

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. CONTRACT ID CODE	PAGE OF PAGES 1 56
2. AMENDMENT/MODIFICATION NO. 0004	3. EFFECTIVE DATE 08-Dec-2008	4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO.(If applicable)
6. ISSUED BY AFGHANISTAN ENGINEER DISTRICT US ARMY CORPS OF ENGINEERS KABUL APO AE 09356	CODE W917PM	7. ADMINISTERED BY (If other than item 6) See Item 6		
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		X	9A. AMENDMENT OF SOLICITATION NO. W917PM-09-R-0001	
		X	9B. DATED (SEE ITEM 11) 03-Nov-2008	
			10A. MOD. OF CONTRACT/ORDER NO.	
			10B. DATED (SEE ITEM 13)	
CODE	FACILITY CODE			
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS				
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer <input checked="" type="checkbox"/> is extended, <input type="checkbox"/> is not extended. Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12. ACCOUNTING AND APPROPRIATION DATA (If required)				
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.				
A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).				
C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
D. OTHER (Specify type of modification and authority)				
E. IMPORTANT: Contractor <input type="checkbox"/> is not, <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.) Facilities of Higher Education (Balkh, Jawzjan and Faryab) 1. Delete Section 01010 Scope of Work in its entirety and replace with the revised Section 01010 Scope of Work dated 16 December 2008. 2. Delete Section 01015 Technical Requirements in its entirety and replace with the revised Section 01015 Technical Requirements dated 16 December 2008. 3. Delete Section 01451 Contractor Quality Control in its entirety and replace with the revised Section 01451 Contractor Quality Control dated 16 December 2008. 4. The due date for proposals is extended to 4 January 2009.				
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect. All other terms and conditions remain unchanged.				
15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)		
		TEL:	EMAIL:	
15B. CONTRACTOR/OFFEROR _____ (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY _____ (Signature of Contracting Officer)		16C. DATE SIGNED 07-Dec-2008

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

The following have been amended:

SECTION 01010

**SECTION 01010
SCOPE OF WORK
Revised 16 December 2008**

1. GENERAL

This project consists of the design and construction of a Faculty of Higher Education (FoHE) facilities for the Ministry of Higher Education to instruct trainers of teachers, instruct teachers at the provincial level, and provide continuing education in order to upgrade teacher qualifications and standardize certification levels of teachers nationwide in Afghanistan. This is a classroom building and is considered an educational occupancy. Its function is to train future teachers in a classroom setting. Additional spaces are required for admin functions. In totality, the facility is designed for classroom and admin functions with incumbent toilet and utility spaces; there are no other functions. Design drawings, included as part of this solicitation package, are to be followed by the contractor, but shall not limit the contractor in design efforts. These drawings shall be further developed for complete building design and shall be site adapted requiring a unique site design that must be submitted to the government as part of the submittal and design process. Such site designs will include all utilities required for the facility. The project facility is defined as the design, material, labor, and equipment to construct buildings, utilities and other infrastructure for these Faculties of Higher Education (FHE). The work within this contract shall meet and be constructed in accordance with International Building Codes (IBC), NFPA-101 Life Safety Code, and applicable local standards. Any standard that can be determined to be substantially equivalent to the standards specified in this document may be used, but it is the Contractor's responsibility to show the equivalency of the alternate standard, and the Contracting Officer must approve its use. A partial listing of references is included herein. The contractor shall comply with the requirements of the contract and the Technical Requirements section 01015 for accomplishment of work within this scope. The contractor shall be responsible for demolitions of existing buildings, site grading and drainage plan, clearing and grubbing, and debris removal on each site as per the Technical Requirements of this contract. This is a site adapt project, the site is procured, the contractor is responsible for constructing the facility on the site and any required utilities that are further described within the RFP package.

1.1 English Language Requirement

All information shall be presented in English. The Contractor shall have a minimum of one English-speaking representative to communicate with the COR at all times when work is in progress.

1.2 Period of Performance

All work under this contract shall be completed within three hundred and thirty (**390**) calendar days after notice to proceed (to include time required for government review of design submittals).

1.3 Submittals

The contractor shall design and construct the facilities mentioned herein in accordance to the contract requirements. The contractor shall be responsible for design and construction submittals. Submittals and a Submittal Register are required as specified in Section 01335 of the Basic Contract.

1.4 Cost Estimate

The contractor shall prepare a parametric construction cost estimate. The contractor shall prepare a thorough, well-supported, estimate reflecting the final design features, construction schedule and

conditions, and any construction phasing requirements. The cost estimate shall be submitted as part of the submittals required for this contract.

1.5 CQM TRAINING REQUIREMENT: Before project design and construction begin, the Contractor's Quality Control Manager is required to have completed the U.S. Army Corps of Engineers CQM course, or equivalent. The Commercial Technical Training Center (CTTC), operated by the United Rehabilitation Bureau in Jalalabad, Afghanistan, provides a course that satisfies the requirement. Courses are offered at regular intervals. For enrollment and course information contact CTTC at the following:

1.5.A. Dr Pervez Mojadidi
Project Manager, United Rehabilitation Bureau
Email: adpzmuj@yahoo.com
Phone: (93) 0700-613-133, 0786489933

1.5.B. Engr. Said Wali Shinwari
Director, United Rehabilitation Bureau
Email: urb1992@yahoo.com
Phone: (93) 0700-287-626, 0797520380

1.5.C. USACE Guide Specification 01451, entitled "Contractor Quality Control", 3.5.D. requires approval of the Contractor's CQC Plan. That approval is contingent upon the successful completion of this course by the Contractor's Quality Control Manager.

2. LOCATION

Facilities of Higher Education building shall be constructed within the Afghanistan provinces on property owned by Provincial Department of Higher Education:

Kunduz, Baghlan, Badakshan and Takhar

Note: These are four (4) distinct and separate facilities.

3. UNEXPLODED ORDNANCE (UXO)

3.1 UXO Clearance

The contractor shall search, identify and clear all mines and unexploded ordnances (UXO's) from the entire site. The contractor shall provide the government a letter indicating that the site is clear of mines and UXO's and is available for construction operations to proceed. All mine and UXO clearing shall be done in accordance with the International Mine Action Standards (IMAS) and clearance shall be accomplished to the anticipated foundation depth. These standards can be found at <http://www.mineactionstandards.org>. Work will not commence in any area that has not been cleared. For any and all areas on or around the site, it is the responsibility of the Contractor to be aware of the risk of encountering mines and UXO's and to take all actions necessary to assure a safe work area to perform the requirements of this contract. The Contractor assumes the risk of any and all personal injury, property damage or other liability, arising out of and resulting from any Contractor action hereunder. In any case the Contractor shall be responsible for identifying all mines and UXO's within the entire site. Once the mines and UXO's are identified, the Contractor shall place them in a location in accordance with IMAS. This work shall proceed in phases, concurrently with other construction efforts as determined by the contractor. If a UXO/mine is encountered after site clearance and during project construction, UXO/mine disposal shall be handled in accordance with Section 01015, Technical Requirements.

4. SUMMARY OF WORK

All requirements set forth in the Scope of Work, but not included in the Technical Requirements, shall be considered as set forth in both, and vice versa. Provide heating and ventilation for this facility. All toilets shall be eastern -style. All eastern-style toilets shall face North or South.

