GUIDE FOR ARCHITECT-ENGINEER FIRMS

PERFORMING SERVICES FOR THE

ATLANTIC DIVISION

NAVAL FACILITIES ENGINEERING COMMAND

Norfolk, Virginia 23511

PUBLIC WORKS DIVISION
BUILDING 1005, MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA 28542-5001

IN REPLY REFER TO:

5000
PWO
1 Dec 86

From: Design Director, Public Works Division, Marine Corps Base, Camp Lejeune
To: Branch Heads

Subj: POLICY STATEMENT, A/E PERFORMANCE EVALUATION REPORT AND CONSTRUCTION CONTRACT FACT SHEET

Encl: (1) Design Division A/E Rating Sheet
(2) Construction Contract Fact Sheet

1. The following policies are effective immediately:

a. Design Division A/E Rating Sheet - Branch heads will insure that enclosure (1) is completed for each project for which they are the lead EIC. These forms will be completed within 20 days of 100% design and forwarded to Technical Records via the Design Director. Technical Records will maintain a file on each A/E doing work at Camp Lejeune. The files will be made available to slate and selection boards in the future. Performance evaluations completed by ROICC personnel will be routed to the appropriate EIC for review, then forwarded to Technical Records for filing. Candid and meaningful comments are requested.

b. Construction Contract Fact Sheet - Enclosure (2) will be filled out and provided to Specifications Branch on all future contracts (A/E and in-house designs). This information should be provided as soon as possible during project design, but in no case later than the 90% submission. Upon receiving notification that a facility will require vacating during construction, the Specifications Branch will forward notification to the AC/S Facilities (Attn: LtCol Kiriacopoulos) via the Design Director. Facilities will be responsible for notifying the customers of the requirement to vacate. The notice to Facilities should provide any pertinent data, such as proposed construction date, vacancy required , etc.

F. E. Cone

F. E. CONE

A&E RATING SHEET

Date	Lead Branch & EIC	Projected Completion

Project Title

Activity & Location

A&E Name and Address

A&E Contract No.	Construction Contract No.	Construction Cost Estimate

INSTRUCTIONS: Each factor shall be rated in accordance with the following categories:

RATING	DESCRIPTION
1	Below Average(Poor), Work Generally Unacceptable
2	Average (Fair)
3	Above Average (Good)
4	Excellent - Work is of Highly Superior Nature

	Field Work & Site Invest	Contract Dwg Design	Adequacy of Detail	Overall Engr Quality	Adequacy of Specs	Management	Cooperation	Adherence to Schedule	Within Gov't Scope	Rater's Initials	COMMENTS
04											
401											
403											
404											
405											
406											
408											

A rating of "1" or "4" shall be supported with a statement.

Overall Comments:

Encl 1

CONSTRUCTION CONTRACT FACT SHEET

THE FOLLOWING DATA SHALL BE PROVIDED TO THE SPECIFICATIONS BRANCH AS SOON AS POSSIBLE DURING PROJECT DESIGN, BUT NOT LATER THAN THE 90% SUBMISSION.

CONTRACT TITLE _____

BUILDING NOS. _____
_____

SPECIFICATION NO. _____

YES	NO	
___	___	NEW STRUCTURE
___	___	BLDG(S) CAN BE OCCUPIED DURING THE WORK
___	___	BLDG(S) NO. REQUIRING FULL VACANCY _____ _____
___	___	BLDG(S) NO. REQUIRING PARTIAL VACANCY _____ _____
___	___	BLDG(S)/EXTERIOR LINES REQUIRING ASBESTOS REMOVAL _____ _____ DESCRIPTION OF EXTERIOR LINES - FROM: _____ TO: _____
___	___	PHASED CONSTRUCTION REQUIRED RECOMMENDED PHASING _____ _____

OTHER COMMENTS:

MEMORANDUM

DATE: 24 November 1986

FROM: Design Director

TO: ALL BRANCHES

Subj: NEW IN-HOUSE A/E CONTRACTS

1. In the near future a total of twelve new A/E contracts are expected to be approved for advertisement, and selection of A/E firms will be accomplished.

2. Due to the extensive job of keeping track of each individual in-house A/E contract, it is directed that no one give the A/E firms any contract, scope of work, change in scope or fee proposals, without first giving the information to the A/E administrator, so a formal letter can be forwarded to the A/E.

3. No fee negotiations are to be held with an A/E firm without first notifying the A/E administrator at least two days prior to negotiations.

4. It is also directed that any fee proposals be reviewed by the A/E administrator for completeness as some previous proposals were not correct and had to be rewritten.

5. All A/E letters, fee proposals, negotiations, etc., are subject to audit and a lack of documentation in the files subjects the government to liability.

6. As there will be extensive typing involved and accurate records required for all upcoming in-house A/E contracts, your compliance with this directive is expected.

F. E. Cone

F. E. CONE

OPNAV 5216/144A (Rev. 8-81).
S/N 0107-LF-052-2320

04

Copy To All Branches

DEPARTMENT OF THE NAVY

Memorandum

DATE: 3 December 1986

FROM: J. H. Fitch

TO: Fred Cone

SUBJ: NEW LAW LIMITING CONTRACT (INCLUDING A/E'S) PER DIEM

1. Per diem rates for Contractors, including A/E Contractors, P.L. 99-234, calls for the revision of the Federal Travel Regulations (FTR) which set the maximum daily reimbursement for meals and lodging (per diem) and binds Federal Contractors to the FTR provisions. FAC 84-19 implements this revision [FAR 31-109(h)(8) and 31.205-46(a)].

2. Per diem for Jacksonville, NC Area is $50.00 per day per person total.

3. Negotiation documentation with A/E's and other Contractors must reflect meals, incidentals, and lodging. Total cost must be based on $50.00 per day per person or less.

☆U.S. GOVERNMENT PRINTING OFFICE: 1985 — 505-012/18049

FORWARD

1. This technical guideline publication assembles information and provides direction to incorporate into the design of facilities at the Marine Corps Base, Camp Lejeune, North Carolina and Marine Corps Air Station, New River, Jacksonville, North Carolina. This publication is issued to provide guidance to Architect/Engineer (A&E) firms performing services for the Department of the Navy, at the Marine Corps Base, Camp Lejeune, North Carolina and Marine Corps Air Station, New River, Jacksonville, North Carolina. It is essential that all A&E personnel and associates responsible for preparing plans, specifications, cost estimates, studies or other services, follow all instructions outlined herein. This publication is an attachment and part of the "GUIDE FOR ARCHITECT ENGINEER FIRMS PERFORMING SERVICES FOR THE OFFICER IN CHARGE OF CONSTRUCTION, JACKSONVILLE, N. C. AREA."

2. This technical guide will be reviewed and updated periodically; therefore, suggestions for improvements and additions are invited. The point of contact is Public Works Design, Mr. A. E. Young, P.E., telephone 910 451-3658.

TECHNICAL GUIDELINES AND CRITERIA FOR DESIGN

REQUIREMENTS

EXIT DEVICES

Provide t-astragal rim type or equivalent exit device in lieu of vertical rod type devices.

TRAFFIC SIGNALIZATION

Provide Eight Phase Controller including complete eight phase cabinet; cabinet shall have: strip fluorescent fixture mounted on underside of cabinet's roof; 120 Volt, 20 Amp GFI receptacle; individual separate grounding bus for AC Voltage, DC Voltage, and equipment grounding. Flasher relay shall not chatter during start up. All field wiring connections and surge arresters for each traffic signal shall be accessible without removal of any terminal, backboard, or item. Controller shall have removable boards including power board, field programmable, NEMA Interchangeable Overlap Card; provide complete documentation of software program.

UTILITIES

STEAM DISTRIBUTION SYSTEM

Operating steam pressures of the central plants are as follows:

Bldg No.	PSI		Bldg No.	PSI
1700	150		G-650	100
AS-4151	150		M-230	50
BA-106	50		M-625	100
BB-9	100			
RR-15	100	(will lower to 50 psi in near future)		
PP-2615	100	(will lower to 50 psi in near future)		

Fiberglass reinforced pipe shall not be used for buried steam condensate return lines; provide Schedule 80 black steel pipe.

Steam condensate receiver pumps shall be steam pressure powered in lieu of electric motor-driven duplex pumps.

Steam trenches are preferred in lieu of direct-buried, pre-insulated steam/-condensate lines. Trench systems serve a dual role as a sidewalk wherever as appropriate.

Minimize the use of below grade steam manholes. If required to be used, then raised the top to 18-inches above finished grade with a fully grated galvanized

steel cover and access.

SEWERAGE LIFT STATIONS

Provide with domestic water system with hose bib outlet for screen wash down.

Provide electrical GFCI duplex outlet.

The Telemetry Monitoring and Control Equipment shall be compatible with the existing AQUATROL CONTROL SYSTEM.

WATER DISTRIBUTION

The Telemetry Monitoring and Control Equipment shall be compatible with either the existing AQUATROL CONTROL SYSTEM controlled from Bldg 670 or the existing Westerman system controlled from Bldg 20 or the existing system controlled from Bldg AS-110.

UTILITY METERING REQUIREMENTS

Metering shall comply with the Camp Lejeune Marine Corps Base "Metering Requirements" and shall be of the pulsed output type with connection to the Base EMCS.

Utility meters are required on facilities occupied by non appropriate funded users, reimbursable tenants, utility facilities, and where designated in the project description.

STEAM METERS

Provide target, strain gauge type steam meters in lieu of orifice plate to measure steam flow.

WATTHOUR METER

Select and coordinate type of metering required for the facility; specify watthour meter with four pulses per one revolution and the demand interval of 15 minutes. Three phase meters shall be three element (three stator) type.

Where the load exceeds the capacity of self-contained meter, provide instrument transformers. Provide voltage (potential) transformers if applicable, and three current transformers with three phase transformer type meter.

Provide ground fault and short circuit protection on voltage (potential) circuits; provide correct multiplier on face of meter.

MECHANICAL SYSTEMS

PNEUMATIC CONTROL SYSTEMS

Air compressors associated with the Building HVAC systems shall installed within Mechanical Rooms to prevent access by the occupant.

Locate shop air compressors in occupant's accessible area with appropriate space for service and maintenance; do not locate in mechanical rooms.

Specify that Pneumatic control air devices be able to withstand 30 psi without damage.

Energy Monitoring And Control Systems (EMCS)

HVAC systems are to be interfaced with the Base EMCS in lieu of building timeclocks. Buildings with simple single zone controls and small air conditioning loads (DX under 20 tons) shall be controlled by radio switches on the condensing units and programmable thermostats; peaking shaving will be accomplished with the radio switch, and the thermostat will provide energy saving during non-business hours. Provide programmable thermostats on small unitary equipment unless directed otherwise. Building with multi zone or complex controls, provide an intelligent multiplexer (IMUX) with interfacing equipment as listed hereinafter. Show monitoring and control logic and riser diagram on the drawings. Provide Data Terminal Cabinet (DTC) with interconnecting empty conduit to IMUX with interconnecting empty conduit to the telephone system equipment and locate the DTC and IMUX cabinets adjacent to one another and within electrical rooms. Do not locate the DTC and IMUX cabinets in high humidity spaces, ie. mechanical room, steam pipe equipment, etc. Input and output points for EMCS interface are to be determined on a project-by-project basis with consulting with the Base Energy Office.

Building HVAC controlled by Radio Switches:

Provide a load management VHF FM radio controlled switch which, when activated, will de-energize the unit compressor; the air handler fan will continue to operate. The radio switch shall be mounted within the unit control compartment or attached to the condensing unit within a weatherproof enclosure. The radio switch shall operate at 139.650 MHZ and shall be 23-bit digital format compatible with Motorola protocol. Equip the switch with test LED(s), reprogrammable addressing posts and shunts, and remote relay driver.

Building Monitoring and Control Systems to be interfaced with the COGGINS SYSTEMS:

(a) Provide Intelligent Multiplexer (IMUX) compatible with Coggins Systems Series 8130 IMUX/Distributed Controller complete and including matching power supply and battery backup. IMUX including power supply and battery backup shall be mounted in a suitable cabinet adjacent to the Data Terminal Cabinet (DTC). Locate IMUX and DTC in an environmentally protected area away from extremes in temperature and humidity.

(b) Provide sensor and control points and terminate control, status and control cables on screw type terminal blocks in the DTC. Provide cable legend

in cabinet.

(c) Provide Type TC #18 AWG stranded cable for control and status points; #22 AWG stranded, drain conductor, shielded, teflon insulated, silicone rubber jacketed cable for analog points. Provide two telephone pairs from telephone backboard to IMUX Cabinet.

(d) Air Handling Unit: Provide 24 VDC Maintained Relay for Start/Stop Control; 600 V Rated Sail Switch for actual status. NOTE: When Air Handling Unit (AHU) is associated with a Direct Expansion AC Unit (DXU), the AHU Start/Stop shall be linked with the DXU compressor to avoid freezing the DXU Coil.

(e) Direct Expansion Air Conditioning Unit (25 ton or larger or multiple compressors): 24 V DC maintaining relay on interfacable mechanical unloader or 50% shed capability on multiple compressors for demand limiting; dry contacts or interfacing relay for actual status; 24 V DC system powered sensor, -20 to 120^0F, 4-20 mA output, 100 ohm RTD for return air temperature status.

(f) Air Conditioning Chiller (25 ton or large or multiple): 24 V DC maintaining relay on interfacable mechanical unloader or 50% shed capability on multiple compressors for demand limiting; dry contacts or interfacing relay for actual status; 24 V DC system powered sensor, 0 to 300^0F, 4-20 mA output, 100 ohm RTD for supply/return water temperature status.

(g) Centrifugal or Screw Type Compressor: Provide 24 V DC maintaining relay for Start/Stop Control; 24 V DC maintaining relay on interfacable mechanical unloader or 50% shed capability for demand limiting; dry contacts or interfacing relay for actual status; 24 VDC system powered sensor, 0-300^0F, 4-20 mA output, 100 ohm RTD for supply/return water temperature status.

(h) Heat Pump: 24 V DC maintaining relay in heat strip control for demand limiting, dry contacts or interfacing relay for actual status.

(i) Hot Water Converters with Pneumatic Controls: Provide 24 V DC electro/pneumatic switch for Start/Stop Control; control relay dry contacts for actual status; immersion type flow switch for water flow status; 24 VDC system powered sensor, 0-300^0F, 4-20 mA output, 100 ohm RTD for temperature status.

(j) Hot Water Converters with Electric Controls: Provide 24 V DC maintaining relay for Start/Stop Control; control relay dry contacts for actual status; immersion type flow switch for water flow status; 24 VDC system powered sensor, 0-300^0F, 4-20 mA output, 100 ohm RTD for temperature status.

(k) Dual Temperature or Chill Water Pump: Immersion Type Flow Switch or Dry contacts on motor controller.

(l) RTD: Provide direct immersion element type with 385 Platinum sensing element, temperature coefficient of 0.00385 ohm/ohm/degree C, 100 (+/- 0.2) ohm ice point resistance, interchangeability of (+/-) 0.02^oC throughout range, self heating of less than 15 mW/^{o}C, three wire, Teflon insulated #28 - #24 AWG leads.

(m) Current Transmitter (for RTD): Provide temperature span of 0 - 300°F (Water) and -20 to 120°F (Air), nominal 1 mA RTD current, (+/-) 0.05% of linearity span, RFI effect (5 W, 470 MHZ @ 3 ft) of < 1% of span error, supply voltage range of 12-80 V DC, 4 - 20 mA, zero adjustment of (+/-) 10% non-interacting, span adjustment of (+/-) 5% non-interacting, stability at zero of (+/-) 0.02% of span/°C and at span of (+/-) 0.01% of span/°C, operating temperature range of -50°C to 80°C.

(n) Provide latching relay for summer/winter control.

(o) Provide 24 V DC maintain relay on outside air dampers; air dampers will be closed when building is not occupied.

NOTE: No controls on Cooling Towers nor Steam Unit Heaters.

HVAC TESTING & BALANCING

Tailor TAB to specific job; specify that TAB reports are to include air filter sizes, quantity and their location within the building.

SEQUENCE OF OPERATION/DESIGN INTENT

Show Sequence of Operation/Design Intent on drawing(s).

PIPE INSULATION

Insulate pipes with rigid insulation where pipes are subjected to being stepped on or damaged; cellular glass insulation is preferred. Do not specify mineral fiber or unicellular insulation on chilled or cold water pipes; cellular glass insulation is preferred.

STEAM LINES

Steam condensate receiver pumps shall be steam pressure powered in lieu of electric motor-driven duplex pumps.

Do not install steam pits within mechanical rooms. Provide counter flow steam lines from an exterior manhole.

At all steam condensate drip traps, provide check valves and test valves.

STEAM CONTROL VALVES

Specify Steam Control Valve Actuators that have been designed to withstand the heat that is transferred from the steam lines and equipment; do not use hydraulic actuators.

HEATING VENTILATION & AIR CONDITIONING SYSTEMS

In order to better control humidity, air conditioning controls for 7.5 tons and smaller air handlers should be ON/OFF on the cooling coil, fan to run intermittently or continuously as appropriate. Air conditioning air handlers larger than 7.5 tons shall have face split cooling coils with progressive controls either modulating or stepped, or have face and by-pass dampers.

Provide phenolic coating or copper fins on copper tubes for outdoor coils of built-up units within 1200-feet of the water. Unitary equipment should be standard off shelf equipment. The heat transfer rating of the phenolic-coated coil should be after the application of the phenolic coating.

Provide hinged door with quarter-turn or half-turn thumb screws for air handling unit filter access; other type access doors are not acceptable.

In applications of buried dual temperature water distribution, provide pre-insulated copper pipe in lieu of plastic pre-insulated pipe.

Automatic flow control balancing valves should only be used in conjunction with piping systems employing centrifugal separators, regardless of piping material (steel or copper).

The use of chilled water fan coil unit (FCU) systems should be avoided due to high maintenance. If used, provide detailed design and specifications to ensure adequate drainage from the FCU.

The use of open cooling towers shall be avoided.

Helical screw compressors are desirable; reciprocating compressors are acceptable. Centrifugal or steam absorption chillers shall not be used.

Avoid locating HVAC equipment above the ceiling or in attic spaces unless absolutely necessary. When HVAC equipments located above the ceiling or in attic spaces, provide drain pan float switch to shut down air handler whenever the drain pan is not draining. Provide access, floor boards, electric lighting, and electrical convenience outlet for maintenance. Do not locate equipment on roofs unless absolutely necessary.

Avoid economizers (dry bulb or enthalphy); high humidity and poor control reliability prohibit successful use.

Require the Contractor to provide a listing of the HVAC filters for each piece of equipment including width, height, thickness, and type (permanent/washable, throwaway, etc.) of filter.

ELECTRIC WATER HEATER

Provide a load management VHF FM radio controlled switch which, when activated, will de-energize the heater elements. The radio switch shall be attached to the

building exterior within a weatherproof enclosure and readily accessible for maintenance. The radio switch shall operate at 139.650 MHZ and shall be 23-bit digital format compatible with Motorola protocol. Equip the switch with test LED(s), reprogrammable addressing posts and shunts, and remote relay driver.

MECHANICAL / ELECTRICAL EQUIPMENT ROOMS

The door keyed locks to all building mechanical / electrical equipment rooms shall be interchangeable with the existing M-keyway GGM 16 Interchanged Core keyed system;

Provide separate mechanical and electrical rooms with exterior, grade-level entrances where possible.

Indicate equipment layout and equipment access for maintenance and removable with minimal disruption.

LUBRICATION SYSTEMS

Where required in shops, install lubrication oil lines in trenches with removable covers.

ELECTRICAL SYSTEMS

CALCULATIONS

Show calculations of connected and demand load for each electrical service.

UNDERGROUND ELECTRICAL WORK

Specify Ozone resistant ethylene-propylene-rubber-insulated (EPR) cable for medium voltage underground distribution work.

OVERHEAD ELECTRICAL WORK

Specify 25 kV Class insulators and bushings, and copper conductors for 12.47 kv primary overhead distribution system and for secondary service drops at the Onslow Beach Complex. Specify stainless steel enclosures for overhead distribution transformers and exterior switchgear. Locate medium voltage equipment above surge tide level.

LIQUID-INSULATED DISTRIBUTION TRANSFORMER

Locate oil-insulated transformers at least 25 ft (8-m) from buildings and not adjacent to egress paths from building(s).

ONE-LINE/RISER DIAGRAMS

Power One Line/Riser Diagram is required to show components, feeder conductor and raceway sizes, panelboards, sub-panels and final overcurrent device.

Telephone Riser Diagram is required to show telephone service entrance, cabinets, backboards, bonding to electrical service equipment, raceway sizes, trunk lines and components.

Fire Alarm Riser Diagram is required to show control panel, Seaboard Radio Alarm Transmitter, initiating and signaling devices, door hold-open devices and, air-handling unit shut-down connections.

ELECTRIC MOTORS

Multi-voltage electric motors are acceptable.

ELECTRICAL RACEWAYS

Use painted surface metal raceways on existing finished surface in administration spaces in lieu of exposed conduit.

Provide (3) 3/4-inch and (2) 1-inch empty conduits where panelboards are flushed-mounted. Run concealed in walls to above accessible ceiling and terminate to all flush-mounted panelboards; cap these conduits.

EXIT & EMERGENCY LIGHTING CIRCUITS

Wire exit and emergency lights ahead of the switch to the normal lighting circuit that is located in the same area or room.

INTERIOR FIRE ALARM SYSTEMS

Connect Fire Alarm Systems including Radio Fire Alarm Transmitters on a dedicated branch circuit with a circuit breaker handle blocking device.

TREE REMOVAL

Notify the Project Manager whenever trees are to be removed from the project site. Directions will be provided by the Project Manager whether the trees will be harvested under a timber contract or hauled to the Base landfill by the construction contactor. Forestry projects will remain the property of the Government.

LANTDIV NORVA 4-4330/89C (~~NEW~~ REV- 10/84)

FOREWORD

This publication has been prepared for the guidance of firms providing Architectural and Engineering Services under contract to the Commander, Atlantic Division, Naval Facilities Engineering Command.

Contract services of this nature fall into two broad classes:

(1) Architect and Engineering Services related to construction, maintenance, alteration or repair of facilities. The product of this class of service is a set of construction documents, i.e., plans, specifications, cost estimate and pre and post design support, such as, soil borings, site topography, and construction surveillance.

(2) Engineering Services related to planning, inspection, study and project development for existing or proposed facilities. The product of this class of service is normally a study or report.

