

**DEPARTMENT OF THE ARMY
U.S. Army Health Facility Planning Agency
Heidelberg, Germany**

**STATEMENT OF WORK
FOR**

**LEASE OF A TEMPORARY
MEDICAL BIRTHING CENTER
ADJACENT TO BLDG # 113
CAMP EDERLE, VICENZA, ITALY**

Project Number: VCZTE

Date: 6 October 2004

TABLE OF CONTENTS

GENERAL DESCRIPTION OF WORK	Page	3
DESIGN REQUIREMENTS		9
DESIGN MANAGEMENT		11
GENERAL DESIGN INSTRUCTIONS		14
GEOTECHNICAL DESIGN		18
ARCHITECTURAL DESIGN		20
STRUCTURAL DESIGN		34
MECHANICAL DESIGN		38
FIRE PROTECTION DESIGN		57
ELECTRICAL DESIGN		62
TELECOMMUNICATIONS DESIGN		75
FINAL INSPECTION AND ACCEPTANCE		81
SUBMITTAL PROCEDURES FOR DESIGN/BUILD PROJECT		82
APPENDIX A	FUNCTIONAL LAYOUT DRAWING	
APPENDIX B	PROGRAM FOR DESIGN (PFD)	
APPENDIX C	ROOMS DETAILS REPORT	
APPENDIX D	ARCHITECTURAL AND ENGINEERING SYSTEMS LEGEND	
APPENDIX E	EQUIPMENT LIST	
APPENDIX F	PARKING LOCATION DRAWING	
APPENDIX G	PREVENTIVE MAINTENANCE REQUIREMENT	
APPENDIX H	EMERGENCY GENERATOR SET MAINTENANCE REQUIREMENT	
<i>APPENDIX I</i>	<i>(SPECIAL TECHNICAL REQUIREMENTS – NOT INCLUDED)</i>	

GENERAL DESCRIPTION OF WORK. The services described in this Statement of Work (SOW) include the following.

Lease of a single story modular building as a Temporary Birthing Center for a period of from one to five years, subject to the availability of funds for each lease year, plus site improvements. The completed project shall be a one story structure with a gross supported modular area of approximately 7,550 square feet (702 square meters). Modular building's base surface approximately 144 feet (43.85 m) x 52 feet, 6 inches (16.00 m). ***Note: Building footprint size cannot be larger than shown on the drawings and location must be as shown.***

The Temporary Birthing Center shall consist of the functional areas shown on the Functional Layout Drawing (Appendix A), as listed below, and as further described in the Program for Design (Appendix B). Room sizes, proportions, and equipment locations shown in the Program for Design are the basis for the design. Arrangement of rooms within the building has been planned to meet the medical care requirements of the Temporary Birthing Center. Minor modifications may be made to accommodate the unique characteristics of the building system offered by the Contractor. It shall be the Contractor's responsibility to provide a suitable modular structural system to meet story and room height requirements, and to avoid structural interferences in the building's usable spaces. The offeror may submit alternative recommendations for Contracting Officer's review and approval, but they must meet the medical care requirements of the facility. Conceptual configuration for these functions is shown

- Patient reception and family waiting areas, with handicapped accessible unisex restroom.
- Central medical materiel service, including equipment washing and drying areas, equipment assembly, bulk supply, medical steam sterilization, instrument storage; and a separate soiled utility room.
- Surgical services sterile zone consisting of two (2) C-Section surgical suites, equipment storage and supply area, scrub area, anesthesia work area, janitor's closet, and gurney storage.
- Residency staff and administration area, including separate male and female locker rooms with handicapped accessible toilets and showers.
- Perinatal care area, including nursing station; two (2) labor, delivery, post partum, and recovery rooms each with a handicapped accessible patient bathroom and shower; newborn nursery; and equipment storage room.
- Patient care area, including two (2) exam rooms, each partitioned with a curtain for use as medical provider's on-call sleeping room; one (1) two-bed patient room with handicapped toilet and shower; non stress testing room; medication preparation area; nutrition preparation area; general storage room; wheelchair storage room; clean storage area; emergency equipment alcove; janitor's closet; and ice machine alcove.
- Nursing unit, including head nurse office and assistant's (NCOIC) office.
- Communications equipment room.

- Technical equipment rooms for mechanical and electrical equipment, and sprinkler pump.
- Patient emergency evacuation zone.

The Contractor shall furnish and erect the modular building on temporary concrete or other structurally stable foundations as required by the modular unit supplier and local building codes, connecting of utilities from existing supplies, removal and hauling off of structures after expiration of the lease period, and returning the site to its original or better condition. This Contractor shall also perform any associated excavation, backfill, site grading, provide crushed stone or other fill material or surfacing, fill retaining system or structures, provide foundations, connect all utilities to include domestic hot and cold water, normal power from two separate sources and emergency electric power, sewer and communications from the source points to the building service points, construct any necessary walkways, access ramps, fire department access ways, walkway coverings or awnings, equipment pads.

This Contractor shall also construct the 30 paved parking spaces behind existing Building 113 and along 8th Street as shown on the drawing (Appendix F), and shall install three (3) removable bollards to prevent vehicles from accessing the space between the Temporary Birthing Center and existing Building 112. Construction of the parking spaces may begin immediately upon approval of the Contractor's design.

Corridor and door widths, corridor or walkway slopes, and transitions between building sections shall be constructed as required within these documents, and shall be designed and constructed to meet fire, life safety, and handicapped accessibility requirements described in Section, DESIGN REQUIREMENTS. Approval for any deviation from these requirements must be requested in writing to the Contracting Officer.

The modular unit building shall be leased for from one to five years, as Temporary Birthing Center, including delivery to the site, erection, as well as removal and hauling off at the termination of the lease period. Layout and materials shall be in accordance with this SOW, appendices, and attached drawings.

The building shall be a one story building with flat roof, sloped to drain. Rainwater shall be directed to gutters and downspouts and shall be controlled in the design to avoid it running directly across walkways. Splash blocks will be used where necessary to prevent erosion of surfaces.

Clear room height: varies according to room function (see additional descriptions and Rooms Report Appendices).

Departmental Criteria. Specialized requirements for medical departments and specialty areas follow. The modular building shall be designed to withstand the site-specific environmental conditions such as extended elevated ambient temperatures and large diurnal temperature swings. It shall also incorporate energy conscious design features such as reflective colors and surfaces, UV-resistant material, and window shading

treatments. Integral rolling shutters are highly desirable for all exterior windows. The design shall incorporate features that facilitate access for the handicapped. Interior signage shall be provided to guide staff and patients through the building including main and subdirectories, directional signs, and room signs. Signage shall include Braille features. Specific room finishes, ceiling heights, mechanically controlled environmental conditions, electrical and communications systems are governed by MIL HDBK 1191 and the departmental criteria included in the appendices to this solicitation.

Construction. The medical modular units shall consist of non-combustible welded steel frame construction. Module sections should be capable of being bolted together. All steel parts shall be protected against corrosion. Connection points, anchorages, and structural systems shall be designed to meet local seismic requirements.

To facilitate this design/build modular unit project, the Contractor shall provide on-board design and/or formal design submittal including an Initial and Final design. This design shall be submitted with detailed drawings that shall include but are not limited to architectural, utility and building system primary equipment and distribution (civil, mechanical, fire protection, electrical, communications), reflected ceilings, structural, hardware/door schedules, finish schedules, equipment specification sheets and other design sheets as listed later in this scope of work. A detailed schedule shall be submitted as part of the design package showing how design and construction activities can be completed with the required completion period. A Corrected Final copy of the design incorporating all design comments shall be submitted for Government review and acceptance. The reviewing agency for the government for healthcare construction is the United States Army Health Facility Planning Agency (USAHFPA) or their appointed representatives.

The modular unit manufacturer shall install the modular units, and be responsible for the timely delivery of the modules, equipment, and personnel required for assembly at the site. The contractor shall assemble the modules, connect utilities and building distribution systems within the modules to existing utilities and installed primary equipment such as air handling units, chillers, medical gas source equipment, and communication head end equipment (e.g. nurse call and PA), and commission all associated equipment and fixtures into operation to include testing and balancing all systems, testing and certifying plumbing fixtures and all installed equipment, prior to acceptance by the Government.

Parking shall remain in place upon removal of the Temporary Birthing Center building.

The Contractor shall maintain Contractor-installed equipment for the duration of the lease. The Contractor shall also perform preventive maintenance of the leased facility as described in Appendix G and maintain the emergency generator set in accordance with Appendix H.

The Contractor's design and construction must comply with the technical requirements contained herein. The Contractor shall provide design and construction using the best

blend of cost, construction efficiency, system durability, ease of maintenance and environmental compatibility. All facilities shall be designed and constructed in accordance with current U.S. and Italian Standards, building codes and as described in these documents. Any standard that can be determined to be substantially equivalent to the Standards specified in this document may be used. It is the contractor's responsibility to show the equivalency of the alternate Standard and the contracting officer must approve its use.

These design and product requirements are minimum requisites. The Contractor is encouraged to propose alternate design or products (equipment and material) that are more commonly used in the region; will be equally or more cost effective or allow for more timely completion, but furnish the same system durability, ease of maintenance and environmental compatibility. The Contractor will be required to submit information as requested by the Contracting Officer to make a comparison of the proposed alternate. All variations must be approved by the Contracting Officer.

Limitation of Working Space. The Contractor shall, except where required for service connections or other special reasons, confine his operations strictly within the boundaries of the site. Workmen will not be permitted to trespass on adjoining property. Any operations or use of space outside the boundaries of the site shall be by arrangement with all interested parties. It must be emphasized that the Contractor must take all practical steps to prevent his workmen from entering adjoining property and in the event of trespass occurring the Contractor will be held entirely responsible.

Temporary Structures. The Contractor shall erect suitable temporary fences, lighting, and necessary structures to safeguard the site, materials and plant against damage or theft, and for the protection of the general public, and shall adequately maintain the same throughout the course of the contract. All utility costs to support temporary structures during the contract period of performance shall be paid by the Contractor.

Subcontractors. Compliance with the provisions of this section by subcontractors will be the responsibility of the contractor

Location. The job site is located adjacent to existing health clinic, Building 113, on Camp Ederle, Vicenza, Italy and can be reached on paved roads. Site location is provided in Appendix A.

Materials. The contractor shall not use the following:

Radioactive material.

Asbestos-containing materials. Asbestos containing material (ACM) will not be used in the design and construction of this project. If no other material is available which will perform the required function or where the use of other material would be cost prohibitive, a waiver for the use of asbestos containing materials must be obtained from the Contracting Officer.

Paint material shall not contain lead. Debris, paint remnants and other waste material shall be removed and disposed of by the contractor in accordance with applicable Italian laws and regulations. The contractor shall comply with all US and Italian environmental regulations governing natural resource protection.

Paint material furnished by the contractor can either be a US or a non-US product. It shall be compatible with existing paint coats and meet the Italian requirements as well as specifications contained in this SOW.

Sequence of Work. Immediately after contract award, the Contractor shall prepare and submit for approval the performance drawings for the medical modular building units, including sufficient detail to evaluate the adequacy of the building design (structural and architectural features, and finishes). The drawings shall also include all details for the site work and temporary foundations, interior and exterior plumbing, mechanical, electrical, signal and communications, and fire protection, as well as all utility connection points. Specifications and manufacturer's data shall be provided for all building components. Documents shall be submitted to the Contracting Officer in four (4) copies. Submit drawings electronically as well as in hard copy. Utilize AutoCAD for Windows 2000 software for electronic submittal. All documents shall be submitted in the English.

The Contractor shall also prepare and submit for Contracting Officer's approval the necessary work plans showing mobilization of equipment, contractor offices, lay down and material storage areas, etc.; design and construction schedule; submittal register listing items to be submitted, proposed submission dates, time for Government approval, and required approval date; safety plan; quality control plan; and environmental protection plan in accordance with the contract clauses.

Coordinate with the Contracting Officer for commencement of site work and for delivery date for the modular facility. Furnish a detailed design and construction schedule from Notice of Award to delivery along with work sequence. The Contractor is encouraged to consider submitting sufficient detail early to permit site and foundation preparation work to begin while the building design details are finalized. Satisfactory coordination of all building, site, and utility system components shall remain the Contractor's responsibility.

While the Contractor is responsible to prepare the site, furnish, install and maintain the Temporary Birthing Center building, all work must be coordinated with representatives of the 22nd ASG DPW. This includes, but is not limited to:

- a. Submission and approval of design drawings, specifications, manufacturers' product data, work plan, schedule, traffic control plan, safety plan, quality control plan, and environmental protection plan.
- b. Digging and welding permits.

- c. Placement of crane, contractor's offices, material storage areas, and mobilization areas.
- d. Site Preparation.
- e. Construction of foundations in accordance with specifications supplied by modular unit supplier.
- f. Connection of electrical power, water, and sewer lines, and any utility outages with at least 7 calendar days written notice.
- g. Connection to the existing clinic's LAN system.
- h. Fire Department vehicle access.
- i. Connection of alarm systems.
- j. Connection to fire fighting water supply and testing of sprinkler system.
- k. Testing of all building systems at final inspection and commissioning.

Work Conditions. After expiration of the lease period, the Temporary Birthing Center building shall be taken down and hauled off completely by the contractor. Existing connections shall be secured, including all required work and materials, and the site shall be returned to its original or better condition.

Demolition Work. Waste material shall be disposed of according to the waste removal regulations of the county, community and/or federal waste disposal laws of the Vicenza community, and any other Italian regional or national requirements.

Downtimes for Utility Lines. The contractor shall notify the Contracting Officer in writing at least seven (7) calendar days prior to disruption of any utility services.

Power and Water Supply for the Contractor. Water and electric power will be provided, as required for the execution of the project, free of charge from available supplies. Electrical connections or temporary installations shall be made by the Contractor in accordance with (Italian electric code) requirements and at the Contractor's own expense. At the completion of construction the Contractor shall remove the temporary connections and return the connection points to their original or better conditions.

Security Requirements. Prior to commencing work under the terms of this contract, the contractor shall contact the Security or Military Police responsible for each installation within the area covered by this contract to obtain all necessary passes or security clearances for persons employed by him who will require access to restricted or classified installation areas. Further, the contractor is placed on notice that employees from the countries listed in Section 252.209-8001, entitled "Disclosure of Ownership or Control

by a Foreign Government that Supports Terrorism”, may not be allowed access to this job site without special permission. Passes shall be issued only to personnel for whom clearances have been granted. The contractor shall not assign any employee to perform work on such installation, when in the opinion of the contracting Officer, the presence of that employee would not be in the best interest of the US Government. The contractors shall inform all his assigned workers that they may be subject to search, at the discretion of the installation commander, when entering or leaving the installation.

Restricted Area. The construction site is adjacent to a fully operational health clinic. The Contractor shall make every effort to limit the generation of noise, dust, and any disruption to the normal operation of the clinic. Close coordination with the Contracting Officers Representative is extremely important to avoid impacting clinic operations.

Environmental Protection Notice. The Contractor shall comply with US and host nation laws, regulations, and orders relating to environmental protection. The Contractor may be required to submit information to the Contracting Officer to ensure all contracting activities are consistent with environmental requirements.

Digging Permit. Prior to commencement of any excavation work the Contractor shall obtain a digging permit from the 22nd ASG DPW. Requests for digging permits shall be submitted in advance at least seven (7) calendar days prior to the start of work in each area.

Welding Permit. If work with an open flame or work causing flying sparks will be required, an approval from the 22nd ASG Fire Department shall be obtained three (3) days prior to start of work.

DESIGN REQUIREMENTS

Design Guidelines. In the interest of expediency, the design requirements of this solicitation are assembled following U.S. requirements. Italian requirements must also be followed and the Contractor is responsible for obtaining the necessary design certification. Where conflicts arise between the U.S. and Italian Standards and Codes, the most stringent requirement will be adopted. U.S. fire and life safety criteria must be strictly adhered to. This project shall be designed in accordance with the latest additions of the following criteria. In addition to the requirements described herein, the Contractor is responsible for obtaining all approvals necessary from the Italian authorities for design and construction work in Italy, and for site safety, including Italian Safety Law 528-99.

Safety and Traffic Regulations. Adhere to all road traffic regulations within US-installation boundaries. The Contractor shall adhere to the safety regulations according to the rules of the Construction Trade Association as well as the safety regulations of Camp Ederle and the U.S. Army Corps of Engineers Safety Manual, EM-385-1-1, latest edition.

Other Applicable Publications.

UFC 4-510-01 Design Medical Military Facilities (MIL-HDBK-1191). Copy available on the NIBS CCB and through a link from the U.S. Army Health Facility Planning Agency (USAHFPA) website (www.hfpa.otsg.amedd.army.mil).

UFC 3-600-01 DESIGN: FIRE PROTECTION ENGINEERING FOR FACILITIES

Architectural and Engineering Instructions – Medical Design Standards (AEI-MDS).

DoD Medical Equipment Room Guideplates. Copy available through a link from the USAHFPA website (www.hfpa.otsg.amedd.army.mil).

Military Standard 1691, Construction and Material Schedule for Military Medical and Dental Facilities (MIL-STRD-1691). Copy available from the USAHFPA Medical Equipment Planner.

National Fire Protection Association (NFPA) standards and codes.

Department of Defense Antiterrorism Construction Standards.

American National Standards/Electronics Industries Association/Telecommunication Industries Association (ANSI/EIA/TIA) communication standards.

Unified Facilities Guide Specifications (UFGS). Copy available on the websites www.ccb.org/ufsg/ufsg.htm and www.hnd.usace.army.mil/techinfo/gspec.htm.

Metric Design: The design shall be developed using the metric system of measurement.

Commissioning. All equipment and systems shall be commissioned on site after installation and startup have been completed. Detailed reports shall be submitted documenting the procedures and outcome of the commissioning tests. Integrated systems testing such as Emergency Power/HVAC, Fire Alarm and Control/Emergency Power/HVAC, Emergency Power/Critical Mechanical Equipment operation to shall be included in the commissioning scope. The commissioning detail shall be similar to the point-by-point testing protocols and documentation/reporting requirements found under UFGS 15951 Direct Digital Control Systems.

Equipment and Distribution System Space: Equipment space requirements, whether in equipment rooms or above-ceiling spaces, shall be sufficient to provide for operations and maintenance (O&M), inspection, ventilation, and replacement. The drawings included with this solicitation show suggested equipment room locations. Proposed locations shall be shown in the Contractor's design drawings. The Contractor shall provide multidisciplinary equipment room plans and cross-sectional elevation sketches of representative congested distribution spaces (above-ceiling, typically) throughout the facility. In the event that a mechanical room needs enlargement, the Contractor shall

enlarge the room (without reducing any other space) at no additional cost to the Government.

DESIGN MANAGEMENT

Responsibility of the Design-Build Contractor

Professional Quality, Technical Accuracy, and Coordination. The Contractor shall be responsible for the professional quality, technical accuracy, and the coordination of all designs, specifications, drawings, and other services furnished under this contract. Work must be organized in a manner that will assure thorough coordination between various details on drawings, between the various sections of the specifications, and between the drawings and specifications. The Contractor shall thoroughly cross-check and coordinate all work until he is professionally satisfied that no conflicts exist, vital information has not been omitted, and that indefinite language open to interpretation has been resolved.

Correction of Work. The Contractor shall, without additional compensation, correct or revise any errors or deficiencies in its designs, drawings, specifications, and other services.

Government Oversight. The extent and character of the work to be done by the Contractor shall be subject to the general oversight, supervision, direction, control, and review by the Contracting Officer.

Unlimited Drawing Rights. The Government shall have unlimited rights in all drawings, designs, specifications, notes and all other works developed in the performance of this contract, including the right to use same on any other Government design or construction without additional compensation to the Contractor. The Contractor hereby grants to the Government a paid-up license throughout the world to all such works to which he may assert or establish any claim under design patent or copyright laws.

Conflicts. Any conflicts, ambiguities, questions or problems encountered by the Contractor in following the criteria shall be immediately submitted in writing to the Contracting Officer with the Contractor's recommendations. Prior to submission to the Government the Contractor shall take appropriate measures to obtain clarification of design criteria requirements, to acquire all pertinent design information, and to incorporate such information in the work being performed.

Design Specialists. Whenever a design specialist is required, the Contractor shall submit for the approval by Contracting Officer, the name of the designated specialist along with the individual's educational background, experience, and licenses or registrations held, before design work commences. The design specialists shall be registered architects, registered professional engineers, or recognized consultants with a background of at least five (5) years design experience in the appropriate specialty. Services of design specialists are required for the following specialties:

Medical Planner
Medical Equipment Planner
Force Protection Engineer
Medical Design
Telecommunications
Geotechnical Design
Fire Protection Engineer
Seismic Design

Conduct of Work. In the performance of contract the Contractor shall:

- Performance. Perform the work diligently and aggressively, and promptly advise the Contracting Officer of all significant developments.

- Telephone Conversations. Prepare a summary, and promptly furnish a copy thereof to the Contracting Officer, of all telephone conversations relating to the design work under this contract.

- Cooperation with Others. Cooperate fully with other firms, consultants and contractors performing work under the program to which this contract pertains, upon being advised by the Contracting Officer that such firms or individuals have a legitimate interest in the program, have need-to-know status, and proper security clearance where required.

- Technical Criteria. All designs, drawings, and specifications shall be prepared in accordance with the contract documents and with the applicable publications referenced in the Design Section. As soon as possible, the Contractor shall obtain copies of all publications applicable to this contract. Any deviations from the technical criteria contained in the contract documents or in the applicable publications, including the use of criteria obtained from the user or other sources, must receive prior approval of the Contracting Officer. Where the technical criteria contained or referred to herein is not met, the Contractor will be required to conform his design to the same at his own time and expense.

Design Priorities. The design of this project shall consider the building's ambient environment and the impact this will have on sources of technical supply, the cost of construction, the low level of maintenance, and the difficulty of obtaining replacement parts. Unless stated otherwise elsewhere in this contract, the following design priorities shall be followed:

- Life-Span. Construction must have an expected life span of 15 years.

- Maintainability. Low maintenance materials and systems must be employed and shall be appropriate for the project climate and location.

- Operability. Systems including but not necessarily limited to mechanical, electrical, communications, etc., must be simple to operate and easy to maintain.

- Standardization. The Contractor shall use standardized materials, products, equipment, and systems to minimize the requirements for replacement parts, storage facilities, and service requirements.

Topographic Surveys, Easements, and Utilities. Unless otherwise stated in the contract, the Contractor will be responsible for detailed topographic mapping, available easements, and utility information for the project.

Geotechnical Investigation. Unless otherwise stated in the contract, the Contractor will be responsible for the geotechnical investigation, including subsurface explorations, sampling, field and laboratory testing, and water studies where applicable. It is recommended that the Contractor contact the office of the 22nd ASG DPW for any existing geotechnical data.

Cathodic Protection and Earth Resistance. Unless otherwise stated in the contract, the Contractor's designer will be responsible for determining whether cathodic protection on buried structures and underground utility systems are needed for special electrical grounding and counterpoise systems, and for gathering the field data necessary for design.

Occupational Safety and Health Act. The facilities, systems, and equipment designed under this contract shall comply with the Occupational Safety and Health Act (OSHA), Code of Federal Regulations, Title 29, Chapter XVII, Parts 1910 and 1926. Any problems in incorporating these standards due to conflicts with other technical criteria shall be submitted to the Contracting Officer for resolution.

GENERAL DESIGN INSTRUCTIONS

General. The Contractor shall be responsible for coordination of grading, foundation, paving and utility requirements for the temporary building, pavements, or other work described in this document.

Drawings. This solicitation includes a preliminary site plan. It is the Contractor's design responsibility to provide final Site Plans showing all proposed buildings, roadways, sidewalks, drainage structures, utilities, exterior lighting, security devices, existing and final ground contours, and signage. An area for location of the Contractor's staging/laydown area near the project site shall be coordinated with the Contracting Officers Representative (COR) and shown on the final Site Plans. Existing conditions and shall be verified by the contractor with a complete topographic and boundary site survey prior to starting design.

Site Survey. The Contractor shall be responsible for furnishing an independent topographic survey of the project site. The survey shall provide all data needed to design and construct the project. The survey shall include location and elevation of all site features within the project limits. This includes buildings (new and existing), roadways, pads, other structures, drainage systems, irrigation system, utilities, and invert elevations of sewer lines. Upon completion of the construction, the original survey shall be updated with an as-built survey of the site as constructed. The as-built survey shall be submitted to the COR for approval.

Design Criteria. These Uniform Facility Criteria (UFC) documents are available on the Internet at <http://www.hnd.usace.army.mil/techinfo/engpubs.htm>

UFC 3-210-01A Design: Area Planning, Site Planning, and Design

UFC 3-210-02 Design: POV Site Circulation And Parking

UFC 3-210-06a Design: Site Planning And Design

UFC 3-230-10A Design: Water Supply: Water Distribution

TM 5-820-4 Design: Drainage For Areas Other Than Airfields

UFC 3-240-04a Design: Wastewater Collection

UFC 3-240-07fa Design: Sanitary And Industrial Wastewater Collection: Gravity Sewers And Appurtenances

UFC 3-240-08fa Design: Sanitary And Industrial Wastewater Collection: Pumping Stations And Force Mains

UFC 3-250-01fa Design: Pavement Design For Roads, Streets, Walks And Open Storage Areas

UFC 4-010-01 Design: DOD Minimum Anti-terrorism Standards for Buildings

UFC 4-510-01 Design: Medical Military Facilities(MIL-HDBK-1191)

Hazardous Materials and Contamination. The US Government does not know of any hazardous conditions at the Site. The Contractor will be responsible for complying with applicable environmental regulations as contained in this solicitation.

Demolition and Removal. The Contractor shall stake-out the project boundaries before starting work. Existing utilities that interfere with this project will be relocated. All demolition debris shall be removed from the site. The COR will designate a site for excess soil. All other debris shall be hauled away by the Contractor to an authorized dumpsite.

New Site Design And Construction. The Contractor shall design all site features shown on the Site Plan and otherwise specified in the solicitation. This includes the temporary building foundations, utility connection lines, parking areas, sidewalks, ramps, stairs, equipment pads, bollards, exterior lighting.

Earthwork. Perform all earthwork necessary to provide compatible floor elevations for each portion of the building. All fill material will be of from a classified "satisfactory" soil material. Compaction under building foundations and pavements shall be at least 95% of maximum density. Soil compaction tests shall be performed in accordance with the frequency listed in the Uniformed Facility Guide Specifications.

Building Finish Floor Elevation. The finish floor elevation of the temporary building shall be set as required for access to each building portion, to provide adequate drainage, to meet the ADA accessibility requirements, and to optimize earthwork.

Site Grading. Finished grade shall slope away from the buildings with positive site drainage away from the building thereafter. The proposed site grading will be developed to minimize the amount of earthwork required. The finished floor elevations of the buildings will be set at a minimum of 15cm above highest adjacent land for the building foundations and will be a minimum 15 cm above finished paved and finish soil grades. Control finished grades to ensure direct runoff of water away from the building at a 5% grade for the first 3 meters. The parking areas will provide positive drainage at a 1% minimum slope in the direction of drainage and a maximum 1½% slope in the direction of parking. Slopes perpendicular to the direction of parking shall be 10% maximum.

Roadway Width Criteria. The designer shall consider the types of vehicles traversing and parking on these facilities. Vehicles shall include but not be limited to: passenger cars, ambulances, emergency vehicles, garbage, fire trucks, military vehicles, delivery service, and utility vehicles

Pavement. Parking areas shall be paved with asphaltic concrete. See Section, Geotechnical Design for minimum pavement requirements. All asphalt pavement design structure (thickness) for light and heavy-duty roads shall be based on TM 822-5, Pavement Design for Roads, Streets, Walks, and Open Storage Areas or other standard asphalt roadway pavement standards. Design shall be based on actual soil conditions and proposed base course and aggregate for concrete. Design software is located at www.pcase.com. Contractor shall provide compaction tests and pavement density tests to the frequency listed in the Uniformed Facility Guide Specs.

Bollards. Minimum 1 m high, 20cm diameter concrete filled steel pipe bollards shall be provided and installed to protect the corners of the temporary building, exterior light poles and other structures that will be exposed to service truck traffic. The bollards shall be painted to match the temporary building wall color. The tops of concrete foundations for the bollards shall be sloped to drain away from the bollard face. Three (3) additional steel pipe, removable bollards shall be provided and installed by the Contractor to restrict vehicles from accessing the space between the Temporary Birthing Center and existing Bldg. 112.

Sidewalks. Sidewalks, ramps, landings/stoops, and curb cuts sized to meet handicap requirements as required by ADA shall be provided as required by building elevation and finished grade requirements at facility entrances/exits and the pathway to the handicap parking area. Guard and handrails shall be installed which meet handicap requirements. Sidewalks shall be widened as necessary to meet building entrance and exit ways. Sidewalks shall be concrete with a minimum nominal thickness of 10 cm, and 20 MPa compressive strength.

Parking. Paved surfaced parking lot shall be provided in the location indicated in the drawings. All parking shall be 90 degrees off-street parking. Parking stalls shall be minimum 2.75m by 5.8m.

Pavement Marking and Signage. Contractor shall provide striping for parking area in accordance with design criteria as approved by COR. Contractor shall provide required parking signs per Camp Ederle standards and COR approval. All signs shall be bilingual (English/Italian).