All standard construction amenities and details such as heating, lighting, site drainage, utility connections, etc. shall be implied as a design and construction requirement. Drawings referenced are contained in the appendix. Concrete walkways are required to connect all facilities, and features such as parking lots, power plants, etc.

Design and Construct circulation pathways and exit stairs in accordance with building code references herein. Fire sprinkler system is not required. The facility shall comply with all other safety requirements as required within references. Smoke detectors and fire alarm systems shall be installed in accordance with requirements herein.

4.0.1 Bid Items (detailed in specifications section 00010 of this contract).

Base Bid

Survey

Design

As-built Drawings

Mobilization/Demobilization

Security Establishment and Sustainment

Education Building (4 each)

Sewage Treatment

Water Well System

Options to the Base Bid

UXO de-mining

Power Generation

Additional Structural Bay for Education Building (1st floor)

Additional Structural Bay for Education Building (2nd floor)

Standing Seam Roof

4.1 Contractor Requirements

The contractor shall design and construct the facilities as a design-build contract and in accordance with the requirements stated in Section 01015: TECHNICAL REQUIREMENTS. Refer to subsequent paragraphs for more specifics about required spaces. The design and construction work shall include, but not be limited to, that described herein. All requirements set forth in the Scope of Work, but not included in the Technical Requirements, shall be considered as set forth in both, and vice versa. Contractor shall design the FHE compound for a population based on a 25:1 student to educator ratio for the number of classrooms and laboratories being provided in the base bid plus any classrooms in awarded bid options. Additional staff requirements to be considered include 6 administrators and 10 miscellaneous staff. All utility systems shall be designed to accommodate the total facility population indicated above. All rooms shall be heated with electrical heaters and cooled by means of windows, ventilation fans, and ceiling fans.

4.1.1 Master Planning

The Contractor shall prepare a site Master Plan based on information contained in the Request for Proposal. The development of the master plan will include participation in a design charrette that will be conducted at the Corps of Engineers Headquarters Office in Kabul. As part of the site Master Plan, the contractor shall:

- a. Perform a soil/geotechnical survey of each site accomplished by a geotechnical professional engineer.
- b. Perform a site survey to include a topography survey noting all utilities, structures, obstacles, vegetation, and livestock on the site.
- c. Provide a site grading and drainage plan. The grading plan shall show finished floor elevations no less than 200mm above finished grade and shall show grading away from all buildings at a 2% slope for 2.5m on all sides of the building.

- d. Provide site cut and fill calculations and profiles of the buildings, water, and sanitary sewer.
- e. All buildings and foundations shall have proper fill material and compacted to 95% proctor and CBR compaction tested.

4.1.2 Water System

Design a potable water system, to include a ground well water source, water well pump, and bladder type hydro-pneumatic tank, and underground pipe distribution system. Assume that the well shall be constructed to deliver a minimum 414 kPa (60 psi) at a flow rate of 36 lpm (9.5 gpm). The two hydro-pneumatic tanks shall provide for a capacity of 500 liters (132 gallons) each. The hydro-pneumatic tanks and distribution system shall be designed to provide a minimum 276 kPa (40 psi) at the second level at all points in the system. Minimum pressures of 207 kPa (30 psi), under peak domestic flow conditions, can be tolerated in small areas as long as all peak flow requirements can be satisfied. Maximum water pressures in distribution mains and service lines shall not exceed 517 kPa (60 psi) at ground elevation. Provide an enclosed water well house to contain the well hydro-pneumatic tanks and chlorination system.

Provide a hand pump backup well. This may be included in the casing with the electric pump or in a separate smaller well. The capacity for the hand pump does not need to meet daily usage requirements but should be designed to extract as much flow as possible.

4.1.3 Sanitary Sewer System

Sanitary sewer system shall consist of piping and a septic system. Septic system shall consist of a septic tank and drainage leach field which will be no less than 60 meters away from the water well. The sewage collection system and effluent disposal shall be designed to accommodate the building population using an average 190 liters per person per day. The septic system shall be gravity fed and shall use the natural topography of the site. A percolation test shall be performed to determine if it is feasible to put in a drain field. Contractor shall submit method for doing a percolation test. If percolation rates are not between 1 to 48 min/cm then the COR shall be notified for further direction. Measured percolation rates shall be used to design the system.

4.1.4 Site Electrical Distribution System

POWER SYSTEM: The contractor shall design a power system for supply and distribution to all buildings to include generator* with fuel storage (* only if the option is exercised), and underground electrical distribution. All electrical design and installation shall meet NEC (NFPA 70) requirements. Conductors and circuits shall be sized for the specific loads. If the power generation option is exercised, the power plant shall include a prime power generator, switchgear, and all appurtenances necessary to meet the electrical demand plus 25% spare capacity.

GENERATORS: Contractor shall connect to local power grid where available. The power generation option, and the design and installation of generators, shall only be exercised where reliable power is not available locally 24 hours per day.

GENERATOR FUEL STORAGE: If the power generation option is exercised, the Contractor shall provide a design for low-profile fuel storage tanks that can accommodate a 30 day fuel supply based on the generator operating at 100% load.

Contractor shall design all interior electrical systems as described in section 01015 Technical Requirements and shall design and install any required exterior lighting, as described in section 01015.

4.1.5 Education Building (2 stories)

Construct a new reinforced concrete classroom facility with CMU in-fill walls and built-up roofing (with optional metal roof) as detailed on the plans in the appendix of this RFP. The function of the facility is solely classroom instruction and shall be designed as an educational occupancy.

4.1.6 Building Architectural Details (Note: specific details regarding room size and construction are shown on the drawings in the attached appendix of this RFP)

- a. Provide classrooms with white boards and tack boards as indicated in the attached conceptual drawings. Classrooms are required for instruction.
- b. Provide 4 Laboratory Classrooms. Provide lab counters with sinks as shown on the attached conceptual drawings. These lab classrooms are required for sciences, languages and computer applications.
- c. Provide Archive- Library room as indicated in the attached conceptual drawings. Construct wood book shelves around all perimeter walls (both exterior and interior sides). Wood shelves shall be 1500 mm each unit, 1750 mm in height, each shelf fixed @ 350 mm spacing, each shelf max loading @ 20 kgs.
- d. Provide storage rooms with steel or wood shelves as indicated in the attached conceptual drawings.
- e. Provide separate latrine rooms for males and females as indicated in the attached conceptual drawings. All toilets shall face north and south for cultural reasons.
- f. Provide office space for: 6 administrative staff and two private offices
- g. Provide building entrance reception area.
- h. Provide speaker intercom system for the building.
- i. Provide electrical utilities room on both floors.
- j. Provide fire protection measures (smoke detectors, extinguishers, fire rated walls, etc).
- k. Base bid roof shall be a Built-up Roof. Roof section is concrete slab one-way sloped structure, slope pitch to be determined by contractor as part of the design based upon climatic and elevation conditions of each site to resist snow and rain/moisture intrusion. The concrete roof section shall be constructed via a built-up asphalt roofing membrane section. Optional bid item roof shall be standing seam as illustrated. Requirements for roofs are indicated in section 01015.

4.1.6 HVAC

Environmental control of the facilities shall be achieved by HVAC equipment proposed by the contractor and approved by the U.S. Government. See section 01015 for technical requirements. Note only heating and ventilation are required for this project; no air conditioning is required.

4.1.7 Demolition and Grading

Minor site demolition is required prior to construction of new work. Grading at the site is required and shall conform to requirements within references herein.