In recent years the use of contracting for the second class of service has increased, however, Architect and Engineering Services related to construction contracting still represents the majority of contracts administered by this Command. Consequently, much of this publication is directed to development of construction documents. A firm providing contract services to the Navy will be the Designer of Record and will incur the usual professional responsibilities and liabilities for the specific project. We evaluate and actively pursue design changes which occur during construction. The designer of record should become familiar with the contract terms and content of this publication with respect to pre and post construction design responsibilities.

Problems typically encountered in several critical areas of project development are listed below. These areas should receive special emphasis as applicable to this project.

a. FIELD WORK - Properly conducted field and condition surveys are essential. This data must be complete, accurately documented and appropriately incorporated into the plans and specifications to avoid large and expensive change orders and construction delays.

b. COST AND BUDGET CONTROL - Effective cost control is essential to successful project development. Establishment of an adequate budget and a design cost control system at the beginning of a project and continuing application of this system throughout the design process can prevent costly redesign of projects.

c. SCHEDULING AND SUBMITTALS - Project schedules are established at the outset to meet the customers operational commitments and inserted in our master scheduling process to balance our work load. Adherence to the established schedule or notification of need for change is imperative. Incomplete and/or uncoordinated submittals are a major problem and will not be accepted. During fee negotiations the Designer of Record should assure that the preparation period is adequate to assure thorough review by the firm prior to review submission.

d. DESIGN QUALITY CONTROL - Many times A&E firms appear to rely on a Government review to provide quality control for the plans and specifications. This, of course, usually delays the return of submittals, involves additional time on our part, and often ultimately results in a poor set of bid documents. Coordination among the various disciplines as well as sections of the specifications is almost always a major problem. Please establish your own quality control program and stick with it. Time spent preparing a quality design package will reduce redesign effort and time spent resolving problems during the construction contract phase.

The contract responsibilities, standards of format and practice defined by this publication are applicable to all Architectural and Engineering and Engineering Services contracts except as altered by the project scope of work.

E. W. Atkinson 10.26.84

E. W. ATKINSON, P. E.
ACQUISITION PROJECT
MANAGEMENT OFFICER

GUIDE FOR ARCHITECT-ENGINEER FIRMS

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SECTION 1. DEFINITIONS AND GENERAL GUIDANCE

1.1 DEFINITIONS

A&E: An architectural firm, an engineering firm, or an architectural and engineering firm engaged for design services.

ES: Engineering services.

CONTRACTING OFFICER: Officer in Charge of A&E contracts - the Commander, Atlantic Division, Naval Facilties Engineering Command.

ROICC: Resident Officer in Charge of Construction, at a specific station or facility designated by the Contracting Officer. He is responsible for the field administration of construction contracts.

LANTDIV: Atlantic Division, Naval Facilities Engineering Command.

NAVFAC: Naval Facilities Engineering Command, headquartered in Washington, D. C.

DESIGN DIVISION: That department within LANTDIV responsible for technical review of all A&E construction contract documents.

PROJECT MANAGER (PM): The individual within the Acquisition Department of LANTDIV who serves as the Contracting Officer's primary representative assigned to a specific project. Unless specifically directed otherwise, ALL LIASION BETWEEN THE A&E AND LANTDIV WILL BE CONDUCTED THROUGH THE ASSIGNED PM. Variations to this standard procedure will be handled by special instructions prior to negotiation and award of the contract.

THE ARCHITECT OR ENGINEER IN CHARGE (AIC/EIC): The individual within LANTDIV who is designated as the point of contact on technical matters.

MAILING ADDRESS: All correspondence and submittals shall be addressed to: Commander, Atlantic Division, Naval Facilities Engineering Command (Attention Appropriate Project Manager), Building N-26, Naval Station, Norfolk, Virginia 23511-6287.

1.2 PHILOSOPHY

Prior to commencing design, the A&E should thoroughly familiarize himself with current design criteria, guides, specifications (provided by LANTDIV), project site conditions, project costs and specific project requirements. Generally, a prenegotiation conference will be conducted on all military construction funded projects and on other projects of significant magnitude or complexity where we or the A&E determine it will be beneficial.

The A&E should be aware that there are differences between private work and Government work such as: (1) the Government cannot limit bidding to a selected list of contractors known to do good work. Any contractor may bid. Therefore, drawings and specification requirements must leave nothing to the imagination. They must be clear, concise, and provide thorough

detailing of existing and proposed construction. (2) Department of Defense requires the use of coordinated Federal and Military specifications for procurement of materials and equipment covered by these specifications. Use of these specifications assures the non-restrictive competition required in the expenditure of public funds. Proprietary specifications are not allowed without written authorization. Failure to grasp these basic differences in rules and policies has been the source of many costly disputes. It is essential that all personnel responsible for the execution of an A&E or ES contract with LANTDIV study these guides and follow the procedures and instructions set forth herein. General instructions can not cover every situation. Specific problems relating to a particular project will be jointly resolved in conferences with activity personnel and the PM.

1.3 ECONOMY IN DESIGN AND CONSTRUCTION

It is LANTDIV's objective to obtain a functionally adequate, habitable, and economic facility. In the design of all projects, it is the Navy's policy to provide functional facilities of a durability consistent with their mission. The A&E throughout his participation in the project shall bear in mind that the interest of the Government is to acquire facilities which are economical in design, construction, operation and maintenance. Accordingly, although due consideration shall be given to appearance, structures shall not entail frills and embellishments and shall not be conceived on the basis of unnecessarily complicated and costly construction systems, materials or equipment.

Although the above paragraph stresses economical design, the A&E is responsible to assure compatibility of the new structure with the architectural character of the base activity. For people oriented facilities such as: UEPHs, UOPHs, dining facilities, lounges, recreation areas, libraries, chapels and theatres, the A&E will be responsible for a totally integrated design. Integrated design means the complete design of a facility, taking into consideration all engineering disciplines involved plus landscape architecture and complete interior design for a comprehensively designed facility. An integrated design achieves harmony of site, landscaping, building design and functional requirements.

1.4 RELEASE OF INFORMATION PERTAINING TO DESIGN PROJECTS

The A&E shall give no information concerning a project to anyone other than authorized station personnel, other A&E's performing design of related facilities and personnel of LANTDIV. During the bidding period, any requests made of the A&E by prospective bidders for clarification or intent of drawings and specifications should be referred to the Director, Engineering and Design Division, LANTDIV, Norfolk telephone (804) 444-9940. However, sources of supply for special equipment may be given to contractors. The A&E should promptly notify LANTDIV of any necessary corrections or clarifications of the drawings and specifications. Release in any form of information pertinent to a project under design or construction for publication, for public speeches or address shall not be made without first securing clearance and a release in writing from the Commander, Atlantic Division, Naval Facilities Engineering Command. All material for which clearance is desired shall be submitted in duplicate.

1.5 DATA AND MATERIAL FURNISHED BY THE GOVERNMENT

a. Schematics, designs, and other criteria furnished with the letter notifying the A&E of selection.

b. NAVFAC Publication P-34, "Engineering and Design Criteria for Navy Facilities" (updated quarterly), contains a listing of current criteria and is available from the Specifications Branch (telphone 444-9906, area code 804). Copies of NAVFAC Design Manuals required for a specific project will be furnished upon request to the PM. It is the A&E's responsibility to update all Design Manuals in his possession based on the most current changes. The A&E should insure receipt of DOD 4270.1-M, Construction Criteria Manual (latest edition including supplements). This manual updates and supersedes much design criteria previously established by the Department of Defense.

1.6 A&E PERFORMANCE EVALUATION

An evaluation of the performance of the A&E is prepared concurrent with the final review of the plans and specifications or other services performed. This evaluation includes a rating of the services performed in such categories as economy and suitability of design, overall engineering quality, adequacy of details and specifications, adherence to schedules and scope, consciousness of budget, responsiveness, and cooperation. The completed evaluations shall be permanently retained in the A&E's file at LANTDIV for review and consideration by future Selection Boards and are distributed to other Government agencies. A&E ratings are available for review by the Designer of Record upon request to the PM.

Upon completion of the construction contract, a second evaluation is completed by the ROICC with emphasis on quality and constructibility of the design; timeliness and response with respect to shop drawing review, clarification of drawings/specification intent and resolution of construction problems; and cooperation.

1.7 A&E OUTSTANDING PERFORMANCE AWARDS

Five programs currently exist to provide recognition of outstanding performance:

a. Naval Facilities Engineering Command - American Institute of Architects Biennial Awards Program for Distinguished Architectural Achievement (NAVFAC Instruction 5016.2, latest edition).

PURPOSE: To recognize outstanding architectural design, encourage professionalism, and promote excellence in design of facilities designed for NAVFACENGCOM.

b. Industrial Incentive Plan. (LANTDIVSTAFFINST 4804.1B)

PURPOSE: To provide recognition for performance by a contractor in excess of contract requirements, in one or a combination of the following areas:

Better product.
Speed of accomplishment.

Savings to the Government.
Cooperation beyond the contract terms to serve the convenience of the Command, the Navy, or the U. S. Government.

c. Department of Defense Design Awards Program (NAVFACINST 5061.4, the latest edition).

PURPOSE: Promote excellence in architectural and engineering design and provide motivation and recognition for architects/engineers who design facilities for the military departments.

d. Naval Facilities Engineering Command - American Society of Interior Designers Biennial Competition for Achievement in Interior Design (NAVFACINST 4804.2, latest edition).

PURPOSE: To recognize high quality interior design.

e. Presidential Design Awards Program.

PURPOSE: To recognize high quality design in fields of architecture, engineering, graphics, interiors, landscaping, commercial/industrial and urban design and planning.

LANTDIV encourages A&E participation in these programs. For further information, contact the Architectural Branch Head, telephone 444-9901, area code 804.

1.8 SELECTION OF MATERIALS

LANTDIV's objective is to provide functional and economical shore facilities for the Navy establishment. We are not in the research and development business. Consequently, it is necessary to investigate thoroughly all new materials that have not been proven in the specific type of service involved, and whose promotion is based upon unsupported statements and lists of supposedly satisfied users. Materials must be used in a manner that will afford the maximum service at the lowest comparable cost. Operation and maintenance costs must be weighed against initial costs to achieve maximum economy. Before deciding upon a specific material for design or specification purposes, the following points shall be considered:

a. Contemplated life of the construction.
b. Climatic and operating conditions.
c. Will material be used to the best advantage under contemplated conditions?
d. Is material a stock item or does it require special processing?
e. Availability of material in the area of usage.
f. Is material proprietary or restrictive?

Where new unproven materials are selected, documentation including detailed economic analysis justifying its use may be required.

1.9 CONSULTATION SERVICES

During design or study preparation the following disciplines are available for consultation. When the A&E contract is for plans and specifications preparation our personnel identify the project by the last four digits of the CONSTRUCTION contract number. Should problems arise in the coordinative effort , contact the PM. Written confirmation of the discussion or desire for written confirmation by LANTDIV should be directed to the PM.

Architectural (includes Interior Design)	444-9901, area code 804
Structural	444-9902, area code 804
Mechanical	444-9903, area code 804
Electrical	444-9904, area code 804
Civil	444-9905, area code 804
Specifications	444-9906, area code 804
Cost	444-9907, area code 804
Fire Protection	444-9908, area code 804
Geotechnical and Paving	444-9911, area code 804
Value Engineering	444-9797, area code 804
Commercial Utilities	444-9568, area code 804
Environmental Quality	444-9556, area code 804
Collateral Equipment	444-9694, area code 804
Cathodic Protection	444-9521, area code 804
Communications and Electronics Facilities	444-9675, area code 804
Energy and Utilities	444-9586, area code 804
Real Estate	444-9042, area code 804

1.10 PROGRESS PAYMENTS

It is our policy to process partial payments. Generally, we process payment requests made concurrent with a review submittal (i.e., preliminary (35%), prefinal, etc.) required by the project scope. However, other progress payments will be processed when accompanied by adequate evidence of progress.

Request for payment should be addressed to the individual and code stated in the contract and must include the following:

a. Original of NAVFAC Form 7300/30 (Rev 7/83) (Contractor's Invoice).

b. Original of LANTDIV NORVA Form 4-7300/18 (New 2-81) (Contract Performance Statement)

c. Original of Affidavit (LANTDIV 4-4235/4 (Rev 5-81) properly notarized).

Sample copies of these forms are attached.

NAVFAC 7300/30 (Rev 10/81)

NAVAL FACILITIES ENGINEERING COMMAND
CONTRACTOR'S INVOICE

INVOICE DATE _____

INVOICE NUMBER _____

FROM:

TO: Officer in Charge of Construction
VIA: Resident Officer in Charge of Construction

1. Below is a Statement of Performance under Contract _____ 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 invoices	$ _____
E.	Amount of this invoice	$ _____

Signature and Title _____

FIRST ENDORSEMENT

Date _____

FROM: ROICC _____

TO: _____

1. Payment is recommended as follows:

A.	Amount of work completed to _____		$ _____
B.	Less:		
	Retention	$	
	Other deductions	$ _____	$ _____
C.	Sub-total		$ _____
D.	Less previous payments		$ _____
E.	Recommended amount for _____ payment.		$ _____

2. Elapsed contract time _____ %

3.

Signature and Title _____
[1]ROICC

Pursuant to authority vested in me, I certify that this invoice is correct and proper for payment.

Date _____ Signature and Title _____
[1]Authorized Certifying Officer

ACRN	APPN/SUBHEAD	OC	BCN	SA	AAA	TT	PAA	COST CODE	AMOUNT

[1]If the ability to certify and authority to recommend are combined in one person, one signature only is necessary; otherwise the ROICC will sign in the space provided.

CONTRACT PERFORMANCE STATEMENT
LANTDIV NORVA 4-7300/18 (New 2-81)

Pending BuBud Approval
CONTRACT #_____

LOCATION: _____

SHEET ____ OF ____

PERIOD ENDING _____

TO BE COMPLETED BY CONTRACTOR						
CONSTR. CONTRACT NO. OR SPECIAL PROJECT NO.	DESCRIPTION OR TITLE OF JOB	TOTAL CONSTRUCTION COST	% COMP.	VALUE OF COMPLETED PERFORMANCE	PRIOR REPORT	CURRENT REPORT
(1)	(2)	(3)	(4)	(5)	(6)	(7)
TOTALS						

REMARKS:

_____
ROICC NAME AND RANK

Contract N62470-_____
Atlantic Division
Naval Facilities Engineering Command

SAMPLE

AFFIDAVIT

TO ACCOMPANY INVOICE NO. _____

STATE OF VIRGINIA)

COUNTY OF NORFOLK)

I John Doe, President , being
(Name and Title)

duly sworn to depose and say that John Doe and Sons, Inc.
(Prime Contractor)

_____ and his Subcontractors who have performed at the site any part of the work under Contract N62470- 84-c-4000 _____ for the period ending 30 November 1984 and covered by this invoice, have complied with the Labor Standards provisions of the contract.

_____

Sworn to before me this _____ day of _____ 19____ .

_____
(Notary Public)

(SEAL)

(To be accomplished by person authorized to sign invoice)

NOTARIZATION REQUIREMENTS FOR A?E FIRMS ARE AS FOLLOWS:

VIRGINIA FIRMS - NOTARY SIGNATURE REQUIRED

OUT-OF-STATE FIRMS - NOTARY STAMP OR RAISED SEAL REQUIRED

OVERSEAS FIRMS - AFFIDAVIT NOT REQUIRED

LANTDIV NORVA 4-4235/4 (Rev.5/81)

SECTION 2 CONTRACTOR REQUIREMENTS

2.1 Quality of Work

The A&E shall be responsible for the professional and technical accuracy and coordination of all designs, drawings, specifications, cost estimates, and other work or materials furnished.

The project submitted by the A&E shall respresent the best engineering solution possible for the scope of work in the A&E contract. All work must be in accordance with current criteria, guides and specifications established by the Naval Facilities Engineering Command, and shall be in accordance with the best engineering practices. Workmanship shall be neat with all lines and lettering of uniform weight and clarity for complete legibility and satisfactory reproduction. All elements of submittals shall be checked by the A&E and such check should be made by persons other than those preparing the materials and by professional personnel trained in that specific discipline. It will be reviewed by the various departments in LANTDIV for compliance with Government requirements and standard criteria. Errors and/or deficiencies shall be corrected by the A&E at no additional cost to the Government.

2.2 A&E Liability

Neither LANTDIV's review, approval or acceptance of, nor payment for any of the services required shall be construed to operate as a waiver of any rights or of any cause of action arising out of the performance of the contract. The A&E shall be and remain liable to the Government for all costs of any kind which are incurred by the Government as a result of inadequate or negligent performance of any of the services furnished.

Reimbursement of costs incurred by the Government as a result of A&E's error and/or negligent performance are actively pursued by LANTDIV. Upon determination that there may be A&E financial responsibility involved, the A&E shall be contacted by the ROICC. The A&E shall be advised of the design deficiency and requested to provide a technical solution to the problem, including cost estimate. He shall be further informed that it is the ROICC's opinion that he (the A&E) may be held financially responsible, but that the final decision rests with the OICC. A&E financial responsibility can include contractor extended overhead costs. Therefore, upon notification of potential liability, the A&E should coordinate with the directing official to determine required technical support and timing to minimize delay costs. Pending final decision by the OICC, the A&E will be invited to attend all price negotiations for corrective work. The A&E shall participate as a non-voting technical advisor to the Government negotiating board. Inability to obtain agreement from the A&E as to financial responsibility or A&E unwillingness to participate in negotiations shall not be cause for delay of remedial construction contract action by the ROICC.

When the OICC determines that the cost of correction for A&E financial liability is below the NAVFAC threshold (currently $1,500) documentation shall be placed in the design and construction contract files and no further action taken. When several of such actions on a project cumulatively exceed the dollar threshold, these actions may be submitted to the OICC for review and possible action.

As an alternate to the above, the A&E (where design error is clearly at fault) may discharge his financial responsibility through negotiation with, and direct payment to, the contractor. This action must be participated in and sanctioned by the ROICC.

2.3 Scope

The A&E must restrict himself to the authorized scope of work provided him as a basis for negotiation of fee. Deviations from the authorized scope include incorporating embellishments within the project scope, increasing the cost above programmed amounts for the project, increases in area, major changes in construction criteria, the inclusion of unauthorized buildings or areas, selections of specific systems or equipment without economic or technical evaluation, or introduction of special equipment. (IN NO CASE WILL CHANGES TO THE SCOPE BASIS ESTABLISHED DURING FEE NEGOTIATIONS BE MADE AT THE ACTIVITY LEVEL. THE A&E'S RESPONSIBILITY IS DIRECTLY TO THE CONTRACTING OFFICER AND ANY REQUESTED DEVIATION FROM THE SCOPE OR ELABORATIONS WITHIN THE SCOPE MUST BE BROUGHT TO THE ATTENTION OF THE PROJECT MANAGER.)

It is the A&E's contractural responsibility to design a facility which can be constructed within the funds available.

During the progress of the work, the A&E may expect minor changes in criteria within the general scope of the project and should make necessary adjustments accordingly. Generally the preliminary (35%) design submittal is intended to clarify and establish specified requirements of the project. Incorporation of Value Engineering (V/E) comments of minor consequence or changes justified on payback which should have been evaluated during 35% design preparation, and changes in functional layout occuring during review are considered within scope of the contract. Should major changes in the scope of work be authorized, appropriate modifications to the A&E contract will be negotiated.

A member or individual of the A&E firm shall be designated as Project Manager and LANTDIV shall be so notified and as such he shall be fully cognizant of the requirements of the performance schedule. He will work directly with the assigned LANTDIV PM, who will furnish design guidance necessary for the successful execution of the work.

2.4 CONFERENCES AND INSPECTIONS

Prior to submitting a fee proposal it is the responsibility of the A&E to visit and inspect the location of the work and to become acquainted with all pertinent local conditions. Following conclusion of fee negotiations and at the initial field investigation visit of the A&E to the station, it is required that he contact the Public Works Officer or Commanding Officer and discuss the scope of work as negotiated and his schedule of performance. All conferences with LANTDIV personnel or station personnel, including telephone conversations, consultation, etc., which involve some question of scope, primary design element, or other consideration of basic import, shall be reduced in writing by the A&E and forwarded, in duplicate to LANTDIV, marked for the attention of the Project Manager; the general intent being that the PM will be fully apprised of all factors affecting the project. The scope of work as negotiated shall not under any circumstances be modified without written approval from Commander, Atlantic Division, Naval Facilities Engineering Command.

2.5 SITE INFORMATION

Any available information relative to existing conditions at the site of the construction will be furnished to the A&E who (unless fee negotiations establish otherwise) shall evaluate and verify such information and make field measurements and investigations as necessary to prepare adequate construction drawings and specifications. When the exposure of existing subsurface construction is considered necessary, the A&E shall arrange with the PM for accomplishment of this work.

2.6 SURVEYS

The A&E shall make all field surveys required for design and preparation of construction documents. In general, this may consist of topographic site surveys, alignment, profiles and cross sections. A sufficient number of semipermanent survey points to serve as intitial horizontal and vertical survey controls for construction of the project shall be set. The horizontal control points and bench marks shall be shown and described on the plans. The datum used shall be that used for the station or area in question and shall be shown on the appropriate site drawings. The surveying firm shall obtain from LANTDIV the bench mark or datum location to be used for the project design. That datum shall be confirmed in writing. Failure to comply with this requirement may be cause for survey/design rework at no additional cost to the Government. Boundary surveys to be used as instruments for real estate purposes shall carry the seal of a licensed land surveyor acceptable to the political subdivision in question.

2.7 SUBSURFACE CONDITIONS

The A&E is required to take soil borings and evaluate subsurface conditions in all cases where the Contracting Officer and A&E determine that soil explorations and laboratory soil test data are necessary: i.e., inadequate data available in LANTDIV's files. Complete reports of these tests, including specific interpretations and cautions, are essential and copies of such reports shall be made part of the information available to all prospective bidders. The A&E shall analyze and interpret all necessary information concerning foundation soil conditions and shall include, in the preparation of specifications and drawings, complete and specific coverage of procedures for foundation construction and for handling unusual subsurface conditions. Soil explorations and tests should conform to the essential requirements outlined in NAVFAC Design Manual DM-7, "Soil Mechanics and Earth Structures" and DM-21, "Airfield Pavement".