Roof Drainage. The Contractor shall design drainage pipes and/or swales to adequately drain roof areas of the temporary building into the existing drainage system. Splash blocks shall be provided by the Contractor where necessary to prevent surface erosion.

Utilities. The Contractor shall design and extend the existing utilities to the Temporary Birthing Center facility. Refer to the site plan drawing for general location information. It is the Contractor's responsibility to confirm the specific locations of the existing utilities and to design and construct new utility services for the temporary building.

Coordination of all site work on the project, including utility work, is the responsibility of the Contractor. Location of equipment, backflow prevention valves, post indicator valves, transformers, electric switches, telephone/cable boxes, manholes, etc., shall be placed in locations not immediately apparent to the facility users or personnel passing by the site. New utility lines shall not be located within 5 meters of the footprint of any future building as shown on the site. Placement of a buried utility main (new or existing) under a new building shall not be allowed. Existing utility lines shall be located by the Contractor as necessary, and shall be protected by bridging or other techniques acceptable to the Contracting Officer.

Utility Trenches. Provide utility trenches for all required underground utilities. Pipes depth, bedding, and cover shall be designed as required by the UFC design criteria for the pipe size, pipe material, and vehicular loading. Utilities placed in traffic areas shall be designed for an AASHTO H20 vehicle loading. Locater's tape shall be placed above the utility one foot below finished grade. Trench backfill shall be compacted to at least 95% maximum density.

Potable Water. All underground pipes shall PVC or ductile iron rated for the pressure and service that are to be used and in accordance with the AWWA and Guide Specification guidelines. A water storage tank system shall be installed to provide potable water for the facility. See Section 6, Mechanical Design for requirements.

Sanitary Sewer System. Daily effluent rate shall be calculated as determined by the Uniform Plumbing Code, Hospital Technical Design Manual, Army Technical Manual as referenced in other areas of this solicitation. The wastewater collection and conveyance system shall be designed in accordance with TI 814-10, Wastewater Collection. The wastewater conveyance system shall comply with all the above requirements and shall be compatible with the wastewater to be conveyed. The materials specified shall withstand the effects of the wastewater and not deteriorate as a result of pollutants in the wastewater. If gravity flow is unobtainable, a grinder-type lift station/force main system shall be provided. Contractor shall submit all design hydraulic, structural and material design calculations resulting from sizing and designing the sewage system extension.

Storm Drainage. Investigate and assess the adequacy of the existing system to handle the runoff from the site. Storm drainage design shall be in accordance with TM-5-820-4. Design the storm drainage system for a 10-year return storm frequency so that no ponding shall occur. Construction shall not impact the existing surface drainage at facilities adjacent to the project site. Modify the existing system as required with additional piping, inlets, and storage basins if necessary to provide adequate drainage for the site without overloading the existing system. All storm drainage structures located in traffic areas shall be rated to withstand wheel loading from anticipated delivery and service vehicles.

Landscaping. Provide a final grade all around the project site. All construction debris, rocks uncovered during construction, demolished pavement and any existing debris within the project site boundaries shall be removed.

Anti-Terrorism and Force Protection(ATFP) Measures. The project shall be designed to comply with the appropriate construction standards as determined by the threat assessment and any additional requirements as identified by the Government for protection against specific threats.

GEOTECHNICAL DESIGN

General. Specific geotechnical information and design criteria are not available. The contractor shall perform a geotechnical investigation as part of this project. Offerors are encouraged to contact the 22nd ASG DPW's office to obtain any existing geotechnical data on the site. The Contractor may perform an inspection and/or preliminary investigation of the soils on the site before submitting proposals.

Design Criteria. These Uniform Facility Criteria (UFC) documents are available on the Internet at: <http://www.hnd.usace.army.mil/techinfo/engpubs.htm>

UFC 3-220-01A Design: Deep Foundations

UFC 3-220-03FA Design: Soils And Geology Procedures For Foundation Design Of Buildings And Other Structures (Except Hydraulic Structures)

UFC 3-220-07 Design: Foundations in Expansive Soils

Geotechnical Investigation. Investigation and identification of subsurface materials shall be in accordance with ASTM D 420. Laboratory testing of soils and aggregate materials shall be in accordance with applicable ASTM standards. The results of the investigation and recommendations shall be presented in a geotechnical report for review and approval by the COR. A licensed geotechnical engineer shall prepare the geotechnical report unless otherwise approved by the COR.

Borings. All borings shall be sampled by a splitspoon sampler in accordance with ASTM D-1586, with samples visually classified in accordance with the unified soil classification system (ASTM D-2487). Samples will be taken at the approximate foundation bearing depth, at changes in soil lithography, and at least every 1.5m. Undisturbed sampling, if required, shall be obtained from offset borings. The depth to water (if encountered) shall be recorded. Under structures, borings shall extend to a minimum depth of 6 meters or refusal, and under roads and parking areas, to a depth of 3 meters. At a minimum, the contractor shall perform soil borings as follows:

Temporary Birthing Center building – 2 borings

Road and Parking area – 2 borings

Soil Sampling. The Contractor shall obtain soil samples for testing as required for the computation of bearing capacities, settlement calculations, and pavement design. A dated

drilling log shall be provided for each boring drilled. All borings shall be sampled by a splitspoon sampler and standard penetration blow counts recorded. The locations (coordinates) and elevations of borings drilled shall be provided on each boring log.

Report. The Contractor shall submit a geotechnical report complete with recommendations specific to the geotechnical design requirements at the site. The report shall include drilling logs, the results of soils test data, and a plan showing the location of each boring as drilled. The Contractor shall use the data from this investigation to provide bearing capacity analyses, settlement calculations, and deep foundation design such as piling and/or caissons, as applicable. A copy of the report shall be submitted to the Contracting Officers Representative for review at the first design submittal. The report shall specifically address the following:

Structures. The report shall recommend the type of foundation system to be used, allowable bearing capacity(ies), depth(s) of placement and bearing elevations for footings, grade beams, slabs, or pile tips. The recommended system shall limit differential settlement of building to 5mm maximum. Total calculated settlements shall be limited to 12mm maximum. Provide recommendations for soil replacement or soil improvement under structures as applicable. Provide compaction requirements for soil preparation under structures.

Pavements. The report shall recommend the allowable design CBR and modulus of subgrade reaction along with the required compaction effort for subgrades. Guidance shall be offered on the types of base course materials available in the area and design strengths.

General Earthwork And Special Features. The report shall clearly describe the subsurface conditions and the regional geology at the site. The report shall recommend any soil replacement or improvement requirements, fill and backfill placement procedures, and types of compaction equipment to be used.

Cathodic Protection And Grounding Systems. The report shall include all PH tests, salinity tests, and resistivity measurements required to design corrosion control and grounding systems. The raw field data shall be provided in the report.

ARCHITECTURAL DESIGN

PROJECT DESCRIPTION. The contractor shall design and construct a Temporary Birthing Center as shown on the drawings and consisting of the functional areas described in Section, GENERAL DESCRIPTION OF WORK above.

Applicable Standards. The design requirements within this solicitation represent the minimum quality and quantity acceptable. Contractors shall be responsible for obtaining any documents referenced in this section but not attached. In the event of criteria conflict, the requirements of this section shall be deemed the controlling authority. The design shall comply with the following applicable standards. Equipment, hardware, and materials shall be standard manufactured items unless otherwise specified. Replacement parts shall be standard and readily available through commercial means. Discontinued products will not be accepted unless approved by the Contracting Officer. All standards cited below are the latest edition, unless otherwise specified.

UFC 4-510-01, Design, Medical Military Facilities (also referred to as Military Handbook 1191, Department of Defense Medical and Dental Treatment Facilities, Design and Construction Criteria/MIL-HDBK-1191). Copy available on the NIBS CCB and through a link from the USAHFPA website (<http://hfpa.otsg.amedd.army.mil/>).

Architectural and Engineering Instructions – Medical Design Standards (AEI-MDS).

DoD Medical Equipment Room Guideplates. Copy available through a link from the USAHFPA website (www.hfpa.otsg.amedd.army.mil/).

Military Standard 1691, Construction and Material Schedule for Military Medical and Dental Facilities (MIL-STRD-1691). Copy available from the USAHFPA Medical Equipment Planner.

Department of Defense Antiterrorism Construction Standards.

American National Standards/Electronics Industries Association/ Telecommunication Industries Association (ANSI/EIA/TIA) communication standards.

Architectural and Engineering Instructions--Medical Design Standards (AEI-MDS).

UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, dated 08 October 2003 (http://www.ccb.org/docs/UFC/4_010_01.pdf).

Unified Facilities Guide Specifications (UFGS)
<http://www.hnd.usace.army.mil/techinfo/gspec.htm> and www.ccb.org/ufsg/ufsg.htm.

Program for Design, Appendix B.

Room Details, Appendix C.

Equipment List, Appendix E

National Fire Protection Association (NFPA) 101, Life Safety Code.

National Fire Protection Association (NFPA) 99, Healthcare Facilities.

International Building Code (IBC), latest edition.

ANSI/CABO A117.1 ADA Accessibility Guidelines for Buildings and Facilities.

UFC 3-600-01, Design Fire Protection Engineering for Facilities, latest edition (http://65.204.17.188/report/doc_ufc.html). NOTE: Military Handbook 1008C, Fire Protection for Facilities, Engineering, Design, and Construction (MIL-HDBK-1008C) is referenced in some documents in the Appendices. The requirements of UFC 3-600-01 are to replace these references in all cases.

Americans with Disabilities Act Accessibility Guidelines (ADAAG), latest edition.

Uniform Federal Accessibility Standards (UFAS), latest edition.

UFC 4-021-01, Design and O&M: Mass Notification System, latest edition.

UFC 4-010-01, DoD Minimum Anti-Terrorism Standards for Buildings", dated 8 October 2003, or latest.

US Army Design Standards, (http://www.mantech-mec.com:8500/army_ids/index.cfm).

ETL 1110-3-491, dated 1 May 2001 Sustainable Design for Military Facilities (<http://www.usace.army.mil/inet/usace-docs/eng-tech-ltrs/>).

Sustainable Project Rating Tool (SPiRiT) Version 1.4, 1 June 2002 (<http://www.usace.army.mil/publications/eng-tech-ltrs/etl1110-3-491/a-c.pdf>).

UFC 3-450-01 (TM 5-805-4), Design: Noise and Vibration Control, 15 May 2003) (<http://www.hnd.usace.army.mil/techinfo/UFC/UFC3-450-01/UFC3-450-01.pdf>).

Design Submittals After Contract Award. The contractor shall make the architectural submittals in accordance with Section, DESIGN AFTER AWARD. In addition, the following specific submittals shall be made as indicated.

DETAILED SCOPE OF WORK. The design of this facility shall be established to withstand the site-specific environmental conditions such as extended elevated ambient temperatures and large diurnal temperature swings. Locally available materials shall be used wherever possible to meet the design intentions of a well constructed, durable Temporary Birthing Center, meeting the necessary design and facility standards.

Structural/seismic design shall be in accordance with the Structural section of this solicitation. All architectural features shall be appropriately braced for anticipated seismic activity. The Contractor shall have flexibility to propose alternate building materials and structural systems to meet the facility's requirements, but final selection of materials shall be subject to the approval of the Contracting Officer. Materials and building systems shall be selected with consideration given to economics not only in the initial acquisition, but also in the future maintenance of the materials when incorporated into the work. The design shall also incorporate energy conscious design features such as reflective colors and surfaces, UV-resistant materials, and window shading treatments. The design shall include features that permit facility access by handicapped persons. Contractors shall provide interior and exterior signage. Signage shall be provided in the English and Italian languages and shall include pictograms where necessary. Signage shall include Braille features to assist handicapped persons as required by ADA.

The Contractor shall be responsible for the completion of the following specific tasks for the facility identified within this solicitation.

Building Design. The facility shall include all components as described within this solicitation.

External Activities. Vehicular access shall be provided as required by the Civil design requirements of this solicitation. Personnel will access the facility by government vehicles, privately owned vehicles (POVs), military vehicles (to include ambulances), bicycles and by walking from other nearby facilities. Additional paved sidewalks connecting to other pedestrian walkways shall be provided for all exit doors and the mechanical equipment rooms and provision shall be in accordance with UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings. Also reference the Civil design section.

Internal Activities. The facility houses U.S. Army staff and contractor personnel. Visitor control is visual through the main entries to each department. Staff may access the facility through secondary entrances. The individual space requirements are contained in the appendices included in this solicitation.

Interior finishes. All interior finishes shall conform to the requirements of NFPA 101, except as modified by UFC 3-600-01. Interior finishes for all exits shall be Class A, and as otherwise outlined in the detailed Rooms Report. Interior finish for all other areas shall be either Class A or Class B. The use of Class C materials is not permitted. Smoke developed ratings by ASTM E-84 shall not exceed 50 for Class A materials and 100 for Class B materials. Cellular plastics shall not be used as interior finish material.

Interior Design: Interior design shall be in accordance with the Architectural and Engineering Instructions – Medical Design Standards (AEI-MDS). Interior finishes are referenced in UFC 4-510-01. Furniture placement shall be shown on the Contractor's equipment plans prepared after contract award. Comprehensive Interior Design (CID) is not required for this facility. However, thought shall be given to the choice of materials,

and interior design color boards shall be submitted to the Government showing all primary finishes for color and texture. These color boards shall be reviewed and approved by the Government, and will be used for coordination with other contractors.

Interior Design Submittal. The interior design submittal shall be in accordance with the documentation Phases A through E as described in the AEI-MDS. See Applicable Criteria paragraph above. Contractors shall discuss the interior design characteristics such as anticipated psychological impact on patients and staff, safety factors, durability, maintenance, proposed materials, finishes, colors and any special features. See Section, Interior Design submittal requirements after award of contract.

Space Adjacencies and Spaced Allocations. Floor plan adjacencies and individual space allocations shall be developed based on the requirements in the appendices and the floor plans included in the drawings. After award, only minor revisions or refinements to the Contractor's space adjacencies and space allocations may be made to better meet the mission requirements or to resolve technical problems that may not be evident at contract award.

Barrier Free Design. This facility is intended to be utilized by able-bodied personnel to the fullest extent. However, it shall be accessible to all handicapped individuals at all appropriate locations. Accessibility requirements shall in accordance with the Americans with Disabilities Act (ADA) and the Uniform Federal Accessibility Standards (UFAS) as far as practicable.

Life Safety Requirements. All structures shall have exits and means of egress that comply with the requirements of UFC 4-510-01 and NFPA 101, to assure protection of occupants from fire or similar emergencies, except as modified by UFC 3-600-01. A Life Safety Plan will be required as specified above.

Fire Safety (Refer also to Mechanical section). Minimum allowable construction type shall be determined by UFC 3-600-01. Actual construction type shall be determined and proposed by the contractor only after code analysis. Actual building type and fire ratings shall be verified with the local Authority Having Jurisdiction (AHJ). See Mechanical section for fire sprinkler requirements. Fire Department access shall be provided on all sides of the building. All components of this facility shall be properly classified per International Building Code (IBC), latest edition. The occupancy shall be as required by NFPA 101 and UFC 3-600-01. The contractor shall be responsible for compliance with MIL-HDBK-1191 Section 13, UFC 3-600-01, NFPA 101 or other National Fire Codes, and other governmental and industry design regulations, manuals, and guidelines as cited for all components of this facility, including any exterior walkways. Applicable military Technical Manuals (TMs) and Engineering Technical Letters (ETLs) provide supplementary design requirements and guidance. In the event of criteria conflict, UFC 4-510-01 shall be the ruling criteria.

Security Design. Security requirements for this facility shall comply with referenced criteria.

Anti-Terrorism/Force Protection (ATFP) Requirements. The facility shall be designed to comply with the appropriate ATFP construction standards as determined by the threat assessment and any additional requirements as identified by the Government for protection against specific threats. Minimum setbacks, required ATFP windows and doors, and vehicular barriers shall be provided. Criteria and information provided in the Structural section of this solicitation shall be carefully followed. See below for door and/or window protection.

Glazing. Use a minimum of 6-mm (1/4-in) nominal laminated glass for all exterior windows and glazed doors. The 6-mm (1/4-in) laminated glass consists of two nominal 3-mm (1/8-in) glass panes bonded together with a minimum of a 0.75-mm (0.030-inch) polyvinyl-butylal (PVB) interlayer. For insulated glass units, use 6 mm (1/4 inch) laminated glass inner pane as a minimum. For alternatives to the 6-mm (1/4-in) laminated glass that provide equivalent levels of protection, refer to the DoD Security Engineering Manual. All exterior windows shall be located a least 1500 mm (6') AFF.

Window Frames. Provide frames and mullions of aluminum or steel. To ensure that the full strength of the PVB inner layer is engaged, design frames, mullions, and window hardware to resist a static load of 7 kilopascals (1 lb per square in) applied to the surface of the glazing. Frame and mullion deformations shall not exceed 1/160 of the unsupported member lengths. The glazing shall have a minimum frame bite of 9.5mm (3/8-in) for structural glazed window systems and 25-mm (1-in) for window systems that are not structurally glazed. Design frame connections to surrounding walls to resist a combined ultimate loading consisting of a tension force of 35-kN/m (200-lbs/in) and a shear force of 13-5kN/m (75 lbs/in). Design supporting elements and their connections based on their ultimate capacities. In addition, because the resulting dynamic loads are likely to be dissipated through multiple mechanisms, it is not necessary to account for reactions from the supporting elements in the design of the remainder of the structure. Alternatively, use frames that provide an equivalent level of performance. For existing buildings, this may require replacement or significant modification of window frames, anchorage, and supporting elements.

Energy Conscious Design. Active solar systems are not permitted. Passive solar design shall be limited to building orientation, thermal mass, roof color, building color, door and window orientation, window glazing, window shading, and shade tree types and location.

Acoustical Design. Acoustical design is a fundamental consideration in medical facility design and requires close, and early, coordination between the mechanical, architectural and structural designers. Structural and airborne transmitted equipment noise, including duct-transmitted and duct breakout noise, may have a significant effect on the design of structural and architectural features. Typical problems experienced in other medical facility designs, and to be avoided with this design, include:

- 1) Insufficient equipment room space to accommodate noise attenuation equipment.

2) Insufficient utility routing space, resulting in high velocity or high aspect-ratio ductwork and consequent noise problems.

3) Location of noise-sensitive areas directly beneath or adjacent to equipment spaces and supply and/or return ductwork to overhead (particularly roof mounted) air handling units. This includes the location and acoustic treatment of the emergency generator enclosure.

4) Insufficient attention to attenuation of duct or partition-transmitted "crosstalk" from physician's offices, examination rooms, or toilets, to surrounding spaces.

Refer to requirements for acoustical analyses in UFC 4-510-01, and refer to MIL-HDBK-1191, [Appendix A](#), Architectural Notes 8 and 9. UFC 3-450-01 provides acoustical design guidance.

Building Systems, Materials, and Equipment. The proposed building systems, materials, and equipment shall comply with UFC 4-510-01 Section 4, and be in accordance with other requirements of this solicitation. See [Appendix A](#) for equipment details and requirements. The intent of this solicitation is to allow contractors the maximum flexibility to design and construct this facility in an economical manner without sacrificing good engineering practices, quality materials and systems. The Government desires low- or no-maintenance finish materials to the greatest extent possible. The exterior building color, including the roof color shall be as outlined in the referenced design guide. Note: Building materials as described herein for walls, ceiling and floors, are minimum requirements, and may require revision based on code compliance and/or other criteria.

Walls. All walls shall comply with UFC 4-510-01. Thermal values shall comply with the requirements of the Mechanical section. Wall materials shall be determined by evaluation of the guidance that follows.

Exterior walls shall be comprised of durable metal panels and shall be a standard component of the selected modular system. Exterior walls shall have an integral insulation and vapor barrier system meeting the design temperature and humidity requirements. The exterior walls shall come finished with a factory paint coat. Only minor touch up of the paint coat will be permitted on site.

Interior Walls. Interior wall partitions may be 15 mm thick gypsum board. Gypsum board shall comply with UFGS Specification 09250, GYPSUM BOARD. Type "X" shall be used for fire resistant walls. Concrete board ("green board") shall be used for wet areas. Walls shall extend above false ceilings to the building's structural ceiling.

Fire Walls. All fire-rated walls shall meet the requirements of UFC 3-600-01. Fire walls constructed of gypsum board shall be Type X.

Wall Base. Wall base shall be appropriate for the finished wall and floor systems used. Allowable materials shall be ceramic tile, rubber or vinyl. Where rubber or vinyl base is used it shall be an integral, seamless component of the floor covering system. Joints between materials shall be welded to eliminate seams. The base/floor interface shall be covered to ease housekeeping and reduce infection hazards. The base shall be a minimum of 100 mm high. Ceramic tile shall be used for toilet rooms and janitor's closets, and shall be integral with the floor and wall tile.

Interior Wall Finishes. Walls shall be a smooth surface with limited seams, anti-bacterial, and washable surface. Corridors and wards shall have wall guards and corner guards for protection against equipment damage.

Paint Wall Surfaces. Painted gypsum board walls, exposed to view, shall have a minimum of two coats of latex paint over primer. Fiberglass mesh wall covering shall be installed prior to painting corridors and heavy traffic areas. Finish shall be eggshell in office/conference areas and semi-gloss in wet or damp areas and storage areas. All non-textured walls shall be painted, except for walls to receive ceramic tile or other material.

Vinyl Wall Covering. Vinyl wall covering shall not be used.

Ceramic Tile Walls. Ceramic tile shall be used on all walls in restrooms and janitor's closets. Tile shall extend from floor to ceiling, and shall be provided behind and on the side of water closets and urinals, and on all walls within all janitor closets.

Edge and Corner Guards, Wall Guards. Provide heavy PVC or stainless steel corner guards at all outside wall corners of gypsum board walls in corridors and restrooms. Top of edge guards shall be a minimum of 2 meters above finished floor. Bottom of guard shall be to floor in areas of no base and to top of base at all other areas. Corner guards shall be mechanically fastened at top and bottom, and shall be otherwise adhered according to manufacturer's recommendations. Wall guards shall be provided in corridors and patient rooms for protection against damage by equipment.

Roofs. Roof materials shall be Class A with a minimum twenty-year warranty. Drainage shall be provided away from all buildings, and shall not allow or provide drainage to the interior of the site that might cause pooling or other collection of water. Roof plan shall take into account the potential maximum rainfall and provide positive drainage to accommodate worst conditions. Roofs shall have a minimum 2% slope. No standing water shall be permitted on any roof structure. Contractor shall provide a simple roof drainage test at the completion of construction to verify that water does not pool anywhere on the roof structure.

EPDM Roof Systems. Contractor shall provide an ethylene propylene diene monomer (EPDM) roof assembly, or approved similar membrane system, for the facility. EPDM roofs must comply with UFGS 07530, ETHYLENE PROPYLENE DIENE MONOMER (EPDM) ROOF MEMBRANE. EPDM roof shall be a fully adhered, mechanically fastened or ballasted system applied over a minimum of two layers of rigid board roof insulation. Stone ballasted systems shall not be used. Other ballasted systems, if used,

shall utilize interlocking pavers designed to resist the required wind loads. Ballasted systems on air permeable decks (e.g., metal decks, precast concrete panels or planks) shall incorporate an air barrier in the assembly. Mechanically fastened systems shall incorporate an air barrier in the roof assembly. Where an air barrier is required, it shall be applied at the deck level or within the insulation sandwich. Air barriers shall be specified in Section ROOF INSULATION. Membrane thickness shall be 1.1 mm minimum for mechanically fastened systems, and 1.5 mm otherwise. A 7.5 mm insulation barrier shall be provided along with a 4 cm concrete tile for ATFP requirements, in addition to the 30 cm slab required in the Structural section of this solicitation. Selected modular systems shall include special mounting, isolation, and sealing provisions where mechanical equipment is roof mounted to avoid the potential for noise, vibration, and leaks.

Protection from the Elements. The Contractor shall be responsible for providing canopies or other structural elements at all doorways to shade them from the sun and shield persons from rain at the building entries/exits. Design of the canopies shall consider the site environmental conditions.

Doors and Windows. Doors shall comply with UFGS 08210, WOOD DOORS, UFGS 08110, STEEL DOORS AND FRAMES, and UFGS 02120, ALUMINUM DOORS AND FRAMES, as applicable. Door hardware shall comply with UFGS 08710, DOOR HARDWARE. All door openings shall be standard width and height (minimum 90 cm x 215 cm), unless otherwise specified. Panic hardware shall be provided as required by criteria, and shall provide for direction-of-egress opening.

Interior Doors. Interior door and frame assemblies shall be ANSI/SDI-100 Grade II, Model 2, heavy-duty seamless hollow steel doors with steel frames. As required by NFPA 101 or other governing codes, windows shall be of tempered glass. Doors shall comply with UFGS 08110, STEEL DOORS AND FRAMES, and shall have core construction as required by the manufacturer for interior doors. The contractor shall provide all necessary hardware for all doors. All interior doors shall have keyed locks, with the exception of the toilet rooms. All doorframes shall be flush with surrounding walls and seams shall be sealed. Contractor shall paint all interior doors and frames (color to be specified by the Contracting Officer) as specified for metal herein. Install half plate/half wired glass at office locations. All steel doors shall have steel frames.

Exterior Doors. Exterior door and frame assemblies shall be ANSI/SDI-100 Grade II, Model 2, heavy-duty seamless insulated hollow steel doors with steel frames. As required by NFPA 101 or other governing codes, windows shall be of tempered glass. Doors shall comply with UFGS 08110, STEEL DOORS AND FRAMES, and shall have core construction as required by the manufacturer for insulated exterior doors. The contractor shall provide all necessary hardware for all doors. All exterior doors shall have keyed locks, as specified in this solicitation, with deadbolt locking mechanisms. All exterior doors shall open outward. All doorframes shall be flush with surrounding walls and seams shall be sealed. Contractor shall paint all exterior doors and frames (color to be specified by the Contracting Officer) as specified for metal herein. Install half

plate/half wired glass at exterior locations except mechanical rooms and main entrance. Mechanical room doors shall not have glass. Main entrance doors shall be a minimum 14-gage steel or aluminum storefront type. All steel doors shall have steel frames. All doors, frames and hardware shall be capable of withstanding heavy-duty use. For all exterior doors the contractor shall provide a commercially manufactured threshold with a vinyl or silicone rubber weatherstripping insert in the face of the stop. Weatherstripping shall be held in an extruded non-ferrous metal housing. All exterior doors shall have heavy-duty closers. Closers shall be top flush end and bottom flush or recessed channel, Grade 1, with brackets, arms, mounting devices, fasteners, pivots, and other features necessary for the particular application. The contractor shall size closers in accordance with the specific door application and size, and with manufacturer's recommendations. Door and frame assemblies shall meet the ATFP requirements as specified in the criteria references above. Exterior doors with lites shall have appropriate coatings to prevent fragmentation.

Fire Doors. Doors required to have a fire resistance rating shall conform to the requirements of UL 10B, ASTM E 152, or NFPA 252 for the class of door required. The contractor is responsible for determining where fire rated doors are required. Affix a permanent metal label with raised or incised markings indicating testing agency's name and approved hourly fire rating to hinge edge of each door. As required by code, automatic closers shall be provided for doors on fire or smoke zone boundaries.

Hardware. Door hardware shall be coordinated with the functional and security requirements required by the criteria. Door hardware shall meet the minimum requirements of USGS Specification 08710, DOOR HARDWARE. All hardware shall be heavy-duty, shall conform to Builders Hardware Manufacturers Association (BHMA) criteria and shall be Grade 1. Finish shall be brushed chrome. All hardware shall be installed in accordance with the manufacturers published instructions. See specific locking requirements below. Each door must have the following hardware as a minimum.

- One and one half pair of metal butt hinges
- One floor or wall, as appropriate, mounted doorstop
- Locks (see below)
- Lever latch handles
- Exit devices, as required by code
- Thresholds for all exterior doors

Exterior doors and interior doors shall have a bored or mortise lockset, with the exception of all exam rooms, toilet rooms and rooms requiring special lock systems. All lock cylinders shall have at least seven pins and have removable cores. All locksets shall have four keys provided. Locksets shall be keyed to one master key system. Each department shall be securable with different keys. Lock into Sterile OR shall be unique. Door closers shall be in accordance with ANSI A156.4 and NFPA 80 Fire Doors and Windows. Kickplates are required on all interior doors. Hinges shall be non-removable pin type for exterior doors and reverse-bevel for interior doors, such that pins will be non-

removable when door is closed. Other antifriction bearing hinges may be provided in lieu of ball-bearing hinges.

Toilet Room Stall Partitions. Restroom stalls shall comply with UFGS Specification 10153, TOILET PARTITIONS. Partitions shall be ceiling hung, overhead braced or overhead braced-alcove. Material shall be cast homogenous material, either polymer plastic, cultured marble, or similar material. Width, length, and height of toilet enclosures shall be per manufacturer's recommendation. Finish surface of panels shall be painted metal. Panels to receive toilet paper holders or grab bars as specified in Section 10800 TOILET ACCESSORIES, shall be reinforced for mounting of the items required. Each stall shall receive a swinging door with barrel bolt closure.

