction drawings.

2.13 REQUESTS FOR INFORMATION

2.13.1 Bid Inquiries.

Bid inquiries, in the form of Requests for Information (RFIs), that relate to possible error, omission, or ambiguity in the bid documents will be provided by the PL to the A-E for resolution. The A-E is required to provide a prompt and clear response to all such inquiries. When response to such inquiries generates a need for a formal amendment to the bid documents, the A-E is to prepare the amendment and associated cost estimates in accordance with Chapters 8 and 9 of this AE Guide. The A-E is not to discuss bid inquiries with other than designated Command personnel.

2.13.2 COR.

After award of the construction contract, inquiries that relate to possible error, omission, or ambiguity in the bid documents may be provided to the A-E for resolution and possible field changes. The A-E may be required to prepare formal Change Order Request (COR) package(s) to be used by the ROICC in effecting a unilateral or bilateral modification to the construction contract. The A-E is to prepare the COR package and associated cost estimate in accordance with Chapters 8 and 9 of this AE Guide.

2.14 A-E COMMUNICATIONS DURING CONSTRUCTION

Throughout the construction period, the A-E shall communicate with the PL and ROICC on technical issues. There shall be no direct communication between the A-E and the Construction Contractor except in those specific instances when the Command may authorize such communication to facilitate the solution of a construction problem.

REVCOM FORMAT FOR NON SUCCESS USERS

DESIGN COORDINATION AND REVIEW - COMMENTS
SOUTHWESTNAVFACENGCOM 11012/1A (8-93)

PROJECT LEADER

John Smith

COMMENTS BY:

Jane Doe

Cost Engineer

CODE:

4CN.JD

PHONE:

619-532-XXXX

DATE:

10 January, 2000

PROJECT TITLE AND LOCATION:

Q-202, SOF Waterfront Operations facility, Naval Amphibious Base, Coronado, California (Dust Off 100% Submittal)

TYPE OF REVIEW:

100% Dust Off Submittal

NO.	DWG.NO. or SPEC.SECT.	COMMENTS	A-E RESPONSE
001	GENERAL	All Government Estimates are now to be completed using the new NAVFAC approved estimating format in the program called "Success" . This is a software program developed for commercial use by the Navy . The latest version is of the program is "SUCCESS 4.0" . Estimators, or firms that are doing current cost estimating work for the Navy, are required to use the new program as of 01 October 1998. , a small project is an ideal project to start with. <u>This requirement is a new mandatory process, since in the very near future the government is now in the process of capturing all bidding documents by the electronic media. As of the above date, we will no longer accept estimates in other formats, unless it is cleared with the Cost Engineering representative for each Activity Focus Team, or by contacting the Senior Cost Engineer, Code 04CN.JB, Southwest Division at (619)532-3713.</u>	
002		This estimate was not done in accordance with the "Success" software program as required by the Southwest Division AE Guide.	
003		The format is also incorrect. See attached word document and duplicate.	
004		The sequencing of the estimate sheets, describing base bid and options, is very confusing. Please contact the above reviewer as soon as possible to discuss.	

CHAPTER 3. ENGINEERING SERVICES

3.1 GENERAL

Engineering Services (ES), including studies, investigations, surveys and reports, each requiring a wide range of specialized engineering expertise, may be required by the Statement of Architect-Engineer Services.

3.1.1 A-E Proposed ES

If an engineering service is not required by the Statement of A-E Services and is later determined to be necessary by the A-E, the A-E shall submit to the assigned contract specialist a statement describing the additional work.

3.1.2 Field Surveys

Survey parties and other A-E field representatives shall report to the activity Public Works Officer or the designated representative immediately prior to commencing a field survey.

3.2 FIELD INVESTIGATIONS

The A-E shall obtain all necessary field data and make site investigations and studies, incidental to the proper accomplishment of the work required under the contract. All information of record relative to existing conditions at the site of construction shall be verified by on-site investigation. The A-E shall investigate all existing systems including utilities (e.g., water, gas, electrical, storm and sanitary sewer, steam, fire alarm, etc.) and existing site conditions (i.e., Historical and Archeological Resources) which may be impacted by the proposed new construction. The A-E shall address and include in his design new loads to be imposed by the contract project and the interface of the new requirements with existing systems. The findings and conclusions of all pertinent investigations shall be included in the design calculations. The A-E shall be responsible for design of improvements at and contiguous to the project site to remedy minor deficiencies in existing systems that affect the new work. The A-E's responsibility is limited to the nearest points of connection to the existing utility mains or primary services. The A-E shall promptly notify the Contracting Officer if additional utility studies or special field tests are considered necessary to assure firm and sound engineering conclusions as a basis of design.

3.3 NATURAL AND CULTURAL RESOURCES

Information regarding project Biological resources, Historical Resources, and Archeological Issues should have been prepared and made available from the Natural and Cultural Resources staff. The A-E shall obtain such information from the PL.

3.3.1 Natural Resources

Deals with endangered and threatened species, soil and water conservation, soil erosion, and habitat management.

3.3.2 Cultural Resources

Deals with historic buildings and structures, archeological sites, historic landscapes, sacred sites, traditional/cultural sites, Native American religious sites, etc..

3.3.3 Mitigation

Mitigation is a requirement established by a Biological Opinion and/or the National Environmental Protection Act (NEPA) process for Natural Resources, resulting in an EA or an EIS. Mitigation measures may effect project design and construction. There may also be a Memorandum of Agreement (MOA) or Programmatic Agreement (PA) for Cultural Resources, establishing mitigation measures that must be included in the project design and construction. These documents establish requirements that must be accomplished as part of the mitigation for the development of a particular construction site. Compliance with the mitigation requirements make it possible for the project to proceed.

During design on Historic Buildings and Structures, the A-E will be required to follow the Department Of Interior's Standards of Rehabilitation and Illustrated Guide Lines for Rehabilitating Historic Buildings and the MOA or PA in consultation with the Cultural Resources staff at Southwest Division.

3.3.4 Environmental Documentation (ED)

The A-E shall request all information on Environmental Documents (ED) from the project leader prior to the submittal of the fee proposal and prior to the start of design. If the ED requires mitigation of any sort, the A-E shall incorporate those requirements into the design documents.

3.4 SURVEYS

The A-E shall:

- a. Make all field surveys required for design and development.
- b. Contact the Command to obtain survey control information before beginning any survey work.

- c. Provide surveys of sufficient detail to permit the establishment of finish grades and to show all existing structures, pavements, utility lines, obstructions, etc., within the limits of work.
- d. Include drainage areas, connections to existing roads, size of existing utilities and data required to connect new utilities to the nearest source of adequate supply in field notes and survey drawings. (If greater than five acre, 2 hectare, 4047 square meters see Chapter 7.2.2.1).
- e. Submit completed survey drawings and field notes with the 15% Submittal or the Preliminary Project Engineering Submittal for review and record information.
- f. The A-E shall contact the Southwest Division Land Surveyor through the PL to obtain precise guidance and direction with respect to horizontal and vertical control for each project.

3.4.1 Survey Monuments

The A-E shall install a minimum of two concrete monuments with brass caps, within the limits of work, see Exhibit 3-D. Monuments shall be visible from each other for future horizontal and vertical control. Monuments are to be set in a manner that will prevent damage of the monuments during construction. All monuments will have both horizontal and vertical control indicated on them based on station data. Horizontal and vertical control maps for the activity will be provided to the design A-E by the Command. Details of the monument in electronic media can be provided through the Command in DWG or DGN format.

3.4.2 Aerial Surveys

When the A-E uses aerial survey methods and material quantities are to be computed from the survey, the A-E will field verify the area where the quantities are to be computed by manual survey methods. Natural ground will be shot to the nearest one tenth of a foot. Concrete and paved areas will be shot to the nearest one hundredth of a foot.

3.4.3 Cadastral Surveys

This service includes surveys to establish metes and bounds for legal descriptions for real estate holdings and for acquisition of new easements and real estate.

3.4.4 Hydrographic Surveys

This service includes the sounding of waterways or borrow areas either with an electronic echo sounder or with a lead line. It may also include the plotting of the soundings and the computations of quantities.

3.5 GEOTECHNICAL INVESTIGATION

NAVFAC Design Manuals DM-5 and MIL-HDBK-1005 series, DM-7.01, DM 7.02, DM 7.03, MIL-HDBK-1021 and the DM-21 series apply. The A-E shall be responsible for the comprehensive research, investigation, and data collection on all soil and subsurface foundation conditions relative to the project site, for the evaluation of such data and for the formulation of recommendations required for complete project design development. Subsurface investigations shall include, but shall not necessarily be limited to, the obtaining of borings and samples, thorough visual inspection, laboratory testing and the documentation of these investigations by written report.

- a. When soil borings are necessary, the borings should be within the foot prints of structures, utility corridors and pavements. The number of borings and their depth shall be sufficient to obtain data for selection of foundation systems, paving, utilities and other supporting facilities. The A-E will perform sufficient research and/or pre-boring field investigation to avoid damaging buried utilities during subsurface exploration.
- b. The A-E shall be alert for any evidence of possible chemical contamination on the site and shall, at a minimum, conduct field evaluation of each boring sample with equipment capable of detecting petroleum product contamination.
- c. If conditions are discovered, which will require more investigative effort than that which was anticipated at the time of contract negotiation, it shall be the A-E's responsibility to immediately notify the Contracting Officer. The A-E shall under those circumstances recommend in writing any recommended additional sampling, testing or studies that may be required to ensure the adequacy of the site and foundation data obtained for the project design.
- d. After completion of borings, holes shall be backfilled and ground surfaces, including pavements, restored to the original condition, unless more stringent local codes or conditions dictate that monitoring of water levels or water quality may be required. Determination of requirements for groundwater monitoring well requirements shall be made by appropriate components within Southwest Division through the PL.

3.5.1 Soil Testing And Earthwork Standards

Soil testing shall include basic physical properties tests to fully characterize all major soil units as well as design parameter tests appropriate for alternative foundation systems and all supporting facilities. All soil testing shall be conducted in accordance with standard

ASTM methods or other procedures as approved by the Command. Borings are to be tested to the extent required to ascertain the general corrosiveness of the site. Test results shall be presented in the manner recommended by the approved procedure or standard and clearly indicate the procedure used by the testing laboratory.

3.5.2 Boring Logs

A complete record of each test hole shall be maintained. The records shall include the boring location, ground elevation of existing surface in reference to an established project datum, a description of the character of the materials encountered (i.e., classification by visual examination and an indication of the conditions in place), elevations or depths of changes in material types where encountered, the elevation and date of the ground water level when first encountered, the elevation of the ground water level at least 24 hours after completion of the boring, and any other unusual ground water conditions. The vertical extent of any visual observations or measurements of probable chemical contamination shall be indicated and described. The record shall include the date on which borings were made, project identification, complete driving records for the casing and sampler indicating the number of blows per foot or fraction of a foot penetration, the weight and height of fall of the hammer used for driving the casing, the weight and height and fall of the hammer, if used, for driving the sample, the size of casing used, and the size and description (manufacturer and model) of sampler for both undisturbed and disturbed samples. Boring logs shall be prepared in accordance with, or similar to, the sample contained in Exhibit 3-A. Boring log information shall reflect basic soil information and descriptive legends as shown in Exhibits 3-B and 3-C, as well as classification of soils and bedrock in accordance with the systems contained in Design Manual DM-7 series. The A-E may use other forms for boring logs provided they contain all of the required information as shown on the exhibits. Lettering on boring logs shall be 0.156 inch (4mm) high minimum.

3.5.3 Report

The results shall be completely recorded, analyzed and presented in a comprehensive technical report which shall contain the necessary recommendations for site grading, foundation design, resolution of related geotechnical problems and, if applicable, a cost comparison of foundation systems. The report shall include a map showing the location of each boring in reference to the lines of the proposed structures, to coordinates, to existing structures, or to other features which are readily identifiable on station maps. The report shall also include a record of each hole in graphical form and test data of all samples, tabulated and clearly presented. To facilitate Graphics Engineering and Mapping Systems (GEMS) input, the station coordinates of at least three (3) reference points (structures) should be included in the boring location plan. The report shall identify soils and bedrock classifications and testing systems used, and results of secondary testing such as consolidation, tri-axial shear and other testing. The report shall describe existing surface and subsurface conditions at the site including both physical and chemical observations of soils during field sampling and laboratory testing. Include in the report the locations of the cathodic protection soil tests/survey, method/description of testing, findings, and

recommendations. Graphs, formulae, references, pertinent computations and other information shall also be included in the report. The report shall include a description of the equipment and procedures used during the field investigation for sampling and classification of the logged soils. Sampler description shall include inside and outside diameters and driving procedures used for each type of sampler employed.

3.5.4 Geotechnical Review Certification

When a geotechnical investigation is included as part of the design package, the project drawings and specifications shall be reviewed by the responsible geotechnical engineer. Geotechnical review shall consist of a written statement from the A-E stating that the submitted 100% Design Plans and Specifications appropriately incorporated the geotechnical consultants recommendations. The certification shall reference the soil reports containing the recommendations utilized in the project design. The certification shall also include a signed statement from the A-E civil/structural engineer responsible for the design that he/she has reviewed the recommendations contained in the referenced soils reports and incorporated the same into the project design. Include a rationale for any deviation from the proposed Geotechnical recommendations.

3.6 SITE SEISMICITY

Certain types of structures may require the development of specific seismic ground motion representation for use in dynamic analysis. This site specific design response spectrum is required for all designs that use dynamic seismic analysis or when specifically called for in the Statement of Architect-Engineer Services. A site specific ground motion representation is also required for all structures constructed on sites with a Class F site classification as defined in Table 3-1 of TI 809-04 (Seismic Design for Buildings) or Section 4.1.2.1 of FEMA 302 (NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures). Seismic Use Group III H (Hazardous Facilities) and Group III E (Essential Facilities) as defined in Table 4-1 of TI 809-04 require a site specific ground motion representation if they are located on sites with a Class E site classification.

3.6.1 Procedures for Developing Seismic Ground Motions

Any structure, regardless of "Seismic Use Group" or "Site Classification" may be designed using site specific ground motion representation if in the opinion of the design team, such design procedures are needed to produce an appropriate design. Refer to section 6.8 of the A-E guide for additional information relative to site specific ground motion representation. Site specific ground motion representations shall be developed by the A-E using well established probabilistic and/or deterministic methods. The procedures used shall comply with section 3-4 of TI 809-04.

3.7 ENGINEERING DOCUMENTATION

The Cost Certification for all military construction (MCON) projects will be the Parametric Cost Estimate (PCE). The PCE does involve upfront design effort since it is the intent of the PCE to produce a budget estimate that allows final design funds authorization for all MCON projects so they can proceed straight through design from zero percent to 100% or final cost documentation for either design build (DB) or invitation for bids (IFB) contracting methods. The PCE will be due in March every year which will result in the budget information being delivered in time for the critical phase of the MCON budget cycle. For complex projects such as medical facilities, treatment plants, or environmentally sensitive projects, early starts will be authorized to complete technical studies or environmental documentation. While there will be periodic reviews in the process, there won't be the long delays that were experienced previously between the 15% completion and the final design start. Many A-E's had complained about this hiatus, which has now been largely eliminated. The PCE shall be prepared by the Cost Engineering and Value Engineering Indefinite Quantity (CE\VEIQ) A-E Contract or In-House. When the design A-E is involved in the PCE, Southwest Division will provide training to the A-E on using the new cost model software that produces the parametric estimate. The A-E scope of work will delineate the degree of A-E involvement in the PCE and will provide special details required as outlined in the CE\VEIQ A-E contract for MCON projects.

Prepare the following (for MILCON Projects only) as outlined in the CE\VEIQ A-E contract.

- a. Form DD 1391 Plus and DD 1391C.
- b. Primary M² cost development sheet and description of high cost/unusual features.
- c. Executive Summary of Project Design and Construction.
- d. Budget Estimate Summary Sheet (BESS) and Parametric Cost Estimate (PCE)
- e. Project Special Considerations.
- f. Project Design and Construction Data.
- g. Sketches of Vicinity Map, Site Plan, Floor Plans, Building Elevations, and Building Cross Sections.
- h. Land Acquisition Data (Where Applicable).

3.8 ARCHITECTURAL REVIEW BOARD (ARB)

- a. An Architectural Review Board (ARB) reviews projects to ensure that architectural aesthetics, functionality, compatibility, and character are maintained at the customer activities in compliance with the Activity's Master Plan and Base

Exterior Architectural Plans (BEAP), and that the project is within the cost limitations of the program. The ARB shall be the focal point for aesthetic review for projects. Provisions for the physically disabled will also be reviewed by the ARB.

b. The review at the schematic/preliminary stage is the means by which the Navy can assure itself of development that is efficient, cost effective and reasonably in harmony with the character and quality of desirable environment. The intent is to provide design guidance in those areas not covered by building codes and design directives. It consists of review by qualified professionals to assure conformance with certain considerations of design that the Navy establishes and administers.

c. The Architectural Review Board (ARB) is to ascertain that the end products of the design will satisfy the following overall goals:

1. The building is sited properly to provide harmonious, effective vehicular as well as pedestrian traffic.
2. The building is sited to take advantage of the existing utilities to provide cost-effective construction of the project.
3. The site planning, including landscape design, is in conformance with the Master Plan and BEAP for the Activity.
4. The Fire Protection System will be addressed to ensure that the Fire Protection Engineer from the Southwest Division Area Focus Team has been involved prior to the ARB presentation.
5. The building design, as well as supporting mechanical and electrical systems, shall be cost effective, well planned, clean in appearance and simple in form.
6. The overall architectural design must be appropriate and responsive to the Naval Facilities Engineering Command policy of providing facilities that are durable in character, timeless, and not trendy in appearance. Stylistic or passing fashion design features and monumental structures are to be avoided.

d. The initial ARB review will take place at the schematic design submittal stage. The PL will require that the A-E to submit design status drawings, basis of design and cost estimates at or near 15% design completion for review and approval by the ARB.

e. Documents required for the ARB submittal will meet at a minimum, the following requirements:

1. A color presentation using felt tip markers, or prisma color pencils on blackline, blueline or brownline print. (Site Plan, and Building Elevations)
 2. Site plan showing building footprint on contoured base map. Indicate all utility lines, access roads, paved areas, vehicular and pedestrian circulation paths, and existing adjacent structures.
 3. List of all rooms and spaces required for the facility. Indicate net square foot/meter area for each room/space. Indicate total gross square foot/meters area of the facility as proposed by the design.
 4. Provide scaled floor plan(s) drawings. Label all rooms/spaces, show all major dimensions. Include footprint of major equipment and furniture required in each space. Indicate Mechanical/room/equipment yard proposed for the facility. Indicate schematic duct work if applicable.
 5. Provide scaled building sections. Show floor to floor, floor to roof, and ceiling heights. Indicate materials and construction for floor, exterior walls and roof. Indicate duct space for HVAC system if such systems are proposed for the facility. Indicate major electrical installations when such installations are proposed for the facility.
 6. Provide scaled building elevations and indicate materials, finishes, texture and color number as referenced in the BEAP.
 7. Indicate Structural, Mechanical and Electrical layout to illustrate the facility design.
 8. Provide a collateral equipment list to support the design, and coordinate furniture footprint with the floor plan(s), and associated cost.
 9. Cost estimate (\$/SF or \$/SM). (See Chapter 9 for requirements.)
 10. Code Criteria Search. (See Attachment C.)
- f. Disabled accessibility requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG), and the Uniform Federal Accessibility Standards (UFAS) are to be met in providing access for people with disabilities in buildings and facilities and facilities designed, constructed, altered, leased or funded by the Department of Defense.

3.9 VALUE ENGINEERING POLICY AND GUIDANCE (VE)

3.9.1. Introduction

The Naval Facilities Engineering Command exists to provide products and services that delight our customers. The intent of VE is to enhance our ability to delight our customers by meeting all their needs while conserving their limited financial resources.

The objective of VE is to provide the best value. Best value is defined as providing required functions for the least life-cycle cost. VE is not cost cutting by impairing required functions. During the process of developing solutions and evaluating alternatives, the VE/Design team members are encouraged to challenge design standards and criteria which do not appear to add value, enhance the project functions, or reflect current private industry practices.

3.9.2. VE Team Studies

There are several different processes available to us to provide Value Engineering studies.

3.9.2.1. Indefinite Quantity Contracts

These contracts provide the opportunity to conduct Value Engineering Team Studies using any one of four (4) methods. The first two methods consist of multi-disciplined teams of professionals meeting exclusively for the project. The third and fourth methods are essentially design charettes facilitated by a professional Certified Value Specialist (CVS). All methods require the active participation of the A-E.

METHOD ONE: 3 DAY VALUE ENGINEERING TEAM STUDY

This study consists of a three (3) day team study and is usually conducted immediately following the 15% Preliminary Project Engineering Submittal. Because the 15% submittal is still very schematic, this study investigates program issues rather than technical details. One of the major advantages to performing an early study is that it helps confirm the program by identifying and clarifying basic functions of the project. It becomes a very important design tool that the User, A-E and Project Leader can use to confirm the needs of the program.

METHOD TWO: 5 DAY VALUE ENGINEERING TEAM STUDY

This is the customary five (5) day study. VE services for this study are normally performed, and a report provided, within 21 calendar days following the initiation of the study.

The VE team for Methods One and Two shall consist of the same number of engineering disciplines performing work in the original design and/or as required to provide VE expertise in all design disciplines included in the original design.

METHOD THREE: 3 DAY FUNCTION ANALYSIS CONCEPT DEVELOPMENT (FACD)

METHOD FOUR: 10 DAY FUNCTION ANALYSIS CONCEPT DEVELOPMENT
(FACD)

The **Function Analysis Concept Development (FACD)** process is exercised at the beginning of the Preliminary or Schematic stage of Design. FACD consists of a series of concentrated on-site work sessions with the A-E and their consultant engineers, the Station, the Activity, the EFD/A, Public Works, Regulatory Agencies, and other interested parties under the guidance of an independent professional CVS facilitator. The process uses Value Engineering methodology to help better define the project's functional requirements and to provide a better understanding of those requirements.

3.9.2.2. A-E Scope of Work for Value Engineering Services

The A-E scope of work may be written to require the A-E to provide an independent VE consultant to participate with the A-E in the design process. The VE consultant's participation is intended to incorporate the VE's systematic approach of proposing and analyzing alternative solutions. The VE consultant works with design team members as well as others who may not be a part of the design team.

3.9.3. VE Reports

A VE report shall be prepared to document all proposals considered. The report shall include schedule and cost impact information, advantages/disadvantages and justification for all proposals, as well as the disposition of all VE proposals, including comments and recommendations incorporated as VE modifications..

FACD study submittals shall consist of:

a. An Executive Summary Report including Project Description, Drawings, Special Design Features that are unique or which generate higher cost, and an Environmental Review; and

b. A Concept Report including data to support the development of the project scope, layout and special features, Basis of Design, site analysis, diagrams of building functions, written reports describing site investigations and fact findings, minutes of meetings and discussions, and Functional Analysis worksheets.

3.10 COLOR RENDERINGS

3.10.1 Color Freehand Renderings

The color rendering shall have a minimum overall dimensions of 24 " x 16 " (610 mm x 410 mm) exclusive of lettering, matting and framing. The rendering shall be mounted under glare reducing glass in a sturdy one inch (minimum) flat top black metal or wood frame. One (1) 16 " x 20 " (400mm x 500mm) Ektachrome print; one (1) 4 " x 5 " (100mm x 120mm) color negative and one (1) 2 " x 2 " (50mm x 50mm) color slide shall be provided of the rendering. A perspective sketch of the proposed rendering shall be submitted to the PL for approval before the final rendering is started.

3.10.2 Color CADD Daytime Renderings

The A-E shall provide the CADD rendering. The rendering shall be mounted in a dark wooden frame with non-glare glass. Provide one (1) 16 " x 20 " (400mm x 500mm) copy; (1) 8 " x 10 " (200mm x 250mm) color print; (1) color slide; (1) color negative; and one (1) copy of magnetic media using high density 3 ½ " (90mm) disks compatible with AutoCAD Release 12 or Intergraph Microstation 5.0. For more information, see Attachment B.

3.11 ENERGY CONSERVATION REPORT

MIL-HDBK 1190 Facility Planning and Design Guide and NAV PUB P-442 Economic Analysis Handbook apply. The A-E shall prepare a report addressing the HVAC systems and energy conserving features and techniques to be utilized in the design of the project. The report shall include the building systems energy analysis and life cycle cost analysis. The energy analysis shall focus on all air conditioning and heating design factors such as insulation, building orientation, solar shading, size, type and location of glazing, lighting, day-lighting, types of HVAC systems, and energy recovery equipment. The life cycle cost analysis shall consider construction, energy, maintenance and operating costs. The report shall be used in determining the most energy efficient and cost effective system based on the life cycle cost analysis prior to initiating a fixed design. The report shall support the design decisions incorporated in the final design. If the design is changed significantly, then the energy report shall be redone to reflect the new conditions.

a. The number and types of alternatives to be analyzed will be based on the project information provided in the scope of work. Prior to starting the analysis the A-E shall submit the proposed system alternatives for approval.

b. After approval of the proposed system alternatives, the A-E shall performed a computerized energy analysis for any new or rehabilitated building that is conditioned and exceeds 3,000 square feet (278 sq. m.) of gross floor area. The computer program shall be a professionally recognized and Command approved computer program that integrates architectural features with air conditioning, heating, lighting, and other energy producing or consuming systems, and will perform 8760 hourly calculations. Alternately, buildings with 3,000 square feet (278

sq. m.) and less gross area may be analyzed using the Simplified Multiple-Measure Methods described in Chapter 28, "Energy Estimating Methods" of the ASHRAE, Handbook of Fundamentals.

- c. The Design Energy Budget (DEB) for new construction and/or major renovation projects shall comply with the Design Energy Target (DET) and Energy Conservation Criteria provided in Chapter 8 (latest revision) of the MIL-HDBK-1190. In addition, designs shall comply with NAVFAC Letter 11100/15C/PNB, dated 5 June 1995, Design Energy Target Reduction, Interim Technical Guidance.
- d. The life cycle cost analysis shall be performed using a Life Cycle Cost In Design (LCCID) computer program or a program determined to be equivalent.
- e. The least complex alternative that met the DET at lowest life cycle cost will be incorporated into the design.

3.12 COMPREHENSIVE INTERIOR SERVICES FOR FURNITURE AND FURNISHINGS PROCUREMENT

DM 14.01 applies. Provide the following:

- a. Furniture placement plans.
- b. Color selection and coordination of furniture and furnishings.
- c. Furniture and furnishings procurement list including cost estimate for each line item. The list shall include, as a minimum, a cost summary sheet, catalog cuts, supplier summary list and specifications for each item. The furniture and furnishings specifications shall include stock/model numbers, item descriptions, quantities, prices, color, finish of fabrics for each item.
- d. Rendering and other presentation materials as may be required to realistically represent the design concept and color scheme for the interior.
- e. Interior signage and directional plan(s) and specifications.
- f. Revisions to the furniture and furnishings procurement list whenever an item specified is no longer available.
- g. Supervision of the installation and placement of furniture and furnishings.
- h. Professional photographs of completed interiors.

3.12.1 Schedule of Submittals for Comprehensive Interior Services

Prior to the start of comprehensive interior services, the A-E interior design staff, through the PL, shall meet with the command interior designer to obtain information on GSA catalogs, procurement sources, and procedure. Refer to the Statement of Architect and Engineering Services for quantities of submittals.

3.12.2 Comprehensive Interior Services for Medical and Dental Facilities

Normally, medical and dental facilities require comprehensive interior design services. The interior design for these facilities must incorporate, and coordinate all equipment, furniture, signage and lighting. Specific submittal requirements and submittal schedule shall be as stipulated in the Statement of Architect-Engineering Service.

3.13 MANDATORY PROCUREMENT SOURCES FOR FURNITURE AND FURNISHINGS

The government has mandatory sources for purchase of furniture and furnishings. Command Interior Design staff will provide the A-E the information on mandatory procurement sources, such as General Prison Industries (UNICOR) and General Services Administration (GSA) current contract catalogs. When an item is not available on GSA schedule, the designer shall consult with the government interior designer and provide descriptive performance specifications for such item for procurement by bidding process.

3.14 CONCEPT STUDIES FOR HOUSING REPAIR AND IMPROVEMENT

Housing Repair and Improvement Studies are required to determine the extent of periodic repair and improvements for existing Military Family Housing developments. The studies will cover site development items such as paving, road work, utilities, landscape, as well as the housing unit construction. The services for these studies will generally include extensive field investigations, tabulation of the deficiencies, and itemized cost estimates for each repair and/or improvement work item. The studies with attendant cost estimates will be used by the Housing Management Offices to schedule and budget the repair and improvement projects.

3.15 SITE ENGINEERING INVESTIGATIONS (SEI) AND REPORTS FOR TURNKEY HOUSING AND DESIGN/BUILD PROJECTS

Site Engineering Investigation (SEI) Studies and Reports are used to study a parcel, or parcels, of land for potential development for TURNKEY HOUSING and DESIGN/BUILD projects. In the performance of the SEI, the A-E may be required to provide a number of specialized studies and reports, which may include, but are not necessarily limited to:

- Topographic Surveys
- Subsurface Soils Reports
- Contamination Analysis and Reports
- Development Density
- Configuration of the Proposed Development

Code Constraints
Environmental Issues and Constraints
Utilities Requirements
Points of Connection
Permits and Administrative Agencies' Requirements
Hydrology
Traffic Studies

3.16 CORROSIVE SOIL AND/OR WATER

For projects which specifically require cathodic protection design services, or those known to require extensive cathodic protection surveys, such as large pipeline projects and/or regulated steel underground storage tanks (USTs)/ hazardous tanks, as required by the Statement of A-E Services, provide the following:

- a. Soil and/or water resistivity measurements. (Not required if addressed in the soil investigation).
- b. Variations in soil and/or water make-up, such as texture and PH factor. (Not required if addressed in the soil investigation).
- c. Soil moisture content and normal seasonal variation. (Not required if addressed in the soil investigation).
- d. Structure to soil potential measurements where protection is to be provided for existing underground structures or where buried test specimens are used for new installations.
- e. Insulation flange measurements.
- f. A cathodic protection stray current interference survey, when the new project is in an area known to be occupied by other existing underground utility systems or structures.

Provide and include in a report the location of tests/survey, method of testing, findings, and recommendations.

3.17 OCCUPATIONAL SAFETY AND HEALTH REPORT

3.17.1 Regulations.

Describe any significant design features necessary for compliance with federal and state regulations pursuant to PL 91-596, the Occupational Safety and Health Act of 1970.

3.17.2 Planning and Design for Safety.

In addition to compliance with regulations and codes, develop a facility with layout and accommodations that protect workers from potential hazards in planned operations. Regulations are minimum standards and frequently address worker protection measures under adverse conditions. The Government benefits when facilities are designed for work environments that are safe to operate and manage. Investment in safety during planning and design includes identifying potential user hazards and eliminating or controlling them through appropriate measures. These include selection of alternative means to accomplish facility function, engineering controls, or installation of protective barriers. Elimination of hazards is preferred to long-term management of hazards and mishap consequences. An early submittal is required for major alternatives to facility arrangement. Engineering controls should be submitted during design development. Protective barriers should be shown in plans and specifications.

a. Determine a plan of action to design for safety. Follow guidance in MIL-STD-882C, System Safety Program Requirements. Estimate additional effort needed and assign responsibilities. Submit the plan in the BOD.

b. Follow up on available Preliminary Hazard Analysis (PHA), Preliminary Hazard List (PHL), or list of hazards developed for the project. Where practical, eliminate hazards identified as Risk Assessment Code (RAC) 1 and 2. Optimize safety in the facility work environment. State the measures planned which are complex or require significant interdisciplinary coordination.

c. If additional study is needed, discuss in the BOD and coordinate with the PL.

d. Include available PHA, PHL, or list of hazards with the BOD as an attachment.

e. Track each hazard for possible elimination, control, or protective barrier design. Comply with MIL-HDBK-1001/1, System Safety Engineering requirements and the A-E contractor requirements in NAVFACINST 5100.11H.

f. In each subsequent submittal, discuss progress and describe design considerations to address safety concerns.

g. If a PHA is not available for facilities assigned an overall RAC-1 or RAC-2, coordinate with the PL. A safety consultant may be needed. MIL-STD-882C provides guidance for accomplishment.

3.18 CONSTRUCTION AND DEMOLITION (C &D) WASTE DIVERSION OPPORTUNITY ASSESSMENT:

The A-E shall prepare a Construction and Demolition (C&D) Waste Diversion Opportunity Assessment for all projects that will utilize the Miramar Landfill in San Diego County,

California, for solid waste disposal. The intent of the assessment is to perform an economic analysis of the potential to divert C&D debris from the landfill. The assessment shall estimate the amount of C&D debris in tons by commodity for the project. The A-E shall evaluate the amount of C&D debris for each commodity type that can be economically diverted from the landfill using the best technology available based on current disposal and diversion costs. The A-E shall then determine remaining amount of the C&D debris in tons that cannot be economically diverted. The A-E shall insert that estimate into paragraph 3.4.1 of Specification Section NFGS-SW-01576 of 01 February 1999. The A-E shall use the same commodity types as shown in the Construction & Demolition Debris Diversion Summary exhibit in the specifications.

3.19 ASBESTOS SAMPLES ANALYSIS, REMOVAL AND DISPOSAL REPORT

3.19.1 Facility Changes

Asbestos has been used in over 5000 products associated with building materials. Facilities undergoing changes such as demolition, renovation, repair, retrofit, and/or rehabilitation potentially involve disturbance of asbestos in the following circumstances:

- a. Construction involving drywall demolition
- b. Spray applied acoustical ceiling material
- c. Work involving decorative paints and walls
- d. Roof repair and/or demolition
- e. Boiler and lagged hot water lines
- f. Floor tiles and adhesive tiles
- g. Linoleum removal
- h. Wall insulation
- i. Plaster & Stucco
- j. Spackles
- k. Caulking putty, millboard and cement insulation
- l. Paints and coating

m. Various textile materials

The A-E shall make prudent efforts to insure that asbestos detection and evaluation is accomplished in sufficient detail to accurately identify the presence of the material or rule out its existence. The Environmental Protection Agency Model Assessment Program shall be used as the guide in defining homogeneous areas, establishing sampling protocols and providing objective identification levels. Particular attention will be given to the correct identification of damaged asbestos containing material with priority assessment based on the EPA algorithm determining removal, encapsulation and/or repair.

3.19.2 Site Investigation of Suspect Materials

In cases where demolition is anticipated, friable asbestos material shall be removed before other work proceeds. Preparation for work will include: (1) notification of regulatory agencies, (2) acceptable arrangements to provide proper transportation, (3) verification of personnel and contractor qualifications, and (4) assurance that administrative procedures are completed relative to requirements for site surveillance when Regulated Asbestos Containing Material (RACM) is present. Additionally, a report shall be submitted, after review, during site surveillance to insure thoroughness in the data generated. This will include the facility history file which includes a record history of maintenance and repairs accomplished to date. Record data from NAVFAC MO-321, Facilities Management and NAVFAC MO-322, Inspection of Shore Facilities will be summarized and presented in a table format as part of the summary report.

3.19.3 Regulated Amounts of Asbestos Materials

Materials that have been objectively identified to contain asbestos are designated Regulated Asbestos Containing Materials (RACM) only if they meet the legally defined identification criteria. Required analysis includes Polarizing Light Microscopy (PLM), Transmission Electro Microscopy (TEM), and X-Ray diffraction. The most commonly used bulk identification procedure is the Petrographic Microscopy (PLM). This is currently the legal methodology for bulk sample identification. This method has limitations based on the limit of detection of the light microscope for diameters less than 0.5 microns. The regulated asbestos containing materials are also defined as fibers of a specific length and length to width ratio, as well as percent by area, rather than weight per volume. Where identification is other than PLM and insertion of values or identifications by TEM is presented by the A-E, this information must be supplemented with ashed weight data, as well as fiber size and length, for consideration and decision making.

3.19.4 Sampling and Analysis Report

The A-E shall provide a sample and test report complete with proper credentialed signatures and statistical sampling protocols showing sectioned homogenous areas, square footage and footnotes, identifying the logic establishing the homogenous areas. This report will summarize the results of the asbestos surveillance and sampling program when completed. Provide a listing of the areas, types and amounts of asbestos found, extent of asbestos contamination, a listing of applicable federal, state and local regulations applicable, and a description of procedures to be incorporated into the construction documents for removal, retrofit, repair, disposal and/or encapsulation, as appropriate.

3.20 PAINTS AND OTHER CHEMICAL COATINGS; SAMPLE ANALYSIS, REMOVAL AND DISPOSAL REPORT

3.20.1 Approved Sampling Plan

Any project involving contact, abrasion, removal, cleaning, or any disturbance of a chemically coated surface will be accomplished only after a definitive analysis of the coating has been made.

3.20.2 Sample Analysis

If the analysis identifies the material as one of the regulated substances such as lead, chromates, organo tins, etc., which are suspected or are known to be a threat to health or the environmental, proper industry accepted work procedures will be initiated.

3.20.3 Work Plan

An approved work plan prepared by a Certified Industrial Hygienist, certified in the Comprehensive Practice of Industrial Hygiene, will be employed by the A-E to conduct necessary sampling, utilizing a model asbestos approved protocol established in published plans of the Environmental Protection Agency (EPA). Such plan for sampling will insure (with a 95% level of confidence) that the materials within a given homogenous area are consistent with report data for the surface reported. In the case of lead for example, direct readings using X-Ray spectroscopy florescence spectrum may be used. A nominal sixty second test with "K" shell reading may be reported. Unverifiable readings falling between 0.8 to 1.2 mg/cm² will be tested further by obtaining a bulk sample and testing using atomic absorption and/inductively coupled plasma spectroscopy or graphite furnace technology.

3.20.4 Laboratory Analysis

Laboratory analysis will be by an accredited laboratory participating in the Proficiency Analytical Testing program conducted by the American Industrial Hygiene Association.

3.21 ENVIRONMENTAL PERMIT REQUIREMENTS INVESTIGATION, REPORT, PERMIT APPLICATIONS AND CONSOLIDATED COMPLIANCE ASSESSMENT REPORT

3.21.1 Design Compliance

The A-E shall design the project to comply with all applicable Federal, State, Local and Intergovernmental Environmental Protection Standards governing air quality, water quality, solid waste and hazardous waste. The A-E shall design the facility to comply with the most stringent applicable standards.

3.21.2 Permit Application Submittal

The project may require that the government secure permits for pollution control, construction, operation, etc. As required, investigate the need for, report on, develop the required data and design information, and obtain and submit completed draft and final permit applications with supporting documentation to SOUTHWESTDIV. Coordinate all contact with any applicable federal, state, and local regulatory agency through SOUTHWESTDIV. SOUTHWESTDIV will be responsible for submission of the application(s) for the final permit(s) where applicable.

3.21.3 Permit Requirements Report

Project Review, Environmental Permit Checklist, see Attachment D-1, Equipment Requiring Permits (known), see Attachment D-2.

Prepare a Permit Requirements Report which includes the following:

- a. Project Review Environmental Permit Checklist, Attachment D.
- b. Permitting authority (EPA, COE, state, local, etc.).
- c. Type of permit required (construction, operation, discharge, use, dump, dredge, fill, haul, etc.).
- d. Who is responsible for submitting the permit application.
- e. Procedure and time necessary to complete permit application and obtain permit.
- f. Permit fees required.
- g. Statement that the project is covered by variances or that the permit is not required. If a variance is required, describe the procedures on how it will be obtained. If a permit is not required, furnish reasons and supporting justification (cite state and local regulations).

- h. For each permit required, the A-E shall evaluate all applicable regulations to determine if monitoring devices are needed. Where required, monitoring devices shall be included in the project design.

3.21.4 Consolidated Compliance Assessment Report

The A-E shall prepare and submit a Consolidated Compliance Assessment Report.

3.22 SOLAR ENERGY STUDY

The AE shall examine the project for solar energy applications and shall prepare a solar energy study to determine the economic feasibility of applying solar energy systems to the project design.

If a solar system is determined to be cost effective, a fee for the design will be negotiated. The solar system is to be included in the bid package (drawings & specifications) as an additive bid item.

3.23 SECTION 106 STATE HISTORIC PRESERVATION OFFICE (SHPO)

The following information shall be prepared by the A-E;

- a. Brief statement of work for the project.
- b. A detailed statement as to why replacement is proposed over repair.
- c. Whether the items being removed/replaced are original to the units. If not, when were they installed?
- d. Dimensions (thickness, height, width), details, materials, and condition (dry rot, broken, etc..) of the items being repaired/replaced.
- e. One (1) set of 10% plans, specifications, and construction schedule.

[The Project Leader shall forward the submittals for 3.23.1 to SHPO via the designated Natural & Cultural Resources staff.]

3.23.1 The use of Recovered Materials shall be incorporated into the [design] [RFP] [IFB] package to the maximum practicable amount. Recovered Material includes the following:

- a. Building Insulation Products (loose-fill, blanket, batt, board, and spray-in-place insulation.
- b. Structural fiberboard and laminated paperboard products for application other than building insulation.
- c. Cement and concrete, including concrete products such as pipe and concrete masonry unit (CMU) block, containing coal fly ash or ground granulated blast furnace (GGBF) slag.

- d. Carpet made of polyester fiber (for use in low and medium wear applications).
- e. Floor tiles and patio block containing recovered rubber or plastic.
- f. Hydraulic Mulch products containing recovered papers or woods.
- g. Compost made from yard trimming, leaves, and/or grass clippings.

3.23.2. Incorporate into the [design] [RFP] [IFB] package (to the maximum extent practicable) any procedures for stopping the work in the immediate area, if any archeological resources are discovered during the earth disturbance.