2.8 CONCEPT DEVELOPMENT FOR MEDICAL PROJECTS

Development of pre-concept, concept and final concepts for NAVFACENGCOM/COMNAVMEDCOM review and approval is required for MCON funded medical projects intended to provide patient care. Generally, initial development is based on a space program. Special instructions will be provided for these phases of design. This requirement preceeds PED and preliminary (35%) design preparation.

2.9 VALUE ENGINEERING (VE)

All projects with an estimated construction cost greater than $2,000,000 may require a 40 hour VE study and presentation. The study is conducted concurrent with the preliminary (35%) design review utilizing the five step job plan as recognized by the Society of American Value Engineers (SAVE). The study will be conducted in the A&E's local area by a consultant to LANTDIV. The A&E's involvement in the VE study with anticipated manhours by discipline is summarized below:

	PM	ARCH	STRU	MECH	ELEC	CIVIL
o Design Team Presents Overview of Design Concept	4	4	4	4	4	4
o Design Team joins VE Team to Review and Supplement VE Effort	4	4	4	4	4	4
o Oral Presentation of VE Study Results to Project Manager	4	-	-	-	-	-
o Review, Supplement, and Comment on VE Report	8	4	4	4	4	4
o Make Oral Presentation at LANTDIV	8	-	8	8	-	-
o Follow-up on Questions/Decisions from Oral Presentation	4	-	-	-	-	-
TOTALS	32	12	20	20	12	12

In addition, the A&E may question specific design criteria, instructions and/or user requirements for the purpose of identifying alternate items or procedures that might satify the REQUIRED FUNCTIONS at a lower life cycle cost. The proposed criteria challenge package must include code references, life cycle analysis supported by recent research and testing and any calculations that are necessary. Also, a brief narrative describing the advantages, disadvantages and magnitude of potential savings shall be included in this package. This data package should be marked VALUE ENGINEERING and submitted with the preliminary (35%) design submittal. However, pending formal approval of any waiver or deviation, project development will continue based on current standards.

2.10 CONSTRUCTION SCHEDULE

Construction scheduling, i.e., sequence of events and time of construction, is required to be submitted for all projects. For projects which involve interruptions of existing building operations or major utility usage, it is the A&E's responsibility to discuss the required outages and interruptions with the appropriate station Public Works and operations personnel and establish a construction schedule for these interruptions in the contract specifications. Where these outages and interruptions adversely impact the project costs or time for completion, notify the PM. A brief description of the restrictions and their basis may be required.

2.11 SITE ADAPTATION OF STANDARD OR WORKING DRAWINGS

On certain repetitive-type structures, such as UEPHs,UOPHs, and subsistence buildings and on certain technical structures, a definitive layout or working drawings may be furnished to the A&E for site adaptation. The A&E is responsible for providing a complete cost estimate and complete specifications based on current guide specifications. Site adaptation, in general, consists of modifying the foundation structure to fit the site and making necessary mechanical changes (heating, evaporative cooling or air conditioning) to fit the climatic conditions existing at the site. If other changes in standard plans or working drawings are contemplated, such changes will normally be spelled out in the scope of work. It is not the responsibility of the A&E to review the design of the standard or working drawings furnished for technical accuracy.However, if errors in the drawings are discovered or if the design or functional layout appears unworkable for site adaptation, the matter will be brought immediately to the attention of the PM. If the A&E cannot fit necessary mechanical or electrical equipment into the space provided in the standard plan, then such space will be adjusted or increased as necessary for the equipment. Such necessary changes are construed to be part of site adaptation.

2.12 ENVIRONMENTAL POLLUTION CONTROL

On projects requiring environmental control permits (excluding dredge and fill) and notifications, the A&E will develop required data, obtain copies of controlling regulations and necessary permit forms, complete and submit the permit application to LANTDIV. LANTDIV will be responsible for submitting the application for final permit. All contact with other federal, state and local regulatory bodies will be coordinated through the PM.

For overseas activities, design and documentation for projects which have environmental pollution discharges, shall comply with local, regional and/or host country pollution control rules, regulations and standards.

SECTION 3. SUBMITTAL REQUIREMENTS

3.1 INTRODUCTION

This section discusses the design related submissions of plans and specifications for review. Project budget related submissions will be required for those contracts requiring preparation of Project Engineering Documentation (PED). PED requirements are established by separate instructions which are furnished with the letter notifying the A&E of selection.

At times circumstances dictate that a formal preliminary submittal be waived. When these circumstances exist, waiving the preliminary submittal is intended to save the time required for submittal preparation and review and not to "Short-cut" project development. When the preliminary submittal is waived, the A&E shall at the 35% design stage contact the activity, present the design as developed thusfar, assure mutual understanding of scope and discuss functional and/or operational requirements which impact the design and/or the construction. Concurrently, the A&E shall coordinate with LANTDIV regarding project scope and development, i.e., guide specifications, cost estimating, fire protection, etc.

3.2 DESIGN SUBMITTALS

Each copy of each element shall be separately bound and shall bear the A&E's name, the project CONSTRUCTION contract number, and date of submittal. INCOMPLETE SUBMITTALS WILL NOT BE ACCEPTED.

3.2.1 PRELIMINARY (35%) SUBMITTAL

A. PURPOSE: This submittal allows the activity to review and concur with the A&E's interpretation of the functional and organizational requirements of the project. Concurrently, LANTDIV is reviewing to assure technical features comply with the Department of Defense and Navy policies and regulations. This submittal is intended to clarify and establish specific requirements for the project.

B. ELEMENTS:

(1) DRAWINGS: Include as a minimum the following: site plan, utility plan, floor plan, roof plan, elevations typical wall sections, foundation plan, floor and roof framing plans, framing elevations (high bay industrial construction), preliminary mechanical layout, preliminary electrical layout.

(2) Basis of Design - See Section 4.

(3) BEAP Presentation - See Section 4.2.1(e).

(4) Outline Specification - See Section 6.

(5) Cost Estimate - See Section 7.

(a) Bid items: if estimated construction cost exceeds the established budget, identify potential additive bid items in accordance with Section 6.13.

(6) Geotechnical reports and foundation studies.

(7) Design Concepts for Military Construction projects requiring a PED - See PED Instruction.

NOTE: The basis of design and outline specification may be combined into a single bound document except the BEAP Presentation must be separate.

C. DISTRIBUTION:

(1) Distribution and number of copies is Activity/project specific and will be provided by PM.

(2) Provide the following to the Value Engineering (VE) Team on all projects requiring a VE study:

(a) Two sets of full size 35% drawings.

(b) Two sets of half size 35% drawings.

(c) Specifications (2 copies).

(d) Detailed Cost Estimate (4 copies).

(e) Basis of design (6 copies).

(f) Design Calculation (mechanical, electrical, etc.).

(g) Boring logs and soil reports.

(h) Photographs of site (8" X 10" size)

(3) For projects, geographically located within the Commonwealth of Virginia, involving new water distribution systems, new wastewater pump stations, or distribution systems, providing the following to the appropriate office of the Department of Health for review: Basis of Design (1 copy); plans (3 copies); and outline specifications (3 copies). Each element shall be clearly marked "PRELIMINARY". The PM will receive a copy of the transmittal letter forwarding each submittal.

3.2.2 PREFINAL SUBMITTAL

A. PURPOSE: A technical review for compliance with DOD and Navy requirements, a constructability review and a final functional check. The A&E should submit plans and specifications complete from his viewpoint, thus preventing time-consuming reviews of incomplete plans and specifications.

ALL PRELIMINARY (35%) REVIEW COMMENTS RETURNED TO THE A&E SHALL BE INCORPORATED INTO THE DESIGN OR AN EXPLANATION SHALL BE PROVIDED FOR NOT DOING SO.

B. ELEMENTS:

(1) Plans - coordinated, checked, and complete from the A&E viewpoint (except for LANTDIV and NAVFAC drawing numbers). Checking should be by persons other than those preparing the materials and who are professional personnel trained in that specific discipline.

(2) Specification - photographic copies of fully edited guide specifications supplemented as required are acceptable. See Section 6.

(3) Cost Estimate - See Section 7.

(a) CES Estimates:

1. Computer load sheets
2. Marked preliminary (35%) estimate
3. Budget summary sheets
4. Vendor/manufacturer quotes

(b) Manual Estimates:

1. Backup estimate with summary sheets
2. Marked preliminary (35%) estimate
3. Vendor/manufacturer quotes

(c) Bids Items - if estimated construction cost exceeds construction funds available, identify in conjunction with the activity and LANTDIV additive bid items and respective values required to produce a base bid within available construction funds. See Section 6.13 for additional information.

(4) Draft Environmental Control Permit(s)

(5) Calculations - engineering calculations shall be neat, legible, logically ordered, bound and indexed. Design data shall be clearly stated. Formulas and reference sources shall be cited. Designers and checkers shall initial and date each computation sheets.

Upon request A&E firms using computerized design procedures must submit, in conjunction with calculations:

1. Digital Computer

(a) A description of the type(s) and configuration(s) used.

(b) Copies of all pertinent input and output data.

(c) Documentation of each program, including a written summary of the program intent and function, assumptions, formulas, numerical methods used, nomenclature, limitations of the program, and references used in developing the program. In event "non-proven" programs are used, a computer run by the A&E of a check problem provided by the Design Division may be required for verification at no expense to the Goverment.

2. Analog Computer

(a) In accordance with DM-6, Chapter 2.

(6) Interior Color/Finish Materials

(a) color board identifying all finish colors listed in the color design, labeled with appropriate color codes.

(b) Color study illustrating the interior color scheme in the form of colored floor plans, elevations, and sketches identifying location of color for building materials, built-in equipment, and window treatments. Color studies are required for facilities with high personnel density or public traffic such as UEPHs, Administrative facilities, training facilities, pass offices, etc.

(c) Furniture footprint reflecting the updated collateral equipment list based on activity interviews which show the end result of the architect's space planning effort. The furniture footprint demonstrates the designer's plan for the various functions that are housed in the facility. The designer shall use standard furniture sizes to demonstrate adequacy of space and to communicate utility and service requirements to engineering disciplines. Although required for space, utility and service requirement development these drawings are seldom included in the construction bid package. They may, however, be used for furniture placement and budgeting for interior furnishings under the post design services interior design option.

(7) All marked materials returned with previous submittal (i.e., plans, specifications, cost estimate, Basis of Design, Calculations, reports, etc.).

C. DISTRIBUTION:

(1) Distribution of plans, specifications and cost estimate are project specific and will be provided by the PM.

(2) Two copies each of the remaining submittal elements will be forwarded to LANTDIV only.

(3) For projects, geographically located within the Commonwealth of Virginia, involving new water distribution systems, new wastewater pump stations, or distribution systems, providing the following to the appropriate office of the Department of Health for review: Plans and specifications (3 copies each). Each set of plans and specifications shall be clearly marked "PREFINAL". The PM will receive a copy of the transmittal letter forwarding each submittal.

3.2.3 FINAL SUBMITTAL

A. PURPOSE: To finalize design phase and prepare documents for construction contract advertisement.

ALL PREFINAL REVIEW COMMENTS RETURNED TO THE A&E SHALL BE INCORPORATED INTO THE DESIGN OR AN EXPLANATION SHALL BE PROVIDED FOR NOT DOING SO.

B. ELEMENTS:

APPROPRIATE SIGNATURES. The A&E is responsible for obtaining the signature of the Commanding Officer of the activity prior to final submission of all projects . Each final tracing shall be signed by the registered professional architect or engineer responsible for the work submitted. In addition, all sheets shall bear the professional seal of the consultant responsible for the work. A firm or partnership stamp is not acceptable. Where the firm's state of residency does not provide for professional sealing, compliance with that state's normal requirements will surfice. Also, the title block on each final tracing shall bear the dated signature of a principal or officer of the A&E of Record.

FINAL TRACINGS. Final tracings, masters and any other data developed by the A&E shall become the property of the Government unless stated otherwise in the contract. Upon request, the A&E of record may retain ownership of final contract plans and specifications. In contracts which vest ownership and retention of the final tracings with the A&E, the A&E shall provide the Government with polyester drafting film, matted both sides, (0.004") reproducibles. The determination of which party will retain the final tracings will be made by LANTDIV.

(1) Original tracings plus 2 sets of prints.

(2) Final Specifications (Bond plus 2 copies).

(3) Cost Estimate.

(a) CES Estimate

(1) Marked prefinal listing of estimate input

(2) Marked Prefinal estimate

(3) Budget Summary sheets

(4) Vendor/manufacturer quotes

(b) Manual Estimates

(1) Backup estimate with summary sheet(s)

(2) Marked Prefinal estimate

(3) Vendor/manufacturer quotes

(c) Proposed bid items (if estimated construction cost exceeds construction funds available)

(4) Calculations.

(5) Interior Color/Finish Materials

(a) one color board displaying all materials labeled with color codes.

(b) Two 8 1/2" X 11" binders containing all coded materials.

(c) Color study illustrating the interior color schemes.

(d) Furniture footprint reflecting final collateral equipment list.

(6) All marked materials returned with previous submittal .

(7) Field Notes, Reports and Studies.

(8) Environmental Control Permit(s).

(9) All NAVFAC DMs that we furnished at project commencement.

NOTE: ALL COMPUTATIONS, STUDIES AND OTHER SIGNIFICANT MATERIAL SHALL BE BOUND IN BOOK FORM.

C. DISTRIBUTION:

(1) Except as otherwise noted above, submit one copy of each element to LANTDIV.

(2) For projects, geographically located within the Commonwealth of Virginia, involving new water distribution systems, new wastewater pump stations, or distribution systems, providing the following to the appropriate office of the Department of Health for review: Plans and specifications (3 copies each). The cover sheet on all copies of both the plans and specifications must bear an original Virginia seal and signature of the professional engineer responsible for the design. The PM will receive a copy of the transmittal letter forwarding each submittal.

SECTION 4. BASIS OF DESIGN

4.1 INTRODUCTION

The basis of design should be a bound presentation of facts sufficiently complete in accordance with the following suggested format to expedite LANTDIV review of the preliminary submittal. Detailed design computations, sizing of members or conductors, details of connections, etc., are not necessary with the basis of design, but general computations supporting system selection are required.

4.2 BASIS OF DESIGN - SUGGESTED FORMAT

The following guidance is written around new building type construction. Where a project consists primarily of mechanical, electrical, structural, or another dicipline, the basis of design shall provide more detailed information for the major discipline.

4.2.1 ARCHITECTURAL

(a) Statement of the type of construction adopted with reference to the anticipated tenure of usage and degree of fire resistance.

(b) Statement as to the type of thermal insulation to be provided, when required, and the value of the "U" factors for the various portions of the structure, i.e., roof, walls, floor, etc. Also provide description of all architectural energy conserving features to be incorporated, including any passive solar systems.

(c) Describe materials for all major items of construction and all interior and exterior finishes. The description of finishes (colors, textures, and patterns) shall be accomplished by the use of a finish schedule. The finish schedule on the drawings shall identify interior building material finishes (A&E may choose room-by-room or finish number format). Provide a one page narrative description of the color design concept addressing Architectural finishes and colors. For the completed project all reference to building colors shall be in the project specification (Section 09050).

NOTE: Informal liason with the Architectural Branch, Interior Design Section, telephone 444-9909, area code 804, is encouraged to facilitate orderly development of integrated colors/finishes.

(d) A description of items not considered to be a permanent part of the structure, such as work benches, shelving, bins and removable partitions.

(e) Analyze the design for compliance with Chapter 3, Section 4, DM-1, Architectural Acoustics. Include a statement as to general adherence to this criteria. When required, list areas of high noise and vibration and acoustic design principles applied.

(f) Design features to make facilities accessible to and usable by the physically handicapped shall be specifically addressed. If provision for physically handicapped is not incorporated, appropriate reasons shall be given. (Follow ANSI Standards.)

(g) Computation of gross floor area in accordance with paragraph 3.1.B of DOD 4270.1M. Gross floor areas should be indicated on the drawings.

(h) Provide preliminary floor plans, elevations and building cross section. Floor plans should indicate the location of all built-in equipment and fire walls.

(i) Equipment rooms of ample size shall be provided, with consideration being given to adequate allowances for access, maintenance, repair and easy removal of units. Room dimensions shall not restrict equipment items to the products of any SINGLE MANUFACTURER. The A&E should assure that the equipment of more than one manufacturer can be accomodated in the space allocated. This policy will not be interpreted as sanctioning an increase in equipment space to accomodate some particular manufacturer's product when such would result in structural costs being greater than the probable resultant saving in equipment costs.

(j) Analysis of Life Safety Code (NFPA 101) requirements for all occupancies involved. Determine occupancy classifications, and compute occupant load, number of units of exit and other requirements. Describe unusual or critical code requirements and indicate how such requirements will be met.

(k) Describe special construction features incorporated into the facility such as barred windows or special wall/roof construction.

(l) Appearance and Smartness of Shore Establishment (BEAP STUDY)
The Navy is emphasizing its desire for pride-worthy standards of appearance and smartness in the shore establishment. Studies have been made of the following Activities:

COMNAVBASE NORFOLK
CINCLANTFLT
NAVWPNSTA YORKTOWN
FLECOMBATRACENLANT DAM NECK
NAVHOSP PORTSMOUTH
NORFOLKNAVSHIPYD
NAS BERMUDA

These studies include recommendations for improving exterior appearance and establishing a theme of exterior development. Study is available at the Activity or through the Project Manager.

An Architectural Review Board has been established to insure architectural compatability is maintained at each activity served by this Command.

Where a Base Exterior Architectural Plan (BEAP) has been completed, it shall be used as the principal guide in evaluating the compatability of a new structure with the existing architectural character of the activity. In absence of a BEAP, accepted design precepts (scale, proportion, rhythm, etc.) should be used as a basis for architectural compatability along with the appropriateness of construction materials to the geological and climatic conditions. The area of concern of the Architectural Review Board is specifically limited to the exterior aesthetics of facilities and complexes. It is not the intent to involve the board in any way in the functional organization or material choices for structures except as they affect exterior appearances.

For designs at activities where a BEAP has been completed, the guidelines provided to the A&E shall require design consistency with the guidance of the BEAP.

Concurrent with submission of the preliminary(35%) design for review, a FORMAL WRITTEN SEPARATE SUBMISSION to the Architectural Review Board and using activity will be required. Should substantial changes occur after the 35% design review, a complete review may be requested at the final submission stage.

Specification for Review. The A&E shall prepare and submit the following:

a. Brief description stating concisely the architectural compatability of the project with existing permanent facilities and the BEAP. This includes not only the building characteristics, but a site analysis, visual environment concept and appropriateness of construction methods and materials.

b. For activities where no BEAP exists, provide 18 color slides of existing facilities on the base judged by the A&E to have influence on the architectural design of his project. The three (3) nearest permanent buildings must be included. The remaining slides should show any high exposure elements or elevations detailing features, etc.

c. A schematic submission to include the following scale drawings developed to the stage indicated:

(1) Site Plan/Plans showing the following:

(a) Pertinent boundaries including existing buildings/structures on site.
(b) Outline of vehicle parking and pedestrian access thereto - show traffic flow patterns.
(c) Outline of building and walks including functional relationship between buildings.
(d) Pertinent dimensions.
(e) Trees to be removed (indicate type and size).
(f) Landscaping (planting materials).
(g) General slope of land (water runoff).
(h) Existing site elements or factors having significant cost impact.
(i) Site furnishings (furniture, fencing, security. signage, exterior lighting, etc.). Explain physically handicapped considerations.
(j) Existing and planned above ground utilities.
(k) North arrow.
(l) Graphic scales.

(2) Floor Plans

(a) Room or space names (or use-designation).
(b) Door and window locations.
(c) Pertinent notations and dimensions.
(d) Main entrances, delivery areas (access as related to site).
(e) Ramps and steps to exterior (with floor/walk elevations).

(f) North arrow.
(g) Graphic scale.

(3) Elevations

(a) Doors and windows (indicate type and material).
(b) First floor elevations with respect to finish grade.
(c) Wall height.
(d) Indicate finish materials.
(e) Architectural characteristics.
(f) Color coordination.
(g) Notations highlighting design elements, materials, etc., pertinent to the achievement of architectural compatability with existing permanent buildings in the immediate vicinity of the project.
(h) Graphic scale.

d. Conference Minutes: The A&E shall prepare minutes of all conferences or meetings in connection with this presentation and forward copies to all attendees.

4.2.2 STRUCTURAL

(a) Description of foundation conditions, type of foundation to be used, method by which the allowable bearing values are to be determined, and maximum allowable bearing capacity for the foundations. Geotechnical information including field boring notes and report of recommendations shall be submitted.

(b) Statement of the type of construction adopted, and reason therefore, with capacity, dimensions, or other size criteria, and list of material selected with design strengths.

(c) Special features to be included in the structure which are not evident from a definitive drawing.

(d) Description of the structural floor systems proposed, with length, spacing and approximate depth of principal members (for beam and girder, etc.), if other than standard drawings are proposed.

(e) Description of the structural roof system proposed with principal dimensions (column spacing, beam spacing, etc.) if other than standard drawings are proposed.

(f) Description of the Lateral Force Resisting System proposed with appropriate materials and dimensions.

(g) Statement of live loading to be used, to include floor loads, wind, snow, earthquake, etc., with data to justify.

(h) Statement of any special considerations that affect the design.

(i) Contact the cognizant PM for extent of crane design required. Include special considerations as to crane and monorail requirements, i.e., special architectural-structural considerations, area of service, and type of system.

(j) Computations for framing system selected including:

(1) "Typical bay" member sizing and cost comparisons of alternate structural systems;

(2) Consideration of horizontal force resisting system for wind and earthquake;

(3) Consideration of unusual geometry (long span, high bay, deep cuts, etc.);

(4) Consideration of heavy equipment supports.

4.2.3 SITE PLAN

(a) Provide site plan with existing and proposed contours shown. It is LANTDIV policy that site plans shall be drawn to a scale of 1" = 25' whenever feasible, allowing for ease of conversion to the metric system and aid in the eventual compilation and updating of utility and planning maps.

(b) Indicate location of all proposed utility connections.

4.2.4 ELECTRICAL

(a) Interior distribution systems.

(1) Electrical characteristics (phase, voltage, and number of wires) of circuits.

(2) Breakdown of the estimated connected load to show:

a. Lighting and convenience outlet load.

b. Power load for building equipment, such as heating, air conditioning, etc.

c. Loads for special operating equipment such as compressors, generators, pumps and for power receptacles being provided to energize special equipment. Apply an appropriate demand factor to each to compute total demand load.