Windows. Approximately 2-4% of the total exterior wall surface of the permanent facility shall be provided with fenestration. Windows shall be provided as described in above paragraphs, Anti-Terrorism/Force Protection (ATFP) Requirements. Windows shall be provided in all components, and shall be provided in all patient sleeping rooms as required in UFC 4-510-01. All windows shall be at least 1.85 meters above finished floor. Proposed exterior window system shall be a manufacturer's standard product that meets the minimum requirements of UFGS Specification 08510, STEEL WINDOWS or 08520, ALUMINUM WINDOWS. Install new anodized aluminum or painted steel framed windows with valance. Operable windows shall be provided with insect screens, and shall be capable of opening to provide adequate natural ventilation. Windows shall be a commercial or institutional grade. Glazing and frames shall also be in accordance with UFGS Specification 08800, GLAZING. If not otherwise specified, exterior glazing shall be laminated double pane, fixed, sealed airtight, with a minimum 13 mm air space, low-E coating, with lamination on appropriate surface to protect occupants. Seal all joints between window frame and building. All windows and joints shall be watertight. Frame color shall be natural aluminum or anodized white or off white. Interior glazing shall be single pane, tempered if required, with lamination on appropriate surface to protect occupants from fragments, and shall be sealed. Windows required to have ATFP protection shall have a clear film lamination on the interior side to prevent fragmentation, and shall be at least 25 mm thick. The glazing shall have a minimum frame bite of 9.5-mm (3/8-in) for structurally glazed systems and 25-mm (1-in) for window systems that are not structurally glazed.

Blinds. Blinds shall be provided for all exterior windows. Blinds shall comply with UFGS Section 12490, WINDOW TREATMENT, and shall be washable, vertical type, operable, with an off-white outer surface color.

Ceilings. All ceilings shall comply with UFC 4-510-01. Ceilings installed in the facility shall be a minimum of 2.50 meters clear height to the underside of all lighting fixtures or other equipment, unless otherwise specified in the Room-by-Room Requirements. Ceilings in the mechanical rooms shall be designed for the equipment intended for those spaces.

Gypsum Board. Painted gypsum board ceilings shall have a smooth texture. Gypsum board ceilings are permitted in toilet rooms, closets, janitor's closets, utility spaces and soffits. Gypsum board ceilings shall comply with the requirements in UFGS 09250, GYPSUM BOARD. Gypsum board ceilings shall be painted similar to the requirements of Walls above, except without the fiberglass mesh wall protection.

Acoustical Ceilings. Suspended acoustical tile ceilings shall be nominal 600 mm x 600 mm x 20 mm or metric equivalent. Acoustic ceiling tile is required throughout the facility except as amended or prohibited elsewhere in this solicitation (especially for infection control areas). As a minimum, suspended acoustic ceiling tile systems shall comply with UFGS 09510, ACOUSTICAL CEILINGS. Acoustical ceilings shall be installed subsequent to required mechanical and/or electrical work. Ends of all grips in ceiling grids shall be fastened securely to adjacent suspension members for rigidity and strength using mechanical fasteners. Grid members that adjoin walls shall be securely fastened using rivets, screws or other appropriate fasteners. Ceiling grids shall be capable of supporting all necessary lighting fixtures and mechanical registers.

Exposed Structure Ceiling. Exposed structure ceilings may be used in the mechanical and electrical rooms, communication rooms and janitor's closets, except as specified in the Project Rooms Report for certain rooms (see appendices). Where spaces are moisture-prone or fire-rated, exposed structural members shall be protected accordingly. Exposed structural ceilings shall be painted similar to Metals above.

Flooring. All flooring shall comply with the requirements in Appendix B and UFC 4-510-01 and shall be non-porous/non-slip material.

Conductive Vinyl Flooring. Conductive vinyl flooring shall be used in Communications rooms.

Ceramic Tile Floors. Ceramic tile floors shall comply with UFGS Specification 09310, CERAMIC TILE, QUARRY TILE, AND PAVER TILE, and shall be installed in all toilet rooms, showers and lounge room wet areas. Provide slip resistant tile where appropriate. In showers, ceramic wall tile may be installed over cement board over metal stud framing or over a setting bed. Cove base shall be of matching tile, integral turns, and shall transition to wall tile without surface change.

Carpeting. Carpeting shall be used in offices. Carpet shall be a tight weave, non-allergenic and anti bacterial material meeting the smoke and flame spread requirements for

Concrete Sealer. Concrete floors are permitted only in the mechanical, electrical and communication rooms. Where a floor finish, such as tile, or painted floor coating is not specified, concrete floors shall receive two coats of a durable clear sealer.

Casework. Casework shall be provided as identified in the guide plates or as shown on the floor plans. As a minimum, casework shall be custom grade in accordance with AWI, hardwood veneer or plastic laminate over medium density fiberboard (MDF), per AWI custom grade standards. Interior cabinet finishes may be plastic laminate or finished stained wood. Cabinetry shall comply with UFGS Specification 06410, LAMINATE CLAD ARCHITECTURAL CASEWORK.

Cabinet Finish. The finished material of exposed fronts and ends of cabinets, door and drawer fronts shall be plastic laminate or stained wood. Metal cabinets will be permitted in locations where chemicals may be stored. Cabinet finish shall be a light color.

Cabinet Hardware. Cabinet hardware shall conform to ANSI 156.9. Cabinet hinges shall be concealed offset and spring-loaded, "European" style, commercial grade. Cabinet drawer guides shall be a minimum of 20-gage steel with double rollers, heavy-duty commercial type.

Countertops. Ceramic tile countertops are not permitted. Countertops in break rooms may be of high pressure laminated plastic, with heat resistive adhesive, fully formed with a continuous sheet of plastic. Provide no-drip bull nose edges with integral coved backsplash where appropriate. Ninety degree glued horizontal counter edges are not permitted.

Countertops in Toilet Rooms. Restroom vanity tops may be plastic laminate or solid resinous materials. Exposed outside corners shall be filleted, chamfered or radius profiles.

Lockers. Lockers, as shown on the plans, will be furnished and installed by others.

Signage.

Facility Signage. Facility signage within the site should provide a clear and concise means for patients, staff, and visitors to move about the site and facility as efficiently as possible. Signage includes all visual messages extending from the building's exterior to an individual room. All signage shall be in English and Italian. Refer to MIL-HDBK-1191 Section 21 for specific requirements.

Building Identification. Building identification shall be in accordance with UFC 4-510-01 and the design guidance provided in this solicitation. Provide building entrance identification signs for each entrance to the facility. These signs shall describe the purpose of the entrance, e.g. "Birthing Center." Building entrance signs must be visible to traffic approaching the building, in a contrasting color to the building and made of non-corrosive materials. Building-mounted signs may be used. If used, it must be easily removed and/or accommodate changes to the message.

Exterior Signage. Exterior signs shall be provided for Handicap Parking.

Interior Signage. The Contractor shall provide interior signage throughout the facility in accordance with MIL-HDBK-1191 Section 21. Spare parts for 10% of the signs and letters shall be provided. The following interior signs, as a minimum, shall be provided.

1) Main directory. At primary entries to the facility, the Contractor shall provide a directory and orientation map located just inside the doorway showing major departments and access corridors to those areas. Lettering on directories shall be secure and easy to change, yet present a professional appearance (similar to system Modulex).

2) Secondary directories. Smaller, less comprehensive directories shall be provided in elevator lobbies and at secondary entrances.

3) Directional signs. Directional signs, indicating the most direct route to the major departments, shall be provided at corridor intersections and "dead ends" as required in UFC 4-510-01. The Contractor shall include "Staff Only" and "No Entry" signs at appropriate locations/entrances where only medical staff entry is authorized.

4) Department identification signs. The Contractor shall provide large, easy to read signs over reception counters, check-in counters, information desks and departments, and shall be either ceiling mounted or affixed to a soffit directly above the counter.

5) Room identification signs. Adjacent to the door opener side of each interior door, rooms shall have framed signs designating the office number. The signs shall be approximately 8 cm x 16 cm and shall be of standard manufacture, made of high impact plastic. Frames shall be either molded plastic or aluminum, with brushed finish. Frames shall be attached to the wall using mechanical fasteners. Removable letters are required to allow addition of office occupants and titles. Contractor shall provide adequate spare letters to accomplish the addition of all building occupant names and titles with the project. Letters shall be approximately 3 cm in height, and shall adhere to the signs without using additional glues or other adhesives. Signs shall include information such as "Oxygen In Use", "Isolation", and "No Visitors" where appropriate.

6) Maintenance identification tags. Room number tags shall be included for every room, space, alcove, closet, toilet, patient room, etc. to assist maintenance staff. These tags shall be approximately 25mm high with raised room numbers. The tags shall be installed on the outside of the room, on the top center of the doorframe.

7) Information, regulatory and code signs, to include fire evacuation signs. Signs shall be provided to meet the minimum requirements for health and safety, accessibility and Military Department safety standards. Exit doors shall be identified with tactile signs. The design and location of emergency egress route/fire evacuation signs shall be coordinated with the local AHJ.

Painting

General. All surfaces shall be painted with the exception of the following: walls and/or ceilings in crawl spaces and concealed areas (if any), sprinkler heads, hardware, fittings, exterior galvanized surfaces, ceiling tile, and other factory finished items. Ceilings, walls and floors shall be waterproof in areas where deluge sprinkler heads are present.

Metal. Painting shall comply with UFGS 09900, PAINTS AND COATINGS. All exterior and interior metal shall be painted. Surfaces shall be cleaned of rust and dirt before painting. Paint system shall be one coat of rust inhibitive primer and two coats of finish for all surfaces that are not painted. Surfaces that are already painted shall be cleaned and painted with adequate coats to provide uniformity with newly painted surfaces. Finish coat paint shall be an alkyd base paint. Color shall be as approved by the Contracting Officer.

Piping. Paint all exposed horizontal and vertical piping, downspouts and gutters on each component. Paint shall be the same system as specified for metal above. Color shall closely match the building colors, or as approved by the Contracting Officer.

Wood. The use of wood shall be limited to interior doors, shelves and cabinetry, minor wall accents, chair rails, baseboards, telephone backboards and unexposed treated roofing nailers. All wood shall be either painted or stained as appropriate after sanding and sealing. Painted surfaces shall use interior grade gloss or semi-gloss alkyd 3-coat system. Stained wood shall use oil-modified polyurethane or moisture-cured urethane 3-coat system over stain.

Handrail System. Exterior and interior handrail systems shall be a custom prefabricated, factory-finished railing system. A detached, floor- or ground-mounted painted steel railing assembly (guardrail) shall be placed continuously along all exterior building surfaces where vehicular traffic, loading, forklift operations, etc., occur, to protect the doors, frames and exterior finish.

Specialties and Furnishings. For toilet accessories, refer to Equipment List.

Fire Extinguishers. Fire extinguishers shall be provided as required by criteria. A minimum of one fire extinguisher per room shall be provided in each of the patient rooms, nurse stations, staff sleeping areas, reception/waiting areas and lounge. Fire extinguishers shall be of the ABC type. All fire extinguishers shall be mounted to the wall in surface-mount or semi-recessed cabinets.

Fire Pump Room. A fire pump room shall be constructed to house sprinkler pumping equipment. The pump room shall be architecturally compatible with the facility. The approximate size is 3 meters by 5 meters, and will house all required pumps and associated pipes, expansion tanks, valves, meters, etc., included in the design. The pump house shall have a metal door and frame, with integral lock and padlock. There will be no windows allowed in this room.

STRUCTURAL DESIGN

General. The Contractor shall design and construct the foundations, superstructure, and all other structural aspects of the Temporary Birthing Center project. The Contractor shall have as part of his design team a licensed Structural Engineer unless otherwise approved by the COR. The structural engineer shall be responsible for the design of the complete structural system for the building. Complete structural system for the building shall include foundations, walls, floor framing, roof framing, lateral load stability and diaphragm design, framing and connection of any architectural features, and support of mechanical and electrical equipment. Structural design shall be in accordance with the design criteria within this solicitation. In case of conflicting requirements between the various elements, the more stringent criteria shall govern. Structural members shall not be fabricated of wood or timber. Cold-formed metal framing members may be used only for architectural framing. Contractor shall submit all design calculations, loads used and assumptions for approval to the COR.

Design Criteria. Utilize the following design documents when performing the structural design. The Uniform Facility Criteria (UFC), Technical Instructions (TI), and Technical Manual (TM) documents are available on the Internet at <http://www.hnd.usace.army.mil/techinfo/engpubs.htm>

UFC 3-310-01 Load assumptions for Buildings

TI 809-02 Structural Design Criteria for Buildings

TI 809-04 Seismic Design for Buildings

TI 809-05 Seismic Evaluation and Rehabilitation for Buildings

TI 809-28 Design and Construction of Conventionally Reinforced Ribbed Mat Slabs (RRMS)

UFC 4-510-01 Design: Medical Military Facilities (MIL-HDBK-1191)

American Institute of Steel Construction (AISC), Manual of Steel Construction, LRFD, 3rd Ed.

Steel Deck Institute (SDI), Design Manual for Composite Decks, Form Decks and Roof Decks, No. 30, April 2001.

American Welding Society (AWS), D1.1, Structural Welding Code – Steel, 2004

American Iron and Steel Institute (AISI), Specification for the Design of Cold-Formed Steel Structural Members.

American Concrete Institute (ACI), Building Code Requirements for Structural Concrete, ACI-318-02.

American Society of Civil Engineers (ASCE), Minimum Design Loads for Buildings and Other Structures, SEI/ASCE 7-02

Structural System.

Foundations: Reinforced concrete. See Section, Geotechnical Design for foundation requirements. Foundations shall be provided to support the modular building units. Coordinate location, elevation, and connection details of foundations with the supplier of the modular buildings. Provide a minimum 80cm crawl space under the modular buildings for installation and utility access. The modular buildings shall have adequate anchorage to the foundations to resist all horizontal and uplift loads. The modular buildings shall be designed to support the static loads specified herein as well as dynamic loads from transporting the units to the site. Lifting points and anchorage points shall be designed to resist all static and dynamic loads. Buildings loads shall include all loads stated below. Special attention to seismic loads and seismic bracing of associated piping, conduit, lighting, equipment, etc shall be provided.

Structural Design Loads. Design loads shall follow UFC 3-310-01, Load assumptions for Buildings, and UFC 4-510-01, Design: Medical Military Facilities, as applicable to this project. The seismic loads shall be determined in accordance with TI-809-4, Seismic Design for Buildings for Vicenza, Italy location. Use the following to determine building loads:

Dead Loads: Actual weights of materials and equipment

Floor Live Loads: UFC 4-510-01, [Appendix A.](#), minimum 2.5 KPa

Roof Live Load: 1.0 KPa

Wind loads: 130 km/h basic wind speed, exposure C, and importance factor of 1.0, per ASCE 7-02.

Seismic Loads: TI 809-04,

Seismic Use Group I (Table 4-1)

Performance Level- LS(1) Life Safety (Table 4-3)

Ground Motion: based on Vicenza, Italy site for Hospital Use.

Performance Objective: based on Vicenza, Italy site for Hospital Use.

Ss = based on Vicenza, Italy site for Hospital Use.

S1 = based on Vicenza, Italy site for Hospital Use.

Soil type/site classification - D (Table 3-1), or as determined by geotechnical investigation.

Seismic Design Considerations. The Contractor shall be responsible to design all elements of seismic protection systems required for the modular unit configuration, and it shall be understood that seismic considerations may apply to the design of equipment and systems of all disciplines, depending upon the level of the seismic threat. In the event that the seismic criteria for the configuration requires seismic bracing for mechanical piping systems subject to thermal expansion movement and related forces, it shall be the Contractor's responsibility to design a system of seismic bracing that simultaneously accommodates the thermal expansion features and performance of the piping, equipment, etc. All mechanical, electrical, medical, and architectural equipment shall be anchored and/or braced as required by the design criteria. Modular buildings shall be anchored properly to the foundations to resist seismic and wind loads

Materials.

Structural Steel. Wide flange (WF) members, channels, angles, plates and bars: ASTM A-36 (yield stress $f_y = 248$ Mpa). ASTM A- 572 or ASTM A-992 ($f_y = 248$ Mpa) may be used for WF members.

High strength bolts: ASTM A-325M.

Hollow Structural Shapes HSS: ASTM A-500, Grade B, $f_y = 317$ MPa.

Welding: E70XX low hydrogen electrodes.

Reinforced concrete: $f'_c = 25$ Mpa at 28 days (verified by testing). Reinforcing steel shall be ASTM A615 Grade 60, $f_y = 415$ Mpa.

Cold-formed steel. ASTM A-446, Grade A,B, or D, with G-90 galvanized coating.

Testing. Concrete slump and concrete strength test specimens shall be performed in the frequency listed in the Uniform Facility Guide Specifications.

FIRE PROTECTION. All modular unit construction, life safety and fire protection systems shall be designed in accordance with the requirements given in UFC 4-510-01, UFC 3-600-01, the National Fire Codes, and other governmental and industry design regulations, manuals, and guidelines as cited. Applicable military Technical Manuals (TMs) and Engineering Technical Letters (ETLs) provide supplementary design requirements and guidance. In the event of criteria conflict, the strictest code shall be considered the ruling criteria.

Extinguishing System. Provide complete automatic sprinkler protection throughout the Temporary Birthing Center.

Fire Detection and Alarm System (FDAS). All equipment, devices, wiring and conduit shall conform to NFPA 70, NFPA 72 and NFPA 90A. Alarm signaling devices shall be both audible and visual type. Visible/audible alarm notification is required for all medical facilities in accordance with NFPA 101. Visible/audible notification appliances are required in all public accessible areas (including corridors and hallways, lounges and lobbies, cafeterias, auditoriums, large conference rooms and public restrooms) as well as spaces in which the audible alarms cannot be heard. Manual pull stations shall be handicap accessible. System design shall be coordinated with the zoning and configuration of the smoke compartmentation resulting from the fire protection/life safety analysis. Performance and capacity of system circuits shall be in accordance with UFGS-13850, FDAS-Direct Current Loop or UFGS-13851, FDAS-Addressable.

MECHANICAL DESIGN

Energy Conscious Design: The design shall incorporate energy conservation measures to the maximum extent in all the building systems incorporated into the modular unit configuration, but compatible with medical functional requirements. These measures include, but are not limited to passive solar design, sun shading, and natural day lighting systems.

Energy Analysis. Computer analysis shall be used for modeling the modular building configuration energy consumption. Acceptable programs shall be of the "hour by hour" type that use established weather data files, perform 8760 hourly calculations, and are capable of simulating all HVAC systems and configuration design features. Obtain USAHFPA approval of the program proposed for use for this project.

Insulation Values: The maximum insulation thermal transmission values are as follows:

Maximum Thermal Transmission Value
Structural Element (Watt/m²-oC) (Btu/hr-ft²- oF)
Opaque Wall 0.285 0.05
Gross Wall 0.795 0.14
Floor w/ Crawlspace 0.285 0.05
Floor w/ Slab 0.565 0.10
Roof 0.170 0.03

Integration of Building Systems (IBS).

Building System Distribution: Modular unit system configurations typically are constructed with well-coordinated utility distribution systems layouts. The additional utility distribution systems required for this project imposes the need for diligent coordination. The purpose is to provide access to the installed distribution systems and their components and equipment. Coordinate the design of all features of the building, integrating the mechanical, electrical, energy, fire protection, architectural, structural, and other features into a whole. Each feature shall be integrated with the others to permit efficient and accessible distribution system layout. IBS design considerations also dictate careful consideration of the locations of equipment rooms and the routing of utility feeders in relation to the floor layout design. The design shall minimize utility distribution "choke points," particularly in above-ceiling spaces, where multiple systems cross or converge resulting in inadequate space for installation, maintenance access, and ventilation. The length and complexity of utility distribution runs shall be minimized. Multiple distribution systems for a given utility, each with a dedicated source supply, based on the modular unit configuration are an option if it shall reduce the on-site installation effort. For example, oxygen service can be distributed from a dedicated source for each of the medical function areas requiring it – Surgery, LDRPs, Patient Care Areas – or any combination thereof. Where possible, avoid routing utility feeders through

areas that they do not serve, minimizing the impact and complexity of future facility modifications.

Design Guideline. The maximum duct aspect ratio shall be 3:1.

Equipment and Distribution System Space: Equipment space requirements in above-ceiling spaces shall be sufficient to provide for operation, maintenance, inspection, ventilation, and replacement. The drawings show suggested equipment room locations. Provide multidisciplinary cross-sectional elevation sketches of representative congested above-ceiling distribution spaces throughout the modular building.

Acoustical Concerns. Acoustics are a fundamental consideration in medical facility design and require close, and early, coordination between the mechanical, architectural, and structural designers. Structural and airborne transmitted equipment noise, including duct transmitted (ductborne) and duct breakout noise, may have significant effect on the design of structural and architectural features and must be considered during Concept Design development. Typical problems experienced in prior medical facility designs, to be avoided with this design, have included:

A. Insufficient utility routing space, resulting in high velocity or high aspect-ratio ductwork and consequent noise problems.

B. Insufficient attention to attenuation of duct or partition-transmitted "crosstalk" from physician's offices, examination rooms, or toilets, to surrounding spaces.

Refer to requirements for acoustical analyses in UFC 4-510-01. TM 5-805-4 provides acoustical design guidance. Refer to ASHRAE Handbooks and Standards and SMACNA Standards for additional design criteria.

Commissioning. All equipment and systems shall be commissioned on site after installation and startup have been completed. Detailed reports shall be submitted documenting the procedures and outcome of the commissioning tests. Integrated systems testing such as Emergency Power/HVAC, Fire Alarm and Control/Emergency Power/HVAC, Emergency Power/Critical Mechanical Equipment operation shall be included in the commissioning scope in coordination with a phase installation by the Contractor. The commissioning detail shall be similar to the point-by-point testing protocols and documentation/reporting requirements found under UFGS 15951 DDC Control Systems. Systems shall be delivered clean and shall not be used during construction period until the system is commissioned and accepted by the government.

Heating/Ventilating/Air Conditioning (HVAC)/Plumbing/Medical Gas: All HVAC, plumbing, medical gas, and other mechanical systems shall be designed in accordance with the requirements given in UFC 4-510-01 and in other governmental and industry design regulations, manuals, and guidelines as cited therein or in this Scope of Work. Room by room HVAC requirements are given in Appendix C, Rooms Details. The ASHRAE Handbooks and Standards, SMACNA Standards, ACGIH Handbook, NFPA

Standards, and the International Standard Plumbing Code shall provide minimum design standards. In the event of criteria conflict, UFC 4-510-01 shall be considered the ruling criteria.

Equipment/System Selection: Equipment and system selection shall be in accordance with UFC 4-510-01, Chapter 8. Equipment includes items such as primary heating and cooling sources, air handling units, exhaust and return air fans, domestic hot water generators, duct-mounted trim humidifiers and booster fans. Systems include piping and duct distribution. Selections shall be of type, capacity, and configuration commonly employed in hospitals.

HEATING, VENTILATING, AND AIR CONDITIONING REQUIREMENTS.

Design Instruction. All HVAC, and other mechanical systems shall be designed and provided in accordance with the requirements of this solicitation and the referenced documents.

Scope. A complete HVAC system in accordance with the referenced documents shall be provided for the Temporary Birthing Center, including primary heating equipment (boilers, pumps etc.), centralized and located in the modular building. This includeparate and independent from the units serving the MU areas. This includes, but is not limited to, the air handling units, unitary air conditioners, duct systems, DDC controls, electrical support equipment, etc.

Submittals. Documents shall be prepared and submitted in accordance with the Section, Submittal Procedures for Design/Build Project and this section.

Systems and equipment selections shall primarily be based on suitability for medical function, simplicity of maintenance, and dependability.

Mechanical Design References

The mechanical systems will be designed in accordance with the requirements of this solicitation, the referenced Unified Facilities Guide Specs and the following codes and standards.

ANSI A13.1 Scheme for Identification of Piping Systems (1981)
ARI 340/360 Commercial & Industrial Unitary Air-Conditioning and Heat Pumps
ASHRAE Cooling and Heating Load Calculation Manual (1992)
ASHRAE Fundamentals Handbook (2001)
ASHRAE HVAC Systems and Equipment Handbook (2000)
ASHRAE HVAC Applications Handbook (2003)
ASHRAE Guideline 12 Minimizing the Risk of Legionellosis Associated with Building Water Systems (2000)
ASHRAE 62 Ventilation for Acceptable Indoor Air Quality (2001)
ASHRAE 90.1 Energy Standard for Bldgs Except Low-Rise Residential Bldgs(2001)

ASME B31.1 Power Piping (2001)
NFPA 31 Standard for the Installation of Oil-Burning Equipment
NFPA 90A Installation of Air Conditioning and Ventilating Systems.
NFPA 255 Surface Burning Characteristics of Building Materials
SMACNA HVAC Duct Construction Standards, Metal and Flexible (1995)
T1-800-01, 20 July, 1998 Technical Manual
UFC 3-400-02 Design: Engineering Weather Data (28 Feb 2003)
UFC 3-410-01FA Design: Heating, Ventilation and Air Conditioning (TI 810-10) (15 May 2003)
UFC 3-410-02A Heating Ventilation and Air Conditioning Control Systems (TI 810-11) (15 May 2003)
UFC 3-450-01 Design: Noise and Vibration Control (TM 5-805-4)
UFC 4-510-01 Design: Medical Military Facilities (MIL HDBK 1191)
UL 142 Steel Aboveground Tanks for Flammable and Combustible Liquids
3.11.9 HVAC Controls. The Contractor shall provide controls required for the HVAC primary equipment and the distribution duct and piping systems. It shall be the Contractor's responsibility to develop the necessary specifications and details of the testing requirements for commissioning the controls in the modular building. Mechanical control systems design, excepting factory packaged equipment controls, shall be based on TM 5-815-3, as applicable, and UFGS 15951, using Direct Digital Control (DDC). The contractor shall provide a submittal of the equipment to be provided. The TM figures are available on CADD from the Corps of Engineers Savannah District, telephone number (912) 652-5318.

HVAC Design Table: The Concept Design total air balance summary shall include all rooms and the proposed conditions.

Mechanical Design

Complete final design of plans, sections, elevations, details, diagrams, schedules, legends, symbols, and abbreviations in the solicitation drawings fully delineating all systems indicated.

System Design

General. The facility shall be heated, air conditioned, humidified, and ventilated in accordance with UFC 4-510-01 Section 8 and this solicitation. The air distribution systems shall include central air handling units, ductwork and air distribution equipment and devices. The system shall be sized for the peak load.

The HVAC systems (piping, air handlers, ducts, unitary air conditioners, terminal units, controls etc.), including air handling equipment and central systems shall be located in mechanical rooms constructed with the Temporary Birthing Center. Individual room HVAC design parameters (temperature, humidity, air changes, relative pressurization, ventilation etc.) shall be in accordance with the solicitation Appendix C, Rooms Details.

The air distribution zoning plan is provided as a guideline only and shall be modified to coordinate with fire and life safety requirements.

Energy Use. This project shall comply with ASHRAE 90.1 for energy efficiency.

Building HVAC Load Calculations. The building HVAC load calculation shall be performed using Blast, Carrier HAP, Trane Trace 700 Load Design Program, latest versions, computer program or an equivalent approved by the Government that performs an hour-by-hour, 8760 hour per year simulation of building performance. Heat gain and loss calculations shall be in accordance with the ASHRAE Fundamentals Handbook. Provide a ventilation summary calculation for each air handling system. Include air change calculations for each space; verify ventilation rates with the referenced publications, verify supply, return, exhaust, and outdoor air quantities. Indicate space airflow pressure relationships in summary. Perform calculations for each room by the ASHRAE method indicated in latest Fundamentals Handbook including the effects of heat lag. Use 10% factor of safety for all calculations to allow for deterioration of equipment over its life, and to compensate for equipment start-up. Do not use any additional safety factors in airside or waterside calculations.

Documentation of each program may be requested, 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 the event "non-proven" programs are used, a computer run by the designer of a check problem may be required by the government reviewer for verification at no expense to the Government.

Design submissions of the analysis shall include complete input data and the following output data (as a minimum): a) Systems summary; b) Room by Room HVAC loads; c) Equipment energy consumption; d) Energy use summary. An electronic copy of the actual input file shall also be provided.

Dewpoint Analysis. In order to assure that no condensation will occur within the building wall components, the Contractor shall calculate the dewpoint at each layer of all typical wall sections. The analysis shall be performed at the full range of interior and exterior conditions. The analysis shall be submitted to the CO.

Interior Design Conditions. The indoor summer temperature, winter temperature, and humidity requirements shall be as indicated in solicitation [Appendix B](#).

Weather Data

Summer:

1% Dry Bulb Temperature = 36.1 C, Mean Coincident Wet Bulb = 20 C, Prevailing Winds 5.6 mps N

2% Dry Bulb Temperature = 35 C, Mean Coincident Wet Bulb = 18.9 C, Prevailing Winds 5.4 mps N

Winter:

99% Dry Bulb Temperature = -16 C, Prevailing Winds 1.6 mps W

97.5% Dry Bulb Temperature = -13 C, Prevailing Winds 1.6 mps W

6.3.5.7 U Values

The building U-Values shall not be greater than those indicated below. Coordinate the U-values with the design of the facility.