3.24 SHORT CIRCUIT AND COORDINATION STUDY

This service is to be used primarily on electrical distribution projects. It is not for use on the typical facility design. (For the typical facility, this design effort is considered to be a part of the project design and calculations.) Determine the short circuit duty required for all protective devices and switchgear and the proper selection and setting of all protective devices to ensure that the electrical system will be properly coordinated. Back-up calculations and time-current characteristic curves must be submitted. The final submittal of relay settings and time-current characteristic curves shall be made when the exact relays, circuit breakers or fuses to be used are known.

3.25 DESTRUCTIVE TESTING

In those instances where information is needed for a project but it is hidden from view or unavailable due to existing facilities, then destructive testing to gain access to this information is highly encouraged. If it is unanticipated and not included in the current Statement of A-E Services, then the A-E is advised to contact the Contract Specialist to request that this be added as a scope change. Each such request will be considered on it's own merit and, if adopted, will be awarded as a modification to the A-E contract.

3.26 FIELD VERIFICATION PRIOR TO CONSTRUCTION

Reconfirm site conditions which generated the basis of design. Any revision to the design required as a result of this survey should be made available to the PL.

3.27 DESIGNER TO ROICC REPORT

Identify "critical" inspection features of the project which will assist the ROICC in the development of an effective inspection plan and the assignment of available expertise. The report shall include items such as those outlined in the "Designer to ROICC Presentation" paragraph of this Guide.

3.28 DESIGNER TO ROICC PRESENTATION

This presentation shall be conducted by the A-E design team to orient ROICC personnel who will administer the construction contract. The presentation shall be made at a place and time established by the ROICC office. The presentation shall include a general description of the project, and shall flag critical, unique or special construction features or details. The presentation shall include, but shall not be limited to, the following:

- a. Outline the project scope of work. Discuss the project construction schedule and all phasing requirements.
- b. Explanation of the structural concept, materials, or unusual construction features. Outline critical structural elements, tolerances, special anchors, pile foundations, testing requirements, joint seals, etc.
- c. Outline of specified testing requirements, i.e., pile loading, field tests, etc. Where tests specified are unusual or non-standard, give more detail. Review Log of Submittals and CQC Testing Plan.
- d. Brief description of mechanical, electrical, utility designs and unusual features such as high pressures, temperatures, capacities, etc.
- e. Discussion of critical areas where 100 percent inspection is required (i.e., subgrade preparation, forms/rebar alignment prior to concrete placement, critical structural connections, A/C or HVAC pre-check out requirements, special finish "sample panels" etc.).
- f. Discussion of critical shop drawing requirements.
- g. Discussion of requirements for supervision of installations by the manufacturer.
- h. Explanation of requirements for operating and maintenance manuals.
- i. Outline of the long lead procurement items and Government furnished equipment and the impact that these items may have on the timely completion or coordination of the project.
- j. Explanation of customer operational requirements (i.e., utility outage periods, aircraft runway closures, phasing of work in certain buildings, areas etc.). Refer to the specified requirement.
- k. Discussion on permit requirements.
- l. Outline of hazardous materials and safety precautions (i.e., asbestos, beryllium, lead paint removal, mercury, toxic substances).

3.29 TRAVEL

Local travel is defined as travel within a 50-mile radius of the local A-E office and is not reimbursable. Travel and per diem expenses outside the local travel area must be approved by the PL prior to start of travel and will be separately reimbursed in accordance with provisions of the Standardized Government Travel Regulations. A travel request must be approved by the PL prior to start of travel, providing the date, length of time and name of individual performing the travel. The travel authorization must be approved in writing or, if granted orally, must be confirmed in writing.

SOIL BORING LOG KEY

SOIL DATA LOG

GROUND SURFACE ELEVATION

DATE:

NUMBER:

DRY DENSITY (LBS/CU FT)	MOISTURE (% DRY WT)	BLOW COUNT (BLOWS/FT)	CHEMICAL (PIC/PPM)	SAMPLE TYPE	DEPTH (FT)	SOIL LOG	SOIL CLASS	LOCATION: Activity, State, Area EQUIPMENT: Type of rig, casing PROJECT: Proposed facility & no. DESCRIPTION
↑	↑	↑	↑	↑	- - - 5 - - - 10 - - - 15 - - - 20 - - - 25 - - - 30 - - - -	↑	↑	<p>Indicate major soil type, color, moisture, minor soil types present, compactness for coarse-grain soils, consistency for fine-grain soils, approximate percentage of cobbles. (see DM 7.1 for further details)</p> <div style="text-align: center;"> ^{1,2} ATD ← </div> <p><u>Water table & Time of observation</u></p> <p><u>Soil Classification</u></p> <p><u>Graphic Log</u> of soil class</p> <p><u>Sampler Type</u> for each sample type indicate I.D., O.D., drive method</p> <p><u>Chemical Data</u> indicate type of equipment & observed concentration</p> <p><u>Blow Count</u> ³ indicate number of blows used to advance specified sampler per foot or as indicated</p> <p><u>Natural Moisture Content</u></p> <p><u>Natural Dry Density</u></p> <p>NOTES:</p> <ol style="list-style-type: none"> 1. Provide table of time and water level readings if a piezometer installed or boring is left open. 2. Provide separate legend defining classification system, particle size limits, sampler procedures and other graphic symbols used in boring logs. 3. Provide recommended conversion to estimate Standard Penetration Test (ASTM 1586) from the blow counts indicated for each sampler. 4. Indicate start and completion times for each boring.

Exhibit 3-A

TYPICAL SOIL BORING LOG

SOIL DATA LOG
















GROUND SURFACE ELEVATION

DATE:

NUMBER:

DRY DENSITY (LBS/CU FT)	MOISTURE (% DRY WT)	BLOW COUNT (BLOWS/FT)	CHEMICAL (PIC/PPM)	SAMPLE TYPE	DEPTH	SOIL LOG	SOIL CLASS	LOCATION: EQUIPMENT: PROJECT:
					- - - - 5____ - - - - 10____ - - - - 15____ - - - - 20____ - - - - 25____ - - - - 30____ - - - -			DESCRIPTION

SAMPLE SOIL BORING LEGEND

MAJOR DIVISIONS			GROUP SYMBOLS		TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)		GW	Well graded gravels, gravel - sand mixtures, little or no fines.
				GP	Poorly graded gravels or gravel - sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amount of fines)		GM	Silty gravels, gravel - sand - silt mixtures.
				GC	Clayey gravels, gravel - sand - clay mixtures.
	SANDS (More than 50% of coarse fraction is smaller than the No. 4 sieve size)	CLEAN SANDS (Little or no fines)		SW	Well graded sands, gravelly sands, little or no fines.
				SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)		SM	Silty sands, sand - silt mixtures.
				SC	Clayey sands, sand - clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)			ML	Inorganic silts, and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
				CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
				OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)			MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
				CH	Inorganic clays of high plasticity, fat clays.
				OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS				Pt	Pest and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

PARTICLE SIZE LIMITS

SILT OR CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	Fine	Medium	Coarse	Fine	Coarse		
	No. 200	No. 40	No. 10	No. 4	3/4"	3"	

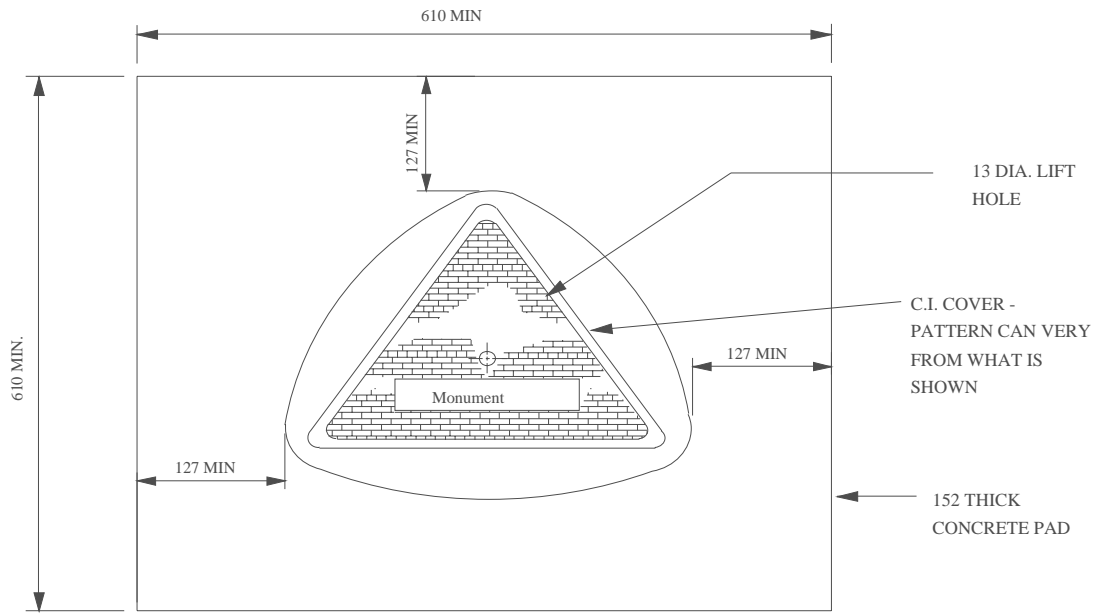
12²

U.S. STANDARD SIEVE SIZE

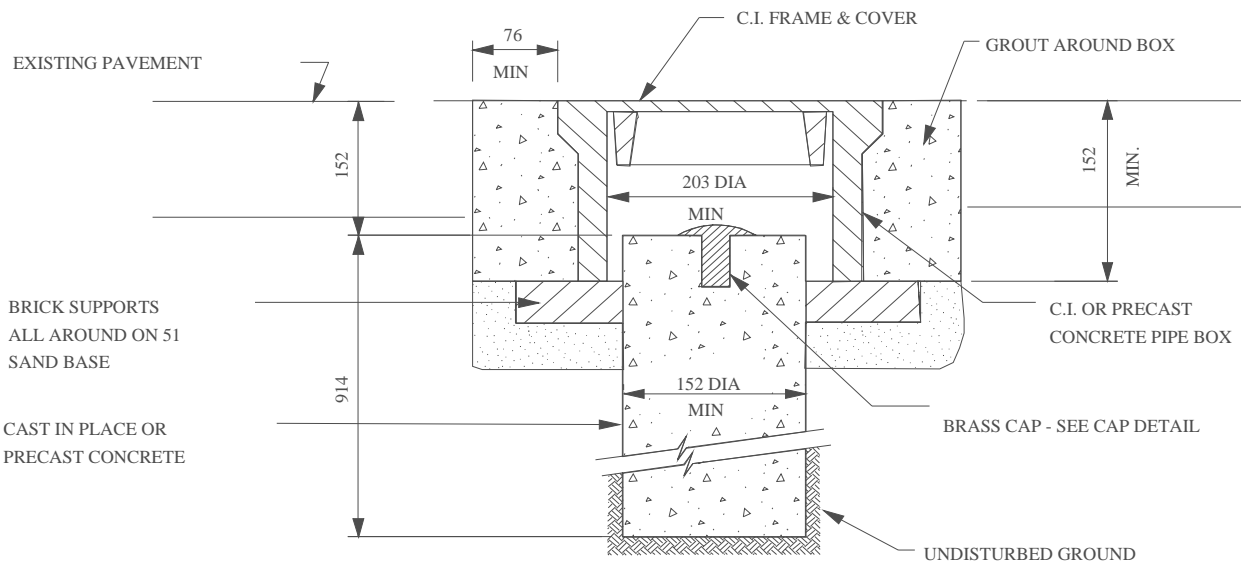
UNIFIED SOIL CLASSIFICATION SYSTEM

Reference:

The Unified Soil Classification System, Corps of Engineers, U.S. Army
 Technical Memorandum No. 3-357, Vol 1, March, 1953 (Revised April, 1960)



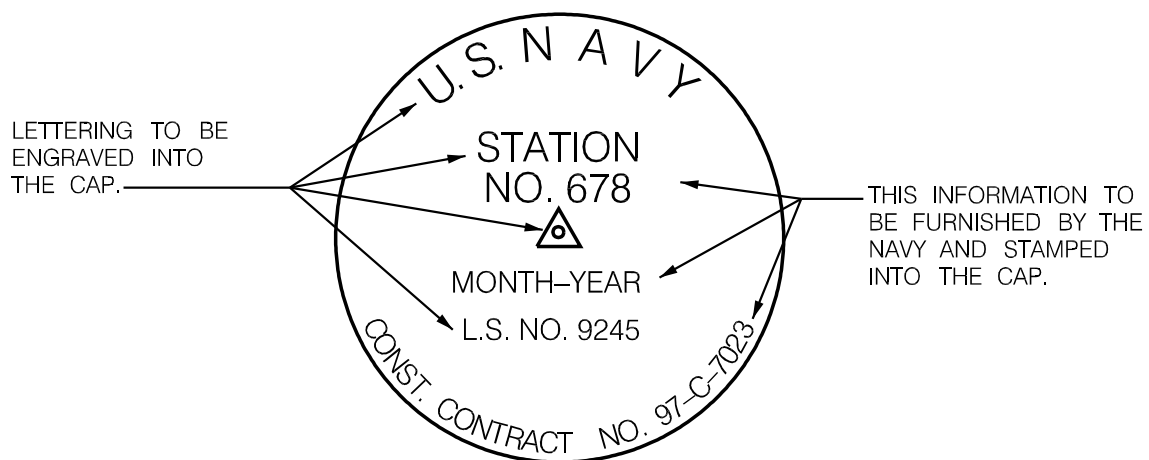
PLAN - IN UNPAVED AREA



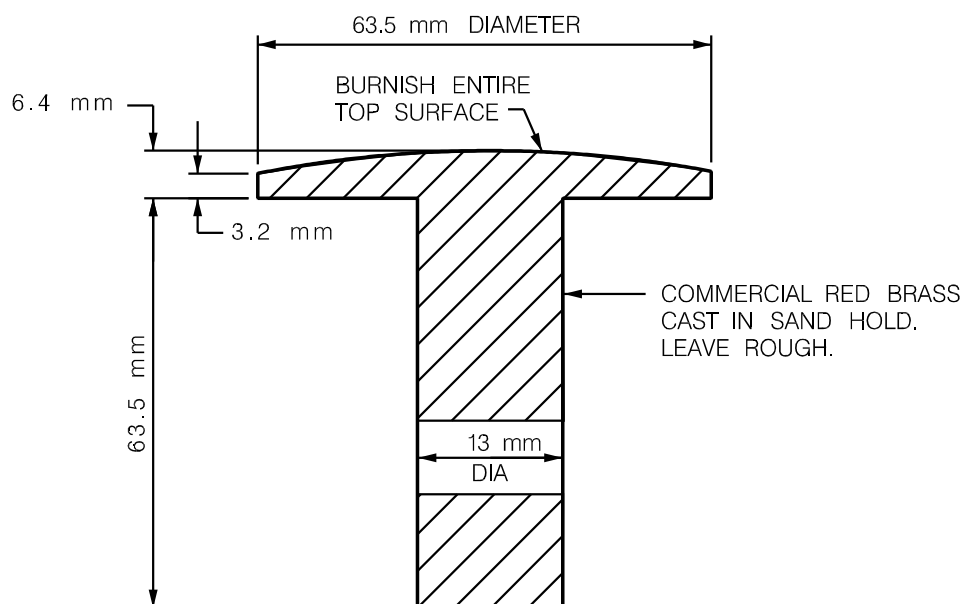
SECTION - IN PAVED AREA

*ALL DIMENSIONS ARE IN MM

STANDARD DRAWING SURVEY MONUMENT



PLAN



SECTION

STANDARD DRAWING
BRASS CAP

CHAPTER 4. CONSTRUCTION CONTRACT SUPPORT SERVICES

4.1 OFFICE CONSULTATION

The A-E shall be available for office consultation necessary to clarify the intent and interpretation of the plans and specifications, to provide advice on questions that may arise in connection with the construction project and to provide consultation for proposed changes to the construction contract. These services are to be provided to the Resident Officer in Charge of Construction (ROICC) or their representatives and not to the construction contractor. The A-E shall provide a copy of all correspondence between the ROICC and the A-E concerning these services to the PL within three (3) days of receiving or sending such correspondence. All correspondence concerning the construction contract shall bear the construction contract number.

4.2 SUBMITTAL REVIEW

The A-E shall be responsible for reviewing a percentage of the construction contractor submittals as stipulated in the Statement of A-E Services. The specific submittals that will be reviewed will be selected during the design phase of the contract. The A-E will submit a recommended list of submittals to the PL for approval with the 100% design submittal. The percentage of submittals for government (A-E) review will be assumed to be 20 percent if it is not stipulated in the Statement of A-E Services. Where the Statement of A-E Services establishes a submittal percentage limitation for A-E review, the A-E shall review shop drawings and material samples that are sufficiently critical or complex or are aesthetically significant. This review shall insure that the submittal is in compliance with the plans and specifications of the contract. Additional submittals may be identified for review to assist the ROICC in monitoring the construction contractor's quality control. The total number of submittals for review should not exceed the percentage limitation without a contract modification. The remaining submittals will be provided to the A-E for information only and will not require review. Within ten (10) working days after receipt by the A-E, the A-E shall return annotated copies of the submittal with recommendations for approval or non-approval based on compliance with the plans and specifications of the contract. The A-E shall retain one copy for their files and one copy for their consultant. The Fire Protection submittals shall only be reviewed for coordination with the other disciplines and for aesthetics. Refer to paragraph titled "OPERATION AND MAINTENANCE SUPPORT INFORMATION (OMS) REQUIREMENTS" and NFGS 01730 for additional requirements.

4.2.1 Stamped Notation

The submittal shall be reviewed for compliance with the construction contract requirements and the following stamped notation shall appear on the face of the submittal if space permits. If space does not permit, the stamp may be on the back side of the submittal. On shop drawings, the stamp shall be near the title block or on the reverse side near the title block corner. In using the stamp, the A-E's signature signifies a recommended action. The A-E's signature should be that of a registered architect or registered engineer as

appropriate for the item being reviewed. All copies of the submittal shall be marked identically. Extensive comments should be forwarded by a separate letter. The A-E may assume that recommendations are approved unless advised to the contrary. The A-E shall provide the stamp at A-E's own expense.

COMMANDING OFFICER
[ADDRESS of Contracting Officer]

RECOMMEND:

APPROVAL

APPROVAL SUBJECT TO THE CORRECTIONS NOTED

RETURN FOR CORRECTIONS NOTED AND RESUBMISSION

DISAPPROVAL

Subject to the requirements of:

Contract No. NXXXXX- -C- Spec. No.

Checked by: (Signature) Date
 (A-E Firm Name)

4.2.2 Responsibility

To Review Designs performed by others. The A-E is responsible for reviewing all designs for conformance to site specific requirements, such as pre-engineered metal buildings, executed by others as part of the construction contract. **Shop Drawings and accompanying designs shall be reviewed and recommended for approval or disapproval by the A-E.** The A-E will stamp and sign these drawings in accordance with Chapter 7 requirements.

4.3 OPERATION AND MAINTENANCE SUPPORT INFORMATION (OMSI) REQUIREMENTS

4.3.1 OMSI Manuals

The following types of manuals, with some typical information required, are included in OMSI packages shown in Attachment E:

- a. User Manual: Construction contractor submittals such as Catalog Data, Operation and Maintenance Data, Test Reports, Shop Drawings, and data prepared, assembled and indexed in a comprehensive manual. It should also

include the Basis of Design, Life Safety implications, and may include medical requirements.

b. Operation and Maintenance Manual: Operation and maintenance information such as the operating information noted above plus normal operating temperatures and pressures, emergency instructions, preventive maintenance plan, troubleshooting guide, maintenance guide, and maintenance and repair procedures. The A-E Statement of Services will indicate the systems to be addressed in the Operation and Maintenance Manual. Depending on size and complexity, systems such as the following may be required to be included:

- Heating, Ventilation, and Air Conditioning
- Direct Digital Controls
- Fire Protection
- Central Refrigeration
- Central Compressed Air
- Fuel Oil Handling and Distribution
- Medical Gases
- Laboratory Gases
- Food Services Equipment
- Commercial Intrusion Detection
- Emergency Power
- Telecommunications
- Airfield Lighting
- Weight Handling, Elevators, and Conveyors

4.3.2 OMSI Types

The level of OMSI will vary with the type of facility or complexity of systems. The type of OMSI required for each project will be noted in the A-E Statement of Services. OMSI packages are identified as the following types:

Type A: Includes the Operation and Maintenance Manual, the User Manual, and Record Drawings. See Attachment E.

Type B: Not Used.

Type C: Consists of the User Manual and the Record Drawings. See Attachment E

4.4 RECORD DRAWINGS

The A-E shall prepare the Record Drawings from the construction contractor marked up construction drawings that show As-Built conditions.

4.4.1 General Procedure

A marked set of construction drawings and the original drawings will be provided to the A-E by the PL. The A-E shall correct the original drawings to show the As-Built conditions as indicated on the marked construction drawings. The A-E shall also incorporate onto the original drawings the written modifications to the construction drawings which were issued by amendment or contract modification. All clouds shall be removed. The notes in the revision block shall remain. All questions regarding interpretation of the changes shown on the marked construction drawings shall be referred to the ROICC. At the request of the ROICC the A-E may be required to use FCDC days to verify the As-Built conditions. The A-E shall forward the corrected record drawings and the set of marked construction drawings to the PL within thirty (30) calendar days following receipt of the marked construction drawings and original drawings.

4.4.2 Computer Graphics Data-Base

For specified projects with computer graphics data-base requirements, (See Attachment B), the A-E shall correct the data base drawing files to show the As-Built conditions. The title CN block and the professional stamp of the original signed drawings of the title sheet and the first sheet of each discipline shall be scanned and inserted into the appropriate data base files to depict design responsibility of the drawings. The revision block, where a revision is shown on the original drawing, shall also be scanned and inserted in the appropriate data-base files. All other As-Built corrections shall be the same as noted below for the correction of original drawings. The A-E shall forward the three (3) CDs with corrected data-base files to the PL within thirty (30) calendar days following the receipt of the marked construction drawings. One CD will be forwarded to the activity, and two CDs will be forwarded to Construction Plan File, Code 04MG.

4.4.3 Correction of Original Drawings

The manner in which the original drawings are corrected shall be as follows: Deletions or superseded portions of the original drawings shall be erased. The final record drawings shall show the actual construction only, except where the original drawing contains portions marked "N.I.C." (not in contract) or where optional methods of construction are shown. No change need be made to those portions of the drawings marked "N.I.C.". The optional methods of construction not used should be crossed out and noted "NOT BUILT". Any previous revision markings and symbols shall be removed from the body of the original drawing. The revision notation in the revision block shall remain. Where an original drawing is modified to show As-Built conditions, the notation "AS-BUILT CONDITIONS SHOWN" shall be entered in the top most available line in the revision block with A-E's initial and date in the space provided. Where no change is required on an original drawing to show As-Built conditions, then the notation "AS-BUILT" shall be entered on the top most available line in the revision block with A-E's initial in the "Prepared by" block and the date in the space provided.

4.5 FIELD CONSULTATIONS DURING CONSTRUCTION

Provide consultation upon specific request by the ROICC or the PL. As a minimum, monthly visits to the construction site by the A-E Project Engineer shall be required.

4.5.1 Field Consultation Report

Immediately following each visit, the A-E shall provide a brief report with findings and recommendations to the ROICC with a copy to the PL. The report shall include names of personnel who provided the service, the dates and length of time on-site and the persons contacted.

4.5.2 Site Access

Shortly after the award of the construction contract, the A-E shall provide to the ROICC, with copy to the PL, the names by professional discipline of personnel who will be available for field consultations. The A-E shall coordinate site access with the ROICC for each visit.

4.6 EVALUATION OF VALUE ENGINEERING CHANGE PROPOSALS (VECP's)

Provide analyses, recommendations, and cost estimates on VECP's submitted by the construction contractor under the Value Engineering Incentive clause of the contract. The purpose of a VECP is to achieve savings in cost by adjusting the design so as to permit more economical methods and materials of construction and yet maintain the operational, functional and aesthetic integrity of the facility. Submit evaluations in triplicate to the PL within 10 calendar days after authorization to proceed date.

NOTES:

CHAPTER 5. SUBMITTALS

5.1 SUBMITTAL REQUIREMENTS

Submit the types and quantities of documents by project design stages as required by the Statement of A-E Services. All submittals will be forwarded with project correspondence referencing project title, project number, location, and A-E contract number. A copy of the correspondence shall be forwarded to the Contract Specialist.

5.1.1 1391+ and (PCE) Parametric Cost and Estimating

Submit the DD1391+ and PCE documents as required by the Statement of A-E Services in the CE\VEIQ A-E contract for the cost engineering cost certification method one or two which ever one is applicable. All submittals will be forwarded with project correspondence referencing project title, project number, location, and A-E contract number. A copy of the correspondence shall be forwarded to the Southwest Division Senior Cost Engineer or his representative. (Distribution identified as (a), (b), (c) and (d), below, are described at the end of Paragraph 5.1.5a, b, c and d, below.)

5.1.2 15 Percent Design - Distribution (a)

Survey Drawings
Survey Field Notes
Soils Report
Schematic
Engineering Documentation
Energy Conservation Report
Corrosive Soils Report
Asbestos Survey
Geochemical Evaluation
Solar Energy Study
Basis of Design Report - (Mandatory for all projects)
Cost Estimates on Disk
Design Calculations

5.1.3 45 Percent Design - Distribution (a), (c), (d)

Resolution of 15% Review Comments
Environmental Permit Requirements
Short Circuit & Coordination Study
Design Calculations
Basis of Design Report (Revised) - (Mandatory for all projects)
Drawings
Outline Specifications

Cost Estimate on Disk

5.1.4 100 Percent Design - Distribution (a), (b), (c), (d)

Resolution of 45% Review Comments
Environmental Permit Requirements
Designer to ROICC Report
Design Calculations
Interior Finish Board
Exterior Finish Board
Basis of Design - Updated - (Mandatory for all projects)
Drawings
Submittal Register and Test Report
C & D Waste Diversion Opportunity Assessment
Cost Estimates on Disk
Specifications
SPECSINTACT generated 100% Contract Specifications on Disk
Geotechnical Review Certification

5.1.5 Final Design – Distribution (a), (c), (d)

Resolution of 100% Review Comments
Designer to ROICC Report
Color Rendering
Original Design Calculations - Updated
Drawings
Specification
Submittal Register and Test Report
Cost Estimate on Disk
Original Drawings and Copies
Original Specifications and Copies
Original Cost Estimate and Copies on Disk
SPECSINTACT generated Final Contract Specifications on Disk

- a. Provide copies directly to the activity, PWO, PWC, Staff Civil and NCTS. Transmittal shall be in Exhibit 5-A format as appropriate with a copy to the PL.
- b. Provide copies of the 100 percent plans and specifications directly to the ROICC. Transmittals shall be in Exhibit 5-B format with a copy to the PL.
- c. For projects at activities not served by Public Works Center make these submittals to the activity Public Works Office.
- d. For specified projects with computer graphics data base requirements, the A-E shall submit test 3½ inch (90mm) 1.44 MB disks consisting of representation of

various project data during 45 percent and 100 percent stages, and complete project data base at final stage, see Exhibit 5-C, along with related documentation as required in Attachment B to the contract.

5.1.6 Transmittals

Where the A-E arranges for submittal shipments by AIR FREIGHT, the A-E shall also arrange and be responsible for the shipment and the delivery of the submittal. Originals and master copies shall be hand delivered or forwarded by registered U.S. mail to the PL. All transmittals shall be addressed to the PL by name and Code.

5.2 REPORTS, ENGINEERING CALCULATIONS, FIELD NOTEBOOKS AND MISCELLANEOUS DATA

Reports, engineering calculations, field notebooks and miscellaneous data shall be legible, neatly bound and indexed and include the A-E's name, the project title, project number, location and the construction contract number. The design rationale shall be clearly stated. When unconventional design methods or formulas are employed, reference sources shall be cited. Calculations shall be on 8½" x 11", (210 mm x 297 mm) paper, punched, bound and identified with the project title, project number, location, A-E, and construction contract numbers. The Engineering Calculations shall be bound, sealed and signed by a professional engineer by discipline. For calculations requirement see Attachment A.

5.2.1 Computer Documentation

When calculations and graphics include the use of computers, and/or computer graphics systems, the following documentation shall be furnished for review:

- a. All pertinent input and output data with critical items clearly identified.
- b. Definitions of all input and output terminology.
- c. Documentation of the program used including a synopsis of program intent, engineering methods, assumptions, limitations, and applicable formulae.
- d. Description of methods used to verify and check results, including supplemental long-hand computations.
- e. If the computer program was developed or extensively modified by the design firm, then, in addition to the above, a detailed description of previous usage along with other information deemed necessary by the PL to ascertain its validity, effectiveness, and application to the specific project, shall be furnished.

5.2.2 Computer Graphics Documentation

All submitted data shall be clearly marked, sequenced, cross referenced, and identified with program title, computer, date, responsible person, contract title, contract number, and project component analyzed.

5.2.3 Metric Measurements

Metric measurements may use soft metric. However, hard metric can be used when feasible. If hard metric is not available on certain items, then soft metric can be used. There is a ten years moratorium on the mandatory use of Concrete Masonry Units (CMU) and Recessed Lighting Fixtures (RLF) that expires Oct 11, 2006

5.2.3.1 Hard Metric

The term "hard metric" denotes the conversion of inch-pound units to new, rounded, easy-to-use metric measurements.

5.2.3.2 Soft Metric

The term "Soft metric" denotes the mathematical conversion of inch-pounds units to metric measurements with little or no rounding.

5.2.3.3 Metric Requirements

When a project is required to be designed and built using metric units of measurement, the following shall apply: See latest Engineering Policy Memo.

- a. All measurements and units shall be shown in System International (SI) metric units exclusively. This includes but is not limited to: Linear measurements, area measurements, volumetric measurements, temperature measurements, climate requirements, waterflows, pressure requirements, noise requirements, lighting requirements, structural characteristics, electrical characteristics, plumbing characteristics, HVAC characteristics, equipment capacities, conveyance system ratings, and all power and energy units.
- b. English system measurements shall not appear in reports, drawings, specifications, cost estimating, or any other submissions. However any computer program that requires calculations which is not available in metric will be allowed. The results of the calculations will be converted into metric.
- c. Design must take place using a 600 x 600 mm planning grid. The A-E firm must strive to use as many "hard metric" products as possible, where competitively available. Where metric products are not available, soft conversion to metric is required, (e.g. 2" x 4") will read $(2 \times 25.4 = 50.8, @ 50) \times (4 \times 25.4 = 116.0, @ 100)$ 50 mm x 100 mm.

- d. The latest edition of Metric Guide for Federal Construction, NAVFAC Metrication Conversion for Design planning and Design Criteria, and NAVFAC Guide Specification shall be used as guidance on drawings, specifications and other elements of metric implementation. Additional guidance can be used that is published by the American Institute of Architect (AIA), Metrication of Master Specifications, ASTM E621 and ASTM E380.
- e. All cost estimating shall be done in SI metric units only.
- f. All terminology in the Specifications shall be in SI metric.
- g. All correspondence must contain SI metric units exclusively.
- h. All meeting presentations and discussions of measurements or units must be conducted using SI metric units.
- i. Shop drawings, catalog cuts, and other submissions during the construction phase will be in SI metric units.
- j. All Operation and Maintenance Manuals will be in SI metric units.

5.3 INTERIOR AND EXTERIOR FINISH BOARDS

16" X 20" (400 mm x 500 mm) with samples showing interior and exterior colors, materials and finishes.

5.4 RESUBMITTAL

Some project submittals are received in a condition which makes them unacceptable for review. In these cases, the package will be returned to the A-E for resubmittal along with an explanation as to why the submittal was not acceptable. The A-E shall provide a resubmittal schedule in writing to the PL within two (2) working days after receipt of the package.

NOTES

S A M P L E
A-E LETTER HEAD

Commanding Officer
Activity Address

Attention: Code

Dear Sir:

In accordance with the terms of our contract with the [insert Command title], Naval Facilities Engineering Command, for the design of [insert Title], [insert Location], Construction Contract Number NXXXXX- -C- , we are forwarding copies of the [45 percent plans] [100 percent plans and specifications] [Final Plans and Specifications] for your review and comment. Please forward review comments to the Project Leader, [Insert Name and Address] by [Insert Date].

Sincerely,

Copy to:
COMMAND PL
COMMAND Contract Specialist

Exhibit 5-A

S A M P L E
A-E LETTER HEAD

Resident Officer in Charge of Construction
Address

Dear Sir:

In accordance with the terms of our contract with the [Insert Command Title], Naval Facilities Engineering Command, we are forwarding copies of the 100 percent plans and specifications for the proposed construction Contract No. NXXXXXX-[]-C-[], [Project Number], [Title], [Location]. Please forward constructibility review comments relating to this submittal to the Project Leader [Insert Name and Address] within two (2) weeks after receipt of this transmittal.

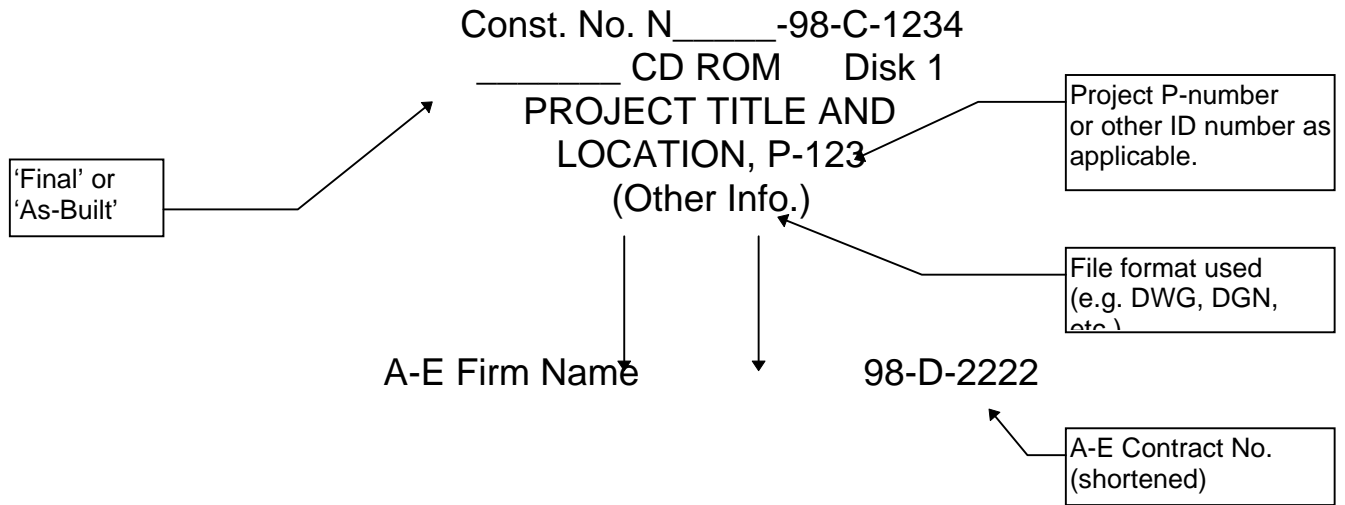
Sincerely,

Copy to:
COMMAND PL
COMMAND Contract Specialist

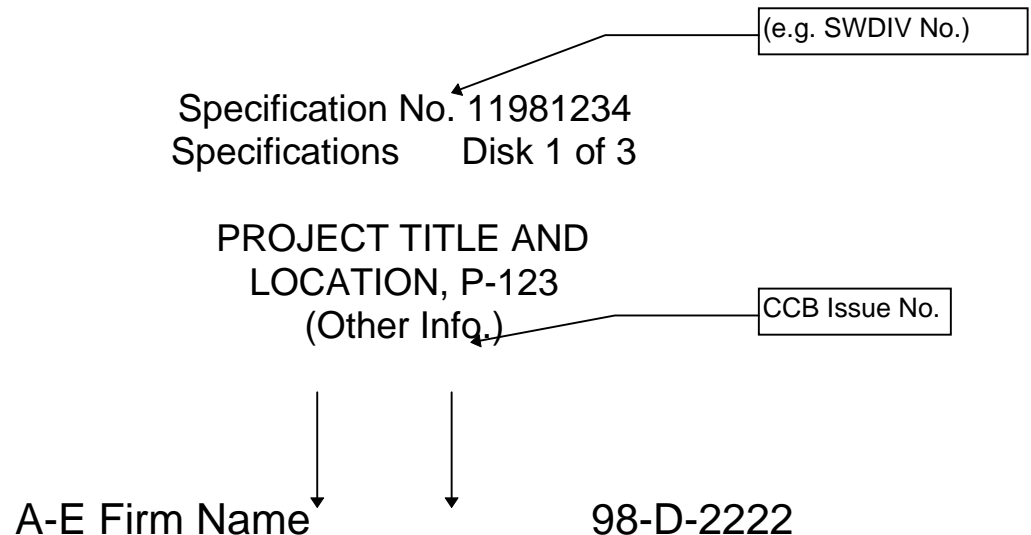
Exhibit 5-B

CD ROM Disk Label Format

CD ROM DISKS:



SPECIFICATION DISKS:



CHAPTER 6. BASIS OF DESIGN REPORT

6.1 GENERAL

This section provides information and requirements for the preparation and submittal of the Basis of Design Report. The Report shall fully describe all project requirements, design solutions and situations affecting the work, as well as justifying proposed departure from standard plans, specifications, NAVFAC technical publications and design manuals or other criteria. Arrange the report in the following order:

- Code Criteria Search
- General Information
- Environmental
- Civil
- Landscaping and Irrigation Systems
- Architectural
- Structural
- Mechanical
- Electrical
- Fire Protection
- Cathodic Protection

6.1.1 Criteria

Identify the governing codes and criteria being utilized for the design. MIL-BUL-34 and the Construction Criteria Base (CCB) provides a listing of those manuals and instructions which apply to most types of facilities normally designed by the Command. Careful attention shall be given to unusual or highly specialized design features for which criteria listed herein may not be applicable. For Air Force, Coast Guard and other agencies, criteria will be furnished as required on a project by project basis.

6.1.2 Computer Graphics

For projects requiring a computer graphics database, the A-E shall review with the Command, the up-to-date computer graphics standards and criteria at the outset to assure database integrity. See Attachment B.

6.2 CODE CRITERIA SEARCH

6.2.1 Code Criteria Search

Identify the governing codes and criteria being utilized for the design. The document is used as a basis for the design and shall include: Occupancies Use Requirements; Requirements for Group Occupancies; Fire Resistive Requirements; Planned/Existing Distances; Fire Protection System; Exits; and Interior Finishes. See Attachment C.

6.2.2 Sources Of Design Criteria

Design in accordance with Military Publications, Criteria Manuals, Instructions or Policies. Design that is beyond the scope of these documents shall be in accord with the 1997 editions of the UNIFORM BUILDING CODE (UBC), including the UNIFORM MECHANICAL CODE, the UNIFORM PLUMBING CODE and the UNIFORM CODE FOR BUILDING CONSERVATION.

6.3 GENERAL INFORMATION

6.3.1 Regional Shore Infrastructure Plans / Station Master Plans

The RSIP for the Southwest Region is under development. It contains high level program and facilities information. Both the RSIP and Activity Master Plans (if available) should be consulted and complied with for functional relationships and project design.

6.3.1.1 Base Exterior Architecture Plan (BEAP)

The BEAP is an addendum to the Station Master Plan and contains site specific design recommendations. The A-E shall follow the recommendations of the Activity BEAP in project design responding to functional and aesthetic requirements.

- a. Describe the design guidelines that pertain to this project and describe how the proposed design incorporates these guidelines into the project design. Explain any deviations.

6.3.1.2 Site Planning

- a. Physical Features. Describe the historic considerations, topography, solar exposure, prevailing breezes, storm exposure, natural beauty of the site, prevalent noise, odors, dust, soil types and possibility of contamination, and a description of nearby buildings at the existing site.
- b. Orientation. Describe how the proposed design takes advantage of, or is compatible with, the physical features of the site; how the design impacts upon energy conservation measures; how the design minimizes existing hazards and nuisance effects; and, how the proposed structure(s) harmonize, or are compatible with, the existing nearby buildings.
- c. Circulation/Traffic Patterns. Describe pedestrian and vehicular traffic patterns as they relate to the building. Estimate building traffic load. Describe shipping, receiving and trash removal requirements.

- d. Describe siting of utilities and where they tie into the existing system. Utilities should not detract from building appearance.

6.3.2 Program Requirements

6.3.2.1 Design Area Tabulation

Provide a complete area breakdown tabulation for gross and net areas to confirm scope and statutory criteria compliance. A supplemental drawing keyed to the area take-off shall accompany the area tabulation. Subsequently revised plans will require area re-tabulation. The project gross area shall not exceed that stipulated by the DD Form 1391.

6.3.2.2 Building Design

- a. Describe the functional requirements of the facility.
- b. Describe persons accommodated, staff size, type and number of visitors.
- c. Indicate the building type of construction based on the latest UBC.
- d. Include a statement as to the consideration and use of definitive, standard designs and previous designs.

6.3.3 Energy Conservation

- a. Describe the proposed energy saving features incorporated in the design and explain the reasons for selecting these items.
- b. Show total annual energy consumption or Design Energy Budget and compliance with the Design Energy Targets of chapter 8 (Latest Edition) of MIL-HDBK-1190 and NAVFAC Letter 11100/15C/PNB dated 5 June 1995, Design Energy Target Reduction, Interim Technical Guidance.. Justification/rationale is required if the predicted annual energy consumption exceeds the Energy Target by more than 10%

6.3.4 Weight Handling Equipment

State the need for weight handling equipment and how the equipment is to be designed and procured. The procurement of weight handling equipment of 20,000 pounds and under, associated with a building, or other facility (not including nuclear, hot metals, or special hazard use) is part of the A-E design responsibility. Procurement of weight handling equipment over ten (10) tons and special purpose (nuclear, hot metals, special hazard) is the responsibility of Government. For those cases where the Government is the procurement agency, the A-E shall promptly supply the required operating data and all pertinent field data for weight handling equipment to the PL. An early submittal of this

information is required for coordination and timely procurement and installation of the equipment.