(3) Type of wiring system, such as rigid conduit, electrical metallic tubing, nonmetallic sheathed cable, etc., and where proposed to use. (CURRENT CRITERIA PROHIBITS EMBEDDING ALUMINUM CONDUIT IN CONCRETE. CURRENT PROJECTS SHOULD BE REVIEWED TO MAKE SURE THAT CONDUIT, PIPE, BARS, ANCHORS, FLASHING, OR OTHER ALUMINUM PARTS ARE NOT EMBEDDED IN CONCRETE.)

(4) Type of conductors, such as rubber insulated, thermoplastic insulated, polyvinyl chloride jacket, etc., and where proposed to use.

(5) A statement describing proposed pertinent standards of design, such as voltage drop, lighting intensities, and type of lighting fixtures, and a statement regarding the use of selective switching or other energy conserving features.

(6) A determination (include calculations) of short-circuit duty required for all protective devices and switchgear.

(7) Type and arrangement of telephone, signal, and fire alarm systems. General telephone design guidance consistent with procedures required by deregulation of the telephone industry will be provided.

(8) Statement relative to the adequacy of the outside distribution system, at the point of take-off, to accept the new loadings imposed. If the source is inadequate, state measures necessary to correct the deficiency.

(9) Indicate interior lighting plan.

(b) Outside distribution systems.

(1) Contact the Utilities Division (telephone 444-9568, area code 804) for location and characteristics of nearest service facility capable of meeting project supply requirement and cost-of-service information for economic analysis. Do not contact local utility companies.

(2) Statement relative to the adequacy of the primary supply at the point of take-off. If primary source is inadequate, state measures proposed to correct the deficiency.

(3) Electrical characteristics of power supply to station, or portion involved, including circuit interrupting requirements and voltage regulation.

(4) Estimate of total connected load and resulting kilowatt demand load by applying proper demand and diversity factors, if a group of loads is involved.

(5) Basis for selection of primary and/or secondary distribution voltage.

(6) Type of conductors, such as copper or aluminum, and where proposed to use.

(7) A statement describing pertinent standards of design, such as voltage drop, physical characteristics of overhead or underground circuits, type of lighting units and lighting intensities.

(8) Type and adequacy of telephone, signal, and fire alarm systems, including a statement as to number of spare telephone conductors available and spare capacity on fire alarm circuit. For fire alarm and telephone system assistance, contact the Fire Protection Branch (telephone 444-9908, area code 804) and the Electrical Engineering Branch (telephone 444-9904, area code 804) respectively.. THE IMPORTANCE OF EARLY RESOLUTION OF THE TELEPHONE AND FIRE PROTECTION REQUIREMENTS CANNOT BE OVER EMPHASIZED.

4.2.5 ELECTRONIC SYSTEMS

(a) System engineering concepts. Describe the proposed type of system, its functions and the interrelationships if the system is a multi-use system (i.e. security, EMCS, etc.).

(1) Security/Entry Control System

Specific site physical security requirements are to be obtained from the Claimant/User. The objective is to identify early in the concept analysis those physical security requirements resulting from local unique environment, conditions, operations, and mission of the facility so they can be fully and properly incorporated into the facility design.

Identify separately from the other project elements the requirements for Intrusion Detection Systems (IDS). Any of the following items and their interconnecting circuits may be considered part of an IDS:

Annunciation Panels and Cabinets
Visual and Audible Annunciators
Magnetic Switches
Proximity (Capacitance) Sensors
Volumetric Sensors (Microwave and Ultrasonic)
Wire Grids
Vibration Detectors (Structure and Fence)
Infrared Sensors
Power Supplies Integral to Items on this List
Closed Circuit Television Cameras and Monitors, and Video Recorders used for Intrusion Detection Purposes.

IDS installation can be divided into three general functional categories:

a. Nuclear ordnance storage sites.
b. Conventional arms, ammunition, and explosives storage sites (AA & E).
c. All other (including but not limited to communications facilities, special training facilities, special operational facilities, intelligence facilities, etc.).

Planning, design and installation of IDS category (a) and (b) and category (c) projects outside the 50 United States or with extensive perimeter systems are the responsibility of the Naval Electronics Systems Command.

Category (c) projects within the 50 United States and not including extensive perimeter systems are planned, designed, installed by NAVFACENGCOM utilizing commercial systems. State that equipment will be installed and outline areas requiring IDS and types of systems proposed.

Describe entry control equipment (versus IDS) when required and outline location, function, and area of control.

(2) Energy Monitoring and Control Systems (EMCS)

(a) Provide sensor and control points terminated in a Data Terminal Cabinet (DTC) for future interface with EMCS.

(b) Provide background for future Field Interface Device (FID) or Multiplexer (MUX).

(c) Locate DTC and FID/MUX in an environmentally protected area away from extremes in temperature and humidity.

(d) Provide two telephone pairs from telephone backboard to FID/MUX backboard.

(e) Provide a communications interface compatible with the EMCS on projects which utilize a Direct Digital Control (DDC) system.

(b) Indicate circuit requirements.

(c) Indicate equipment selection in such categories as: Government-furnished equipment; standard manufacturer or commercially available items; and special equipment requiring developmental, research, or breadboard methods to meet the requirements.

(d) Describe site or location considerations.

(e) Identify required ratio path and propagation.

(f) Define antenna requirements such as types, separation, tower heights, aircraft clearance, and area requirements.

(g) Describe antenna transmission lines, terminations, and switchings.

(h) Identify azimuth coverage of radar installations.

(i) Descibe bonding and grounding requirements.

(j) Describe communication and control cables and radio links.

(k) Identify test equipment, repair shop, and spare parts storage requirements.

(l) Describe equipment, instrumentation, arrangement, and space requirements indicating requirements for racks, consoles, and individual mountings. Provide the most economical design in first cost, operation and maintenance costs, and operating conditions conforming to best engineering concepts.

(m) Identify wiring and cabling requirements plus terminations.

(n) Identify power and lighting requirements, including emergency or standby requirements.

(o) Describe air conditioning, including humidity and dust-control requirements.

(p) Identify interference and clearance requirements.

(q) State security requirements (Red/Black criteria).

4.2.6 CATHODIC PROTECTION

(a) Provide results of soil resistivity measurements when a buried steam line, P.O.L., or other is required. Mr. Karl Liebrick (444-9521, area code 804) should be contacted to see if these measurements are already available for the area involved.

(b) Indicate variations in soil make-up.

(c) Indicate soil moisture content and normal seasonal variations.

(d) Provide results of 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) Provide results of temporary cathodic protection tests, if any, under same conditions described in item (4) above.

4.2.7 PLUMBING

(a) Determination of number of each type of fixture based upon the number of persons to be served.

(b) Estimated number of fixture units and water demand in gpm for all plumbing fixtures.

(c) Estimated maximum and minimum water pressure at each building and indicate if booster pumping will be required.

(d) Type, size and design temperature of domestic water heater and distribution system. Also, a statement as to whether heat recovery is contemplated for domestic water heating.

(e) Design temperature of domestic hot water distribution system and extent of recirculation system within building.

4.2.8 HEATING, VENTILATION, AND AIR CONDITIONING

(a) Design Conditions

(1) Table 4.2.8.1 "Outside Design Temperature LANTDIV Activities", included at the end of this section shall be utilized in the design of all new and rehabilitation type construction, except critical facilities listed in priorities 1-4 by DOD 4270.1M.

(2) Summer and winter design temperatures shall be stated, based on criteria set forth in DM-3 and DOD 4270.1M, except that winter design temperatures for living spaces shall be $68^{o}F$ versus $70^{o}F$. Summer and winter indoor and outdoor design termperatures and relative humidities for the structure or spaces within structures which differ shall be indicated on the plans. For some buildings a table may be required to clearly do this.

(3) Building cooling load calculations should include the effects of heat lag by time averaging the instantaneous heat gains over a period of time based upon the type of construction.

(4) Psychrometic calculations shall be illustrated on psychrometic charts.

(5) "Humid Area" criteria provided in DOD 4710.1M applies to projects located in Africa, Bermuda, the Caribbean, or Central America.

(b) Heating

(1) Describe the source of heat energy which will be used, such as extension of central high pressure steam with meter, hot water with meter, or independent heating facility with the type of fuel to be utilized. Also explain why this source was selected in lieu of other available sources. Where there is a possibility of more than one type being economical or where it is large enough to qualify under Energy Conservation, Paragraph h(6)(a), a computerized analysis shall be included to justify the selection. Resistance electricity, natural gas, and L.P. gas are not allowed for space comfort heating except in unusual situations. Contact LANTDIV Mechanical Engineering Branch, telephone 444-9903, area code 804, for guidance concerning allowable fuel sources.

(2) Briefly describe and/or show on the drawings the type and routing of the system proposed to convey the heat source, if applicable; for example, 100 psig low level, above ground steam and condensate lines on concrete support, interconnecting to the existing system at manhole no. 150 and traveling due north into the mechanical equipment room. State if condensate return system is to be utilized. If condensate is to be wasted, heat reclaim shall be studied. If wasted, it should be cooled to 150°F maximum, then returned to the sanitary sewer system (unless specifically instructed otherwise). Indicate the maximum hourly production of condensate so LANTDIV may make a study of the sanitary system adequacy.

(3) Describe and/or provide schematics of the type of heating medium and system to be used within the buildings. Also include reasons for selection of this system over others available.

(4) Briefly describe the HVAC Control System. A specific type of control system will be specified only when mandatory. Otherwise, the contractor shall be given the option of providing the control system, i.e., pneumatic, electric or electronic.

(c) Ventilation

(1) State whether a gravity or mechanical system is to be used and provide a brief description of the type proposed.

(2) Indicate the number of outside air changes per hour in various areas, the type of filtration, if applicable, and whether OSHA requirements are applicable.

(3) State if smoke removal systems are to be employed in accordance with DM-8.

(4) Describe the operation of the system in summer and winter modes.

(d) Air Conditioning

(1) Provide a complete description and/or schematics of the air conditioning system proposed including an explanation of why this system is preferred over others. Also indicate locations of major components of the system. For larger systems which qualify under energy conservation, a computerized comparision between at least two systems is required.

(2) Provide a statement of areas to be air conditioned for determining whether air conditioning is authorized in accordance with DOD 4270.1M.

(3) Identify special humidification or de-humidification requirements, as well as special filtration requirements.

(4) Describe any special architectural features being incorporated to reduce cooling loads. Also, any features being incorporated in the mechanical system which would reduce energy consumption should be separately discussed.

(e) Combination Systems

(1) For systems in which the heating, ventilating and/or air conditioning are combined, repetition may be eliminated by consolidating the aforementioned requested information.

(f) Energy Conservation

(1) Computer energy analysis for buildings larger than 8,000 square feet requiring heating and cooling and larger than 20,000 square feet requiring heating only shall be used to study energy conservation features. Concurrence of systems to be studied should be obtained prior to conducting study. If a valid computer analysis was, or is being prepared during PED preparation for the project, this may suffice. Use of our computer energy analysis contract is required unless provisions are made during negotiations to perform energy analysis by another means (i.e.., A&E has in-house computer energy analysis capability). When computer analyses are performed, the total annual energy consumption estimate should be clearly stated. The A&E should strive to provide a structure which meets the Energy Budget figures presented in Table 4.2.8.2 "Interim DOD Design Energy Budgets", included at the end of this section. Justification/rationale is required should the annual energy consumption estimate exceed the budget figure by more than 15%.

(2) Criteria established NAVFAC Instruction 4100.5A of 10 November 1977, "Design Criteria Guidance for Energy Conservation", included at the end of this section shall be utilized unless justifications are provided for utilizing other criteria. Heat balance diagrams similar to those on pages 2-3, 2-4, 2-5, and 2-6 of Interior Design Criteria Technical Guidelines for Energy Conservation in New Buildings shall be provided for heated and air conditioned structures.

OUTSIDE DESIGN TEMPERATURE
LANTDIV ACTIVITIES

SITES IN U.S.	Air Conditioning Design Date D. Bulb / MCWB** (2 1/2%)	Degrees Days Cooling	Winter Design Data D. Bulb (97 1/2%)	Degree Days Heating	Air Conditioning Criteria Data D. Bulb 93F. 80F. (HOURS)		W. Bulb 73F. 67F. (HOURS)		WEATHER
KENTUCKY									
Covington	90 / 72	1080	6	5070	24	748	316	1423	B
Lexington	91 / 73	1197	8	4729	37	822	401	1641	B
Louisville	93 / 74	1268	10	4640	80	1022	668	1886	B
Owensboro	94 / 75	1444	10	4220	113	1106	777	1942	B
MARYLAND									
Bainbridge	90 / 75	1076	15	5184	42	713	601	1630	B
Baltimore	91 / 75	1108	13	4729	43	790	533	1613	B
Cumberland	89 / 74	828	10	5012	20	596	314	1254	B
NORTH CAROLINA									
Cape Hatteras	86 / 77	1550	27	2731	0	832	1521	2771	B
Cherry Point	90 / 78	1922	24	2832	23	1055	1342	2760	B
Hertford ('67 issue)	90 / 79	N/A	25	N/A	48	990	1238	2526	B
Camp Lejeune	90 / 79	1810	23	2901	30	1020	1481	2870	B
VIRGINIA									
Charlottesville	91 / 74	1263	18	4162	54	964	376	1544	B
Chincoteague ('67 issue)	88 / 77	N/A	20	N/A	15	649	864	2281	B
Eustis, Fort	90 / 76	1585	20	3752	26	875	807	2065	B
Lynchburg	90 / 74	1100	16	4233	31	696	376	1544	B
Newport News	90 / 77	1539	20	3549	21	809	1010	2290	B

* Areas considered "Humid Areas"
** MBWB - Mean coincident Wet Bulb Temp @ 2 1/2% DBT

Table 4.1

Norfolk	91 / 76	1441	22	3488	41	874	961	2238	B
Northwest (67' issue)	92 / 79	N/A	25	N/A	55	1010	1110	2412	B
Petersburg ('67 issue)	94 / 77	N/A	18	N/A	120	1006	795	1991	B
Portsmouth	91 / 76	1441	22	3488	41	874	961	2238	B
Richmond	92 / 76	1353	17	3939	70	932	765	1973	B
Roanoke	91 / 72	1030	16	4307	38	810	223	1468	B
Dam Neck	89 / 76	1485	22	3639	12	708	856	2184	B
Williamsburg	91 / 76	1345	20	3671	42	905	807	2065	B
Yorktown	90 / 77	1539	20	3623	21	809	1010	2290	B
WEST VIRGINIA									
Charleston	90 / 73	1055	11	4590	25	744	315	1521	B
Huntington	91 / 74	1098	10	4374	47	797	470	1671	B
Parkersburg	90 / 74	1045	11	4817	33	736	401	1528	B
Wheeling	86 / 71	647	5	5930	5	461	105	886	B
Sugar Grove ('67 issue)	85 / 72	N/A	5	N/A	2	381	116	743	C
SITES OUTSIDE U.S.									
AFRICA									
Morocco:									
Kenitra	86 / 71	1044	41	1230	32	338	106	1720	B
Somalia:									
* Berbera	(105/ 87)	6746	69	0	834	4354	3922	4387	B
Kenya:									
* Mandera	97 / 82	7004	69	0	394	3134	2380	4065	B

* Areas considered "Humid Areas"
** MBWB - Mean coincident Wet Bulb Temp @ 2 1/2% DBT

Table 4.2.8.1

* Mombosa	(93 / 77)	5569	68	0	33	2620	3756	4368	B
Nairobi	85 / 64	1377	47	966	0	441	0	150	B
ATLANTIC OCEAN									
Azores:									
Lajes Field, Terceira	78 / 70	621	48	1332	0	24	17	889	B
Villa doPorto('67 issue)	78 / 68	N/A	52	N/A	0	45	0	456	D
Bermuda:									
All Localities	(85 / 78)	2631	54	325	0	1272	2014	3626	B
Iceland:									
Keflavik	57 / 52	0	17	8838	0	0	0	0	D
CARIBBEAN SEA									
Bahama Islands:									
* Grand Turk	88 / 80	3634	70	0	0	3850	4208	4404	B
Cuba:									
* Guantanamo Bay	93 / 82	5537	66	0	131	2790	3935	4411	B
Puerto Rico									
* Roosevelt Roads	89 / 81	5576	69	0	1	3154	4103	4415	B
* Sabana Seca	88 / 79	4982	66	0	1	2227	3655	4413	B
CENTRAL AMERICA									
Canal Zone:									
* Balboa	88 / 81	5851	73	16	4	1963	3832	4390	B

* Areas considered "Humid Areas"
** MBWB - Mean coincident Wet Bulb Temp @ 2 1/2% DBT

Table 4.2.8.1

Europe									
Greece:									
Athens	91 / 71	2002	37	1779	60	1343	412	1768	C
Italy:									
Naples	86 / 70	1024	35	2671	4	472	132	1061	B
Sigonella (Sicily)	94 / 71	1472	35	2240	103	1124	243	1532	B
Spain:									
Madrid	94 / 68	1022	28	3895	106	804	8	317	C
Rota	90 / 69	1195	38	1715	35	674	113	1269	B
United Kingdom:									
Edzell (Scotland)	73 / 61	10	25	6222	0	9	0	3	D
Holy Lock (Scotland) ('67 issue)	71 / 60	N/A	27	N/A	0	23	0	15	D
London (England)	77 / 64	92	28	5188	0	26	0	43	D
Londonderry (N. Ireland)	69 / 61	9	29	5825	0	0	0	1	B
NORTH AMERICA									
Canada:									
Argentia, Nfld.	66 / 63	7	12	7754	0	0	0	17	B

* Areas considered "Humid Areas"
** MBWB - Mean coincident Wet Bulb Temp @ 2 1/2% DBT

NOTE: ALL DATA (EXCEPT THAT WHICH IS NOTED) CONDENSED FROM NAVFAC P-89 dated 1 Jul 1978

Table 4.2.8.1

INTERIM DOD DESIGN ENERGY BUDGETS
(000) BTU/SQ FT/YR
APPLIES ONLY TO ENERGY CONSUMED WITHIN THE BUILDING FIVE FOOT LINE
(BASED ON THE DOE BUILDING CATEGORIES AND WEATHER ZONES)

BUILDING CATEGORY		NATIONAL	REGION ¶	REGION 2	REGION 3	REGION 4	REGION 5	REGION 6	REGION 7
	CDD	------	2000	2000	2000	2000	2000	2000	2000
	HDD	-----	7000	5500-7000	4000-5500	2000-4000	0-2000	0-2000	2000-4000
STORAGE		50	60	55	45	40	30	35	50
4¶0	Liquid Storage-Fuel & Non-Propellants								
420	Ammunition Storage								
430	Cold Storage	¶00	¶¶0	¶05	95	90	80	85	¶00
440	Covered								
INDUSTRIAL		75	85	80	75	70	60	65	75
220	Production								
890	Other (Use Local Description)								
SERVICE		95	¶05	¶00	90	85	75	80	95
2¶0	Maintenance Facilities								
730***	Laundry/Dry Cleaning								
740****	Commissary								
RESEARCH AND DEVELOPMENT		60	75	75	60	55	45	50	65
3¶0	R¶D and Test Facilities								
390	Other (Use Local Description)								
UTILITIES		20	30	25	20	20	¶5	20	25
8¶¶	Electric Power								
820	Heat and Refrigeration (Air Conditioning)								
OTHER		55	70	70	55	50	40	45	60
¶20	Liquid Fueling and Dispensing Facilities (N/A)								
¶30	Communications, Nav. Aids & Airfield Light (N/A)								
¶40	Land Operational Facilities (N/A)								
¶50	Waterfront Operation Facilities (N/A)								
¶60	Harbor and Coastal Facilities (N/A)								
830	Sewage and Waste (N/A)								
840	Water (N/A)								

FOOTNOTES

Use only that portion relating to confinement facilities. Use your departmental 5 or 6 digit category code to identify, e. g., Air Force use 73083¶ and other appropriate sub category codes.

**Use only that portion related to buildings. Use your departmental 5 or 6 digit category code to identify.

***Use only that portion pertaining to laundry and dry cleaning facilities Use your departmental 5 or 6 digit category code to identify.

****Use only that portion pertaining to exchange and commissary facilities. Use your departmental 5 or 6 digit category code to identify.

See Table 4.2.8.3 "Guidelines for Using Building Design Energy Budget" for a description of includable energy consumption.

Table 4.2.8.2

INTERIM DOD DESIGN ENERGY BUDGETS
(000) BTU/SQ FT/YR
APPLIES ONLY TO ENERGY CONSUMED WITHIN THE BUILDING FIVE FOOT LINE
(BASED ON THE DOE BUILDING CATEGORIES AND WEATHER ZONES)

BUILDING CATEGORY			NATIONAL	REGION ¶	REGION 2	REGION 3	REGION 4	REGION 5	REGION 6	REGION 7
		CDD	------	2000	2000	2000	2000	2000	2000	2000
		HDD	-----	7000	5500-7000	4000-5500	2000-4000	0-2000	0-2000	2000-4000
OFFICE										
6¶0	Administrative Building		55	70	70	55	50	40	45	60
620	Administrative Structures Underground									
690	Other (Use Local Description									
HOSPITAL										
5¶0	Hospital Buildings		¶60	200	200	¶65	¶60	¶50	¶55	¶76
530	Laboratories		6¶	77	77	6¶	55	44	50	66
540	Dental Clinics		68	85	85	66	60	45	57	73
PRISON										
730	* Confinement Facility (Stockade)									
SCHOOL			50	75	70	60	55	40	45	60
¶7¶	Training Facilities									
730	Dependent Nursery School									
730	Dependent Kindergarten School									
730	Dependent Grade School									
730	Dependent High School									
INSTITUTIONAL										
730	Community Facilities - Personnel		55	65	60	50	45	35	40	55
740	Community Facilities - Morale, Welfare & Recreational - Interior		55	65	60	50	45	35	40	55
	Clubs		93	¶00	97	95	93	80	95	94
	Theater-Auditorium		38	50	46	43	40	27	30	32
	Dining Facilities		75	80	75	72	69	67	82	80
760**	Museums & Memorials		39	55	50	40	35	25	30	35
HOUSING										
7¶0	Family		82	90	80	75	80	60	9¶	96
720	Bachelor		6¶	80	70	64	60	48	5¶	52

GUIDELINES FOR USING BUILDING DESIGN ENERGY BUDGET

1. The Energy Budget figures apply only to buildings and energy consumed within the five-foot line of the building, except for the following cases:

a. Where a package chiller, cooling tower, air cooled refrigeration condensor, transformer or substation, or heating plant is located outside the five-foot line but serves only one building, the energy required to operate these facilities shall be chargeable to the building.

b. Where facilities as noted in 1.a. above serves two to four buildings, the energy requirements shall be prorated amoung the buildings. Where such facilities serve five or more buildings, these facilities shall be considered in the category of central plants.