Maximum U-Values (watts/m²-C) are as follows:

Opaque walls (opaque portion of walls) – 0.85

Gross walls (includes doors, windows etc) – 2.15

Slab on grade floors – 1.36

Ceilings/roofs – 0.28

Heating System

Heating Supply

Heating energy for building heating shall be provided from new local boilers. The boilers shall be in accordance with UFGS Section 15569A, WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH.

A fuel meter is required for each individual boiler.

Boilers shall be provided with manually activated emergency shut-off devices, and safety shut-off switch, installed adjacent to door to mechanical room housing the boiler, to shut down boiler(s) in case of emergency per ASME CSD-1 requirements.

The boilers shall be a packaged No. 2 fuel oil boilers, fired sectional cast iron type rated for operation up to 275 kPa (40 psig), with forced draft type burner. The boiler water shall be treated to reduce corrosion and scaling. Boiler burner gas train shall be UL and FM approved. The selected boilers shall be mounted on an anchored reinforced concrete housekeeping pad with a 6" clear space from the boiler to the edge of the pad. All manufacturers specified maintenance clearances shall be provided in the mechanical room containing the boilers. Boilers shall have a minimum efficiency of 81 percent. The boiler shall be equipped with an ASME rated pressure relief valve. Boiler breechings shall be double-wall, insulated, prefabricated, and in accordance with NFPA 54. Boiler combustion safety control shall have an LED readout. The Mechanical Room shall be provided with carbon monoxide gas leakage monitoring and alarm control panels, to

effect automatic shutdown of the boilers and domestic hot water heaters, upon detection of gas leakage.

Boiler sizing shall include the load for the domestic hot water generators.

The heating pumping systems shall consist of dual variable speed pumps, two-way heating terminal control valves. A standby pump shall be provided for system redundancy. All pumps shall be mounted on anchored reinforced concrete housekeeping pads located within the mechanical room. Manufacturer's recommended service clearance shall be provided. Pumps shall be provided with calibrated balancing valves, check valves, pressure gauges (inlet and outlet), butterfly valve, strainer, and diaphragm expansion tank and an air separator with automatic fill valve and air purger.

An automatic treated make-up water system shall be provided for the heating hot water system.

The water supply temperature shall be automatically reset based on outdoor air temperature.

Hot Water Piping and Accessories

Hot water heating piping shall be designed in accordance with ASME B31.1 and sized using equal friction method. Fluid velocities shall not exceed 2.48 meters/second (8 feet/second). Include velocity pressure drops for all fittings in accordance with the Cameron Hydraulic Data guide. UFGS 15556A shall be edited to reflect the solicitation requirements.

Piping shall be schedule 40 seamless or ERW ASTM A 53 with malleable steel threaded or forged steel butt-welding fittings. Copper tubing, hard drawn type L ASTM B88, with wrought copper fittings may be used for pipe sizes 50 mm and smaller. Provide full port ball valves for shutoff duty in pipeline sizes 75 mm and smaller, OS&Y gate valves for line sizes 100 mm and larger. Check valves shall be swing type in horizontal piping, spring type at pump discharge locations. Balancing valves shall be manual, bronze globe body pattern with adjustment handle and hidden locking stop feature; ball element, needle type element, and spring-loaded valves are not acceptable. Air separator shall be centrifugal type, ASME welded steel tank, tangential threaded or flanged inlet/outlet tappings, with internal baffles to provide a 97% air elimination efficiency at a maximum internal velocity of 1.2m/s and a maximum pressure drop of 3 kPa. Pressure gages shall be liquid filled non-shock type; provide compound type for pumps. Furnish piping accessories indicated; air separator, chemical shot feeder, air vents, pressure/temperature test ports, and thermal wells for temperature control system.

Provide air vents at each heating terminal device, and at high points in system. Individual stop valves shall be provided for each connected item of terminal equipment and as indicated in the referenced documents.

Insulation. Hot water heating piping, including valves, pipeline accessories and fittings shall be insulated with fiberglass material, of thickness indicated in UFGS 15080A according to temperature of service. Insulation shall be covered with a stainless steel jacket in the mechanical rooms and with a PVC jacket in all other areas. Equipment internal to the building; heat exchangers, air separator, expansion tank shall be insulated with rigid fiberglass material and exterior stainless steel jacketing of thickness indicated in UFGS 15080A according to temperature of service.

Air Conditioning. Air conditioning systems shall be provided in accordance with UFC 3-410-01FA, UFGS 15895A, and UFGS 15700A. Air distribution systems shall be provided in accordance with the requirements of UFGS 15895A. Split-systems (direct expansion) shall be utilized for the cooling requirements at the air handling units.

Refrigerants used shall have Ozone Depletion Potential less than 0.05 AND shall not be planned for phase out in the United States or Europe. R-134A, R407C, and R-410A meet these requirements. The total volume of refrigerant of the air conditioning systems shall be within the specified limits of ASHRAE Standard 15.

Split-systems shall be provided in accordance with UFGS 15700A. It is required that the system be decentralized to prevent a cooling failure of the entire building, therefore separate split-systems shall be provided for each air handling unit or required cooling coil location. Condensers shall be air cooled and not located on the roof unless approved by the COR. Condenser shall be deliberately oversized or otherwise designed for the performance degradation of the hot and dusty environment. Each condensing unit shall have dual scroll type compressors with independent refrigerant circuits, either of which can operate independently in the case of a failure. Unit performance shall be certified in accordance with ARI 340/360 and meet the minimum requirements of ASHRAE 90.1.

The HVAC systems shall be sized to provide comfort ventilation through the use of an economizer cycle to achieve design conditions. The HVAC systems, when the winter dry bulb temperature is 1.6 degrees C (35 degrees F) or less, shall be designed so that up to 100% outside air may be used to provide all the cooling needed, or reduce the load on the air conditioning refrigeration equipment. Use of the economizer cycle above 1.6 degrees C (35 degrees F) shall be provided when use of the economy cycle is cost effective.

Ventilation Systems Design. Ventilation for building occupants shall be provided in accordance with UFC 4-510-01, UFC 3-410-01FA, ASHRAE 62, as modified by this solicitation. Ventilation air shall be injected into the building at each air-handling unit upstream of the coils. Each unit shall maintain a constant minimum outside airflow.

The ventilation system shall be designed to account for the fume hoods. The system shall modulate as needed to maintain room design conditions whether this equipment is on or off.

Exhaust systems shall exhaust all soiled spaces such as toilet rooms, bathrooms, janitor's closets, lockers, and other spaces as indicated.

Air Intake and Exhaust

Placement of HVAC outdoor air intakes and exhausts shall meet the requirement of UFC 4-510-01 paragraph 8.11.3 except that intakes shall be a minimum of 3 meters (10 feet) above grade and shall be separated from any exhaust (HVAC or plumbing) by a minimum distance of 10 meters.

Air Handling Units. UFGS 15895A shall be edited to include the requirements in this solicitation. Air handling units shall be factory packaged, section modular type design, constructed of 50 mm thick pre-insulated double wall panels. A minimum 400 mm access section with door shall be provided upstream of each coil. Maximum coil face velocities shall be limited to 475 feet per minute (2.4 meters per second). Control dampers shall be constructed to provide no more than 10 CFM/ft² (50.8 lps/m²) air leakage at 4" water column (1 kPa). Angled filter section shall not be utilized. Air handling unit shall be factory assembled consisting of supply fan section, heating coil section, filter sections and access sections, all mounted on a common structural base channel system. Supply fan section shall be equipped with non-overloading plug-type centrifugal fan mounted on a steel base frame. Fan base shall be isolated from air handling unit base rails by the use of housed spring isolators. Fans shall be V-belt driven by belt drives sized for 150% of design power requirement. Provide adjustable sheaves for fans up to 20 Hp (15 kW). Provide pre-filter section equipped with 30% efficiency flat filters. Provide intermediate filter section at the AHU discharge with 95% efficiency filters.

Air Distribution. UFGS 15895A shall be edited to include the following requirements. Ductwork shall be constructed of type G90 galvanized steel to SMACNA HVAC Duct Construction Standards. Flexible ductwork runouts to terminal devices shall be limited to 5 feet (1.5 meters) in length. Each duct branch shall be fitted with a manual balancing damper. All ductwork shall be located above slab, supported from roof structures. Return air shall be ducted to unit from each space. Ceiling return air plenums shall not be used. Low pressure distribution ductwork shall be installed to SMACNA pressure class 500 Pa , seal class A, and leakage class 6/12 as a minimum. Test ductwork in accordance with SMACNA 10. Access must be provided to all devices or areas that may require periodic inspection, including but not limited to balancing devices, motor operated dampers, flow measuring stations, smoke/fire dampers, etc. Ductwork downstream of final filters serving operating room including turning vanes, dampers and accessories shall be constructed of Type 316 stainless steel, to SMACNA pressure Class 500 Pa (2" wg). Duct humidifier sections shall be all-welded liquid tight with integral drain pan. Unless otherwise noted, ceiling supply air diffusers shall have square configuration louvered face with four or more concentric elements in face. Furnish with opposed blade manual damper in throat. Construct of fabricated steel, off-white enamel painted finish. Operating room ceiling diffusers shall be low-velocity, non- aspirating type, with adjustable internal baffle below inlet, perforated faceplate with uniform 1 mm diameter holes, 150 mm deep plenum, fabricated entirely of type 304 stainless steel. Ceiling return and exhaust registers shall be square configuration, perforated face, steel construction with manual opposed blade damper in throat. Furnish off-white painted enamel finish. Final filter

sections shall be factory assembled, side-access housing with integral hinged and gasketed access door, lever-locking filter retaining linkage, corrosion resistant steel internal filter frame and baffles, internally gasketed to prevent short circuiting of air, and galvanized steel casing construction.

Ductwork. Supply, return, exhaust, and outdoor air ductwork shall be sized using the design method specified in UFC 3-410-01FA. Include velocity pressure drops for all fittings in accordance with ASHRAE.

Duct Insulation. UFGS 15080A shall be edited to include the following requirements. All exposed ductwork insulation shall be factory fabricated rigid insulation board. Concealed insulation may be duct-wrap or rigid. Insulation shall be faced with a vapor barrier material having a performance rating not to exceed 1.0 perm. Insulation, vapor barrier, and closure systems shall be noncombustible as defined in NFPA 255, with a flame-spread rating of not more than 25, and a smoke developed rating of not more than 50, as defined in ASTM E 84. Glass cloth and vapor barrier coating is required at all insulation terminations and penetrations for stick pins. Vapor barrier coating is required at all insulation seams and all insulation penetrations. Insulate back of all air devices on air handling unit systems.

Miscellaneous Fans. Exhaust fans shall be utility vent set type. Return fans shall be in-line centrifugal type. Roof mounted fans are not acceptable. Fans shall be V-belt driven by belt drives sized for 150% of design power requirement. Provide adjustable sheaves for fans up to 20 Hp (15 kW). Motor selection shall permit non-overloading operation at all conditions. All fans shall be provided with vibration isolators to decouple the motor assembly from the fan housing. Suspend fans with vibration isolators from building structure. Edit UFGS 15895A to include the requirements above.

Humidification. Humidity controls shall be provided as necessary to meet the requirements given for individual spaces in solicitation Appendix B. Humidity controls for Critical and Sensitive areas shall be provided on a room basis. Humidity controls for all other spaces may be provided on a zone or system basis as determined to be sufficient to maintain the required conditions. For spaces which require maintaining a relative humidity envelope of 30%-60%, active humidification may not be necessary if the room requirements can be met based on the outside air conditions and interior latent load. The Contractor shall estimate the interior RH in these spaces based on ASHRAE methods and submit a copy of the calculations and conclusions to the CO. If the calculations show that the required RH conditions can not be maintained during normal working hours than humidification shall be provided as indicated below.

HVAC Humidification shall be provided through a factory assembled direct steam injection humidifier, designed in accordance with ASHRAE HVAC Systems and Equipment Handbook and the recommendations of ASHRAE Guideline 12 to minimize the risk of Legionella Disease. The system shall also meet the requirements of UFGS

15720N for “Steam Grid Humidifiers”. Steam shall be clean and sterile for direct injection into the air stream.

Mechanical Rooms and Equipment. The mechanical spaces indicated in the architectural layout are a minimum size and are believed to have adequate space for the required mechanical systems serving the building, however stacking of equipment (i.e air handlers) may be required. The Contractor is responsible to verify the mechanical room sizes using the actual sizes of selected equipment. In the event that the mechanical rooms need enlargement, the Contractor shall enlarge the rooms without reducing any other space and at no additional cost to the government.

Mechanical equipment shall be designed in accordance with this section and the UFGS guide specifications indicated in this requirements document. The equipment described is a minimum. All materials and equipment provided shall be standard catalogued products of manufacturers regularly engaged in the production of such materials and equipment shall be of the manufacturers' latest standard design. Equipment shall comply with the requirements of Underwriter's Laboratories, Inc. (UL), Air Conditioning Refrigeration Institute (ARI), American Society for Testing and Materials (ASTM), National Electric Manufacturer's Association (NEMA), American National Standards Institute (ANSI), National Fire Protection Association (NFPA), or other national trade associations as applicable.

All pieces of floor mounted mechanical equipment shall be installed on a 100 mm thick concrete equipment pad. Provide pad 200 mm larger than equipment footprint on all sides. Install pins into floor slab prior to pouring equipment pad. All suspended equipment shall be properly supported according to the manufacturer's instructions. Provide trapeze hangers for larger pieces of equipment. Provide adequate clearance around all pieces of equipment for periodic maintenance, inspection and cleaning in accordance with manufacturers recommendations. Service of one piece shall not require disturbance of adjacent equipment. Each piece of motorized equipment shall be provided with vibration isolators. Nominal deflection and natural frequency of isolation equipment shall be selected based upon equipment size and structural attachment details. Roof mounted equipment is not acceptable. All equipment shall be accessible from the first floor or an enclosed mezzanine level.

Fuel Oil System. Provide a No. 2 fuel oil system for the HVAC boilers. Include all tanks, piping fittings, valves, and pipeline accessories. UFGS 13202A shall be edited to reflect the following requirements.

Fuel Oil Piping. Piping Interior and exterior shall be schedule 40 seamless or ERW ASTM A 53 piping with malleable steel threaded or forged steel butt-welding fittings. Any underground piping shall be double walled with leak detection in the interstitial space. Furnish conventional port ball valves for shutoff duty. Furnish a basket strainer with key handle and union removable top in supply line to generator.

All piping shall be properly supported, with allowances for thermal expansion and contraction. Piping shall not be encased in concrete. All piping shall be pitched to drainable locations. Individual stop valves shall be provided for each connected appliance and elsewhere as indicated on the solicitation Contract Drawings. Piping system components shall conform to NFPA 31.

Fuel Oil Storage Tank. Provide a factory fabricated exterior located steel tank in accordance with UL 142 with secondary containment. A minimum of one manway shall be provided. Tank capacity shall be based on seven (7) days peak HVAC requirements and domestic hot water usage. Provide tank with integral drainable fill sump, access manhole, and pipe tapings.

Generator Accessories. Provide muffler piping as needed. Include all piping fittings and muffler drain valve.

Generator Engine Exhaust Piping. Piping shall be schedule 40 seamless or ERW ASTM A 53 piping with forged steel butt-welded fittings and weld-neck or slip-on steel class 150 piping flanges. Provide stainless steel gaskets at each flanged connection. Provide stainless steel corrugated metallic flexible connection at engine discharge; minimum 450 mm long. Flexible connector shall be rated for 650 degrees C.

Insulation. Exhaust piping and muffler, including flanges and fittings installed internal to the building shall be insulated with two layers of pre-molded rigid fiberglass material, each 80 mm thick, with staggered joints. Finish insulation with all purpose kraft paper jacket and insulating mastic at all seams and termination points.

Design and Installation of Engine Exhaust Piping. Piping and muffler shall be properly supported, pitched to drain, with allowances for thermal expansion and contraction. Provide drain connection from muffler to floor drain with ball type shutoff valve.

Direct Digital Controls. Direct Digital Controls (DDC) shall be used to control HVAC systems and equipment.

UFGS 15951A shall be edited to reflect these minimum requirements. Provide electric/electronic actuators on all dampers and valves. Provide power transformers for all DDC system loads. All wiring regardless of voltage shall be installed in electric metallic tubing (conduit). Provide individual controllers for each central system; each AHU, heating system and terminal heating equipment. Provide connection for a portable workstation (laptop) computer to monitor, reset and troubleshoot each controller. Individual controllers may remain independent and do not require interconnection unless required to meet system design requirements.

Provide platinum element sensors. Equip room sensors with (software limited) occupancy set point adjustment.

Each air handling unit or zone shall have a centrally located emergency HVAC shutoff. It shall be accessible to the building staff and labeled “Emergency HVAC shutoff” both in English and Italian. The shutoff shall shutdown all fans and air-handling units and close all outdoor air intakes. The location of the shutoffs shall be coordinated with the COR.

Provide a laptop computer loaded with all required hardware and software for point monitoring, setting, and troubleshooting of each DDC controller. Computer shall be minimum 2.0 GHZ, 512 GB RAM, 15-inch screen and meet all controller manufactures recommendations.

All control devices shall be labeled with laminated plastic tags using unique identifiers which are cross referenced to the control drawings. Provide a manual override for all actuator related digital and analog outputs. The power source (panel and circuit number) for each DDC panel shall be clearly indicated on the control panel and on the control drawings. Provide status for all fans and pumps by the use of current relays. Provide return air, outdoor air, mixed air, and supply air temperature monitoring. Provide zone space temperature monitoring and control for all systems. Provide return air, humidity sensors and monitoring for all systems. Locate all actuators out of the airstream.

Seismic Design. Seismic design requirements shall be in accordance with UFC 4-510-01, UFGS 13080 SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT and UFGS 15070A SEISMIC PROTECTION FOR MECHANICAL EQUIPMENT. The Seismic classification shall be as indicated in Part 5, Structural Design.

Acoustical Criteria. Mechanical systems shall be designed to meet the criteria in UFC 4-510-01, UFC 3-450-01 (TM 5-805-4) and the noise criteria indicated in solicitation Appendix B.

Provide mechanical machinery selections and duct layout to achieve these levels. Any spaces not specifically listed above shall be coordinated with the user. Duct liner is prohibited in supply air duct systems. Duct sound attenuators are strongly discouraged. Vibration transmission from equipment shall be minimized with the use of vibration isolation equipment as required.

Identification. All HVAC piping and duct systems shall be provided with identification as follows: Provide piping identification adhesive labels with flow arrows complying with ANSI A13.1. Provide laminated plastic nameplate for each item of mechanical equipment with minimum 6 mm lettering. Provide tag for each valve and summary listing laminated in plastic (2 copies). Tags shall be brass; stamped with corresponding number and service, with brass chain.

System Maintainability. Ensure that filters, controls, control valves, and coils are easily accessible for servicing and cleaning. Isolation valves shall be provided for each terminal unit, zone, branch, long runs, etc. as necessary for proper isolation and maintenance. Coils shall be fully removable without requiring demolition of any building components.

Piping fitup of all coils shall include unions to facilitate easy coil removal. Note that a minimum of one meter clearance is required around all floor mounted equipment.

Testing, Adjusting and Balancing. Testing, Adjusting and Balancing shall be performed in accordance with UFGS 15990A and coordinated with the commissioning requirements.

Commissioning. Commissioning shall be in accordance with UFGS 15995A Commissioning of HVAC System except as modified in this solicitation. Commissioning requirements shall be clearly detailed on the design drawings and shall be clearly stated in the construction specifications to ensure the HVAC systems are properly installed, balanced and calibrated prior to building occupancy. Detailed reports shall be submitted documenting the procedures and outcome of the commissioning tests. Integrated systems testing such as Emergency Power/HVAC, Fire Alarm and Control/Emergency Power/HVAC, Emergency Power/Critical Mechanical Equipment operation shall be included in the commissioning scope.

PLUMBING AND MEDICAL GASSES

PLUMBING REQUIREMENTS

Design Instruction. All plumbing systems shall be designed and provided in accordance with the requirements of this solicitation and the reference documents.

Scope. Complete plumbing systems in accordance with the referenced documents shall be provided for the Temporary Birthing Center facility. Potable and non-potable water shall originate from the existing Bldg. 113 supplies. Any hot water boosters and supporting equipment for the temporary modular building shall be provided by the Contractor.

Submittals: Documents shall be prepared and submitted in accordance with Section, SUBMITTAL PROCEDURES FOR DESIGN/BUILD PROJECT and this section.

Systems and equipment selections shall primarily be based on suitability for medical function, simplicity of maintenance, and dependability.

The Contractor shall calculate building loads and demands for all services during project development and shall verify that available utility capacities will satisfy the calculated demands.

The Contractor shall establish the types, capacities, arrangement, and locations of the major mechanical equipment (including distribution routings) during project development.

Plumbing Design References. The plumbing systems will be designed in accordance with the requirements of this solicitation, the referenced Unified Facilities Guide Specs and the following codes and standards.

ASHRAE 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings (2001)

ASTM B88 Standard for Seamless Copper Water Tube

ASTM B819 Standard for Seamless Copper Tube for Medical Gas Systems

ASTM D1193 Standard Specification for Reagent Water

ASTM D1785 Standard Specification for Poly Vinyl Chloride (PVC) Plastic Pipe

ICC International Plumbing Code (2003)

Plumbing and Drainage Institute PDI WH 201 Water Hammer Arrestors (1992)

ASHRAE Applications Handbook

MIL-STD-1691 Construction and Material Schedule for Military Medical and Dental Facilities

NFPA 99 Health Care Facilities (2002)

UFC 3-450-01 Design: Noise and Vibration Control (TM 5-805-4)

UFC 4-510-01 Design: Medical Military Facilities (MIL HDBK 1191)

UFC 3-420-01FA Design Plumbing (TM 5-810-5)

UL 732 Standard for safety of Oil-Fired Storage Tank water Heaters

Plumbing Design – General. Complete final design of plans, sections, elevations, details, diagrams, schedules, legends, symbols, and abbreviations in the drawings, fully delineating all systems required.

Domestic Water Systems.

References. The domestic water system will be designed in accordance with the requirements of this solicitation, the referenced Unified Facilities Guide Specifications and the following codes and standards:

AWWA C104 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water

AWWA C151 Ductile Iron Pipe Centrifugally Cast for Water

DIPRA (Ductile Iron Pipe Research Association) Thrust Restraint Design for Ductile Iron Pipe 2002

ICC International Plumbing Code (2003)

NFPA 24 Standard for the Installation of Private Fire Service Mains

NSF/ANSI Standard 61: Drinking Water System Components

Design Instruction. All plumbing and medical gas systems shall be designed and provided in accordance with the requirements of this solicitation and the reference documents.

Scope: The Contractor shall design and construct the connection for water supply utility services for the Temporary Birthing Center. The Contractor shall provide water service lines and water distribution lines within the building footprint. The water facilities shall

be designed and constructed in accordance with the criteria contained herein. Placement of a buried utility main under a new building is not permitted.

Incoming Water Supply. The incoming water supply shall be divided into two systems; potable and non-potable. The non-potable shall supply the toilets and urinals. All other fixtures shall be supplied by the potable system. Provide a potable and non-potable water system to supply the fixtures indicated in this solicitation. Include all pipe, fittings, valves and pipeline accessories. Domestic water shall be provided in accordance with UFC 3-420-01FA (TM 5-810-5), International Plumbing Code, UFC 4-510-01 and UFGS 15405A. UFGS 15405A shall be edited to reflect the additional requirements in this SOLICITATION. Individual stop valves shall be provided for each fixture except tubs and showers. Individual stop valves shall be installed at connections to appliances such as ice-makers, sterilizers, etc. Shutoff valves shall be provided at each toilet fixture group to allow isolation.

Water Treatment. Water for the Temporary Birthing Center facility will be treated by a Reverse Osmosis system supplied by the Contractor for all potable uses. Toilets will be supplied directly from normal building supplies with non-treated but filtered water. Contractor shall provide separate potable and non-potable piping systems in the modular building and connect to these separated sources.

Potable and Non-Potable Domestic Water Piping and Accessories. Piping within the building shall be ASTM B88 hard drawn copper type L with wrought copper fittings.

Backflow Prevention. Backflow prevention shall be provided in accordance with UFC 4-510-01, International Plumbing Code, and UFGS 15405A.

Non-Potable Domestic Water Treatment. The non-potable water shall be filtered only and distributed to the toilet and urinal fixtures.

Potable Domestic Water Treatment. All hot and cold potable water shall be treated through a reverse-osmosis system to produce water that complies with ASTM D1193, Type IV water. Cartridges shall be renewable. The system shall be fully automatic, regenerating as necessary without interrupting service. The Contractor shall perform a water quality test on a typical sample of the water available at Camp Ederle. The test shall include hardness, turbidity, PH, iron, manganese, total dissolved solids, bacteria, volatile organic compounds (VOC) and any further parameters required by the water treatment provider to size the system. A full size bypass line with shutoff valve shall be provided for future use.

A chlorination station shall be provided for the potable water system (located downstream of the Reverse-Osmosis system). The potable water shall be injected with chlorine to achieve 0.1 to 0.2 mg/liter chlorine content. The system shall be fully automatic volume controlled dosing system injecting chlorine-dioxide from a storage container. The injection pump shall be a motorized variable-frequency positive displacement type pump for infinitely variable injection rate. The storage container shall

be sized for a one-month supply and shall have a level switch for pump protection. The system shall include a meter for monitoring the amount of chlorine used. The system shall include continuous electronic monitoring of the residual chlorine in the water with a 4-20mA electrical output for data collection. The system shall be turned over to the government with a full supply of chlorine-dioxide.

Domestic Hot Water. Domestic hot water shall be provided in accordance with UFC 3-420-01FA (TM 5-810-5), International Plumbing Code, UFC 4-510-01 and UFGS 15405A. Domestic hot water shall be stored and normally provided at 60 degrees C. A hot water recirculation loop shall be included circulating the water back from the most remote fixtures of each distribution line to the hot water heater. The circulation system shall maintain the return water at a minimum of 51 degrees C. A thermostatic mixing valve at the supply shall be included to allow the distribution supply temperature to be set from 43-60 degrees C.

Domestic Hot Water Generators. Domestic hot water shall be produced in the existing system in Bldg. 113. The hot water demand for the temporary building shall be sized in accordance with UFC 4-510-01. Boosting heat exchangers, if necessary, will be double wall type that separates the potable water from the heating hot water in accordance with the International Plumbing Code. Heat exchangers and hot water storage tanks shall be ASME code stamped for the maximum allowable working pressure. Hot water storage tanks shall be cement-lined or glass-lined steel type in accordance with AWWA D100. The heat loss shall conform to ASHRAE 90.1.

Water heaters shall be provided with fully automatic controls.

Provide a bladder type expansion tank for the domestic hot water system.

Insulation. Piping, including valves, pipeline accessories and fittings shall be insulated with fiberglass material, of thickness indicated in UFGS 15080A according to temperature of service. Equipment internal to the building; heat exchangers, air separator, expansion tank shall be insulated with rigid fiberglass material and exterior stainless steel jacketing of thickness indicated in UFGS 15080A according to temperature of service. Insulate all exposed hot water and drain piping below plumbing fixtures with vinyl coated flexible unicellular pre-molded insulation designed as an assembly for this purpose.

Sanitary Waste and Vent System. Provide sanitary waste and vent system in accordance with UFC 3-420-01FA, the International Plumbing Code and as indicated in this solicitation. Include all pipe fittings, specialties and pipeline accessories. UFGS 15405A shall be edited to reflect the following requirements.

The Contractor shall provide all sanitary piping.

Waste and Vent Piping and Accessories. Piping within the building heated space shall be cast-iron, hub-and-spigot, or hubless construction.

Plumbing Fixtures

Fixtures. Fixtures shall be provided complete with fittings and trim. All shutoff valves shall be metal construction. Plastic valves are not acceptable. Unless otherwise noted, all fixtures, fittings and trim shall be from a single manufacturer and have the same finish.

All faucets shall have solid brass bodies, ceramic disc valving and chrome plated trim. Water consumption shall not exceed 0.16 l/s.

Fixtures shall be water conservation type in accordance with the International Plumbing Code.

All vitreous china shall conform to ANSI A112.19.2M, Vitreous China Fixtures. Stainless steel fixtures shall conform to ANSI A112.19.3M, Stainless Steel Plumbing Fixtures.

Floor Drains shall be provided in bathrooms, mechanical rooms, and for equipment requiring drainage.

Fixture descriptions shall be as described by the American Society of Mechanical Engineers.

Fixture List. Required equipment shall be as listed in the Project Equipment Quantity List with requirements per UFGS 15405A and MIL-STD-1691 as modified by this solicitation.

Acoustical Criteria. Systems shall be designed to meet the sound limitation criteria in UFC 40510-01 and TM 5-805-4.

Identification. All plumbing systems shall be provided with identification as follows: Provide piping identification adhesive labels with flow arrows complying with ANSI A13.1. Provide laminated plastic nameplate for each item of mechanical equipment with minimum 6 mm lettering. Provide tag for each valve and summary listing laminated in plastic (2 copies). Tags shall be brass; stamped with corresponding number and service, with brass chain.

Seismic Design. Seismic design requirements shall be in accordance with UFC 4-510-01, UFGS 13080 SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT and UFGS 15070A SEISMIC PROTECTION FOR MECHANICAL EQUIPMENT. The Seismic classification shall be as indicated in Part 5, Structural Design.