6.3.5 Construction Permit Information

Identify information regarding permits necessary for construction.

6.3.6 Physical Security

Describe the physical security or hardening requirements that will be used in the design.

6.3.6.1 Physical Security Hardening

Describe the required physical security hardening, of all projects involving Armories, Arms Rooms, Weapons Storage Facilities, Ready Service Lockers, Terminal Equipment Buildings, Sensitive Compartmented Information Facilities, (SCIFs), etc. These projects shall be designed and constructed in accordance with the minimum criteria of MIL-HDBK-1013/1, OPNAVINST 5530.13A and OPNAVINST 5530.14B.

6.3.6.2 Doors, Windows And Wall Penetrations

The number of doors, windows and wall penetrations within these facilities shall be kept to a minimum. The entrance doors shall be secured with high security locking devices and all windows, wall openings, etc., shall be hardened to resist intrusion.

6.3.6.3 Plans And Specifications

All plans and specifications, incorporating physical security features, shall be reviewed by a host activity security officer/provost Marshall or designated representative, during the design process and various review phases.

6.4. ENVIRONMENTAL REQUIREMENTS

- a. The A-E shall identify and determine the necessity for all environmental permit requirements including as a minimum those items identified in Attachment D.
- b. The A-E shall provide all technical data required for permit application.

6.4.1 Environmental Assessment/Environmental Impact Statement (EA/EIS)

- a. Describe the impact that the new construction will have on the project site environment and habitat as identified in the EIA/EIS.

- b. Describe how the design will mitigate the impacts identified in the EA/EIS or describe the requirements the proposed design does not meet and provide justification thereof.
- c. Describe preservation of trees, plants, wildlife, air, water quality, pollution abatement, landscaping and blending of construction with surroundings. The EIA/EIS is normally provided by the Command to the A-E undertaking the design.

6.5 CIVIL ENGINEERING

6.5.1 Site Grading

- a. Describe the drainage of the site.
- b. Describe the differential between finish floor elevations and the finish grades adjacent to structures. Relate finish floor elevation to 100 year flood level.
- c. Describe the earthwork.
- d. Indicate the cut and fill quantities.
- e. Indicate the location of borrow pits and disposal areas and indicate the type of materials associated therewith.
- f. Describe the retaining walls.

6.5.2 Utilities

- a. Describe special utilities including oily waste and salt water systems, etc. outside the building's five (5) foot line.
- b. Identify those systems that need cathodic protection based on the soils report.

6.5.3 Storm Sewer System And Surface Drainage

Use Local Rainfall Intensity-Duration Frequency Curves.

- a. Indicate if the existing system to be connected to is adequate to handle the additional flow. Indicate the source of the information.
- b. State the quantity of storm flow (use rational method) and the sizes, material, class and "D" load design of all storm sewers and culverts and sizes of drop inlets.
- c. Provide a small scale topographic map which depicts the individual drainage areas and their overland flow path.

- d. Indicate the maximum design velocity in unlined ditches.
- e. Indicate design flooding of street gutters under maximum design flow conditions and type of drop inlets to be used.
- f. Indicate minimum diameter of storm drain piping.
- g. Indicate minimum width of concrete cross gutters where surface storm drainage crosses street paving.
- h. State minimum slopes for surface drainage for the following:
 - Grass or turfed areas
 - Paved areas
 - Paved ditches
 - Grass swales
 - Unpaved areas within 10 feet (3000mm) of buildings
- i. Discuss requirements for National Pollutant Discharge Elimination System (NPDES) Permitting for the project locality.

6.5.4 Water Systems

- a. Describe the existing water system, covering particularly the type, capacity, adequacy, condition and present water use.
- b. Describe how the design will minimize or eliminate the unsatisfactory conditions.
- c. Describe connections to existing water distribution systems.
- d. State the type of construction proposed, materials for water mains, type of well, etc.
- e. Describe distribution systems. Provide statement of design, domestic consumption required and available fire flow, residual pressure and elevation differentials. (Include designer's estimate of tentative pipe sizes.)
- f. Indicate the water demand for the project and how it was derived.
- g. Indicate if the existing system to be connected to is adequate to supply this demand and how this was determined. If source is inadequate, state correction measures needed.

h. Statement of tentative sizes, elevations, capacities, or design consideration for reservoirs, treatment units, pumping plants, well pumps and how they were determined.

i. Indicate design pump speed and provide pump and system curves.

6.5.5 Sanitary Sewer Systems

a. Describe the existing sewer system. Indicate if the existing system to be connected to is adequate to handle the additional flow and how this was determined.

b. Describe the new sewer system, pumping stations, the sewage flow to be generated by the project and how it was derived, quantity of sewage, minimum scour velocity during the peak daily flow, and the sizes and material and type of all sewer lines.

c. Indicate design depth for underground systems.

d. Indicate pump design speed.

6.5.6 Sewage Treatment System

a. Describe the existing system covering particularly the type, capacity, present flow.

b. Indicate the design capacity and degree of treatment required of the new system and how they were derived.

c. Indicate how the new system will meet these requirements.

6.5.7 Dust And Erosion Control

Describe the type of treatment selected, affected areas, and reasons for selection of type and determination of areas.

6.5.8 Fencing

Describe type, height and security measures.

6.5.9 Railroads

a. Describe general soil conditions, soil exploration and testing performed or to be performed and the results.

- b. Describe the type of service for which railroad track will be provided, anticipated volume and type of traffic, the ruling grade and the maximum curvature.
- c. Indicate the proposed type, source and thickness of ballast, weight of rail and source, treatment and dimensions of ties proposed.

6.5.10 Paving

- a. Indicate the type, speed, volume of traffic and design wheel loads.
- b. Indicate thickness of all pavements and base courses.

Note: For projects estimated to exceed \$100,000 or 20,000 square yards (16723 m² .) in area, include the following additional data:

- c. Design loadings.
- d. Site plan indicating safety clearances.
- e. Evaluation of the reuse of the existing paving materials in the new paving system.
- f. Analysis and justification of the recommended construction.

6.5.11 Airfield Pavement Systems

Describe the following:

- a. The classification and strength characteristics of subgrade soils
- b. Wheel loads and number of operations for each type of aircraft
- c. Evaluation and cost comparison of alternative pavement sections
- d. Vertical and horizontal clearance requirements
- e. Design rainfall frequency and method proposed for storm and hangar deluge system drainage.
- f. Type of lighting to be provided and the adequacy of existing runway and taxiway regulator capacities.

6.6 LANDSCAPE ARCHITECTURE

Describe the following:

6.6.1 Irrigation Systems

- a. The irrigation system (conventional or drip). Include specific areas such as slopes, natural areas, lawn, recreational areas, etc.
- b. Water conservation methods.
- c. Existing irrigation to remain (where applicable).

6.6.2 Plant Materials

- a. Transition areas and the relationship to new construction.
- b. Theme (i.e., entry, color, plant, etc.).
- c. Lawn use and purpose. Give approximate percent of total landscaped area.
- d. Water conservation measures.
- e. Existing plant materials and site furnishings to be removed and/or reused.
- f. General maintenance levels/requirements (such as high, medium, low) for the various types of landscaped areas.

6.6.3 Other Site Features

- a. Signage.
- b. Specialty paving.
- c. Site furnishings.
- d. Landscape lighting.
- e. Project site's environmental context and natural resources.

6.7 ARCHITECTURE

- a. Describe the functional space. Every function listed shall identify its required number of personnel, which will be keyed to their required square footage.

- b. Describe how the space efficiently and effectively meets the operational needs of the customer/activity.
- c. Describe how all the elements of engineering and architecture have been integrated so the interior-exterior elements of the facility are energy efficient, functional, aesthetically pleasing, harmonious and compatible (i.e., materials, colors, textures, lighting, furnishing, equipment, spatial relationship, scale, graphics, signage, landscaping, etc.).
- d. Describe how the design complies with MIL-HDBK-1190, "Facility Planning and Design Guide", the Uniform Federal Accessibility Standards, the Americans with Disabilities Act Accessibility Guidelines, whichever provides the greatest accessibility requirements, and in accordance with the Architectural Barriers Act, 42 U.S.C. 4151-4157.

6.7.1 Sustainable Development

It is the policy of the Naval Facilities Engineering Command (NAVFAC) to incorporate sustainability principles and concepts in the design of all facilities and infrastructure projects to the fullest extent possible, consistent with budget constraints and customer requirements. It is further the policy of NAVFAC to seek to do this with no increase in first cost. This policy, which will lead to substantial improvements in life-cycle operations and reduce life-cycle costs, applies to renovation and alteration projects as well as new construction; applies to projects regardless of funding source or amount; applies to projects accomplished for all customers; applies to projects accomplished both in-house and through A-E contracts; and applies to design associated with all procurement methods, including design-build.

NAVFAC's definition of "Sustainable Design," incorporates the following sustainability initiatives:

- Increased energy conservation and efficiency
- Increased use of renewable energy resources
- Reduction or elimination of toxic and harmful substances in facilities and their surrounding environments
- Improvements to interior and exterior environments leading to increased productivity and better health
- Efficiency in resource and materials utilization, especially water resources
- Selection of materials and products based on their life-cycle environmental impacts
- Increased use of materials and products with recycled content
- Recycling of construction waste and building materials after demolition
- Reduction in harmful waste products produced during construction

- Facility maintenance and operational practices that reduce or eliminate harmful effects on people and the natural environment

Sustainable design concepts and principles can be applied to any type of facility, anywhere, under any cost constraints. However, the extent to which specific sustainability strategies can be applied to a given project will vary, based on a wide array of local conditions, customer requirements, budget constraints, and other considerations.

6.7.2 Movable Partitions

Provide justification for the use of movable partitions. Indicate how the flexibility of room size has been considered.

6.7.3 Equipment Rooms

- a. Describe in terms of size, access, maintenance, repair and easy removal of equipment.
- b. Indicate how future expansion, if foreseen or planned will be included in the design.
- c. State what criteria was used to determine the size of the equipment room.

6.7.4 Roof Structure

6.7.4.1 Slope

Indicate the roof slope of the design.

6.7.4.2 Drains, Roof

Describe the type of roof drains used. Indicate their location. Describe how the design will provide for differential movement between roof drains and leaders.

6.7.4.3 Parapets

Justify the use of parapets, copings, or similar types of raised peripheral walls.

6.7.5 Colors, Materials and Finishes

State the criteria used to determine the interior and exterior colors, materials and finishes.

6.8 STRUCTURAL

6.8.1 NON SEISMIC DESIGN REQUIREMENTS

All structural design, other than seismic design, shall be based upon the loads, load combinations and loading provisions from ANSI/ ASCE 7-95 "Minimum design Loads for Buildings and Other Structures" published by the American Society of Civil Engineers. Loads for locations and conditions that are beyond the scope of ANSI/ASCE 7-95 shall be obtained from Mil-Hdbk-1002/2A dated October 1996 published by NAVFACENGCOM.

Member design shall comply with the requirements of the following materials criteria:

- a. Structural Steel: "Load and Resistance Factor Design Specification for Structural Steel Buildings" (LRFD) published by AISC - December 1, 1993 edition or "Allowable Stress Design and Plastic Design Specification for Structural Steel Buildings" (ASD) published by AISC - June 1, 1989 edition or "Load and Resistance Factor Design Specification for Structural Steel Buildings – Metric" (LRFD) published by AISC - December 1, 1994 edition.
- b. Open web Steel Joists: "Standard Specification, Load Tables and Weight Tables for Steel Joists and Joist Girders" published by the Steel Joist Institute – Fortieth Edition dated 1994.
- c. Cold Formed Steel: "Specification for the Design of Cold-Formed Steel Structural Members" published by AISI- 1996 edition.
- d. Steel Deck: "Specification for Composite Steel Floor Deck", "Specification for Non-Composite Steel Form Deck", "Specification for Cellular Deck Floor Systems" and "Specification for Steel Roof Deck" as contained in Publication No. 29 dated 1995, published by the Steel Deck Institute.
- e. Concrete: "Building Code Requirements for Structural Concrete" (ACI 318-95) published by the American Concrete Institute.
- f. Masonry: Refer to seismic design requirements.
- g. Wood: AF&PA/ASCE 16-95 "Standard for Load and Resistance Factor Design (LRFD) for Engineered Wood Construction" published by ASCE, or "National Design Specification for Wood Construction" published by the National Forest & Paper Association and by the American Wood Council – 1997 edition.
- h. Plywood / Structural-Use Panels: "Plywood Design Specification" published by APA-The Engineered Wood Association – January 1997 edition or "Design

Capacities of APA Rated Structural-Use Panels” (Technical Note Number N375B) dated June 1995.

6.8.2 SEISMIC DESIGN REQUIREMENTS FOR NEW BUILDINGS AND OTHER NEW STRUCTURES

Seismic design shall comply with the requirements of the US Army Corps of Engineers publication TI 809-04 “Seismic Design for Buildings” dated December 1998. This publication is based on and must be used in conjunction with the “NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures” (FEMA 302) – 1997 edition. TI 809-04 uses Performance Based Engineering (PBE) analysis and design principles which are based on the ATC methods published in the “NEHRP Guidelines for the Seismic Rehabilitation of Buildings” (FEMA 273).

- a. All design must be performed using “strength design / LRFD” procedures.
- b. Note that a peer review in accord with section 1-10 of TI 809-04 is required for the design of hazardous facilities (seismic use group III H) and for essential facilities (seismic use group III E.)
- c. Design for enhanced performance (seismic use groups II and III) shall not produce a design with members lighter than would result from a “standard occupancy” (seismic use group I) design using importance factors of 1.5 for group III and 1.25 for group II.
- d. Designs for “Immediate Occupancy” (seismic use group IIIE) are highly dependent on continued function of building utility systems. It is expected that such designs will involve a major effort to assure the continued operation of these utility systems.

6.8.2.1 Ground Motion: Geotechnical (Soils Investigation) reports shall contain a determination of the “Site Class” as defined in Table 3-1 of TI 809-04 or section 4.1.2.1 (Site Class Definitions) of FEMA 302. Determination of F_a and F_v shall not be made without a geotechnically established site class. Minor projects that do not require geotechnical investigation reports may be designed to the FEMA 302 default site class D.

- a. Site-specific determination of seismic ground motion shall be based on the guidelines presented in chapter 3-4 of TI 809-04. Note that a peer review is required for site specific ground motion determination as defined in section 3-4.b of TI 809-04.
- b. Refer to section 3.6 of the A-E Guide for additional information on site specific ground motion representation.

6.8.2.2 Architectural, Mechanical, Electrical and Other Nonstructural Components Design: As a minimum, all design shall be based on the requirements for Seismic Design Category D.

- a. Seismic anchorage and restraint details shall be provided for all equipment that exceeds 400# (180kg) in weight. If exact weights and dimensions are unknown, details shall be based on the best information available, and may be modified during construction if original design assumptions prove to be inaccurate.
- b. Support and seismic restraint shall be detailed for all ducts, pipes, suspended equipment etc. Reference to generally accepted standards such as the "SMACNA Guidelines" are acceptable for ordinary installations.
- c. Support and seismic restraint of all ceiling systems shall be detailed. Details to include compression struts at all locations where diagonal splay bracing occurs.

6.8.2.3 Foundation Design: As a minimum, all foundation design shall comply with section 7.5 (Seismic Design Categories D,E & F) of FEMA 302.

6.8.2.4 Steel Design: As a minimum, all steel design shall comply with section 8.4 (Seismic Design Categories D, E and F) of FEMA 302. Member design shall be based upon the requirements in Part 1 of the AISC publication "Seismic Provisions for Structural Steel Buildings" dated April 15, 1997.

- a. Design using "Special Moment Frames" (SMF) requirements- chapter 9 "Intermediate Moment Frames" (IMF) requirements – chapter 10, "Ordinary Moment Frames" (OMF) requirements – chapter 11 or "Special Truss Moment Frames" (STMF) requirements – chapter 12 of the "AISC seismic Provisions" will not be permitted without advance written approval from Code 04CN.EH, Southwest Division.
- b. Design of concentrically braced frames shall comply with chapter 13 – "Special Concentrically Braced Frames" (SCBF) of the "AISC Seismic Provisions." Attention is called to section 13.3c and commentary section C13.3c for the 2t set back exception when critical buckling is out of plane of the gusset plate. Attention is also called to section 13.4a.3 for the post buckling unbalanced vertical load on the beam
- c. Design using "Eccentrically Braced Frames" (EBF) requirements – chapter 15 of the "AISC Seismic Provisions" are permitted unconditionally unless the design involves link-to-column connections. In accord with section 15.4a, link-to-column moment connections require tests that demonstrate inelastic rotation capability and therefore must be approved in writing by Code 04CN.EH Southwest Division.

6.8.2.5 Concrete Design: As a minimum, all concrete design shall comply with section 9.7 (Seismic Design Categories D, E or F) of FEMA 302. The exceptions to section 9.7.3 shall be excluded. Reinforced Concrete Structural Systems Composed of Interconnected Precast elements – Appendix to chapter 9 of FEMA 302, will not be permitted without written approval from Code 04CN.EH, Southwest Division.

6.8.2.6 Composite Steel and Concrete Structural Design Requirements – Design per chapter 10 of FEMA 302 and Part II of the “AISC Seismic Provisions”, will not be permitted without written approval from Code 04CN.EH, Southwest Division.

6.8.2.7 Concrete Masonry Design: As a minimum, all concrete masonry design shall comply with section 11.3.9 (Seismic Design Categories D, E and F) and section 11.11.5 (Special Reinforced Masonry Shear Walls) of FEMA 302. Stack Bond Construction per section 11.3.9.3 of FEMA 302, will not be permitted for structural walls without written approval from Code 04CN.EH, Southwest Division. Alternate Provisions for the Design of Masonry Structures – Appendix to Chapter 11 of FEMA 302 shall NOT be used.

- a. Minimum requirements for inspection and testing shall comply with the requirements of FEMA 302. It is recommended, for any significant CMU construction, that the continuous QC specialist inspection mentioned in part 1 of specification section 04230 be called for and that prism tests be used to document the required f_m' .

- b. Note that section 7-2-h(5)(d) of TI 809-04 calls for the use of 1.25 f_y for the expected lateral strength of shear wall reinforcing used in shear or flexural calculations.

6.8.2.8 Wood Design: As a minimum, all wood design shall comply with section 12.8 (Seismic Design Categories E and F) of the “NEHRP Seismic Provisions.” Design of members and connections shall comply with “AF&PA/ASCE 16-95, Standard for Load and Resistance Factor Design (LRFD) for Engineered Wood construction” - reference 12-1 in the “NEHRP Seismic Provisions.” Note that section 12.8 of the “NEHRP Seismic Provisions” prohibits the use of unblocked structural-use panel sheathing diaphragms.

6.8.2.9 Seismically Isolated Structure Design: Design of seismically isolated structures shall be in accord with chapter 13 of the “NEHRP Seismic Provisions.”

- a. The “Equivalent Lateral Force” procedure (reference section 13.3 shall not be used.

- b. Site specific ground motion spectra shall be used for all seismically isolated structure design.

c. Design using seismic isolation must receive written approval from Code 04CN.EH, Southwest Division.

d. Note that a design and test program peer review in accord with section 13.8.1 of the “NEHRP Seismic Provisions” is required.

6.8.2.10 Passive Energy Dissipation System Design: Design of passive energy dissipating systems shall be in accord with the appendix to chapter 13 of the “NEHRP Seismic Provisions.”

a. Designs using passive energy dissipating systems must receive written approval from Code 04CN.EH, Southwest Division.

b. Note that a design and test program peer review similar to that prescribed in section 13.8.1 of the “NEHRP Seismic Provisions” is required.

6.8.2.11 Nonbuilding Structure Design: Design of Piers and Wharves shall comply with “Technical Report TR-2069-SHR - Design Criteria for Earthquake Hazard Mitigation of Navy Piers and Wharves” dated March 1997, distributed by NAVFACENGCOM, rather than by the provisions of the “NEHRP Seismic Provisions.”

All tanks and vessels shall be designed to meet the additional requirements of section 14.4.3.3 of the “NEHRP Seismic Provisions.”

6.8.2.12 Cold Formed Metal Framing: Seismic design using light gage cold formed metal framing shall comply with section 8.6 “Light-Framed Walls” of the “NEHRP Seismic Provisions.”

6.8.3 SEISMIC REHABILITATION DESIGN REQUIREMENTS

Seismic design shall comply with the requirements of the “NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures” (FEMA 302), with the “Handbook for the Seismic Evaluation of Buildings – A Prestandard” (FEMA 310) and with the “NEHRP Guidelines for the Seismic Rehabilitation of Buildings” (FEMA 273) when Performance Based Engineering (PBE) is specifically required.

Evaluations of existing buildings using (FEMA 310) shall generally be based on the Tier 3 evaluation procedures using linear static or linear dynamic analysis. No preliminary Tier 1 or 2 evaluation is required. For highly irregular buildings, Tier 3 detailed evaluation using nonlinear static analysis may be required. The special URM bearing wall procedure may be used when appropriate. Note that chapter 5 of (FEMA 310) permits seismic evaluations to 0.75 x new design criteria as an acceptance standard, but requires upgrades to 100% of new design criteria.

Existing buildings and other existing structures shall not be rehabilitated to “PBE based Enhanced Performance Objectives” (seismic use groups II and III) unless specific

approval is obtained from Code 04CN.EH for a level of retrofit performance beyond “Life Safety.” The design criteria for such enhanced performance upgrades will be assigned at the time a decision is made to design for enhanced performance.

6.8.3.1 Ground Motion: Site characteristics may be determined from previous Geotechnical (Soils Investigation) reports if adequate information is available. Determination of the “Site Class” as defined in Table 3-1 of TI 809-04 or section 4.1.2.1 (Site Class Definitions) of FEMA 302 shall be made by a geotechnical engineer. Determination of F_a and F_v shall not be made without a geotechnically established site class. Minor projects that do not require a geotechnical report may use the FEMA 302 default site classification D.

- a. Site specific determination of seismic ground motion shall be based on the guidelines presented in chapter 3-4 of TI 809-04. Note that a peer review is required for site specific ground motion determination as defined in section 3-4.b of TI 809-04.
- b. Refer to section 3.6 of the A-E Guide for additional information concerning site specific ground motion representation.

6.8.3.2 Architectural, Mechanical, Electrical and Other Nonstructural Components Design: Seismic rehabilitation shall include anchorage and restraint of all equipment that is not adequately anchored. As a minimum, all new anchorage design shall be based on the requirements for Seismic Design Category D of FEMA 302.

- a. Seismic anchorage and restraint details shall be provided for all equipment that exceeds 400# (180kg) in weight. If exact weights and dimensions are unknown, details shall be based on the best information available, and may be modified during construction if original design assumptions prove to be inaccurate.
- b. Support and seismic restraint shall be detailed for all ducts, pipes, suspended equipment etc. Reference to generally accepted standards such as the “SMACNA Guidelines” are acceptable for ordinary installations.
- c. Support and seismic restraint of all ceiling systems shall be detailed. Details to include compression struts at all locations where diagonal splay bracing occurs.

6.8.3.3 Foundation Design: As a minimum, all new foundation design for seismic rehabilitation shall comply with section 7.5 (Seismic Design Categories D,E & F) of FEMA 302.

6.8.3.4 Steel Design: As a minimum, all new steel design for seismic rehabilitation shall comply with section 8.4 (Seismic Design Categories D, E and F) of FEMA 302. Member design shall be based on the requirements in Part 1 of the AISC publication "Seismic Provisions for Structural Steel Buildings" dated April 15, 1997.

a. Design using "Special Moment Frames" (SMF) requirements- chapter 9, "Intermediate Moment Frames" (IMF) requirements – chapter 10, "Ordinary Moment Frames" (OMF) requirements – chapter 11, "Special Truss Moment Frames" (STMF) requirements – chapter 12 of the "AISC seismic Provisions" or modifications to existing moment frames will not be permitted without advance written approval from Code 04CN.EH, Southwest Division.

b. Design of concentrically braced frames shall comply with chapter 13 – "Special Concentrically Braced Frames" (SCBF) of the "AISC Seismic Provisions." Attention is called to section 13.3c and commentary section C13.3c for the 2t set back exception when critical buckling is out of plane of the gusset plate. Attention is also called to section 13.4a.3 for the post buckling unbalanced vertical load on the beam.

c. Design using "Eccentrically Braced Frames" (EBF) requirements – chapter 15 of the "AISC Seismic Provisions" are permitted unconditionally unless the design involves link-to-column connections. In accord with section 15.4a, link-to-column moment connections require tests that demonstrate inelastic rotation capability and therefore must be approved in writing by Code 04CN.EH, Southwest Division.

6.8.3.5 Concrete Design: As a minimum, all new concrete design for seismic rehabilitation shall comply with section 9.7 (Seismic Design Categories D, E or F) of FEMA 302. The exceptions to section 9.7.3 shall be excluded. Reinforced Concrete Structural Systems Composed of Interconnected Precast elements – Appendix to chapter 9 of FEMA 302, will not be permitted without written approval from Code 04CN.EH, Southwest Division.

6.8.3.6 Composite Steel and Concrete Structural Design Requirements – New design for seismic rehabilitation per chapter 10 of FEMA 302 and Part II of the "AISC Seismic Provisions", will not be permitted without written approval from Code 04CN.EH, Southwest Division.

6.8.3.7 Concrete Masonry Design: As a minimum, all new concrete masonry designs intended for seismic rehabilitation shall comply with section 11.3.9 (Seismic Design Categories D, E and F) and section 11.11.5 (Special Reinforced Masonry Shear Walls) of FEMA 302. Stack Bond Construction per section 11.3.9.3 of FEMA 302, will not be permitted for structural walls without written approval from Code 04CN.EH, Southwest

Division. Alternate Provisions for the Design of Masonry Structures – Appendix to Chapter 11 of FEMA 302 shall not be used .

Minimum requirements for inspection and testing shall comply with the requirements of FEMA 302. It is recommended, for any significant CMU construction, that the continuous QC specialist inspection mentioned in part 1 of specification section 04230 be called for and that prism tests be used to document the required fm'.

6.8.3.8 Wood Design: As a minimum, all wood design shall comply with section 12.8 (Seismic Design Categories E and F) of the “NEHRP Seismic Provisions.” Design of members and connections shall comply with “AF&PA/ASCE 16-95, Standard for Load and Resistance Factor Design (LRFD) for Engineered Wood Construction.” Note that section 12.8 of the NEHRP Seismic Provisions prohibits the use of unblocked structural-use panel sheathing.

6.8.3.9 Seismically Isolated Structure Design: Design of seismically isolated structures shall be in accord with chapter 13 of the “NEHRP Seismic Provisions.”

- a. The “Equivalent Lateral Force” procedure referenced in section 13.3 may not be used.
- b. Site specific ground motion spectra shall be used for all seismically isolated structural design.
- c. Design using seismic isolation must receive written approval from Code 04CN.EH, Southwest Division.
- d. Note that a design and test program peer review in accord with section 13.8.1 of the “NEHRP Seismic Provisions” is required.

6.8.3.10 Passive Energy Dissipation System Design: Design of passive energy dissipating systems shall be in accord with the appendix to chapter 13 of the “NEHRP Seismic Provisions.”

- a. Designs using passive energy dissipating systems must receive written approval from Code 04CN.EH, Southwest Division.
- b. Note that a design and test program peer review similar to that prescribed in section 13.8.1 of the “NEHRP Seismic Provisions” is required.

6.8.3.11 Nonbuilding Structure Design: Seismic rehabilitation of Piers and Wharves shall be based on the provisions of “Technical Report TR-2069-SHR - Design Criteria for Earthquake Hazard Mitigation of Navy Piers and Wharves” dated March 1997, distributed by NAVFACENGCOM, rather than by the provisions of the “NEHRP Seismic Provisions.”

Seismic rehabilitation of tanks and vessels shall utilize the additional requirements of section 14.4.3.3 of the "NEHRP Seismic Provisions."

6.8.3.12 Cold Formed Metal Framing: Seismic design using light gage cold formed metal framing shall comply with section 8.6 "Light-Framed Walls" of the "NEHRP Seismic Provisions."

6.8.4 QUALITY ASSURANCE

Minimum Quality Assurance requirements shall be as defined in the "NEHRP Seismic Provisions." More stringent requirements may be inserted into the contract documents by the "structural engineer of record" if it is felt that additional testing and inspection are desirable.

- a. Structural Inspection and Testing Requirements shall be included in the individual specification sections. These requirements will become part of the contractor managed quality control program.
- b. specialists must be identified for the various inspection categories (e.g. concrete, steel, masonry, welding.) in specification section 01450 and "special inspector certifications" such as ACI, AWS, ICBO shall be required. Note that the "QC Specialist" as defined in the NAVFAC specifications is equivalent to a "Special Inspector" as defined in the Uniform Building Code.
- c. Structural Steel Fabricating Shops should be required to possess AISC certification in the appropriate category. ICBO and City of Los Angeles certifications will also be accepted.
- d. Pre-Engineered Metal Building fabricators must be required to possess AISC certification in the MB category.
- e. Structural Steel Erectors may be required, on major projects, to possess AISC certification in the appropriate category.
- f. Pre-cast concrete producers shall be required to possess PCI (Precast/Prestressed Concrete Institute) plant certification in the appropriate category.
- g. Epoxy coatings on reinforcing steel shall be produced in plants certified by CRSI (Concrete Reinforcing Steel Institute) for fusion bonded epoxy coatings.
- h. Plant fabricated metal plate connected wood trusses shall be produced in Plants by the TPI (Truss Plate Institute) quality assurance inspection program.

6.8.5 CONTRACT/CONSTRUCTION DOCUMENT REQUIREMENTS

6.8.5.1 Foundation Conditions

- a. Describe site conditions, type of foundation to be used and the method employed to determine allowable soil bearing values.
- b. Indicate the maximum dead load, dead + live load and combined dead + live + seismic/wind design bearing values.
- c. Indicate the passive, active and at rest design pressures, the coefficient of friction and the sub-grade modulus.
- d. Indicate if a site specific design spectrum has been used in the design and give the site class in accord with the seismic design criteria used in the seismic design.
- e. Identify the soils investigation reports on which the design was based.

6.8.5.2 Basis of Design

Provide a brief basis of design that describes the type of construction, the framing systems used, the lateral load resisting elements, the foundations and all other special information needed to convey an understanding of the structural systems. This shall include definitions of the diaphragms and the process of shear transfer between diaphragms and vertical lateral load resisting elements. This shall also include definitions of the manner in which foundations and slabs on grade are used to distribute lateral forces between the structure and the ground.

6.8.5.3 Materials

Clearly define the types of materials for each structural element and system. All structural materials shall be competitively available and shall be produced by a domestic manufacturer.

6.8.5.4 Loads

- a. List snow loads, live loads, wheel loads, equipment loads, material handling loads and any special design loads. Identify the source for all loads listed.
- b. List mooring, berthing and deck loads for marine structures.
- c. For wind loads list basic wind velocities, importance factors, exposure categories and topographic factors.

d. For seismic design list the base shears in terms of %mass and list the coefficients used to compute the base shear.

6.8.5.5 Pre-engineered Metal Building Systems

a. All loads and forces necessary to design the superstructure must be provided by the structural designer of record. This must include all wind and seismic design requirements.

b. The structural designer of record must review and approve all design calculations and shop drawings.

c. A foundation design and anchor bolt design must be provided in the contract documents. These designs will be evaluated based on the foundation reactions provided by the superstructure designer for review by the designer of record. The foundation design must provide for resisting the horizontal reactions at the column bases. It shall be stated that construction of foundations shall not take place prior to design and shop drawing approval by the designer of record.

d. It shall be required that all calculations and shop drawings executed by a metal building manufacturer be sealed by a registered structural or civil engineer.

e. It shall be required that the metal building fabricator be certified through the AISC Plant Quality Certification Program in the MB category.

f. All serviceability limit states that are to be applied to the superstructure must be stated in the contract documents. The contract documents must state that fixed base column design is prohibited.

g. Provide complete dimensions that include such information as roof slopes, eave heights, floor elevations, required clearances, outside face of girts or columns and any needed reference dimensions.

h. Indicate if the building is to be designed for future expansion and indicate bays that are available for diagonal bracing.

6.8.5.6 Design-Build Elements within Design-Bid-Build (IFB) contracts.

a. All structural elements shall be completely designed and detailed in the contract documents by the structural designer of record. The contractor shall not be responsible for the production of structural designs nor should the contractor be required to make design or detailing decisions.

b. Examples of elements included in this requirement are member connections, light gage metal stud/joist framing, support and restraint of ceiling systems, support and restraint of wall systems, concrete/masonry inserts, equipment support, anchorage and restraint, support and restraint of pipes and ducts and support of casework.

Exceptions: Open web steel joists, precast concrete elements and fabricated wood trusses, that are not part of the lateral load resisting system, may be designed by the manufacturer if all loads are clearly given in the contract documents and the designer of record accepts the designs. Contractor furnished designs must be stamped by a registered civil or structural engineer however the designer of record will still be responsible for these designs based on the required acceptance.

6.8.5.7 Structural Notes

a. The drawings must contain a set of "Structural Notes" which provide critical reference information for use when future modifications and evaluations are made. e.g. Design Criteria, Design Loads, References to Design Standards, Required Material Properties, Types, Grades & Strengths, General Construction Requirements etc.

b. All structural drawing sets shall contain a statement to the effect that "The seismic design represented in these contract documents equals or exceeds the requirements of the 1997 edition of the Uniform Building Code."

6.8.5.8 Design-Build Contracts

a. Structural design performed under the direction of a design-build contractor shall conform to the level of care that is expected of designs done under direct contract to the Navy.

b. Drawings must be completely detailed such that design decisions and choices in the field are not necessary.

c. The designer of record will assume responsibility for all work within the particular discipline whether performed personally or by specialty sub-contractors. This responsibility is as defined in item 6.8.5.6 above.

6.8.5.9 Welding Requirements

Acceptance criteria for ultrasonic testing of groove welds shall be based on Table 6.3 of AWS D1.1.

All weld metal and base metal subjected to cyclic tension shall be supplied with "charpy" V-notch testing in accordance with ASTM A6 supplementary requirement SS. (5 specimen option). The impact test shall meet a minimum average value of 20 ft. lbs. absorbed energy @ -20 degrees F.

6.8.5.10 Crane Certifications:

The design, construction and installation of cranes is normally contracted for on a design-build basis, regardless of the type procurement used for the major construction contract. NAVFAC specifications (sections 14534, 14535, 14606, 14622, 14636 or 14637) provide instruction for design of cranes and monorails.

- a. Mil-Hdbk 1038 (Weight Handling Equipment) provides design criteria for cranes. The Navy requires annual inspections and certifications based on the requirements of NAVFAC P-307 (Management of Weight Handling Equipment) as part of their safety certification program. The P-307 requirements include static and dynamic load tests and generally exceed similar commercial certification requirements. The Navy certification requirement shall not be inserted into the crane design specification as the contractor is not responsible for procuring this inspection. Instead, all post-erection inspections and tests contained in the crane specifications that require contractor inspection and testing shall remain in the specification. These requirements are equivalent to a commercial certification. A provision that the contractor provide all weights for these load tests shall be added to the standard specification language.
- b. The designer of record is responsible for the design of all crane / monorail supporting members except patened track beam for underrunning cranes and monorails which will be designed by the crane contractor.

6.8.6 STRUCTURAL STEEL PAINT RECOATING

Removal of existing steel coatings to permit application of new coatings shall not be attempted except where paint adhesion tests indicate that existing coatings do not have sufficient adhesion to allow overcoating with an encapsulating coating.

- a. Adhesion tests for existing steel coatings shall be in accord with ASTM D 3359 (method A).
- b. Where removal of relatively small areas of existing steel coatings are necessary, SSPC SP11 (Power Tool Cleaning to Bare Metal) should be preferred over blast cleaning.
- c. All federal, state and local environmental requirements must be adhered to in the removal and disposal of existing steel coatings. Reference section 3-19 of the A-E Guide for general removal requirements.

6.8.7 MISCELLANEOUS REQUIREMENTS

6.8.7.1 Load Combinations:

- a. Load combinations per ASCE-7 shall supercede comparable Load Combinations contained in materials criteria documents, however other documents may add supplementary Load Combinations in addition to those contained in ASCE 7. Note the modified strength reduction factors in appendix B of ACI 318.
- b. When specifically required, strength and stability shall be checked to ensure that structures are capable of withstanding the effects of extraordinary (i.e. low probability) events such as fires, explosions and vehicular impact.

6.8.7.2 Loads:

- a. Live Loads used in the design of buildings and other structures shall be the maximum loads expected by the intended use or occupancy, but shall in no case be less than the minimum loads required by ASCE 7 or Mil Hdbk 1002/2A.
- b. In buildings where the intended use might result in partitions being erected or rearranged, provision for partitions with a minimum weight of 20 psf shall be made, whether or not partitions are shown on the drawings.
- c. Any single panel point of the lower chord of exposed trusses or any point along the length of exposed primary structural members over manufacturing, storage, warehousing or maintenance shops shall be designed for a concentrated load of 2000 pounds (8.9 kN) in addition to all other loads. For all other occupancies a concentrated load of 200 pounds (0.89 kN) shall be used.
- d. Crane live loads shall be the rated capacity of the crane. Design loads for the runway beams, including connections and support brackets, of moving bridge cranes and monorails shall include the maximum wheel loads and the vertical, lateral and longitudinal impact forces induced by the moving crane or monorail. For cranes and hoists with rated loads in excess of 10 tons, the Navy Crane Center (NCC) must be contacted for assistance in determining loads and coordinating the design elements.
- e. Snow loads that are not covered in ASCE-7 or Mil-Hdbk 1002/2A shall be based on accepted local criteria.

6.8.7.3 Miscellaneous:

- a. Design values for proprietary materials are to be obtained from ICBO Evaluation Reports.
- b. Recommendations contained herein that represent construction requirements must be inserted into the contract documents. Contract documents include drawings and performance specifications intended for Design - Build contracts as well as drawings and descriptive specifications intended for Design - Bid - Build contracts.
- c. Statements such as “may require, should be considered etc.” contained in the above criteria documents shall be interpreted as “is required” unless a specific exemption is granted by Southwest Division – Code 04CN.

6.8.8 MINIMUM DESIGN REQUIREMENTS

Requirements listed below are minimum. Design loads and conditions may demand that designs exceed these minimum requirements. Design calculations shall include a source for all design forces/stresses used that are not governed by industry standards defined in this document.

6.8.8.1 Concrete and Foundations:

- a. Concrete slabs on ground shall have a minimum thickness of 4 inches. Minimum reinforcing shall be #3 reinforcing bars at 16” on center or 4x4-w2.9xw2.9 welded wire reinforcing. The slab reinforcing shall be placed on firm supports 1/3 the slab depth from the top of slab with a minimum cover of 1-1/2 inches. Fiber reinforcement in the concrete mix shall not be considered as replacing the above steel reinforcing.
- b. Concrete slabs on ground shall have construction, control or expansion Joints at maximum spacing of 25 feet in each direction. If special circumstances make such a spacing impractical, approval for deviations shall be obtained from code 04CN.EH at Southwest Division. Slab reinforcing shall continue through construction and control joints.
- c. All concrete slabs shall have thickened edges and shall be reinforced with a minimum of 2-#4 continuous reinforcing bars (one top and one bottom). Minimum depth of thickened slab edges shall be 8 inches for conditions where no superimposed dead loads occur on the slab and 12 inches where superimposed dead loads are present.

6.8.8.2 Concrete Masonry Construction:

- a. Walls constructed of concrete masonry units require control or expansion Joints at maximum spacing of 30 feet unless evidence is presented that documents the use of greater lengths without detrimental effects. Design calculations for shear walls must be based on the actual wall segment lengths between joints.
- b. All concrete masonry construction shall use medium weight units per ASTM C90, types M or S mortar and grout with a minimum compressive strength at least 500 psi. higher than fm'.
- c. All walls constructed of concrete masonry units shall be fully grouted. (grout in all cells) The design mass calculations must reflect this condition.
- d. Walls must be constructed of single or double open end units. Single or double open end bond beam units must be used in courses in which horizontal reinforcing is placed. No two closed unit ends shall abut in the wall such that no head joints exist.
- e. Columns must be constructed of closed column units or pilaster units with joints staggered from course to course. No web sections may occur within columns.
- f. Running bond is required for shear walls and wall frames.
- g. Horizontal joint reinforcing may be used in conjunction with reinforcing bars to meet minimum reinforcing requirements in lightly loaded walls. Joint reinforcing shall not be used to resist computed stresses.
- h. In 8 inch or thinner walls, reinforcing shall be limited to one face of reinforcing in each direction located at the center of the wall thickness.

6.8.8.3 Wood Framing

- a. Plywood and oriented strand board are the only structural use panels permitted for horizontal or vertical diaphragms in wood construction. Minimum thickness to be ½ inch. All horizontal diaphragms must be blocked unless tongue and groove joints are used.
- b. Connections of wood framing members shall, where possible, be made with mechanical connectors rather than toenails, endnails etc. Wood stud walls shall be anchored to concrete foundations to resist design loads with minimum anchorage as follows:

(1) Exterior wood framed walls and all wood framed shear walls (interior or exterior) shall be anchored to concrete foundations with ½" round embedded anchor bolts (w/ 4" embedment) spaced 30 inches on center.

(2) Interior non-bearing, non-shear wall partitions may be anchored with 3/8" round embedded anchor bolts (w/ 3" embedment) or 3/8" round expansion anchors (with 4" embedment) spaced a maximum of 48" on center. As an alternate, 0.145 " diameter powder actuated fasteners may be used at a maximum spacing of 24" on center.