4.1.8 Life Safety

Design and Construct circulation pathways and exit stairs in accordance with building code references herein. Fire sprinkler system is not required. The facility shall comply with all other safety requirements as required within references. Smoke detectors and fire alarm systems shall be installed in accordance with requirements herein. The intent of the life safety is to provide sufficient protected exit pathways via one hour fire rated corridors for the occupants to exit the building in the event of a fire or other emergency. The contractor is to design this facility with personal life safety as the highest design objective.

4.1.9 Lighting

General lighting shall be provided as indicated and shall meet recommendations from IESNA for each building type and function within each building. Design and installation shall meet NEC 70 requirements.

Exterior lighting shall be high intensity discharge luminaries on 10 meter high minimum spun aluminum or galvanized steel poles. If to be installed on an existing installation, type of luminaries shall match existing predominant type within installation.

4.1.10 Electrical

All electrical design and installation shall meet NFPA 70 (NEC 2005) requirements. Electrical receptacles shall be provided as indicated. Conductors and circuits shall be sized for the specific loads. Secondary power shall be 380/220 Volts, 3-phase, 4 wire, 50 Hz.

4.1.11 Foundation Design

Foundations, including subgrade, shall be designed and constructed based on recommendations from geotechnical investigation required herein. Foundation shall be placed below the frost line depth as determined by the geotechnical report for each site.

5. COMPLETION OF WORK

All work required under this contract shall be completed within three hundred and thirty (**330**) calendar days from Notice to Proceed (NTP) for site work. Site work construction will not be allowed to proceed until demining is complete or until sufficient engineering analysis and plans have been produced by the contractor and the government has granted clearance. Liquidated damages in the amount of \$1700.00 for every calendar day of delay shall be assessed and charged to the Contractor.

6. REFERENCES

Refer to Section 01015 for required references.

-- End of Section --

SECTION 01015**SECTION 01015
TECHNICAL REQUIREMENTS
Revised 06 December 2008****1. GENERAL**

1.1 The Contractor shall site design and construct the education facilities in accordance with the design-build contract and shall comply with 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. The contractor shall demolish and remove any and all existing structures and debris on the site prior to construction.

1.2 These design and product requirements are minimum requirements. 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.

1.3 ASBESTOS CONTAINING MATERIALS

Asbestos containing material (ACM) shall 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. ACM is defined as containing more than 1% ACM by weight.

1.4 SAFETY**1.4.1 Unexploded Ordnance (UXO)**

It is the responsibility of the Contractor to be aware of the risk of encountering UXO/mines and to take all actions necessary to assure a safe work area to perform the requirements of this contract. If during construction, the contractor becomes aware of or encounters UXO/mines or potential UXO/mines, the contractor shall immediately notify the COR, mitigate any delays to scheduled or unscheduled contract work, and clear/remove the UXO/mines. The contractor may only provide clearance/removal services via UN MAC accredited entities. Clearance/removal may only be undertaken in accordance with IMAS. The Contractor assumes the risk of any and all personal injury, property damage or other liability arising out of or resulting from any Contractor action taken hereunder.

Scrap metal shall be the property of the Host Government. The scrap metal on site shall be moved to an area away from the site perimeter as directed by the Contracting Officer's Representative and left for the Host Government to remove and/or salvage.

NOTE: For previous UXO/mine information, the following points of contact from the UN Mine Action Center of Afghanistan are provided:

Mohammad Sediq, Chief of Operations,
Email: sediq@unmaca.org
Cell: +93 070 295207

Hansie Heymans, Chief Information Officer,
Email: hansie@unmaca.org
Cell: +93 070 294286

1.4.1.1 Explosives Safety

1.4.1.1.1 General Safety Considerations

General safety considerations applicable to personnel, both essential and non-essential, at project sites where UXO may be encountered include:

- a. Do not carry fire or spark-producing devices.
- b. Do not conduct explosive or explosive-related operations without approved procedures and proper supervision and UXO safety support.
- c. Do not become careless by reason of familiarity with UXO or the reported probability level of UXO contamination.
- d. Do not conduct explosive or potentially explosive operations during inclement weather.
- e. Avoid contact with UXO except during UXO clearance operations.
- f. Conduct UXO-related operations during daylight hours only.
- g. Employ the "buddy system" at all times.

1.4.1.1.2 Activity Hazard Analysis (AHA) briefings

a. Activity Hazard Analysis's shall be prepared in accordance with the Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1.

b. Hazard analyses will be prepared and briefed by personnel that are knowledgeable in UXO and explosives safety standards and requirements. These personnel should understand the specific operational requirement and hazard analysis methodologies. A hazard analysis will be performed for each activity to determine the significance of any potential explosive-related hazards. Explosive residues may be discovered or exposed during UXO operations in the form of powder or various granular and powder based pellets. These contaminants can enter the body through the skin or by ingestion if proper personal hygiene practices are not followed. Explosive fillers such as white phosphorus are dangerously reactive in air and acute exposure can result in serious injury to the skin, eyes, and mucous membranes. They are also a fire hazard.

Safety requirements (or alternatives) that will either eliminate the identified hazards, mitigate or control them to reduce the associated risks to an acceptable level will be developed. The adequacy of the operational and support procedures that will be implemented to eliminate, control, or abate identified hazards or risks will then be evaluated and a second risk assessment completed to verify that a satisfactory safety level has been achieved.

1.4.1.2 Notification of Noncompliance

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 work site, 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. The Contractor shall make no part of the time lost due to such stop orders the subject of claim for extension of time or for excess costs or damages.

1.5 LIMITATION OF WORKING SPACE

The Contractor shall, except where required for service connections or other special reason(s), 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.

Areas located immediately outside the construction area might contain mines and unexploded ordnance

(UXO). Contractors assume all risks when venturing in or out of the designated work area.

1.6 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.

1.7 SUBCONTRACTORS

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

1.8 LIST OF CODES AND TECHNICAL CRITERIA:

The following codes and technical criteria and those referenced therein shall be required for this project. References within each reference below shall be required and adhered to. This list is not exhaustive and is not necessarily complete.

AABC - Associated Air Balance Council (National Standards for total System Balance)

ACI 318 Building Code Requirements for Structural Concrete (latest edition), American Concrete Institute

American Water Works Association, ANSI/AWWA C651-99 standard

ARI - Air Conditioning and Refrigeration Institute

ASCE 7-02, Minimum Design Loads for Buildings and Other Structures, 2002

ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy

ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality

ASME - American Society for Mechanical Engineering

ASTM - American Society for Testing and Materials

EIA ANSI/TIA/EIA-607: (1994) Commercial Building Grounding/Bonding Requirement Standard.

Factory Mutual (FM) Approval Guide-Fire Protection (2002).