Submittals. Documents shall be prepared and submitted in accordance with Section, Submittal Procedures for Design/Build Project and this section.

Water Source and Water Service Line. Domestic water to the building shall be provided from existing supplies at Bldg. 113. The Contractor shall install new water service lines from Bldg. 113 to the Temporary Birthing Center building. The lines shall include a shutoff valve and be capped off underground with thrust restraint. The service lines shall be designed and installed in accordance with NFPA 24 and applicable AWWA standards. Water lines shall be ductile iron cement-mortar lined in accordance with AWWA C151 and C104. Thrust restraint shall be designed and provided in accordance with DIPRA Thrust Restraint Design for Ductile Iron Pipe and may be provided with thrust blocks or locking gaskets (as recommended by the piping manufacturer). The design shall limit installation beneath pavement. Minimum earth cover for the new utility lines will not be less than 1.5 meters. Sizing of the line shall be in accordance with the International Plumbing Code but shall not be smaller than DN50. A shut off valve shall be installed near the point of connection to the main. A separate fire service line shall be installed as required in Section, Fire Protection.

Pressure Boosting System. If necessary, a pressure boosting system shall be provided to supply water from the existing supply network to the Temporary Birthing Center building at the minimum required building pressure. The pressure boosting system shall be a variable speed pumping system in accordance with UFGS 15405A. The system shall be designed to maintain a minimum of 2.2 bar to the most remote fixture during peak demand. A dual pumping system shall be provided with each pump sized for the peak building demand. The pumps shall automatically rotate as primary and secondary and shall automatically switchover in the case of a failure. A pump bypass line (full line size) shall be provided for future use.

Storm Drainage: Provision for storm drainage management from the roof shall be incorporated into the design. Coordinate the selection with and obtain the site-specific storm intensity rate from the 22nd ASG DPW's office.

Medical Gases. Medical gas station outlets for individual rooms shall be as specified. The distribution systems shall be designed and installed in accordance with UFC 4-510-01 and NFPA 99.

Commissioning. The plumbing system commissioning shall be in accordance with UFC 4-510-01, NFPA 99, and UFGS 15995A except as modified in this solicitation. Commissioning requirements shall be identified in a point-by-point manner and shall be detailed on the design drawings and stated in the construction specifications to ensure the systems are properly installed, balanced and calibrated prior to building occupancy. Detailed reports shall be submitted documenting the procedures and outcome of the commissioning tests. Integrated systems testing such as Emergency Power/Critical Mechanical Equipment operation shall be included in the commissioning scope.

The plumbing systems shall be maintained clean and not be used during the construction period until the systems are commissioned and accepted by the Government.

FIRE PROTECTION DESIGN

General. Fire protection systems shall be designed and provided in accordance with the requirements of this solicitation and the referenced documents.

Scope: A complete wet pipe sprinkler system in accordance with the referenced documents shall be provided for the entire health facility. All source equipment (tanks, fire pumps, drivers, zone valves) shall be installed in the modular building.

Coordination: Design of the system shall be coordinated with the zoning and configuration of the proposed smoke compartmentalization resulting from the fire protection/life safety analysis.

Building construction, life safety and fire protection systems shall be in accordance with UFC 4-510-01, UFC 3-600-01, and the National Fire Codes.

Submittals. Design narrative, calculations and drawings shall be prepared and submitted in accordance with the Section, Submittal Procedures for Design/Build Project and this section.

Systems and accessories selections shall primarily be based on suitability for medical function, effectiveness in preventing freezing, simplicity of maintenance, and dependability.

The Contractor shall calculate building loads and demands for the fire protection system service during project development, and shall verify that available utility capacities will satisfy the calculated demands. Calculation summaries shall be presented in the project narrative as background information for the Contractors use. However, it shall be explained in instructions that the calculations in the project are based on preliminary assumptions and that new calculations will be required by the Contractor to refine and complete the design of the equipment and systems during final design.

The Contractor shall establish the types, capacities, arrangement, and locations of the system components (including distribution routings) during project development.

Plumbing Design References. The sprinkler systems will be designed in accordance with this solicitation, NFPA Standards, UFC 3-600-01, and UFC 4-510-01. The sprinkler system shall use the following design criteria and standards:

AWWA D103 Factory-Coated Bolted Steel Tanks for Water Storage
UFC 4-510-01 Design: Medical Military Facilities (MIL HDBK 1191)
UFC 3-600-01 Design: Fire Protection Engineering for Facilities (2003)
NFPA 13 Installation of Sprinkler Systems (2002)
NFPA 20 Standard for the Installation of Stationary Fire Pumps for Fire Protection
NFPA 24 Standard for the Installation of Private Fire Service Mains
NFPA 1963 Standard for Fire Hose Connections

Fire Protection Engineer Requirements

Fire Protection Engineering Consultant. This project requires the services of a qualified Fire Protection Engineer. If the Contractor proposes to use in-house designers, experience and qualification data shall be submitted to show compliance with the minimum experience and qualification requirements listed below. If Contractor in-house staff is not available, or if experience and qualification submittals are not approved, the Contractor shall use the services of a qualified Fire Protection Engineering Consultant to accomplish fire protection engineering and life safety design requirements for project development. The Fire Protection Engineering Consultant will not simply be a consultant or reviewer of plans, but shall participate in project development as a full member of the Contractor team. The name and credentials (education, registration, experience) of the fire protection engineer shall be submitted with the initial contract documents, and approved by the COR prior to proceeding with the fire protection design.

The following are the minimum experience and qualification requirements. The requirements shall be submitted by the contractor. These requirements are based upon a U.S. qualified fire protection engineer. An individual with international equivalent experience and education may be approved by the COR with sufficient documentation from the contractor. The determination of equivalency will be solely at the discretion of the COR.

A registered Professional Fire Protection engineer, or an individual with a Bachelor or Master of Science degree in fire protection engineering from an accredited university engineering program plus five years of work experience in fire protection engineering, or a registered Professional Engineer that has passed the National Council of Examiners for Engineering and Surveys (NCEE) fire protection written examination, or a registered Professional Engineer with a minimum of 5 years experience dedicated to fire protection engineering.

At least five years of experience in the application and interpretation of NFPA 101, Life Safety Code and/or life safety requirements of model building codes.

At least five years of experience in the design and/or review of fire suppression systems and fire alarm systems, including experience in the review of shop drawings and sprinkler system hydraulic calculations, and the application and interpretation of the National Fire Codes and/or other model building codes.

Experience in the design of medical facilities.

Experience in testing of fire protection systems.

Fire Protection Installer/Shop Drawing Preparer

Fire Protection Designer/Installer: The fire protection system fabrication drawings indicated in UFGS 13930A, "Wet Pipe Sprinkler System, Fire Protection", shall be prepared by a registered fire protection engineer or an individual holding a current Level III or IV competency certificate in Fire Sprinkler Layout issued by the National Institute for Certification in Engineering Technologies (NICET). The fabrication drawings shall also bear the stamp or certificate of this individual.

Sprinkler System Design Requirements

The modular building shall be fully protected with an automatic wet pipe sprinkler system. All areas of the facilities shall be protected including mechanical rooms, electrical rooms, communications rooms, generator rooms etc. The sprinkler system design shall be in accordance with UFC 3-600-01, NFPA 13, NFPA 20 and the appropriate UFGS Specifications Sections.

The sprinkler hazard classifications shall be in accordance with UFC 3-600-01, UFC 4-510-01, and NFPA 13. Design densities, design areas and exterior hose streams shall be in accordance with UFC 3-600-01.

Complete final design of plans, details, diagrams, schedules, legends, symbols, and abbreviations in the solicitation drawings fully delineating all systems indicated. Add drawings as necessary to fully delineate all systems required in the solicitation documents.

Water supply: The water supply for the wet pipe sprinkler system shall be from the Camp Ederle water distribution system.

The sprinkler system shall include, a fire department connection for direct feeding of the system and an exterior water flow alarm horn connected to the building fire alarm system.

Fire Pump: The requirements for the fire pump shall be as indicated in UFGS 13920A as modified by this solicitation. The fire pump shall be in accordance with NFPA 20 utilizing a diesel engine drive. The diesel operated pump shall conform to UL 1247 and be UL listed and FM approved. The fuel supply shall be in accordance with UFGS 13920A, NFPA 20 and NFPA 37 with a dedicated aboveground fuel tank. The tank shall be sized for 5.1 liters/kW (1 gal per horsepower) plus 10%. The pump, engine and fuel system shall be located in the fire pump building.

Hose Stream Hydrant: An aboveground fire hydrant connected to the Camp Ederle fire water distribution system shall be located along a service drive, not closer than 13 meters to the building and not further than 20 meters. The hydrant shall be a DN150 aboveground dry barrel hydrant with 2-DN65 National Standard hose connections and 1 DN115 National Standard pumper connection in accordance with NFPA 1963. Removable adapters shall be provided on each connection to adapt to the local hydrant

thread standard. Contractor shall coordinate with local authorities to determine local thread standard.

Each sprinkler system riser shall include an indicating control valve, and flow switch. All control valves shall be outside screw & yoke(O.S.&Y.) type and be provided with tamper switches. All electronic system components shall be connected to the building fire alarm system.

The exterior hose stream demand shall be in accordance with UFC 3-600-01. This shall be 950 lpm for light hazard, and 1900 lpm for ordinary hazard.

A fire department connection shall be provided for the building, located directly accessible to the fire department on a vehicular accessible elevation of the building.

Sprinkler system shall be protected against earthquake damage. Seismic protection shall include flexible and rigid couplings, sway bracing, and other features as indicated in NFPA 13.

The Contractor shall edit the indicated UFGS for this project. Options and material choices shall be limited to those within the sections. These shall be submitted for review with the preliminary and final design submittals. Marked-up versions of the specifications shall be submitted in the preliminary design submittal to allow reviewer to identify changes made. These specifications shall conform to the design of the sprinkler system. The installation contractor shall submit material data, hydraulic calculations, and shop drawings as required by UFGS 13930A to the Contracting Officer for review prior to installation.

Fire Suppression System Calculations. Hydraulic calculations shall be as indicated in NFPA 13 (per the Design Area Method) except that calculations shall be performed by computer using software intended specifically for fire protection system design using the design requirements indicated in this solicitation. Software that uses k-factors for typical branch lines is not acceptable. Calculations shall substantiate that the design area used in the calculations is the most demanding hydraulically. Water supply curves and system requirements shall be plotted on semi-logarithmic graph paper so as to present a summary of the complete hydraulic calculation. A summary sheet listing sprinklers in the design area and their respective hydraulic reference points, elevations, actual discharge pressures and actual flows shall be provided. Elevations of hydraulic reference points (nodes) shall be indicated. Documentation shall identify each pipe individually and the nodes connected thereto. The diameter, length, flow, velocity, friction loss, number and type fittings, total friction loss in the pipe, equivalent pipe length and Hazen-Williams coefficient shall be indicated for each pipe. For gridded systems, calculations shall show peaking of demand area friction loss to verify that the hydraulically most demanding area is being used. Also for gridded systems, a flow diagram indicating the quantity and direction of flows shall be included. A drawing showing hydraulic reference points (nodes) and pipe designations used in the calculations shall be included and shall be independent of shop drawings.

Material and Equipment. UFGS 13930A shall be edited to include the following minimum requirements: Sprinkler piping shall be black steel with iron fittings. Pipe 50 mm and smaller shall be schedule 40 and pipe 65 mm and larger shall be schedule 10. Fittings and joints shall be threaded, flanged, grooved, or shop-welded. Fittings employing plain-end pipe or devices which bite the pipe surface shall not be used. Indicating control valves shall be outside stem and yoke (OS&Y) design and shall include a position monitor switch. Underground valves shall be post indicator type.

ELECTRICAL DESIGN

General. Electrical design shall conform to the latest design criteria, standards, codes, UFC 4-510-01 Design: Medical Military Facilities (formerly MIL-HDBK-1191 Medical and Dental Treatment Facilities Design) (October 16 2003) and locally accepted equivalent host nation practices. Selected design products that have been proven reliable and trouble-free in commercial service locations for two years and longer in an environment similar to that of the project site. No aluminum conductors shall be used in the construction of this facility; no aluminum buss shall be used in switchboards and panel-boards; and no transformers shall have aluminum windings.

Design and Construction. The design and construction of the electrical systems shall be in accordance with: (1) United States National Fire Protection Association Standards; (2) the rules and recommendations of ANSI C2; (3) as required herein; (4) Internationally recognized or Host Nation standard that can be determined to be substantially equivalent by the contracting officer to the standards mentioned herein; and (5) the attached Guide Specifications. Guide specifications are included in this solicitation for use in preparation of the design and shall be edited consistent with the criteria furnished.

Electrical Design Criteria:

ANSI C2 2002 National Electrical Safety Code
NFPA 70 - 2002 National Electrical Code
NFPA 99-2002 Health Care Facilities
NFPA 101-2000 Life Safety Code
Unified Facilities Criteria (UFC) 3-600-01 Design: Fire Protection (formerly MIL-HDBK-1008C Fire Protection for Facilities) (April 17 2003)
UFC 4-510-01 Design: Medical Military Facilities (formerly MIL-HDBK-1191 Medical and Dental Treatment Facilities Design) (October 16 2003)
ETL 1110-3-412 Transformer Application Guide
ETL 1110-3-432 Exit Signs
ETL 1110-3-441 Electronic Ballast for Fluorescent Lighting Fixtures
TI 800-1 Design Criteria
TI 811-16 Lighting Design
TM 5-811-1 Electrical Power Supply and Distribution
TM 5-811-2 Electrical Design Interior Electrical Systems
TM 5-811-14 Coordinated Power Systems Protection

Special Conditions. Evaluate local regulations, environmental concerns, existing conditions or other unique factors, which may require special electrical design considerations. State in the design narrative these special conditions, and the resulting design safeguards or solutions proposed for the design. Special aspects include climate conditions, local power distribution and grounding methods, multiple service entrances, exposed exterior power cables, limited power sources, day-lighting extremes, and use of CONUS (Continental United States) products.

Seismic Protection and Structural. Electrical equipment and distribution systems may require special seismic protection design to the extent required by criteria for this project site. Design/builder shall confirm design drawings and specifications for electrical systems and components are coordinated with other trades to insure that structural anchorage, supports, bracing and restraints are adequate for personnel and property protection. Seismic design requirements shall be in accordance with UFC 4-510-01, UFGS 13080 SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT and UFGS 15070A SEISMIC PROTECTION FOR MECHANICAL EQUIPMENT. The Seismic classification shall be as indicated in Section, Structural Design.

Site Power.

A commercial power grid feeds the vicinity of the project site. Details may be obtained from the office of the 22nd ASG DPW. The facility will be served by the two primary service feeders each serving one end of a new double-ended substation and shall include an interlock tie-breaker to provide two sources of normal power. The Design-Build Contractor shall provide a Design Analysis and Narrative, which will be included in the Design Submittal. The narrative shall discuss site power topics such as distribution and utility power reliability, available system capacity allocated for this project, condition of the electrical distribution to the project, physical site obstructions above or below grade, and any other pertinent observations. Any required upgrading of electrical distribution services necessary for a usable project, but beyond the identified project scope shall be identified expeditiously in order to avoid adverse conflicts with project schedule or funds. Design/builder shall validate local on-site project power and criteria requirements, and obtain a realistic and current estimate of power source capacity and reliability available for this project.

Services. Primary service feed for this project is available from the two transformer stations located near Bldg. 113. ETL 1110-3-412, Transformer Application Guide will be utilized in the selection and application of transformers and dielectrics. Design/builder shall use special grounding systems and testing methods as used in local practice to verify site ground resistance. Design intent is to provide special grounding methods as required for patient care areas, specifically involving invasive procedures.

Preliminary Demand Load Calculations: At this stage of design, only an estimated demand load calculation based on the area and use of the facility will be given. The Temporary Birthing Center facility is based upon NFPA 70 (NEC) Art. 517-3 as hospital. Based upon industry standard value of average kW per square foot by business type (assuming 3000 hours of full load operation) for a hospital = .017 kW/sf. This equates to about 170VA/SM. Using this value, the estimated load is 170VA/SM X 702 SM (building gross area) = 120 kVA. A double-ended unit substation will be required by the Contractor in accordance with Figure 10-1 of MIL-HDBK-1191.

Note that a manually operated primary selector switch and fused load break disconnect switch will be provided for each transformer (2 X total kVA required for the configuration).

Power Distribution (Interior Electrical Requirements)

General. The interior electrical distribution system shall be configured as required for the Camp Ederle power system utilizing a separate equipment ground conductor run continuous throughout the facility. Actual electrical loads and demand factors, where known, shall be used for electrical calculation purposes. Where loads are unknown, the contractor shall utilize loading and demand factors outlined in NFPA 70. The Contractor shall follow the guidelines outlined in UFC 4-510-01 Design: Medical Military Facilities (formerly MIL-HDBK-1191 Medical and Dental Treatment Facilities Design) (October 16 2003) Chapter 10. Branch circuits feeding receptacles of unknown loads shall be limited to 1200 VA per circuit. The interior electrical distribution system shall be designed with a minimum of 25% excess load capacity in all motor control panels, panelboards, and feeders after all load and demand factors have been applied to the electrical calculations. Additionally, all distribution panelboards shall have 25% excess physical space for future use. All electrical equipment shall be located in rooms, closets or spaces dedicated solely for this purpose. Article 408, Switchboards and Panelboards, of the National Electrical Code and applicable BS EN standards shall apply. Circuits will be sized to limit voltage drops to no more than 5% at the worst condition. The design goals will be to limit voltage drops to 2% on feeders and 3% on branch circuits. All wiring shall be copper conductors.

Location. Generally all electrical distribution panelboards and transformer components, like multi-tap transformers, shall be located only in electrical rooms or closets, with authorized personnel access only. Electrical rooms have been indicated on the plans to minimize distribution power losses, and for efficient use of distribution components. Design-Build contractor must verify that electrical rooms and dedicated spaces will be used only for electrical power equipment, with no other building systems, piping, or ducts passing through electrical rooms, except for service to such room. Design-Build contractor provides space for future panelboards and dry transformers. Design-Build contractor provides out-swinging doors where needed to improve equipment access, and electrical personnel workplace safety.

Coordination with Existing Service. The Contractor shall interface the electrical portion of the modular units in the designated electrical rooms by providing a circuit breaker enclosure for each area. The circuit breaker shall be sized according to the load requirements of the individual modules. The Contractor shall provide the feeders from the main substation switchgear to the circuit breaker enclosures, and from the circuit breaker enclosures to the MUSC electrical panels located in the modular areas. The MUC feeders will be terminated within the MUC panels serving the modular areas.

Growth Capacity. Design/builder provides at least 20 percent future load growth capacity in all cable and electrical equipment, plus provides at least 25 percent spares and spaces in each panelboard.

Nonlinear Loads. Design builder shall verify the nonlinear load requirements for each power distribution area, and identify equipment and building wiring requiring harmonic

ratings or special design, as follows. These conditions will be prevalent with equipment that has diode-capacitor input power supplies, i.e., personal computers, printer, and medical test equipment. For those areas with high nonlinear load, "K" factor rated transformers are required. Power circuits serving workstations shall be sized to accommodate personal computer equipment at each workstation. Drawings will indicate which circuits are rated to serve nonlinear loads such as electronic and computer equipment. Provide a dry transformer schedule identifying the "K" factor, primary and secondary voltage rating, and kVA. Provide larger or multiple neutrals, and any other design features necessary to accommodate significant harmonic load currents. See ETL 1110-3-403. Each communications/data workstation outlet will be provided with an adjacent duplex receptacle on a dedicated circuit which serves not more than four duplex receptacles, and which includes a non-shared neutral. Where a 220 volt receptacle is incorporated in the same metal box with a communications/data, television or LAN outlet, a partitioned metal box with separate power and signal conduits will be provided. Coordinate the location of the independent 220 volt circuits with the user for facsimile equipment, copy equipment and laser printers.

Protective Device Coordination. Design-Build contractor coordinates electrical equipment as follows. Provide a short-circuit and protective devices coordination studies in accordance with TM 5-811-14. Selection of protective devices and switchgear for a new electrical system shall be based on a short-circuit protective device coordination analysis. The analysis shall include all existing system protective devices affected by alterations and additions to the system. All protective devices shall be properly coordinated to provide selective tripping. *Do not provide series rated equipment.* The coordination study shall be done using a manufacturer's actual fuse and breaker curve data.

Convenience Outlets. Provide a minimum of one general purpose 220 volt duplex (in a double pole switched configuration for extra safety) receptacle outlet per wall in each room. In rooms where walls exceed 3 meters, provide an additional duplex outlet for each additional 3 meters of wall or fraction thereof. Receptacle spacing shall not exceed 3 meters for administrative areas. The general purpose receptacles are in addition to the special purpose and dedicated outlets for special equipment. General-purpose duplex receptacles in corridors will be located with a maximum spacing of 15 meters. The Lounge Area will be served with all electrical appliances and equipment. *Refer to Lounge Equipment Schedule for detailed requirements.* In an effort to address the potential overheating effects of neutral conductors due to substantial non-linear loads, dedicated 220 V circuits will be provided for fax machines, copy machines, and laser printers. In addition, the computer workstation receptacles will be fed by 220 V branch circuits with no more than four receptacles per circuit. These branch circuits will be provided with a separate neutral conductor to mitigate the effects of nonlinear loads. Also, significant non-linear producing loads will be connected to the same electrical panel with an oversized neutral. **Receptacles and wall plates connected to emergency power shall be red in color.**

Motors. Design-Builder may provide motor control centers where appropriate for efficient power distribution to concentrations of motors. Provide a motor schedule, which identifies the load, voltage, horsepower, full load current and the service factor. The Service Factor (SF) should be not less than 1.15 for motors, which are accessible for repair and/or replacement.

Emergency Power. Facility program indicates need for a hospital emergency system meeting requirements as noted in UFC 4-510-01 Design: Medical Military Facilities (formerly MIL-HDBK-1191 Medical and Dental Treatment Facilities Design) (October 16 2003), to include special operations and test requirements for the automatic transfer switch. Emergency lighting provided shall comply with NFPA Standards and the IES where not modified by other criteria or standards. Emergency power for life safety and critical patient care (NEC 70, Emergency System loads) will be segregated from essential building equipment (NEC 70 Equipment System loads) to a degree necessary to minimize disruption of the "Emergency System" due to operation of the "Equipment System General reliability recommendations as indicated in UFC 4-510-01 Design: Medical Military Facilities (formerly MIL-HDBK-1191 Medical and Dental Treatment Facilities Design)(October 16 2003)shall be adhered to. For additional requirements, refer to the Project Room Report for designation of emergency loads. In addition, include feeders from two ends of a primary loop system, feeding to dual-ended secondary substation and a bypass isolation transfer switches.

Emergency Diesel Generator. The existing emergency generator sets in Bldg. 113 shall be modified to provide emergency power to the Temporary Birthing Center. These generators are expected to require minimal reconditioning to provide reliable service. The Contractor shall be responsible to revitalize the generators and connect them to the Temporary Birthing center, including all required equipment, panels, and preliminary testing, plus underground fuel storage tank.

Generator Mounted Circuit Breakers: Contractor shall supply (3) Main Generator mounted circuit breakers wired VAC.

1. (1) 1250 AMP Main Load
2. (1) 1000 AMP Load Bank (for connecting a portable load bank)
3. (1) 400 AMP For parasitic load center

Generator Room. Room shall have wall louvers sufficient to provide make-up air for the cooling system. The engine generator room shall contain all the necessary system components; double doors shall be provided for access to all controls and equipment requiring periodic maintenance or adjustment, and to allow installation and removal of the engine generator set.

Day Tank. The engine generator set shall be provided with an integral base mounted day tank mounted below the generator.

Fuel Storage Tank: The Contractor shall provide and install an underground fuel storage tank (UST) with sufficient capacity, or refill capability, for 72 hours continuous

operation. The UST shall be designed, fabricated, and installed in accordance with current US and Italian Environmental Final Governing Standards. Offerors unfamiliar with these standards are encouraged to contact the 22nd ASG DPW's office at Camp Ederle. The tank shall be of double-wall construction with interstitial leak detection and alarm system. Tank shall be located in a reinforced concrete pit with locking, removable reinforced steel cover – design and construction by Contractor. Tank shall be large enough to supply fuel to the generator for 72 hours continuous at 70% capacity.

Surge Protection and Power Conditioning. Provide surge protection at main distribution panels and secondary locations. Unless otherwise noted herein, UPS systems shall be sized and provided for all telecommunications closets and blood bank according to the load requirements. Refer to Section, Telecommunications Design. Other special power conditioning equipment will be procured by the Army for any user computer or process equipment requiring no break or conditioned power. In addition, the Design-Builder shall provide source equipment and size the UPS for Telecommunications Headend equipment and a Central Battery Bank for the Operating Room Lighting. The electrical equipment shall be located as indicated Communication utility rooms (Surgical Battery Bank shall be located in the Electrical Room provided for the O.R. area).

Lighting

Lighting Levels and Characteristics. Lighting intensity Lux levels shall be in accordance with UFC 4-510-01 Design: Medical Military Facilities (formerly MIL-HDBK-1191 Medical and Dental Treatment Facilities Design) (October 16 2003) for any areas referenced within, with general limitations for non-itemized areas per MIL-HDBK-1190. Refer to Appendix C Project Rooms Details Report for requirements to include Lux lighting levels for each room. The report also gives ceiling heights which is required for accurate lighting calculations. Further general guidance is provided by the Illumination Engineering Society (IES) Lighting Handbook and applicable publications. See IES Lighting Handbook and related publications for lighting of exterior areas not covered in UFC 4-510-01 Design: Medical Military Facilities (formerly MIL-HDBK-1191 Medical and Dental Treatment Facilities Design) (October 16 2003), or TI 811-16. Improved color quality lamps shall be used in patient care areas, and high color rendering index lamps shall be used for critical visual task areas, per UFC 4-510-01 Design: Medical Military Facilities (formerly MIL-HDBK-1191 Medical and Dental Treatment Facilities Design) (October 16 2003). Propose alternatives to special lighting products where replacement cycles or stocking of special products would adversely affect mission requirements. General use of wide spectrum lighting products could be a choice for local conditions, and possibly could reduce excessive lamp stocking.

Intensity: Lighting intensity Lux (foot-candle) levels shall be in compliance with UFC 4-510-01, [Appendix A](#) as modified by appropriate ETLs and with general guidance provided by the Illumination Engineering Society (IES) Lighting Handbook. The light Lux (foot-candle) levels for exterior areas not listed in the UFC 4-510-01 shall be in accordance with the IES Lighting Handbook.

Interior Lighting System: Include the following requirements:

- A. Illumination should be provided with fluorescent luminaries. Incandescent and High Intensity Discharge (HID) fixtures may be used in special areas or for architectural design reasons. Commercial standard fixtures and custom light fixtures shall be used.
- B. Fluorescent lamps should be F32T8, cool white equivalent for administrative and classroom areas, 32 watts energy saving types with a temperature of 4,100K and a minimum Color Rendition Index (CRI) of 82. Color improved fluorescent lamps shall be used in required areas to provide enhanced color rendering and high efficiency with a temperature of 5,000K and a CRI of 80 or better. For areas where electronic ballasts are a concern (OR, DR, LDR, etc.) and electromagnetic ballasts are used, fluorescent lamps shall be color improved with a temperature of 5,000K and a CRI of 90.
- C. HID lamps shall be high pressure sodium with dual re-strike elements.
- D. Lighting fixtures are generally rated for 277 volt operation except certain incandescent lighting fixtures that shall be rated for 220 volt operation.
- E. Fluorescent ballasts shall be the high power factor electronic energy saver types. The inverter frequency shall be at the level and frequency range so as not to interfere with operations, calibration of equipment and communications. The nonlinear load generated by the switch-mode power supply shall not exceed 10 percent of the fundamental current. See ETL 1110-3-441.
- F. Energy efficient design considerations shall include use of efficient lamps and luminaries, automatic lighting control, and other alternatives that meet the reliability, durability, and maintainability requirements of the mission. Utility areas may use low cost low efficiency lighting where justified by low usage and by some automatic shut-off such as door switches. Natural day-lighting should be used where feasible and economical. Electronic ballasts are not recommended where the ambient temperature for any reason could exceed 40 °C (104 °F).
- G. Life safety egress illumination shall include 25 percent of corridor plus 25 percent of assembly areas such as conference rooms/classrooms.
- H. Light Emitting Diode (LED) exit signs shall be used and shall conform to the performance requirements of ETL 1110-3-432.
- I. Light fixture lenses made of plastic shall be virgin acrylic.
- J. If recessed light fixtures are used, they shall be supported from the structure.
- K. Provide 15 to 25 percent general lighting and 100 percent of task lighting for operating rooms, emergency treatment rooms, and any other room where invasive procedures shall be provided with 1-1/2 hour battery backup illumination that shall operate without interruption during periods of normal and emergency power lapse. Batteries for lights in operating and delivery rooms shall be located outside those rooms for ease of replacement and maintenance. Battery capacity may be reduced to 1/2- hour illumination if backed-up by two or more emergency generators. A minimum of one battery-powered light shall be provided in the generator set and emergency switchboard location and in central communication rooms.