6.8.8.4 Cold Formed Metal framing

Welding of light gage cold formed material is permitted for 16 gage and greater thicknesses. Designs for this material shall be based on well established allowable force values for welds and mechanical fasteners. Light gage steel stud wall systems shall be anchored to concrete foundations to resist design lateral loads with minimum anchorage as follows:

- a. Exterior walls and all walls designed as shear walls to have ½" round embedded anchor bolts (with 4" embedment) spaced a maximum of 30" on center.
- b. Interior bearing walls to have ½" round embedded anchor bolts (with 4" embedment) spaced a maximum of 30" on center.
- c. Interior non-bearing, non-shearwall partitions to have 3/8" round embedded anchor bolts (with 3" embedment) or 3/8" round expansion anchors (with 4" embedment) spaced a maximum of 48" on center. As an alternate, 0.145 inch diameter powder actuated fasteners may be used at a maximum spacing of 24" on center.

6.8.8.5 Steel Framing

Project documents shall call for one class of structural steel bolt throughout the entire project. For example, ASTM A307 or ASTM A325 for all connections. The locations of slip critical (friction) bolts must be clearly defined. Anchor bolts and other threaded material may differ from the standard bolts.

6.8.8.6 Steel Roof Deck

Steel deck diaphragms must be welded along the side seams. Button punched seams are not permitted.

6.8.8.7 Epoxy Coatings for Reinforcing Steel

Epoxy coatings for reinforcing bars shall be applied after bending in accord with ASTM A 934.

6.8.9 HOW TO OBTAIN DOCUMENTS

- a. FEMA : FEMA documents may be ordered from FEMA by telephoning 800 480 2520 or 301 497 1873.
- b. Corps of Engineers: TI XXX XX documents may be downloaded from the Corps of Engineers web page. (www.usace.army.mil / Techinfo / Instructions.)
- c. NAVFAC: Many TI XXX and MilHdbks may be downloaded from the LantDiv web page. (www.efdlant.navfac.navy.mil / engineering Innovation / publications.)
- d. Department of Defense Specifications and Standards: Many military publications can be obtained by writing DODSSP - Building 4, Section D - 700 Robbins Ave. - Philadelphia, PA 19111-5094. (Telephone 215 697 2179.)
- e. Southwest Division: Hard copies of many of the above documents may be obtained at Southwest Division headquarters – 921 West Broadway – San Diego. Contact Ed Hanlon by phone at 619 532 1649 or by E-Mail at hanlonea@efdswnavfac.navy.mil to check availability.

6.9 MECHANICAL

6.9.1 Heating, Ventilating And Air Conditioning (HVAC)

MIL-HDBK 1003/3 Chapters 8 and 10 of MIL-HDBK 1190, P-89, and the International Mechanical Code (IMC). Provide a description and schematics of the system and an explanation of why this system is preferred over others. Include in the description the following:

- a. Indoor and outdoor design temperatures.
- b. "U" factors for walls, ceilings, floor, etc.
- c. Special humidification or dehumidification requirements.
- d. Special filtration requirements.
- e. A statement regarding the ability of an existing mechanical system to carry the load when the existing system is expanded or modified.

6.9.1.1 Heating

Include in the description of the heating system the following:

- a. The heating medium, such as steam, hot water, gas or electricity and explain why this medium is preferred over others.
- b. The total flow, pressure and quality requirements of the proposed facility and the ability of the existing utility network to meet these demands.
- c. Indicate location of the heating plant and state if condensate is to be returned.

6.9.1.2 Ventilation

In the description of the ventilation system include the following:

- a. Whether a gravity or mechanical system is to be used.
- b. Whether or not smoke removal systems are proposed.
- c. Indicate the number of outside air changes per hour in various areas, the type of filtration, and applicable OSHA and/or Industrial Hygiene requirements.
- d. Operation of the system in summer and winter modes.

6.9.1.3 Cooling

In the description of the cooling system include the following:

- a. A list of the areas to be cooled.
- b. Locations of major components.
- c. The proposed equipment including the type of refrigerant and water treatment.
- d. Describe the environmental control system type and functions.

6.9.2 Plumbing

MIL-HDBK 1003/1, DM3.5 and International Plumbing Code. Provide a description and schematics of the proposed systems. Include in the description the following:

- a. The number and type of each fixture based on the number of persons to be served.

- b. The total flow requirement and the estimated maximum and minimum water pressure at each building and a statement if booster pumping is proposed.
- c. The type size, location, and design temperature of the domestic water heater.
- d. The design temperature of the domestic hot water distribution system and a statement if recirculation is proposed.
- e. A discussion of any specialized features such as medical gases, hydraulic systems, vacuum or compressed air.

6.9.3 Cold Storage

MIL-HDBK-1032/2 and ASHRAE Standard 15, latest edition.

- a. Provide a description and schematics of the proposed refrigeration system for the cold storage facility including an explanation of why this system is preferred over others.
- b. List areas to be refrigerated, including their usage and temperatures to be maintained.
- c. Describe the proposed equipment and locate the major components.

6.9.4 Heating Plants

MIL-HDBK 1003/6. Provide a description and schematics of the proposed systems. Include in the description the following:

- a. The number, size, type and pressure of the new boilers.
- b. The type of fuel and the proposed storage and distribution systems.
- c. The number and type of new auxiliaries and their power sources.
- d. The type and function of the safety and combustion control systems and how they will perform.

6.9.5 Exterior Distribution Systems

Steam, High Temperature Water, Chilled Water, Natural Gas, And Compressed Air. MIL-HDBK-1003/8A.

Provide a description and schematics of the proposed system(s). Include the description of the following:

- a. Loads and fluid conditions, fluid characteristics, and distribution site locations.
- b. Factor governing test for field permeability, soil resistivity, soil stability and water conditions.
- c. Information on the distribution pipe sizing, valves and supports, distribution methods and piping specifications.

6.9.6 Fuel Distribution And Storage

MIL-HDBK 1022 Provides a description and schematics of the proposed system. Include in the description the following:

- a. Identify type and materials for pipes, tanks, and valves.
- b. For GAS systems describe type, location of take off from supply and available pressure.
- c. For LIQUID systems describe unloading facilities such as dock, tank, car, or truck; state the basis for storage capacity, the rate of pumping and the number of dispensing outlets, the hazard classification and the power requirements.

6.9.7 Elevators, Escalator, Dumbwaiters, Access Lifts,Pneumatic Tube Systems

DM-3.09. Provide a description and schematics of the proposed system including an explanation of why this system is preferred over others.

6.10 ELECTRICAL

6.10.1 Facilities

- a. Service: Describe the characteristics, capacity, conductor size, metering, ductbanks and raceways. Describe the total connected load and resulting kilowatt demand load by applying the proper demand and diversity factors. Indicate adequacy of the supply at the point of connection.
- b. Transformers: Describe the type to be used, coolant, rating, protective devices, and connections.
- c. Main Distribution Switchboard: Describe the rating of the bus, the number of circuit breakers and metering. Include the total computed load.
- d. Service Equipment Panel: Describe the phase, voltage, current, power and Asymmetrical Interrupting Capacity (AIC).

e. Lighting and Illumination: Illuminating Engineering Society's (IES) Lighting Handbook except as modified by MIL-HDBK-1190. Indicate lighting level requirements. Describe type of lamps and fixtures to be used and where proposed to be installed. For high bays, discuss accessibility solutions for installation and maintenance. Describe methods for energy conservation. Describe the need for emergency and exit fixtures.

f. Grounding: Describe the grounding system required for the facility.

g. Motor Loads: Describe the type of motors, ratings and protective devices.

h. Electronic/Computer Systems: Describe the systems and any special coordination necessary to achieve required overall system performance and any new techniques proposed. Describe demand load of equipment including allowances for expansion and diversity factors used. Describe equipment environmental air conditioning requirements, including cooling load of equipment. Describe special bonding, grounding and shielding requirements.

i. Special Equipment: Describe any special equipment required. Describe the basis of selection, characteristics, and types of enclosures. Include the total connected load and resulting demand.

j. Signaling/Communication: Describe communication requirements in terms of quantity, types of service and power.

1. Describe the types of antennae, transmission lines, method of installation, termination, switching, etc.

2. Describe radio circuit requirements, including number of circuits and frequencies to be utilized, also wired circuits required indicating those for voice, remote control, etc.

3. Where radio transmission is involved, provide the transmission characteristics to determine need for frequency assignment.

4. Describe special bonding, grounding and shielding requirements.

5. For radar installations, indicate azimuth of coverage and any special precautions to achieve safety to personnel and to minimize interference with other operations.

k. Emergency Power: Describe the need for emergency generators or uninterruptible power systems and method of operation during a power outage. Describe the rating, protective devices and connections.

- l. Intrusion Detection Systems (IDS): Describe how the design will meet IDS requirements.
- m. Specialized Receptacles: Describe special receptacles used in the design.
- n. Wiring Systems: Describe raceways, wire type, conductor insulation, and shielding.
- o. Switchgear And Motor Control Centers. Describe the type of circuit breakers and starters to be used, interrupting rating, continuous rating, control power, metering and relaying, and enclosures.
- p. Telecommunications/Local Area Network (LAN). Describe the type and arrangement of telecommunication /LAN systems including type and quantity of cables, hardware /accessories and capacity of the existing system. Indicate source and connections to existing systems. Describe current criteria for manholes/handholes, ducts, cables, jacks, backboard, etc., required for proper design of the systems.
- q. Lightning Protection System. Describe how the design will meet the requirements for a lightning protection system.
- r. Hazardous Locations. Identify all areas considered hazardous with appropriate classification and division based on the National Electrical Code.

6.10.2 Electrical Distribution System

- a. Primary Supply to Station. Describe the electrical characteristics of power supply to the Station, or portion involved including circuit interrupting requirements and voltage regulation.
- b. Station Distribution: Describe the electrical characteristics and adequacy. If inadequate, state measures proposed to correct the deficiency. Describe the basis for selection of distribution voltage.
- c. Standards of Design: Describe the pertinent standards of design, such as voltage drop, physical characteristic of overhead or underground circuits, type of street lighting units and lighting intensities.
- d. Conduits and Conductors: Describe the type of conduit to be used, where installed, depth of installation, and whether direct buried, concrete encased or surface. Describe the type of conductor insulation, shielding, grounding requirements, and where proposed for use.

- e. Loads: Describe the total connected load and resulting kilowatt demand load by applying proper demand and diversity factors, if a group of loads is involved.
- f. Transformers: Describe type of transformer to be used, coolant, rating, protective devices, and connection.

6.10.3 Instrumentation And Control Systems

- a. Describe the overall process to be controlled and the control philosophy. Indicate the control system inputs from the process and the control system outputs to the process. Describe the process sensors and signals, the control system signals and actuating devices. Describe the control algorithms to be implemented. Provide a general sequence of operations. Indicate a typical functional diagram for control of the major process similar to a Scientific Apparatus Makers Association (SAMA) diagram or a function blockwire diagram.
- b. Describe the control equipment signal processing scheme, i.e., electric analog or digital; single processor or distributed processors; programmable logic controller based; personal computer based; single loop controller based; multi-loop controller based; or mini-computer based. Indicate the expected update frequency for critical, typical and non-critical data points in the system. Indicate the expected end-to-end control accuracies.
- c. Describe the hard wired control logic scheme and provide a typical ladder logic diagram to illustrate the method to be used on the contract drawings.
- d. Describe the control program programming scheme, ladder diagram logic, function block logic and a typical diagram to illustrate the method to be used on the contract drawings.

6.11 FIRE PROTECTION

Reference all appropriate criteria requirements applicable to the project and explain how these requirements will be incorporated into the design. At a minimum, the following fire protection provisions shall be addressed:

- a. Type of construction and interior finishes.
- b. Classification of occupancy.
- c. Building separations and exposure protection (between project building and surrounding buildings); remedial action required if project involves an existing building.

- d. Height and area limits and allowable increases; fire walls (locations and ratings, including doors, windows, and dampers); remedial action required if project involves an existing building.
- e. Water supplies. Data from hydrant flow tests, comparison of the required versus the available fire flows to determine if the water supply is adequate, and a description of the water supply facilities (e.g., number of pumps available/on line, size of water storage tanks, etc.).
- f. Means of egress requirements. Number and types of exits; Separation of means of egress (fire and smoke partitions and walls and door ratings); exit travel distances; egress capacity and occupant load; exit signage and emergency lighting; etc.
- g. Fire alarm and detection systems. Locations of manual alarm initiation devices and audible/visual warning device requirements; system zoning; type of automatic detection (if required) with areas of coverage.
- h. Extinguishing systems. Identify:
 - 1. All areas requiring extinguishing systems and the type of system.
 - 2. Classification of hazard and design density requirements.
 - 3. Areas requiring gaseous or chemical fire protection systems and design parameters.
 - 4. Size and type of fire pumps and/or standpipes as required.
- i. Smoke control systems. Number and locations of smoke zones; method and sequence of operation.
- j. Other fire protection features as appropriate to the hazards of the facility.

6.12 CATHODIC PROTECTION

Based upon the soil investigation/corrosive soil and/or water survey/report, describe the requirements for cathodic protection. Provide a list of all metallic underground structures (such as pipes, storage tanks, hydraulic lifts, casing, steel pilings), utilities, and above ground storage tanks. Indicate the type of material of each structure. If cathodic protection is necessary, describe the method of protection.

NOTES

CHAPTER 7. DRAWINGS

7.1 GENERAL

MIL-HDBK-1006/1 A Drawing And Specifications, as modified by this section, provides information and requirements for the preparation of drawings. In case of a conflict, the A-E Guide will govern. Drawings shall include details that are listed in the Naval Facilities Guide Specifications.

7.1.1 Additive Designation

Portions of work which are to be an Additive Bid Item shall be identified on the drawings as "Additive Bid Item". **Do not include the Additive Bid Item number on the drawings.** Rearrangement of priorities at the last minute or by amendment will be simplified if it is not necessary to change the drawings.

7.2 DRAWING REQUIREMENTS

7.2.1 Order Of Drawings

Arrange drawings in the following order:

<u>Type of Drawing</u>	<u>Symbol</u>
Title Sheet	T
Civil	C
Geotechnical	GT
Landscape and Irrigation	L
Architectural	A
Structural	S
Mechanical	M
Plumbing	P
Electrical	E
Fire Protection	FP
Cathodic Protection	CP

7.2.2 Title Sheet

The title sheet shall include the vicinity map, location map, location plan, index to drawings, and a fallout shelter statement, if applicable. The project site, main station entrance, truck delivery entrance and routes, borrow pits, temporary offices as well as contractor site storage yards (all dimensioned to indicate spaces set aside) shall be shown on the location plan. The index shall list drawing reference numbers, drawing titles, and NAVFAC drawing numbers included in the contract in sequential order and by disciplines.

7.2.2.1 Storm Water Discharge Requirements

For projects requiring compliance with NPDES permitting for storm water discharges associated with construction activity (i.e. 5 acres, 2 hectares or more of soil disturbance), the location map shall extend approximately one quarter mile beyond project boundaries showing: the construction site, surface water bodies (including known springs and wetlands), known wells, an outline of off-site drainage areas that discharge into the construction site, general topography, and the anticipated discharge location(s) where the construction site discharges to a municipal storm sewer system or other water body.

7.2.3 Drawing Orientation

Plans shall be oriented with the North arrow pointing upward or to the right and the orientation of all building plans shall be identical and all site plans shall be identical.

7.2.4 Drafting Media

Tracing paper, grid paper, profile paper and vellum will be provided by the government, if available. The Government will not supply Mylar. All sheets will be D size, see Exhibit 7B. For drawings on CADD, see Attachment B, the Government will provide electronic file to the A-E for title block. Transition to SI drawings will be implemented when supplies are exhausted, at which time International Organization for Standard (IOS) "A" series drawing sheets (A1, etc.) shall be used. All drawings in the contract shall be the same size.

7.2.5 Lettering And Shading

Completed drawings shall be in pencil or ink. Uppercase vertical lettering is preferred and must be plain and legible. The minimum size freehand lettering height on all project drawings shall be 5/32 inch, 3.25 mm. All imaging shall be on the top side. Computer-plotted lettering (pen-plot and 400 dots per inch electrostatic plot) shall be 1/8 inch, 3.25 mm. **The use of pencil or crayon shading or poche' on the back of the drawings will not be permitted because of unsatisfactory reproduction.** All sections or areas normally denoted by poche' shall be indicated by stippling, crosshatching or other pattern indication. Decals placed on the bottom or backside of drawings shall not be used.

7.2.6 Scales

Locate directly under the title of each plan, elevation, section, detail, etc., an indication of the scale of the object drawn, (Example: SCALE 1/8" = 1'-0", 1:100). Closely related groups of details having identical scales and tied together with a common title may receive a single indication of scale under their title. Topographic surveys must be drawn at scales of 1" = 10', 1:200, 1" = 20', 1:300 or 1" = 40', 1:400, as appropriate. In addition to the conventional scales, and directly to the left of the title block, provide a series of graphic scales which shall include every scale used on the sheet. Scales shall be placed in sequence according to size with the smallest uppermost. It is not sufficient to place all

scales on one master sheet; each sheet must be treated independently as many drawings are reduced in size and are not always proportionately reduced. Minimum scale for floor plan(s) shall be $1/8" = 1'-0"$, 1:100. Use an identical scale for all disciplines to facilitate inter-disciplinary plan checking. Roof plan scale shall be identical between disciplines. Minimum scale for landscape construction, irrigation and planting plans shall be $1" = 20'-0"$, 1:200.

7.2.7 Title And Revision Blocks

Sample drawing title and revision blocks are illustrated by Exhibit 7-A. Note that the construction contract number and specification number are to be placed as indicated (Not the A-E contract number). Title block will be provided by the Government through electronic media or bulletin board.

7.2.8 NAVFAC Drawing Numbers

Assign one NAVFAC drawing number to each sheet. A block of NAVFAC Drawing Numbers will be issued upon request of the A-E when the total number of drawings (sheets) has been established. Once assigned, the NAVFAC number shall not be used on any other sheet.

7.2.9 Sheet Number

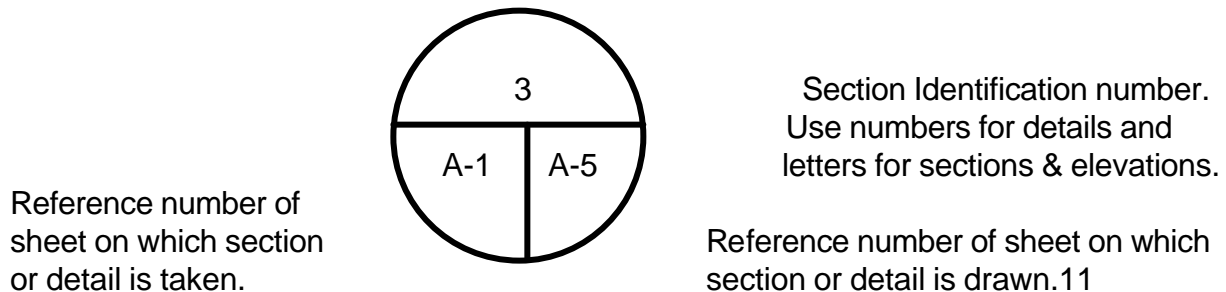
In numbering the sheets, apply the basic sheet number and the total number of sheets on the first and last sheets only, (i.e., Sheet 1 of 126). The balance of the sheets shall show only the basic sheet number without the total number, (i.e., Sheet 2 of). The last sheet of the final drawing shall show the last sheet number and the total numbers of sheets, (i.e., 126 of 126).

7.2.10 Drawing Reference Numbers

The A-E shall use "A-1", "M-6", etc. reference numbers for architectural, mechanical, etc., drawings, and shall place them immediately above the standard title block and adjacent to the right border line. See Exhibit 7-A.

7.2.11 Section/Detail Identification

Section identification shall be identified in the following manner.



7.2.12 Signatures And Corporate Stamps on Drawings

All designers, draftsmen and checkers responsible for the preparation of drawings shall sign or initial each drawing. Each drawing shall also be signed and stamped by a person of corporate status.

7.2.13 Stamps On Drawings

Each drawing and each set of calculations shall be stamped and signed by the individual who had responsible charge of the design and drawing preparation for each discipline. In states in which any of the above disciplines is not currently registered, the drawing shall be signed and stamped by a registered professional (Architect or Engineer) in the appropriate discipline responsible for preparation of the particular drawings.

7.2.14 Revisions To Contract Drawings

See Chapter 8 for requirements for Amendments and COR Packages. A revision is any change on a drawing after the drawing has been issued to bidders up to the time of completion of construction. Revisions shall be made by erasure, crossing out, addition of new or revised information on the signed drawings or by redrawing.

7.2.14.1 Revision Symbol

A revision symbol will be used to identify the revision. Each change for a revision will indicate the location on the drawing by a triangle with a letter and number (See sample, Exhibit 7-A.). The revision will be identified by an upper case revision letter in sequence; that is Revision A will indicate the first revision to a drawing, Revision B, the second, etc., except that I, O, Q and X shall not be used. All changes made at one time shall be identified with the same revision letter, but shall be followed by a suffix number used serially for each time the letter is used, thus: A2. The revised area on the drawing shall be circled with a soft black pencil in order to make the revision more conspicuous and easily found. The revision symbol shall be located as near as possible to the notes, lines, views, or

dimensions which are changed so as to keep the number of symbols to a minimum. Where there are many changes in one area on a drawing so that separate revision symbols would crowd the drawing, a single revision symbol may be used to identify the change if sufficient data is included in the revision block. If the revision accompanies an amendment or Change Order Request (COR), the amendment number or COR letter should be indicated along with a description of the change. **New drawings accompanying amendments or CORs shall bear the following notation in the revision block. "This drawing accompanies amendment number or COR"**. Before revising a drawing, the freehand circles of the drawing for the previous revision shall be removed. Alphabetical revision letters do not necessarily relate to the alphabetical letters of the CORs.

7.2.14.2 Revision Block

Each revision shall be recorded in the revision block of the drawing. The revision letter shall be placed in the "SYM" column. A brief description of the changes shall be made in the description column. See Exhibit 7-A.

7.2.14.3 Approval Of Drawings

Approval of the drawing will be made by the Command in the date and approval column.

7.3 FIFTEEN PERCENT SUBMITTAL REQUIREMENTS

Include the following:

- a. Site plan showing building footprint on contoured base map. Indicate all utility lines, access roads, paved areas, vehicular and pedestrian circulation paths and existing adjacent structures.
- b. List of all rooms and spaces required for the facility. Indicate net square foot/square meter, sf/m^2 area for each room/space. Indicate total gross square foot/square meter, sf/m^2 area of the facility as proposed by the design. Include adjustments required by covered areas such as walkways or passageways.
- c. Scaled floor plan drawings. Label all rooms/spaces, show all major dimensions. Include footprint of equipment and furniture required in each space. Indicate mechanical/room/equipment yard and major electrical installations proposed for the facility. Indicate schematic duct work.
- d. Scaled building sections. Show floor to floor, floor to roof and all ceiling heights. Indicate materials and construction for floor, exterior walls and roof. Indicate duct space for HVAC systems if such systems are proposed for the facility.

- e. Scaled building elevations. Indicate material finishes, texture and color number as referenced in the Base Exterior Architecture Plan (BEAP).
- f. A composite drawing will occasionally be required to illustrate the inter-relationships of all design components in the same general space to eliminate conflicts that might occur between building systems.
- g. Structural, Mechanical and Electrical layouts to illustrate the facility design.

7.4 FORTY-FIVE PERCENT SUBMITTAL

Develop all architectural and engineering drawings to a uniform level so that the entire project may be reviewed for conformance with authorized scope and criteria. Combine following drawings as appropriate for simplicity and clarification. For example, show demolition plan and existing topography plan together unless complexities warrant more detail.

7.4.1 Civil Drawings

Include the following:

- a. Existing Topography
- b. Demolition Plan
- c. Site Plan
- d. Grading Plan
- e. Paving Plan
- f. Utility Plan (including Fire Protection)
- g. Retaining Wall Sections

7.4.1.1 Existing Topography

Existing contours shall be plotted at one foot (0.3m) intervals and be clearly distinguishable from new contours. On substantially flat areas where one foot contours are widely separated, augment the topography with spot elevations. All spot elevations on the ground shall be given to the nearest tenth of a foot, and on pavements or structures to the nearest one hundredth of a foot. Scale shall be 1" = 20' (1:200) with scales of 1" = 40' (1:500) for large area projects and 1" = 10' (1:100) for small area projects. The drawing shall be oriented so that the North arrow is up or to the right on the drawing. The following shall be shown:

- a. A topographic survey of the site with at least two points on the traverse set permanently with standard Navy Monuments (Brass Cap in concrete).
- b. Both the horizontal and vertical control monuments including elevations and coordinates.
- c. The bearing and distance between the control monuments.
- d. All surface and subsurface utilities.
- e. All surface structures on and off site that may effect the design.
- f. All trees and shrubs on the project site.
- g. Inverts of all utilities and sizes shall be shown.

7.4.1.2 Demolition Plan

Indicate the following:

- a. Type and thickness of structures, foundations and pavements to be removed.
- b. Sizes and materials of all existing utility lines to be removed.
- c. Limits of demolition.
- d. Size and thickness of trees to be removed.
- e. Trees and shrubs to remain.

7.4.1.3 Site Plan

- a. Locate all new work by coordinates or dimensions from prominent existing structures.
- b. Clearly distinguish new facilities from existing.
- c. Indicate the following:
 - 1. Building Location
 - 2. Access Roads
 - 3. Parking
 - 4. Survey Control Points
 - 5. Bench Marks

- 6. Sidewalks
- 7. Finished floor elevations

7.4.1.4 Grading Plan

Shall be of the same orientation and scale as the existing topography plan. Existing contours shall be clearly distinguishable from new contours. Indicate the following:

- a. High and low points and grade breaks with spot elevations. Additional spot elevations shall be provided along ditches at culverts, inverts and at all other critical surface positions to indicate surface run-off. Spot elevations on the ground shall be shown to the nearest tenth of a foot (31mm) and those on structures or pavements to the nearest one-hundredth of a foot (3mm).
- b. Finish floor elevations for all buildings and concrete slabs.
- c. Top elevations and inverts of all drainage structures and ditches.
- d. Limits of grading.
- e. Vertical control benchmark.
- f. Buildings, structures and pavement areas.
- g. Pavement types.
- h. Erosion and Sediment Control Measures.

7.4.1.5 Paving Plan

- a. Shall be the same orientation and scale as the site plan.
- b. Indicate the following:
 - 1. Airfield pavements, roads, curbs, gutters and shoulders in section views.
 - 2. Type and thickness of structure including base course and sub-base.
 - 3. Wheel loadings for airfield pavements, grating and covers.
 - 4. Joint pattern and details for rigid pavement layout.
 - 5. Pavement markings and striping.

7.4.1.6 Utility Plan

- a. Orient and scale the Utility Plan the same as the Site Plan.
- b. Indicate the following:
 1. Location, alignment, type of utility, and pipe size of all new and existing utilities. These utilities will normally include domestic water, fire protection, water, sanitary sewers, storm sewers, natural gas, electrical, steam, high-temperature hot water, compressed air and P.O.L. product lines.
 2. Horizontal alignment at a dimensional offset from and parallel to the edge of a building or structure, the centerline or edge of a road or street, a fence line or other physical feature.
 3. Vertical alignment or grade by a defined nominal distance below finish grade for water lines, gas lines, electrical ductbank and P.O.L. product lines.
 4. Vertical alignment for sanitary and storm sewer lines by invert and top elevations at all manholes, catch basins and curb inlets.
 5. Point of Connection (P.O.C.) of the new utilities, including Fire Protection.

7.4.2 Geotechnical Drawings

Include the following:

- a. Soil Boring Logs and Data.
- b. Soil Boring Location.

7.4.2.1 Soil Boring Logs And Data

The site soil conditions shall be indicated as boring logs on the drawings. Locations of borings shall be shown on the Civil Site Plan. A small scale location plan shall accompany the boring logs. Soil boring logs shall be drawn in accordance with Exhibits 3-A, 3-B, 3-C and as contained in DM-7 and DM-21. The GT sheets shall also include tabulated results of chemical and/or physical properties test as appropriate to adequately describe the site conditions expected to impact facility construction.

7.4.3 Landscape Architecture Drawings

Include the following:

7.4.3.1 Landscape Construction Plan

- a. Site signage, fencing and playground area.
- b. Landscape drainage layout (i.e., piping and catch basins/drain inlets).
- c. Site legend with symbols and descriptions.

7.4.3.2 Irrigation Plan

- a. Irrigation head layout, both existing and proposed.
- b. Piping layout (lateral line only).
- c. Irrigation legend with symbols and descriptions.

7.4.3.3 Planting Plan

- a. Tree, shrub, vine, groundcover and lawn locations.
- b. Site furnishings (i.e., benches, tables, tree grates, bicycle racks, trash receptacles, playground equipment, etc.).
- c. Existing plant material(s) and/or site furnishing(s) to remain. Use dashed outline symbol to represent these elements.
- d. Plant legend with botanical and common names, sizes, quantities and additional remarks.
- e. Site furnishings legend with symbol and description.

7.4.4 Architectural Drawings

Include the following:

- a. Architectural Site Plan.
- b. Demolition Plan.
- c. Floor Plans.

- d. Roof Plans.
- e. Exterior Elevations.
- f. Building Sections.
- g. Wall Sections.
- h. Room Finish Schedule.
- i. Large Scale Plans.
- j. Interior Elevations.
- k. Equipment Layouts.
- l. Reflected Ceiling Plan

7.4.4.1 Architectural Site Plan

Indicate new and existing buildings, structures, roads, parking, sidewalks, and site improvements. Identify all structures and site features. Provide campus plan(s) for multiple building developments.

7.4.4.2 Demolition Plans

For renovation work and additions to existing facilities, indicate existing construction, items to be removed or altered, and new work.

7.4.4.3 Floor Plans

Indicate all required spaces. Provide space identification, number, and function. Indicate all windows, doors, walls, partitions, moveable partitions, built-in equipment, and significant features of the facility. Indicate collateral equipment which affect the plan layout (such as trainers, machinery, etc.) or are necessary for accurate placement of utilities (such as laboratory tables, BEQ furniture, etc.). Indicate overall and critical dimensions.

7.4.4.4 Roof Plans

Indicate type of roof, direction of slopes, roofing type, access to roof, and mechanical and electrical equipment.

7.4.4.5 Exterior Elevations

Show all exterior elevations. Indicate height of floors, and major vertical dimensions. Indicate type and extent of finish materials.

7.4.4.6 Building Sections

Show sections through entire facility indicating floor and ceiling heights, major structural elements, and major equipment (such as flight trainers or other major equipment).

7.4.4.7 Wall Sections

Indicate wall sections including foundation and roof which illustrate and identify the construction elements and location. Indicate significant dimensions.

7.4.4.8 Room Finish Schedule

Indicate finishes of floors, bases, walls, partitions and ceilings for all spaces.

7.4.4.9 Large Scale Plans

Show enlarged plans of complex spaces (such as kitchens, laboratories, etc.) and typical spaces (such as BEQ, BOQ modules, etc.).

7.4.4.10 Interior Elevations

Show elevations of interior spaces. Indicate finishes, trim, shelving, and equipment. Indicate heights of cabinets, work surfaces, wainscots, and ceilings.

7.4.4.11 Equipment Layouts

Indicate and identify major furniture and equipment. Indicate items which are existing and relocated, new collateral equipment, or equipment provided by the Contractor.

7.4.4.12 Reflected Ceiling Plan

Show ceiling plan and identify grid systems, hard surfaces, light fixtures, smoke detectors, diffusers, and any special features.

7.4.5 Structural Drawings

Include the following:

- a. General Notes and Typical Details.

- b. Foundation Plan.
- c. Floor Framing Plan.
- d. Roof Framing Plan.
- e. Sections and Details.
- f. Elevations.
- g. Schedules.

7.4.5.1 General Notes And Typical Details

Include all loads: snow, roof and floor loads, wheel loads, seismic criteria, and wind loads. List any special loads such as crane loads and for other concentrated loads and, if necessary for clarity, provide a diagram. State dead, live and total allowable loads on the soils and corresponding loads actually used. List mooring and deck loads for waterfront structures. Include the application/location and units of measure for each load. Design data shall be separated from the General Notes. Material notes shall identify all materials used such as structural steel, concrete, masonry, etc.

7.4.5.2 Foundation Plan

Use the same scale and orientation as the architectural plans. Show the sizes, location and arrangement of all significant features of the foundation system. Include the layout of all slabs, footings, piers, grade beams, piles, caissons, pile/caisson caps, trenches, pits, openings, depressed and thickened slabs, etc. Provide a column-line grid system oriented about the axes, usually length and width, of the structure and along the center-lines of the major support columns and walls. Elevations may be given using any datum consistent throughout the structural drawings so long as the chosen datum is referenced to the true elevation. Show adjacent existing structures and foundations which will impact the new construction.

7.4.5.3 Floor And Roof Framing Plans

Orientation of framing plans shall match the foundation plan. Show the sizes, location and arrangement of all significant features of the horizontal framing system. Include the layout of all beams, joists, stringers, purlins, slabs, decks, plates, grating, etc. showing all dimensions and elevations necessary to fully describe the basic structural system. The elevations shall be referenced to some finished datum such as top of steel, slab, finished floor, concrete, joist, deck, etc. Special construction features and site conditions which have a significant impact on project cost shall be shown.

7.4.5.4 Elevations

Line drawings representing the lateral load resisting systems shall be indicated.

7.4.5.5 Sections And Details

Provide sufficient information to identify the types of material and methods of construction required such that a reliable cost estimate can be developed for the structure. All parts or pieces shall be identified and shown in sufficient detail to provide relationships to other structural/architectural features.

7.4.6 Mechanical Drawings

Provide a general layout of the systems proposed, including total loads and single-line drawings and schematic diagrams, showing general arrangement of mechanical equipment, piping, and ductwork. Include the following drawings (Additional description of these drawings is in paragraph-MECHANICAL 100% SUBMITTAL):

- a. Demolition Plans (when required).
- b. Plot or Site Plans (for projects with extensive external systems).
- c. Mechanical Plans.
- d. Schematic Diagrams.
- e. Equipment Schedules.
- f. Fire Protection system(s)

7.4.7 Plumbing Drawings

Provide a general layout of the systems proposed, showing the general arrangement of the fixtures, equipment, and piping. Include the following drawings (Additional description of these drawings is in paragraph PLUMBING 100% SUBMITTAL):

- a. Plot or Site Plans (for projects with extensive external systems)
- b. Plumbing Plans
- c. Isometric & Schematic Diagrams
- d. Fixture & Equipment Schedules
- e. Fire Protection System(s)

7.4.8 Electrical Drawings

Include the following:

- a. Notes, Legends, Symbol List.
- b. Existing Site and Demolition Plan.
- c. Site Plan.
- d. Single Line Diagrams.
- e. Floor Plan(s).

7.4.8.1 Notes, Legends And Symbols List

Electrical symbols shall conform to ANSI Y-32.3 and Y-32.9.

7.4.8.2 Demolition Plan

Include existing electrical site information such as buildings, pavements and utilities. Electrical demolition shall be shown on this drawing and indicated by legend. Demolished features should not be shown on subsequent drawings. Interior demolition shall be shown on a separate plan.

7.4.8.3 Site Plan

Show new and remaining aboveground and underground electrical equipment. When located in proximity to other utilities, all should be shown to avoid conflicts. Information on existing conditions shall be complete. Show circuits and feeders. Show conductor by size, number, voltage and type of insulation.

7.4.8.4 Single Line Diagrams

This plan shall show (including electrical characteristics and ratings) the following:

- a. Existing distribution to a point of connection.
- b. Primary feeder to project.
- c. Pad-mounted transformer or substation with primary and secondary switchgear.
- d. Secondary Feeders.

- e. All panels, switchboards, motor control centers, transformers and other major electrical loads such as M.G. sets, A/C chillers, etc.

7.4.8.5 Floor Plans

- a. Lighting Plan(s). Show a building's full floor plan (first, second, etc.). These plans shall show the layout and type of fixtures to be used for all types of lighting systems.
- b. Power Plan(s). Show a building's full floor plan (first, second, etc.). The power plans shall show the location of receptacles, panelboard(s), switchboards, motor control centers, transformers and any other major equipment throughout the inside of the building or project.
- c. Communication/Signal Plan(s). Show building's full floor plan (first, second, etc.) with the location of devices and hardware/accessories. These plans shall show the following:
 - 1. Telephone
 - 2. Intercom
 - 3. Local Area Networks (LAN)
 - 4. Closed Circuit Television (CCTV)
 - 5. Others as required
 - 6. Fire Protection System(s)

7.4.9 Fire Protection System(s)

Show existing and proposed fire alarm boxes and circuits. Show sizes of existing and proposed water mains, risers and fire hydrant locations. Show separation distance from adjacent buildings.

7.5 PROJECT DRAWINGS - 100 PERCENT SUBMITTAL

Project drawings shall be complete and camera ready for reproduction and advertisement with all elements thoroughly checked by the A-E. After all Quality Control checking is completed, the check-set with all correction marks, shall become part of the A-E's 100% submittal to the Command. Drawings and specifications shall contain the same terminology. **SOUTHWESTNAVFACENGCOM reserves the right to advertise and award the construction documents at the 100 percent submittal stage.**

7.5.1 Civil Drawings

Include the following:

- a. Existing Topography
- b. Demolition Plan
- c. Utility Site Plan (Including Fire Protection System(s))
- d. Plot Plan
- e. Grading Plan
- f. Paving Plan
- g. Plan and Profile
- h. Profiles
- i. Cross sections
- j. Dredging Drawings
- k. Details and Sections, Civil
- l. Painting and Striping
- m. Utility Systems Seismic Design
- n. Soils Boring Logs and Data

7.5.1.1 Existing Topography

Existing topography shall be the record of a field topographic survey performed by a licensed Land Surveyor on a proposed project site. The specific project limits shall be indicated. On sanitary and storm sewer lines, manholes, catch basins and clean-outs shall be identified and located. The utility line inverts shall be indicated.

7.5.1.2 Demolition Plan

- a. Indicate all existing structures, foundations, and pavements, including type, dimensions, and thickness, which will require demolition and removal prior to the new project construction. It is essential that the limits of removal be clearly identified and dimensioned, and a depth requirement established for all foundation removal.

Photographic reproductions of complicated buildings for structures to be demolished may be used to supplement drawings and notes for clarity.

b. Show buried tanks and structures like inlets and manholes that are not to be completely removed, but abandoned in place filled with sand.

c. Indicate **all existing utility lines (including Mechanical and Electrical)** to be removed or abandoned in place.

d. Indicate all existing trees and shrubs to be removed or saved.

e. Deposition of the demolished and removal material shall be clearly indicated. Material to be salvaged shall be identified and direction given by notes as to how and where it shall be stored or deposited. Asbestos and other hazardous materials at the site shall be identified and a safe removal-disposal plan developed.

7.5.1.3 Utility Plan

Sanitary and storm sewer lines shall have invert and top elevations indicated at all manholes, catch basins and curb inlets. All significant appurtenances shall be identified including Fire Protection System, by symbol and/or noted. Indicate new fittings to make proper connections. Indicate related features.

7.5.1.4 Site Plan

The site plan shall be drawn to the same scale and orientation as the existing topography plan. Locate and dimension all new structures, buildings, walks, parking areas, roads, etc., by coordinates, dimension offsets from a horizontal control base line or stationing, and offsets from a road centerline. Road and railroad alignment shall indicate stationing, centerline tangent bearings, and curve data. Major new utility supply lines routing shall be indicated by tangent distances and bearings along the centerline of the pipe. Project limit lines shall be clearly delineated showing contractor's area of responsibility; the contractor's office area, storage and lay-down areas. Where new project work interfaces with existing facilities within the site, the new work shall be clearly delineated by heavy outline, symbols, and/or notes.

7.5.1.5 Grading Plan

The grading plan shall show earthwork, indicate daylight line between cut and fill embankments, excavations, select borrow fills, ditches and swales, and surface elevations of pavement areas, curbs, culverts, catch basins, and manholes to present an adequate surface drainage plan and storm drainage system for the entire project site. Erosion and sediment control measures shall be indicated. Identify all buildings, structures, pavement areas and note pavement types. The plan shall be of the same orientation and scale as the existing topography plan. The surface runoff pattern shall be indicated by finish grade

contours, using heavy solid lines at one foot intervals with storm drainage flow arrows along earth swales and irregular pavement surfaces. Provide complete retaining wall details including graded filter material and provisions for drainage. Provide the finish elevations at all corners and grade breaks for all buildings and concrete slabs and indicate the top elevation and inverts of all drainage structures. Additional spot elevations shall be provided along ditches at culvert inverts and at all other critical surface positions to clearly indicate surface runoff. Indicate the limits of grading. Indicate the location of the disposal or borrow area and hauling routes. Location of test pits may be shown on this plan. Spot elevations on the ground shall be shown to the nearest tenth of a foot and those on structures or pavements to the nearest one-hundredth of a foot. The vertical control benchmark, shown on the existing topography plan, shall be repeated on this plan.