IBC - International Building Codes, 2003 (and its referenced codes including those inset below):

- IMC – International Mechanical Code
- IPC – International Plumbing Code

Lighting Handbook, IESNA, latest edition

National Electrical Safety Code (NESC), Institute of Electrical and Electronic Engineers (IEEE C2), 2002 edition

NFPA 10, Portable Fire Extinguishers, 2002 edition

NFPA 70, National Electrical Code, 2005 edition

NFPA 72, National Fire Alarm Code, 2002 edition

NFPA 75, Standard for the Protection of Information Technology Equipment

NFPA 80, Standard for Fire Doors and Other Opening Protectives, 2007 edition

NFPA 101, Life Safety Code, 2006 edition

NFPA 110, Standard for Emergency and Standby Power Systems, 2005 edition

Plumbing and Drainage Institute (PDI-WH-201) water hammer arrestors

International Mine Action Standards, latest edition; (see <http://www.mineactionstandards.org> for copy of standards)

TM 5-805-4 Noise and Vibration

UFC 1-200-01, Design: General Building Requirements, 20 June 2005

UFC 1-300-07A Design Build Technical Requirements

UFC 3-230-03a, Water Supply, 16 Jan 2004

UFC 3-230-04a, Water Distribution, 16 Jan 2004

UFC 3-230-08a, Water Supply: Water Treatment, 16 Jan 2004

UFC 3-230-09a, Water Supply: Water Storage, 16 Jan 2004

UFC 3-230-10a, Water Supply: Water Distribution, 16 Jan 2004

UFC 3-230-13a, Water Supply: Pumping Stations, 16 Jan 2004

UFC 3-230-17FA, Drainage in Areas Other than Airfields, 16 Jan 2004

UFC 3-240-04a, Wastewater Collection, 16 Jan 2004

UFC 3-240-07FA, Sanitary and Industrial Wastewater Collection-Gravity Sewers and Appurtenances

UFC 1-300-09N, Design Procedures, 25 May 2005

UFC 3-310-01, Structural Load Data, 25 May 2005

UFC 3-501-03N, Electrical Engineering Preliminary Considerations, 16 Jan 2004

UFC 3-520-01, Interior Electrical Systems, 10 June 2002

UFC 3-530-01AN, Design: Interior and Exterior Lighting and Controls, 19 Aug 2005

UFC 3-540-04N Design: Diesel Electric Generating Plants, 16 Jan 2004

UFC 3-550-03FA Design: Electrical Power Supply and Distribution Systems, 1 Mar 2005

UFC 3-600-01, Design: Fire Protection Engineering for Facilities, 26 Sept 2006

UFC 4-010-01, Design: Minimum DoD Antiterrorism Standards for Buildings, 22 Jan 2007

UFC 4-010-02, DoD Minimum Antiterrorism Standoff Distances for Buildings, 19 Jan 2007

UFC 4-020-04FA, Electronic Security Systems: Security Engineering, 1 Mar 2005
UFC 4-021-01, Design and O&M: Mass Notification Systems, draft 1 May 2006
UFC 3-580-01 Telecommunications Building Cabling Systems Planning and Design
Underwriters' Laboratories (UL) Fire Protection Equipment Directory (2002)
UL Standards (as applicable)
UL 752, Bullet Resisting Equipment, 2000 or later
USCINCCENT OPORD 97-1

The publications to be taken into consideration shall be those of the most recent editions. Standards other than those mentioned above may be accepted if the standards chosen are internationally recognized and meet the minimum requirements of the specified standards. The Contractor shall be prepared to submit proof of this if requested by the Contracting Officer.

2. SITE DEVELOPMENT:

2.1 GENERAL

The project includes furnishing all materials, equipment and labor for designing, constructing site grading, water, and sanitary sewer.

2.2 ENVIRONMENTAL PROTECTION

2.2.1 Applicable regulations

The Contractor shall comply with all Host Nation laws, rules, regulations or standards concerning environmental pollution control and abatement with regard to discharge of liquid waste into natural streams or manmade channels. The contractor shall review host nation and U.S. Government environmental regulations with the contracting officer prior to design and discharge of any liquid wastes into natural streams or manmade channels.

2.2.2 Notification

The Contracting Officer will notify the Contractor in writing of any observed non-compliance with the foregoing provisions. The Contractor shall immediately take corrective action. If the Contractor fails or refuses to promptly take corrective action, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No extension of time or damages will be awarded to the Contractor unless it was later determined that the Contractor was in compliance.

2.2.3 Spillages

Measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, waste washings, herbicides and insecticides, and construction materials from polluting the construction site and surrounding area.

2.2.4 Disposal

Disposal materials, wastes, effluents, trash, garbage, oil, grease, chemicals, etc., shall be taken to a dumpsite off site and subject to the approval of the Contracting Officer. Burning at the project site for the disposal of refuse and debris will not be permitted.

2.3 CIVIL SITE DEVELOPMENT

2.3.1 Site Plan

The contractor shall locate the facilities in general agreement with the requirements in the Scope of Work 01010. All buildings, roads, parking areas, entry control points, wall, fence, utility structures, and other site features shall be clearly defined and dimensioned on the site Master Plan. The contractor shall perform and provide a geotechnical survey and topographic survey of the site and adapt the facilities in accordance to the topographic data. The contractor shall use the natural grade as much as possible when designing and constructing the gravity sanitary sewer system.

The site plan shall show geometric design of the site, including applicable dimensions of all exterior facilities, mechanical equipment, utilities, etc. Required facilities are described in the following sections of this specification.

All site plans and site master plans shall be drawn in the following projection and datum for incorporation into the U.S. Army Corps of Engineers GIS system:

WGS 1984 UTM Zone 42 N

2.3.2 Demolition

Demolition shall include removal of all structures, foundations, pavements, and utilities, and clearing and grubbing. All refuse and debris shall be disposed of off site. Holes and depressions shall be backfilled. Fill materials shall be composed of satisfactory soils or aggregates defined in ASTM D 2487 as GW, GP, GM, SP, SM, SW, CL-ML. Minimum soil compaction shall be 95 percent of maximum density as defined in ASTM D 1557.

2.3.3 Grading and Drainage

The contractor will provide all necessary site grading to insure adequate drainage so that no areas will be flooded due to a rainfall of a 10-year frequency. Drainage of the area should be compatible with the existing terrain. Building floor elevation shall be a minimum 200mm above grade and slope away from the building on all sides at a minimum of 2% for 2.5 meters.

2.3.3.1 Site Grading Plan and Storm Water Drainage

The contractor shall design a site grading plan that provides positive drainage and minimizes the requirement for major structures in a cost effective manner.

2.3.4 Civil Utilities

2.3.4.1 General

The design of the water and sanitary systems shall be sized to provide flow and discharge based on a fixture unit basis. The design drawings shall show all utility lines, line sizes, valves, manholes, disinfection systems, and applicable details associated with water and sanitary system designs. Specifications covering water lines, valves, pumps, controls, sanitary sewers and storm sewers shall be submitted as part of the design and shall require standard materials that are available in-country. Contractor shall install and connect exterior sanitary sewer collection and water supply piping to service connection points of each facility requiring such.

2.3.4.2 Water

2.3.4.2.1 General Water

Design and construction shall serve the demand. The Contractor shall install water service connections to include all pipe, valves, fittings and appurtenances. The required Average Daily Demand (ADD) is described in the Scope of Work Section 01010. In the event potable or non-potable use water is required prior to completion of the water facilities infrastructure the Contractor may be issued a Request for Proposal to provide non-potable (tank truck) and potable (bottled or other reliable source) consumption. Provide a minimum of one (1) outside water hydrant (hose spigot) per building to be used for landscaping purposes.

2.3.4.3 Well

The well shall be constructed in accordance with AWWA A100 Water Wells. Well shall be installed to prevent aquifer contamination by the drilling operation and equipment, intra- and inter-aquifer contamination, and vertical seepage of surface water adjacent to the well into the subsurface, especially the well intake zone.