2. Losses from steam, chilled water, high temp water or hot water distribution lines beyond the five-foot line are not chargeable to the building energy consumption except as provided in 1.b. above.

3. Exterior lighting beyond the five-foot line is not chargeable to the building energy consumption.

4. Building Design Energy Budgets include only the energy required for space heating, space cooling, domestic hot water and lighting.

5. Energy Budgets relate to building gross sq. ft. Gross area is the sum of all floor areas of a building including basements, cellars, mezzanines, other intermediate floor tiers and penthouses. All measurements shall be from the exterior wall of the building or from the center line of party walls.

6. For the purpose of calculating Energy Budgets the following conversion factors will be used:

Electricity	3,413 BTU per killowatt hour
Fuel Oil	138,700 BTU per gallon
Natural Gas	1,030,000 BTU per thousand cubic feet
Liquified Petroleum Gas (including Propane and Butane)	95,500 BTU per gallon
Anthracite Coal	28,300,000 BTU per short ton
Bituminous Coal	24,580,000 BTU per short ton
Purchased Steam or Steam From Central Plant	1,000 BTU per pound
High Temperature or Medium Temperature Water from Central Plant	Use the heat value based on the temp of the water actually delivered at the building five-foot line.

Table 4.2.8.3

4.2.9 ENVIRONMENTAL POLLUTION CONTROL Identify expected environmental pollution and the proposed method of control. A detailed description will be necessary for those facilities directly related to controlling air and water pollution; such as sewage treatment plants, industrial treatment facilities, incinerators, smoke elimination facilities and other similar projects. When subsurface tile filtration is being considered for sewage disposal, a soil percolation test will be required for each such disposal system.

List all environmental control permits and notifications required.

Design of Oil Spill Prevention Control and Countermeasures (SPCC) systems shall be in accordance with Federal Register, Title 40, part 112 titled "Oil Pollution Prevention". The Civil Engineering Branch will provide detailed criteria for incorporation of SPCC design into basis of design.

4.2.10 ASBESTOS HANDLING IN REPAIR PROJECTS. The A&E shall, through a certified testing lab, investigate the possibility of asbestos material to be removed. If asbestos materials are found, the A/E must indicate the scope of asbestos removal in the project documents and specify removal procedures in sufficient detail for a contractor to submit an accurate bid. If testing is performed and the material does not contain asbestos, add a note on the drawings to that effect.

4.2.11 MISCELLANEOUS MECHANICAL SYSTEM

(1) Provide a description of any special mechanical systems such as compressed air, hydraulic, nitrogen, etc., including an explanation of the medium source.

4.2.12 HEATING PLANTS AND HEATING PLANT ADDITIONS

(a) Before stating the type of fuel to be used and an economic comparison of the selected fuel with other available fuels, contact LANTDIV Mechanical Engineering Branch (telephone 444-9903, area code 804) for the latest criteria for fuel selection.

(b) Describe new boilers including size, pressure and type.

(c) Describe any new auxiliaries to be added and what source of power will be used for their operation.

(d) Describe the fuel storage and conveying system to be installed.

(e) Describe the safety and combustion control systems utlized and how they will perform.

4.2.13 REFRIGERATION (COLD STORAGE)

(a) Identify areas to be refrigerated, indicating their usage and temperatures to be maintained.

(b) Describe type of refrigeration equipment and systems.

4.2.14 FIRE PROTECTION SYSTEMS

(a) Automatic sprinkler and gaseous extinguishing systems shall not be designed, i.e., a piping plan will generally not be provided to show new work. Such a plan may be necessary to indicate existing piping sizes and locations or to show pipe routing where interference problems exist. A schematic riser diagram is required and points of connection must be identified.

(b) Describe fire detection and alarm systems including location of detectors, manual stations, audible devices, control panel, etc. Number of conductors and circuiting shall not be indicated.

(c) Indicate location of water supply main entrance to building and detail of sprinkler valves. Also indicate location and details of gaseous extinguishing system equipment and supplies but not piping.

(d) Refer to NAVFAC DM-8 "Fire Protection Engineering" for specific applications and requirements for various types of fire protection systems. Such systems must meet applicable NFPA standards.

(e) Provide the following information about sprinkler systems:

(1) Authority for installation of sprinkler systems.

(2) Hazard classification of occupancy and whether system will be hydraulically calculated or follow pipe schedule.

(3) For hydraulically designed systems, state density and area of application as well as water supply available at point of connection (static pressure and residual pressure at design flow). This data must be based upon flow tests at or near the point of connection and must appear in the Basis of Design.

(4) Identify type(s) of automatic sprinkler system(s) involved, i.e., wet-pipe, dry-pipe, preaction and/or deluge. Indicate areas to be protected and each type of system proposed. If the use of a preaction or deluge system is contemplated, contact the Fire Protection Engineering Branch at (804) 444-9908, for guidance before proceeding with design.

(5) Provide fire pump data

4.2.15 FUEL DISTRIBUTION AND STORAGE

(a) Gas

(1) Describe type, location of take-off from supply, and available pressure.

(2) Identify type and materials for pipe and valves.

(b) Liquid Petroleum Products

(1) Describe unloading facilities, such as dock, tank car, or truck.

(2) Describe type of system and proposed features.

(3) State basis for storage capacity, rate of pumping, and number of dispensing outlets.

(4) Describe power supply and power requirements.

(5) Identify type and materials for pipe, tank and valves.

4.2.16 WATER SUPPLY

(a) Describe the existing system, indicating particularly the type, capacity, condition, present water use, and unsatisfactory elements.

(b) State type of construction proposed, materials for water mains, type of well, etc.

(c) For distribution systems, state design parameters including domestic and fire flow, residual pressure, elevation differentials, etc. Include designer's initial estimate of pipe sizes. For projects geographically located within the Commonwealth of Virginia coordination with the appropriate office of the Department of Health is required.

(d) State tentative sizes, elevations, capacity, etc., as can readily be determined without long computations or design consideration for reservoirs, treatment units, pumping stations, well pumps, and such units.

4.2.17 SEWERS AND SEWAGE DISPOSAL SYSTEMS

(a) Describe the existing system indicating particularly the type, capacity, condition, present flow, and unsatisfactory elements.

(b) State the degree of treatment necessary by effluent requirements and units necessary for treatment.

(c) State design factors with present and projected design population loads for sewage teatment plants. For projects geographically located within the Commonwealth of Virginia coordination with the appropriate office of the Department of Health is required.

(d) State materials to be used for sewer systems and sewage treatment plants.

(e) Identify standards (Federal, State, local) governing the design.

(f) Describe the impact of steam condensate and cooling water discharges on existing sewer lines and sewage treatment plants and the estimated cost of distribution and treatment of this additional loading.

4.2.18 ROADS, DRIVEWAYS, PARKING AREAS, AND WALKS

(a) State general soil conditions, with a brief outline of soil exploration and testing performed.

(b) Describe the type and volume of traffic, controlling wheel loads and types or classes of roads under consideration with justification for any deviation from criteria thicknesses for these classes.

4.2.19 AIRFIELD PAVEMENT

(a) The relative economies of rigid and flexible paving are constantly changing with the improvement of design features and construction techniques and with the development of new products. These factors are of significant importance in both new pavement construction and in the rehabilitation of existing pavements. All projects require careful study and evaluation of the in-place materials and the proposed construction materials. For these reasons LANTDIV will review carefully the proposed design cross sections on all major airfield paving projects.

(b) All A&E firms are requested to submit to the Commander, Atlantic Division, Naval Facilities Engineeing Command, a design summary and outline specification at least 6 weeks prior to completion of plans and specifications for all airfield pavement, new construction and repair projects of 10,000 square yards or greater area, and for major repair not readily measurable (such as joint sealing or small repair) estimated at $10,000 or more. The design summary should include descriptions of the proposed pavement sections (including alternate section, if applicable), test data on pavement materials and soils used in the design, and computations of the required pavement thickness for the design aircraft wheel loadings.

(c) State general soil conditions with a brief outline of soil exploration and testing performed.

(d) Identify design wheel loading, type of aircraft, any abnormal operating conditions.

(e) Identify type of pavement; bituminous, concrete, reinforced, etc.

(f) Note deviations from Naval Air Systems Command planning standards with reasons therefore.

(g) Describe method of handling storm drainage.

(h) State type of lighting to be provided. Evaluate adequacy of existing runway and taxiway regulator capacities.

4.2.20 DUST AND EROSION CONTROL

Dust and erosion control, where deemed necessary, will be considered an integral part of all design and construction projects. Such controls will be generally limited to areas actually scarred or denuded in the process of constructing a project. Dust and erosion control will not be confused with landscaping. Preliminary submittal will contain the

necessary design data, outline specifications, and costs for dust and erosion control measures where applicable. The Basis of Design will incude a statement regarding the type of treatment selected, affected areas, and reasons for selection of type and determination of areas. An erosion control plan (ECP) must be filed with the state of North Carolina where site work is involved. The A&E of Record is responsible to coordinate with the North Carolina Department of Natural Resources and obtain approval of an ECP. That approval shall be obtained by letter from the North Carolina Department of Natural Resources.

4.2.21 FENCING

State type, height, and justification for fencing.

4.2.22 RAILROADS

(a) State general soil conditions, outline the soil exploration and testing performed or to be performed, and such results thereof as may be available.

(b) State type of service for which railroad track will be provided, anticipated volume and type of traffic, the ruling grade, and the maximum curvature.

(c) Describe proposed type, source and thickness of ballast, weight of rail and source, treatment, and dimensions of ties proposed.

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
200 STOVALL STREET
ALEXANDRIA, VA 22332

NAVFACINST 4100.5A
FAC 0441F

10 NOV 1977

NAVFAC INSTRUCTION 4100.5A

From: Commander, Naval Facilities Engineering Command

Subj: Design Criteria Guidance for Energy Conservation

Ref: (a) Executive Order 12003 of 20 July 1977
(b) Interim Design Criteria - Technical Guidelines for Energy Conservation in New Buildings

Encl: (1) Energy Conservation Measures for New Buildings

1. Purpose. To provide current guidance and information on various energy conservation measures in developing designs for new buildings.

2. Cancellation. NAVFACINST 4100.5 of 5 March 1974 is superseded.

3. Background. Reference (a) requires that the average total energy requirements for all new buildings be reduced by 45%. This reduction is required by 1985 as compared with energy requirements for similar facilities in 1975. Reference (b) was previously issued to provide interim design guidance on this subject.

4. Discussion. Enclosure (1) provides an updated and consolidated list of energy conservation measures to be considered in designing new buildings. Reference (b) should be used for additional information on the items listed in enclosure (1). All items listed in enclosure (1) will not be technically applicable to every building. Some will be technically applicable but not economically feasible. The effectiveness of some of the items will be climate dependent. For example, minimum exterior area to interior volume will be desirable for areas that experience long periods of extreme hot and/or cold; however, for areas having year-round mild climates maximum exterior area to interior volume may be desirable to take advantage of natural ventilation and lighting. Therefore, a careful evaluation should be made of each item for each site.

5. Action. In performing energy analyses in the design of new buildings, addressees shall use the guidelines of enclosure (1) and reference (b) as a checklist of alternative solutions for achieving the energy conservation goals of reference (a).

Distribution: (over)

T. F. Stallman

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Assistant Commander for
Engineering and Design

10 NOV 1977

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ENERGY CONSERVATION MEASURES FOR NEW BUILDINGS

NOTES

1. Items noted with an asterisk are mandatory requirements established by DOD.

2. Numbers in parentheses after each item indicate applicable criteria references.

Criteria References

1. Interim Design Criteria - Technical Guidelines for Energy Conservation in New Buildings of January 1975.

2. DOD Construction Criteria Manual (DOD 4270.1-M) of October 1972.

3. NAVFAC letter 1023/MEC of 6 June 1977.

Energy Conservation Measures

I. Architectural

A. Siting

1. Minimize wall and glass area exposed to the south, southwest and west when air conditioning vice heating is expected to be the major load. Architectural shading, tinted glass, or solar screening should be considered for all glass having these exposures. For applications where heating is the major concern, more glass exposure to the south, southwest and west and less to the north would be desirable. Likewise shading would not be required. (1)

2. Utilize natural terrain and landscaping to provide windbreaks to reduce heating loads, and shading to reduce cooling loads. Can also be used to improve natural ventilation where applicable. (1)

3. Where natural ventilation can be used to provide human comfort in trade wind areas and in spring and fall, use natural terrain and landscaping to improve wind patterns around buildings. (1)

4. Locate parking areas to avoid creating heat islands adjacent to the building.

5. Consider locating part or all the facility underground. (1)

B. Building Envelope

1. Evaluate use of glass since glass permits the greatest transfer of energy of the building components. For areas where natural ventilation is desirable, large operable windows may be desirable. (1)

2. Evaluate the use of double glazing. Exterior walls of buildings with large glass areas can have a lower composite "U" value with double glazing and uninsulated walls than with single glazing and insulated walls; therefore, the cost study of buildings with large window areas should consider the cost effectiveness of using double glazing and uninsulated walls. (1)

*3. When air conditioning vice heating is of primary importance, use light colored surfaces on walls and roofs to reduce solar heat gain. Where heating is the primary concern the use of darker exterior colors may be in order. Use minimum ceiling heights to minimize volume to be environmentally controlled. (1)

4. Consider increasing insulation in walls and roofs. (2)

5. Optimize the wall and roof area to interior volume ratio to reduce the exterior surface area available for heat gain and heat loss in extremely hot and cold climates. (1)

6. Consider consolidation of individual structures into one facility.

7. Select construction material and assemblies for exterior envelope that have high resistance to heat flow and/or that will provide thermal lag. (1,2)

8. Locate corridors, stairwells, elevator shafts, storage rooms, etc. on exterior to act as a buffer between exterior and conditioned space - west exposure when air conditioning is significant, north exposure when heating is significant. (1)

9. Utilize natural lighting when cost of electrical energy saved will exceed cost of additional energy required for air conditioning and heating. (1)

10. Consider benefit of water sprayed roofs and roof ponds to reduce air conditioning load. Cost of roof maintenance and water make-up must be considered.

11. Provide insulation in the ceiling of existing buildings to bring the ceiling "U" factor into conformance with requirements for new construction before air conditioning is added. (1,2)

II. Mechanical

A. HVAC Systems

1. Evaluate the following HVAC systems which are considered to have low energy use potential: (1,2)

   a. Variable air volume (VAV).
   b. Hydronic loop heat pump.
   c. Air-to-air heat pump.
   d. Water-to-air heat pump (where a water source is available).

*2. Do not use reheat systems when new energy is required.

*3. Consider economizer cycle for air conditioning applications. (1)

4. Evaluate the economic feasibility of using solar energy for heating and/or air conditioning.

5. Provide reduced amounts of outside air since most ventilation air supplies are excessive. (1)

B. HVAC Equipment

1. Use double bundle condensers on refrigeration machines to reclaim rejected heat. Use for domestic water preheating, perimeter heating (when there is a requirement for year round air conditioning), reheat (when humidity control is required or when economically justified). (1)

2. Use run-around coils, thermal wheels or heat pipes to reduce air conditioning and heating loads resulting from make-up and exhaust air. (1,2)

3. Consider use of return air lighting fixtures to prevent lamp and ballast heat from entering the occupied space thereby reducing supply air requirements and fan horsepower. Warm air from fixtures can be used for reheat in air conditioning systems. (1,2)

4. Water cooled lighting fixtures should also be considered to reduce air conditioning loads. Water heated by the light fixtures can be used to heat perimeter spaces or for reheat in air conditioned spaces. (1)

5. Consider thermal storage (such as water tanks) systems to store heated or chilled water. Waste heat from air conditioning condensers, water cooled lighting fixtures etc. can be stored when cooling is required for interior spaces in the winter time. Chilled water can be stored to reduce the size of refrigeration machines required for peak loads. (1)

6. Use built-up water-to-air or air-to-air heat pumps in larger buildings. Consider use of diesel or gas turbine drive and collect waste heat for domestic water heating, space heating and absorption air conditioning. (1)

7. Consider the use of diesel engines or gas turbines to drive pumps and other industrial loads to reduce electrical load and electrical demand. Use waste heat as noted in paragraph 6 above. (1)

8. Consider the use of single stage evaporative coolers as a precooler for outside air make up in air conditioning systems in arid zones. (1)

9. Consider the use of air cooled condensers in series with cooling towers to minimize equipment sizes and reduce electrical consumption. Use a small cooling tower in series with a large air cooled condenser for peak shaving, particularly in arid zones. (1)

10. For large multi-building, multi-use complexes consider total energy systems whereby electric power is generated on-site and waste heat from prime mover is reclaimed for use as noted in paragraph 6 above. (1,2)

*11. When split system unitary air conditioning assemblies of the RCU-A-C and RCU-A-BC types having capacities of 60,000 Btuh and less are used, they shall have a Btuh/watt ratio of not less than 7.5 based on the condensing unit and coil only. This ratio shall be established for both types of assemblies from the capacity and power ratings listed for RCU-A-C assemblies in the ARI publication "Directory of Certified Unitary Air Conditioners" (latest edition). In determining the ratio for a RCU-A-BC assembly, when the condensing unit is listed under RCU-A-C assemblies with different coils, the condenser coil assembly with the highest Btuh/watt ratio shall be used to determine the acceptability of the RCU-A-BC assembly. In cases where the condensing unit used with a RCU-A-BC assembly is not listed as part of RCU-A-C assembly, the Btuh/Watt ratio, based on the information listed for the RCU-A-BC assembly shall not be less than 6.5. (1)

*12. When room (window) air conditioning units are used for air conditioning existing quarters, they shall produce not less than 8.5 Btuh per watt input for 120 volts and not less than 8.0 Btuh per watt input for 230 volt units. In order to establish these ratings, the Association of Home Appliance Manufacturers' publication "Directory of Certified Room Air Conditioners" (latest edition) shall be the sole determination. Energy rates for through-the-wall units shall be specified in Fed. Spec. 00-A-372. All future replacements of room units shall conform to these requirements. (1)

13. Consider the use of waste heat boilers in conjunction with incinerators to recover energy from solid wastes for large buildings and multi-building complexes. (1)

14. Consider use of modular equipment where part load performance would be improved.

15. Use large energy storage systems (such as water tanks) to store "waste heat" from lights and air conditioning condensers when air conditioning must be operated in the winter time for interior spaces, EDP equipment, or other high grain areas.

16. Use air-cooled condensers, indoor sumps on cooling towers or temperature actuated cooling tower bypass to eliminate the heating of cooling towers in below freezing weather.

17. Use piggyback refrigeration system to reduce electrical load. A piggyback unit is a balanced combination of a steam turbine driven centrifugal refrigeration machine exhausting into an absorption refrigeration machine.

18. Use diesel engines or combustion turbines to drive centrifugal or screw machines for air conditioning, industrial pumps, etc. to reduce electrical load and to reduce electrical demand charges. Use waste heat boilers and/or heat exchangers to recover and use heat.

C. Controls

*1. Use the DOD type thermostat which limits space temperatures to a maximum of 75 degrees F in winter and a minimum of 75 degrees F in the summer. (2)

2. Provide controls to reduce or eliminate outside ventilation air in unoccupied buildings. (1,2,3)

*3. Use an outside temperature sensing unit to modulate hot water heating systems by increasing water temperature as outside air drops and decreasing water temperature as outside air rises. When fan coil units are used to provide both heating and air conditioning, the hot water should be modulated down to a maximum temperature of 75 degrees F when the ambient temperature is 60 degrees F. (1,2)

*4. Provide a positive shut-off of heating systems when outside air temperature reaches 65 degrees F. In well insulated buildings, cut-off can occur at 60 degrees F. (1,2)

5. Use programmed control through clocks or other systems for night, weekend, and holiday temperature set back (or cut off) to reduce air conditioning and heating loads. Normally, air conditioning for personnel comfort will be cut off during unoccupied hours and heating reduced by 15 degrees F. (1,2)

D. Plumbing

*1. Electric water heaters of 80 gallon capacity and less shall comply with the requirements of Fed. Spec. W-H-196H. This applies to both new and replacement installations. Water heaters meeting these requirements are included in the current GSA term contract; therefore, all procurements for family housing should be through GSA in accordance with the requirements of DOD 4270.1-M. (1)

2. Provide domestic hot water to toilets without shower facilities at 100 degrees F vice 140 degrees F to reduce heat losses. Effects of requirement for increased pipe size shall be considered. (3)

3. In buildings operated on a nominal 40 hour week or in buildings operated on a nominal two shift basis (5 or 7 day week), a clock timer should be used to stop the domestic hot water circulating pump during unoccupied hours, allowing 30 minutes before and after normal working hours. (3)

4. Evaluate the economics of solar energy to generate domestic hot water.

III. Electrical

1. Use three-phase transformers particularly in large substations to reduce transformer losses. (1)

2. Design facilities to provide high power factor. (1)

3. Maintain a base wide power factor of not less than 90%. (1)

4. Use high efficiency light sources such as fluorescent lamps in lieu of incandescent in as many areas as possible, and use high intensity discharge lamps such as high pressure sodium in lieu of incandescent lamps for area floodlighting. (1,2)

5. Use multiple switching to permit lights near windows to be turned off. (1,2)

6. Consider the use of time clock or photocell control of exterior lighting. (1,2)

7. Consider use of multi level ballasts to permit selection of non-uniform general lighting. (2)

8. Use task lighting versus high level general lighting. (Requires location of task, by architect or interior designer). (1,2)

9. Use highest distribution voltage consistent with economics and safety. (1,2)

10. Consider automatic dimmers to maintain constant lighting level between cleaning and relamping intervals.

11. Provide fluorescent ballast with high power factors (pf=0.90 min.).

12. Use three phase power where possible. (1,2)

SECTION 5. DRAWINGS

5.1 ARRANGEMENT OF DRAWINGS

Drawings should be arranged in the following order:

Title Sheet and Index (can be included with plot and vicinity plan sheet and should not be used on projects requiring ten or less sheets)
Plot and/or vicinity plans
Sanitary and Civil
Boring logs
Architectural
Landscaping
Structural
Plumbing
Mechanical (heating, ventilation, etc.)
Solar (if included)
Electrical

5.2 SIZES OF DRAWINGS

The Atlantic Division, Naval Facilities Engineering Command, makes a practice of using three sizes of drawings, the 8 1/2" x 11" size, the 8 1/2" x 14" size and the 28" x 40" size. The smallest size is for letter-size sketches to accompany amendments, the middle size is normally used in the preparation of drawings to accompany Project Engineering Documentation (PED) while the larger size is utilized for construction contract drawings. Sketches should always include a 1/2" border all around except a 3/4" border is required at bound edges. The A&E should make it a practice to use 28" x 40" drawings in all cases unless specifically directed to use another size. Figure 5.2.1 depicts drawing and title block requirements.