7.5.1.6 Paving Plan

Orient and scale the paving plan the same as the plot/site plan. The pavement plans shall show the location, limits, and alignment of all airfield pavements, parking areas, storage areas, roads, curbs and gutters, walks and patios. Pavement surface, base course, sub-base course materials and thickness shall be indicated by note and legend symbol. Earth shoulder and subgrade preparation and compaction requirements shall be indicated by note. Rigid pavement layout shall indicate the joint pattern, identifying the type of joint by line or note symbol. Design surface elevations shall be indicated around the perimeter, and along all construction joints at slab corners at 75' to 100' intervals, or more often, as may be required, to reflect changes in grade. Transition pavements and fillets on airfield pavements or road intersections will require additional surface elevations to establish the transition grades or warped surfaces. Steel reinforcement or temperature steel location, sizes and spacing shall be indicated by note, symbol or enlarged detail on the same drawing or on a detail drawing. All embedded structures or items such as manholes, pits, tie-downs, ground receptacles, etc., shall be indicated and their effect on the standard joint pattern shall be shown. Design wheel loading for airfield and roadway pavements, grating and covers shall be noted. Design surface elevations for flexible pavements shall be indicated around the perimeter, at curb inlets and catch basins, and at locations within the paved area to reflect changes in grade. Crowned road pavements shall have surface elevations indicated along the roadway centerline and along both edges. Super-elevation diagrams shall be shown for the curved road. Sidewalk and patio pavements shall indicate the joint pattern, set at grade of control curb or building line or conform to adjacent topography, and shall indicate a design transverse slope to assure free-draining surface. Typical cross-sections of all pavement design sections on the project shall be shown on the paving plan or shown on a detail drawing and cross-referenced. Special pavement details including joint details, steel reinforcement, tie-downs, grounding receptacles, curb or curb and gutter sections, new pavement abutting existing pavement, etc., may be shown on the paving plan or shown on a detail drawing and cross-referenced.

7.5.1.7 Plan And Profile

Where the new facility or utility involves a long linear strip of topographic area, special preprinted "Plan-Profile" sheets may be used. The plan view shall be stationed from left to right, complete with a given starting station and ending station, widths, and all topographic features indicated. The grade profiles shall be indicated on the grid section of the sheet, stationed similarly from left to right, and shall cover the same length of facility/utility as the plan section. Where several sheets are required, a "match line" shall be shown on both adjacent sheets and clearly identified for continuity.

7.5.1.8 Profiles

Profiles shall be clearly identified and cross-referenced to the road or utility on the plot plan. The scale for profiles shall generally have a ratio of 10:1 horizontal to vertical. The horizontal scale shall be the same as the site plan. On the profiles drawing:

- a. Show profiles for all sanitary and storm sewers. For storm sewers serving tributary areas of ten (10) acres (4 hectare) or more or any pipe 12" (30mm) in diameter (30mm) or greater under pressure flow, show hydraulic grade lines.
- b. Indicate the existing and finish grade, all manholes and catch basins, invert elevations, stationing of all appurtenances, the slope of the pipe between appurtenances, clearly indicating the invert (flow line) and top of the new utility pipe.
- c. Show profile for water mains or transmission lines indicating valve boxes and other appurtenances located by stationing.
- d. Show profiles for centerlines, edges, and ditch lines of roads, runways, and taxiways, complete with stationing and vertical curve information for changes in grade.

7.5.1.9 Cross Sections

- a. Show for all new roads, runways, taxiways, and pier aprons; and for all reconstructed roads, runways, and taxiways where the reconstructed grade varies substantially from the existing grade.
- b. Surface and base course scarification, regrading and recompacting to restore original grade and section, will not require cross sections.
- c. Show the cross-section of all intersecting existing and/or new utility lines or culverts to indicate possible interferences of one utility to another, or indicate amount of cover over pipes or culverts.
- d. Cross sections shall be:

1. Provided for all site areas where substantial excavation, embankment, or engineered fill is intended; or where airfield approach-departure clearances are shown.
 2. Taken normally at every Station in 100 foot intervals (30m) with additional sections taken in between at grade breaks or other topographic irregularities which would cause inaccuracies in earthwork quantity computations.
 3. Plotted starting with Sta. 0+00 at the lower left hand corner of the drawing, and proceed up and to the right with increasing stationing.
 4. Plotted normally at a vertical scale of 1" = 2' and horizontal scale of 1" = 10' (1:100) or 1" = 20' (1:200), and the centerline and edges finish grade elevation indicated at each Station.
 5. Taken at 50' (15m) or closer for pavement widening and repair projects where a smooth join with existing finished surfaces is required.
- e. Special sections traversing the entire facility site, at typical locations or at right angles to each other, are sometimes required to clearly indicate the required work where the building foundations are set on or within engineered fill, or unusual grading problems are encountered.

7.5.1.10 Dredging Drawings

The limit of dredging shall be depicted by the contract dredging depth contour and any limiting waterfront structure. Dredging drawings will normally consist of the hydrographic survey plans and the dredging sections and details.

- a. The hydrographic survey plan will show:
 1. Waterfront area.
 2. Limits of dredging.
 3. Contract dredging depth and overdredge allowance.
 4. Channel widths.
 5. Existing piers, wharves, docks, quaywalls, groins, breakwaters, and any other waterfront structure which might limit or control the dredging operations.
 6. Soundings depicting the elevations below MLLW of the channel or harbor at every Station (100' interval) (30m) or half-Station (50' interval) (15m) along

a pier line or base line, and at a 25' interval (7.5m) in a transverse direction. Where soundings are obtained with an automatic continuous recording fathometer, the 25' interval (7.5m) is not applicable. Additional soundings shall be taken in critical areas, and in areas of irregular bottom conditions, high or low spots, or any artificial sunken obstruction.

7. Horizontal control points and vertical control benchmarks shall be indicated.

8. Soil test borings locations.

9. Disposal site.

10. Dredging phasing sequence.

11. All referenced horizontal and vertical control points and datum.

b. The dredging sections and details drawing shall show:

1. Cross-sections or typical sections as the project might require.

2. MLLW line.

3. Existing seabed (mudline).

4. Contract dredging depth.

5. Overdredge allowance depth.

6. Pay depth.

7. Design side slope against piers or along the perimeter of the dredging area.

8. Any special sloping.

9. Rip-rapping and/or pier modification related to the dredging.

10. Subsurface buried cable or other utility line requiring special care in the dredging operation.

7.5.1.11 Details And Sections, Civil

Show at an adequate scale and sufficiently annotated to clearly define the work intended. Whether the details and sections are indicated to be to scale, or labeled not to scale

(N.T.S.), they shall be drawn proportionally so as not to give a distorted view of what is intended. All details and sections shall be clearly identified and cross-referenced to the plan showing their location.

- a. Details should include, but not limited to, manholes, catch basins, inlets, pipe bents and connections, fire hydrants, valve boxes, underground tank installation, pavement reinforcement and joint details, curbing details, fencing details, and all special installation features.
- b. Sections should include, but not limited to, all typical roadway sections, pavement sections, ditch sections, dike sections, trenching sections, etc.

7.5.1.12 Painting And Striping

Pavement (road and airfield) and parking area painting and striping locations, pattern and detail can be shown on the site plan or paving plan for many small to average sized projects. However, when the facilities requiring painting and striping are of such magnitude that they would clutter up another drawing, they may be presented on a separate drawing. All markings, raised markers, figures, and stripes shall be clearly located by dimensions, and the width of stripes and spacing of dashed lines clearly indicated. Special arrows, crosswalks, lettering on the pavement surface, and special symbols shall be detailed and fully dimensioned. The type and color of the markings should be identified, such as reflectorized or non-reflectorized traffic paint, yellow, red or white.

7.5.2 Landscape Architecture

Include the following:

7.5.2.1 Landscape Architecture Plan

- a. Landscape dimensioning and layout. Indicate point of beginning.
- b. Detail referencing.
- c. Fencing, signage and playground layout.
- d. Landscape drainage layout (i.e., piping and sizing, direction of flow, slope of pipe, all catch basins/drain inlets and all invert and rim elevations). Indicate connections to existing storm drain systems or outfall areas.
- e. Site legend including symbols, descriptions, finishes, material types, color and quantity.

7.5.2.2 Irrigation Plan

- a. Irrigation plan shall be on a separate sheet, but at the same scale as the planting and landscape construction plans. Minimum scale size shall be 1"=20'-0", 1:2000.
- b. Piping (main, lateral and sleeving) layout and sizing. Show distinct symbols for potable and non-potable pressure and non-pressure existing and new irrigation lines, and supply lines. Include these symbols in the irrigation legend.
- c. Irrigation head/emitter module layout, both existing and proposed.
- d. Valve (standard control, drip assembly, isolation, gate, ball and quick coupler) layout, sizing and sequencing. For each standard control and drip assembly valve include total flow (GPM or GPH). For drip assembly valves, indicate pressure regulator setting.
- e. Point of connection location, size, type of line and static PSI availability.
- f. Size and location of reduced pressure backflow preventer/water meter/pressure regulator/wye strainer assembly.
- g. Location, size and type of controller and location of power source for controller.
- h. Location and size of water pump.
- i. Location of in line swing and/or spring check valves.
- j. Location of automatic drain valves for drip irrigation systems only.
- k. Location of soil moisture sensors and/or rain shut off device(s).
- l. Location of separate drinking fountain potable water line. Coordinate connection to sewer line (if applicable).
- m. Irrigation legend indicating symbols, psi, gpm/gph, radius, pattern, nozzle size, descriptions and detail reference.
- n. Irrigation installation notes.

7.5.2.3 Planting Plan

- a. Locations of trees, shrubs, vines, groundcovers and lawn area.
- b. Location of lawn and playground edging material.

- c. Exact location of aboveground utilities (i.e., fire hydrants, electrical transformer, TV cable box(es), telephone and electrical poles, overhead wires, sewer and water manholes, steam lines, street lights, gas handholes, etc.).
- d. Existing plant materials/site furnishings to remain. Use dashed outline symbols to represent these elements.
- e. Plant legend with common and botanical name, symbol, size, quantities, detail reference, additional remarks, turf and/or wildflower seed mix, germination rate and slurry composition, erosion control blanket type and drip emitter quantities/GPH output for each plant type.
- f. Separate site furnishings legend with symbol, finishes, textures, material type, color, quantity and description.
- g. Planting installation notes.
- h. Coordinate site features (i.e., new or existing walkways, building pads, utilities and roadways) with other disciplines for accuracy of layout.

7.5.2.4 Irrigation Details

Show adequate irrigation details to enable the contractor to properly assemble, install and attach all irrigation equipment and piping that are indicated on the plan(s). Key the details to the other drawing(s) using the bubble system described in section 7 under “detail identification”.

7.5.2.5 Planting, Site Furniture, And Drainage Details

Show adequate planting, drainage and site furniture details to enable the contractor to properly fabricate, assemble, install and attach drainage equipment and piping, site furniture and plant materials that are shown on the plan(s). Key the details to the other drawing(s) using the bubble system described in section 7 under “detail identification.”

7.5.3 ARCHITECTURAL DRAWINGS

Include the following:

- a. Architectural Site Plan.
- b. Demolition Plan (when required).
- c. Floor Plans (1/8" scale, 1:100 minimum).

- d. Reflected Ceiling Plans (same scale as floor plans).
- e. Roof Plans (same scale as floor plans).
- f. Exterior Elevations.
- g. Building Sections.
- h. Wall Sections.
- i. Room Finish Schedule (with color schedule).
- j. Door and Window Schedule.
- k. Large Scale Plans ($\frac{1}{4}$ ", 1:50 scale minimum for toilet rooms, laboratories, control rooms, and other special activity areas).
- l. Interior Elevations ($\frac{1}{4}$ ", 1:50 scale minimum).
- m. Door and Window Details (3", 1:5 scale minimum).
- n. Miscellaneous Details.
- o. Equip. Layouts & Schedules (for medical, kitchen, shop equip., etc.).

7.5.3.1 Architectural Site Plan

Indicate new and existing buildings, structures, roads, parking, sidewalks, and site improvements. Identify all structures and site features. Provide campus plans for multi-building developments.

7.5.3.2 Demolition Plans

For renovation work and additions to existing facilities, indicate existing construction, items to be removed or altered, and new work.

7.5.3.3 Floor Plans

Indicate all required spaces. Provide space identification, function/capacity and room number. Indicate all doors, windows, moveable partitions and their identifying symbols. Indicate wall, partitions, structure, built-in equipment/collateral equipment. Identify sections and locations of enlarged plans. Indicate required dimensions and gross area of floor.

7.5.3.4 Reflected Ceiling Plans

Indicate type and extent of ceiling materials. Indicate electrical fixtures, HVAC diffusers, openings, equipment, special features.

7.5.3.5 Roof Plans

Indicate type of roof, direction of slopes, parapets, expansion and isolation joints, roof drains, scuppers, sky lights, mechanical and electrical equipment, and curbs for any roofing membrane penetration. Indicate sections cut and required dimensions.

7.5.3.6 Exterior Elevations

Show all exterior elevations. Indicate height of floors, and vertical dimensions. Indicate type and extent of finish materials. Indicate swing/direction of movement for windows and doors.

7.5.3.7 Building Sections

Show sections through entire facility. Indicate floor and ceiling heights, structural elements, exposed wall surfaces and major equipment.

7.5.3.8 Wall Sections

Indicate wall sections including foundation and roof construction where applicable. Illustrate and identify materials and locations. Indicate all required dimensions.

7.5.3.9 Room Finish Schedule

Indicate finishes of floors, bases, walls/partitions, cabinets, trim, ceilings, ceiling heights, and special requirements for all interior spaces. Include color schedule for all finish materials.

7.5.3.10 Door And Window Schedules

Indicate all doors, windows, and folding partitions. Indicate door and frame type, size, thickness, fire-rating, louvers, hardware, glazing and special requirements. Include elevations of doors, frames, windows and partitions.

7.5.3.11 Large Scale Plans

Show enlarged plans of complex spaces (such as kitchens, laboratories, control rooms). Indicate built-in/collateral equipment, special requirements. Provide required dimensions.

7.5.3.12 Interior Elevations

Provide elevations of interior spaces. Indicate finishes, trim, cabinets, shelving, built-in/collateral equipment. Indicate heights of cabinets, work surfaces, wainscots, trim, and ceilings. Indicate mounting heights of all equipment accessories.

7.5.3.13 Door And Window Details

Show head, jamb, and sill details of all windows and doors. Indicate frames, anchorage, glazing, sealants, all special requirements.

7.5.3.14 Miscellaneous Details

Show details of all cabinets, partitions, accessories, built-in equipment and special requirements.

7.5.3.15 Equipment Layouts

Provide plans of all collateral and contract equipment. Provide schedule indicating responsibility for purchase, removal, shipping, receiving, installing and testing of all equipment.

7.5.3.16 Ceiling Systems

Support and seismic restraint of ceilings systems shall be detailed. Details must include diagonal splay restraints and compression struts.

7.5.4 Structural Drawings

Include the following:

- a. General Notes and Typical Details.
- b. Foundation Plan.
- c. Floor Framing Plan.
- d. Roof Framing Plan.
- e. Elevations.
- f. Sections and Details.
- g. Schedules.

h. Other Drawings.

7.5.4.1 General Notes And Typical Details

- a. Design criteria, design loads, allowable stresses, material properties and reference standards.
- b. Material notes such as structural steel, concrete, masonry, etc.
- c. Bid information such as pile/caisson lengths, excavation depths, footing elevations, etc.
- d. Special test requirements.
- e. Abbreviations and symbols.
- f. Construction details that are applicable to significant portions of the design, and that can readily be identified by a referenced section cut(s).

7.5.4.2 Foundation Plan

- a. Layout of foundation support systems showing all dimensions and elevations necessary for construction. The foundation plan must be fully dimensioned without reliance on dimensions located on other drawings.
- b. Size or schedule references for all foundation features such as footings, grade beams, piles, caissons, pile/caisson caps, etc.
- c. Control/expansion/construction isolation joints in slabs, walls and grade beams.
- d. Trenches, pits, openings, depressed/thickened slabs.
- e. Test pile/caisson locations.
- f. Existing and final site conditions/features.
- g. Indicate bearing walls, columns, dowels, straps, holddowns, etc.

7.5.4.3 Floor And Roof Framing Plans

- a. Layout of horizontal framing elements showing all dimensions, orientation, grid lines and elevations necessary for construction.

- b. Size or schedule references for all horizontal framing elements such as beams, joists, purlins, slabs, headers, decks, grating, etc.
- c. Control, expansion, and construction joints.
- d. Openings requiring special framing or reinforcing.
- e. Location of splices, brackets, penetrations, sleeves, embedments, bracing, weldments, etc.
- f. Other special requirements, such as equipment clearances, travel distances for hoists and cranes, etc.
- g. Catwalks, ceiling framing lower chord bracing and other intermediate level framing shall generally be shown on separate framing plans.
- h. Show diaphragm reinforcing, diaphragm chords and diaphragm truss layouts.
- i. Indicate locations of special connection and special reinforcing.
- j. Indicate locations of vertical lateral load resisting elements.
- k. Identify collector (drag) members and detail special connections to transfer drag loads between elements.

7.5.4.4 Elevations

- a. Layout of vertical framing elements showing all dimensions, orientations and elevations necessary for construction.
- b. Size or schedule references for all vertical framing elements such as columns, walls, piers, beams, bracing, etc.
- c. Wall panel layouts including control/expansion/construction joints.
- d. Openings requiring special framing or reinforcing.
- e. Location of splices, brackets, penetrations, sleeves, embedments, bracing, weldments, girts, lintels, headers, etc.
- f. Other special requirements such as equipment clearances, travel distances for hoists and cranes, etc.

7.5.4.5 Sections And Details

- a. Sections and details showing all parts, shapes, sizes, materials, dimensions, elevations, arrangement and orientation necessary for construction.
- b. Schedule references for fasteners, welds, plates, clips, ties, stirrups, pins, etc.
- c. All connections completely detailed to a point where no further engineering is necessary.
- d. Concrete/masonry wall reinforcement details showing size, clearances, placement, shape, etc. Also show shear wall boundary element and boundary zone detailing.
- e. Anchor bolts, base plates, bearing plates, showing materials, sizes, welds, embedments, projections, reference elevations, etc.
- f. Shear transfer details between elements of the lateral load resisting system clearly defined.

7.5.4.6 Schedules

Schedules for beams, columns, lintels, joists, trusses, frames, piles, caissons, footings, pile/caisson caps, pile/caisson capacities/loads (vertical and horizontal), grade beams, slabs, connections, bracing, etc.

7.5.4.7 Other Drawings

Layout of structural systems for special fabrications and construction such as space trusses/frames, long span trusses, post- and pre-tensioned systems, shells, towers, fabric structures, etc.

7.5.4.8 Seismic Anchorage Of Pipes, Ducts And Equipment

The project drawings shall explicitly detail the support and seismic anchorage and restraint for all equipment that exceeds 400 lbs (180 kg) and building/utility systems. Where it can be shown that unrestrained movement can be tolerated without damage to equipment or system elements, restraint need not be provided.

- a. Details shall include the size and embedment of bolts and anchors as well as sizes and connections for structural support elements.
- b. Suspended equipment shall be supported from structural members, rather than from floor or roof decks.

- c. Stud walls supporting equipment shall be provided with multiple studs and backing plates.
- d. If precise dimensions and weights of equipment are unknown, anchorage details shall be based on the best knowledge available, and may be modified during construction if original assumptions prove to be invalid.
- e. Support and restraint of pipes, ducts and conduit of moderate size may be in accord with the SMACNA "Guidelines for Seismic Restraints of Mechanical Systems and Plumbing piping systems" or with another approved set of seismic restraint guidelines.
- f. Where external vibration isolators are used on equipment, the isolators must be anchored to resist seismic lateral forces.
- g. Where equipment is placed on computer access floors, the equipment must be anchored through the access floor to the structural floor below, unless the access floor system is specifically designed to resist the horizontal and vertical equipment forces.
- h. If it is known that equipment shop drawings will provide seismic anchorage details and that the construction price will include the cost of such anchorage, the anchorage need not be detailed on the project drawings, if a statement is made on the drawings that anchorage will be per approved shop drawings.

7.5.4.9 Precast Concrete Wall Panels

Precast concrete wall panels used as lateral load resisting elements shall be designed as independent elements with no forces transfer across joints.

7.5.4.10 Metric Reinforcing Steel

For projects that use metric dimensions (S.I. units) reinforcing steel must be sized as soft metric conversions of inch-unit bars, i.e. #10, #13, #16, #19, #22, #25, #29, #36, #43, or #57.

7.5.4.11 Design Wind Pressure

- a. The minimum wind velocity to be used in design shall be 80 mph (130 km/hr) per MIL-HDBK 1002/2.
- b. Within ¼ mile (400 meter) of the shoreline, all wind designs shall be based on exposure "D" forces per U. B. C. section 1614 and Table 16-f. Wind Design for inland locations may be based upon exposure "C", if such an assumption is justified.

7.5.4.12 Moisture Content

- a. Dimension lumber shall have a maximum moisture content of 19 percent when delivered to the job site.
- b. Lumber with minimum nominal dimensions of 5 inches or greater may have a maximum moisture content of 25 percent when delivered to the job site.

7.5.4.13 Roof Investigations

- a. Roofing investigations shall include examination of equipment, support and anchorage of all roof mounted equipment. When reroofing has occurred, existing equipment that is not properly secured, shall be re-anchored.
- b. If a new roof is installed, that weighs more than the replaced roof, the capacity of the affected framing members shall be checked, and if members are over stressed, it shall be reinforced.

7.5.5 Mechanical Drawings

Include the following:

- a. Demolition Plans (when required).
- b. Plot or Site Plans.
- c. Large Scale Plot or Site Plan.
- d. Mechanical Plans.
- e. Large Scale Mechanical Plans.
- f. Elevations and Sections.
- g. Details.
- h. Isometric and Schematic Diagrams.
- i. Control Diagrams.
- j. Sequence of Operations.
- k. Equipment Schedule.
- l. Equipment Seismic Anchorage.

7.5.5.1 Demolition Plan

- a. Demolition shall be shown on a separate plans.
- b. Indicate equipment, ductwork and piping to be demolished including type of material, sizes or dimensions.
- c. Hazardous material such as asbestos and lead paint shall be identified and quantified

7.5.5.2 Site Plan

Required for projects with extensive external mechanical systems, such as power plants, central heating plants, and steam distribution systems. Site Plans shall:

- a. Be drawn to as large a scale as possible, providing the scale is adequate to show initial installation and future maintenance. Scale shall not be smaller than 1"=50', 1:500.
- b. Show all new utility systems, existing systems, and points of connection.
- c. Show all new and existing structures.
- d. Show dimensions of new systems from a permanent reference point on the project site.
- e. Profiles shall be plotted on the same sheet and directly underneath the plan for all outside underground mechanical piping systems. Indicate invert elevations, slopes, and finish grades.

7.5.5.3 Large Scale Site Plans

Provide when outside mechanical systems are so extensive as to preclude their indication at a reasonable scale on a single plan. In this case, the Plot Plan shall serve as a Key Plan.

7.5.5.4 Mechanical Plans

Provide for each floor, as well as for foundation, attic, and roof spaces containing equipment ductwork and or piping. Mechanical Plans shall:

- a. Be drawn at a scale not less than $1/8"=1'0"$, 1:100, . All ductwork shown in double line to scale.
- b. Include legends, notes, etc. to assure clarity.
- c. Show provisions for controlling expansion and anchoring of piping and ductwork.
- d. Not combine HVAC work with Plumbing system work without the specific approval of the PL.

7.5.5.5 Large Scale Mechanical Plans

Provide for Mechanical equipment rooms. Large Scale Mechanical Plans shall:

- a. Be drawn at a scale of $3/8"=1'0"$, or $1/2"=1'0"$, 1:25.
- b. Include equipment in the room drawn to scale.
- c. Include piping in the room over 3", 750 mm diameter drawn to scale using double lines; piping 3", 750 mm and less can be shown single line.
- d. Identify (using dashed lines for example) adequate space for maintenance, including removal of tube bundles, etc.

7.5.5.6 Elevations/Sections

Provide when vertical dimensions and/or potential interferences are significant in the design. The scale of the elevation/section shall be large enough to clearly show the characteristics of the system, and to allow accurate take-offs of vertical lengths and fittings.

7.5.5.7 Details

Show adequate details to enable the contractor to properly fabricate, assemble, install, attach, and suspend the equipment and piping that is shown on the plans, sections and elevations. Key the details to the other drawings using the bubble system described elsewhere in this chapter.

7.5.5.8 Isometric And Schematic Diagrams

Include piping, equipment configurations, flow direction, and connection points. The scale of the diagrams shall permit easy tracing of the fluid (liquid and gaseous) flow paths.

7.5.5.9 Control Diagrams

- a. Indicate the function of the control systems involved.

- b. Identify the type of controls (pneumatic, electronic, DDC).
- c. Clearly show the limits of the system and the items being controlled.
- d. Be coordinated with the Electrical drawings as well as the Mechanical drawings to ensure all of the electro-mechanical devices function together.

7.5.5.10 Sequence Of Operation

Provide a complete, step by step, written sequence of operation explaining the control system logic. It is preferred that this sequence be shown on a drawing next to the control diagram, however, it may be shown in the specification. The sequence of operation shall:

- a. Be consistent with the control diagram.
- b. Identify values for the set points (for start-up, normal running conditions, shutdown, etc.)
- c. Define emergency conditions and procedures.

7.5.5.11 Equipment Schedules

Show separately and include:

- a. Name, location, and identifying symbol of each major piece of equipment.
- b. Engineering data (flow, pressure, temperature, special operating conditions, etc.). Note: this information need not be totally complete at the 45% submittal.
- c. Electrical requirements for equipment requiring electrical power (voltage, amperage, phase, frequency, horsepower, etc.).

7.5.6 Plumbing Drawings

Include the following:

- a. Demolition Plans (when required).
- b. Plot or Site Plans and Profiles.
- c. Large Scale Plot or Site Plans.

- d. Plumbing Plans.
- e. Large Scale Plumbing Plans.
- f. Elevations and Sections.
- g. Details.
- h. Isometric and Schematic Diagrams.
- i. Equipment Schedule.
- j. Seismic Anchorage for Equipment.

7.5.6.1 Demolition Plan

- a. Demolition shall be shown on a separate plans.
- b. Indicate equipment and piping to be demolished including type of material, sizes or dimensions.
- c. Hazardous material such as asbestos and lead paint shall be identified and quantified

7.5.6.2 Site Plan

Plumbing systems, such as central domestic hot water plants. Site Plans shall:

- a. Be drawn to as large a scale as possible, providing the scale is adequate to show initial installation and future maintenance. Scale shall not be smaller than 1"=50' or 1:500.
- b. Show all new utility systems, existing systems, and points of connection.
- c. Show all new and existing structures.
- d. Show dimensions of new systems from a permanent reference point on the project site.
- e. Profiles shall be plotted on the same sheet and directly underneath the plan for all outside underground piping systems.
- f. Indicate invert elevations, slopes, and finish grades.

7.5.6.3 Large Scale Site Plans

Provide additional large scale Site/Plot Plans where outside plumbing systems are so extensive as to preclude their indication at a reasonable scale on a single plan. In this case, the Site Plan shall serve as a Key Plan.

7.5.6.4 Plumbing Plans

Plumbing Plans are required for each floor, as well as for foundation, attic, and roof spaces containing equipment and or piping. Plumbing Plans shall:

- a. Be drawn at a scale not less than $1/8"=1'0"$, 1:100.
- b. Include legends, notes, etc. to assure clarity.
- c. Show provisions for controlling expansion and anchoring of piping.
- d. Not combine HVAC work with Plumbing system work without the specific approval of the PL.

7.5.6.5 Large Scale Plumbing Plans

Large scale Plumbing Plans shall be submitted for equipment rooms. Large scale plans shall:

- a. Be drawn at a scale of $1/2" = 1'0"$, or 1:20.
- b. Include equipment in the room drawn to scale.
- c. Include piping in the room over 3", 750 mm diameter drawn to scale using double lines; piping 3", 750 mm and less can be shown single line.
- d. Identify (using dashed lines for example) adequate space for maintenance, including removal of filters, chlorinators, etc.

7.5.6.6 Elevations/Sections

Provide elevations and/or sections where vertical dimensions and/or potential interferences are significant in the design. The scale of the elevation/section shall be large enough to clearly show the characteristics of the system, and to allow accurate take-offs of vertical lengths and fittings.

7.5.6.7 Details

Show adequate details to enable the contractor to properly fabricate, assemble, install, attach, and suspend the equipment and piping that is shown on the plans, sections and elevations. Key the details to the other drawings using the bubble system described elsewhere in this chapter.

7.5.6.8 Isometric/Schematic Diagrams

Isometric and/or schematic diagrams showing the piping and equipment configurations, flow direction, and connection points shall be included. The scale of the diagrams shall permit easy tracing of the fluid flow paths.

7.5.6.9 Equipment Schedules

The Equipment Schedules shall be shown separately and shall include:

- a. Name, location, and identifying symbol of each major piece of equipment.
- b. Engineering data (flow, pressure, temperature, special operating conditions, etc). Note: This information need not be totally complete at the 45% submittal.
- c. Electrical requirements for equipment requiring electrical power (voltage, amperage, phase, frequency, horsepower, etc.)

7.5.7 Electrical Drawings

Include the following:

- a. Notes, Legends, Symbol List.
- b. Demolition Plans.
- c. Site Plans.
- d. Floor Plans.
- e. Diagrams.
- f. Schedules.
- g. Details, Sections, Elevations.

7.5.7.1 Notes, Legends, And Symbols List

Electrical symbols shall conform to ANSI Y-32.2 and Y-32.9

7.5.7.2 Demolition Plan

Identify electrical work to be demolished.

7.5.7.3 Site Plan

Show new overhead and underground power, street lighting, communications, fire alarm loop system, utility power supply, emergency power supply and distribution systems. Show the relationship of the work in a building with distribution and services to the outside area.

- a. Utility Power Supply. Show the source, the voltage, phase and type of system (delta or wye) and if grounded or ungrounded, the number and size of conductors and if single or three-phase.
- b. Emergency Power Supply. Show all mechanical and electrical items necessary for satisfactory operation. The electrical details shall indicate the number of units, the capacity of each in KVA, voltage, phase and type of system. The method for starting and transferring load shall be indicated. The ratings of transfer switch, circuit breaker and wiring shall be noted on the drawings.
- c. Underground Installation. Show installation and indicate if the cables are direct burial or in ducts. Show cross sections of each different condition. Plans and sections shall indicate all construction in vaults, manholes and handholes. Required sump pumps or drains shall be indicated. Spare ducts shall be stubbed out for future use from all vaults, manholes and handholes. Indicate location of splices, terminators, cutouts, etc. Indicate cable number, use, size, number of conductors, insulation type and voltage rating for each cable. Show duct bank profiles.
- d. Overhead Installations. Locate on the site plan with notations indicating system voltage; size of conductors; location, size and type of transformer banks; pole line switches; lightning protection; and grounding. Elevations, details and material lists shall be provided to identify and describe poles, height, class, cross arms, pole line hardware, transformer mounting and separation. Cross arm details shall include length, size, and number of pins.

7.5.7.4 Floor Plans

In addition to the 45% submittal requirements include the following:

- a. Intrusion Detection System (IDS).
- b. Any other special connections to outside systems.
- c. Locations of entering conduits and service racks.
- d. Circuits and feeders.
- e. Conductor by size, number, voltage and type of insulation.
- f. Conduit size and type.
- g. Telecommunication System.
 - 1. Circuits
 - 2. Conductors/cable by size, number, voltage, and type of insulation.
 - 3. Conduit size and type.

7.5.7.5 Diagram

- a. Riser Diagram. Detail communication/signal systems, the interconnection between panels and equipment, and connection to supply. Notations shall indicate the use, rating and location of panel and equipment.
- b. Single-Line Diagrams. Use this type of diagram to simplify understanding of power. Use single lines and simplified symbols to indicate the course and component devices or parts of the electrical circuits.
- c. Full-Line Diagram. Show all phases or polarities of the electrical system such as generator and transformer windings, busses, feeder circuits, distribution branch circuits, control circuits, and all switching-control-relay-metering equipment. Label and indicate size of equipment, busses and conductors, etc.
- d. Relay and Control Circuits Diagrams. Show in straight line without regard for physical relationships, all circuits and devices, elements of any equipment and its associated apparatus. Where the circuit function is inherently in a definite sequence, the sequence shall be indicated.

- f. Process and Instrumentation Diagrams. Include process and instrumentation diagrams to indicate the extent of instrumentation and automation.

7.5.7.6 Schedules And Tables

Identify circuits, protective devices, ratings, loads, phasing, controls, instrumentation, and other pertinent information concerning the installations.

- a. Panelboards. Include breakers for feeders and branches of suitable rating. Indicate if cabinets are flush or surface type. In a table indicate location of panel, circuit breaker number, use, load, breaker size and type; a column of this table may be used to describe feeder and branch circuit wiring.
- b. Lighting Fixtures. Show with approximate dimensioned sketches and description; this shall include the method of hanging and mounting height. Include aligners, special disconnecting fittings or ballasts. If the fixture is modified, supply a detail and notes to convey the description so that the desired item is in no way limited to one manufacturer.
- c. Special Equipment. Identify by a symbol with a number and/or name. Indicate electrical ratings and include data to indicate the type and size. Projects involving the installation and interfacing of special equipment or providing services to such equipment shall be detailed to final termination point indicating clearly where work of others begins. Provide a schedule keyed to the floor plan(s) to identify all Government furnished equipment.

7.5.7.7 Sections And Details

- a. Show location, state size and type and indicate all necessary construction data for transformers, breakers, switches, cutouts, voltage regulators, cubicles, feeders, control wiring, lightning protection, potheads, and lighting fixtures. Detail connections to power supply, feeders and grounds.
- b. Substations and switchgear installations shall include plans, details, elevations, and diagrams that show and describe all meters, instrument transformers and controls, remote or local. Show all connections to grounds, existing facilities or to equipment supplied by others. Show future expansion.
- c. Show seismic anchorage details for the attachment and anchorage of all electrical equipment and fixtures.

7.5.8 Cathodic Protection

Include the following:

- a. Notes, Legends and Symbols List.
- b. Site Plan.
- c. Diagrams.
- d. Details & Sections.

7.5.8.1 Site Plan

Show all existing and proposed cathodic protection systems. Show all metal structures to be protected by new Cathodic Protection Systems. Include the source, voltage, phase. Show location of handholes.

7.5.8.2 Diagrams

Detail the interconnection between panels and equipment and connection to supply. Label and indicate size of equipment and conductors and show electrical ratings.

7.5.9 Fire Protection Drawings

7.5.9.1 Water Distribution

Location and size of existing or new sprinkler system supply mains, new fire hydrants, valves, sprinkler risers, etc.

7.5.9.2 Fire Rated Walls, Doors And Exits

- a. Show and identify fire rated walls, partitions, doors and windows.
- b. Show all exits to building exterior and mark the route of travel and travel distance from any point in a room or portion of the facility to the exits.

7.5.9.3 Gaseous Type Extinguishing Systems

- a. Location of the storage cylinders, control panel and source of AC power to the control panel. (To be tapped off ahead of the main disconnect through a fused disconnect).
- b. Location of warning signs/devices, detectors, manual release stations and locations of auxiliary functions.

1. HVAC shut-down.

2. Power shut-down.

- c. Areas to be protected by these systems.

7.5.9.4 Galley/Kitchen Hood Extinguishing Systems

- a. Location of the storage cylinders, warning signs/devices, manual release stations and auxiliary functions.

1. Gas shut-down.

2. Power shut-down to be via a shunt-trip breaker.

- b. Areas to be protected by these systems.

7.5.9.5 Wet-Pipe Fire Sprinkler Systems

Location of the riser assembly, the water motor gong and the fire department connection.

7.5.9.6 Pre-Action/Deluge Systems (in addition to 7.5.9.3 above)

Location of the detection system control panel, detectors, and areas to be protected by these systems, and location of the source of AC power to the control panel, (to be tapped off ahead of the main disconnect through a fused disconnect).

7.5.9.7 Fire Pumping Systems

- a. Location in noncombustible shelters, if exterior or fire rated construction, if interior.

- b. Single line layouts per NFPA No. 20.

- c. AC power supplies from controller connection to the electrical distribution system and power arrangement per NFPA No. 20.

- d. Locations of the controllers, pumps, test headers, pressure relief valves, pressure relief discharge lines, and by-pass lines.

7.5.9.8 Fire Alarm Systems

- a. Location of the fire alarm control panel, (to be in a normally occupied location), manual pull stations and audio/visual horns.

- b. Location of the Master Box/Transmitter and annunciator panel/interface panel.
- c. Locations of the fire protection system control panels and fire protection system pressure switches.
- d. Areas to be protected by the automatic detection systems, if required. The locations of these devices are not to be shown on the drawings.
- e. Location of the source of AC power to the control panel, (to be tapped off ahead of the main disconnect through a fused disconnect.)
- f. Do not show conduit runs, conduit sizes, wire sizes, or wire counts for the interior systems and single line diagrams, unless specifically directed by the Area Focus Team Fire Protection Engineer.
- g. Show the location of the connection of the control panel to the Master Box or Transmitter and annunciator panel or interface panel.
- h. Show the location of the station fire alarm loop and a two (2) inch, (51 mm) concrete encased conduit from the Master Box to that location.

NOTES



CONSTR.CONTR.NO.
(NXXXXX-XX-C-XXXX)

CHAPTER 8. PROJECT SPECIFICATION

8.1 GENERAL DESCRIPTION

NAVFAC MIL-HDBK 1006/1A, "Policy and Procedures for Project Drawing and Specification Preparation," provides the requirements and basic instruction on the preparation of project specifications. NAVFAC MIL-HDBK 1006/2, "Policy and Procedures for Guide Specification Preparation," gives guidance to specification writers for the preparation of specifications in the NAVFAC Facilities Guide Specifications (NFGS) format. NFGS are provided on a CD-ROM, available from the National Institute Of Building Science (NIBS) free of charge for A-E's under contract with NAVFAC.

- a. Standard Navy NFGS Specifications NFGS-00000 (used on most projects).
- b. Short Form Navy Guide Specifications NFGS-SF-0000 (to be used only with permission from Code 4CN.CD).
- c. Regional Specifications NFGS-R-0000 that are used on all projects administered by Southwest Division. Consult with Code 04CN.CD for their use and for any updates.

8.2 SPECIFICATION FORMAT (DESIGN-BID-BUILD)

Unless otherwise approved by the Command, prepare all project specifications using Naval Facilities Guide Specifications (NFGS) in the SPECSINTACT/SGML format. This is available in quarterly issues on the Construction Criteria Base (CCB) CD-ROM available from the National Institute of Building Sciences (NIBS). If a NFGS does not exist for a product or system required to accomplish the design, a section shall be developed in the Navy SPECSINTACT format from other sources, such as Corps of Engineers, AIA Masterspec, CSI Spectext or, A-E's existing sources. Number all sections developed by the A-E in conformance with the Construction Specifications Institute (CSI) Masterformat, current (1995) edition. Section numbers of A-E developed specifications shall not conflict with the NFGS system.

8.2.1 Outline Specifications

As a minimum include the following:

- a. Include each anticipated NFGS Section along with other sections that may be required for the specific project. Provide a brief statement regarding the portion of the work included in each section.
- b. Include all products and systems anticipated to accomplish the project.
- c. Include any special conditions of service and unique site conditions.

8.2.2 Guide Specification Selection

Select specification sections from the "NAVY" menu except for those written specifically for SOUTHWESTNAVFACENGCOM and identified on the menu as "SWDIV." The A-E shall contact Code 4CN.CD for any changes or updates of these sections or any additions to them. Unless specifically directed, the only Division 00 sections requiring editing by the A-E is Section 00102, List of Drawings. The A-E is required to complete a Project Information Form (provided by the Area Focus Team member (PL) managing the project).

8.2.3 Guide Specification Issue Dates

The date of issue, or version, of NFGS to be used for each project shall be based on the version that is current at the time of return of the 45% design review comments to the A-E. If there is no formal 45% review, the date shall be determined by the date of award of the 100% design.

8.2.4 Specification Number

A specification number is created from the last two digits in the regional area number, the fiscal year of the project and the last four digits of the construction contract number. For example, if the contract number for a Southwest Division project is N68711-97-C-1234, the specification number would be **11971234**.

8.3 RESTRICTIVE SPECIFICATIONS

The use of proprietary specifications, "or equal" specifications, extended warranty requirements, and other restrictive requirements are permitted only with written permission from the Command. The A-E shall justify them on the firm's letterhead and shall submit the justification request at least 30 days prior to the 100 percent submission, but preferably with the 45 percent submission. The early submissions of these items are necessary as approvals are normally time consuming and may jeopardize the project schedule. See Exhibit 8-A for an example of the required documentation for approval request.

8.3.1 Proprietary Products

If a situation arises in which only one product or system will perform the required function, and the use of proprietary specifying is granted by the Command, then the item shall be specified by the manufacturer's name and model or catalog number followed by the phrase "Notwithstanding Any Other Provision Of This Contract, No Other Product Will Be Acceptable."

8.3.2 Or Equal Specification

The use of open proprietary specifying by naming acceptable commercial products followed by the words "or equal" may be permitted with Command approval under the following conditions:

- a. There are no Government Guide Specifications for the item.
- b. The item is a minor part of the construction project.
- c. The item cannot be specified by descriptive, performance or reference standard methods.

Note: In each instance include a minimum of three manufacturers in the description followed by the words "or equal." Describe the essential features of the item in sufficient detail to establish the basis upon which the quality of unlisted products will be determined. The A-E may be requested either prior to bid opening or after award to approve of any "or equal" substitutions.

8.3.3 Extended Warranty Clauses

Do not include special warranty clauses, other than those provided in the Contract Clauses, i.e., a 1-year warranty by the Contractor or manufacturer's standard commercial warranty. Any special warranties require the approval of a Level 1 Contracting Officer. Submit justification for requiring the warranty clause with a copy of the proposed specification.

8.3.4 Experience Clauses

Do not include Contractor experience clauses, other than those provided in the NAVFAC Guide Specifications unless they are required to perform the work required by the specification. Any special experience clause not included in existing NAVFAC specifications requires the approval of a Level 1 Contracting Officer. Submit justification for requiring the experience clause with a copy of the proposed specification.