2.3.4.3.1 Capacity Test

The Contractor shall furnish and install an approved temporary test pump, with discharge piping of sufficient size and length to conduct the water being pumped to point of discharge, and equipment necessary for measuring the rate of flow and water level in the well. An 8 hour step-drawdown capacity test shall be run with the pumping rate and drawdown at the pump well and observation wells recorded every 1/2 minute during the first 5 minutes after starting the pump; then every 5 minutes for an hour; then every 20 minutes for 2 hours. From this point on, readings taken at hourly intervals, until the water level stabilizes, shall be sufficient. Observation wells (existing well) shall be read on the same schedule as the pump well. During the step-drawdown test, the pumping rate shall be increased in steps at 2 hour intervals. Specific capacity shall be measured for each step. The well shall be "step" tested at rates of approximately 1/2, 3/4, 1 and 1 1/2 times the design capacity of 137 gpm. When the pump is shut off, water level readings shall be taken during the rebound period for the same intervals of time as the drawdown test. The record of the test, in triplicate, shall be delivered to the Contracting Officer.

2.3.4.3.2 Water Quality Sampling and Analysis

The Contractor shall perform water quality sampling and testing at the source. The Contractor shall utilize well-qualified and equipped testing capability in the project site area, if available. If professional testing services are not available in the area, the Contractor will submit an alternative practical testing source for approval. Raw water quality criteria for Water Quality and Criteria Standards, and shall address the following: PH, turbidity, conductivity, oxidation reduction potential, total dissolved solids, color, odor, total coliform/fecal coliform (bacteria) an indicator of the presence of E. coli. These baseline parameters are a partial list as presented in TM5-813-3/AFM 88-10 APPENDIX A.

2.3.4.3.3 Well House

At new well, construct a permanent well house with concrete slab floor. The floor of the well house shall slope away from the casing approximately 3 mm per 300 mm (1/8" per foot) and drain to the outside. Floor of well house shall be above flood plain. The well house design should be such that the well pump, motor and drop pipe could be removed readily and accessible via an insulated and lockable roof hatch above. Provide a small window for natural light located high up on the room. The entry door shall be lockable and insulated and made of metal with a metal frame. The well house shall protect valves, hydropneumatic tanks and pumping equipment plus provide freeze protection for the pump discharge piping beyond the check valve. The well house shall be insulated and a heating unit installed. The well shall be protected from unauthorized use by a chain-link security fence with lockable gate. Provide outriggers, barbed wire and concertina wire on fence and gate.

2.3.4.3.4 Raw Water Disinfection

Contractor shall perform disinfection of the well water in accordance with AWWA A 100 or equivalent. Bacteriological samples shall be collected and examined in accordance with Standard Methods for the Examination of Water and Wastewater by a qualified lab as approved by the Contracting Officer.

2.3.4.3.5 Water Filtration

The Contractor shall install an in-line, fully automatic, self-cleaning, sediment filtration unit. The filter shall be able to meet or exceed applicable standards for water quality. The Contractor shall install and use filtration unit in accordance with manufacturer's recommendations.

2.3.4.3.6 Hydro-pneumatic Storage Tank

The Contractor shall provide two 500 liter bladder type hydro-pneumatic expansion tanks. The storage facility shall be located above drainage areas and locations subject to flooding as approved by the Contracting Officer.

2.3.4.3.7 Disinfection & Chlorination System

Use hypochlorite compounds for disinfection. A hypo-chlorinator shall be used to feed a sodium hypochlorite solution of 5-15% available chlorine into the system. Hypochlorite compound may be a liquid or solid form. The hypo chlorination system shall consist of a chemical solution tank for hypochlorite, diaphragm-type pump, power supply, water pump, pressure switch and storage tank (optional hydro-pneumatic/storage). The pump shall feed a hypochlorite solution in proportion to the water demand. The

hypo-chlorinator shall have a pumping rate, liters per day (lpd) (gallons per day (gpd)) adequate to deliver 5 percent (%) available hypochlorite solution adjustable to the quantity of water being produced from the source. Dosage rate will vary somewhat depending on actual pump production rate and available residual chlorine in the system. Contractor shall determine the required dosage rate milligrams per liter (mg/l) to maintain the required chlorine residual (usually 0.2-0.4mg/l) in the distribution system. Chlorine solution tank shall be large enough to hold a three days supply of hypochlorite solution. A fresh solution shall be prepared every two or three days because the solution may lose its strength over time and this will affect the actual chlorine feed rate. The hypochlorite shall be stored in a cool dry place. Sodium hypochlorite can lose from two to four percent of its available chlorine content per month at room temperature. Contractor shall verify required minimum residual chlorine in accordance with local requirements verified and approved by the Contracting Officer. The chlorination system shall have the capability for manually adjusting the dosage rate and be installed in such a manner that the system can be easily disconnected and bypassed in the event of health safety or routine maintenance and repair. Disinfection of water mains shall be in accordance with AWWA standard C651-86 and disinfection of storage facilities in accordance with AWWA standard C652-86.

2.3.4.3.8 Chlorine Shelter

Contractor shall furnish a shelter as per chlorine manufacturer's installation requirements. The Contractor shall provide manufacturers catalog information and shop drawing to the Contracting Officer for approval.

2.3.4.4 Water Distribution System

2.3.4.4.1 General

The Contractor shall provide a water distribution system described as follows: Pipe diameters used in the network shall be as calculated, using ductile iron (DI) conforming to AWWA C151, installed in accordance with C 600 or polyvinyl chloride (PVC) as per ASTM D 1784 and 1785. All pipes and joints shall be capable of at least 1.03 Mpa (150 psi) and 1.38 (200psi) hydrostatic test pressure unless otherwise specified. Pipes should be adequate to carry the maximum quantity of water at acceptable velocities 0.9 to 1.5m/sec (3 to 5 ft/sec) at maximum flows not to exceed 2.8m/sec (9.2ft/sec) with working pressures of 240kPa (35psi) to 350kPa (50psi). **Minimum pressure shall be 276kPa (40psi) to all points of the distribution system and maximum pressure shall be 517kPa (60psi).** Pipe service connections from the distribution main to the building shall be either Polyvinyl Chloride (PVC) plastic Schedule 80 ASTM D 1785 or copper tubing conforming to ASTM B 88M, Type K, annealed. After choosing piping material type, use similar piping materials for all buildings for efficiency of future maintenance activities. Water supply distribution shall connect to a building service at a point approximately 1.5m (5 feet) outside the building or structure to which the service is required. Adequate cover must be provided for frost protection. A minimum cover of 800mm (2'-8") is required to protect the water distribution system against freezing. Water lines less than 1.25 meters (4 feet) deep under road crossings shall have a reinforced concrete cover of at least 150 mm (6 inch) thickness around the pipe.