L. All High Pressure Sodium (HPS) lamps shall have dual re-strike elements.

Interior Lighting Fixture Types: Include the following requirements:

A. General offices, service corridors and general purpose areas shall typically have 600x1200mm (2'x4') recessed fluorescent troffers with virgin acrylic prismatic lenses and two to four lamps per fixture.

- B. Offices, laboratories and areas with numerous Personal Computer (PC) workstations and/or video display units shall have low glare and low brightness type luminaries to reduce reflected images on the PC screens and to improve visual comfort.
- C. Small storage rooms shall have 300x1200mm (1'x4') surface or pendant mounted fluorescent luminaries with wrap-around virgin acrylic lenses and two lamps per fixture.
- D. LED exit fixtures shall be used and shall meet the performance requirements of ETL 1110-3-432. Provide a manufacturer's certification for each type of exit sign.
- E. HID luminaries shall be used in areas with high ceilings and open construction.
- F. Conference rooms and/or classrooms shall be provided with multi-level lighting consisting of 600x1200mm (2'x4') recessed fluorescent fixtures and recessed incandescent down lights controlled by dimmer switches.

Interior Controls: Include the following requirements:

- A. Switching of light fixtures in rooms shall typically consist of a single on-off switch that controls all general room lighting located adjacent to the room entrance.
- B. Multiple switching shall be provided in large rooms and areas to allow switching of individual zones or areas. Each zone shall be provided with a separate switch.
- C. Multiple switching shall also be provided for light fixtures with two ballasts. One switch shall control the outer lamps and the other switch shall control the inner lamps.
- D. Separate dimmer controls shall be provided for rooms with dimming ballasts or incandescent fixtures that are required to be dimmed.
- E. Timer switches shall be provided in rooms with infrequent use such as janitor closets, equipment storage rooms and public toilets.
- F. Special areas such as entries and lobbies shall be switched through lighting control panels. Photoelectric control units shall switch the lights off when daylight is sufficient to illuminate the space.
- G. Split switching shall be required in all examination rooms and provider office

Workstation Computers. Design builder shall coordinate lighting design as follows. Lighting in offices and work stations containing video display units or computer terminals, shall incorporate shielding, indirect luminaries or other approved low glare/low brightness design features. Visual Comfort Probability (VCP) calculations are not required; however lighting design and fixture selection shall incorporate high VCP characteristics.

Energy Efficiency. Design considerations include use of efficient lamps and luminaries, automatic lighting control, and other alternatives proposed which are justified through life cycle cost analysis studies and which meet the reliability, durability, and maintainability requirements of the mission within authorized budget. Utility areas may use more economical lighting where justified by low usage or by automatic control.

Automatic lighting controls will not be used in functional areas, unless the U.S. Army considers such use appropriate for the mission. Incorporation of natural day-lighting should be considered where feasible and economical. Where electronic ballasts are used, provide high power factor, low distortion types. Fluorescent ballasts shall be the high power factor, electromagnetic or electronic, energy saver types. If electronic ballast is used, the inverter frequency shall be at the level and frequency range as not to interfere with operations, calibration of equipment and communications. The nonlinear load generated by the switch-mode power supply is limited to typically 10 percent of the fundamental current. See ETL 1110-3-441. Electronic ballasts are not recommended where the ambient temperature for any reason could exceed 104 degrees Fahrenheit. Incandescent and other inefficient fixtures are discouraged for use. High intensity discharge (HID) fixtures may be used indoors where the fixtures are located at least 8 m above the work plane.

Utilization Voltage. The ceiling light fixtures are typically rated 220 volt for efficient system operation. Consider locally replacement part availability in establishing system design voltage.

Egress Lighting. The life safety branch of the emergency lighting shall be provided for life safety egress routes and exit marking. Design-Build contractor verifies operation as follows: Selective corridor lighting fixtures and exit signs will be connected to the life safety branch of the emergency power. These life safety lights shall re-illuminate within 10 seconds after the loss of normal power and shall meet or exceed NFPA-101 and NFPA 70 requirements. Life safety egress illumination will include 25 percent of corridor and 50 percent of stairway illumination, plus 25 percent of assembly areas such as conference/class rooms. Verify exit sign criteria and standards conforms to ETL 1110-3-432. LED exit signs to be used shall include a minimum of 160 high output LEDs per face for improved legibility in smoky conditions.

Battery Back-Up Luminaires. Operating Room lighting shall be provided with a Central Battery System that uses batteries housed in a large cabinet. They supply backup power to specified lighting fixtures from a central location, and can also power some other functions that may be needed. These units must generally be in separate, vented rooms as the batteries used often give off hazardous vapors.

Egress paths of light fixtures (luminaries) shall be provided with battery back-up ballasts to provide continuous illumination during the 10 seconds it takes the generator to start.

Interior Controls. Switching of light fixtures in rooms shall typically consist of a single on-off switch adjacent to the entrance which controls all general room lighting. Multiple switching shall be provided in large rooms and areas to allow switching of individual zones or areas. Each zone shall be provided with a separate switch. Where multi-level lighting is required in a given space, provide two ballasts per light fixture and dual switching. One switch shall control the outer lamps and the other switch shall control the inner lamps. Provide dimmer controls in rooms where continuous lighting adjustments are required. Evaluate need for timer switches in rooms with infrequent use, such as

janitor closets, equipment storage rooms and toilets. Verify with the user. Design-Build contractor shall verify the following. Special areas such as entries and the lobby shall be switched through lighting control panels, utilizing photoelectric control units to switch the lights off when daylight is sufficient to illuminate the space. Lighting control panels shall also interfaced with the building management system for programmed time control or override of the photoelectric control. User guide plates provide the functional design intent for lighting controls.

Exterior Lighting Systems. Provide building security lighting with wall mounted 70 watt high pressure sodium fixtures with constant watt autotransformer ballasts, low temperature rated, with control by photoelectric sensor via lighting contactor. Installation of these fixtures shall be coordinated with 22nd ASG DPW to avoid interfering with Italian neighbors and other functions at Camp Ederle. The locations for these fixtures are to be selected to prevent the fixtures from being iced over from snow fall. Design/builder shall verify adequate illumination for exterior entrances. Provide emergency power for illumination of emergency service entrances and associated signage. Site illumination levels shall be in accordance with the recommended levels of the Illumination Engineering Society (IES) for the specific areas, except modified as needed for local safety and security requirements. Lamps with dual re-strike elements shall be provided for safety concerns, if this type is compatible with the Installation standards.

Exterior Controls. Design-Build contractor verifies operation of photoelectric control units to switch the lights on at dusk and off when daylight is sufficient for illumination. Incorporate the lighting controls with the building management system if provided for programmed time control or override of the photoelectric controls for special events or testing.

Special Systems

Provide rigid steel conduit with pull wire for any specifically identified security or other special system use.

Commissioning. The commissioning test plan shall include the normal and emergency interface requirements.

Seismic Protection. Building electrical equipment and distribution systems shall be protected from seismic activity in accordance with the guidance provided in TI 809-4.

Service Requirements. The building power factor shall be greater than 0.90, the phase loads shall be balanced. Phase loads shall not deviate more than 10% between phases. Site Power. The Contractor shall (1) incorporate site and field design data for existing or planned power service, including site-generated, (2) validate project power and criteria requirements and the power source capacity available for the project, and (3) confirm power reliability and condition of electrical distribution to the project. Any necessary upgrading of electrical distribution shall be identified.

Load Sizing. The distribution lines and equipment shall be able to serve the full design load of this facility plus at least 20 percent load growth.

General Power. The design requirements are as follows:

- A. Identify any exterior and interior environmental conditions and special requirements that shall affect cable, power and electronic equipment selection and application.
- B. Fall-of-potential ground testing method shall be used to validate grounding. Because of the sensitivity of the equipment, it is recommended that the contractor coordinate with the 22nd ASG DPW's office if ground resistance lower than 25 ohms is required (See NFPA 70, Article 250.). If the 5-ohm communication ground is bonded to the power ground, then the system ground resistance shall be 5 ohms or less.
- C. Provide short-circuit and protective devices coordination studies in accordance with TM 5-811-14. Selection of protective devices and switch-gear for a new electrical system shall be based on a short-circuit protective device coordination analysis. All protective devices shall be properly coordinated to provide selective tripping. Do not provide series rated equipment. The coordination study shall be done using a manufacturer's actual fuse and breaker curves on full size log-log paper similar to K&E 48 5258, not as a computer program. Show methodology of computations.
- D. Back-to-back receptacles shall not be installed. See Medical Design Guide Plates and coordinate with USAHFPA on special outlets.
- E. Each LAN workstation outlet shall be provided with an additional well-defined adjacent duplex receptacle on an independent single phase (20 ampere, 220 volt) circuit having not more than four duplex receptacles and a non-shared neutral. Where a 20 ampere, 220-volt receptacle is incorporated in the same metal box with a television or LAN outlet, a partitioned metal box with separate power and signal conduits shall be provided.
- F. Provide independent circuits for fax and copy equipment and laser printers. Coordinate locations with USAHFPA.
- G. Receptacles in crawlspaces and shops shall have GFCI protection.
- H. Provide at least 25 percent spare spaces and 20% future load growth capacity in each panel-board, switchboard and switchgear.
- I. Emergency power is required. Evaluate the need for emergency power and identify the requirements. Uninterrupted Power Sources are required for

communications closets, operating room suites, blood bank, and any other locations that cannot suffer a loss of power.

- J. Validate nonlinear load requirements, incorporate these into the sizing of all electrical equipment and conductors, and identify the multiplier for equipment and building wire size. Drawings shall indicate which circuits shall serve nonlinear loads such as electronic and computer equipment. Provide larger or multiple neutrals to accommodate the resulting harmonic currents.
- K. For those areas with a high nonlinear load, "K" factor rated transformers are required. Provide a transformer schedule that identifies the "K" factor, primary and secondary voltage, and kva ratings.
- L. Power circuits serving workstations shall be sized to accommodate personal computer equipment at each workstation. Drawings shall indicate which circuits shall serve nonlinear loads such as electronic and computer equipment. Provide larger or multiple neutrals to accommodate the resulting harmonic currents (ETL 1110-3-403). UPS or other power conditioning equipment shall be procured along with the computer or process equipment requiring no break or conditioned power.
- M. Provide a motor schedule that identifies the load, voltage, horsepower, full load current and Service Factor (SF). The SF should be not less than 1.15 for motors that are accessible for repair and/or replacement.
- N. Power voltage for receptacles shall be 220V.

Lightning. Perform a lightning risk assessment per NFPA-780 and TM 5-811-3. The structure category for this "Type of Structure" index is considered to be a hospital building. If a lightning protection system is required, the system shall be a UL Master Labeled system.

TELECOMMUNICATIONS DESIGN

Codes and Standards. The project shall be designed and constructed within the codes and standards as indicated in Section 1, Project Description and General Requirements, and applicable publications as listed below and in the Guide Specifications.

Applicable Publication: The most current editions of the publications listed below constitute an addendum to this chapter wherever referenced or applicable.

Design Criteria

NFPA 70 National Electric Code (2003)
ANSI C2 National Electrical Safety Code
EIA 232-D Interface Between Data Terminal Equipment and Data Communications Equipment Employing Serial Binary Data Interchange (*between computer and modem/telephone line*)
EIA/TIA 568-B.1 (2001) Commercial Building Telecommunications Wiring Standard (*Pin-out per AT&T Specification*)
EIA/TIA 569A (1996) Commercial Standard for Telecommunications Pathways and Spaces (*cabling pathways and dedicated rooms*)
EIA/TIA 606 (1993) Administration Standard for the Telecommunications Infrastructure of Commercial Buildings (*administrative record-keeping elements of a modern structured cabling system*)
ANSI/EIA-607 (1994) Grounding and Bonding Requirements for the Telecommunications Infrastructure of Commercial Buildings (*Telecommunications Bonding Backbone (TBB) standard*)
EIA/TIA TSB 67 (1995) Transmission Performance Specifications for Field Testing of Unshielded Twisted-Pair Cabling Systems (*100-ohm UTP cabling and connecting hardware in the horizontal subsystems of structured cabling systems*)
EIA/TIA TSB 95 (1998) Field Certification of installed category 5 channel for use with 1000Base-T (*Additional Transmission Specifications for 4 Pair 100-ohm Category 5 Cabling*)
NFPA 99-1999 Health Care Facilities
NFPA 101-2000 Life Safety Code
Unified Facilities Criteria (UFC) 3-600-01 Design: Fire Protection (April 17 2003)(formerly MIL-HDBK-1008C Fire Protection for Facilities) UFC 4-510-01 Design: Medical Military Facilities (October 16 2003) (formerly MIL-HDBK-1191 Medical and Dental Treatment Facilities Design)
MIL-HDBK 1012/3 Telecommunications Premises Distribution Planning, Design, and Estimating (May 31 1996)(formerly TM5-811-9 Voice/Data Telephone Systems)
UFC 4-021-01, Design and O&M: Mass Notification System (December 2002)
International Building Code (2003)
NFPA 72 National Fire Alarm Code (1999)

Design Analysis (DA). The Communications Design-Builder Contractor (CDBC) shall insure that all of the communication systems are described in great detail in the DA. This

effort shall begin with the elaborating of the first design submittal from the Medical Telecommunications Consultant (MTC) and the systems descriptions shall continue to be elaborated/expanded through the Final Design-Build submittal. Particular attention shall be given to this area to insure the DA provides a complete detailed narrative on the scope, equipment, function and operation of each system. The DA shall serve as the basic document against which the design shown on the drawings and in the specifications is checked. The CDBC shall first insure the Design Analysis is accurate and then shall coordinate the drawings and specifications with these documents. The CDBC shall coordinate all aspects of the communications systems design with the other disciplines and shall participate in the development of the cost estimates. The CDBC shall design all of the communications systems in lieu of involvement with only selected systems. The CDBC shall develop the drawings and specifications that will be included in the Final submittal for this Design-Build project. The extent of the design shall be as defined in earlier portions of these Design Instructions.

The CDBC shall insure the initial cost estimates include cost data for all of the communications systems. Backup data shall be in sufficient detail to allow for a complete review of the summary figures provided.

Medical Telecommunications Consultant (MTC). The Contractor for this project shall obtain the services of a Medical Telecommunications Consultant (MTC). The CDB Contractor for this portion shall confirm that the MTC is approved by USAHFPA before the start of any design work, and is utilized for all aspects of the design of all communications systems. The MTC shall coordinate all aspects of communications systems design with all affected disciplines and shall participate in the development of the communications cost estimate. The MTC shall design all of the communications systems listed in lieu of involvement with only selected systems. The MTC shall perform all of the site investigation work for the communications systems and shall not be involved as a primary site investigator for any other discipline. The intent is to achieve successful coordination of all aspects of the construction contract with respect to selection and interfacing of the telephone/data, premises distribution, nurse call, access control/IDS system, public address, mass notification, and fire alarm systems.

Site Telephone/Data System. The outside plant cabling at Camp Ederle includes NIPRNET, SIPRNET, CENTRIX, and VTC. The proposed Birthing Center will require extensive collaboration for the outside plant system and services. As a result, the CDBC shall perform an investigation of the proposed site to determine possible routing requirements for the site telephone cables and the site data cables. This will include determination of the number of voice and data outlets required in each area (this includes determination of the number of required workstations as defined in MIL-HNBK 1012/3); number of cables of each type to be run to each outlet; type of horizontal distribution pathways to be used; conduit sizes; utilization of telecommunication closets indicated in the plans without exceeding horizontal distance restrictions of EIA/TIA 568; and equipment layout in telecommunications rooms. The MTC shall be present in the initial site visit, in conjunction with the Camp Ederle Information Management Officer representatives to discuss and determine equipment location and connection responsibilities. The MTC shall evaluate and determine the interface of the Telephone

Service to the modular building from the existing clinic PABX via individual switching cabinets. The MTC shall develop the Telephone Station Requirements Matrix (TSRM) and identify the required telephone sets. Procurement of the telephone sets and any and all switching equipment (hardware and software) shall be done under this contract. The MTC shall coordinate with the Signal Battalion at Camp Ederle for all issues relating to this section.

Premises Distribution System (PDS)

The CDBC (MTC) will design the PDS for this facility. The total design of the PDS shall consist of the telephone and data copper and fiber inside plant cable, outlets, terminal blocks, cross-connect fields, patch panels, fiber optic interfaces for voice and data networks. In addition, provide an EIA 19" standard double-tier rack for future Government- Furnished, Government-Installed (GFGI) equipment for the LAN. The PDS shall include both copper and fiber optic cables. The outlet at each workstation shall include connectors for both voice and data terminals. Each telecommunications room shall be provided with a dedicated UPS sized to allow for proper operation. One four pair Category 5 or higher UTP cable shall serve the voice portion. Multimode 62.5/125 micron, tight buffered, tight tube, fiber distributed digital interface (FDDI) grade fiber optic cable shall be installed in the vertical backbone to support data systems. User terminal equipment shall be compatible with the fiber optic cable installation. In open areas or offices that require voice/data outlets at locations away from the walls, coordinate at these locations. All UTP and fiber optic data cables shall be terminated on patch panels in the communications closets. The CDBC shall insure that all UTP (and fiber optic) outlet jacks and terminal blocks are rated at the same category or higher as the connected cable (fiber).

Tone Visual Nurse Call System

A Tone Visual Nurse Call system will be required for this facility. The total design of the Tone Visual Nurse Call (TVNC) System shall be by the MTC in accordance with the latest version of UFC 4-510-01 Design: Medical Military Facilities (October 16 2003)(formerly MIL-HDBK-1191 Medical and Dental Treatment Facilities Design), Section 11. The design will include the Design Analysis, Drawings, and Specifications. This will include all equipment, wiring, back-boxes, conduit and cable tray, space allocation for the central and distributed equipment. Contractor shall coordinate all necessary utilities such as electrical power and grounding and local ventilation associated with the operation of the system.

Public Address (PA) and Paging System. A zoned, distributed multi-channel stand-alone voice PA system shall be furnished and installed in the facility. The system shall be zoned and shall include an all-call function. The system shall be provided in all building common areas, to include all corridors, hallways, and open use areas, medical and nursing staff areas, lounges and lobbies, waiting areas, locker rooms, and public restrooms. Voice inputs shall be via microphone input. The total design of the PA system shall be accomplished by the MTC. This will include drawings and specifications for this

Construction contract. The CDBC Contractor shall provide the total system including the infrastructure needed to support the PA system within the site built portion of the facility, and up to the connection points in the modular sections. This will include all back-boxes, conduit, cable tray space, space allocation for central and distributed hardware equipment, antenna structural support, and all necessary utilities such as electrical power, grounding and local ventilation. ***Note: Zone selection and telephone interface equipment SHALL NOT be part of the PA System via the telephone system.***

Mass Notification System. An independent mass notification system shall be provided, with design in accordance with UFC 4-021-01 Paragraph 4-2.1. The system shall provide capability to broadcast live and prerecorded voice messages (4 minimum) from a central control unit located in the nursing control area. The system shall include a secure local operator console with microphone, display, and controls. Visual alarms, in all locations similar to the fire alarm system, and voice messaging, in all locations similar to the PA system, shall be provided. Textual displays shall be located in waiting areas. The textual displays shall display two lines of text. The mass notification system may be interfaced with the public address system, provided that additional speakers are used to attain total coverage of the building area. If this method is used, features must be provided in the public address system to insure that emergency messages have priority over non-emergency messages. Visual alarms shall be unmarked strobe-type, amber colored and shall be separate from the fire alarm system. A temporary over-ride of the audible fire alarm system devices and provision for future transmission of fire alarm over-ride to the main fire station shall be provided. Wiring system shall be supervised. An autonomous control unit with self-diagnostics, displays, back-up battery power, and provisions for redundant communication links between building control unit and future base central shall be provided.

Intrusion Detection System (IDS). IDS shall consist of outlet boxes with blank cover plates, and conduit to cable trays with pull-wire. The specific requirements for IDS will be as follows: Medication storage area shall be protected with IDS system. Annunciation shall be local alarms and remote annunciation located in the nursing control area. The CDBC shall complete the MTC's design and install the conduit and back-box system based on actual sensor types required to meet user needs.

Infant Abduction System. An infant abduction system shall be designed for LDRP's and Nursery areas of the building. The system shall be wiring to provide audible alarms throughout the building.

Physiological Monitoring System. An empty conduit and back-box system with pull wires shall be provided for the installation of a Physiological Monitoring system, provided under a separate contract, in accordance with the draft MIL-HDBK-1191, Section 11.

Cipher locks shall be required on Communications Room door.

Fire Alarm System. A manual fire alarm system and automatic fire detection system shall be provided according to use and occupancy classification Group I-2, which includes a building used for medical, surgical, psychiatric, and nursing care on a 24-hour basis of more than five persons who are not capable of self-preservation. Smoke detectors shall receive their primary power from the building wiring (secondary power from the emergency system), and will be installed in all corridors and corridors continuous to the exits, waiting areas, open-use spaces adjacent to the corridors, patient sleeping rooms, storage areas, and utility rooms. The automatic fire detection system shall operate in conjunction with an automatic sprinkler system. Refer to Section, Mechanical Design for Fire Protection requirements. The location and spacing of automatic detectors shall be based upon applicable code requirements including the appropriate reference standard, NFPA 72. All constructions associated with this section shall be designed in accordance with (UFC) 3-600-01 Design: Fire Protection (MIL-HDBK-1008C), UFC 4-510-01 Design: Medical Military Facilities (MIL-HDBK-1191), the National Fire Codes, and other governmental and industry design regulations, manuals, and guidelines as cited. The Design Analysis shall describe the alarm initiating and alarm indicating requirements, sequence of operations, zoning and annunciation of alarm and supervisory signals, interface of building and fire protection systems, system configuration, signal type, required coordination with other building systems such as HVAC, sprinkler system, and building control system. The design shall be classified as a Local Protective Signaling System, intended to provide notification to occupants within the protected building, with provisions for future automatic fire department notification. All equipment, devices, wiring and conduit shall conform to NFPA 70, NFPA 72 and NFPA 90A. Alarm signaling devices shall be both audible and visual type. Visible alarm notification is required for all medical facilities in accordance with NFPA 101. Visual notification appliances are required in all building common areas (including corridors and hallways, lounges and lobbies, waiting areas, cafeterias, auditoriums, conference rooms and public restrooms), as well as for spaces in which the audible alarms cannot be heard. System design shall be coordinated with the zoning and configuration of the smoke compartmentation resulting from the fire protection/life safety analysis. Performance and capacity of system circuits shall be in accordance with UFGS-13851, FDAS-Addressable. Manual pull stations shall be labeled in the English and Italian languages Fire Alarm and Detector Testing shall be required, based upon testing requirements and protocol: NFPA 72, NFPA 70, and Manufacturer's Literature.

Cable Tray. A communications cable tray system will be installed throughout the facility, just above the corridor ceilings. The cable tray systems will extend into each communications closet. Calculations to validate sizing shall be furnished. The contractor shall design the cable tray system in accordance with UFC 4-510-01, Section 19, and ANSI/EIA/TIA Standards 569A, Cable trays shall be furnished as the primary wire-way for the communications systems in any IBS area. Cable trays shall be trough type per NEMA VE-1 and sized for maximum 40% fill. Contractor shall use manufacture's bend radius cable tray system as applicable in lieu of locally manufactured systems. Spacers shall be provided in all cable trays to separate the different types and functions of cable. Conduits shall connect the individual communications outlets to the cable trays. An

efficient method of collecting these conduits and penetrating any walk-on deck shall be designed.

Communications Closet and Communications Service Entrance Room. The CDBC shall pay particular attention to the environmental requirements of ANSI/EIA/TIA 569A for communications for these two rooms. The communications closet and communications service entrance room will be used to install all of the communications racks and equipment, wire terminals, and patch panels installed under the Design-Built contract as well as the future Government Furnished Government Installed racks and equipment for the LAN. Design of these spaces shall be per ANSI/EIA/TIA 568B, I3A, and UFC 4-510-01. The room shall be used to install all of the equipment and wiring terminations for the PDS and the GFGI equipment and cabinets for the LAN data systems. Minimum size of the closets shall be 33.52 square meters (110 sf). The minimum dimension for any wall is 2.74 meters (9') long. The MTC and MUSC shall pay particular close attention to the requirements in ANSI/EIA/TIA 568B, I3A and UFC 4-510-01 Appendix 1 for utility support, finishes and restrictions on the use of the spaces by other utilities. Location of all communication rooms shall be provided by the Government technical representative.

Qualifications of the Designer/Installer

Design. The fire alarm system shall be designed under the direct supervision of a professional engineer. All submittals shall bear the stamp of the supervising engineer.

Preparation. A trained, authorized agent or direct factory office of the fire alarm equipment manufacturer shall prepare installation drawings, perform system programming, and test the fire alarm system. These tasks shall be performed by a registered fire protection engineer or an individual holding a current Level III or IV competency certificate in Fire Alarm System issued by the National Institute for Certification in Engineering Technologies (NICET). Installation drawings shall also bear the stamp or certificate number of this individual.

FINAL INSPECTION AND ACCEPTANCE

Phasing. The contractor shall plan review/ prepare estimate, and submit any items to the Government for clarification. The contractor shall submit a formal Work Plan for approval. This shall include all processes from planning to completion.

The contract award shall authorize the contractor to begin final design. Final design shall be coordinated with USAHFPA. The Government's written approval of the final design shall act as the contractor's authority to begin the manufacturing process. The assembly timeline shall be scheduled for a specific completion date in order to time transportation with the foundation completion.

Transportation (for modules/personnel/equipment) arrival dates and utility requirements for assembly of the modules shall be included in the project schedule and coordinated with the Contracting Officer.

The contractor shall verify existing condition on site prior to construction and notify the Government of any necessary modification to the site prior to assembly.

Upon arrival of the modules the contractor shall execute assembly.

Final Inspection: Upon completion the contractor shall accompany the Government on a final inspection of the product. Any deficiencies noted shall be corrected by the contractor prior to final acceptance by the Government.

After correction of the pre-final items a final inspection shall be conducted by the Government (to be accompanied by the contractor). Any deficiencies noted shall be corrected by the contractor prior to final acceptance by the Government.

The contractor shall repair and patch all areas and items damaged due to the execution of this project. All repairs/patches shall leave those items equal to or better than the condition prior to the execution of this project. These conditions are all inclusive to include cleanliness from dust and debris, penetrations of walls and floors, damage to walls, floors, doors into or surrounding the project area, and any exterior surface.

SUBMITTAL PROCEDURES FOR DESIGN/BUILD PROJECT

PART 1 GENERAL

REFERENCE. The publication listed below forms a part of this specification to the extent referenced. The publication is referenced to in the text by basic designation only.

CONSTRUCTION SPECIFICATIONS INSTITUTE

Manual of Practice Construction Specifications Institute
601 Madison Street
Alexandria, Virginia
22314-1791

SUBMITTAL CLASSIFICATION. Submittals are classified as follows:

DESIGN SUBMITTALS. Contractor Furnished design submittals are the various design documents which primarily consist of specifications, drawings and design analysis and calculations. The Design-Build Contractor shall not begin construction work until the Government has reviewed the Design-Build Contractor's final design and has cleared it for construction. Clearance for construction shall not be construed as meaning Government approval. Unless otherwise indicated, the risk for the design is the sole responsibility of the Design-Build Contractor.

CONSTRUCTION SUBMITTALS. Contractor Furnished Government Approved Construction Submittals. Government approved construction submittals are primarily related to plans (Contractor Quality Control, Accident Prevention, Area Use etc.), schedules (Project Schedule/Network Analysis), and certificates of compliance. They may also include proposed variations to approved design documents in accordance with the paragraph entitled "VARIATIONS".

For Information Only Construction Submittals (FIO). All submittals not requiring Designer of Record or Government approval will be for information only.

SUBMITTAL CERTIFICATION. The CQC organization shall be responsible for certifying that all submittals and deliverables have been reviewed in detail for completeness, are correct, and are in strict conformance with the contract drawings, specifications, and reference documents.

Effective Quality Control System. The Design-Build Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Special Technical Requirements for Quality Control.

Organizational Responsibility. The quality control system shall cover all design, construction, subcontractor, manufacturer, vendor, and supplier operations at any tier, both onsite and offsite.

CQC System Manager Review and Approval. Prior to submittal, all items shall be checked and approved by the Design-Build Contractor's Quality Control (CQC) System Manager. If found to be in strict conformance with the contract requirement, each item shall be stamped, signed, and dated by the CQC System Manager. Copies of the CQC organizations review comments indicating action taken shall be included within each submittal.

Determination of Compliance. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements by the Contracting Officer.

Responsibility for Errors or Omissions. It is the sole responsibility of the Design-Build Contractor to ensure that submittals do or do not comply with the contract documents. Government review, clearance for construction, or approval by the Contracting Officer shall not relieve the Design-Build Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract.

Government Review. Government review, clearance for construction, or approval shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory.

Substitutions. After design submittals have been reviewed and cleared for construction by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless justified as indicated in the paragraph entitled VARIATIONS.

Additional Submittals. In conjunction with Submittal Procedures, the Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work.

Untimely and Unacceptable Submittals. If the Design-Build Contractor fails to submit submittals in a timely fashion, or repetitively submits submittals that are not in strict conformance with the contract documents, no part of the time lost due to actions shall be made the subject of claim for extension of time or for excess costs or damages by the Design-Build Contractor.