8.3.5 Pesticides, Herbicides, Fungicides, Etc.

Products of this nature require special approval. For a project using these materials submit the specification section for review prior to the 100 percent submittal. This is necessary to keep the project on schedule as the review will require additional time.

8.3.6 Computer Software For Construction Projects

If software is to be required for the project, the paragraph "Agreement to License the Government to Allow Designated Organizations Use of Contractor Data for Government Purposes" and a DD Form 1423, "Contract Data Requirements List," will need to be edited

and submitted with the A-E Information Form for incorporation into the contract by the Contracting Officer. Contact Code 04CN.CD for instructions.

8.4 STANDARDS

If the Military or Federal Standard references in the REFERENCE portion of PART 1 of NFGS Sections does not meet the design requirements for the project, appropriate commercial standards should be substituted. If the reference used is not included in the list of references furnished with the issue of the CCB used, the A-E must include the source and telephone number in the project specification's Section 01420, References.

8.5 CRITERIA

The NFGS sections include notes that assist the designer in the editing of the project. Adhere to these notes unless permission is received by Code 4CN.CD and the person managing the project. Refer to the notes in the NFGS for the drawings required for the product or system specified. NFGS may include drawings. Do not include such drawings in the specifications. Appropriate drawings shall be included in the project drawing set.

8.5.1 Product Identification

If any schedule on the drawings or in the specifications refers to a manufacturer's product for comparison, insert the following paragraph after each of the schedules included:

"Manufacturer's names, color identification, textures, and patterns listed are for purpose of identification only. Products of any other manufacturer that approximate the color, texture, or pattern are acceptable if they conform to the specifications. Named products are acceptable only if they conform to the specifications."

8.5.2 Construction Category Codes

For Military Construction Projects the specifications require the identification of Category Codes for different types of construction. If these are not furnished to the A-E prior to completing the specifications they will be returned with the 100 percent comments.

8.6 COORDINATION, DRAWINGS, SPECIFICATIONS, COST ESTIMATE

The A-E shall be responsible for coordination between drawings, specifications, and cost estimate. Incomplete and uncoordinated submittals will not be reviewed by the EFD and will be returned for resubmittal with no further extensions or modifications to the contract. Note: The "Success" estimating program used by the Government incorporates a Work Breakdown Structure (WBS) which is based on CSI "Uniformat", a Uniform classification of Construction Systems and Assemblies. Refer to the 1998 Edition of "Uniformat" for the relationship of Uniform Construction categories to CSI Masterformat 16 Division specification sections

8.7 BIDDING REQUIREMENTS

Government procurement policies require that a construction award be made within available project funds. The following paragraphs describe procedures that supplement the information found in the NFGS regarding the bidding process.

8.7.1 Project Information Form

The information in this form is used by the Command's contract branch to complete the contractual requirements, Division 00. This form is available from each AFT or Code 4CN.CD. The form is to be included with the 100 percent submittal and an updated copy, if required, at the final submittal. This form may be updated as required by changes in the Federal Acquisition Regulations (FAR) or in the contractual sections in Division 00. (See Exhibit 8-B.)

8.7.2 Base Bid

The base bid shall by itself provide a complete and usable project.

8.7.3 Additive Bid Items

Additive Bid Items may be required to help assure that a construction award can be made within available project funds. Select work increments for additive bid items that can be separated from the project without rendering the facility unusable. There shall be no more than four additive bid items unless otherwise authorized by the Command. Arrange additive bid items so that the most essential portion of the work is added first. Succeeding items will be cumulative for purposes determining if the project is within the available funds; however, to provide latitude in selection, each additive bid item shall be independent of the others. Command policy is that the total of the additive bid items shall not be more than 25 percent of the base bid. The requirements for additive bid items are included in the Project Information Form.

8.7.4 Unit Price Bid Items

Unit price bid items are used for types of projects where the exact quantities of selected portions of the work cannot be determined prior to performance. State the quantity to be used for evaluating each item. The unit price is contractually enforceable only where the specified quantity of work is within plus or minus 15 percent of the actual quantity. The submission for unit prices is included in the Project Information Form.

8.7.5 Options

If options are required due to funding requirements, consult with the PL on the specific AFT for specific directions. The requirements for options are included in the Project Information Form.

8.8 AMENDMENTS

Prepare amendments in strict conformance with "Exhibit 8-C,. Prepare and submit amendments and a copy of the amendment on appropriate magnetic media, 3½ inch disks, identify processor used. See Exhibit 8-D.

8.9 CHANGE ORDER REQUESTS (COR)

Prepare Change Order Requests in strict conformance with "Amendments and Change Order Request (COR)" Exhibit 8-D. Compile and submit COR packages and a copy of the COR on appropriate media, 3½ inch (90mm) disks, identify program used.

8.10 COMBINING SEPARATE PROJECTS INTO ONE BID PACKAGE

When the decision is made by the Command to combine two or more construction projects into one bid package, one A-E firm will be selected to accomplish the task. See Exhibit 8-E.

8.11 SPECIFICATIONS PRINT FORMAT

Produce the hard copy using a printer producing characters with a minimum 300 dots per inch (dpi). Use six lines per inch, 10 or 12 point (preferably 12), Sans Serif font, on 20 pound (9-10kg), 8-½ x 11 inch (210mm x 297mm) white cut sheet paper for printing. Use 12 pitch if a fixed pitch is used. Paper with perforated edges is not acceptable. Type throughout the specifications shall be the same size and style. Strikeouts, screening, bolding, underlines, or other embellishments are not permitted. All parts of the specification are considered of equal importance.

8.12 MAGNETIC MEDIA

In addition to hard copy and the requirements of Attachment B, provide with the 100 percent and final submissions a "Back-Up" copy on SISGML compatible, and preferably 3.5 inch (90mm) disks of the SPECSINTACT Job File using the SPECSINTACT job Back-Up command. Identify each of the disks with the project name, specification number, issue of CCB used, and project location. Include "P" numbers for those projects so numbered. These disks may be used for printing the bid package, therefore they must be able to duplicate the final hard, signed copy submitted. Any disk that appears not to allow a duplicate print will be returned to the A-E for the required corrections.

8.13 SUBMITTALS AND TESTING LIST

Generate the Submittal List, Submittal Register, and Test Report from SPECSINTACT. Identify submittals to be approved by the GOVERNMENT with a "G."

8.14 SUBMITTALS

Prior to printing, the A-E should use the SPECSINTACT error reports for checking and correction errors.

8.14.1 45 Percent Submittals

The 45 percent submittal shall include an Outline Specification in the format of Exhibit 8-F. Outline Specifications may be required for large, complex projects such as hospitals prior to 45 percent. Verify with the PL for the specific project.

8.14.2 Basis Of Design

Submit in accordance with Chapter 6, Basis Of Design.

8.14.3 100 Percent Submittal

Specifications shall be complete, camera ready, with all elements thoroughly checked and coordinated with the drawings, and with sufficient detailed information to permit accurate bidding and construction of the project. If the project is to be "fast-tracked", where the 100 percent submittal is to be used for advertisement, and bids conform to final submittal requirements, provide the following:

- a. Specifications on magnetic media consisting of backup of the edited job "Pull Files" on disks using the SPECSINTACT system.
- b. Bound hard copies of the specifications. Include cover sheet and required blank forms (NFGS 01330 and 01450). The separately generated project cover sheet on CCB may be included.
- c. Copy of the Submittal Register and Test Reports.
- d. Copy of the Project Information Form.

8.14.4 Final Submittal

Specifications shall be complete, camera ready, with all elements thoroughly checked and coordinated with the drawings, and with sufficient detailed information to permit accurate bidding and construction of the project. Provide the following:

- a. One complete unbound specification manuscript on 20 pound (9-10kg) paper, single spaced, and printed on one side only. Pages with rough edges are not acceptable. Include the required blank forms in the final package for sections 01330 and 01450.
- b. Provide quantity of Bound hard copies as required by the Scope of Work.
- c. Final specifications on magnetic media consisting of the edited job "Pull Files" on disks of the SPECSINTACT job file using the SGML/SPECSINTACT system.
- d. Final copies of the Submittal Register and Test Report.
- e. The cover sheet shall be stamped by a licensed member of the firm to which the Government awarded the design contract.

8.15 SPECIFICATION FORMAT (DESIGN-BUILD PROJECTS)

Design-Build projects require specifications at two different levels. The technical portion of the RFP (provided by the Government) includes Performance Specifications to describe facility requirements to prospective proposers. Upon award of a contract, the Contractors' A-E is required to provide Proprietary Specifications to identify the actual products and systems to be used to satisfy the RFP and to confirm the quality level proposed by the Contractor upon which the award was made.

8.15.1 Performance Specifications

Performance specifications shall describe the performance of a facility to meet the needs of the user (in terms as general as possible) to offer the Design-Builder the maximum latitude in providing the best value to the Government. Depending upon the nature and magnitude of the project and the project delivery method, performance specifications may take several forms including:

- a. Specintact; for large, complex projects.
- b. PerSpective: A new performance specification based on Uniformat, developed jointly by CSI and DBIA (Design-Build Institute of America) and available through CSI. Contact Code 4CN.CD for further information.
- c. Shortform Performance Specifications for small projects: Format available From Code 4CN.CD.

- d. Existing “ Part Two” of the Six Part RFP developed for family housing.

8.15.2 Proprietary Specifications

Proprietary specifications shall be provided by the Contractors A-E as a part of the 10 percent design package and shall provide information on the specific products and systems to be used for the project which are based on products and systems provided in the proposal evaluated and approved by the Government as the basis of award. Changes to products and systems after award can be made only upon approval by the Contracting Office.

Proprietary specifications shall be written in CSI 16 Section Format based on CSI Masterformat 1995 Edition with sections written in three (3) part format. These specifications shall be produced using one of the following commercial master systems.

- a. AIA MASTERSPEC distributed by Acrom, (800) 424-5080.
- b. SPECTEXT distributed by The Construction Sciences Research Foundation, Inc. (410) 893-6892.
- c. SpecLink distributed by Building Systems Design, Inc. (888) 273-7638.
- d. Other similar systems based on CSI 16 Section Format.

8.15.3 Division 1, General Requirements

General Requirements shall be provided in NAVFAC Format and shall include all sections pertinent to the contract. Verify exact requirements with PL. Some activities have sections written for their use only.

8.15.4 Submittals

Submittals shall be as indicated for Design-Bid-Build projects unless otherwise stated in the RFP.

EXHIBIT 8-A

RESTRICTIVE SPECIFICATIONS

APPROVAL REQUEST

1. GENERAL: Requests for approval of the use of restrictive specifications shall be made in advance and in writing to the Project Leader. Letters of request shall include the following:

- a. Project information including Contract No. (N68711-FY-C-XXXX), Project No. (P-XXX), Project Title, and Project Location.
- b. Formal request for the use of restrictive specification in subject contract based upon the following data:
 1. Complete description of the item and the manufacturer.
 2. Justification of why the specification must be restrictive. The Command will not act favorably on justifications made solely for the purpose of matching existing products or systems, unless the product or system will not function properly if not matched exactly.
 3. Estimated total cost of the contract.
 4. Estimated cost of restrictive items.

EXHIBIT 8-A

EXHIBIT 8-B
PROJECT INFORMATION FORM (PART A)
GENERAL PROJECT INFORMATION
(By Project Leader)

(To be completed prior to forwarding to A-E for completion)

1. Project Name: _____
2. Project Number: (P-No, SP-No, ESR-NO, other)_____
3. Contract Number: N68711-_____-_____-_____
4. Contract Type: DES-BID-BLD __DES-BLD____ MACC/SOC __Other_____
5. Estimated construction Cost (ECC) \$_____
6. A-E Firm: _____
7. Point of Contact: _____
8. Phone Number: (____) - _____ - _____
9. Area Focus Team (AFT) _____
10. Project Leader: _____
11. Phone Number: (____) - _____ - _____
12. Contract Specialist: _____
13. Phone Number: (____) - _____ - _____
14. ROICC: _____
15. Phone Number: (____) - _____ - _____

EXHIBIT 8-B

INFORMATION FOR CONTRACTING OFFICER (BY A-E)

I INSTRUCTIONS TO BIDDERS/PROPOSERS

1. Does project include unit prices? Yes___ No___

If yes, include the following and coordinate with specification section:

a. Lump sum for all work not covered in the unit price items listed below: _____

\$ _____

b. Unit price per _____ for _____

\$ _____ per _____ x _____ = \$ _____

c. Unit price per _____ for _____

\$ _____ per _____ x _____ = \$ _____

Total Price Base Bid Item 0001 \$ _____

2. Are there also Additive or Deductive Bid items? Yes _____ No _____

What are the additive or deductive bid item(s): _____

If yes, coordinate with Contracts as this requires Contracting Officer approval.

Coordinated: _____ Not Applicable _____ Yes _____ No _____

3. Reference to FAR 5252.214-9301, Notice To Bidders

Does the project include additive bid items? Yes _____ No _____

EXHIBIT 8-B

If yes, include the following (May be included as an attachment):

(i) Base Bid Item 0001 shall be the entire work complete in accordance with the drawings and specifications, but not including work indicated or specified to be provided under any of the other bid items.

(ii) Additive Bid Items 0001AA shall be the addition of the following, complete in accordance with the requirements specified hereinafter:

(iii) Additive Bid Items 0001AB shall be the addition of the following, complete in accordance with the requirements specified hereinafter:

4. Reference FAR 52.236.27, Pre-Bid Site Visitation

(Coordinate with Project Leader and Contracting Officer)

Will a Pre-Bid site visitation be required? Yes_____ No_____

If yes, complete the following:

a. Point Of Contact: _____

b. Telephone Number: (_____) - _____ - _____

c. Special Security requirements: _____

d. Other special requirements: _____

5. Reference to FAR 52.217-7, Option for Increased Quantity Separately Priced Line Item.

Will this project have "Option" items? Yes_____ No_____

If yes, requires Contracting Officer's permission. (Coordinate with the Project Leader, and Contracting Officer)

EXHIBIT 8-B

If yes, complete the following: (May be included as an attachment):

- (i) Option Item 0001 shall be the addition of the following, complete in accordance with the requirements specified hereinafter:

- (ii) Option Item 0002 shall be the addition of the following, complete in accordance with the requirements specified hereinafter:

How long of a period, in days, will the option to award be for? _____

Also, will the option item effect the construction period of the contract?

Yes ____ No ____

If so, explain (Take into consideration the effect of it being awarded (1) with the original bid, (2) at any time during the specified option period, or (3) at the end of the specified option period):

6. Reference FAR 52.236-4, Physical Data

Is physical data (e.g. test borings, hydrographic, weather conditions data, etc.) to be furnished or made available to offerers? Yes _____ No _____

If yes, fill in applicable data:

- a. The indications of physical conditions on the drawings and in the specifications are the result of site investigations

by _____

(insert description of investigative methods used, such as surveys, auger borings, test pits, probing, test tunnels, etc.)

EXHIBIT 8-B

b. Weather conditions: _____

(insert a summary of weather records and warnings)

c. Transportation facilities _____

(insert a summary of transportation facilities providing access to and from the site,
including information about their availability and limitations)

d. Insert other pertinent information: _____

7. Pre-Proposal Conference (Design/Build).

Is a pre-proposal conference to be scheduled? Yes____ No ____

If yes, complete the following:

a. Scheduled for (day) _____ Date _____

b. Location: _____

c. Point of Contact: _____

d. Telephone Number: (_____) - _____ - _____

8. FAR 52.252-3, Alterations In Solicitations

(Consult with Project Leader, and/or Contracting Officer if this information is required
or if there will be any special conditions for proposals)

a. Will technical proposals be in several parts? Yes____ No____

If yes, describe _____

b. Will costs be separated from technical requirements? Yes ____ No ____

c. Will proposal require an Administrative breakdown? Yes ____ No ____

d. Will proposal require an Organization breakdown? Yes ____ No ____

EXHIBIT 8-B

- e. Are instructions on how to breakdown costs required? Yes ____ No ____
- f. Will there be specific or special format for submissions? Yes ____ No ____

If yes to any item above, attach description.

II INFORMATION FOR EVALUATION SECTION 00202

1. "Source Selection." If this project is an RFP and is using evaluation of bids for selection, complete this section.

"EVALUATION FACTORS FOR AWARD." _____

III INFORMATION FOR SECTION 00452

1. Reference FAR 52.223-4, Recovered Material Certification

Does this contract specify the use Recovered Materials? (i.e. materials that have been collected or recovered from solid waste per FAR 23.402)

Yes _____ No _____

If yes, describe _____

IV INFORMATION FOR SECTION 00102

1. A-E edits entire section "List of Drawings" in SPECSINTACT and submits it complete at the 100% and final submittal.

Section 00102 included: Yes _____ No _____

V INFORMATION FOR SECTION 00710 OR 00720

1. Reference DFARS 252.210-7000, Brand Name or Equal

Does the project include any Brand Name or Equal statements? Yes _____ No _____

EXHIBIT 8-B

If yes, requires prior approval by a Level One Contracting Officer. Provide the following:

Description: _____

Spec Section and/or Dwg. No.: _____

Spec Para. or Drawing View: _____

Obtain copy of justification form from PL. Will require approval of a Level One Contracting Officer. Attach completed form.

2. Reference FAR 52.211-10 Commencement, Prosecution, and Completion of Work and Alternate I

a. Complete the entire work ready for use not later than _____ calendar days after notice to proceed.

b. Phasing sequence as follows: _____

3. Reference FAR 52.223-3, Hazardous Material Identification and Material Safety Data

Will this contract require delivery of hazardous material that will remain in place when the project is completed and for which the station requires Material Safety Data Sheets? Yes _____ No _____

a. Location of hazardous material: _____

b. Material Safety Data Sheet information: _____

4. Reference FAR 52.225-5, Buy America ACT - Construction Materials

Does the project have any exemptions to the Buy America ACT? Yes ____ No ____

Prior approval is required for an exemption. If yes, fill in table below:

EXHIBIT 8-B

Description: _____

Spec Section or Drawing No.: _____

Spec Paragraph or Drawing View: _____

5. Does this project specify any Class I Ozone Depleting Substance (ODS)?

Yes _____ No _____

Attach memorandum for contract file verifying the specification has been reviewed for these substances. When there is no alternative to using ODS, provide technical certification that no other product is available to meet requirements. Some products do have waivers, coordinate with the Project Leader. Use of these products requires the Contracting Officer's approval.

VI INFORMATION FOR SECTION 00711 OR 00721

1. Reference FAR 52.236-14, FAC 5252.236-9304, and FAC 5252.236-9305

a. Are utilities furnished by the Government or the Contractor? Yes ____ No ____

b. Will there be any cost to the Contractor for utilities furnished by the Government?

Yes ____ No ____

If yes, complete the following:

Electric \$ _____ per _____

Water \$ _____ per _____

Gas \$ _____ per _____

Other _____ \$ _____ per _____

VII INFORMATION REQUIRED BY SECTION 00830

1. In what city, county, state, and on which base is the project located? Complete the following:

a. City: _____

b. County _____

c. State _____

d. Base _____

EXHIBIT 8-B

VIII SOFTWARE AND COMPUTER REQUIREMENTS

1. Reference Computer Data and Software Clause, DOD FARS 52.227-7013, and Data Requirements Clause, DOD FAR 52.227-7031

Does this project require any computer software? Yes_____ No_____

If yes, complete the following:

Purpose:_____

Description:_____

Specification Section: _____

Project may require completion of DD Form 1423, Contract Data, and DD Form 1664, Data Item Description. Consult with Project Leader and Contracting Officer. RFP's require the use of DD Form 1423.

If these forms are required, complete and attach.

2. Computer Hardware

Does this project require any computer hardware? Yes_____ No_____

If yes, complete the following:

Purpose:_____

Description:_____

Specification Section: _____

May require review by Counsel and/or Information Systems Support, ADP services, for any special requirements. Coordinate with PL, Contracting Officer, and user.

EXHIBIT 8-B

IX PROPRIETARY PRODUCTS

1. Does this project specify any proprietary items either directly or indirectly?

Yes_____ No_____

If yes, complete the following:_____

Indicate where these items can be found in the drawings and specifications.

Description: _____

Spec Section or Drawing No. _____

Spec Paragraph or Drawing View: _____

Obtain copy of justification form from PL. Will require approval of a level one
Contracting Officer. Attach the completed form.

X Government Furnished Equipment Yes_____ No_____

If yes, please identify equipment:_____

Indicate where these items can be found on the drawing and specifications

*****END*****

EXHIBIT 8-B

EXHIBIT 8-C

PREPARATION OF AMENDMENTS

1. GENERAL: NAVFAC regulations require that amendments must be in the possession of each prospective bidder a minimum of ten (10) calendar days prior to the bid opening date. Failure to meet this deadline will result in bid postponement. Amendments prepared by the A-E must be submitted to the PL prior to the bid opening date to allow for review, processing, printing and distribution by the COMMAND. The amendment must be submitted to the PL in time to allow for printing and mailing, so that the bidders will receive the amendment at least 10 days prior to bid opening. Full size drawing reproductions take longer to reproduce. If full size drawings are included, increase the lead time required as advised by the PL.

2. FORMAT: Amendment items must be in the same order as in the subject project specifications' sections. Changes to specifications shall be first, followed by new specifications, verbal descriptions for drawing revisions, sketches (if allowed), and, finally, drawings. Minor changes to drawings may be made by written descriptions and by sketches on 8-1/2 x 11 inch paper. Sketches shall contain no more than one detail and shall contain the same title block as the drawing revised. Major changes may require re-issue of existing specification sections and drawings or the addition of new specification sections and drawings. Include changes in order of NAVFAC drawing number and specification number. Attach new or revised specifications sections to back of amendment before any drawing or sketches.

3. PAGE FORMAT: The COMMAND will provide the cover sheet (Standard Form SF30) for all amendments. The A-E shall provide the remainder of the amendment beginning with page 2. Provide the following title and numbering system for each sheet:

Project Number, Title, and Location Specification Number (Upper left hand corner)
Amendment Number (Upper right hand corner)

Section Number or Sketch Letter(If required)
Pagination
(Bottom center of page)

Amendment Numbers will be assigned by the PL and will begin with "0001" for each project. Page numbering will appear as follows and the first page shall always start with "2." Changes shall be in the same order as the specifications.

EXHIBIT 8-C

When an amendment includes a new specification section, the amendment number will be in the upper right hand corner below the specification number as previously illustrated, and the page numbering at the bottom of each sheet will appear as follows (normal specification pagination):

Section Number - Section Page Number

For Example:

SECTION 08110 PAGE 6

4. SAMPLE FORMAT: Following paragraphs illustrate required sequence of changes included in the amendment. On each page include headers and footers described above.

4.1 INTRODUCTION: Include the following paragraph to start amendment:

The following changes shall be incorporated into the original issue of drawings and specifications for this project:

Prepared by: [A-E initial and date]

4.2 CHANGES TO THE TABLE OF CONTENTS:

TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

Following Section 01500, Temporary Facilities and Controls, add the following:

Section 01781 - Operation and Maintenance Requirements

4.3 PROJECT SPECIFICATION CHANGES: Clarity in the identification of items to be changed and in the changes themselves is of the utmost importance in an amendment. The following rules should be followed:

Rule 1: When identifying paragraphs use the full number such as "2.1.2.3."

Rule 2: The first two or three words of a paragraph title should be sufficient for identification. However, the writer should double check for paragraphs with similar titles and use full titles if there is any chance for confusion.

Rule 3: When making a small change which involves just a number, word or small group of words, identify the line or sentence number within the paragraph.

EXHIBIT 8-C

a. Adding Paragraphs or Subparagraphs:

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.

b. Word Changes:

SECTION 15182
REFRIGERANT PIPING

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

c. Omitting Paragraphs or Subparagraphs:

SECTION 02742
BITUMINOUS HOT MIX PAVEMENT

2.2 ASPHALT CEMENT

Delete this paragraph in its entirety and substitute the following:

2.2 NOT USED

d. Adding new sections:

EXHIBIT 8-C

SECTION 01781
OPERATION AND MAINTENANCE REQUIREMENTS

Add this section accompanying this amendment in its entirety.

e. Replacing existing sections:

SECTION 01330
SUBMITTALS

Replace this section in its entirety with the accompanying "SECTION 01330, SUBMITTALS, revised [month-day-year]".

NOTE: Title the new section on the specification, only required on first page, as follows:

SECTION 01330
SUBMITTALS revised [mm/dd/yy] (or)
revised [mm/dd/yy]

4.4 DRAWING CHANGES:

a. Adding drawings:

SECTION 00102
LIST OF DRAWINGS

1.2 CONTRACT DRAWINGS

Add the following drawings to the list of drawings, making a total of 23 drawings. Drawings shall be dated [Month-Day-Year]:

NAVFAC DRAWING NUMBER

TITLE

8088123
8088136

Revised Floor Plan
Lighting Fixture Details

EXHIBIT 8-C

b. Revising Drawings:

SECTION 00102
LIST OF DRAWINGS

1.2 CONTRACT DRAWINGS

The following revised drawing(s) supersede the drawings of the same number and title from the original issue as shown on the list of drawings in the specifications. These drawings are issued with this amendment. Drawings shall be dated [Month-Day-Year]:

<u>NAVFAC DRAWING NUMBER</u>	<u>TITLE</u>
8088191	Foundation Plan, Revised (Date)
8088192	Floor Plan, Revised (Date)

NOTE: Complete the "Revisions" block in the upper right hand corner of drawings with letter designation, description, name of preparer, and date. The "Approved" block shall be completed by the PL. Note revisions by distinctive symbols at appropriate locations on the drawing.

c. Written Changes to Drawings:

SECTION 00102
LIST OF DRAWINGS

1.2 CONTRACT DRAWINGS

The changes and/or revisions following shall be made to the drawings listed herein. Prospective bidders are requested to transfer changes and revisions to their bid sets. The successful bidder will be required to post each change or revision to the RECORD DRAWINGS which he must maintain at the jobsite in accordance with the clause "RECORD DRAWINGS" in the specifications. No new drawings will be issued reflecting these changes:

<u>NAVFAC DRAWING NUMBER</u>	<u>TITLE</u>
8088193	Plan and Details

DESCRIPTION OF CHANGE

EXHIBIT 8-C

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

d. Sketches: When written changes to the drawings are not feasible and the changes are minor in nature, 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 the project drawings. Include on each sheet the headers and footers described above:

SECTION 00102
LIST OF DRAWINGS

1.2 CONTRACT DRAWINGS

NAVFAC DRAWING NUMBER

80881914

TITLE

Site Plan and Details

DESCRIPTION OF CHANGE

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

EXHIBIT 8-C

EXHIBIT 8-D

PREPARATION OF CHANGE ORDER REQUESTS (COR's)

1. GENERAL: Change Order Requests are identified alphabetically with the order assigned sequentially in the field by the ROICC. Additions, changes and deletions that are incorporated into Change Order Requests shall appear in the same order as their original position in the project manual and drawings. Change Order Requests must include all previous changes made by amendment.

2. PAGE FORMAT: Unlike amendments, the Change Order Request (COR) requires a cover sheet provided by the A-E. The format shall conform to the following example:

Specification Number
COR "___"
(Upper right corner)

The following changes shall be incorporated into the project documents for this project:

Prepared by: [A-E initial and date]

PROJECT TITLE
P-123

at the

STATION
CITY, STATE

In this location provide a brief, self contained description of the Change Order Request (COR)

Center the following at the bottom of each page:

COR "___"
Pagination

EXHIBIT 8-D

Example, start the COR with page number "1":

COR "A"
Page 1 of 6 pages

2. When adding complete, new specification sections in a COR, place the section title, specification number, and COR letter as follows:

Project Number, Title, and Location
(Upper left corner)

Specification Number
COR "___"
(Upper right corner)

Bottom of page centered:

Section Number - Section Page Number
Pagination

Example:

SECTION 08110 PAGE 6
Page 8 of 13 Pages

3. CHANGE ORDER REQUEST CONTENT: A typical COR package would include items in the following sequence, format is similar to an amendment:

- a. Table of Contents changes.
- b. Changes, new, or additional specifications sections in numerical order.
- c. New drawings.
- d. Deleted drawings.
- e. Revised drawings.

4. DRAWINGS: Only full size reproducible drawings are allowed.

EXHIBIT 8-D

EXHIBIT 8-E

PROCEDURES FOR COMBINING SEPARATE PROJECTS

1. GENERAL: Individual projects prepared by one or more A-E Firms may be combined for the purpose of securing a single bid. If the Command directs the AE to combine separate projects, the A-E selected to combine the projects shall prepare the bid package under the direction of the PL and in conformance with the following guidelines:

- a. Identify individual projects as Part "A" and Part "B" or Part "X," in alphabetical order as required, for the combined projects.
- b. Package the bidding documents and Division 1 specification sections together and identify as Part "A"/Part "B"/Part "X" on each sheet. Identify the technical specifications including Division 2 through Division 16 as Part "A" or Part "B" or Part "X," as required, on each sheet.

1.1 SPECIAL CASES

In some cases, the use of the "Parts" designation may not be appropriate. The PL will furnish guidance in packaging the project documents.

2. TITLE PAGE: Prepare new title pages clearly identifying the required parts, project titles, job order numbers, and PL. The cover sheet for the entire package shall contain the signatures of all A-E firms responsible for each part. This is to signify that all A-Es agree that the Division 01 specifications apply to each of their part's technical specifications. Place individual cover sheets for each part as the first page of each of the parts.

3. TABLE OF CONTENTS: Prepare separate Tables of Contents for the bidding documents and Division 01 specifications packages and each of the technical specification packages. Identify in the Table of Contents with the Division 01 specifications that the Table of Contents for the technical sections for each part is located at the beginning of each part's specifications.

4. REPORTS: Prepare separate Submittal Registers and Test Reports for each part and the Division 01 specifications.

5. DRAWINGS: Label all drawings in the lower right hand corner, above the title block, with the appropriate part designation as required.

EXHIBIT 8-E

PROJECT NAME, NUMBER
at the
LOCATION (IF DIFFERENT THAN OTHER PARTS)
(PART A)
PROJECT NAME, NUMBER
at the
LOCATION (IF DIFFERENT THAN OTHER PARTS)
(PART B)
PROJECT NAME, NUMBER
at the
LOCATION (IF DIFFERENT THAN OTHER PARTS)
(PART C)
at the

NAVAL STATION, SOMEWHERE
CITY, STATE

If parts are by different A-Es, complete following:
DESIGNED BY:

PART A _____
PART B _____
PART C _____

SPECIFICATIONS
PREPARED BY:
(name of firm responsible for combining projects)
NAME OF FIRM
ADDRESS
CITY, STATE

SUBMITTED BY: _____ DATE: _____
APPROVED BY: _____ DATE: _____
Project Architect/Engineer: _____

11yy####
P-#/Title (Part A), P-#/Title (Part B), P-# (Part C)

11YY####
PART A,B, & ____

EXHIBIT 8-E

PROJECT TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

01010	SUMMARY OF WORK
01025	MEASUREMENT AND PAYMENT
#	APPROPRIATE TITLE
#	title
#	title
etc.	etc.

DIVISION 02 - THROUGH - DIVISION - 16

AN INDEX OF TECHNICAL SECTIONS PRECEDES EACH OF THE FOLLOWING PARTS:

PART A:	TITLE
PART B:	TITLE
PART C:	TITLE

- End of Project Table of Contents --

PART A or PART B or PART C
PROJECT TABLE OF CONTENTS PAGE 1

EXHIBIT 8-E

EXHIBIT 8-F

OUTLINE SPECIFICATIONS

1. PAGE FORMAT

Include as header each page of Outline Specification:

Project Title and Location

Specification No.

Include as a footer bottom center each page:

SECTION NO. and or GENERAL REQUIREMENTS
Pagination

2. GENERAL REQUIREMENTS, DIVISION 01

Include as applicable with brief descriptions:

GENERAL REQUIREMENTS

- a. Brief description of the project.
- b. Codes or special requirements.
- c. Phasing required.
- d. Scheduling and duration.
- e. Special project procedures.
- f. Government furnished and installed equipment.
- g. Government furnished and Contractor installed equipment.
- h. Coordination requirements.
- i. Additive bid items, unit prices, and options.
- j. Special security requirements.
- k. List of Division 01 sections to be included.

EXHIBIT 8-F

3. TECHNICAL SECTIONS

Include as applicable for each section:

SECTION NUMBER	TITLE
----------------	-------

- | | |
|----|---|
| a. | System Description: Use descriptions required to explain characteristics or special requirements. Especially required if not indicated on drawings or requirements not included in product description. |
| b. | Submittals: Describe any special submittals, testing, or calculations. |
| c. | Quality Assurance: Describe special project requirements such as mock-ups, samples, or special testing required. |
| d. | Warranty: Describe any special warranties. |
| e. | Components: Describe materials and manufactured products, equipment, finishes, and components. Use performance requirements, quality of finishes, or reference standards if appropriate. |
| f. | Fabrication: Describe special shop or factory fabrication requirements, special finishes, or special tolerances. |
| g. | Preparation: Describe unusual or special requirements. |
| h. | Installation: Describe special installation requirements or tolerances more restrictive than normal standards. Reference trade association standards. |
| i. | Field Quality Control: Describe field test requirements for installed products. |
| j. | Schedules: Identify where products not easily shown on drawings are used. Include simple schedules for special finishes or quality and special hardware. |

EXHIBIT 8-F

EXHIBIT 8-G

PREPARATION OF AMENDMENTS

1. PURPOSE OF AMENDMENTS (ADDENDA):

A document issued during the bidding period to make changes in the “Bidding Documents”.

2. REASONS FOR AMENDMENTS:

There are many reasons for amendments. However, the most common is to amend the bidding documents as follows:

2.1 To revise Contract Drawings with SKETCHES, to issue revised drawings, to issue new drawings, and to delete drawings. When revised drawings are required, be sure to indicate the appropriate “Revision Date” in the REVISION BLOCK on each drawing. The revised areas shall be clouded and designated with the appropriate symbol.

NOTE: Do not make changes to drawings by word description that will cause bidders/Contractors to make changes in the design drawings.

2.2 To make revisions to the specifications by word descriptions:

2.2.1 Revise words, numbers, sentences, or paragraphs.

2.2.2 Add or delete various sentences, paragraphs, pages, or complete sections.

3. NAVFAC REGULATIONS:

Require that amendments must be in the possession of each prospective bidder a minimum of ten (10) calendar days prior to the bid opening date. Failure to meet the deadline will result in bid postponement.

4. PREPARATION PROCESS:

When the need for an amendment arises, the A-E shall contact the Project Leader (PL) or an appropriate representative such that the Specification Specialist can provide a copy of the “Instructions for the Preparation of Amendments and Change Orders” in a timely manner. It would be helpful if there is a coordinated effort between the Specification Specialist and the A-E such that the “First Submittal - Correct Amendment” principle can be achieved.

EXHIBIT 8-G

NOTES

CHAPTER 9. COST ESTIMATES

9.1 GENERAL

This section establishes the requirements and provides the instructions for preparation of cost estimates. Project estimates based on plans and specifications shall be provided with each submission as required by the Statement of Architect-Engineer Services. For MILCON/BRAC projects, estimates must form the basis of the DD Form 1391 which is a part of the Engineering Documentation. The A-E objective is to develop a final cost estimate that will be within 10% of the lowest responsible bid considering all factors affecting costs including bidding climate. In the event that bids received on projects require clarification and analysis before an award can be made, the A-E shall provide that analysis at no additional cost to the government. Additionally, the A-E shall provide an estimate for each Amendment and each Change Order Request (COR). The government Cost Engineers will provide the A-E with all cost guidance information necessary to develop a suitable project cost estimate. **The government final cost estimates are to be marked by the A-E with “For Official Use Only”. Access to or disclosure of information within the estimate is limited to those personnel whose official duties require knowledge of the estimate. The A-E shall consider all cost estimates to be confidential documents.**

9.1.1 Purpose of Estimate

Properly prepared project cost estimates provide a check of plans and specifications for constructibility, coordination conflicts, discrepancies, omissions and cost control. They provide checks during design development to assure the project can be built with available funds. Estimates are also used by the government to establish and assure that sufficient money is requested to fund the project, to develop historical data for future estimating and to verify contract bid prices.

9.1.2 Cost Engineering Estimate Format Guide

The Cost Engineering Format Guide is a cost estimating document developed to make all AE firms aware of the formats for estimates and other required documents that are considered acceptable for the development of 1391 plus, parametric cost estimate (PCE), 15%, 45%, 100%, and final construction cost estimates that are utilized throughout the Naval Facilities Engineering Command Engineering Field Divisions and Activities (EFDs/EFAs). Southwest Division's use of the estimates are for guidance only. If changes are warranted due to the nature of a project, contact the Senior Cost Engineer, Code 4CN.JB **The government Senior Cost Engineer will provide the A-E with all cost guidance information necessary to develop a suitable project cost estimate at a scoping meeting prior to the start of design.**

9.2 PROJECT ESTIMATE REQUIREMENTS

A detailed project cost estimate submittal for all projects over \$100,000 shall be prepared and identified by at least the specification number and systems format in accordance with MIL-HDBK 1010, Cost Engineering Policy and Procedures guide and using the Success Cost Estimating Program. If additional information or clarification pertaining to estimates under \$100,000 is required, a visit to the Cost Engineering Representative is highly recommended.

9.2.1 Estimating Format And Documentation

All cost estimates will be in the Success format except for the backup documentation for the Engineering Documentation which is a part of the Parametric Cost Estimate (PCE) and 1391 Plus Submittal for unique projects not readily adaptable to Success.

9.2.2 Success

The A-E will be required to run the estimate on his/her own computer equipment. Hard copy estimates will be required for each submittal. The Success program, data base and User's Guide are included on the Construction Criteria Base (CCB) compact disc. Contact Code 04CN.JB, Cost Engineer if CCB is not available. A copy of the NAVFAC Success configuration report file and manual with sample reports, will be made available to all A-E firms upon request. Include the following reports (menu selection) with each submittal.

- "A", Summary Report
- "B", Systems Report
- "D", Mark-up Report
- "E", Detailed Estimate Unburdened

Send a disk (3 ½ ", 90mm) containing the complete estimate with all submittals. Minimum computer requirements are provided with the program.

9.2.3 Detailed Estimate

Detailed Estimate means that all work required by each work breakdown structure (WBS) item shall be completely estimated under the applicable WBS systems and subsystems in the Success format even though the project may include work at multiple facilities. For example, all concrete work and all interior electrical work in the detailed estimate shall be taken off by their respective work breakdown structures (WBS). One exception is items of work such as demolition, excavation, concrete, miscellaneous iron and other items

incidental to the electrical or mechanical work which, following trade practice, are normally quoted and performed by those contractors.

9.2.4 Detailed Estimating Criteria

Provide the name of the person(s) and the firm with primary responsibility for preparation and checking on each estimate sheet. To facilitate comparison of estimated costs with the contractors' costs, follow construction trade practice. The first step in estimating cost is to decide what size and type of contractor is in the best position to be most competitive for the project under consideration. This decision will permit a determination of which items of work will be done by the prime contractor and which items are likely to be subcontracted. The appropriate markups for material and labor can then be developed. Use local costs including the appropriate material or equipment costs (so note in parentheses). This is mandatory, and failure to comply may be reason for rejection of estimate. Include costs such as subsistence, transportation and the premium portion of overtime in General Requirements. Include incidental demolition, excavation, shoring, de-watering, concrete and miscellaneous metal for the mechanical and electrical sections in the mechanical and electrical estimates. Include everything, and duplicate nothing. Provide a cross reference note in the applicable work breakdown structure section estimate. For example, the first item under CIP Concrete might be "see electrical estimate for duct bank encasement".

9.2.4.1 San Clemente Island / San Nicolas Island

The rules under which the Contractor works are set forth in the specification. The costs for subsistence, travel, travel time, premium portion of overtime and shipping are substantial and should be included in the General Requirements. Review any questions with Code 04CN, in order to understand and cost these items as a contractor would do so.

9.2.4.2 Units of Measure

Use standard units of measure common to the trade involved. The units used shall be those used in purchasing the principal material involved. Sufficiently describe the size, material, quality and type of items, or tasks to be performed in the item description to permit unit cost verification without constant reference to plans and specifications. Failure to do so may be grounds for rejection of the estimate. The accuracy of quantity take-offs should be carefully verified. Include a reasonable allowance for waste where applicable (concrete piping, etc.). Please include guidance for projects to be designed in SI units. See Section 5.2.3.

9.2.4.3 Estimate Detail

Prepare all estimates, except the 15 percent submittal, in sufficient detail to permit verification of quantities and pricing. Do not use "Lump Sum", "Job" or similar expressions unless no alternative is possible or unless the cost is very minor. As an example of the detail required, do not lump footing concrete with column concrete since labor costs for concrete placement in these separate cases are most likely different. Cubic yard costs including formwork, rebars, concrete placing, curing and finish for each concrete element (footings, columns, etc.) may be acceptable for a 45 percent submittal but are not acceptable for a 100 percent or Final Estimate. Cost engineering judgment, however, does not require the breakout into finite detail of minor items which have little significance in the total job cost. However, it does require an independent Government Estimate of construction costs in the degree of detail the Government would pursue if it were competing for the award of each proposed contract.

9.2.4.4 Unit Costs

After determining the type of contractor who will be in the best competitive position to successfully bid the job, the various portions of the work can be allocated to one of the following categories of contractors.