2.3.4.4.2 Pipe

2.3.4.4.2.1 The Contractor shall provide pipe of adequate strength, durability and be corrosion resistant with no adverse effect on water quality. The exterior surface of the pipe must be corrosion resistant. If the pipe is installed underground pipe shall be encased with polyethylene in accordance with AWWA C105. Water distribution pipe material shall be PVC or Ductile Iron (DI). Ductile iron pipe shall conform to AWWA C104, et al. DI fittings shall be suitable for 1.03MPa (150psi) pressure unless otherwise specified. Fittings for mechanical joint pipe shall conform to AWWA C110. Fittings for use with push-on joint pipe shall conform to AWWA C110 and C111. Fittings and specials shall be cement mortar lined (standard thickness) in accordance with C104. Polyvinyl Chloride (PVC) pipe shall conform to ASTM D 1785. Plastic pipe coupling and fittings shall be manufactured of material conforming to ASTM D 1784, Class 12454B. PVC screw joint shall be in accordance with ASTM D 1785, etal, Schedules 40, 80 and 120. PVC pipe couplings and fittings shall be manufactured of material conforming to ASTM D 1784, Class 12454B. Pipe less than 80mm (3 inch) screw joint, shall conform to dimensional requirements of ASTM D schedule 80. Elastomeric gasket-joint, shall conform to dimensional requirements of ASTM D

1785 Schedule 40, All pipe and joints shall be capable of 1.03 Mpa (150psi) working pressure and 1.38 Mpa (200psi) hydrostatic test pressure. Pressure water lines crossing roads or parking areas shall be encased in concrete for a distance of 2.7m on each side of the road or parking lot crossing.

2.3.4.4.2 Hydrostatic, Leakage and Disinfection tests

The Contracting Officer will be notified not less than 48 hours in advance of any water piping test and will be given full access for monitoring testing procedures and results. Where any section of water line is provided with concrete thrust blocking for fittings or hydrants tests shall not be made until at least 5 days after installation of the concrete thrust blocking, unless otherwise approved.

2.3.4.4.2.3 Pressure Test

After the pipe is laid, the joints completed, and the trench partially backfilled leaving the joints exposed for examination, the newly laid piping or any valved section of piping shall, unless otherwise specified, be subjected for 1 hour to a hydrostatic pressure test of 1.03 MPa (150 psi). Each valve shall be opened and closed several times during the test. Exposed pipe, joints, fittings, hydrants and valves shall be carefully examined during the partially opened trench test. Joints showing visible leakage shall be replaced or remade as necessary. Cracked or defective pipe, joints, fittings, hydrants and valves discovered following this pressure test shall be removed and replaced and retested until the test results are satisfactory.

2.3.4.4.2.4 Leakage Test

Leakage test shall be conducted after the pressure tests have been satisfactorily completed. The duration of each leakage test shall be at least 2 hours and during the test the water line shall be subjected to not less than 1.03 MPa (150psi). Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved or approved section, necessary to maintain pressure to within 34.5kPa (5 psi) of the specified leakage test pressure after the pipe has been filled with water and the air expelled. Pipe installation will not be accepted if leakage exceeds the allowable leakage, which is determined by the following formula:

$L = 0.0001351ND (P \text{ raised to } 0.5 \text{ power})$ L = Allowable leakage in gallons per hour N = Number of joints in the length of pipeline tested D = Nominal diameter of the pipe in inches P = Average test pressure during the leakage test, in psi gauge

Should any test of pipe disclose leakage greater than that calculated by the above formula, the defective joints shall be located and repaired until the leakage is within the specified allowance, without additional cost to the government.

2.3.4.4.3 Bacteriological Disinfection

2.3.4.4.3.1 Disinfection Procedure

Before acceptance of potable water operation, each unit of completed waterline shall be disinfected as prescribed by AWWA C651. After pressure tests have been completed, the unit to be disinfected shall be thoroughly flushed with water until all entrained dirt and mud have been removed before introducing the chlorinating material. Flushing will be performed in a manner and sequence that will prevent recontamination of pipe that has previously been disinfected. The chlorinating material shall be liquid chlorine, calcium hypochlorite, or sodium hypochlorite. The chlorinating material shall provide a dosage of not less than 50 ppm and shall be introduced into the water lines in an approved manner. Polyvinyl Chloride (PVC) pipelines shall be chlorinated using only the above-specified chlorinating material in solution. The agent shall not be introduced into the line in a dry solid state. The treated water shall be retained in the pipe long enough to destroy all non-spore forming bacteria. Except where a shorter period is approved, the retention time shall be at least 24 hours and shall produce not less than 25 ppm of free chlorine residual throughout the line at the end of the retention period. Valves on the lines being disinfected shall be opened and closed several times during the contact period. The line shall then be flushed with clean water until the residual chlorine is reduced to less than 1.0 ppm.

2.3.4.4.3.2 Sampling

For each building connected to the water system, personnel from the Contractor's commercial laboratory shall take at least 3 water samples from different points, approved by the Contracting Officer, in proper sterilized containers and perform a bacterial examination in accordance with approved methods. The commercial laboratory shall be verified to be qualified by the appropriate authority for examination of potable water.

2.3.4.4.3.3 Acceptance Requirements

The disinfection shall be repeated until tests indicate the absence of pollution for at least 2 full days. The unit will not be accepted until satisfactory bacteriological results have been obtained.

2.3.4.4.4 Time for making Tests

Except for joint material setting or where concrete thrust blocks necessitate a 5-day delay, pipeline jointed with rubber gaskets, mechanical or push-on joints, or couplings may be subjected to hydrostatic pressure, inspected and tested for leakage at any time after partial completion of backfill.

2.3.4.4.5 Concurrent Tests

The Contractor may elect to conduct the hydrostatic tests using either or both of the following procedures. Regardless of the sequence of tests employed, the results of pressure tests, leakage tests, and disinfection shall be recorded for submission and approval. Replacement, repair or retesting required shall be accomplished by the Contractor at no additional cost to the Government. a. Pressure test and leakage test may be conducted concurrently, b. Hydrostatic tests and disinfection may be conducted concurrently, using water treated for disinfection to accomplish the hydrostatic tests. If water is lost when treated for disinfection and air is admitted to the unit being tested, or if any repair procedure results in contamination of the unit, disinfection shall be re-accomplished.

2.3.4.4.6 Valves

Valves (Gate valves w/box) shall be placed at all pipe network tee and cross intersections and the number of valves shall be one less than the number of lines leading into and away from the intersection. For isolation purposes valves shall be spaced not to exceed 3600 mm (12 feet). Gate valves shall be in accordance with AWWA C 500 and/or C509. Butterfly valves (rubber seated) shall be in accordance with C504 etal. The valves and valve boxes shall be constructed to allow a normal valve key to be readily used to open or close the valve. Provide traffic-rated valve boxes. Provide concrete pad, 1 meter (3'-4") square, for all valve boxes.

2.3.4.4.7 Vacuum and Air Release Valves

Air release valves are required to evacuate air from the main high points in the line when it is filled with water, and to allow the discharge of air accumulated under pressure. Vacuum relief valves are needed to permit air to enter a line when it is being emptied of water or subjected to vacuum. Contractor shall submit manufacturer's data for properly sized combination air and vacuum release valves and determine their locations on the distribution system subject to review and approval of the Contracting Officer.

2.3.4.4.8 Blow-Off Valves

The Contractor shall provide 40-50mm (1-5/8" – 2") blow-off valves at ends of dead end mains. Valves should be installed at low points in the mains where the flushing water can be readily discharged to natural or manmade drainage ditches, swales or other.

2.3.4.4.9 Thrust Blocking

Contractor shall provide concrete thrust blocking at any point where the layout of the system changes the direction of the flow, increases the velocity, or decreases or stops the flow. At these points, the pipes and fittings must be anchored and kept from moving or pulling apart by the use of thrust blocks installed against undisturbed earth.