STAMPS. Stamps shall be used by the Design-Build Contractor on all design and post design construction submittals to certify that the submittal meets contract requirements and shall be similar to the following:

Design-Build Contractor (Firm Name)
Contract Number
Contract Name

I certify that this submittal accurate, is in strict conformance with all contract requirements, has been thoroughly coordinated and cross checked against all other applicable disciplines to prevent the omission of vital information, that all conflicts have been resolved, and that repetition has been avoided. It is complete and in sufficient detail to allow ready determination of compliance with contract requirements by the Contracting Officer.

Name of CQC System Manager: _____
Signature of CQC System Manager: _____
Date: _____

ENGLISH LANGUAGE. All specifications, drawings, design analysis, design calculations, shop drawings, catalog data, materials lists, and equipment schedules submitted shall be in the English language.

UNITS OF MEASUREMENT. Design documents shall be prepared in metric system.

Drawings. All site layout data shall be dimensioned in meters or coordinates, as appropriate. All details and pipe sizes shall be dimensioned in millimeters.

Design Calculations. Calculations shall be in metric units as deemed appropriate by the designer to meet the requirements of the design. Quantities on the contract drawings stated in metric units, shall also be stated in metric units in the design analysis to match the drawings.

Specifications. All equipment and products shall be specified by U.S. standards and described by metric units.

WITHHOLDING OF PAYMENT FOR SUBMITTALS

Design Submittals. Payment for Design work will not be made in whole or in part until the Government has reviewed and cleared the design for construction.

Construction Submittals. Payment for materials incorporated in the work will not be made if required approvals have not been obtained. In event under separate clause of the contract, the Design-Build Contractor is allowed partial or total invoice payment for materials shipped from the Continental United States (CONUS), and/or stored at the site, the Design-Build Contractor shall with his request for such payment, submit copies of approvals (ENG Form 4025) certifying that the materials that are being shipped and/or stored have been approved and are in full compliance with the contract technical specifications.

PRODUCTS

General. The following are contract deliverables, which expound upon and finalize the design parameters/requirements outlined within the contract documents. They shall be prepared in such a fashion that the Prime Contractor is responsible to the Government and not as an internal document between the Prime Contractor and its Subcontractors, Vendors, Suppliers, etc.

Design Analysis. A design analysis, written in the English Language with metric units, shall be submitted for review by the Government. The design analysis is a written explanation of the project design which is expanded and revised (updated) as the design progresses. The design analysis shall contain all explanatory material giving the design rationale for any design decisions which would not be obvious to an engineer reviewing the final drawings and specifications. The design analysis contains the criteria for and the history of the project design, including criteria furnished by the Government, letters, codes, references, conference minutes, and pertinent research. Design calculations, computerized and manual, are included in the design analysis. Narrative descriptions of design solutions are also included. Written material may be illustrated by diagrams and sketches to convey design concepts. Catalog cuts and manufacturer's data for all equipment items, shall be submitted. Copies of all previous design phase review comments and the actions assigned to them shall be included with each submission of the design analysis. Specific requirements for the design analysis, listed by submittal phase, are contained hereinafter.

Design Calculations. When they are voluminous, they shall be bound separately from the narrative part of the design analysis. The design calculations shall be presented in a clean and legible form incorporating a title page and index for each volume. A table of contents, which shall be an index of the indices, shall be furnished when there is more than one volume. The source of loading conditions, supplementary sketches, graphs, formulae, and references shall be identified. Assumptions and conclusions shall be explained. Calculation sheets shall carry the names or initials of the computer and the checker and the dates of calculations and checking. No portion of the calculations shall be computed and checked by the same person.

Automatic Data Processing Systems (ADPS). When ADPS are used to perform design calculations, the design analysis shall include descriptions of the computer programs used and copies of the ADPS input data and output summaries. When the computer output is large, it may be divided into volumes at logical division points.

Computer Printouts. Each set of computer printouts shall be preceded by an index and by a description of the computation performed. If several sets of computations are submitted, they shall be accompanied by a general table of contents in addition to the individual indices.

Preparation of the Description. Preparation of the description which must accompany each set of ADPS printouts shall include the following.

- a. Explain the design method, including assumptions, theories and formulae.
- b. Include applicable diagrams, adequately identified.
- c. State exactly the computation performed by the computer.
- d. Provide all necessary explanations of the computer printout format, symbols, and abbreviations.
- e. Use adequate and consistent notation.
- f. Provide sufficient information to permit manual checks of the results.

Specifications. Specifications shall be prepared in accordance with the Construction Specifications Institute(CSI) format. The Design-Build Contractor prepared specifications shall include as a minimum, all applicable specifications sections referenced by the CSI. Where the CSI does not reference a specification section for specific work to be performed by this contract, the Design-Build Contractor shall be responsible for creating the required specification.

Preparation of Proprietary Non-Generic Design Documents. During the course of design, the designer, shall specify specific proprietary materials, equipment, systems, and patented processes by trade name, make, or catalog number. The subsequent use of construction submittals to supplant and/or supplement incomplete design effort is unacceptable. Design submittals containing non-proprietary and/or generic design criteria where proprietary items are available, will be returned for resubmission.

Quality Control and Testing. Specifications shall include required quality control and further indicate all testing to be conducted by the Design-Build Contractor, its subcontractors, vendors and/or suppliers.

Ambiguities and indefinite specifications. Ambiguities, indefinite specification requirements (e.g., highest quality, workmanlike manner, as necessary, where appropriate, as directed etc)and language open to interpretation is unacceptable.

Industry Standards. The Specifications shall be based on industry accepted international standards such as: National Fire Protection Association (NFPA), International Building Code (IBC), American Concrete Institute (ACI), American Water Works Association (AWWA), Americans With Disabilities Act (ADA), etc. Standards referenced shall be by specific issue; the revision letter, date or other specific identification shall be included.

Incorporation of Government Review Comments. Subsequent to submission to the Government, the specifications shall be finalized by the incorporation of Government review comments.

Drawings. Drawings, prepared in English and Italian with metric units of measure, are a part of each submittal. The working drawings shall be adequately labeled and cross-referenced for review. Complete, thoroughly checked and coordinated contract drawings shall be submitted. The contract drawings submitted for final review shall include the drawings previously submitted which have been revised and completed as necessary. The Design-Build Contractor shall have incorporated any design review comments generated by previous design review(s), have completed all of his constructability and coordination checks, and have the drawings in a Ready-to-Build condition. The drawings shall be complete at this time and contain all the details necessary to ensure a clear understanding of the work throughout construction.

Drawing Size. All drawings shall be prepared for metric size "A1" sheets (594mm by 841mm) or if approved by the contracting Officer of an internationally recognized size approximately 24 inches (60 cm) by 36 inches (90 cm). Drawings shall be trimmed to size if necessary.

Plotter Prepared Original Drawings. Plotter prepared original drawings shall be prepared on 20 pound bond paper, unless otherwise approved and shall be plotted on the matte side. Raster plotters must provide a minimum resolution of 400 dpi while vector plotters shall provide a minimum resolution of 0.0010 inch with an accuracy of +0.1% of the move and a repeatability error of not more than 0.005 inch. Drawings produced from dot matrix plotters are not acceptable. Plots accompanied by the digital design file may be prepared on vellum; translucent bond is not acceptable. Line density shall be equivalent to that produced by black India ink; half-tones and gray scale plots are not acceptable unless otherwise approved. Manual changes to plotted originals are not acceptable.

Half-Size Reduction. Preparation of all work shall accommodate half size reduction unless instructed otherwise by the Contracting Officer.

Symbols and Abbreviations. Symbols and abbreviations shall be internationally recognized.

Design Discipline Designation Format. The drawing package shall be divided into the following proposed divisions:

Discipline Designation	Discipline
C	Civil
XE	Exterior Electrical and Communication
XM	Exterior Mechanical
A	Architectural
S	Structural
P	Plumbing, Process and Piping

M	Mechanical Design
FP	Fire Protection and Life Safety
E	Electrical and Communications

Each drawing for the particular facility shall be designated by the discipline designation and sheet number (e.g., E-6 is the sixth Electrical drawing, E-7 is the seventh Electrical drawing etc.). Standard detail drawings sheet reference numbers shall have the letters "S" preceding the discipline. (Example: SE-6).

Grouping Drawings. A building or individual facility design shall, except for site development drawings, be grouped in the design drawing package so that a single building may be withdrawn by deleting or removing a consecutive block of sheets.

Title and Revision Block. Title and revision block shall match FIGURE 1 through 5 furnished in the paragraph entitled ATTACHMENTS.

Drawing Scales. The scales indicated on the following list shall, in general, be used for all drawings. The Contractor may, at its option, make exceptions to scales indicated, if approved in writing by the Contracting Officer.

Site, Grading and Utility Plans - 1:500

Key Plans as large as practical, 1:100 @ concept; 1:50 at final

Cross Sections - 1:10

Details - As required for clarity

Binding. All volumes of drawing prints shall be firmly bound and shall have covers of heavier bond than the drawing sheets. If posts are used to fasten sheets together, the drilled holes on the bond edges of the sheets shall be on 8-1/2-inch centers.

Drawing Convention. Drawings prepared in any convention other than CADD, must have approval of the Contracting Officer.

Typical Sheets. Typical sheets of standard details uniformly used on all buildings are authorized and encouraged. Sheets of standard details may be prepared so that they can be reused if the design package must be divided into separate construction packages. Each typical detail drawing sheet may be limited to a particular design discipline. Standard detail sheets shall be organized by discipline as are the other drawing sheets. Details peculiar to one facility shall not be shown in the standard details but with the group of drawings for the facility to which it pertains.

Index Sheet(s). The first sheet of each volume in a project shall be a cover sheet. In general, the second sheet shall be the first index. Multiple index sheets may be required, depending on the project size. All index sheets shall be included with each volume of

drawings and shall be an index of all the individual drawings in all volumes. The index shall list sequentially the site development drawings, each facility's drawings, and the standard details drawings (if any), and shall locate them by volume and file number. Each index sheet shall be signed and stamped by a principal of the Design-Build Contractor.

Specifications Placed on the Drawings. Details of standard products or items which are adequately covered by specifications shall not be included on the drawings.

Legends. For each submittal, legends of symbols and lists of abbreviations shall be placed on the drawings. They shall include all of the symbols and abbreviations used in the drawing set, but shall exclude any symbols and abbreviations not used. Since many symbols are limited to certain design disciplines, there is a definite advantage to the use of separate legends on the initial sheet of each design discipline or in the Standard Details package for each discipline. If legends have not been shown by discipline, a legend shall be placed on the first drawing.

Location Grid. To facilitate the location of project elements and the coordination of the various disciplines' drawings, all plans shall indicate a column line or planning grid, and all floor plans (except structural plans) shall show room numbers.

Composite and Key Plans. If the plan of a large building or structure must be placed on two or more sheets in order to maintain proper scale, the total plan shall be placed on one sheet at a smaller scale. Appropriate key plans and match lines shall appear on segmented drawings. Key plans shall be used not only to relate large scale plans to total floor plans but also to relate individual buildings to complexes of buildings. Key plans shall be drawn in a convenient location and shall indicate the relative location of the represented plan area by crosshatching.

Revisions. Drawing revisions shall be prepared only on the original CADD files. A revision area is required on all sheets.

ARCHITECTURAL SUBMITTAL REQUIREMENTS

EXECUTION

GENERAL

Design Kick-off Meeting. In addition to regular meetings with the Government the Contractor shall conduct a formal design kick-off meeting. The purpose of the meeting is to assure attention to project requirements and to suggest ways of improving the design prior to tentative level submissions. All subcontractors are required to attend.

Government Design Changes. Government design changes which do not increase construction costs shall be made at no charge to the Government. The Contracting Officer may request design submittals in addition to those listed when deemed necessary

to adequately describe the work covered in the contract documents. Submittals shall be made in the respective number of copies and to the respective addresses set forth in the paragraph entitled SUBMITTAL PROCEDURE. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements.

SUBMITTAL REGISTERS

Design Submittal Register

General. The Contractor shall submit as part of his Project Schedule, information regarding the submittal and clearance for construction of Contractor furnished design documents. In addition, the Contractor shall provide a complete submittal register in the sample format (Contractor Furnished Design Documents Submittal Register) which is attached to this section. The Contractor shall, within fifteen (15) calendar days after approval of the Project Schedule, submit six (6) copies of his finalized Contractor Furnished Design Document Submittal Register to the Contracting Officer for approval. The submittal register shall consist of a tabulation of all the Contractor furnished design documents with the indicated dates integrated into the Design Progress Schedule. The Contractor shall post all actual dates of submittal actions (including clearance for construction) as they occur. Revisions shall be made at minimum on a monthly basis to keep the submittal register in agreement with the scheduled dates shown in the network mathematical analysis. Six (6) copies of the revised submittal register shall be furnished to the Contracting Officer at the time revisions are made in the network mathematical analysis.

Additions or Revisions. Any additions or changes required to be made to the Design Submittal Register as a result of the Contracting Officer's review shall be incorporated into the Design Submittal Register by the Contractor and a resubmittal of six (6) copies shall be effected within five (5) calendar days after receipt of the Contracting Officer's review comments.

Construction Submittal Register (ENG Form 4288). Attached to this section is ENG Form 4288 which the Contractor is responsible for developing for this contract. All construction submittals shall be shown on this register. The submittal register shall be the controlling document and will be used to control all construction submittals throughout the life of the contract. The Contractor shall maintain and update the register on a monthly basis for the Contracting Officer's approval.

TRANSMITTAL FORM (ENG Form 4025). The sample transmittal form (ENG Form 4025) attached to this section shall be used for submitting both design and construction submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care will be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

PROGRESS SCHEDULE. The Contractor shall prepare and submit a design progress schedule to the Contracting Officer. The Critical Path Method (CPM) of network calculation shall be used to generate the Project Schedule. The progress schedule shall show, as a percentage of the total design price, the various items included in the contract and the order in which the Contractor proposes to carry on the work, with dates on which he will start the features of the work and the contemplated dates for completing same. Significant milestones such as review submittals shall be annotated. The Contractor shall assign sufficient technical, supervisory and administrative personnel to insure the prosecution of the work in accordance with the progress schedule. The Contractor shall correct the progress schedule at the end of each month and shall deliver six (6) copies to the Contracting Officer. The approved Project Schedule shall be used to measure the progress of the work, to aid in evaluating time extensions, and to provide the basis of all progress payments.

SCHEDULING

Design Submittals. Adequate time (a minimum of fourteen (14) working days exclusive of mailing time) shall be allowed for review and clearance for construction. If the Contractor fails to submit design submittals in a timely fashion, or repetitively submits design submittals that are not in strict conformance with the contract documents, no part of the time lost due to such actions shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

Post Design Construction Submittals. Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of fourteen (14) working days exclusive of mailing time) shall be allowed for review and approval. If the Contractor fails to submit post design construction submittals in a timely fashion, or repetitively submits submittals that are not in strict conformance with the contract documents, no part of the time lost due to actions shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

SUBMITTAL PROCEDURE

Design Submittals. (The following requirements apply to the modular units and milvans as well.)

For each submittal the contractor shall provide all drawings, specifications, cut-sheets, calculations, design analysis and all other information for that submittal during the Concept Design Coordination Meetings. The contractor shall coordinate the dates of submittal with the COR based on the requirements above.

The needs of the Government are such that contractor shall provide four (4) hard copies of the entire design submittal, at each stage, and shall be transmitted to the Government

by means of ENG Form 4025. The location the submittal is to be sent shall be coordinated at the Concept Design Coordination Meeting.

Post Design Construction Submittals. For each construction submittal, based on the submittal register, the contractor shall provide all drawings, cut-sheets, calculations, and all other information for that submittal. The contractor shall also provide four (4) hard copies of the submittal, for each submittal, and shall be transmitted to the Government by means of ENG Form 4025. The location the submittals is to be sent shall be coordinated at the Pre-construction Coordination Meeting.

Operation and Maintenance Manuals. Operation and maintenance manuals in shall be submitted in five copies to the Contracting Officers Representative administering the construction portion of the contract. The address shall be provided at the pre-construction coordination meeting.

Submittal Numbering System. Instructions on the numbering system to be used for construction submittals follows:

Submittals

Shop drawings and materials are listed on the Submittal Register (ENG Form 4288) as follows:

- a. List is prepared according to contract specifications and drawings, picking up all items involved in the project.
- b. This list is divided into sections as indicated in the specifications for example:

Sec. 01015	"Technical Requirements"
Sec. 02831	"Chain-Link Fence"
Sec. 02710	"Subdrainage System"
Sec. 03300	"Concrete For Building Construction"
Sec. 04200	"Masonry"

Numbering procedures for transmittal on ENG FORM 4025

- a. Each section, may include a list of items. All these items will then be listed with a progressive number within the sections they belong to, for example:

Sec. 01015 will have 01015.00 (Basic number)

Item x	"	"	01015.01
Item y	"	"	01015.02
Item z	"	"	01015.03

Sec. 02710 will have 02710.00 (Basic number)

Item x " " 02710.01
Item y " " 02710.02
Item z " " 02710.03

Sec. 02600 will have 02600.00 (Basic number)

Item x " " 02600.01
Item y " " 02600.02

Sec. 03300 will have 03300.00 (Basic number)

Item x " " 03300.01
Item y " " 03300.02
etc.

b. It is evident a transmittal will never show a Section number i.e., 02831.00, 03300.00, etc., since these are only the basic numbers of the system. Numbers on transmittals will be the item numbers, i.e., 01015.01, 02710.01, 02710.02, 02710.03, 03300.01, 03300.02, etc. All items, as listed on the Submittal Register, will be submitted via a separate transmittal form ENG FORM 4025 thus avoiding getting together more than one item (as listed) and more than one number. There are items, on the other hand, which may be submitted all together on the same transmittal form. This must be established before submission is made.

c. Sec. 10800 "Toilet Accessories" - this section will have basic number 10800.00 - all items relative to it will be listed one by one on separate lines. ONLY one transmittal number will then be given for all of these "10800.01" which will include i.e., robe hook, toilet paper holder, mirror, soap holder, cabinet for paper towels, etc. Each one of these items will be listed on the same Transmittal Number 10800.01 as item 1, item 2, item 3, etc.

Resubmittals. Should the Contractor be required to resubmit any transmittal, it will be accomplished by utilizing the same transmittal number followed by the letter "A" for the first resubmittal, "B" for the second resubmittal, "C" for the third resubmittal, etc. For example, a first resubmittal of "Toilet Accessories" would be 10800.01A, a second resubmittal 10800.01B, etc. The purpose of this system is to avoid deviations from Submittal Register. Also, to avoid confusion arising from the use of more than one number on transmittal when more than one item is submitted on the same form. This system will also facilitate the use, wherever required, on machine printouts.

Variations. If design documents or construction submittals show variations from the contract parameters and/or requirements, the Contractor shall justify such variations in writing, at the time of submission. Additionally, the Contractor shall also annotate block "h" entitled "variation" of ENG FORM 4025. After design submittals have been reviewed and cleared for construction by the Contracting Officer, no resubmittal for the purpose of substituting materials, equipment, systems, and patented processes will be considered unless accompanied by the following:

- a. Reason or purpose for proposed variation, substitution, or revision.
- b. Comparison of the quality of variation with the quality of the specified item. This shall be in the form of a technical evaluation tabulating differences between the item originally specified and what is proposed.
- c. Provide a cost comparison. This shall include an acquisition and life cycle cost comparison.
- d. For proprietary materials, products, systems, and patented processes a certification signed by an official authorized to certify in behalf of the manufacturing company that the proposed substitution meets or exceeds what was originally specified.
- e. For all other actions, a certification signed by a licensed professional engineer or architect certifying that the proposed variation or revision meets or exceeds what was originally specified.
- f. Advantage to the Government, if variation is approved, i.e. Operation and Maintenance considerations, better product, etc.
- g. Ramifications and impact, if not approved.

If the Government review detects any items not in compliance with contract requirements or items requiring further clarification, the Contractor will be so advised. Lack of notification by the Contracting Officer of any non-complying item does not relieve the Contractor of any contractual obligation.

Non-Compliance. The Contracting Officer will notify the Contractor of any detected noncompliance with the requirements of this specification. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the worksite, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

REVIEW OF CONTRACTOR PREPARED DESIGN DOCUMENTS

General. The work under contract will be subject to continuous review by representatives of the Contracting Officer. Additionally, joint design review conferences with representation by all organizations having a direct interest in the items under review may be held. The Contractor shall furnish copies of all drawings and related documents to be reviewed at the review conference on or before the date indicated by the Government.

Additional conferences pertaining to specific problems may be requested by the Contractor or may be directed by the Contracting Officer as necessary to progress the work. The Contractor shall prepare minutes of all conferences and shall furnish two copies to the Contracting Officer within seven (7) days after the conference.

Independent Design Review. The Contractor shall have someone other than the Designer or Design Team perform an independent review of all specifications, drawings, design analysis, calculations, and other required data prior to submission to the Government. Upon completion of this review, the Contractor shall certify that each design submittal is complete, accurate, is in strict conformance with all contract requirements, that repetition has been avoided, that all conflicts have been resolved, and that the documents have been thoroughly coordinated and cross checked against all the applicable disciplines to prevent the omission of vital information.

Contractor's Quality Control Organization Review. This review shall be for the purposes of eliminating errors, interferences, and inconsistencies, and of incorporating design criteria, review comments, specifications, and any additional information required. Design submittals submitted to the Contracting officer without evidence of the Contractor's certified approval will be returned for resubmission. No part of the time lost due to such resubmissions shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

Government Review. The contractor shall not begin construction work until the Government has reviewed the contractor's design and has cleared it for construction. Clearance for construction does not mean Government approval. Government review shall not be construed as a complete check but will indicate only that the general design approach and adherence to contract parameters. The Government Review is often limited in time and scope. Therefore, the Contractor shall not consider any review performed by the Government as an excuse for incomplete work. Upon completion of the review, all comments will be forwarded to the Contractor. The Contracting Officer will indicate whether the design submittal has or has not been cleared for construction. Design submittals cleared for construction by the Contracting Officer shall not relieve the Contractor from responsibility for any design errors or omissions and any liability associated with such errors, nor from responsibility for complying with the requirements of this contract.

Incorporation of Government Review Comments. The Contractor will be furnished comments from the various Government reviewers. The review will be for conformance with the technical requirements and parameters of the contract documents. The Contractor shall either incorporate each comment or, if the Contractor disagrees technically and does not intend to comply with the comment(s), the contractor shall clearly outline, with ample justification, its reasons for its noncompliance within five (5) days after receipt of the comment(s). Additionally, the Contractor is cautioned in that if it believes the action required by any comment exceeds the requirements of this contract, that he should take no action and notify the Contracting Officer in writing immediately. The disposition of all comments shall be furnished in writing with the next scheduled

submittal. The review comments and the submittal material for each design review will become the basis for any ensuing design work. Copies of the design review comments with the action taken on each comment noted, shall be bound in all succeeding volumes of the design analysis.

Conferences. As necessary, conferences will be conducted between the Contractor and the Government to resolve review comments.

Design Deficiencies. Design deficiencies noted by the Government shall be corrected prior to the start of design for subsequent features of work which may be affected by or need to build upon, the deficient design work.

Government Review Period. Adequate time (a minimum of fourteen (14) working days exclusive of mailing time) shall be allowed for Government review and comment on each design submittal. Upon completion of the review, all comments will be forwarded to the Contractor and/or clearance for construction will be provided the Contractor.

Design Discrepancies. The Contractor shall be responsible for the correction of incomplete design data, omissions, and design discrepancies which become apparent during construction. The Contractor shall provide the Contracting Officer with a proposed recommendation for correcting a design error, within three (3) calendar days after notification by the Contracting Officer. The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the worksite, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor. Should extensions of design, fabrication plans and/or specific manufacturer's details be required as a result of a Government issued Change Order, the Government will make an equitable adjustment in accordance with Contract Clause 52.243-4 entitled CHANGES.

Phased or "Fast-Track" Design

General. If approved by the Government, design and construction sequencing may be effected on an incremental basis as each approved phase or portion (e.g., demolition, geotechnical, sitework, exterior utilities, foundations, substructure, superstructure, exterior closure, roofing, interior construction, mechanical, electrical, etc.) of the design is completed.

Sequence of Design-Construction (Fast-Track). After receipt of the Contract Notice to Proceed (NTP) the Contractor shall initiate design, comply with all design submission requirements and obtain Government review of each submission. The contractor may begin construction on portions of the work for which the Government has reviewed the

final design submission and has determined satisfactory for purposes of beginning construction. The Contracting Officer will notify the Contractor when the design is cleared for construction. The Government will not grant any time extension for any design resubmittal required when, in the opinion of the Government, the initial submission failed to meet the minimum quality requirements as set forth in the contract.

Notice-to-Proceed for Limited Construction. If the Government allows the Contractor to proceed with limited construction based on pending minor revisions to the reviewed Final Design submission, no payment will be made for any in-place construction related to the pending revisions until they are completed, resubmitted and are satisfactory to the Government.

In-Place Construction Payment. No payment will be made for any in-place construction until all required submittals have been made, reviewed and are satisfactory to the Government.

Commencement of Construction. Construction of work may begin after receipt of the clearance for construction (Notice to Proceed) for each design phase. Any work performed by the Contractor prior to receipt of the clearance for construction, shall be at the Contractor's own risk and expense. Work cleared for construction that does not conform to the design parameters and/or requirements of this contract shall be corrected by the Contractor at no additional cost or time to the Government.

Design Stages. Design submittals are required at the Concept (35%) and Final (100%) design stages and a Corrected Final design submittal. The requirements of each design stage are listed hereinafter. The number and contents of the design submittals phases shall be reflected in Design Submittal Register as well as in the Contractor's design progress schedule.

3.9.1 Concept Review Submittal (35%). The Contractor shall provide an initial submittal at 35% design completion for Government review and comment. The 35% design completion point is considered the end of the concept design phase. The primary purposes of this submittal and review are the identification and resolution of all major design/engineering issues and the reconfirmation of the Project Scope. To explain and support the design the submittal shall include (1) a set of plans as described in the following disciplines, (2) catalog data (cut sheets) for all medical equipment and primary building system equipment, and (3) specifications for construction materials and finishes, hardware, and building system components. All plans, cut sheets, specifications, and pertinent information shall be Internet accessible. The plans for all disciplines shall show the room names and numbers. The following documents shall be submitted:

Civil/Site:

Design Analysis: In a narrative form, discuss rationale for design of all new site features. Discuss the means by which the required utility capacities for potable water, fire water supply, sanitary waste disposal, and storm water management will be provided.

Calculations: Discuss any deviations from criteria or standard practice and any waivers granted, pending or needed. List any additional information or criteria needed to complete the design. Provide the following design calculations:

- Sizing of new utility lines
- Evaluation of existing lines
- Sizing of storm drainage system
- Pavement design

Geotechnical Report: Provide completed report as described in Section, GEOTECHNICAL DESIGN.

Drawings:

Site Survey: Show location and elevation of all existing features as determined by the Contractor's topographic survey.

Site Demolition Plan: Show all existing site features that must be removed to complete the project. At a minimum this includes utilities, storm drainage, irrigation system, concrete pads, roadways, and trees.

Site plan: Show the required site preparations, layout of the site built structures, modular units, water tanks, sidewalks, roads, parking areas, barrier walls, traffic arms, and equipment pads.

Grading Plan: Show finish grade elevations, pavement elevations, and finish floor elevations. Provide location and elevation of at least two project benchmarks. Assure that all grade changes are defined by spot elevations. Show the means for storm water management for the pavement, roof discharge, and site drainage.

Utility Plan: The plan shall include the locations and invert elevations of all existing and new connections for all required utilities. Provide longitudinal profile sections of new utility lines. Show invert elevations and sizes of existing utility lines.

Architectural:

Design Analysis: Provide the design rationale for the architectural features addressing site-specific environmental conditions and energy conservation that are incorporated into this solicitation. Discuss hardware recommendations. Codes used to identify colors, materials and finishes on the Color/Material Board(s) should be consistent with those used throughout the design documents. Show exterior and interior signage on interior elevations and on a layout plan. Describe the interior and exterior design intent. Discuss the accessibility features have been incorporated to accommodate temporarily handicapped patients. The Design Analysis shall provide certification by the Authority Having Jurisdiction (AHJ) that the building design complies with the life safety

provisions of the applicable criteria indicated this specification. It shall also discuss separation requirements, fire resistant requirements of construction elements, materials and finishes, flame spread, and smoke developed ratings and class. The analysis shall identify required fire-rated partitions and fire and smoke barriers, discuss the life safety egress considerations including the type and number of exits, capacity, arrangement and protection of means of egress, maximum travel distance, discharge from exists, exit marking, illumination of means of egress, emergency lighting, and special security features. The contractor shall also indicate the fire detection and voice communication requirements for field devices, central equipment and Installation reporting requirements.