- a. General Contractor and Sub-Contractors Unit Costs. General and Sub-Contractor Unit Costs for materials and equipment include delivery and applicable sales taxes less trade and payment discounts. Use a separate line for equipment to separate material and equipment costs for those operations that involve both costs and enter in the material column. Labor Unit Costs consist of a manhour total cost of Base Rate plus taxable Fringe Benefits and applicable Insurance Benefits for the appropriate labor classification divided by the productivity in the units of work involved for one hour of work. Include subsistence, premium portion of overtime (when required), travel expenses and similar costs in the General Requirements, Division 1.
- b. Mechanical/Electrical Unit Costs. The most comprehensive data on electrical and mechanical labor costs are published in the form of man-hours required to perform items of work. These are averages and may need adjustment. The detailed estimate by specification section is to follow the same format as previously described for the General Contractor unit costs, except that the mechanical/electrical sub-contractor's overhead and profit are added to each unit cost appropriate to the size, competitive climate and desirability of the job. Pay particular attention to trade discounts which vary but may approach a 50 percent reduction of list price for some items of mechanical and electrical materials and equipment. When the mechanical or electrical contractor is the prime contractor, do not add Overhead and Profit (OH&P) in unit prices.

9.2.5 Other Cost Factors.

9.2.5.1 General Requirements

General Requirements, are included in Division 1 of the estimate and are summarized in Division 1 of the General Summary. These costs should be carefully developed from the checklist shown below, using items applicable to the project. Note that the equipment covered in General Requirements is generally administrative/support equipment. Include Quality Control costs in General Requirements. There is a significant cost difference between jobs which require a QC Representative and support staff and the jobs which require a QC Representative only. (See specifications)

GENERAL REQUIREMENTS CHECKLIST

SUPERVISION

Superintendent
Civil Engineer
Layout
Timekeeper
Material Clerk
Non-working Foreman
Watchmen

MISCELLANEOUS

Project Sign
Job Office Supplies
Travel Expense

QUALITY CONTROL (QC)

QC Representative
QC Assistant (part or full-time)
QC Clerical (part or full-time)
Material Testing Expenses
Professional Staff for Submittal Reviews
Certification Expenses
Specialty Inspectors

TEMPORARY FACILITIES

Mobilization Costs
Job Office
Storage Sheds
Tool Shed
Ladders and Ramps
Stairways

CLEANUP

Periodic and Final Cleanup
Clean Floors
Clean Windows

INSURANCE

Surety Bond Watchmen
Public Liability Insurance
Fire and Wind Damage
Equipment Floater Insurance
Job Progress Photographs

REPAIR

Repair Damaged New Work
Owner Call-Backs

TRAVEL AND SUBSISTENCE (Exclude Home Office Personnel)

Travel Expenses
Travel Time Pay
Subsistence
Site Differences

EQUIPMENT

(General Contract administrative equipment and General Contractor equipment for general use for an extended period of time at the job site. Production equipment should be cost following the

Job Toilets

item of work requiring the equipment.)

TEMPORARY UTILITIES

Temporary Power Service

Temporary Power

Temporary Heat

Temporary Water

Temporary Water Service

Job Telephone

Pickup Trucks

Trucks

Forklift

Saw Rigs

Hoisting Towers

Cranes

Conveyors

Salamanders

Scaffolding

Wheel Barrows and Buggies

Power Tools

Picks, Shovels, Sledges, etc.

Miscellaneous Small Tools

TEMPORARY PROTECTION

Temporary Enclosures

Temporary Partitions

Barricades

Protect New Work

Protect Trees and Shrubs

Protect Existing Utilities

Protect Adjacent Property

9.2.5.2 Estimate Escalation

Add escalation to each design estimate. Escalate the project costs to the mid-point of the estimated construction period. Use the escalation line item for showing the mid-point escalation on the primary and sub contractors markup sheets in the Success formatted estimate.

9.2.5.3 Estimate Design Development Contingency

Add a percentage for contingency to allow for cost increases due to items of work which will become more clearly defined as the design develops. The added percentage shall be based on the judgment of the estimator. Show the percentage used on the primary and subcontractors mark-up sheets under design contingencies. Delete Design Development Contingency from the 100% and Final Estimate.

9.2.5.4 Additive Bid Items

Additive bid items shall be prepared and presented in the estimate in the same manner as the base bid estimate. Normally, each Additive Bid Item should be within 2 to 10 percent of the base bid item with the total of all additive bid items not to exceed 25 percent of the base bid item. Limit additive bid items to four items unless otherwise authorized.

9.2.6 Submittal Guidance

The submittal requirement is the same for 45 percent, 100 percent and Final Estimate. Review comments will be provided at each submittal stage. A-E response to review comments at each submittal is mandatory. Remember all estimates will be submitted using the work breakdown structure (WBS) numbering system. Failure to do so will be cause "for rejection."

9.2.6.1 Parametric Cost Estimate (PCE) Submittals, 1391 Plus & 15 Percent Estimates

Provide a primary and supporting facilities development sheet as back up for the budget estimate summary sheet, as indicated in the Cost Estimate Format Guide.

9.2.6.2 45 Percent Estimates

Prepare 45 percent estimates in as much detail as possible. Make sure that the scope of the project is clear. Fully develop the estimate summaries at the 45 percent stage even though the detailed work breakdown structure system by subsystem Success systems estimate may lack full detail. It is necessary to carefully evaluate escalation and design development contingencies discussed in previous paragraphs.

9.2.6.3 100 Percent Estimate

The 100 percent estimate shall be developed from completed drawings and specifications and shall be a firm and realistic estimate of the project cost based on a detailed and accurate quantity take-off extended with current unit costs. The summaries shall reflect costs by Bid Items as described in the bid documents and shall follow the approved or revised format furnished with the 45 percent review comments. As part of the 100 percent review comments, Cost Engineers will prepare a Cost Position Summary comparing it to the A-E's 100 percent estimate. Response to the summary and explanation to other review comments is mandatory and shall be provided as part of the Final Estimate Submittal.

9.2.6.4 Final Estimates

The final estimate should require only a backcheck of the 100 percent review comments if the project scope has not changed. If there is significant change in cost between the 100 percent and Final Submittal, verification will be required.

9.3 ENGINEERING DOCUMENTATION

See Chapter 3. If the project scope of work includes Engineering Documentation, the A-E is required to contact the Cost Engineer for detailed instructions on preparation. Examples of these items are shown in the Cost Engineering Estimate Format Guide.

9.4 AMENDMENT ESTIMATES

Amendment Estimates are issued to cover project changes after release of bid documents but prior to bid opening. The Amendment Estimate shall be prepared to reflect the changes in the project. The Amendment Estimate requirements for detail and format are identical to those of the Final Estimate.

9.5 CHANGE ORDER REQUEST ESTIMATES

Change Order Request (COR) Estimates are required when changes must be negotiated after the construction contract has been awarded. The format for this type of estimate is the same as that required of the Construction Contractor so as to assist the ROICC and to simplify negotiations. There are significant differences between development of COR Estimates and the Project Estimate previously discussed. Prepare separate estimates of direct costs for deductive and additive costs. Prepare a separate estimate for the Prime Construction Contractor's work and for each sub-contractor involved in the changed work. If necessary, contact the cognizant ROICC for information on the division of work between the general contractor and subcontractors. Examples of COR estimates format can be found in the Cost Engineering Estimate Format Guide available from the Cost Engineers. The A-E of record will only be required to complete the back sheet portion which is the unburdened cost. In-house estimates by the cost engineers will follow the same guidance.

9.6. BID ANALYSIS

Provide an analysis of the low bid when the low bidder is greater than ± 10 percent from the Final Government Estimate or when there is substantial variance with the other bidders and viability of the low bid is questionable. This involves the comparison of estimates with the low bidder's to the extent that areas of differences can be identified and evaluated for responsiveness to project requirements. The confidentiality of the Government Estimate shall be maintained and quantitative elements shall be divulged only as is necessary to obtain information for analysis and conclusions.

9.7 8(a) CONTRACTS

Since 8(a) projects are negotiated directly with the Contractor, the Government estimate should reflect that work for which funds are available and no more. There will be no Additive Bid Items allowed in 8(a) projects. There is only a Base Bid Item. The detailed estimate will be formatted in the same manner as estimates prepared for regular MCON projects as described herein before, except that the A-E will prepare a detailed estimate package with line item description and unit of measure only to be given to the 8(a) contractor for his use in presenting his proposal.

9.8 OPERATION AND MAINTENANCE (O&M) PROJECTS

These types of projects involve any combination of Construction, Repair, Maintenance, and Equipment Installation and are funded from local appropriations. For funding control, it may sometimes be required that line items in the cost estimates be designated with a “C”, “R”, “M”, and “E” to identify and segregate the types of work involved. Where this is a requirement of the Statement of A-E Services, consult with the Cost Engineers for guidance.

NOTES

CHAPTER 10. A-E INVOICING PROCEDURES

10.1 GENERAL

Payment will only be made on executed contracts and executed modifications. Progress payments are due and payable whenever a significant amount of work has been accomplished and upon receipt from the A-E of the completed forms:

- a. Contract Performance Statement, NAVFAC 10-7300/31, (See Exhibit 10-A)
- b. Contractor's Invoice, NAVFAC 7300/30, (See Exhibit 10-B)
- c. A-E Travel Claim Voucher, SOUTHWESTNAVFACENGCOM 4650/17 (See Exhibit 10-C)

Note: With final invoices include Contractor's Release, NAVFAC 4330/7, (See Exhibit 10-D)

10.2 INVOICE SUBMISSIONS

Submit originals only.

10.2.1 Mailing Instructions

For Procedure I: mail and address all invoices to the attention of the contracting officer, and plainly mark the lower left-hand corner of the front of the envelope:

[Insert name of the Command's Address]
[Insert name of appropriate team listed on each delivery order]
INVOICE ENCLOSED Project P-____ or R____-____
ATTENTION: Contracting Officer (refer to the contract document for the appropriate code)

For Procedure II: contracts, submit to the ROIC at contracting activity. Plainly mark the lower left-hand corner of the front of the envelope: "INVOICE ENCLOSED".

10.3 INVOICING FREQUENCY

Normally, partial payments are made at the 15%, 45%, 100% and Final stages of the design. Alternatively, partial payments will be made upon request by the A-E, whenever a significant amount of the contracted services have been accomplished, such as site investigations. However, no more than one (1) invoice per month per contract or delivery order will be accepted for payment. Payments will be made on the basis of the overall percentage of completion. Include completed forms, Exhibits 10-A and 10-B, at each invoicing.

10.3.1 Travel

Include a completed A-E Travel Claim Voucher, Exhibit 10-C, for each individual when invoicing for travel.

10.3.2 Final Invoice

Include executed Contractor's Release, Exhibit 10-D. Final payment will be made after:

- a. The Final Submittal has been reviewed and accepted;
- b. The A-E has submitted a properly executed contractor's release; and
- c. The A-E has returned all materials borrowed from the government.

10.4 CONTRACT PERFORMANCE STATEMENT, NAVFAC 10-7300/31 (EXHIBIT 10-A)

Exhibit 10-A shows invoicing format applicable when the A-E contract involves the design of one or more facilities. Include only items of the original contract and the change orders thereto. The award of services included as contract options will be by change order. If Post Construction Award Support is included as an option to the A-E Contract, a change order for these services will be issued after award of the construction contract. Item by item guidance on how to complete the Contract Performance Statement, Exhibit 10-A follows:

10.4.1 Location

The title and location of work as shown in the contract document.

10.4.2 Contract

A-E contract number.

10.4.3 Sheet Numbers

Number sheets consecutively.

10.4.4 Period Ending Date

Actual closing date of work for which invoice is presented. The period ending date must agree with the date on which the work was actually completed; e.g., the date on which submittals were actually made to Command.

10.4.5 Cost Category

Column (1). Leave blank.

10.4.6 Description Column (2)

Shall agree with descriptions of work authorized under the contract. Each portion of the A-E work shall be itemized as shown. Include any travel and per diem allowance contained in the contract in the itemized listing. If the contract includes Post Construction Award Support, provide separate descriptions for Construction Contract Support Services, Field Consultation During Construction and Value Engineering Evaluation, Title II Inspection, as applicable.

10.4.7 Estimated Cost - Column (3)

The estimated cost shall agree with the contract price and any subsequently approved modifications, including travel allowance. Enter modifications separately. Do not include work not covered by an executed contract document. The total of this column shall be the total value of the contract to date. For final invoicing involving reimbursable items, column (3) should be reduced to show actual costs and total if the A-E claims less than the amount authorized.

10.4.8 Percent Complete - Column (4)

The total of this column is the percentage of physical completion of the contract requirements as estimated by the A-E. Where this quotient involves a fractional percentage, the figure should be rounded. For final invoicing involving reimbursable items, column (4) should show 100 percent.

10.4.9 Value - Column (5)

The value of the completed work is the estimated cost of each item as shown in column (3) multiplied by the percent completed as shown in column (4). In no event will an invoice be processed for payment where the total indicated for column (5) is in excess of the total indicated for column (3) multiplied by the total percentage indicated for column (4). For final invoicing, include the actual costs for reimbursable items.

10.5 CONTRACTOR'S INVOICE, NAVFAC 7300/30, (EXHIBIT 10-B)

Include the name and code of the PL and the project identifiers as shown on Exhibit 10-B.

10.5.1 Invoice Date

Date of submission of invoices. This cannot precede "Period Ending" date shown on accompanying Contract Performance Statement, and shall not precede date of award of contract nor date of previous invoice.

10.5.2 Invoice Number

Insert the number of the invoice starting with "1" and continuing in sequence for subsequent invoices. The last invoice under the contract shall be labeled "Final".

10.5.3 From

Shall be the firm name, Point of Contact (P.O.C) and complete address as shown in the contract document.

10.5.4 Contract

Insert the contract number as shown on the contract document.

10.5.5 Station

The location of work as shown in the contract document.

10.5.6 Total Value Of Contract Through Modification

Insert the numerical designation of the last executed modification. The amount of the total value of contract shall agree with the total shown on column (3) of the Contract Performance Statement, including travel and per diem allowance. On the final invoice, this figure should be reduced to reflect actual costs for reimbursable items such as Travel, Field Consultation and Value Engineering Evaluation if the A-E claims less than the reimbursable amounts authorized.

10.5.7 Percentage Of Performance Complete

Divide column 5, Exhibit 10-A, (total) by line A, Exhibit 10-B.

10.5.8 Value Of Completed Performance

The value of completed performance shall agree with the total of column (5) of Exhibit 10-A.

10.5.9 Less: Total Of Prior Invoices

Insert the total of previous invoices and not the actual amount received by the A-E.

10.5.10 Amount Of This Invoice

Subtract line D from line C.

10.5.11 Signature

A principal of the firm shall sign the invoice. Indicate title of the person's position in the firm. Leave the first endorsement section blank.

10.6 NON-ACCEPTANCE OF A-E INVOICE

Improperly prepared invoices that do not meet the requirements of this A-E Guide will be returned to the A-E within 7 days of receipt, stamped NOT ACCEPTED. When you re-submit a properly prepared invoice, the date on it must be the date re-submitted and not the original date of the NOT ACCEPTED invoice. The invoice number will remain the same.

10.7 DISALLOWANCE ON INVOICED AMOUNT

Line item(s) or percentages of line items will be disallowed when the supporting documentation is absent or incomplete or when the PL disagrees with the A-E's estimate of the quantity of work performed.

NOTES

LOCATION: AIRFIELD PAVEMENT & ROAD REPAIR, NAVSTA SAN DIEGO

TO BE COMPLETED BY CONTRACTOR					FOR ROICC USE ONLY			
COST CATE- GORY	DESCRIPTION	ESTIMATED COST	% COM- PLETE	VALUE	%	CONSTRUCTION IN PLACE		
						VALUE	PRIOR REPORT	THIS PERIOD
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	<u>A-E SERVICES</u>							
	<u>AIRFIELD PAVT. P-048</u>							
	Sub-Surface							
	Investigation	\$ 5,000.00	100	\$ 5,000.00				
	Survey	\$ 4,000.00	100	\$ 4,000.00				
	Field Investigation	\$ 1,000.00	80	\$ 800.00				
	Design	\$25,000.00	20	\$ 5,000.00				
	Travel	\$ 4,500.00	-0-	\$ -0-				
	Modification P-001	<u>\$ 6,700.00</u>	<u>30</u>	<u>\$ 2,010.00</u>				
	Sub-Total	\$46,200.00	37	\$16,810.00				
	<u>ROAD REPAIR - R7-60</u>							
	Sub-Surface							
	Investigation	\$ 3,000.00	100	\$ 3,000.00				
	Survey	\$ 2,000.00	80	\$ 1,600.00				
	Field Investigation	\$ 1,000.00	100	\$ 1,000.00				
	Design	\$20,000.00	20	\$ 4,000.00				
	Travel	\$ 1,000.00	-0-	\$ -0-				
	Modification P-002	<u>\$ 4,500.00</u>	<u>10</u>	<u>\$ 450.00</u>				
	Sub-Total	\$31,500.00	32	\$10,050.00				
TOTAL		\$77,700.00	34	\$26,860.00				
UNDISTRIBUTED CHARGES MATERIAL								
OTHER								
GRAND TOTALS								

REMARKS

ROICC Name and Rank

LOCATION: AIRFIELD PAVEMENT & ROAD REPAIR, NAVSTA SAN DIEGO

TO BE COMPLETED BY CONTRACTOR					FOR ROICC USE ONLY			
COST CATE- GORY	DESCRIPTION	ESTIMATED COST	% COM- PLETE	VALUE	%	CONSTRUCTION IN PLACE		
						VALUE	PRIOR REPORT	THIS PERIOD
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	<u>POST CONSTRUCTION</u> <u>AWARD SUPPORT</u> <u>AIRFIELD PAVT. P-048</u> Modification P003 Construction Contract Support Services Field Consultation During Construction 2 days @ \$312.50 Value Engineering Evaluation 20 Hrs. @ \$32.00 Sub-Total	\$ 2,500.00 \$ 625.00 \$46,200.00 <u>\$ 620.00</u> \$ \$ 3,765	10 40 37 <u>50</u>	\$ 250.00 \$ 250.00 \$16,810.00 <u>\$ 320.00</u> \$ 820.00				
TOTALS								
UNDISTRIBUTED CHARGES-MATERIAL								
OTHER								
GRAND TOTALS								

REMARKS

ROICC Name and Rank

LOCATION: AIRFIELD PAVEMENT & ROAD REPAIR, NAVSTA SAN DIEGO

TO BE COMPLETED BY CONTRACTOR					FOR ROICC USE ONLY			
COST CATE- GORY	DESCRIPTION	ESTIMATED COST	% COM- PLETE	VALUE	%	CONSTRUCTION IN PLACE		
						VALUE	PRIOR REPORT	THIS PERIOD
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	<u>POST CONSTRUCTION</u> <u>AWARD SUPPORT</u> <u>Road Repair</u> Modification P-004 Construction Contract Support Services Field Consultation During Construction 2 days @ \$390.00 Value Engineering Evaluation 10 hrs. @ \$30.00 TITLE II INSPECTION Sub-Total	\$ 2,000.00 \$ 780.00 \$ 300.00 <u>\$100,000.00</u> \$103,080.00	10 	\$ 200.00 \$ 650.00 \$ 150.00 <u>\$ 10,000.00</u> \$ 11,000.00				
TOTALS		\$184,545.00	21	\$ 38,680.00				
UNDISTRIBUTED CHARGES MATERIALS								
OTHER								
GRAND TOTALS								

REMARKS

ROICC Name Rank

**NAVAL FACILITIES ENGINEERING COMMAND
A - E CONTRACTOR'S INVOICE**

CONTRACT SPECIALIST: _____ INVOICE DATE: _____
PROJECT NO. D. O. # _____ INVOICE NUMBER: _____
PROJECT TITLE: _____

FROM:

TO: COMMAND, CODE 0211

1. Below is a Statement of Performance under Contract N68711 _____
at (Station) _____

The enclosure provides breakdown of this statement of performance.

A. Total value of contract through change _____ \$ _____
B. Percentage of performance complete _____ %
C. Value of completed performance \$ _____
D. Less: Total of prior invoice \$ _____
E. Amount of this invoice \$ _____

Signature and Title: _____

From:

Date: _____

To:

1. Payment is recommended as follows:

A. Amount of work completed to _____ \$ _____
B. Less:
 Retention: \$ _____
 Other Deductions: \$ _____
C. Subtotal: \$ _____
D. Less Previous payments \$ _____
E. Recommended amount for _____ payment \$ _____

RESPONSIBLE CERTIFYING ACTIVITY UIC _____
INVOICE RECEIPT DATE _____
MATERIAL/SERVICES RECEIPT DATE _____
MATERIAL/SERVICES ACCEPTANCE DATE _____
DATE FORWARDED TO PAYING ACTIVITY _____
I CERTIFY THIS AMOUNT IS CORRECT AND PAYMENT IS RECOMMENDED:

SIGNATURE/TITLE

DATE

<u>ACRN</u>	<u>APPN/SUBHEAD</u>	<u>OC</u>	<u>BCN</u>	<u>SA</u>	<u>AAA</u>	<u>IT</u>	<u>PAA</u>	<u>COST CODE</u>	<u>AMOUNT</u>
-------------	---------------------	-----------	------------	-----------	------------	-----------	------------	------------------	---------------

Exhibit 10-B

A-E TRAVEL CLAIM VOUCHER

NAME _____

FIRM _____

PLACE OF TRIP _____

PURPOSE OF TRIP _____

AUTHORIZED BY _____

DATE _____

ITINERARY			
DATE 19	LOCAL TIME (24 Hour Clock)	(Home, Office, Base, Activity, City and State, City and Country etc)	MODE OF TRAVEL
	DEP		
	ARR		
	DEP		
	ARR		
	DEP		
	ARR		
	DEP		
	ARR		
	DEP		
	ARR		
	DEP		
	ARR		
	DEP		
	ARR		

REIMBURSABLE EXPENSES

CAR RENTAL _____ \$

CAR PARKING _____ \$

PRIVATE CAR MILEAGE(.29/MILE) ____ \$ _____

BRIDGE, ROAD, FERRY TOLLS _____ \$ _____

GASOLINE _____ \$ _____

TAXI _____ \$ _____

AIR FARE _____ \$ _____

I CERTIFY THAT AMOUNTS ARE ACTUAL AND NECESSARY

EXPENSES INCURRED IN PERFORMANCE OF OFFICIAL

TRAVEL FOR WHICH I HAVE NOT BEEN REIMBURSED:

(SIGNATURE)

DATE

REQUIRED ATTACHMENTS: A. RECEIPTS FROM CARRIERS, COPIES OF TICKETS, OR REQUIRED CERTIFICATIONS IF COST OF TRANSPORTATION IS CLAIMED.

B. RECEIPTS FOR LODGINGS AND ANY ITEM OF EXPENSE CLAIMED IN EXCESS OF \$25.00.

C. ITEMIZATION OF ACTUAL EXPENSES ON A DAILY BASIS WHEN CLAIM FOR REIMBURSEMENT INCLUDES TRAVEL ON AN ACTUAL EXPENSE BASIS.

INFORMATION REQUIRED BY THE PRIVACY ACT OF 1974. AUTHORITY: 5 U.S.C. 5701-5742.37 U.S.C. 404-427, AND E.O. 9397 PRINCIPLE PURPOSE: USED FOR REVIEWING, APPROVING, ACCOUNTING AND DISBURSING FOR OFFICIAL TRAVEL.

ROUTINE USES: TO SUBSTANTIATE CLAIMS FOR REIMBURSEMENT FOR OFFICIAL TRAVEL.

DISCLOSURE: VOLUNTARY. FAILURE TO FURNISH INFORMATION REQUESTED MAY RESULT IN TOTAL OR PARTIAL DENIAL OF CLAIM.

Exhibit 10-C

CONTRACTOR'S RELEASE
NAVFAC 4330/7 (6-72)
S/N 0105-lf-001-9100

CONTRACTOR'S RELEASE UNDER CONTRACT

KNOW ALL MEN BY THESE PRESENTS: In consideration of the premise and the sum of

(\$ _____)
lawful money of the United States of America (hereinafter called the "Government")

(\$ _____)
of which has already been paid and

(\$ _____) of which is to be paid
by the Government under the above-mentioned contract, the undersigned Contractor does, and by the receipt of said sum shall,
for itself, its successors and assigns, remise, release and forever discharge the Government, its officers, agents, and
employees, of and from all liabilities, obligations and claims whatsoever in law and in equity under or arising out of said
contract.

IN WITNESS WHEREOF, this release has been executed this _____ day of _____ 19

WITNESS:
(Contractor)

_____ BY:

_____ TITLE:

CERTIFICATE

I, _____, certify that I am the _____ secretary
of the corporation named as contractor in the foregoing release; that
who signed said release on behalf of the Contractor was then _____ of said corporation;
that said release was duly signed for and in behalf of said corporation by authority of its governing body and is
within the
scope of its corporate powers.

(Corporate Seal)

Exhibit 10-D

ATTACHMENT A

CALCULATION REQUIREMENTS

1. GENERAL

Furnish in separate bound volumes by disciplines, designated as "Calculations", all supporting data, rationale (system and equipment selection, engineering considerations and life cycle cost) and calculations. When the 45% submittal is not required, calculations normally required to be submitted with the 45% shall be submitted with the 100% submittal.

1.1 45% SUBMITTAL

1.1.1 Civil

Provide calculations to support the design for the following:

- a. The quantity of water required and the sizes, materials and class of all pipes, reservoirs and pumps for all water systems. Also provide typical pump and system curves.
- b. The quantity of sewage and the sizes, material and type of all sewer lines for all sanitary sewer systems. Also provide typical pump and system curves.
- c. To verify the design flow and sizing of all Sewage Treatment System units.
- d. The asphalt and paving sections.
- e. Storm drainage facilities.
- f. To indicate if the site has a balanced cut/fill or the quantity of borrow/disposal.
- g. Retaining wall design to comply with the latest edition of UBC.

1.1.2 Structural

Provide sufficient structural calculations to verify the framing system, and all major structural elements for all loads including wind and seismic.

1.1.3 Mechanical

Provide calculations for the following:

- a. Building or room heat gain and loss.

- b. Pressure drops for pump and compressor selection.
- c. Duct, equipment and other external losses for fan selection.
- d. Water capacity of pipe and equipment and pressures used for system design and for expansion tank selection.
- e. Expansion and contraction of piping with stresses at loops and anchor points.
- f. Cv value selection for all control valves.
- g. For direct expansion refrigeration systems, provide information for pressure drops and velocities of gas and liquid (including velocity to return oil for gas and suction risers), at zero degrees F.
- h. Water heaters - capacity and make up requirements.
- i. Heat exchanger - temperature, flow, capacity and heat rejection rate.
- j. Fluid velocity in pipes and ducts.

1.1.4 Electrical

Provide calculations for the following:

- a. Preliminary connected and demand load tabulations.
- b. Lighting calculations showing design and calculated foot-candles to justify quantity, type, and layout of fixtures.

1.1.5 Fire Protection

Provide calculations for the following:

- a. Total sprinkler system demand based upon discharge density, area of sprinkler operation and outside hose allowances.
- b. Fire pump size and pressure calculation.
- c. Foam application rate.
- d. Rate of application of CO₂ and any other approved clean agent.
- e. Smoke control system pressure difference, airflow and response time.

- f. Fire flows and pressures.

1.2 100% SUBMITTAL

1.2.1 Civil

Provide calculations to verify:

- a. Quantity of storm flow (use MIL-HDBK-1005/2 and 1005/3), velocities, sizes, material, class and "D" load design of all storm sewers and culverts, outlets, erosion controls, and sizes of drop inlets for Storm Sewer Systems and surface drainage.

1.2.2 Irrigation System

Provide calculations for the following:

- a. Calculations for:

1. Valve at highest elevation.
2. Valve at lowest elevation.
3. Valve with highest GPM (L/M) and GPH (M^3/H).
4. Valve with lowest GPM (L/M) and GPH (M^3/H).

- b. Calculation sheet indicating valve sequence number, total GPM/GPH, elevation of valve, water meter and highest irrigation head or emitter, total friction loss through all irrigation equipment and piping, operating PSI (kPa) of irrigation head or emitter and residual PSI, or kPa.

1.2.3 Structural

Provide refinement of 45 percent calculations, i.e., detailed calculations to verify adequacy of design and selection of structural system. Calculations shall include but are not limited to:

- a. Vertical and lateral analysis.
- b. Anchorage for Mechanical, Electrical and Non-structural elements.

1.2.4 Mechanical

Provide refinement of 45 percent calculations, i.e., complete detailed calculations to verify adequacy of design and selection of equipment, source connections, and flow balance. Calculations shall include but shall not be limited to:

- a. Room by room load calculations.
- b. Final steam, hot water, chilled water, gas, oil, etc., distribution and flow balance.
- c. Update flow diagram to reflect final loads, equipment capacity and pressure requirements.

1.2.5 Electrical

Provide calculations to verify adequacy of design and selection of equipment, conductors, and protective devices. Include as a minimum the following:

- a. Load tabulation of connected and demand loads.
- b. Voltage drop calculations for conductors.
- c. Voltage drop calculations for starting large motors.
- d. Short circuit calculations.
- e. Lighting calculations.
- f. Coordinated time-current characteristic curves of protective devices. Final device settings and time-current characteristic curves shall be provided during construction when exact devices are known.
- g. Tension and sag calculations for pole line conductors, messengers, and guys.

1.2.6 Fire Protection

Update 45% calculations to verify adequacy and accuracy of the system. Complete hydraulic calculation of sprinkler and foam water system to verify adequacy of available water supply.

ATTACHMENT B

ELECTRONIC DESIGN DATA REQUIREMENTS

1. GENERAL

COMPUTER AIDED DESIGN AND DRAFTING

1.1 Project Design and Construction Documents

Project design and construction documents shall be produced using Computer Aided Design and Drafting (CADD) technology and other electronic software. Compatibility with Southwest Division hardware and software is required to permit effective review, use and eventual modification of the drawings by the government. The following specific requirements are provided to ensure that the deliverable items furnished under the design contract are capable of being fully utilized by Southwest Division and by the Station/Activity. A-Es shall provide their CADD and other electronic work products such that the data can be utilized effectively and efficiently by Southwest Division using its existing Microstation J CADD and Adobe Acrobat 4.0 software running on the Microsoft Window NT version 4.0 operating system.

2. DEFINITIONS

2.1 Definitions That Apply To References and Uses Included in These Standards

- a. Windows 95, 98 or NT 4.0 registered trademarks: Refers to disk operating systems that are fully compatible with AutoCAD Release 14 or Microstation J.
- b. AutoCAD Release 14 and Microstation J: Computer Aided Design and Drafting (CADD) software programs, registered and trademarked by Autodesk, Inc. and Bentley Corporation, respectively.
- c. Acrobat 4.0 Portable Document Format (PDF) authoring software registered and trademarked by Adobe Systems, Inc.
- d. Drawing: A plotted output hard copy representation of drawn design data prepared on vellum or other suitable reproducible material. The plotted output must be accomplished by electromechanical means, i.e., a plotter. Hand drafted changes and/or additions to plotted drawings after final plot will not be acceptable. Final plots shall match "*.DWG" or "*.DGN" file on magnetic media completely. The quality, size, configuration, and other physical attributes of final plotted drawings shall be as described in the contract.

- e. Menu Modifications: Any and all modifications to default menu configurations (supplied by Autodesk, Inc., or Bentley Corporation, with the originally issued program package), which are, or were, created by the A-E through the use of text files and text editors to facilitate the production of the Project Documents.
- f. LISP Routines: Any and all new LISP or AutoLISP routines which are, or were, created by the A-E through the use of text files and text editors to facilitate the production of the Project Documents. For purposes of this document, the terms "LISP" and "AutoLISP" shall be considered to be synonymous.
- g. Data Files: Any and all deliverable information supplied by the A-E which may contain either graphic data, nongraphic data, or a combination of both, stored upon, and retrievable from, digital media in either ASCII text files or "*.DWG/DGN" files compatible with AutoCAD Release 14 or Microstation J. Specific files included shall contain all files and data necessary to facilitate reading, loading, copying, editing, and plotting all of the various data files.
- h. Digital Media: ISO 9660 compliant Disk (CD-ROM).
- i. Hard Copy: A printed or plotted copy (photo-reproducible) in "letter" or "drawing" format.
- j. ASCII (American Standard Code for Information Interchange): A text file format resulting from the utilization of a word processing program. Word processing programs used shall be compatible with Microsoft Word, Version 7.0.
- k. Electronic Solicitation (ES): An electronic acquisition methodology developed by the Tri-Service CADD/GIS Technology Center. ES consists of the same Contract Forms, Clauses & Conditions and Drawings & Specifications used for normal acquisition, i.e., hard copy paper documents, but in electronic form distributed on compact disk (CD-ROM) and/or over the Internet. In order to facilitate Southwest Division's use of ES methodology, all electronic submittal deliverables will be required to be in Adobe Acrobat PDF in addition to native file formats. More information regarding this software can be obtained from Adobe Systems, Inc.: 345 Park Avenue , San Jose, CA 95110-2704, phone: (800) 879-3219, website: <http://www.adobe.com>.

3. DELIVERABLES

3.1 Computer Files

Computer files created for Southwest Division projects through the use of CADD are deliverable items to be furnished on ISO 9660 compliant CD-ROM. By reference, DFAR

clause 252.227-7023 - Drawings and Other Data to Become Property of Government is made as part of this contract's requirements.

3.1.1 Required Files

Required files include, but are not limited to, the following:

- a. Drawings: All hard copy drawings produced for the purpose of designing and/or drafting the Project in compliance with the requirements of the A-E Contract, the A-E Guide and other referenced instructions, directives, design manuals, etc.
- b. Electronic Files: All files shall be compressed, native format and compatible with and readable (without modification) by AutoCAD, version 14 or Microstation J as required by the specific Station. Required files include, but are not limited to, the following files and will be placed in a directory structure separating each design discipline:
 - (1) Project Drawings; in two formats - uncompressed native file format (DWG or DGN) and Adobe Acrobat PDF. To facilitate ES and printing by Southwest Division, individual PDF files will be combined into a collated set utilizing Acrobat Exchange software yielding a single interactive file "bookmarked" to each sheet. Where the number of project drawings would create a file larger than 5 Megabytes, the drawing set may be broken down into multiple PDF files smaller than 5 Megabytes. PDF drawing files are to be rendered full scale, with black & grey screened linework and used to produce the plotted hardcopy drawings required by this contract to be submitted with wet stamps & signatures.
 - (2) All Drawing library symbols, blocks, attributes, script files, hatch and/or fill patterns, text fonts and/or styles, etc., utilized during the preparation of the Project Drawings. These CAD elements shall be located in the same directory as the CAD files such that no errors or replacements are encountered when the file is opened in its native format from the CD-ROM.
 - (3) All menu modifications, LISP programs and routines, and other custom commands utilized in the development of the Project Drawings and required to facilitate evaluation and/or editing of the Project files.
 - (4) SpecsIntact SGML Specifications in both uncompressed native file format and Adobe Acrobat PDF. To facilitate Electronic Bid Solicitation by Southwest Division, a single interactive PDF Specifications manual will be produced utilizing Adobe Acrobat Exchange. The PDF

Specification will be "bookmarked" to the first page of each division & section and the table of contents will be "linked" to each division & sections first page.

- (5) Cost Estimates; in both uncompressed native file format and Adobe Acrobat Portable Document Format (PDF).
- (6) Calculations; in both uncompressed native file format and Adobe Acrobat PDF. If handwritten, calculations will be scanned and converted to Adobe Acrobat PDF.
- (7) Reports; in both uncompressed native Microsoft Word 7.0 file format and Adobe Acrobat PDF.
- (8) Design review comments in both uncompressed native Microsoft Word 7.0 file format and Adobe Acrobat PDF.
- (9) To facilitate Electronic Solicitation by Southwest Division, provide a complete ES CD-ROM including Contract Viewer software with appropriate editing of the CON file. A sample ES CD-ROM and instructions may be obtained from:
<http://tsn.wes.army.mil/TSNSoftware.asp>. Native format CADD data required to be submitted by item (1) above is not to be placed on the ES CD-ROM unless directed by the Contracting Officer (i.e., for design-build RFP packages).

4. DOCUMENTATION DELIVERY

4.1 Required Documentation

Required documentation shall be delivered in hard copy form, 8 1/2" x 11" paper (210mm x 297mm) and on digital media utilizing PDF format and shall include the following:

- a. Indexed Listing of all data files included in the Project;
- b. Cross Listing of all file names and corresponding Drawing names;
- c. Indexed Listing of all data files required for each Drawing, including, but not limited to:
 - (1) Symbols and blocks with scale factor and attribute data;
 - (2) Hatch and fill patterns, text fonts, etc.
- d. Comprehensive Listing of all menu modifications, LISP routines, and/or customized commands required to properly load, edit and plot each Drawing;

- e. Complete plotting instructions, i.e., AutoCAD color to weight mapping, etc..

5. COMPOSITION OF FILES

5.1 Project Drawing Characteristics

- a. Project Drawings, drawing files, and other graphic intelligence files shall be created in accordance with the Station/Activity preference, where same exists, regarding layer/level, line weight and plotting information, etc.. Where no Station/Activity preference exists, files shall be created in accordance with the Tri-Service A/E/C CADD Standards, latest release, as published by the Tri-Service CADD/GIS Technology Center. For more information on the Tri-Service A/E/C CADD Standards and/or a copy on CD-ROM, contact:

<p>Tri-Service CADD/GIS Technology Center Attn: CEWES-IM-DA/Spangler 3909 Halls Ferry Road Vicksburg, MS 39180-6199 Phone: 1-800-522-6937 x6783 e-mail: spangls@ex1.wes.army.mil Home Page: http://tsc.wes.army.mil</p>

- b. Drawings: Shall be modular in construction and content with respect to the various text, symbols, blocks, attributes and individual drawing entities. The A-E shall institute a quality control program to insure maximum modularity.
- c. Symbols and Blocks: Consisting of various groupings of entities, as required, and showing functional definitions or "blocks" of each drawing. (For example, for a Mechanical Drawing defining a chilled water piping system, a block may consist of predefined entity groupings representing pumps and valves.) Symbols and blocks utilized to produce a Drawing shall be furnished separately as parts of a symbol library and shall identify all individual entities utilized to construct the symbol or block, in order to facilitate future editing and/or reconstruction.

6. PROJECT SCHEDULE

6.1 Project Design Schedule And Phase.

The Project schedule shall be separated into two distinct parts, subject to variations relating to the A-E Contract and to the A-E Scope of Work.

a. Design Phase:

(1) 100% Submittal: Shall include all Drawings which are a part of the 100% submittal package and shall include all Deliverables and Documentation described in Items 3 and 4 above, including all corrections required as a result of Government Review.

(2) Final Submittal: Shall include all Drawings which are a part of the Final submittal and shall include all Deliverables and Documentation described in Items 3 and 4 above, including all corrections required as a result of Government Review.

b. Construction Contract Support Services Phase: The A-E shall update all CADD drawing and database files to reflect project as-built conditions as indicated by the record documents kept by the construction contractor at the job site. Upon completion of the construction project, all updated computer files as described above shall be delivered to the government in the formats and media described above.

ATTACHMENT C

CODE CRITERIA SEARCH:

Date: _____

Project Title: _____

Location: _____

A-E Contract No.: _____

Name of the A-E Firm: _____

A-E Firm Contact: _____ Tel: _____

Project Leader: _____ Tel: _____

REFERENCES:

- ◆ MIL-HDBK-1008C: Dated 10 JUNE 1997
- ◆ APPLICABLE NATIONAL FIRE CODES (N.F.C) (Latest Edition)
- ◆ UNIFORM BUILDING CODE (Latest Edition)
- ◆ NAVFAC Policy and Design Planning Statements and or Design Policy Letters
- ◆ CONSTRUCTION CRITERIA BASE (CCB) (Latest Edition)

(MIL-HDBK-1008C, Policy and Design Planning Statements and Design Policy Letters supersede NFPA & UBC Requirements where addressed)

1. USE OR OCCUPANCY AND GENERAL BUILDING LIMITATIONS (MIL-HDBK-1008C AND UBC CHAPTERS 3,4,& 5):

1.1 Use: _____

1.2 Occupancy Group(s) (UBC Table 3-A): _____

1.3 Type of Construction (MIL-HDBK-1008C & UBC Table 5-B) : _____

1.4 Allowable Area:

Basic Allowable (UBC Table 5-B):	_____	s.f (s.m)
Multi-Story Increase (UBC Sec. 504.2):	_____	
Subtotal:	_____	s.f (s.m)

Yard Increase (UBC Sec. 505.1):		
Two Sides: (_ - 20)1.25% = 50% max	_____	s.f (s.m)
Three Sides: (_ - 20)2.5% = 100% max	_____	s.f (s.m)

3.0 MEANS OF EGRESS (N.F.P.A 101):

3.1 Minimum Egress Requirements (Sec. 5-2 to 5-5):

Occupancy/Use	Area (gross or net s.f/s.m)	Occupant Load Factor (s.f/s.m)	Occupant Load Area ÷ Occupant Load	Egress Factor Stairways in/cm	Level in/cm

Required Exit Width: Occupant Load x Egress Factor = ____ x ____ = In (cm)

Required No. of Exits (min. 2): Exit Width ÷ Door Clear Width = ____ ÷ ____ =
(Min.32 in/81 cm)

Required Stair Width: Occupant Load x Egress Factor = ____ x ____ = In (cm)
(min. in/112 cm)

Is Stairs Limiting Component ? : ____ Yes ____ No

3.2 Travel Distance to Exits (Sec. 5-6):

Occupancy	Travel Distance Limits	Unsprinklered ft/m	Sprinklered ft/m
	To exits		
	Common Path		
	Dead - End		

3.3 Separation of Means of Egress (sec 5-1 & 6-2):

Are Exit Access Corridors Required to be Separated from other
Parts of the Building by Fire Rated Walls: ____ YES ____ No

If Yes: By ____ Hour Rated Walls and ____ Minute Rated doors

Are Exits and Vertical Openings Required to be Separated from
other Parts of the Building by Fire Rated Walls: ____ Yes ____ No

If Yes: By ____ Hour Rated Walls and ____ Minutes Rated doors

If No: Section and Exception No.:

3.4 Emergency Lighting Provided (Sec 5-9): ____ YES ____ No

3.5 Marking of Means of Egress Provided (Sec 5-9): ☐ YES ☐ No

3.6 SPECIAL HAZARD PROTECTION (Sec 6-4):

Hazardous Area Description	Separation/Protection (rated walls and/or sprinklers)
Laundry Room & Trash Room	1- hr and sprinklers

3.7 Atriums Where Permitted Shall Comply with Sec 6-2.4.6 and NFPA 92B. Provide Design Criteria: _____

3.8 INTERIOR FINISH (MIL-HDBK-1008C & Sec 6-5):

Areas/Rooms	Class A, B, or C	
	Sprinklered	unsprinklered
exits, exit passageways, sleeping rooms, & correction facility	A	
hospital patient rooms	B (w/quick response heads) A	
Other:		

3.9 ROOF COVERINGS AND ROOF DECK ASSEMBLIES (MIL-HDBK-1008C :

Roof Coverings: ☐ Class A ☐ Class B ☐ Class C
Roof Deck Assembly: ☐ FM Class I ☐ UL Listed ☐ NRTL

4.0 ROOF ACCESS FOR MANUAL FIRE FIGHTING (MIL-HDBK-1008C & NFPA 1):

Fire Fighting Access to Roof in Buildings 3 and More

Stories in Height Shall be Provided:

Size of Hatch ((not less than 16 s.f (1.48 s.m) with a min.
dimension of 2 ft (61cm)):

☐ O.K. ☐ N/A
☐ s.f (s.m)

Fire Dept. Vehicle Access in Facilities 4 Stories or More in

Height and All Warehouses Shall be Provided:

Are Fire Lanes and Turnarounds in Compliance With NFPA 1:

☐ O.K. ☐ N/A
☐ Yes

4.1 UNSPRINKLERED ATTICS AND SUSPENDED CEILINGS (MIL-HDBK-1008C):

Is Concealed Space: ☐ Combustible or ☐ Non-Combustible

Draft Stops in Concealed Combustible Attics/Ceilings Shall be Provided to

Divide the Spaces into Areas Not Exceeding **3000 s.f (280 s.m)**

☐ O.K.