2.3.4.5 Sanitary Sewer

2.3.4.5.1 General

The Contractor shall use the surveyed topographic information that show vegetation, drainage channels and other land surface features such as underground utilities and related structures that may influence the design and layout of the collection system. The sanitary sewer shall be gravity fed sewer lines. Sanitary sewers less than 1.25 meters (4 feet) under road crossings shall have reinforced concrete cover at least 150 mm (6 inch) thick around the pipe.

Exterior sanitary sewer line construction shall include service to the building as described in the Scope of Work Section 01010. Contractor shall design sanitary sewer collection, treatment system using approved field survey data and finished floor elevations. Main collection sewers will follow the most feasible route to the point of discharge. The sewer collection, treatment system shall be designed to accommodate the initial occupancy and a reasonable expansion capability. All sewers shall be located outside of the roadways as much as practical, and minimize the number of roadway crossings. To the extent practical, a sewer from one building shall not be constructed under another building, or remain in service where a building is subsequently constructed over it. Construction required shall include appurtenant structures and building sewers to points of connection with building drains 1.5m (5 feet) outside the building to which the sewer collection system is to be connected.

The Contractor shall use the following criteria where possible to provide a layout which is practical, economical and meets hydraulic requirements: 1) Follow slopes of natural topography, 2) avoid routing sewers through areas which require extensive restoration or underground demolition, 3) Avoid areas of high groundwater and placement of sewer below the groundwater table, 4) locate manholes at change in direction, size or slope of gravity sewers, 5) use straight sections between manholes, curved alignment shall not be permitted 6) avoid placing manholes where the tops will be submerged or subject to surface water inflow, 7) evaluate alternative sewer routes where applicable, 8) verify that final routing selected is the most cost effective alternative that meets service requirements. In the event that facilities to be provided under the contract must be occupied prior to completion of permanent wastewater infrastructure, the Contractor will be responsible for providing temporary portable shower and bathroom facilities.

2.3.4.5.2 Protection of Water Supplies

The Contractor shall ensure that the sewer design meets the following criteria:

2.3.4.5.3 Sanitary sewers shall be located no closer than 60m (197 feet) horizontally to water wells or reservoirs to be used for potable water supply.

2.3.4.5.4 Sanitary sewers shall be no closer than 3 m (10 feet) horizontally to potable water lines; where the bottom of the water pipe will be at least 300mm (12 inches) above the top of the sanitary sewer, horizontal spacing shall be a minimum of 1.8 m (6 feet).

2.3.4.5.5 Sanitary sewers crossing above potable water lines shall be constructed of suitable pressure pipe or fully encased in concrete for a distance of 2.7m (9 feet) on each side of the crossing. Pressure pipe will be as required for force mains in accordance with local standards and shall have no joint closer than 1 meter (3 feet) horizontally to the crossing, unless the joint is encased in concrete.

2.3.4.5.6 Sanitary sewer crossing roads or parking areas shall be encased in concrete for a distance of 2.7m on each side of the road or parking lot crossing. Pressure pipe will be as required for force mains in accordance with local standards and shall have no joint closer than 1 meter (3 feet) horizontally to the crossing, unless the joint is encased in concrete.

2.3.4.5.7 Quantity of Wastewater

The sewage collection system and effluent disposal shall be designed to accommodate the building population using an average 190 liters per person per day. Design criteria guideline shall be based on average influent wastewater characteristics as BOD of 400mg/l, SS of 400mg/l, BOD load of 750ppd, and

SS load of 750ppd.

2.3.4.5.8 Gravity Sewer

Sanitary sewers shall be designed to flow at a maximum of 90 to 95 percent full. Sanitary sewer velocities shall be designed to provide a minimum velocity of 0.6 meters per second (mps) or 2.0 feet per second (fps) at the ADD flow rate and a minimum velocity of 0.8 to 1.05 mps (2.5-3.5fps) at the peak diurnal flow rate. In no case shall the velocity drop below 0.3 mps, (1.0 fps) to prevent settlement of organic solids suspended in the wastewater. Pipe slopes shall be sufficient to provide the required minimum velocities and depths of cover on the pipe. Unless otherwise indicated (see Building Connections and Service Lines), gravity sewer pipe shall be installed in straight and true runs in between manholes with constant slope and direction. Adequate cover must be provided for frost protection. A minimum cover of 800 mm (2'-8") will be required to protect the sewer against freezing.

2.3.4.5.9 Manholes

The Contractor shall provide standard depth manholes (MH), (depth may vary) an inside dimension of 1.2 meters (4 feet). Manholes shall be made of cast-in-place reinforced concrete with reinforced concrete cover. Alternate precast manhole option shall taper to a 750 mm (30-inch) cast iron frame that provides a minimum clear opening of 600 mm (24 inches). In every case, the manholes, frames and covers shall be traffic rated, H-20 load rating. All manholes shall be provided with a concrete bench with a flow line trough, smoothly formed to guide waste flow to the outlet pipe from the inlet pipe(s). The top surface of the bench shall be above the crown of all pipes within the manhole. All surfaces of the bench shall be sloped smoothly toward the trough to guide flow, even under peak flow conditions.

2.3.4.5.9.1 Manhole Design Requirements

Manholes are required at junctions of gravity sewers and at each change in pipe direction, size or slope, except as noted hereinafter for building connections.

2.3.4.5.9.2 Spacing

The distance between manholes must not exceed 120 m (400 ft) in sewers of less than 460 mm (18 inches) in diameter. For sewers 460 mm (18 inches) and larger, and for outfalls from wastewater treatment facilities, a spacing of up to 180 m (600 ft) is allowed provided the velocity is sufficient to prevent the sedimentation of solids.

2.3.4.5.9.3 Pipe Connections

The crown of the outlet pipe from a manhole shall be on line with or below the crown of the inlet pipe.

2.3.4.5.9.4 Frames and Covers

Frames and covers shall be cast iron, or ductile iron, traffic rated in either case to an H-20 load rating. Cast iron frames and covers shall be traffic rated, circular with vent holes.

2.3.4.5.9.5 Steps for Manholes

Steps shall be cast iron, polyethylene coated, at least 15 mm (5/8 inch) thick, not less than 400mm (16 inches) in width, spaced 300 mm (12 inches) on center.

2.3.4.5.10 Pipe

Pipe shall conform to the respective specifications and other requirements as follows: Provide Polyvinyl Vinyl Chloride (PVC) conforming to ASTM D 3034, Type PSM with a maximum SDR of 35, size 380 mm (15inch) or less in diameter. PVC shall be certified as meeting the requirements of ASTM D 1784, cell Class 12454 B.

2.3.4.5.10.1 Fittings

Fittings shall be compatible with pipe supplied and shall have a strength not less than that of the pipe.

Fittings shall conform to the respective specifications and requirements as follows: provide PVC fittings conforming to ASTM D 3034 for type PSM pipe.

2.3.4.5.10.2 Joints

Joints installation requirements shall comply with the manufacturers installation instructions. Flexible plastic pipe (PVC or high density polyethylene pipe) gasketed joints shall conform to ASTM D3212.

2.3.4.5.10.3 Branch Connections

Branch connections shall be made by use of regular fittings or solvent-cemented saddles as approved. Saddles for PVC pipe shall conform to Table 4 of ASTM D 3034.