5.3 DRAFTING MEDIA

Unless otherwise instructed, completed sets of working drawings will be in pencil or ink on tracing cloth or polyester drafting film with a minimum base thickness of .004 inch matted both sides. The A&E must furnish his own tracing cloth/drafting film.

5.4 ORIENTATION

The orientation of NAVFAC drawings should be arranged with North toward the top (or left edge, if better suited) of the plotted sheet and normal to the sheet borderline. On individual sheets, if the shape of the area dictates, North can be oriented between these directions to accommodate the site. For example, on drawings having excessive longitudinal but limited lateral dimensions, such as those for roads and railroads, North can be oriented obliquely to make the best use of available space. All discipline drawings should be consistent in orientation in so far as practicable.

It is customary for a building plan to be oriented with the main entrance toward the bottom or right edge of the sheet, depending upon the building shape.

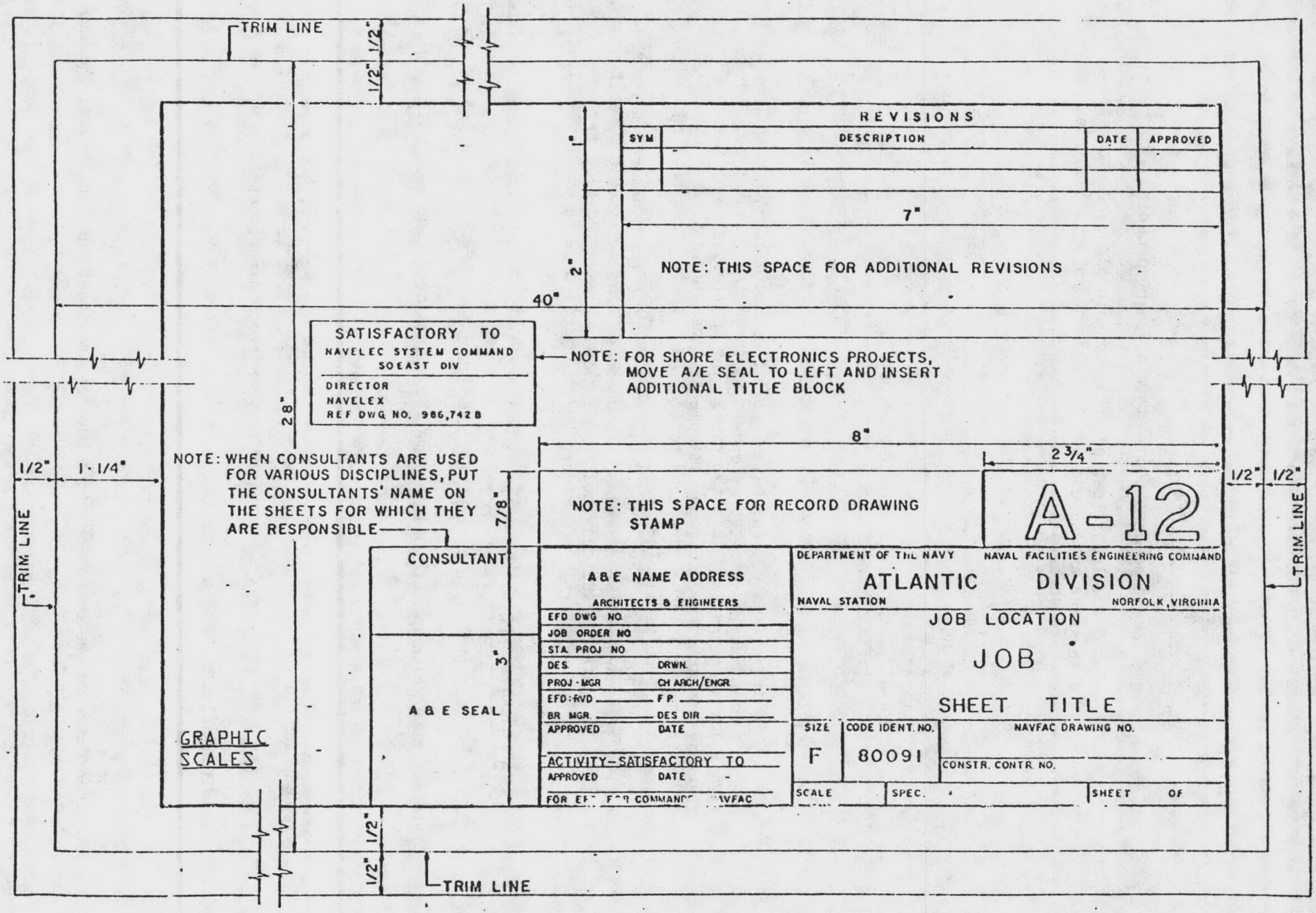

TRIM LINE
1/2"
1/2"
REVISIONS
SYM
DESCRIPTION
DATE
APPROVED
7"
2"
NOTE: THIS SPACE FOR ADDITIONAL REVISIONS
40"
SATISFACTORY TO
NAVELEC SYSTEM COMMAND
SOEAST DIV
DIRECTOR
NAVELEX
REF DWG NO. 986,742 B
NOTE: FOR SHORE ELECTRONICS PROJECTS, MOVE A/E SEAL TO LEFT AND INSERT ADDITIONAL TITLE BLOCK
28"
8"
2 3/4"
1/2"
1-1/4"
NOTE: WHEN CONSULTANTS ARE USED FOR VARIOUS DISCIPLINES, PUT THE CONSULTANTS' NAME ON THE SHEETS FOR WHICH THEY ARE RESPONSIBLE
7/8"
NOTE: THIS SPACE FOR RECORD DRAWING STAMP
A-12
TRIM LINE
CONSULTANT
A&E NAME ADDRESS
ARCHITECTS & ENGINEERS
EFD DWG NO.
JOB ORDER NO.
STA. PROJ NO.
DES.
DRWN.
PROJ. MGR.
CH ARCH/ENGR.
EFD: RVD
FP
BR MGR.
DES DIR
APPROVED
DATE
ACTIVITY-SATISFACTORY TO
APPROVED
DATE
FOR EFD FOR COMMAND NAVFAC
3"
A & E SEAL
GRAPHIC SCALES
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION
NORFOLK, VIRGINIA
JOB LOCATION
JOB
SHEET TITLE
SIZE
F
CODE IDENT. NO.
80091
NAVFAC DRAWING NO.
CONSTR. CONTR. NO.
SCALE
SPEC.
SHEET
OF
1/2"
1/2"
TRIM LINE

Figure 5.2.1

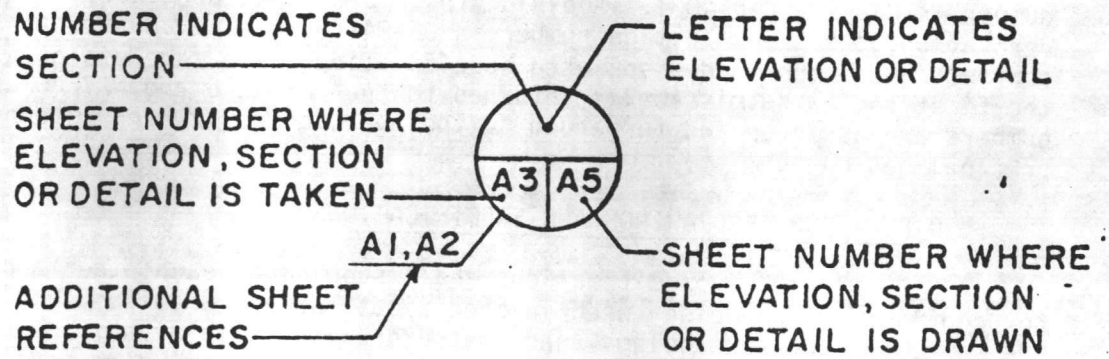
5.5 LETTERING AND SHADING

The Naval Facilities Engineering Command uses the 35 mm filming system file for retention of construction drawings. This office, in further utilization of this system is using half-size bidders's drawings. The quality of these reduced prints is a direct result of the drafting efforts of the A&E preparing the drawings. The finest cameras and most carefully controlled processing cannot produce good results unless the original drawing is of a high quality.

Unnecessary detail--poor spacing--careless lettering--weak lines, and lettering which is crowded and too small result in illegible films for full-scale and half-scale reproductions. INFORMATION AND REINFORCING DETAILS, CONTAINED IN POCHED AREAS WILL NOT REPRODUCE; THEREFORE, POCHEING IS NOT ACCEPTABLE. THE MINIMUM SIZE LETTERING ON ALL PROJECT DRAWINGS SHALL BE 5/32" HIGH. Make minimum gap between lines equal to one-half the letter height. Lettering and line weight must be in accordance with the above.

5.6 SECTION AND DETAIL DESIGNATION

The standard section symbol will be as follows:



ELEVATION, SECTION OR DETAIL SYMBOL

NOTE: SYMBOL SHOULD ALWAYS APPEAR AS PART OF THE TITLE, PLACED UNDER THE VIEW.

5.7 SCALES

Located directly under the title of each plan, elevation, section, detail, etc., shall be an indication of the scale of the object drawn. (Example: SCALE 1/8" = 1'0"). 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.

In addition to the conventional scales, and directly to the left of the title block, shall be 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 not always in even-scaled proportions. For these reasons it is imperative that graphic scales be shown.

5.8 TITLE BLOCKS

The choice of the correct title block is based upon three basic considerations: (1) size of the sheets used; (2) the type of organization preparing the drawings; and (3) the name of the naval activity that will approve the completed drawings. Most working drawings will be prepared on sheets 28" x 40" and the correct size title block is indicated in Figure 5.2.1.

5.9 DRAWING NUMBERS

The Procurement Instrument Identification Number System (PIIN System) consists of 13 alphanumeric characters. An example of the PII number is N62470-84-B-4001. Applying the appropriate procedural derivation, the specification number is 05-84-4001. The construction contract PII number and associated specification number are assigned when the first review submission is returned to the A&E; EFD and NAVFAC drawing numbers are assigned and forwarded to the A&E upon review and return of the prefinal design submittal.

5.10 RELATION OF DRAWINGS AND SPECIFICATIONS

Drawings and specifications shall supplement each other and must not conflict. Terminology used in specifications and drawings should be the same. If the terminology used in the drawings should vary and revision of the drawings is not practicable, the specifications must reconcile such differences in a manner similar to the following: "Hollow tile (also indicated as 'clay tile' and 'terra cotta tile'), etc."

5.11 COMMON DISCREPANCIES IN NOMENCLATURE

There are many phrases and statements placed on drawings which are considered satisfactory in professional architectural and engineering practice but are not acceptable in the preparation of drawings for the Navy. The following is a list of such items found repeatedly on drawings submitted by A&Es. After each discrepancy or group of related discrepancies there is the preferred designation.

a. INCORRECT: "As instructed by the Architect."

CORRECT: "As instructed by the Contracting Officer."

NOTE: Contract drawings should be so clearly detailed as to preclude the use of this statement except in most unusual circumstances.

b. INCORRECT: "By others."
"By the Navy."
"By the Naval Facilities Engineering Command."

CORRECT: "By the Government."

c. INCORRECT: "By Electrical Contractor."
"By Plumbing Contractor."
"By the Plumber."
"By the Elevator Contractor."

EXPLANATION: Usually no statement is necessary. The Government recognizes only the prime contractor; the breakdown into trades is not in accordance with Government practice.

In the event work is shown on the drawings which is not included in the scope of the contract, use the following:

CORRECT: "Not in contract" or
"By Government."

d. INCORRECT: "12 GA zinc-coated steel flashing."
"Copper flashing."

CORRECT: "Metal flashing" (Metals are referred to only as metal and not as a particular kind or gauge. Kind and weight are covered in the specifications.)

e. INCORRECT: "Formica."

CORRECT: "Plastic Laminate" (Proprietary names are not permitted.)

f. INCORRECT: "See Arch. Sheets"

CORRECT: "See Sheet A-4" (Refer to a specific sheet number.)

5.12 BORING LOG PRESENTATION

Figure 5.12.1 represents a typical drawing developed to present boring logs, soil conditions, and testing accomplished during design. This information in the format shown shall be included on the contract drawings for all projects on which soil information is obtained.

BORING NO 1

DEPTH (FT)	DESCRIPTION	BLOWS	WN%
	SAND, SILTY, FINE WITH LITTLE TO SOME GRAVEL, BROWN, MOIST, MEDIUM DENSE (SM)	24	10.9
5.0	SAND, CLAYEY, FINE WITH GRAVEL AND CORAL FRAGMENTS, LIGHT BROWN TO BROWN, MOIST, DENSE TO LOOSE (SC)	9	18.0
		5	27.1
10.0	CLAY, SANDY, WITH LITTLE TO SOME CORAL FRAGMENTS, LIGHT BROWN, VERY MOIST, VERY SOFT TO MEDIUM STIFF (CH)	2	22.3
15.0	CLAY, SILTY, GRAY, VERY MOIST, VERY SOFT (CH-CL)	4	25.0
	CLAY, SILTY, GRAY, VERY MOIST, VERY SOFT (CH-CL)		
20.0	SAND, SILTY, VERY FINE, GRAY, SATURATED, LOOSE TO MEDIUM STIFF (SM-ML)	7	28.1
25.0		10	24.6
	SAND, SILTY, FINE, BROWN, SATURATED, LOOSE TO MED DENSE (SM)		
30.0		11	18.9
	SAND, CLAYEY, FINE, BROWN, SATURATED, MEDIUM DENSE (SC)	15	
35.0			
	SAND, CLAYEY, FINE WITH TRACE TO LITTLE CRUSHED STONE AND CORAL FRAGMENTS, GRAY, SATURATED, DENSE (SC)	39	
40.0			
45.0	SILT, FINE, SANDY, WITH LITTLE CLAY, BROWN, MOIST, HARD (ML-CL)	50/4"	
50.0	BOTTOM OF BORING 50'	50/5"	

BORING NO 2

DEPTH	DESCRIPTION	BLOWS	WN%
	SAND, SILTY, FINE WITH CRUSHED STONE FRAGMENTS, BROWN, MOIST, MEDIUM DENSE (SM)	14	8.9
		12	18.3
	SAND, CLAYEY AND CORAL FRAGMENTS, LIGHT BROWN, MOIST, MEDIUM DENSE TO VERY LOOSE (SC)	3	22.9
		3	28.6
	SAND, CLAYEY, FINE, WITH TRACE MARINE SHELL FRAGMENTS, GRAY, MOIST, VERY LOOSE (SC)	4	24
	SAND, SILTY, VERY FINE, WITH LITTLE CLAY, BROWN TO GRAY, VERY MOIST, VERY LOOSE (SM-ML)		
	SILT, SANDY, WITH TRACE CLAY, BROWN, VERY MOIST, SOFT	4	26.6
	SAND, SILTY, FINE, WITH TRACE CLAY, BROWN, VERY MOIST TO SATURATED, MEDIUM DENSE TO LOOSE (SM-SC)	11	14.0
	BECOMING FINE TO MEDIUM SAND IN SAMPLE #9	15	29.6
	CLAY, SILTY, WITH LITTLE FINE SAND, GREENISH GRAY, VERY STIFF (CL-ML)	8	21.2
	SAND, SILTY, FINE, BROWN, MOIST, VERY DENSE (SM)	50/4"	
	BOTTOM OF BORING 43'	63"	

BORING NO 3

DEPTH (FT)	DESCRIPTION	BLOWS	WN%
	SILT, SANDY, BROWN, MOIST, VERY STIFF (ML)	20	16.1
		31	16.2
5.0	SAND, CLAYEY, FINE AND CORAL FRAGMENTS, LIGHT BROWN, MOIST, DENSE (SC)	12	17.5
	CLAY, SANDY, WITH LITTLE SILT, BROWN, MOIST, STIFF (CL-ML)	2	26.3
10.0	SAND, SILTY, FINE, WITH CORAL FRAGMENTS, BROWN, MOIST, VERY LOOSE (SM)	2	44.9
15.0	CLAY, FINE, SANDY, WITH LITTLE SILT, GRAY, VERY MOIST, VERY SOFT TO SOFT (CH-ML)	5	28.3
20.0	SAND, SILTY, FINE, WITH TRACE CLAY, GRAY TO BROWN, VERY MOIST TO SATURATED, MEDIUM DENSE (SM)	12	29.4
25.0		19	23.4
30.0		24	21.6
35.0	SAND, SILTY, FINE, GREENISH GRAY, VERY MOIST TO SATURATED, MEDIUM DENSE (SM)	19	
40.0	TRACE TO LITTLE CRUSHED STONE AND VERY SILT LEAVES IN SAMPLE #11	24	
45.0	SAND, SILTY, FINE, BROWN, MOIST, VERY DENSE (SM)	35	
50.0	SAND, SILTY, FINE TO COARSE, BROWN, SATURATED, VERY DENSE (SM)	50/5"	
	BOTTOM OF BORING 51'		

WATER LEVEL OBSERVATIONS

NOTED ON RODS AT COMPLETION	18.5'	NOTED ON RODS AT COMPLETION	13.5'	NOTED ON RODS AT COMPLETION	23.5'
CAVED IN @	8.5'	CAVED IN @	11.5'	CAVED IN @	10.0'
	42.5'		39.5'		42.5'

BORING LOGS

VERT SCALE 1" = 5'-0"

TEST PIT NO. 1

DEPTH OF STRATA (FT)	DESCRIPTION	REMARKS
0.0 - 2.2	SILT, WITH SOME FINE SAND, BROWN, DRY TO DAMP, SOFT	DAMP @ 1.0'
2.2 - 2.6	SILT, GRAY, WET, SOFT	
2.6 - 5.0	SILT, WITH SOME FINE SAND, BROWN, DAMP TO WET, SOFT	SAND CONTENT INCREASES TO 30% AT 5.0'
5.0 - 8.0	SAND, SILTY, WITH CORAL FRAGMENTS, TAN, SATURATED, MEDIUM DENSE	WATER SEEPING IN @ 6.0'
8.0 - 10.0	SILT, VERY FINE, SANDY, BROWN, MOIST TO DRY, MEDIUM STIFF	AT 6.0' SILT CONTENT INCREASING WITH DEPTH WITH OCCASIONAL GRAY SOFT CLAY POCKETS

BOTTOM TEST PIT @ 10.0'

TEST PIT NO 2

DEPTH OF STRATA (FT)	DESCRIPTION	REMARKS
0.0 - 2.5	SILT, WITH SOME SAND AND STONE, 7" TO 4' BROWN, DRY TO DAMP, SOFT	DAMP @ 1.0'
2.5 - 5.3	CORAL, SILT TO COBBLE SIZE, LOOSE, DAMP TO SATURATED	WATER SEEPING IN @ 5.3'
5.3 - 9.5	SILTY SAND FINE WITH TRACE OF GRAVEL, TAN TO BROWN, SOFT	
9.5 - 12.0	SAND, MEDIUM TO COARSE WITH SMALL GRAVEL AND SHELL FRAGMENTS, LOOSE	
12.0 - 13.0	SILT, SANDY, FINE, BROWN, SOFT	

BOTTOM TEST PIT @ 13.0'

TEST PIT NO 3

DEPTH OF STRATA (FT)	DESCRIPTION	REMARKS
0.0 - 2.0	SILT, WITH SOME FINE SAND, BROWN, DRY TO DAMP, SOFT	DAMP @ 1.0'
2.0 - 3.6	CORAL, SILT TO COBBLE SIZE, SANDY, TAN, LOOSE, DAMP TO SATURATED	
3.6 - 4.1	CLAY, SANDY, FINE, WITH LITTLE CORAL FRAGMENTS, GRAY - GREEN, VERY MOIST TO SATURATED, VERY SOFT	WATER SEEPING IN @ 4.0'
4.1 - 9.0	SILT, SANDY, FINE, WITH LITTLE SHELL FRAGMENTS, TAN TO BROWN, SOFT	
9.0 - 10.0	SAND, MEDIUM TO COARSE WITH TRACE SMALL GRAVEL, SHELL FRAGMENTS, AND SILT, BROWN TO GRAY, WET, LOOSE	
10.0 - 12.5	SILT, SANDY, FINE, BROWN, SOFT	

BOTTOM TEST PIT @ 12.5'

TEST PIT NO 5

DEPTH OF STRATA (FT)	DESCRIPTION	REMARKS
0.0 - 1.2	SILT, WITH SOME FINE SAND, BROWN, DRY TO DAMP, SOFT	DAMP @ 1.0'
1.2 - 3.2	CORAL, SANDY, CLAYEY, TAN TO REDDISH-BROWN, MEDIUM DENSE, DAMP	
3.2 - 4.8	CLAY, SANDY, FINE, GREY, ORGANIC, SHELLS, SOFT	DARK TAN WET ORGANIC W/ LITTLE 4.0' TO 4.8'
4.8 - 10.5	SILT, SANDY, FINE, BROWN, MOIST, SOFT	WATER AT COMPLETION - DRY - 7.0'
10.5 - 11.5	SAND, COARSE WITH TRACE SMALL GRAVEL AND CLAY, BROWN, MOIST, LOOSE	

BOTTOM TEST PIT @ 11.5'

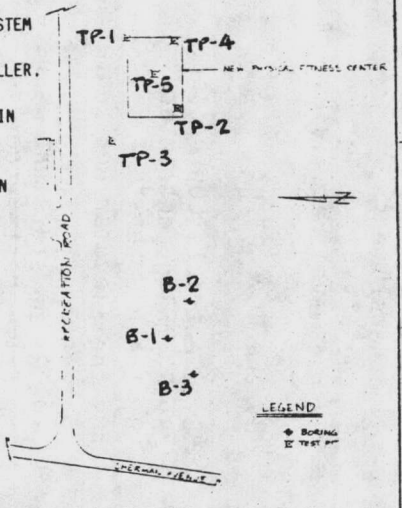
TEST PIT NO 4

DEPTH OF STRATA (FT)	DESCRIPTION	REMARKS
0.0 - 1.0	SILT, WITH SOME FINE SAND AND SMALL FRAGMENTS RED AND BROWN, DRY TO DAMP, SOFT	DAMP @ 1.0'
1.0 - 3.0	CORAL, WITH SOME SAND, BROWN TO GRAY, SATURATED	1.0' TO 3.0' CORAL FRAGMENTS UP TO 3" LENGTH
3.0 - 7.0	SILT, SANDY, FINE, BROWN, SOFT	WATER AT COMPLETION - 2.8'

BOTTOM TEST PIT @ 7.0'

GENERAL NOTES

1. BORINGS ADVANCED BY HOLLOW STEM AUGERING.
2. BLOWS COLUMN INDICATES DEPTH OF SAMPLE AND NUMBER OF BLOWS REQUIRED TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER ONE FOOT INTO UNDISTURBED SOIL WITH A 140 LB. HAMMER FALLING 30" AS PER ASTM D-1586.
3. WN% COLUMN INDICATES DEPTH OF SAMPLE AND NATURAL MOISTURE CONTENT OF SOIL AS PER ASTM TEST D-2216.
4. ALL DEPTHS AND LOCATIONS ARE APPROXIMATE.
5. BORINGS DRILLED BY FROEHLING & ROBERTSON, INC. OF NORFOLK, VA. FEBRUARY 1983.
6. SP, ML, CL, ETC. FROM UNIFIED SOIL CLASSIFICATION SYSTEM DESCRIPTION OF SOIL IN ACCORDANCE WITH BURMISTERS CLASSIFICATION ON BASIS OF VISUAL ESTIMATE BY DRILLER.
7. DASHED LINE (---) REPRESENTS AN ESTIMATED CHANGE IN THE SOIL STRATA.
8. TEST PIT DATA OBTAINED BY GOVERNMENT INVESTIGATION (CODE 411, LANTDIV) FEBRUARY 1984.