4.2 SMOKE AND HEAT VENTS (MIL-HDBK-1008C & NFPA 204):

In Sprinklered Buildings Prefer Skylights When Vents are Required ☐ O.K. ☐ N/A
In Unsprinklered Buildings Provide Auto Operated Vents ☐ O.K. ☐ N/A

5.0 FIRE EXTINGUISHING SYSTEMS (MIL-HDBK-1008C AND NFC):

5.1 Automatic Sprinkler Systems:

Is an Automatic Sprinkler System Required or Provided: ☐ YES ☐ No

Type of Sprinkler System Provided: _____

Discharge Density: _____ gpm/s.f (l/s/mm)

Discharge Area: 3000 s.f (279 s.m) and Outside Hose Allowance of _____ gal/min (L/min)

Min. Underground Main Size: 6 in (153 mm)

Fire Flow information:

Static Pressure: _____ psi (kPa) Hydrant No. _____

Residual Pressure: _____ psi (kPa) Hydrant No. _____

Available Flow: _____ gpm (L/s)

Fire Pump Size, If Required: _____ Pump(s) Rated @ _____ gpm (L/s) and _____ psi (kPa)

5.2 Gaseous Extinguishing System (MIL-HDBK-1008C and NFPA 12 & 2001) :

Is a gaseous extinguishing system required: ☐ YES ☐ No

Description of System: _____

5.3 Manual Fire Alarm and Detection Systems:

Is a Manual Fire Alarm and/or Fire Detection System
Required or Provided: ☐ YES ☐ No

5.4 Hydrants (MIL-HDBK-1008C):

Min. No. of Hydrants Required by Flow : _____ gpm (L/s)

Min. Size of Lateral main : 6 in (153 mm) Spacing Between Hydrants: _____ ft (m)

5.5 AIR HANDLING (Air Handling, Heating, Ventilation, and Exhaust Systems, and Fire Dampers Shall be in Compliance with NFPA 90A, 90B, 91, 96 and 101)

Are Duct Detectors Required: ☐ Yes ☐ No

Are Fire Dampers Required: ☐ Yes ☐ No

ATTACHMENT D

PROJECT REVIEW ENVIRONMENTAL PERMIT CHECKLIST

HAZARDOUS WASTE	YES	NO
1. Does the project involve a hazardous waste transfer or storage facility?		
2. If yes, will the waste be stored longer than 90 days?		
3. Is the required containment provided for spills?		
4. Are incompatibles stored separately?		
5. Is the floor slopped to allow spill collection or, alternatively, are containers elevated to prevent contact with spills?		
6. Is the truck loading apron bermed to collect spills?		
7. Is the facility at least 50 feet (15.24 meters) from the property line?		
8. Is a construction permit required?		
9. Is an operating permit required?		
UNDERGROUND STORAGE TANKS		
10. Does the project involve underground storage of regulated substances?		
11. Will there be closure or removal of an UST?		
12. Will there be installation or modification of an UST?		
13. Is a construction permit required?		
14. Is notification or registration required?		
15. Is leak detection provided?		
16. Is the UST used to store heating oil only for consumptive use on the premises?		
17. Are regulatory design criteria met?		
HAZARDOUS WASTE TANKS		
18. Does the project involve either under or aboveground storage of hazardous waste in tanks?		
19. Will the hazardous waste be stored longer than 90 days?		
20. Is a construction permit required?		
21. Is an operating permit required?		
22. Is notification required?		
23. Is leak detection provided?		
24. Is the tank double walled?		
25. Is the tank compatible with what will be stored?		

	YES	NO
26. Is a RCRA permit required?		
AIR PERMITS		
27. Does the project involve an air pollution source?		
28. Compare air source emissions with the Applicable Air Pollution Control District (APCD) state allowable emissions standards and determine if permit application is required.		
29. Will toxic air containment's present require a health risk assessment?		
30. Will equipment noted on enclosed list be installed or modified?		
31. Are regulated operations or sources such as boilers, incinerators, petroleum storage tanks, fire-fighting training, munition disposal by burning, plating, sandblasting, rocket and jet engine testing, asbestos application by spraying, fuel-transfer, or painting involved?		
32. Are there other potential air sources?		
33. Is a construction permit required?		
34. Will new source Best Available Control Technology (BACT), Air Quality Modeling (AQM), Lowest Achievable Emission Rate (LAER) and offsets to meet requirements of new sources review regulations?		
35. Are other regulatory agency permits required?		
36. Are emission controls provided (Particulate, SOX, VOC, etc.)?		
37. Will there be an air emission source from an Installation Restoration Program (IRP) removal or remedial project?		
38. If yes, will a CERCLA permit exemption apply? (Remedial action conducted entirely on-site)		
VAPOR RECOVERY		
39. Does the project involve a gasoline filling station?		
40. Is a stage I and/or a stage II vapor recovery system required?		
41. Are permits required?		
ACQUISITION OF LAND/BUILDINGS		
42. Does the project involve land or building acquisition?		
43. Has an environmental site survey been completed?		
44. Is the site known to have been used to store, handle, or dispose of hazardous materials/wastes?		
45. Is the site, or has it been, occupied by bulk storage tanks?		
46. Is asbestos present or likely to be present?		
47. Are PCB transformers present?		
48. Will necessary permits require environmental testing/cleanup?		

	YES	NO
49. Will public hearing be required?		
<u>DEMOLITION</u>		
50. Does the project involve demolition?		
51. Is asbestos present or likely to be present?		
52. Will asbestos removal notification be required?		
53. Is lead paint present?		
54. Are PCB transformers present?		
55. Are any permits required, including concurrence from State Historic Preservation Office on historic/cultural resources?		
56. Are underground storage tanks present?		
<u>WITHDRAWAL FROM AQUIFERS</u>		
57. Does the project involve water withdrawal from an aquifer?		
58. If yes, is the aquifer sole-source?		
59. Is notification required?		
60. Are any permits required?		
61. Is water withdrawal a result of an Installation Restoration removal or remedial action project?		
62. If yes, will a CERCLA permit exemption apply?		
<u>WATER PERMITS</u> <u>WATER WITHDRAWALS</u> <u>SURFACE WATER WITHDRAWALS</u>		
63. Does the project involve the withdrawal of water from surface water sources for domestic (potable) uses or industrial usage?		
64. Is a water allocation permit required?		
65. Are construction permits required for intake structures?		
66. Is notification of regulatory agencies required?		
<u>GROUND WATER WITHDRAWALS</u>		
67. Does the project involve the direct withdrawal of groundwater for potable, industrial uses or groundwater clean-up?		
68. Is a water allocation permit required?		
69. Is notification of regulatory agencies required?		
70. Are well construction permits required?		
<u>TREATMENT FACILITIES</u>		
71. Does the project include potable water storage (tanks, reservoirs) or treatment (disinfection, pH control, filtering) facilities, or expansion of the basewide water distribution system?		

	YES	NO
72. If yes, are potable water construction/operating permits needed?		
<u>WASTEWATER DISCHARGES</u>		
<u>DOMESTIC SEWAGE</u>		
73. Will domestic (sanitary) sewage be discharged from the project?		
74. Does the project discharge to a sanitary sewage collection system?		
75. Will new sewer mains be constructed or will the effluent flow increase?		
76. Are construction, operating or sewer extension permits required?		
77. Does the discharge flow to a Navy owned STP?		
78. Will the discharge affect the ability of the sewage treatment plant to meet the flow parameters of the NPDES permit? (if yes, a new permit may be required)		
79. Is notification of regulatory agencies required?		
80. Does the discharge flow to a publicly owned treatment plant?		
81. Is notification required?		
82. Is a connection permit required?		
83. Does the discharge flow to a septic system?		
84. Is the septic system new?		
85. Is a construction permit required?		
86. Is a discharge (to groundwater) permit required?		
87. Is the septic system existing?		
88. Does it have a permit?		
89. Are there flow limitations?		
90. Is notification of increased flow required?		
91. Does the project involve the construction of a sewage treatment plant?		
92. If yes, is a NPDES permit required?		
<u>INDUSTRIAL DISCHARGES</u>		
93. Is there going to be a discharge of industrial wastewater from the facility? An industrial discharge can be considered any wastewater generated by any source other than sanitary facilities, such as sinks, urinals, water closets, and floor drains. Examples are photographic labs, laundries, plating operations, pesticide-formulation operations, hospitals, explosive manufacturing, numerous organic and inorganic chemical processes, and cooling and blowdown water from boilers.		
94. Is the discharge going to flow into a sanitary sewage collection system?		
95. If yes, is pretreatment required?		
96. If yes, is a permit required? (Local ordinances may be required for permits for any industrial connection)		

	YES	NO
97. Is the discharge going to flow to a storm sewer system, surface water or groundwater?		
98. If yes, is a NPDES permit required?		
99. Construction permits may be required for outfall structures or wells.		
100. Will there be a discharge to the sanitary sewer from an Installation Restoration Program removal or remedial action project?		
101. If yes, is a permit required?		
STORM WATER DISCHARGES		
102. Facilities that “discharge storm water associated with industrial activity,” includes any site where certain activities are performed. Projects that propose to perform any industrial activity may require (1) modification of an existing NPDES storm water permit or, (2) submission of an application for a new permit. NPDES permits will also be needed if a facility, currently without a permit, constructs an industrial facility.		
103. Does the project involve construction activities that disturb more than 5 acres?		
104. If yes, is a NPDES permit required?		
105. Will there be discharge to the storm sewer from an installation Restoration Program removal or remedial action project?		
106. If yes, will a NPDES permit be required?		
CORPS OF ENGINEERS PERMITS		
107. Does the project describe work in or adjacent to the coastal zone or aquatic sites such as, but not limited to, rivers, streams, lakes, creeks, ponds, estuaries, etc.?		
108. Does the project describe work in or adjacent to wetlands?		
109. Is the project adjacent to or within a wetland or aquatic environment or will have an impact upon a wetland or aquatic environment, has a wetland delineation been completed?		
110. If the project will have an impact upon wetlands, or aquatic environment, has site approval been issued?		
111. Has the wetland delineation been confirmed by the U.S. Army Corps of Engineers or state regulatory agency?		
112. If a coastal zone consistency determination is required, has it been completed?		
113. Does the project require utility runs that might cross wetlands or navigable water? (These may be included in other projects)		
114. Does the project include or require access roads that cross wetlands or navigable water?		
115. Does the project include construction of intake/discharge structures or headwalls within a wetland or waterway?		
STATE WETLANDS PERMITS		
116. Does the state in which the project is sited have wetlands and/or dredging regulations which may apply to the projects?		

	YES	NO
117. Does the project describe work within 100 feet of wetlands?		
STATE WATER QUALITY CERTIFICATION		
118. Does the project require state review and approval under the provisions of Section 401, of the Clean Water Act? (Water Quality Certification)		
APPLIED BIOLOGY PROJECTS		
119. Does the project include installation or maintenance of wood piles, poles, or ties?		
120. Is the project a waterfront structure, pier wharf or bulkhead?		
121. Does the project include wood structural components?		
122. Does the project include landscaping with plants or maintenance of turf, shrubs or trees?		
123. Does the project include the application of pesticides other than for the prevention of termites?		
124. Has preconstruction treatment to prevent termites (NFGS 02284) been omitted from the specification?		
125. Is preconstruction treatment to prevent termites other than as specified in NFGS 02285?		
ASBESTOS REMOVAL		
126. Does the project include the construction, repair or rehabilitation of food service or food storage facilities?		
127. Does the project involve potential disturbance of asbestos?		
128. Has an asbestos survey been performed?		
129. Does the project involve renovation, demolition or repair work?		
130. Is federal, state or local notification required?		
131. Are any state or local permits required?		
132. Is third party monitoring required or recommended?		
133. Is the NAVFAC spec section 02080 included and edited correctly?		
LEAD PAINT REMOVAL		
134. Does the project involve potential disturbance of lead paint?		
135. Had a lead paint survey been performed?		
136. Does the project involve renovation, demolition or repair work?		
137. Is federal, state or local notification required?		
138. Are any state or local permits required?		

Attachment D-1
EQUIPMENT REQUIRING PERMITS

1. Abrasive Blasting Equipment (Pot & Nozzle)
2. Asphalt Roofing Kettles
3. Asphalt Tankers
4. Hot-Mix Asphalt Paving Batch Plants
5. Abrasive Blasting Cabinets, Rooms and Booths
6. Tire Buffers
7. Sand, Rock and Aggregate Screens
8. Boilers, Heaters, Gas Turbines and Asphalt Heaters
9. Concrete Batch, Block or Pipe Plants, or Mixers Over 1 Cubic Yard
10. Non-Municipal Incinerators
11. Burn-Out Ovens
12. Core Ovens
13. Metal Melting and Sweating Furnaces
14. Concrete-Treated-Base (CTB) Plants
15. Rock & Aggregate Plants
16. Brick Plants
17. Salt Bath Heat Treat Furnaces
18. Cupola Furnaces for Gray Iron Production
19. Bulk Dry Chemical Transfer and Storage Facility Equipment
20. Gasoline & JP-4 Fuel Storage and Transfer at Fuel Farms
21. Gasoline Service Station Storage & Transfer to Trucks & Automotive Vehicles
22. Paint Spray Booths
23. Curing or Baking Ovens
24. Degreasers (Vapor and Cold)
25. Paint or Solvent Diptanks, Solder Levelers, Roller-Coatings Machines, Driers and Miscellaneous Equipment Using Materials Containing Organic Solvents
26. Dry Cleaning Facilities Using Halogenated Hydrocarbon Solvents
27. Dry Cleaning Facilities Using Petroleum Base Solvents
28. Chrome Electroplating, Anodizing, Chemical Milling and Other Material Preparation Equipment Using Inorganic Chemicals
29. Brake Debonders
30. Waste Disposal Shredder Units
31. Waste Disposal Air Classified Units
32. Waste Disposal Drier Units
33. Waste Disposal Pyrolysis Reactor Units
34. Gas Turbine Test Cells, Aircraft Engine Testing (Non-Shaft Engines)
35. Gas Turbine Test Cells, (Shaft Engine Testing)
36. Piston Type Internal Combustion Engines
37. Grinding Booths and Rooms
38. Organic Gas Sterilizers
39. Surface Coating Application Stations (Metal Parts, Marine, Aerospace & Automotive Coatings)
40. Municipal Waste Storage & Processing
41. Industrial Waste Water Treatment
42. Air Stripping & Soil Remediation Equipment
43. Sewage Treatment Facilities
44. Fire Fighting Training Facility

ATTACHMENT E

OPERATION AND MAINTENANCE SUPPORT INFORMATION (OMSI)

INTRODUCTION

1. The Operation and Maintenance Support Information (OMSI) concept was developed to help activities operate, maintain, and repair selected facilities. Produced during the facility's construction, OMSI manuals provide an organized library of data on as-built materials, systems, and equipment. Because of the comprehensive nature of these manuals, they are used as the first step toward solving operation, maintenance, or repair problems.
2. The OMSI User Manual consists mainly of construction contractor submittals for as-built materials/equipment, such as Manufacturer's Catalog Data, Shop Drawings, Parts Lists, Test Reports, and Operation and Maintenance Data, assembled and indexed in a comprehensive manual. The User Manual may also provide more detailed information on operation, maintenance, repair and troubleshooting for selected key systems such as Fire Protection, Roofing, and Heating, Ventilating and Air Conditioning (HVAC). The User Manual is organized by divisions and sections corresponding to the divisions and sections of the construction specifications. For example, if you wanted to find information about interior electrical wiring, you would look under Division 16, "Electrical", and then under Section 16402, "Interior Wiring Systems". A specification table of contents is located at the front of each manual volume. The specification sections for Division 1 are not applicable for OMSI, so this division is used for general facility information such as floor area, overall dimensions, utility cut-off locations, etc.
3. An OMSI Operation and Maintenance Manual consists of selected systems requiring operation, maintenance, and repair procedures. Each system in the manual consists of four sections: Operation, Preventive Maintenance, Corrective Maintenance, and Appendix. For each section, the manual may provide extensive additional information such as emergency operating procedures, troubleshooting, and warranty provisions.
4. NAVFAC Guide Specification NFGS-01730 has been written to require the construction contractor to furnish operation and maintenance data. For projects that include the OMSI requirement, this data is provided to the A-E who will develop the OMSI package. All NFGS sections that have operation and maintenance requirements have been coordinated with NFGS-01730.

USER MANUAL

GENERIC CONTENTS

DIVISION 1 - GENERAL

1. OMSI Type. Indicate the type of OMSI (A or C) provided for the facility. If a Type A is being provided, state the specific systems which are covered by the OMSI Operation and Maintenance Manual.

2. Facility Information. As applicable, provide the following data which is useful for maintenance services of the facility (tabular and concise narrative format is desired with photographs as appropriate) :

a. General Description of Facility: Function of facility, overall width, length, and height, number of floors, crawlspace/slab/basement, normal number of occupants.

*b. Type and Number of Systems/Zones for: Heating, ventilation, and air conditioning (HVAC), fire protection, intrusion detection, emergency power, and other major systems. Provide an equipment inventory showing item descriptions, model numbers, and manufacturers and suppliers names and addresses (if available). Listing should be limited to major components such as shown on design equipment schedules.

c. Number, type and size of each filter used in HVAC system.

d. Net Area of Facility Broken Down by Type of Space and Floor Covering, e.g.: office carpet, corridor carpet, office vinyl tile, corridor vinyl tile, bathroom/lavatory ceramic tile, playing court hardwood, shop/mechanical room concrete, etc.

e. Total areas each of painted wall and ceiling surfaces; ceramic tile wall and ceiling surfaces; suspended ceiling surfaces.

f. Total area of roof broken down by type of roof surface/system.

g. Number, types, and size of windows; indicate special features such as tilt-in sash for cleaning.

h. Total number and types of light fixtures, including number and types of bulbs/tubes required.

i. Number of bathroom fixtures, including number of sinks, commodes, lavatories, and urinals.

j. Beneficial Occupancy Date (B.O.D.).

k. Basis of Design.

*For Type C OMSI, provide cross reference here to the appropriate User Manual specification section for expanded information on the operation, maintenance and repair of these systems. For Type A OMSI, cross reference here if system is included in the OMSI Operation and Maintenance Manual.

3. Floor Plans & Site Plans. Provide legible small scale floor and site plans.

4. Utility Connection/Cutoff Points. Denote the main interior and exterior connection and cutoff points for all utilities on small scale floor and site plans. Plans should contain enough information to make the location of the connection/cutoff points obvious to someone unfamiliar with the facility and should denote which system, area, or portion of a system it controls. Where applicable, clearly indicate the room number, panel number, valve number, etc., of the respective utility being identified.

5. As-built Drawing List. List the as-built drawings by title and sheet numbers and identify where the drawings and specifications will be kept on file.

6. Extended Warranty Information. Provide special/extended warranty information to the extent that it is available from data submitted by the contractor or available from the ROICC office. An extended warranty is defined as a warranty exceeding one year and may cover parts, labor or both such as warranties for A/C compressors, hot water heaters and water coolers. The A-E will not be required to contact manufacturers to obtain warranty data on equipment and material where this data has not been provided by the contractor or where the ROICC has not required the contractor to furnish such data. List each item which has special warranty information and include the written guarantee or warranty for the item. The list shall state the applicable specification section, duration of the warranty, start and ending dates of the warranty, point of contact for fulfillment of the warranty, and required operational and general service maintenance to be performed by the Government to maintain the manufacturer's special warranty agreement. Roofing systems warranty information shall be included here with special cross reference to the roofing specification section.

DIVISIONS 2 THROUGH 16

1. For each specification section, the User Manual shall provide an as-built record of materials and built-in equipment used in the construction. This should include all as-built materials and equipment for which manufacturer's data submittals were made in accordance with the construction specifications. Information to be provided includes a description and model number of the item; name, address, and telephone number of the manufacturer and supplier; and where the material was used. Catalog cuts and manufacturer's data sheets are examples of applicable sources for fulfillment of this requirement. Include shop drawings as appropriate based on specific relevance to operation, maintenance, repair and alteration of the facility or system. Shop drawings should be reduced to 16" x 22" (406mm x 558mm) maximum and submitted in pocket folders organized by specification section and permanently attached to the binder. Each pocket folder is to be labeled indicating content. Extraneous data should not be included in the manual. For example, if manufacturer's data sheets are composed such that information on several part numbers or model numbers is shown, the as-built material should be highlighted or otherwise noted and the extraneous sheets should be removed and discarded. Insert all operation and maintenance data furnished in accordance with the construction specification in the applicable Division/Section of the User Manual. If an Operation and Maintenance Manual is provided for this project, the contractor submitted Operation and Maintenance Data Packages for the selected systems must be incorporated into the Operation and Maintenance Manual but cross-referenced in the User Manual.

2. Under the roofing specification section, provide separate sheet(s) with the following information for each roofing system: name of roofing product/system; manufacturer's, supplier's, and installer's name, address, and phone number; warranty period and manufacturer's specific requirements to maintain warranty; methods and materials for maintenance, repair, and modification, including prohibited practices; roof structural load limits; maintenance inspection and service checklists with recommended schedule.

3. Under the corresponding specification section, provide the information shown in paragraph 3a, b, c, and d below for the following systems: Heating, Ventilating and Cooling (HVAC) System, Space Temperature Control System, Fire Extinguishing Systems, and Fire Alarm Systems. This information is in addition to the requirements of Divisions 2-16, paragraph 1, and should also include all Operation and Maintenance Data Package information furnished in accordance with the construction specifications.

a. Operation. General system description, concise narrative of system operation including schematics, control diagrams, color coded flow diagrams, start-up/shutdown procedures, normal operating instructions, operating norms, emergency operating instructions, safety and Lock Out/Tag Out instructions, and interconnection with other systems (such as fire protection). HVAC presentation shall reference Testing, Adjusting, Balancing, and Start-up (TABS) final Certified

Balance Reports and the Space Temperature Control Systems presentation shall include all Automatic Controls Acceptance Tests (ACATS).

b. Preventive Maintenance. Provide a routine Preventive Maintenance (PM) schedule for each system on those components requiring PM. The PM schedule should include frequency and details of inspection and service to be accomplished based on manufacturer's recommendations and good engineering practice.

c. Corrective Maintenance. Provide a basic troubleshooting guide to isolate probable causes of typical system malfunctions and recommend corrective procedures. Equipment/component removal, replacement and repair instructions shall refer to the Operation and Maintenance Data Package as submitted by the construction contractor.

d. Environmental Consideration. Identify systems/equipment which require environmental operation, reporting, testing, analysis or inspection to comply with Federal and related state/local environmental laws and their respective implementing regulations, statutes, policies, etc. For each system/equipment, describe the required procedure and frequency for environmental operation, reporting, testing, analysis and inspection.

NOTE: If an OMSI Operation and Maintenance Manual is also to be prepared for systems of this facility, it is generally not necessary to duplicate information included in those manuals into this User Manual. However, if the information also applies to other systems, the data may be duplicated for the applicable sections of the User Manual.

SUBMITTAL REQUIREMENTS

1. Concept Submittal (2 hard copies required). The Concept Submittal should include the cover sheet and spine inserts, table of contents, binders and dividers, and other materials as necessary to demonstrate the proposed physical arrangement of the manuals and the quality of the copies, dividers and tabs. In addition, the Concept Submittal should include the information of Division 1 and one other selected division. These divisions should be presented in sufficient detail to evaluate the data collection and arrangement process. The marked-up construction Submittal Matrix should also be forwarded for review.

Photocopies of contractor's submittals are acceptable for this submittal. This submittal shall be delivered to Southwest Division.

2. Prefinal Submittal. (2 hard copies required). The manual shall be at 90 percent or more completion. Because the prefinal User Manual will actually be used by the activity, it should contain all the required information that is available at the time of submission. Approved binders are required for this submittal. One copy shall be delivered to Southwest Division and one copy shall be delivered to the designated point of contact at the activity. Review comments on the prefinal submittal may be provided to the A-E at various times after facility start-up and approximately 60 days before due date of the final User Manual. These comments will address recommendations and problems encountered during ongoing operation and maintenance of the facility. The hard copies will be returned to the A-E no later than 60 days before the due date of the final User Manual.

3. Final Submittal. (3 hard copies, 2 microfilm copies required). One hard copy (the "master" copy) that is a complete finished product, must be maintained by the A-E. This copy should be used for making corrections and microfilm copies while waiting for the copies from the activity and Southwest Division to be returned. The hard copies and microfilm copies of the final submittal must address the comments made during all previous reviews. A copy of the prefinal review comment sheet with the A-E's response to each item shall be forwarded with the final submittal. One hard copy and one microfilm copy shall be delivered to Southwest Division; two hard copies (including the "master" copy) and one microfilm copy shall be delivered to the designated point of contact at the activity.

a. Hard Copy. The final manual shall be bound in durable, red, hard cover, spring post loose-leaf binders that are water and grease resistant. The final binders shall be for 8½" x 11" sheet size and have a three-inch thick capacity. Typical binders will have a clear pocket located on the front which will accept an 8½" x 11" sheet size paper and a spine pocket which will hold a printed sheet that identifies the project title, project number, location, construction contract number and volume number. Sheets in the manual shall be high quality paper and the dividers shall be heavy duty paper with plastic reinforced holes and tabs. Tabs shall be provided to show the Specification Section number with keywords to identify the section title, major equipment groups, i.e., valves, pumps, chillers, control panels, sensors, etc., and the topics of Division 1. Tabs shall also be

provided to identify all O & M data and its contents. Instruction sheets, drawings, etc., larger than 8½" x 11", but not exceeding 16" x 22" shall be inserted into the binders as single fold-out sheets which may be punched or clipped into the binder or inserted into pockets attached to heavy duty paper. Large O&M manuals and large drawings such as key shop drawings which cannot be reduced may be inserted in stiff paper or clear plastic pockets. Because loose material is easily lost, use of pockets should be kept to a minimum. A Master Table of Contents for all volumes shall be provided at the front of each volume. As appropriate, the following statement is to appear at the bottom of each page of the table of contents: "An OMSI Operation and Maintenance Manual has also been prepared for selected systems of this facility. Therefore, if some system data is not found in this User Manual, it may be available in the Operation and Maintenance Manual."

- b. Microfilm Copy. In addition to submitting hard copy sets of the final User Manual, also required are two sets in a microfilm format (35mm cartridge). Each set should be self-contained within one or more microfilm(s). Cartridge containers should be prepared, filmed, and included in each microfilm for each set, after the binder cover sheet. If more than one microfilm is used to film each set, the Master Index should so indicate. The first page of the Master Index should show the following heading information: Type of OMSI Manual; project title and location; project number and construction contract number; number and title of the volumes and their respective contents. The Master Index should be to the level of the hardcopy Master Table of Contents. The intent of the Master Index is to quickly locate data contained in the microfilm.
- c. Electronic Format - Provide narrative information in a Word for Windows format, unless otherwise specified by the Southwest Division Technical Representative. Provide drawings and plans prepared for the OMSI manuals in a CAD format. Name and index the files for ease of identification and update. Provide all files on 3 1/2 inch high density disks.
- d. Compact Disk. - Provide the OMSI manuals on Recordable Compact Disk using Adobe Acrobat 3.0 or similar software capable of producing PDF (Portable Document Format) files. Scanned documents shall be scanned at 150 DPI or better. The PDF files shall be indexed by part (Facility Information, Primary Systems Information, and Product Data) and each entry identified in the table of contents. Indexes and Hyperlinks may be hidden or highlighted. Highlighted indexes may only be UNDERLINED or COLOR TEXT. The final submittal shall include written instructions for installing, accessing and retrieving information from the Recordable CD.

OPERATION AND MAINTENANCE MANUAL
GENERIC CONTENTS

Section A - Operation

1. General System Description - provides an overview of as-built system composition and operation of system.
2. Start-up and Shutdown Procedures provides step by step instructions to bring as-built systems from static to operational configurations and from operating to shutdown.
3. Normal Operating Instructions - includes control diagrams with data to explain operation and control of as-built system and specific equipment.
4. Operating Norms - provides temperatures, pressures, flow rates, etc. to be expected during normal operation of the as-built system.
5. Emergency Operating Instructions - includes emergency procedures for equipment malfunctions to permit a short period of continued operation or to shutdown the equipment to prevent further damage to the as-built system and equipment; provides emergency shutdown instructions for fire, explosion, spills, or any contingency; and provides guidance on emergency operations of all utility systems including valve locations and portions of systems controlled.
6. Environmental Considerations - includes a listing of as-built systems/equipment which require special environmental operation, reporting, testing, analysis or inspection to comply with Federal and related state/local environmental laws and their respective implementing regulations, statutes, policies, etc. Examples are backflow preventer inspections, underground storage tank testing, hazardous material/waste usage and storage documentation, and inspection and testing of air pollution control devices. For each system/equipment, describe the required procedure and frequency for environmental operation, reporting, testing, analysis and inspection.
7. Important and Special Considerations - contains items of special interest concerning system design, as-built construction, or operation; and provides a list of environmental conditions (temperature, humidity, and other relevant data) which are best suited for each piece of equipment and those conditions under which the equipment should not be allowed to run.

8. Test Procedures and Scheduling - provides procedures for as-built system/equipment tests not performed as recurring preventive maintenance.
9. Operator Servicing Requirements - includes instructions for services to be performed by the operator such as lubrication, adjustments, and inspection on the as-built equipment / system.
10. Safety Instructions - provides personnel hazards and as-built equipment safety precautions for all operating conditions, including Lock Out / Tag Out instructions.
11. Flow diagrams - contains drawings indicating as-built system liquid, air or gas flow during normal operations.
12. Diagrammatic Plans - provides plans, by floor, of actual installed system.
13. Valve List - includes as-built listing and location of all major valves associated with the system. The construction contractor will normally physically mark the valves with permanent type tags/labels to include a consecutive identifying number.
14. Operation Records - includes forms, samples, and instructions for keeping necessary operating records of the as-built systems and equipment.
15. Special Warranty Conditions - provides guidance/instructions necessary for the operator to follow to keep all warranties valid for as-built equipment and systems.

Section B - Preventive Maintenance

1. Preventive Maintenance Plan and Schedule - provides a maintenance plan for each piece of as-built equipment which shall be in accordance with the manufacturers' recommended maintenance, good engineering practice, and other historical information to include skill level, frequency and time required for each check; provides an annual schedule by week to accomplish the required maintenance at the necessary frequency.
2. Work Orders / Task Cards - provides individual maintenance tasks taken from the maintenance plan and printed on cards which can be used as a work order to facilitate the performance of the required preventive maintenance by the mechanic assigned to do the specified work. Cards shall also include information on special tools needed, safety precautions, Lock Out/Tag Out instructions and environmental considerations.
3. Lubrication Instructions (other than those by operator) - includes a table showing recommended lubricants for specific temperature ranges and applications; chart (s) with schematic diagram of the as-built equipment showing lubrication points, recommended types and grades of lubricants, and capacities; a lubrication schedule showing service interval frequency.

4. Instructions for Maintaining a Log of Preventive Maintenance Accomplished - to provide a system of work management where the accomplishment of preventive maintenance may be recorded, monitored and controlled by either hand or computer method.

Section C - Corrective Maintenance

1. Troubleshooting Guides and Diagnostic Techniques - includes step by step procedures to promptly isolate the cause of malfunctions of as-built systems and equipment, describes clearly where and how the checkout is performed and what conditions are to be sought; identifies tests or inspections and test equipment required for troubleshooting procedures. In general, the troubleshooting guides for this manual should be carried to the level of cross referencing the contractor provided manufacturer's troubleshooting data for the constituent equipment, parts or components of the systems.

2. Maintenance and Repair Procedures - provides maintenance and repair instructions and the list of tools required to restore as-built equipment to proper operating standards. Include safety, Lock Out/Tag Out and environmental instructions.

3. Removal and Replacement Instructions - includes step by step procedures presented as a combination of text and illustrations and a list of tools and supplies required for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments; provides the tolerances, dimensions, settings, and adjustments required. Include safety, Lock Out/Tag Out and environmental instructions.

4. Instructions for Maintaining a Log of Corrective Maintenance and Repair Accomplished - to provide a system of work management where the accomplishment of corrective maintenance may be recorded, monitored and controlled by either hand or computer methods; to include history of corrective maintenance actions, parts used, time required, etc. for a given piece of equipment or system.

Section D - Appendix

General - All items included in the Appendix must be paged, indexed and properly cross referenced throughout the text of the manual in Section A, B and C.

1. Inventory of Equipment - a listing of all equipment identifying nomenclature such as make, model, serial number, size, location, etc. for each item.

2. Operation and Maintenance Data - Include Operation and Maintenance Data Package information provided by the construction contractor per Section 01730 and the technical sections of the specification. This information must also be incorporated into the preparation of each system discussion under the Operation, Preventive Maintenance and Corrective Maintenance sections of the Operation and Maintenance Manual.

3. Manufacturer's Equipment Information - includes drawings, illustrations, and technical data furnished by the manufacturer for the equipment and system components and organized/indexed for easy reference.
4. Parts Lists - provide identification and coverage for all parts of components, assemblies, subassemblies, and accessories of the end items subject to replacement; specify special hardware requirements, e.g., high strength bolts and nuts; identify parts by make, model, serial number, and source of supply to allow reordering without further identification; include clear and legible illustrations, drawings, and exploded views to enable easy identification of the items; shows index/reference/key number which will cross-reference the illustrated part to the listed part; parts shown in the listings shall be grouped by components, assemblies, and sub-assemblies with individual parts identified to the assembly.
5. Warranty Information - lists each piece of equipment furnished by the construction contract and includes the written guarantees of such equipment. The equipment list shall state the specification section applicable to the equipment, duration of the warranty, start date of the warranty, ending date of the warranty, and the point of contact for fulfillment of the warranty; provides a listing of required operational and general service maintenance to be performed by the Government to maintain the manufacturer's warranty agreement; provides a listing of all shipping and packaging requirements to send off for repair if applicable.
6. Personnel Staffing and Training Requirements - includes the number and classification of people needed to operate and maintain the facility; provides an operating and maintenance indoctrination program which shall include formal classroom instruction, on-the-job training, and necessary audio-visual "canned" instruction that can be maintained on file by the Government for indoctrinating future operations/maintenance personnel.
7. Testing Equipment and Special Tools Required - includes information on the test equipment required to perform specified tests and special tools needed for the operation, maintenance, and repair of components.
8. Inspection Plan - provides an occupant inspection checklist of major components of the facility and establishes a Public Works Department inspection guide developed from NAVFAC MO-322.
9. Supply Inventory Requirements - lists spare parts, fuels, lubricants, etc. required for maintenance and repair to ensure continued operation without unreasonable delays; reflects special consideration if facility is at a remote location; lists parts and supplies having long lead times to obtain.
10. Names, Addresses and Telephone Numbers of Manufacturers, Suppliers and Contractors/Subcontractors - list by applicable equipment, system, and section of the construction specifications.

11. Bibliography - contains listing of reference materials used in preparation of the O&M Manual.

12. Glossary - list of difficult or technical terms used in the O&M Manual with explanations/meanings.

13. As-Built Drawings and Specifications - list drawings by titles and sheet numbers, description of the specifications and identifies the location where they will be kept on file.

14. Permits and Standards - lists the permits and standards that were issued for the facility and includes the written documents themselves.

SUBMITTAL REQUIREMENTS

1. Concept Submittal (2 hard copies required). The purpose of this submittal is to present, for approval, an overall plan to be followed during the ongoing preparation of the manual. One copy shall be delivered to SOUTHWEST DIVISION and one copy shall be delivered to the designated point of contact at the activity. This submittal shall include but not be limited to providing the following information:

1. Identify by name all systems that will be addressed in the manual.
2. Provide the format and table of contents of the manual and include the following:
 - a. Sample spring post loose-leaf binder. Show a typical title as it will appear on the front face and also on the spine of the binder.
 - b. Proposed divider format with sampler divider and completed tab.
 - c. Samples showing the quality of paper and the quality of reproduction proposed.
 - d. Select one system of moderate complexity and partially develop the various operational and maintenance aspects of the system. This development should have sufficient depth to clearly demonstrate the arrangement and level of detail proposed for all systems that will be included.

2. Prefinal Submittal (3 hard copies required). The manual shall be at a minimum of 90 percent completion. This submittal should contain all the required information available at the time of submission to begin detailed operation and maintenance of the facility. Binders approved during the SOUTHWEST DIVISION review of the concept submittal are required for this submittal. One hard copy (the "master" copy) must be retained by the A-E. One copy shall be delivered to SOUTHWEST DIVISION and one copy shall be delivered to the designated point of contact at the activity. As necessary, SOUTHWEST DIVISION will

provide review comments to the A-E regarding the prefinal submittal. These comments will be provided after site validation, so that problems discovered during review, site validation, and facility start-up can be addressed by the final submittal. Additional comments may also be provided by SOUTHWEST DIVISION and the activity after the Beneficial Occupancy Date (B.O.D.) to address problems encountered during the ongoing operation and maintenance of the facility. The hard copies from SOUTHWEST DIVISION and the activity will be returned approximately 60 days before the due date of the Final Submittal.

3. Final Submittal (3 hard copies, 2 microfilm copies required) The master copy should be retained by the A-E for making corrections and for making the microfilm copies while waiting for the copies from SOUTHWEST DIVISION and the activity to be returned. The hard copies and microfilm copies of the final submittal must address the comments made during all previous reviews and during the validation. A copy of the prefinal review comment sheet with the A-E's response to each item shall be forwarded with the final submittal. One hard copy and one microfilm copy shall be delivered to SOUTHWEST DIVISION; two hard copies (including the "master" copy) and one microfilm copy shall be delivered to the designated point of contact at the activity.

a. Hard Copy

1. The final manual shall be bound in durable, hard cover, blue, spring post loose leaf binders that are water and grease resistant. The binders shall be for 8½" x 11" sheet size and have a three inch thick capacity. Typical binders will have a clear pocket located on the front and spine which will hold a printed sheet that identifies the project title, project number, location, construction contract number, volume number and the system(s) included in that volume. Each binder shall be referred to as a single volume. If possible, all sections of a system should be contained in a single binder. Multiple systems may be contained in a single binder provided that all sections of a system are included in the same binder.

2. Sheets in the manual shall be high quality paper and the dividers shall be heavy duty paper with plastic reinforced holes and tabs. Tabs shall be provided to identify the System title, the different sections under each system such as "Operation," "Preventive Maintenance," "Corrective Maintenance," and "Appendix," and the major topics under each section. Tabs shall also be provided to identify the title of each O & M Data Package and its contents.

3. Instruction sheets, drawings, etc., larger than 8½" x 11" (215.9mm x 279.4mm) but not exceeding 16" x 22" (406.4mm x 558.8mm) shall be inserted into the binders as single fold-out sheets. Large O&M manuals and large drawings such as key shop drawings which cannot be reduced may be inserted in stiff paper or clear plastic pockets. Because loose material is easily lost, use of pockets should be kept to a minimum.

4. A master table of contents for all volumes shall be provided at the front of each volume. The following statement should appear at the bottom of each page of the master table of contents: "An OMSI User Manual has also been prepared for this facility. If product data for components/materials of the systems covered by this Operation and Maintenance Manual cannot be found, it may be contained in the applicable specification section of the User Manual."

b. Microfilm Copy. In addition to submitting hard copy sets of the final Operation & Maintenance Manual, also required are two sets in a microfilm format (35mm cartridge). Each set should be self-contained within one or more microfilm(s). Cartridge containers should be labeled as to their contents. A Master Index should be prepared, filmed, and included in each microfilm for each set, after the binder cover sheet and preface sheet. If more than one microfilm is used to film each set, the Master Index should so indicate. The first page of the Master Index should show the following heading information: Type of OMSI Manual; project title and location; project number and construction contract number; number and title of the volumes and their respective contents. The Master Index should be to the level of detail of the hard copy Master Table of Contents. The intent of the Master Index is to quickly locate data contained in the microfilm.