Drawings: The floor plans for this facility are provided for Contractor reference. It is intended that Contractors will maintain this layout as exactly as possible, and that all interfaces between permanent and semi-permanent structures will be maintained with acceptable tolerances to allow connection of utilities, etc. NOTE: Mechanical and electrical space requirements shall be adjusted as required for the medical and HVAC equipment provided in the facility. Functional adjacency requirements and space allocations as required in the Program for Design (PFD) shall be maintained. The Contractor must provide a layout that is efficient and effective for the overall facility operation. The Government will consider only minor variations of the layout provided. Provide an updated floor plan with room names and numbers, a plan showing equipment placements, room elevations showing furniture and medical equipment placements, a roof plan, exterior elevations, major sections, a reflected ceiling plan, and window and door schedules. Also show a life safety plan and ATRFP plan. All life safety and ATRFP systems, materials or features shall be described in explicit detail, beginning with this submittal and expanded and elaborated in the final design submittal. Show access routes to the all portions of the Temporary Birthing Center, and its entrances and the circulation flow diagrams for staff, patients, visitors, supplies delivery, and waste disposal. The floor plan shall be at minimum scale 1:100. Plans or partial plans showing equipment and congested areas shall be at minimum scale 1:50. Show the structural grid including columns, corridors, and stairs. Provide net and gross area tabulations. Show the proposed Antiterrorism/Force Protection (AT/FP) features. Provide a room finish schedule to include all items that require color/pattern selection. The life safety plan shall show circulation, occupancy classification, smoke compartments, fire-rated exterior walls, area separations, and specific interior partitions including fire-rated doors and dampers, occupancy and exit separations, horizontal exits, smoke partitions, fire resistive ratings, required exit locations, capacities, means of egress, and maximum travel distances to an exit and to a smoke barrier. A fire protection plan at not less than 1:100 shall be submitted showing fire alarm zones, fire detection and alarm system (FDAS) zoning and the control and annunciation panels and all connections to devices for notifying, monitoring, control, and inputs to other building systems such as the HVAC control system, and locations for fire extinguishers, smoke and fire dampers, smoke detectors, exit signs, and emergency doors.

Medical Equipment: The Program for Design (PFD) included with this solicitation shall be used for identifying the equipment list required for each room. The PFD also provides the equipment item's Joint Service Number (JSN) with which a general description and

required utilities is available from Military Standard 1691, Construction and Material Schedule for Military Medical and Dental Facilities. Provide a complete room-by-room Equipment and Casework Schedule identifying the Logistics Category (Log Cat) of each equipment and casework item (see latest version of MIL HDBK 1191 for Log Cat definitions). Include all Log Cat A, B, E, F and G items and any Log Cat C items requiring unique utilities or structural support. Include utility requirements. An Equipment and Casework Schedule format is enclosed for reference as part of this solicitation. Catalog cuts and Equipment Data Sheets shall be provided for all required equipment items. An Equipment Data sheet sample format is enclosed with this solicitation. The equipment elevations shall be drawn at 1:50 scale and show the mounting heights. Show the JSN for each equipment item.

Life Safety Plan: The Contractor shall submit a complete Life Safety Plan indicating, as a minimum, the locations of all necessary fire doors, fire walls, egress routes, emergency stairs (if required), fire alarm pull station locations, egress travel distances, ATRP (blast) door and/or window locations, and required site standoff distances. All elements must comply with NFPA 101 and the above ATRP documents. Additionally, the Contractor is to refer to information included in the floor plans provided with this solicitation.

Hardware Submittal

The Contractor shall submit a hardware schedule compliant with UFGS 08710, DOOR HARDWARE. As a minimum the following information shall be provided:

- Hardware Item and Description:
- Location:
- Manufacturer name and catalog number:
- Features:
- Finish:

Mass Notification System: Mass notification is the capability to provide real-time information to all building occupants or personnel in the immediate vicinity of a building during emergency situations. The Contractor shall provide a diagram identifying the type of system proposed and the schematic layout of this system. If electronic equipment is required, electrical diagrams shall be included to show power source, UPS (if appropriate), major connections and other pertinent data.

Structural:

Design Analysis.

Include all of the following information in a narrative format.

Roof Framing. Clearly describe vertical and lateral load resisting systems.

Foundation Type. Based on the completed geotechnical investigation, provide a design analysis with foundation recommendations.

Live Loads. List the live loads to be used for design.

Seismic Design. Preliminary seismic design is required. Give the site Seismic Spectral Accelerations, S_s and S_1 , facility Seismic Use Group, and Seismic Design Category. State if seismic or wind controls the design of the lateral force resisting system. When seismic controls the design of the lateral force resisting system, describe the system selected using "Basic Seismic-Force-Resisting System" terminology from Table 7-1 of TI 809-04. Also describe any special seismic design features such as seismic separation joints.

Wind Loads. State the basic wind speed, importance factor and exposure category, and should utilize references UFC 3-310-01 and ASCE 7 as the basis for calculating wind pressures.

Anti Terrorism and Force Protection (ATFP). Identify the structural measures incorporated into the roof framing system and walls.

Structural Calculations:

Provide calculations necessary to demonstrate the adequacy of the structural design and shall include the following:

Superstructure. Design load and analysis for main framing system. Design of slabs beams, columns, lateral bracing, shear walls, horizontal diaphragms. Vertical dead and live loads and lateral loads caused by seismic and wind loads shall be included in the superstructure design.

Foundation. Design loads and analysis including sizing to satisfy allowable foundation bearing pressures, and sizing and reinforcement of all structural foundation members.

Structural Drawings.

General Notes Drawing. Include all design loads(dead, live, wind, earthquake) material properties, soil properties, and standard requirements for concrete and masonry construction.

Foundation plan and typical sections. Show all foundations, including dimensions and elevation.

Roof framing plan and typical sections. Show roof frame and supporting elements. . Include lateral load resisting system elements(shear walls, frame bracing, moment resisting frames, wall system, etc.).

Fire Protection:

Design Analysis: The Design Analysis shall address all provisions pertaining to fire protection systems. All fire protection systems shall be described in explicit detail, beginning with this submittal and expanded and elaborated in the final design submittal. The Design Analysis shall

- A.** provide a complete detailed narrative including scope, equipment, function, operation and interface of each system,
- B.** provide certification by the Fire Protection engineer that the building design complies with the fire protection provisions of the applicable criteria indicated this specification section.
- C.** list the occupancy and hazard of contents classifications of each space,
- D.** describe the alarm initiating and alarm indicating requirements, sequence of operations, zoning and annunciation of alarm and supervisory signals, interface of building and fire protection systems, system configuration, signal type, required coordination with other building systems such as HVAC, sprinkler system functional aspects such as equipment type, location, fire flow demand, water duration, and smoke control features,
- E.** be accurate and coordinated with the drawings.

Calculations: The calculations shall include

- A.** sprinkler system hydraulic calculations as detailed in the solicitation under Fire Protection,
- B.** water supply calculations for the required fire flow and pressure demand,
- C.** fire pump/booster pump sizing.

Drawings: Drawings shall be prepared using CAD The drawings shall include

- A.** a fire protection system plan at not less than 1:100 showing sprinklered areas, area classifications, design densities, sprinkler locations, risers, piping, water source, test connections, seismic assemblies, valves,
- B.** a longitudinal and transverse building section showing typical branch line and cross-main pipe routing as well as elevation of each typical sprinkler,
- C.** details of each type of riser assembly; pipe hanger; sway bracing for earthquake protection, and restraint of underground water main at point-of-entry into the building, and electrical devices
- D.** a legend identifying symbols

HVAC and Plumbing:

Design Analysis: Include the following:

- A.** Provide the energy analysis for the Design Energy Budget to compare to the specified Design Energy Target.

- B.** description of all aspects of the mechanical design in depth, including a summary of building loads and service demands with the considerations that went into system and equipment selection,
- C.** an HVAC Design Table that includes the air balance summary and other HVAC-related data for each room or space in the facility,
- D.** a medical gas outlet summary table that includes the type and number of outlets by room, and the rooms grouped by zone valve and alarm, both area and master, a unique identifier for each zone valve and alarm panel, the room name/number location of each zone valve and alarm panel,
- E.** description of special HVAC applications for temperature/humidity-sensitive areas or critical occupancies, such as specialty medical function rooms, communications or electrical rooms, and computer rooms,
- F.** description of the HVAC control system, interface with the building fire alarm/smoke evacuation, security, electrical equipment monitoring, electrical load shedding controls, and any other electronic building systems through the building management system,
- G.** catalog cuts with descriptions and performance data for the major equipment upon which preliminary establishment of mechanical room space has been based,
- H.** description of seismic design elements or requirements for the mechanical design, including the approach to provide seismic bracing without compromising the ability to compensate for pipe expansion and contraction,
- I.** description of the anticipated acoustical treatment requirements (structural/airborne transmission and ductborne noise), including silencers, duct lining (to be minimized in favor of other attenuation methods), and other acoustical attenuation approaches,
- J.** description of the considerations that went into selection of outside air intake locations,
- K.** discussion of water treatment requirements for domestic water and heating water systems including a description of design proposals for the prevention of Legionella in domestic water systems,
- L.** provide a preliminary point-by-point commissioning plan for the HVAC and Plumbing systems

Calculations: The calculations shall include

- A.** room-by-room, zone, and total heating and cooling loads accounting for all heat gains including medical equipment and ventilation air intake, insulation value of the thermal envelope components taking into account the “fin effect” insulation reduction of metallic studs and supports, plumbing and medical gas demands and storage requirements on the basis of fixture and outlet counts,
- B.** preliminary noise calculations for each air handler to determine the need for duct sound attenuators and acoustical treatment of the equipment room walls to minimize noise transmitted from mechanical equipment and through the distribution systems and the equipment room construction into adjoining spaces.

- C. preliminary sizing/selection calculations for all plumbing and medical gas equipment, including main building pumps, water storage, water treatment equipment, heat exchangers, domestic hot water generators.

Drawings: Show the proposed locations for equipment rooms, outside air intakes, exhaust discharges, the HVAC zones on a floor plan. Indicate in the equipment rooms the proposed locations for the equipment items, including electrical components, and dedicated areas for maintenance access and service such as coil pulls and filter changeouts. Show the equipment to scale. Provide a main duct layout plan, an HVAC main piping distribution layout plan, an HVAC control system architecture plan, a plumbing and medical gas main piping distribution layout plan, and elevations for all equipment rooms showing all major items including ducts.

Electrical:

Design Analysis: Include the following

- A. a discussion of the power and lighting design to include the service, transformers, connection interfaces, power distribution centers and distribution systems used throughout the modular unit configurations, the essential electrical system and subsystems, alternate power sources, lighting systems, isolated power systems, X-ray, CAT scan, and magnetic resonance imaging power systems, ground system for patient care, lightning protection system, corrosion control, and special requirements for selected areas,
- B. a discussion of the rationale for selection of reduced voltage starting, power factor correction and power conditioning equipment,
- C. a report of the existing primary power supply source and site conditions survey results,

Calculations: The calculations shall include

- A. power systems load calculations for determining ratings of transformers, backup (secondary) generator capacity, switchboards, automatic transfer switches, motor control centers, and power distribution panels using watts per square meter for lighting, small appliance and medical equipment except sterilizers,
- B. preliminary short circuit analysis,
- C. voltage drop analysis to support the proposed wiring method.

Drawings: Provide the following

- A. electrical equipment room layouts,
- B. electrical closet locations,
- C. lighting fixture and switching layout,
- D. general and emergency receptacle layout,
- E. power line diagram with interface connection points,

- F.** grounding system layout for power, lighting, and communication,
- G.** lighting fixture schedule including lamp types, color rendition index (CRI), color temperature, and special requirements such as for mounting,
- H.** typical panel schedules
- I.** power wiring distribution layout plan and a lighting plan.

Communications:

Design Analysis: Describe the purpose, operating features, configurations and established locations of each communication system. Provide a Telephone Station Requirements Matrix (TSRM) to include:

- A.** Room number and description.
- B.** Local intercom.
- C.** Number and type of outlets.
- D.** Number and type of instruments.
- E.** Telephone Feature Package.
- D.** Service class and interdepartmental intercom.

Calculations: The calculations shall include

- A.** communication room and closet sizing calculations to show that the size is in accordance with the EIA/TIA 569 for room sizing,
- B.** sizing for main cable serving the communications closets

Drawings: Provide the following

- A.** typical communications layouts for all zones or areas for all communications systems (for nurse call, code blue, public address and data and voice communication systems) and all major system components and showing all drop placements,
- B.** communications duct entrances and cable routes serving the area including the cable types and sizes,
- C.** functional block diagrams demonstrating the basic functions of the headend equipment for the television distribution system, public address and program distribution system, and voice and data cable distribution network,
- D.** typical communication room equipment layouts,
- E.** zone drawings indicating the communication room serving each modular unit configuration area and show the communication cable connections if the given communication room is not part of this Contract's scope.

Interior Design:

Design Analysis: Interior design submittal shall be in accordance with the documentation Phases A through E as described in the Architectural and Engineering Instructions – Medical Design Standards, see Applicable Criteria. Discuss the interior design

characteristics such as anticipated psychological impact on patients and staff, safety factors, durability, maintenance, and proposed materials, finishes, colors and any special features. Color/Material Board(s), Perspective Presentation Board(s), with color photos of the board(s), and an Interior Design Brochure shall be provided. The Board and photos shall be cross-referenced to the Room Finish Schedule. Include all items for which a color selection is required such as doors, casework, counter tops, toilet partitions, trim items, and miscellaneous specialties. Label all items presented on the Board. The Interior Design Brochure shall be a separate volume, suitable for updating.

Drawings: Indicate furniture on the equipment plans with light solid lines. Only major furniture items and any window drapery track shall be indicated. Items such as drapery, waste receptacles and artwork shall not be indicated. Interior design perspective sketches shall be provided. The drawings shall be no larger than double page foldout size.

Final Design Review Submittal (100%)

The review of this submittal is to insure that the design is in accordance with directions provided the Contractor during the design process. The only effort remaining between the FINAL DESIGN REVIEW SUBMITTAL and the Backcheck Submittal is the incorporation of the Government Review Comments. The Contractor shall submit the following documents for Final review:

- a. Design Analysis, developed to a 100% design stage. The Design Analysis shall be in its final form. It shall include all backup material previously submitted and revised as necessary. All design calculations shall be included. The Design Analysis shall contain all explanatory material giving the design rationale for any design decisions which would not be obvious to an engineer reviewing the Final Drawings and Specifications.
- b. 100% Complete Construction Specifications. The Draft Specifications on all items of work submitted for Final Review shall consist of marked-up proprietary specifications.
- c. 100% Complete Construction Drawings. The Contract Drawings submitted for Final Review shall include the drawings previously submitted which have been revised and completed as necessary. The Contractor is expected to have completed all of his coordination checks and have the drawings in a design complete condition. The drawings shall be finalized at this time including the incorporation of any design review comments generated by the Preliminary design review. The drawings shall contain all the details necessary to assure a clear understanding of the work throughout construction.
- d. The Government's 35% Design Review Comments with the Contractor's annotation to each comment.

e. The following shall be submitted;

Site Civil.

Design Analysis: Update the narrative to include changes from concept design.

Calculations: Update and complete the calculations from the concept design as necessary. At a minimum, include updated calculations for potable water, sanitary waste, and storm drainage systems.

Drawings: Update the plans from the concept design. Show the locations of all utility service lines, manholes, tanks, valves, irrigation system, and exterior equipment pads. Provide complete details of all site features, profiles of new sewer lines, and other information needed to completely describe the site work.

Architectural:

Design Analysis: Update the Design Analysis. Discuss acoustical treatments required to satisfy the acoustic noise level requirements specified in the MIL-HDBK-1191. The design analysis shall include a description of the type, location, quantity and extent of application of spray-applied fireproofing and fire-stopping methods, and shall include verification of structural fire resistance integrity for walls, partitions, roof and all their penetrations.

Drawings: Update the drawings.

Medical Equipment: Update the equipment and casework drawings (plans and elevations) and schedules including the JSN's, the Log Cat categories, the utility requirements, catalog cut sheets, and the Equipment Data Sheets.

Structural:

Design Analysis:

Update the narrative to include changes from the concept design as necessary.

Structural Calculations.

Update and the calculations from the concept design as necessary. Complete the design to include connection designs and other details to demonstrate the adequacy of the structural design

Drawings.

Update the drawings from the concept design. Add all necessary details to provide construction drawings that fully describe the structural elements of the buildings. Include the following drawings:

Foundation plan(s) and details. Show column grid lines, beam locations size and reinforcement, concrete slab thickness and reinforcement, construction, contraction and expansion joints. Clearly show any requirements for capillary water and vapor barrier or carton forms for voids below foundation slabs and beams. Detail the foundations for size and reinforcement.

Roof framing plan. Show locations and sizes, and details of slabs, beams, joists, and columns.

Framing Details. Provide sections and details for superstructure framing structural members and connections.

Wall sections and details: Show wall thickness, reinforcement size and spacing, control joint details, stiffener, and lintel schedules.

Fire Protection:

Design Analysis: Update the Design Analysis. Provide all supporting information including catalog cuts, studies, and criteria for the systems specified in the 40% submittal requirements. Include the following:

- A. a description of the water supply storage means for the sprinkler system,
- B. documentation of deviations from established criteria,
- C. documented resolution of issues developed during the design or construction

Calculations: Update the calculations. Include a calculation for the required water storage quantity and the storage tank sizing. Provide hydraulic calculations to demonstrate that the design will provide an adequate water supply to support the fire flow demand.

Drawings: Update the drawings. Additional information to show on the drawings include:

- A. all sprinkler feed mains, cross-mains, and hazard classifications (i.e., light, ordinary group 1, 2 or 3, etc.) with design densities for each room configuration area indicated on the drawings,
- B. a FDAS riser diagram indicating all central equipment and system zoning arrangements,
- C. a matrix of the sequence of operations indicating all combinations of input/output alarm and supervisory functions,

HVAC and Plumbing:

Energy Conscious Design: Update the Design Analysis discussion of energy conscious design features and the energy analysis for the Design Energy Budget.

Design Analysis: Update the Design Analysis. Include the following:

- A.** a discussion of all aspects of the mechanical design in detail, describing the systems and equipment and the engineering considerations that were part of the selection process,
- B.** a summary of the load analyses results,
- C.** a discussion of the piping thermal expansion control features,
- D.** an update of the HVAC Design Table to include tabulations for each HVAC zone or air handling unit, listing of transfer air quantities to and from rooms necessary to maintain air balance, and the maximum room air flow requirement (the greater of the total air change and the required supply air for the load),
- E.** catalog cuts containing dimensional and performance data, required maintenance clearances, and recommended upstream and downstream straight duct runs and separation distances for all equipment selections
- F.** point-by-point commissioning plan for the HVAC and Plumbing systems

Calculations: Update the calculations. Include the following:

- A.** identification of the equipment loads for each room and all energy analysis program inputs and assumptions including simultaneous use factors,
- B.** sizing/selection calculations for all major HVAC system components including boilers, chillers, treatment equipment, heat exchangers, storage tanks, and air handling units and sub-components, and primary heating water, domestic water, chilled water, and condenser water pumps,
- C.** sizing/selection calculations or sizing/selection considerations, for minor equipment including VAV/CAV terminals, trim humidifiers, diffusers, registers, grilles, pumps (other than the prime movers), control valves,
- D.** sizing/flow/pressure loss calculations for all piping and ductwork systems,
- E.** calculations of any steam requirements for heating, process, and humidification as applicable,
- F.** calculations and sizing procedures for all elements of thermal expansion compensation equipment for piping systems,
- G.** acoustical analysis of the need for air handling unit noise attenuation, as well as attenuators downstream from VAV/CAV terminal units, to maintain room criteria NC levels, calculating noise transmission from the primary supply and return fans to the first room served by the respective system considering realistic inlet static pressures at the VAV terminal(s) (NOTE: If the "first rooms served" do not experience noise problems, extend the analysis to succeeding rooms; use duct configuration features for sound attenuation since attenuators are considered a maintenance and infection control problem),
- H.** sizing/selection calculations for all plumbing and medical gas equipment, including water storage, main building pumps, water treatment equipment, heat exchangers, domestic hot water generators, and piping systems.

Drawings: Update all drawings. Floor plans shall be scaled to 1:100 and mechanical equipment rooms and congested areas to 1:50. Show plans for multiple plumbing fixture or equipment groupings at 1:50 scale. Equipment room plans shall be scaled to 1:50 for all plant and equipment rooms. Provide the following

- A.** demonstrate, using drawings, plans, elevations, sketches, overlays, or other tools or representations as necessary, that building utilities are vertically and horizontally space-coordinated with architectural and structural elements to show that there is sufficient space for operation and maintenance, within the space and access constraints imposed by the modular unit configurations' dimensional characteristics,
- B.** verify that access routes for the transportation of tools, materials, and equipment, including eventual equipment replacement, are suitably dimensioned and provide for wheeled transportation where needed,
- C.** show locations and sizes of all ductwork, piping, and major raceways,
- D.** provide cross-sectional views showing ceiling space at representative "choke points" or congested locations in each modular unit configuration showing all mechanical, fire protection, electrical, communications, structural, and architectural elements at that location in sufficient scale and detail to verify adequate clearance are available for installation, change-out, maintenance, access, and cooling air circulation space,
- E.** schematic drawings for each mechanical system including all plumbing, medical gas, HVAC piping systems, HVAC control systems with I/O summaries and written Sequences of Operation for all major mechanical systems, and equipment and components labeled by name and with a unique identifier
- F.** ductwork plans showing all main, run-out, and branch ducts with duct-mounted, terminal, and fixture (diffusers, registers, and grilles) equipment with pressure classifications, main and run-out duct dimensions, air fixture flow quantities, and identifiers for all components such as fans (exhaust, booster), trim humidifiers, final filters, dampers, terminal units, reheat coils, air flow measuring stations, and individual room branch ducts or run-outs,
- G.** distribution piping for all mechanical systems including mains, run-outs, branches, riser locations, and building entry/exit points, dimensioned, thermal expansion anchors and guides, seismic bracing (if required for seismic restraint), and other expansion compensation features, with "ells" or offsets for expansion individually dimensioned according to calculated requirements,
- H.** separate plumbing and medical gas plans if required for clarity showing the connected equipment (plumbing fixtures, headwall units, etc.),
- I.** equipment room plans with all equipment and space or clearance requirements for maintenance, equipment removal, and dedicated electrical space indicated,
- J.** layout for all HVAC, plumbing, and medical gas equipment, component, fixture, and outlet locations,
- K.** thermostat and humidistat locations with a symbol and indicate what component or equipment is being controlled,

- L.** all medical gas system source equipment (compressors, vacuum pumps, storage cylinders and tanks), distribution system components (piping shutoff valves, zone valves), and alarm system (master and area panels), the locations of piping sensors for each service relative to zone valve locations,
- M.** schedules for mechanical equipment to define performance, capacity, acoustical, and dimensional data including all major plant equipment, heat exchangers, storage vessels, primary pumps, air handling units, control system devices and equipment - including control valves, room-by-room air balance schedules.

Electrical:

Design Analysis: Update the Design Analysis.

Calculations: Update the calculations. Complete short circuit and ground fault analyses.

Drawings: Update the drawings. Provide the following

- A.** exterior lighting,
- B.** normal and emergency lighting branches with circuit numbers identifying all lights connected to each branch,
- C.** JSN numbers shown at receptacles dedicated to a medical equipment item,
- D.** panel and motor locations,
- E.** elevations where required to show congested electrical equipment installations and for larger equipment items such as the switch gear,
- F.** schematics for special control and switching functions,
- G.** schedule for feeder conduit and wiring,
- H.** switchboard and motor control center schedules indicating the branch type – normal, life safety, critical, or equipment – and starter size.
- I.** connection points for panels and equipment requiring power,
- J.** the fire detection and alarm signaling devices wiring layout and the point to which the it will be connected to the feed leading to the centrally supervised location on the Installation,
- K.** specific types and locations of control panels, batteries and chargers, transmitter, annunciator, fusible safety switch, remote trouble device, alarm initiating and indicating devices, and connections to appliances and fire extinguishing system switches and controls,
- L.** location of fire alarm master box, circuit runs to installation fire alarm system, if telegraphic or telephonic, and to building control panel,
- M.** connection points for panels and equipment requiring AC power.

Communications:

Design Analysis: Update the Design Analysis.

Calculations: Update the calculations.

Drawings: Update the drawings. The communication floor plan drawings and the equipment room layouts shall be to a 1:50 scale. Provide the following;

- A.** communications floor plans to indicate specific types and locations of all communications outlets including tie-in points for telephone and program distribution systems in elevator shafts with room numbers, room titles and all furniture/equipment layouts without furniture/equipment identification numbers and the area served by each communications closet indicated,
- B.** room layouts using for all communications, operations, and equipment rooms to include locations of equipment racks, terminal cabinets, power junction boxes, control units, standby DC power supplies, annunciators, CPU's, terminals, printers, entering and exiting conduits and cable trays, and signal ground facilities,
- C.** complete communications system conduit and riser diagrams of the telephone system, loudspeaker paging and program distribution system, intrusion detection system, nurse call systems, premises distribution system, radio paging system, and the TV distribution systems,
- D.** telephone and data communications outlets coordinated with the equipment and furnishings, both outlets and furnishings shown on floor plans,
- E.** expanded functional block diagrams of all communications systems shown in detail,
- F.** exact locations of the communications equipment (i.e., wall telephones and nurse call stations) installed in rooms with equipment and casework will be shown on the equipment wall elevations drawings,
- G.** elevation drawings of communications equipment rooms and closets.

Interior Design:

Design Analysis: Update the Design Analysis, the Color/Material and Perspective Presentation Boards, the Interior Design Brochure, and the Room and Casework Finish Schedules.

Drawings: Update the interior design perspective sketches.

Backcheck Submittal. The purpose of this submittal and review is the provision/verification of final design/construction documents, updated to incorporate the accepted 100% Submittal review comments. After the FINAL DESIGN REVIEW SUBMITTAL review, the Contractor shall revise the Contract Documents by incorporating any comments generated during the FINAL DESIGN REVIEW SUBMITTAL and shall prepare final hard copy Construction Specifications. The Contractor shall submit the following documents for the Backcheck submittal:

- a. Design Analysis
- b. Construction Specifications

c. Construction Drawings

d. The Government's Backcheck Submittal comments with the Contractor's annotation to each comment.

Partial Design Submittals. In the interest of expediting construction, the Contracting Officer may approve partial design submittals, procurement of materials and equipment, as well as issue the Notice To Proceed (NTP) for construction of those elements of the design which have been cleared for construction. Such partial notices to proceed shall be solely at the discretion of the Contracting Officer.

Design Submittals not in compliance with the contract documents

The Contractor shall, without additional compensation, correct or revise any errors or deficiencies in its design analysis, specifications, and drawings, and promptly furnish a corrected submittal in the form and number of copies as specified for the initial submittal. No part of the time lost due to such resubmissions shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice shall be given promptly to the Contracting Officer.

GOVERNMENT APPROVED CONSTRUCTION SUBMITTALS (Required During Construction)

General. Since this contract requires that the drawings and specifications specify specific proprietary materials, equipment, systems, and patented processes by trade name, make, or catalog number, it is anticipated that construction shop drawings will primarily be limited to testing, construction plans (e.g., Contractor Quality Control, Accident Prevention, Resident Management System, Area Use etc), schedules (Project Schedule/Network Analysis), certificates of compliance, reports, records/statements and variations.

Variations. After design submittals have been reviewed and cleared for construction by the Contracting Officer, no submittal for the purpose of substituting materials, equipment, systems, and patented processes will be considered by the Government unless submitted in accordance with the paragraph entitled VARIATIONS.

Additional Shop Drawings and Submittals. In accordance with the paragraph entitled DESIGN DISCREPANCIES, the Government may request the Contractor to provide additional shop drawing and submittal type data subsequent to completion of the design.

Incomplete Design. The Contractor shall not use construction submittals as a means to supplant and/or supplement an incomplete design effort.

Government Approval of Construction Submittals. The approval of construction submittals by the Contracting Officer shall not be construed as a complete check, but will indicate only that the general method of design construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as it is the sole responsibility of the Contractor to certify that each submittal has been reviewed in detail and is in strict conformance with all the contract documents and design criteria referenced therein.

Submittals. Submittals (other than shop drawings) shall be limited to items such as Plans (e.g., Quality Control Plan, Accident Prevention Plan, Area Use Plan etc.), Certificates of Compliance, Installation Instructions, Manufacturer's Catalog Data, Descriptive Literature/Illustrations, Factory and Field Test Reports, Performance and Operational Test Data Reports, Records, Operation and Maintenance Manuals, and required variations.

Government Review. Upon completion of review of construction submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. Four (4) copies of the submittal will be retained by the Contracting Officer and one (1) copy of the submittal will be returned to the Contractor.

For Information Only Submittals. These submittals shall be checked, stamped, signed and dated by the Contractor's Quality Control Engineer, certifying that such submittal complies with the contract requirements. All Contractor submittals shall be subject to review by the Government at any time during the course of the contract. Any Contractor submittal found to contain errors or omissions shall be resubmitted as one requiring "approval". No adjustment for time or money will be allowed for corrections required as a result of noncompliance with plans or specifications. Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. These submittals will be used for information purposes. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications and will not prevent the Contracting Officer from requiring removal and replacement if nonconforming material is incorporated in the work.

ATTACHMENTS. The following attachments form an integral part of this specification:

ENG FORM 4025 - Transmittal of Shop Drawings, Equipment Data, Material Samples, or Manufacturer's Certificate of Compliance (2 pages)

Contractor Furnished Design Documents Submittal Register

ENG FORM 4288 - Submittal Register

--- End of Section ---