BORING AND TEST PIT LOCATION PLAN

SCALE 1" = 100'

GRAPHIC SCALE

ATLANTIC DIVISION

F 80091

Figure 5.12.1

SECTION 6. SPECIFICATIONS

6.1 GENERAL REQUIREMENTS FOR THE PREPARATION OF PROJECT SPECIFICATIONS

The project specifications form a part of the contract documents. Format and general instructions for the preparation of project specifications are included in NAVFAC DM-6, "Drawings and Specifications". Project specifications shall be based on NAVFAC guide specifications, edited and supplemented to suit the particular project. The specifications shall be as brief as possible, definite, and free of ambiguities and omissions, which might result in controversies and contractor claims for additional compensation.

In order to provide uniformity for reproduction of specifications, it is requested that all sketches which are to be bound as a page in the specifications be drawn on a sheet of the same dimensions as the specification page size with 1/2 inch margin on three sides with a 3/4 inch margin on the bound edge.

6.2 GUIDE SPECIFICATIONS

Guide specifications of NAVFAC Series "TS" and "NFGS" will be furnished for all sections of the specifications for which they are available. The A&E shall carefully edit, modify, and supplement these sections and prepare additional sections in the same format to ensure they are coordinated with the project design. The latest guides, the "NFGS" series, should be considered as standards for format where they differ from earlier guides. For further (latest) information on preparation of specifications, see "Instructions to A&Es and Typists," which is furnished with the guide specifications.

6.3 DESIGN CRITERIA

NAVFAC Publication P-34 lists all current Federal and Military Specifications and industry and technical society specifications commonly used in Navy construction and repair work and which are referenced in NAVFAC guide specifications. P-34 is available from the Specifications Branch (telephone 444-9906, area code 804). It is essential that the A&E become thoroughly familiar with existing design criteria including those referenced in the guide specifications, before they are referenced in the project specifications. Before actually referencing one of these specifications, the following points should be resolved:

a. Does the amount of material and the nature of the project justify referencing the design criteria and testing required therein (particularly for materials on which such tests are not common)?

b. Does the selected design criteria cover material of a quality and type suitable for the service required?

6.4 REFERENCING OF DESIGN CRITERIA

In referencing design criteria, the following rules should be followed:

a. Do not copy portions of design criteria in the project specifications, except where applicable portions are short in length and remainder of criteria does not apply to the specific project.

b. Avoid reference to specific paragraphs in the design criteria unless the paragraphs referenced are the only portions of the criteria that are applicable to the specific project.

c. Avoid repeated references to a design criteria within the same section.

d. Read carefully all "Notes on the Use of the Criteria".

e. Specify types, classes, weights, and similar applicable characteristics required to insure accurate description.

6.5 SPECIFYING NEW MATERIALS

From time to time requests are made to consider the use of materials which are comparatively new. The fact that a material is new should not necessarily bar its use. Neither should previous use place a material in an "approved" category. Usually, service records of new materials do not exist. It is necessary, therefore, to base judgements upon laboratory tests. Such tests, in order to be accepted as authoritative, should be made by impartial qualified laboratories. Tests conducted by laboratories employed by manufacturers do not always show possible defects in the material tested. Unless a material is tested under the conditions of actual use, or comparisons are made under like conditions, the results are not conclusive. Most reputable manufacturers will furnish readily all requested information and answer all reasonable questions. Unless the manufacturer of a new material furnishes factual data sufficient to evaluate the material, it should not be considered for use. If a material is considered for use, a suggested competitive-type specification should be obtained from the manufacturer. Such a specification must be analyzed and revised as necessary to assure that a competitive, good-quality product will be obtained.

6.6 PROPRIETARY AND RESTRICTIVE REQUIREMENTS

a. Proprietary Specifications. The restrictions below, are contained in the Federal Acquisition Regulations (FAR) and certain statutes. From time to time a situation arises in which only a single product will perform the required function. In such cases, the A&E should forward a request to the LANTDIV PM fully justifying use of the sole source product. Proprietary or restrictive requirements shall not be used unless it is conclusively established that no substitute will serve the purpose. Timely submittal of the request is required to avoid delays in the work. If such authorization is granted, the item should be specified by manufacturer's name and catalog number, followed by "notwithstanding any other provision of this contract, no other product will be acceptable" or language of similar import. This is necessitated by the the General Provisions which permit substitution of any supposedly equal product unless such language is used. Use of proprietary items is prohibited unless formal written approval is obtained.

b. "Or Equal" Specifications. Specifying items by naming acceptable commerical products followed by the words "or equal" is permitted 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, and (c) the item cannot adequately be described because of technically involved construction or composition. In each instance a minimum of three manufacturers shall be included in the description followed by the words "or equal". The essential features of the item must also be set forth in sufficient detail to establish the basis upon which the equality of nonlisted products will be determined.

c. Experience clauses shall not ordinarily be included in the technical specifications. Clauses contained in NAVFAC guide specifications in the "STET" series issued prior to 1 January 1975 must be approved by NAVFAC HQ prior to use in a project specification. All guide specifications in the "TS" and "NFGS" series issued after 1 January 1975 which contain warranty, experience, and other related clauses have been reviewed and approved by NAVFAC HQ. These guide specifications may be used without any other HQ approval or request for waiver.

6.7 PRE-QUALIFICATION STATEMENTS/EXPERIENCE REQUIREMENTS

Projects utilizing conventional construction methods and materials can not be restricted with respect to bidders, building systems, or materials. Occassionally a project is unique in nature or has special circumstances which dictate use of unconventional methods. For these projects the A&E shall identify and document to the PM the need and basis of need for unique construction or state-of-the-art procurements. Documentation shall include a description of the unique features, the reasons for their uniqueness, and a description of the prequalification/experience requirements necessary to adequately construct these features. Documentation should be forwarded to the PM as soon as possible in the design process.

6.8 PHRASEOLOGY

The following instructions related to common errors in phrasing have evolved from NAVFAC experience with A&E specifications:

a. Under "Requirements" do not say "the work consists of". Drawings should show scope. If necessary to list certain parts, say "the work includes".

b. In lieu of reference to the accompanying drawings or the Contracting Officer, use the words "as shown", "as indicated", "as detailed" or "as approved", "as directed", "as permitted", but not "as shown on drawings" or "as approved by the Contracting Officer". That clause of the General Provisions, entitled "Additional Definitions," defines the meaning of these and similar terms.

c. Do not use the expression "to satisfaction of the Contracting Officer" or "satisfactory to the Contracting Officer". The contract states specifically that all work must meet the approval of the Contracting Officer.

d. There are two parties to the contract, (1) the Government, represented by the Contracting Officer and (2) the Contractor. Therefore, do not use such expressions as "subject to the approval of the architect", "when in the opinion of the architect", "this contractor", "masonry contractor", or "subcontractor". Do not use the term "owner"; rather, use the term "Government".

e. Do not use "etc."; the term is too indefinite for bidding and inspection purposes.

f. The use of the expression "as indicated on the drawings" is very seldom necessary; the fact that a detail is on the drawings indicates that it is unnecessary to mention it in the specification.

g. Do not use expressions such as "The work required shall include, unless stated specifically otherwise, the provision of all materials for the installation of all concrete, including reinforcement necessary to the construction and completion of the work in accordance with the drawings, the specifications, and the intent thereof". Since the drawings indicate clearly the exact limitations of the several classes of work, defining the limits of work within the specifications is superfluous and may be contradictory by failure to mention something shown clearly and intended to be included.

h. Minimize the use of cross references and in no case use paragraph numbers for this purpose. If necessary to refer to a particular paragraph, do so by its title and the section number and title under which it is to be found. Cross references of the following type are totally unnecessary: "Painting of the wood work is covered under "'Painting'" or "painting is specified hereinafter".

i. Do not place upon the contractor the responsibility for the possible inaccuracy of, or the lack of, information on the part of the Government; e.g., never use sentences similar to "although the drawings indicate approximately the conditions that are likely to be found, bidders should satisfy themselves as to the actual conditions, for while they are believed to be shown, the Government does not guarantee the accuracy of the information given and the bidder shall assume all responsibility in the use of such". REMEMBER THAT THE GOVERNMENT IS RESPONSIBLE FOR THE ACCURACY AND SUFFICIENCY OF THE INFORMATION IT GIVES TO BIDDERS OR CONTRACTORS AND THE A&E IS IN TURN RESPONSIBLE TO THE GOVERNMENT FOR THAT SAME INFORMATION. It will be necessary to establish in the project specification a definite basis of bid. For example, on a roof rehabilitation project where the extent of defective construction is unknown, the specification shall set forth, as a basis of bid, a definite amount of work to be performed and provide for adjustment in accordance with the General Provisions if the extent of work varies from the amount stated under the basis of bid.

j. Do not include "warranties" in technical sections unless they are for more than one year, and generally not unless they are included in the NAVFAC guide specification. A one year warranty is covered in the General Provisions.

k. Do not set up a paragraph in the various sections entitled "Work not Included". Specify the work that <u>is</u> included under the respective sections.

l. Specifications should clearly delineate air conditioning ducts, heating ducts and piping systems which are required to be insulated. The phrase "insulating all ducts except in conditioned spaces" has resulted in differences of opinion and claim situations; also all duct systems should be appropriately designated as supply, exhaust, fresh air intake, or return to further clarify insulating requirements.

6.9 MISUSE OF WORDS

a. Do not confuse any and all; e.g., "Correct any defects" should read "Correct all defects".

b. Do not confuse either or both; e.g., "Paint sheet metal on either side" should read "Paint sheet metal on both sides." "Either" implies a choice.

c. Do not confuse or and and; e.g., "It shall be free from defects of workmanship and material which would impair its strength or durability." The use of "or" in this sentence results in a meaning not intended.

d. Do not use "and/or". The courts have considered this phrase to be intentionally ambiguous and, therefor, to be interpreted in favor of the Contractor.

e. Use statements which are definite and do not contain words and phrases which may be ambiguous. Examples:

"Remove the equipment from the building during the alterations thereof and reinstall the equipment after completion of the alterations." Do not say "Remove and replace the equipment as indicated."

"Remove the existing culverts and reinstall the culverts in the new locations." Do not say "Replace the existing culverts as indicated on the drawings."

"Remove existing and provide electrical wiring." Do not say: "Replace the electrical wiring" as this implies reinstallation of the old wiring.

f. "Provide" is defined in the clause entitled "Additional Definitions" of the General Provisions as "furnish and install". When material or equipment is furnished by the government directly or under other contracts for installation by the contractor, the term, "install" should be used; however, the contractor may be required to "provide" foundations, fastenings, etc., for the installation. If the word "install" is used alone, the bidder or contractor has a right to assume, on the basis of the definition cited that the Government will "furnish" the materials in question.

g. Avoid ungrammatical omission of the articles; e.g., "Contractor shall paint ceiling of office" should read "Paint the ceiling of the office."

h. Certain terms and designations of work phases, rooms and areas commonly used in naval activities should not be used in construction specifications, for example: Bulkhead (for wall), deck (for any floor), ladder (for stair), head (for toilet), galley (for kitchen), overhead (for ceiling), etc.

i. Provide statements of direction, opposed to statements of information; e.g., "wall shall be painted" should read "paint the wall." "To be ...", "shall be ...", "will be ..." does not affix responsibility.

6.10 USE OF ABBREVIATIONS AND SYMBOLS

In general, abbreviations should be avoided except those which are generally understood and accepted and can be used economically: e.g., psig, cfm, kw. (The use of ft., in., lbs., %, do not offer great savings.) The use of symbols is undesirable for three basic reasons: (1) most are difficult to produce on a typewriter; (2) they frequently have more than one meaning; (3) the typist may not know what is intended and therefore type an improper symbol. Feet ('), inch ("), degree (^{o}), pound and number (#), should be written out, except that number may be abbreviated (No.). In the text it is preferable to spell figures except where they give dimensions, for example: "Ten buildings", "100 feet long"; however, "one" and "zero", where used singly shall always be spelled out. Never use both the written and numerical figure, "ten (10)".

6.11 CATEGORY CODES FOR CONSTRUCTION PROJECTS

Project documentation for new construction and repair projects involving capital improvements identifies primary category codes for the project. The A&E shall include these numbers with a brief narrative description (i.e., title) and quantity in Section 01011 of the project specifications. With the return of the preliminary (35%) submittal LANTDIV (Specifications Branch) will provide a listing of category codes for supporting facilities outside the building (i.e., not within 5 feet of the building). The A&E shall use this listing to determine appropriate category codes and shall include these with his narrative in Section 01011.

6.12 SUBMISSION PROCEDURES

a. PRELIMINARY (35%) SUBMISSION (OUTLINE SPECIFICATIONS). Before starting work on project specifications, the A&E personnel who prepare the project specification shall confer as necessary with the LANTDIV Specifications Branch to insure a clear understanding of current Government requirements. All A&Es starting their first project for LANTDIV shall confer with the Engineering and Design Division and particularly the Specifications Branch before starting any work. The Specifications Branch will provide A&Es with a document titled "Instructions to A&Es and Typists", and this document should be thoroughly studied prior to beginnng preparation of specifications.

After the preliminary architectural and engineering studies have been completed and the basic features of the proposed design have been established, but before any detailed preparation of project specifications is begun, an outline specification shall be forwarded to the Commander, Atlantic Division, Naval Facilities Engineering Command.

The outline specification should list each anticipated section of the project specification along with appropriate statements applicable to each section. The outline specification should state all basic construction items and specific types of materials, and should be complete enough to enable LANTDIV to furnish the proper guide specifications and to provide appropriate guidance to the A&E. On receipt of this outline specification, NAVFAC guide specifications will be furnished for all items for which they are available together with specific guidance for selection of materials and preparation of the specification. The outline specifications should describe any special conditions of service and site conditions inherent in the project. The following outline will illustrate the information desired:

Site work	Scope and any special conditions
Roads and parking areas	Type of subbase, if any, base and surfacing
Foundations	Type; i.e., spread footings or piles, type of piles proposed, subsurface conditions
Frame	Concrete, steel, etc.
Wall construction	Brick, concrete masonry unit, concrete, panel wall and type
Floor construction	Structural concrete, metal deck with concrete fill, etc.
Roofing	Type (built-up, shingles, etc.), insulation, etc.
Windows	Metal, wood, types
Doors	Metal, wood, types, fire ratings, if any
Interior finishes	Plaster, ceramic tile, exposed concrete, or masonry, acoustical treatment, floor coverings, etc.
Partitions	Types, framing
Plumbing	Brief description of system, fixtures
Heating	Type of system, listing of major components
Air Conditioning	Type of system, listing of major components
Fire protection	Type of system, listing of major components

Electrical work	Type of system, listing of major components
Outside utility	Brief description of each system
Special Equipment	List and give a brief description of any special items of equipment such as cranes, materials-handling systems, galley and snack bar equipment, elevators, etc.
Building modifications, if applicable	Brief description

Federal and Military Specifications are NOT stocked in quantity sufficient for issue by LANTDIV. After determination of the Federal and Military Specifications that will be required, a request that includes the identification number of the specification required and your contract number should be forwarded to: Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120, telephone 697-3321, area code 215. The importance of obtaining the necessary Federal and Military Specifications cannot be over-emphasized, particularly when the A&E has shop drawing approval responsibility.

b. PREFINAL SUBMISSION (COMPLETE SPECIFICATION)

Specifications for the prefinal submission shall be to the best of the A&E's knowledge, complete, with all elements thoroughly checked and coordinated with the drawings and with sufficient detailed information to permit accurate bidding and construction of the project. Prior to writing the specifications for a prefinal submittal, the A&E should contact the Specifications Branch Head, telephone 444-9906, area code 804, to insure the use of the latest NAVFAC and LANTDIV guide specifications. Particular emphasis shall be placed on coordination of the various elements of the specification where portions are prepared under subcontract to the A&E contract. For the prefinal submittal of the specification, NAVFAC and LANTDIV guide specifications shall be neatly edited, and legible photographic copies submitted for review. Additional specifications not covered by NAVFAC and LANTDIV guide specifications shall be typed on bond paper and legible photographic copies submitted for review. Both the typed specifications and edited guides shall be bound in one single volume. The informaton required to complete Division 1, Sections 00101 and 01011, may be typed directly on the guide furnished by LANTDIV. Sections 01012 and 01400, or 01401, as applicable, will be incorporated into the final manuscript by LANTDIV.

At present, except for Iceland, Europe, and the Azores, all contracts of $2,000,000 construction cost and larger are administered under Contractor Quality Control (CQC). Under this system the contractor's CQC representative approves all shop drawings except those specifically designated by the project specifications for approval by the Contracting Officer. Shop drawings for the following systems, equipment and materials are ALWAYS designated for Contracting Officer (CO) approval.

A. MECHANICAL:

1. Boilers and warm air furnaces greater than 500,000 BTU/hr., including controls and auxilliaries.

2. Air and gas compressors greater than 25 SCFM and greater than 250 psig.

3. Air pollution control devices (including electrostatic precipitators, bag-houses, mechanical collectors, scrubbers, and demisters).

4. Chillers and refrigerator compressors greater than 15 tons.

5. Cooling towers, evaporative condensers, and radiators greater than 15 ton.

6. Air conditioning and condensing units greater than 15 tons.

7. Heat pumps greater than 5 tons.

8. High efficiency filters and filter boxes.

9. Heating and Ventilating, and Air Conditioning (HVAC) control systems.

10. Terminal devices which modulate to control space conditions (Variable Air Volume (VAV) boxes, term air blender units, induction units, and fan-coil units).

11. Heat exchangers greater than 100,000 BTU/hr.

12. Air ducts for systems with pressure of 3 inch wg or greater.

13. Air handling units and unit heaters greater than 2,000 SCFM.

14. Fans for heating and ventilating units with motors 3 hp and greater.

15. Pumps with motors 3 hp and greater.

16. Aviation fueling system components.

17. Plug, ball, trunnion mountwd butterfly, and double block and bleed valves on Petroleum Oil and Lubricant (POL) systems.

18. Buried factory preinsulated steam and condensate piping and contractor system design drawings (pipe, insulation, conduit, and system design layout only).

*19. Fire Protection systems.

B. ELECTRICAL SYSTEMS: (All review submittals under the following sections.)

Section 16208 - Diesel Engine-Generator Set (25-250 KW)

Section 16262 - Automatic Transfer Switches

Section 16304 - Pier, Electrical Distribution for Naval Stations

Section 16461 - Interior Transformers

Section 16462 - Pad Mounted Transformers (75 KVA to 500 KVA)

Section 16465 - Interior Substations

Section 16475 - Interior Switchgear

Section 16492 - Motor-Generator Sets, 400 Hertz

Section 16510 - Lighting, Interior

Section 16530 - Exterior Lighting

*Section 16721 - Exterior Fire Alarm System

*Section 16722 - Interior Fire Alarm System

*Section 16723 - Fire Alarm, Radio Type

*Section 16760 - Intercommunication System

*Section 16782 - Master Television Antenna System

C. MISCELLANEOUS MATERIALS/SYSTEMS:

1. Piling
2. Preengineered Buildings
3. Building Hardware
4. Weight Handling Equipment
5. Medical Equipment
6. Food Service Equipment
7. Elevators
8. Water Sewage and Industrial Waste Treatment Equipment
9. Energy Monitoring and Control Systems.

* Shop drawing approval for these items by LANTDIV only.

Each submittal paragraph in the project specification which contains one or more of the items listed above shall contain language such as "Items in the following list which are followed by "(CO)" shall be approved by the Contracting Officer". For a specific project the A&E may with LANTDIV approval, supplement this list which is critical to the successful completion of the project.

The standard 16 division Construction Specifications Institute format shall be used on all projects. On small projects or projects of a special nature using only a few divisions, the listing of non-applicable divisions may be omitted.

Control Diagrams

Provide a written sequence of operation for each mechanical and electrical control system stating explicitly how systems are to function. Give all pertinent data regarding safety, alarms, indicators, and control parameters. The sequence of operations may be shown on the control diagrams in lieu of in the specification.

c. FINAL SUBMISSION

Following the review of the prefinal submittal, comments and corrections to be included in the final submission will be furnished to the A&E by LANTDIV. The final submission to LANTDIV shall consist of one complete specification manuscript on bond paper, single spaced, and typed on one side only, and two bound photographic copies. Do not bind the bond manuscript but do bind the copies.

6.13 BID ITEMS

In order to insure an award being made within available funds, additive bid items will be established by the A&E in conjunction with the PM and the station; however, additive bid items are not required whenever the project cost estimate is clearly within the funds available.

In composing bid items, the base bid must provide a usable facility. Work increments for additive bid items should be selected which can logically be separated from the project without rendering the facility unusable. It is intended that the base bid with all additive bid items will provide the maximum usable facility for the funds available.

Additive bid items shall be arranged so that the most essential portion of the work is added first. Succeeding items will be cumulative for purposes of determining if the project is within the available funds; however, to provide latitude in selection, each additive bid item shall be independent of others, where practicable.

The number of bid items and the estimated additive amounts per item will depend upon the nature of the project. Where feasible and practicable, there will normally be not more than three bid items. Each estimated additive increment should tend to approximate 5% to 10% of the estimated base bid. There shall be no more than four additive items without specific approval of the Commander of the Atlantic Division, Naval Facilities Engineering Command. Bid items shall not be indicated

on the drawings or referenced anywhere in the Specifications without prior approval of LANTDIV Specifications Branch. Do not use the term "alternate" to represent additive bid items. Deductive bid items are not permitted.

SECTION 7. COST ESTIMATES

7.1 GENERAL

A detailed cost estimate is required with each submittal. All estimates shall be prepared in the systems format whether manually prepared or prepared in the Cost Engineering Systems (CES) format. The estimate detail for each submittal shall be consistent with the level of design required for that submittal. Accurate quantity take-off, inclusion of all elements of construction, and accurate unit prices for the project's geographic location are fundamental to the development of a good cost estimate.

Properly prepared cost estimates provide a check of plans and specifications for constructability, coordination conflicts, discrepancies, and omissions. They are used by the Government to establish/verify budget costs, statutory cost or International Balance of Payment Program requirements; develop historical data for future estimating and verification of contract bid prices.

Prior to fee negotiations for ALL PROJECTS, the A&E shall contact the Cost Engineering Branch, telephone 444-9907, area code 804 and arrange a meeting to discuss cost estimating requirements. Systems format, summary sheets, escalation, and detail requirement data will be provided at this meeting.

7.2 PROJECT DESIGN ESTIMATES

The estimate at each submittal is in the A&E's best judgement what it should cost to build the facility under normal bidding conditions assuming bids are opened at the stated bid opening date. Bid opening shall be established by the PM. The estimate shall be escalated to what a contractor would be expected to bid assuming bids are opened on the established date. Pricing must reflect all requirements of the contract plans and specifications. The individual preparing the estimate should read the specifications paying particular attention to division one and wage rates.

7.2.1 Preliminary Engineering Documentation (PED)

The back-up estimate shall be in accordance with current NAVFAC & LANTDIV PED instructions which will be furnished by the PM.

NOTE: Preliminary (to the extent that design development allows), prefinal, and final estimates shall reflect direct unit cost to the contractor; sales tax on materials, insurance and taxes on labor; and sub and prime contractor overhead will be added as separate items.

7.2.2 PRELIMINARY (35%)

The estimate for this submittal shall reflect costs based on reasonably accurate take-off of materials/systems consistent with the level of design. For those elements of the project where the status of design does not permit a reasonably accurate take-off of quantities or firm pricing of individual items of work, unit prices may be used; such as, cost

per square foot for buildings or building foundations, cost per square yard for pavement or cost per fixture for mechanical or electrical fixture. USE OF EMPIRICAL COSTS SHALL BE MINIMIZED.

A manually prepared estimate in systems format is required for projects utilizing either manual or CES estimates.

7.2.3 PREFINAL

The prefinal estimate shall be prepared from complete drawings and specifications. Full and accurate description of each system, subsystem and element shall be provided. Quotations must be obtained for all items of substantial quantity or cost. Documentation must be provided for all line items that represent more than one percent of the contract cost or are of such nature that a standard price is not available. Documentation may be in the form of written quotations or may be taken by telephone. In either case the documentation must show: company name, person contacted, date of quote and date the quoted price is escalated to. "Estimating Prices" are considered to be quotations if they represent a reasonable expectation of the price a contractor will be expected to pay. ESTIMATES WHICH DO NOT CONFORM TO THESE FORMAT AND INFORMATION REQUIREMENTS WILL BE RETURNED FOR REVISION. This estimate will be compared with the scope of work estimate or authorized funds for the project. Separate estimates must be prepared for each bid item included in the specifications, including unit cost for piling, and shall be submitted in the proper format.

Separate estimates will be prepared for each new non-identical building, structure, or addition costing over $50,000 contract cost. Costs of alteration work to existing buildings will not be included with the building addition costs. When one construction contract contains more than one type of work (i.e., new construction, repair, equipment installation, etc.), the estimate shall be structured such that each type of work is identified separately. In addition to an overall or composite summary sheet, each type of work requires a separate summary sheet. Costs from these separate summary sheets must be directly transferable to the composite summary sheet.

For projects requiring a CES estimate the A&E shall complete and submit the computer load sheets in accordance with instructions from the Cost Engineering Branch. In addition, adequate manual estimate preparation to assure the project is within proposed construction funds is required. However, a budget summary sheet is the only manually prepared document that must be submitted.

7.2.4 FINAL

Same as prefinal except for correction/inclusion of prefinal comments and for projects involving building construction, a cost model questionaire will be returned with the prefinal submittal. Completion of this questionaire without quantities (i.e., check off systems included, type of system, spans, etc.) and return with the final submittal is required. A brief narrative description of each non-standard system is also required.. When the final estimate varies by more than + 10% of the low bid, A&E review and analysis of the estimate will be required at no additional cost to the Government.

7.3 ESTIMATES FOR NEGOTIATED CONSTRUCTION CONTRACTS

In addition to requirements established for competively bid construction contracts, estimates for negotiated construction contracts shall:

a. Use CES format unless estimated construction cost is less than $100,000.

b. Final estimate must accurately reflect the final plans and specification. Direct comparison with the construction contractors estimate will be made in quantity take-offs; quotes for major material/equipment, items; crew size, equipment, and production rates; and area labor rates. Where conflicts exist between A&E estimate and construction contractor estimate, the A&E will provide prompt verification/substantiation for items in question.

c. Should conflicts between plans and specifications occur, the A&E will promptly clarify intent and prepare a draft "as negotiated" amendment.

7.4 ESTIMATES FOR PROJECTS LOCATED OUTSIDE CONUS:

In addition to the provisions set forth above, reduction of the foreign exchange costs (FEC) requires special attention. The project shall be designed to utilize material which will reduce the FEC in all areas not in conflict with local construction methods or country-to-country agreements.

Estimates prepared for work outside the CONUS will be based on prices prevailing in the area in which work is to be preformed. Unusual conditions peculiar to the project under design shall be considered. The blanket use of geographical factors will not be permitted.

Back-up estimates for overseas areas may be prepared either in local currency or in U. S. dollars; however, a summary sheet in dollars must be shown and used as a cover sheet. When estimates are prepared in a foreign currency, two summary sheets shall be used in the back-up estimate. The foreign exchange rate used shall be indicated on the cost summary. Quantity take-off may be in metric or English units.

In overseas countries where labor and material escalation is allowed and compensated during construction, the estimate escalation must be prepared in the following manner:

a. When construction contractor pricing will be based upon local bid prices at the time of bidding without any consideration of escalation: the designer of record will escalate to the 1/3 point of construction. The assumed bid date shall be established by the PM; escalate from that point to the 1/3 point of construction. The estimate summary shall indicate date escalated to and % escalation.

United States material purchases and shipping to overseas projects should be escalated using U. S. escalation/rates and bid date formula.

INTERNATIONAL BALANCE OF PAYMENTS (IBOP)

All construction projects located in overseas areas require Foreign Exchange Cost (FEC) be minimized and IBOP implications be identified on the cost estimate and DD Form 1391 as appropriate. This requires consideration of two construction procedures:

a. Normal Procedures - Construction procedures which would normally be used consistent with local practice where no effort is made to suppress FEC.

b. Planned (IBOP) Procedures - Construction procedures developed to minimize FEC emphasizing:

(1) Adherence to executive orders, U. S. laws, status of forces agreements, and/or treaties which affect our contractural freedom in the specific project area including maximum feasible use of U. S. contractors, materials, products, and equipment.

(2) Maximum use of U. S. flag ocean and air carriers.

(3) Utilization of competent military labor where applicable.

(4) Incorporation of portable van-type installations and prefabricated structures manufactured in the U. S.

Development of the cost estimate, the PED, and/or preliminary (35%) stage indicating the following is required:

IBOP DATA:	NORMAL	PLANNED		NORMAL	PLANNED
CWE	$545,000	$588,000*	FEC	$326,000	$222,000

* Recommended construction method.

Except where country-to-country agreements specifically establish construction procedures in which case normal and planned procedures would be the same, the recommended procedure will generally be based on the following:

PLANNED procedures will be recommended if for every dollar increase in CWE from NORMAL to PLANNED procedure there is a corresponding decrease in FEC of two dollars or more. Where this criteria is not met NORMAL procedures will be utilized.

When the recommended procedure is not consistent with this criteria i.e., NORMAL procedure is recommended/required by country-to-country agreements or project urgency, an explanation for the deviation is required.

Cost estimates for overseas projects will be prepared in the detail described for all other projects. The IBOP data shown above must be indicated on the DD Form 1391 and the Preliminary Cost Estimate Sunmmary Sheet(s) in the form shown. At the end of each estimate indicate returns to the U. S. in accordance with the IBOP Instruction.

7.4.1 ESTIMATES FOR PROJECTS LOCATED IN ICELAND:

The A&E will be given specific written guidance for preparation of Government estimates for Iceland projects including samples of Icelandic Prime Contractor estimates for similar type projects.

7.5 UPDATING ESTIMATES:

When updating estimates, those in which pricing used is less than six months old may be escalated by a percentage; those in which pricing used is more than six months old shall be re-priced.

7.6 ESTIMATES FOR STUDIES

Estimates for Studies should contain sufficient description, quantities, and unit prices for major items of work to adequately describe the entire scope of work. Unit prices may contain contractor overhead and profit. The total estimate shall also include allowance for escalation to the stated bid opening date, contingency and SIOH.

The first sheet of this estimate should be a summary sheet showing total cost. Back-up sheets indicating the rationale used to derive the quantities and corresponding unit prices are required with each submittal.

SECTION 8. POST DESIGN SERVICES

8.1 Consultation During Construction

8.1.1 Unless construction surveillance services are negotiated, the A&E has no field construction responsibilities. Through its Construction Division, LANTDIV will inspect all field work. However, the A&E shall promptly furnish consultation and advice to clarify the intent of the drawings and specifications and/or questions that may arise during the construction of the project.

The A&E will be responsible for the preparation of all amplifying drawings, amendments, and change orders at the direction of LANTDIV or the ROICC staff at no increase in fee if changes are due to errors, omissions or poor design quality. Changes or additions to the plans and specifications resulting from a change in scope shall be prepared at the direction of LANTDIV or the ROICC staff. When additional compensation is due the A&E, the Project Manager should be contacted immediately, advised of the added work and confirming fee proposal submitted.

The A&E shall assure through discussions with the directing official the timing required for design preparation to minimize delay to the construction.

8.2 Shop Drawings

At the Government's option, checking of shop drawings and other data submitted by the construction contractor are an A&E responsibility. The A&E shall provide and use the stamp shown in Figure 8.1 to process shop drawing submittals.

Currently all CONUS projects with construction value over $2,000,000 utilize Contractor Quality Control (CQC). Under this system the contractor's CQC representative approves for construction all shop drawings except those specifically designated in the project specification for approval by the Contracting Officer.

Accurate, timely review of ALL shop drawings is an A&E responsibility. The sub-section entitled "Shop Drawing Review Procedure for Project which do not Incorporate CQC" outlines the procedure for handling non-CQC projects. This procedure also applies to all CQC projects where the shop drawing is designated for Contracting Officer approval or proposes a deviation.

From the A&E view point there is no difference in the review of a CQC or a non-CQC project shop drawing except for CQC projects, the A&E will receive only one copy of the shop drawing for his review and retention. Since the contractor's CQC representative is approving shop drawings for construction then sending them to the A&E, these items must be reviewed promptly. It is the A&E's responsibility to immediately advise LANTDIV of problems/discrepancies encountered in CQC approved shop drawings.

ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511

APPROVED _____

APPROVED AS NOTED _____

DISAPPROVED _____

SUBJECT TO THE REQUIREMENTS OF

CONTRACT NO. _____
APPROVAL OF A SUBMITTAL DOES NOT INCLUDE APPROVAL OF ANY DEVIATION FROM THE CONTRACT REQUIREMENTS UNLESS THE CONTRACTOR CALLS ATTENTION TO AND SUPPORTS THE DEVIATION--THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING PROPER PHYSICAL DIMENSIONS & WEIGHTS, COORDINATION OF TRADES, ETC., AS REQUIRED.

REVIEWER _____ DATE _____

FOR OFFICER IN CHARGE OF CONSTRUCTION

DEVIATION: (ONLY) APPROVED ☐

DISAPPROVED ☐

LANTNAVFACENGCOM

INITIALS _____

DATE _____

NEW STAMP (TO BE PLACED BELOW CQC STAMP OR DESIGNER REVIEWER APPROVAL STAMP WHERE REQUIRED)

ADD FOLLOWING CHECK POINT TO CQC STAMP:

____ APPROVED FOR USE SUBJECT TO GOVERNMENT APPROVAL OF SPECIFIC DEVIATION

Figure 8.1

SHOP DRAWING REVIEW PROCEDURE FOR PROJECTS WHICH DO NOT INCORPORATE CQC

The construction contractor for the project has been instructed to forward to your office for review all shop drawings, manufacturer's data, certifications and samples, except those designated for LANTNAVFACENGCOM's approval, as follows:

TRANSMITTAL FORM	SUBMITTAL	SAMPLES
5	7	*

*Quantities specified

The procedure for handling these submittals is as follows:

a. Acceptable Submittals - If the submittal complies with the contract requirements, it shall be stamped APPROVED, dated and legibly signed by an authorized person. If minor revisions were made by the contractor in order to make the submittal comply with the requirements, it shall be stamped APPROVED, dated and signed. If minor revisions are made by the A&E in order to make the submittal comply with the contract requirements, it shall be stamped APPROVED-AS-NOTED, dated and signed. The revisions must be identically marked on all copies of the submittal. Each revision must be initialled by the person making the revision. The reviewer's section of the transmittal form, including the endorsement returning the submittals to the contractor, shall be completed, and both transmittal form and submittals distributed as follows:

	TRANSMITTAL FORM	SUBMITTAL	SAMPLES
Contractor	1	3	*
ROICC	2	2	1
LANTNAVFACENGCOM (Code 05)	1	1	0
A&E	1	1	0

*Additional quantities returned to contractor

b. Unacceptable Submittals - If the submittal does not comply with the contract requirements and cannot be made to comply by minor revisions and the contractor has not proposed and supported a deviation from the contract requirements, the submittal shall be stamped DISAPPROVED, dated and signed.

The reviewer's section of the transmittal form shall be completed and both transmittal forms and submittals distributed as follows:

	TRANSMITTAL FORM	SUBMITTAL	SAMPLES
Contractor	3	5	ALL
ROICC	0	0	0
LANTNAVFACENGCOM (Code 05)	1	1	0
A&E	1	1	0

c. Proposed deviations from the contract requirements - If the contractor proposes a deviation from the contract requirements, it must be supported by the following information:

(1) Reason for the proposed substitution.

(2) If material or equipment is unavailable, document efforts made to procure.

(3) Complete technical data on the proposed substitution, sufficient to determine acceptability.

(4) Acknowledge that all changes caused by the proposed substitution will be the responsibility of the contractor and at no additional cost to the Government.

(5) Proposed change, if any, in the contract price and/or time.

These submittals shall be reviewed but not stamped. The A&E comments/ recommendations and reviewer action shall be noted on one copy of the transmittal form and forwarded with the remaining unendorsed transmittal forms, the unstamped submittals and A&E cost estimate to this Command (Code 05).

Upon completion of review by LANTNAVFACENGCOM, the submittal will be stamped, dated and signed, and distribution made to the contractor, ROICC, and A&E.

When a submittal must be revised by the A&E due to such reasons as changed Government requirements or correction of design deficiency, it must be forwarded to this Command (Code 05) with an explanation for the new requirements and the estimated change in contract price for the contractor to comply with the new requirements.

Only certifications which state that the item submitted complies with the contract requirements are acceptable. A statement that the item submitted is equal to or better than the specified item will not suffice.

When a submittal cannot be reviewed within two weeks, the ROICC must be advised of the estimated date of review completion.

The contractor has also been requested to submit three copies of his submittal log to your office. It is requested that you review this log to assure that all submittals required by the contract specifications have been included. If the log is acceptable, one copy should be forwarded to the ROICC and one copy to LANTNAVFACENGCOM (Code 05). If the log is not complete, it should be returned to the contractor, with comments, for correction. One copy of the log and comments should be forwarded to the ROICC.

8.3 Record Drawings

At the Government's option, the A&E may be responsible for the preparation of "as-built" drawings. When this option is exercised, the A&E will be provided a marked copy of project drawings indicating all changes made during construction and the project tracings. The tracings shall be corrected in black pencil in accordance with NAVFAC DM-6, Drawings and Specifications, to reflect the actual construction. Optional methods of construction not used should be crossed out and marked "NOT BUILT". No change need be made to portions of drawings marked "NOT IN CONTRACT (NIC)".

8.4 INTERIOR DESIGN (OPTION)

8.4.1 INTRODUCTION

This section discusses requirements for post construction award interior design preparation for procurement of furniture and furnishings.

NAVFAC Interior Design Program objectives, criteria and philosophy are set forth in NAVFAC Instruction 11012.120 (Interior Design). The furnishings phase of the interior design program deals with the design, selection, arrangement and color coordination of the furniture. These furnishings are generally included in A&E contracts for military construction (MCON) funded projects and certain other selected types of projects which have high personnel density or public traffic. It is included in the A&E contract as an option since generally its preparation will not begin until approximately one year prior to construction completion. The A&E's efforts (design reviews, meetings, etc.) will be coordinated by LANTDIV's Collateral Equipment Specialist (telephone 444-9694, area code 804).

8.4.2 SCOPE

The scope of work for interior design preparation is:

a. Selection of furniture, furnishings and accessories including but not limited to sofas, chairs, tables, screens, planters, art work, carpets, draperies, etc. Most items are available on and must be selected from GSA contracts. Applicable GSA schedules will be made available to the A&E.

b. For items not available on GSA contract, the A&E will prepare adequate specifications and other data necessary for procurement actions.

c. The A&E shall select and coordinate all colors, fabrics, etc., with the colors of the building surfaces. Although building surface colors are selected during design, the A&E shall verify actual contractor applied color schemes through field verification and/or coordination with the ROICC staff.

d. Presentation boards of a minimum size of 15 x 20 inches shall be prepared. These boards are to include furniture placement plan, catalog cut-outs of furniture, furnishings and accessories, color samples, material swatches of draperies, carpets and fabrics.

e. A minimum of four interior design 8 1/2 x 11 inch brochures shall be prepared and delivered to the Collateral Equipment Specialist. These brochures shall include but at A&E discretion are not limited to:

(1) Floor plans indicating locations of all furniture, furnishings and accessories.

(2) Procurement lists identifying all items to be purchased by stock number (Federal Supply items), contract number (GSA contracts), identification number and description (open purchase items), quantity, price, etc. Care shall be taken in the selection of all items to insure that delivery times are reasonably within the construction completion time of the project.

(3) Photographic color reproductions of the presentation boards reduced to fit 8 1/2 x 11 inch brochure size.

(4) Purchase specifications, drawings and other supporting data for open purchase and special order items, e.g., draperies, custom-built screens or dividers, art work, etc.

f. Advisory service as required to make changes resulting from changes in requirements, nonavailability of items or materials previously selected, etc.

8.4.2 Development Sequence and Submittal Requirements

The following sequence will be generally followed by the A&E in developing the interior design plan:

a. Approximately twelve months before construction completion the contract option will be awarded. The A&E will be contacted by the Collateral Equipment Branch and direction provided on when to begin developing the furniture and equipment procurement package. A meeting with LANTDIV Collateral Equipment and Interior Design representatives will be scheduled at this time. The purpose of this meeting will be to clarify procedures and requirements, develop tentative schedule and obtain current GSA information. The A&E should not begin work on this phase without contract authorization.

b. The A&E will visit the activity to review the program and update the room-by-room furniture placement plans and collateral equipment list developed during the Color Design.

c. Submit two copies of proposed plan to LANTDIV Collateral Equipment Specialist in rough draft format for LANTDIV review. The purpose of this review is to insure that proposed plan complies with basic limitations imposed by Government regulations and eliminate obvious errors, e.g., stock numbers, quantities, etc. The plan is to be updated based on this review.

d. Visit to activity jointly by the A&E and LANTDIV representatives to present the plan by means of presentation boards and updated rough draft listings to the activity command representatives.

e. The A&E will submit the original and four copies of the final procurement package modified in accordance with agreements reached during the final activity presentation.

8.4.4 Guidelines for Selecting Furniture and Accessories.

a. Facilities should have functional interiors, reasonably pleasant in appearance and conducive to the purpose for which they were constructed. Lavish design, "gold plated" in any respect or even having the appearance of being wasteful of Government funds, should be avoided. In furniture and furnishings, items which are not to be used include oriental and decorator rugs, period furniture reproductions (Williamsburg, French Provincial, Early American, etc.,) figurines or "objects d'art", free standing decorator items such as large world globes, leather covered furniture, and original paintings or numbered prints, especially if signed by the artist, ornate chandeliers and elaborate window coverings.

b. Criteria for furniture selection shall include function, anthropometric considerations, maintenance, durability, comfort and cost. Careful consideration shall be given to coordination of building and furniture finishes and colors, also shelving, storage and other similar tall or high density equipment should conform to fire regulations regarding overhead clearances, density, etc.

c. Furniture selections should be made, to the greatest extent possible from items available on Federal Supply contracts. Selection of substitutions for items on contract must be supported by detailed information and documentation. This justification must accompany any waivers submitted to the General Services Administration (GSA) requesting procurement for non-standard items.

d. Provide detailed working drawings and specifications for the procurement, fabrication and installation of custom furniture, etc., from commercial sources.

e. Technical equipment, linens (except draperies and bedspreads), housekeeping items and other equipment shall not be included in the procurement package.