2.3.4.5.10.4 The minimum depth of the cover over the pipe crown shall be 0.8m (2'-8").

2.3.4.5.11 Building Connections and Service Lines

Building connections and service lines will be planned to eliminate as many bends as practical and provide convenience in rodding. Bends greater than 45 degrees made with one fitting should be avoided; combinations of elbows such as 45-45 degrees should be used with a cleanout provided. Connections to other sewers will be made directly to the pipe with standard fittings rather than through manholes. However, a manhole must be used if the connection is more than 31m from the building cleanout. Cleanouts shall be provided outside of the building. Service connection lines will be a minimum of 100 mm (4 inch) diameter and laid at a minimum 1% grade, but up to 2% as design parameters dictate. Service laterals shall be 150 mm (6 inch) and sloped to maintain the minimum velocity as described in paragraph "Gravity Sewer."

2.3.4.5.12 Cleanouts

Cleanouts must be installed on all sewer-building connections to provide a means for inserting cleaning rods into the underground pipe. Install manufactured wye fittings. In lieu of a wye fitting, an inspection chamber may be installed. The inspection chamber shall be of the same construction as a manhole. Preferably the cleanout will be of the same diameter as the building sewer, and never be smaller than 100 mm (4 inch).

2.3.4.5.13 Field Quality Control

2.3.4.5.13.1 Field Tests and Inspections

The Contracting Officer will conduct field inspections and witness field tests specified in this section. The Contractor shall perform field tests and provide labor, equipment and incidentals required for testing.

Check each straight run of pipeline for gross deficiencies by holding a light in a manhole; it shall show a practically a full circle of light through the pipeline when viewed from the adjoining end of the line. When pressure piping is used in a non-pressure line for non-pressure use, test this piping as specified for non-pressure pipe.

Test lines for leakage by either infiltration tests or exfiltration tests. Prior to testing for leakage, backfill trench up to at least lower half of the pipe. When necessary to prevent pipeline movement during testing, place additional backfill around pipe to prevent movement during testing, but leaving joints uncovered to permit inspection. When leakage or pressure drop exceeds the allowable amount specified, make satisfactory correction and retest pipeline section in the same manner. Correct visible leaks regardless of leakage test results.

Infiltration tests and ex-filtration tests: Perform these tests for sewer lines made of specified material, not only concrete, in accordance with ASTM C 969M, ASTM C 969. Make calculations in accordance with the Appendix to ASTM C 969M, ASTM 969.

2.3.4.5.14 Deflection Testing

Deflection testing will not be required, however, field quality control shall ensure that all piping is installed in accordance with deflection requirements established by the manufacturer.

2.3.4.5.15 Wastewater Treatment System

The wastewater treatment system and effluent disposal shall be designed to accommodate the compound's current demand. The Contractor shall use a wastewater treatment system, such as, a subsurface absorption field, whenever possible. Design requirements and criteria for treatment systems shall be in accordance with guidelines outlined in TM 5-814-3/AFM 88-11, Volume III Domestic Wastewater Treatment and UFC 3-240-02N Wastewater Treatment Systems Augmenting Handbook. Minimum acceptable percolation rates for absorption field and mound systems are categorized as slow permeable 3 to 120 min/in (1-48 min/cm). The sewage treatment system shall be sited the maximum distance possible from the working areas, public use areas and proposed facility. Septic systems shall be designed and installed in accordance with UFC 3-240-03.

3. ARCHITECTURAL REQUIREMENTS

3.1 GENERAL

All material approved shall become standardized material to be used throughout the facilities under contract. Different sub-contractors shall not use different material or standards under the contract. Intent of the project is to use locally procured materials (unless specified otherwise) and labor to the maximum extent possible while satisfying seismic building code. Conflicts between criteria shall be brought to the attention of the Contracting Officer for resolution. In such instances, the Contractor shall furnish all available information with justification to the Contracting Officer.

3.2 DESIGN CRITERIA

The Codes, Standards, and Regulations listed herein shall be used in the construction of this project. The publications shall be the most recent editions. Standards other than those mentioned may be accepted provided they meet the minimum requirements and the contractor shall submit proof of equivalency to the Contracting Officer for approval.

IBC- International Building Code

NFPA-101- National Fire Protection Association, Life Safety Code.

3.3 LIFE SAFETY/ FIRE PROTECTION/ HANDICAPPED ACCESSIBILITY

To the extent possible, all facilities will be designed in accordance with recognized industry standards for life safety and building egress. An adequate fire alarm system, fire extinguishers, and smoke alarms shall all be included as required. Due to the lack of adequate water volume and pressure, sprinkler systems are not feasible. The facility shall comply with all other safety requirements of NFPA 101. In keeping with the intended function of these facilities, handicapped accessibility will be incorporated into this project to the greatest extent possible. Elevators shall not be required. At least one exterior handicapped access ramp shall be installed and shall extend to the second floor. The maximum slope of the ramp shall not exceed 8.5% and shall not exceed 10m in length without a landing platform. The interior width of the ramp shall not be less than one (1) meter.

3.4 ANTITERRORISM/ FORCE PROTECTION

Force protection/anti-terrorism measures for this location are not required.

3.5 EXCAVATION

Trench excavation shall be made for concrete footings. Trenches shall be a minimum of .8 meter deep. Trenches deeper than 1.5 meters shall have protective shoring to protect workers or have the sides of the trench sloped back at a slope of 1.5:1. Care shall be taken when backfilling of foundation trenches to avoid damage to walls. Any excess dirt shall become the property of the Contractor and shall be removed from the site to a location approved by the Contracting Officer.

3.6 CONCRETE

Place 100 mm (4") of capillary water barrier below areas to receive a concrete slab on properly compacted soil free of organic material. Concrete flooring in wet areas shall slope to the floor drain and not allow for water to puddle. Concrete slabs in all areas shall not be placed prior to inspection and approval of piping and sub-surface by the Contracting Officer. Foundation trenches shall be level and free of loose material. Trenches shall be inspected and approved by the Contracting Officer prior to placing of any concrete foundations. See paragraph 5 for structural characteristics of concrete and reinforcing steel for foundations and slabs.

3.7 MASONRY

Storage of masonry materials shall be in a dry place or materials shall be covered with a plastic protective layer. Cover open walls each day to keep them protected and dry. Concrete masonry units (CMU) for exterior walls shall be either 200 mm or 300 mm wide x 400 mm x 200 mm high as shown on drawings. All cells shall be fully grouted and reinforced in exterior and shear walls. They shall be installed in running bond level and plumb. Mortar joints shall be 9 mm on all sides between CMU. Joints shall be struck with a concave tool to provide a smooth recessed curved surface. Install only quality units. The surface shall be free of chips, cracks, or other imperfections that would detract from the overall appearance of the finished wall. Defective CMU or mortar shall be rejected.

3.8 METAL

3.8.1 Steel Roof Joists

At the contractor's option, steel roof framing may be designed and installed in lieu of the roof structure noted in specifications 01010. Steel roof joists shall be placed according to the roof design and roof manufacturer specifications. Steel "Z" purlins shall be installed perpendicular to the steel beams. Use continuous metal roof sheets from ridge to eave to avoid constructing roof seams. In lieu of the continuous metal roof sheets, the Contractor can submit a plan for roofing seams; however, the plan must show a detail of how leaks will be avoided, and the Contracting Officer before application must approve the plan. Steel "hat channels" shall be installed on the bottom side of steel beams for the installation of gypsum board with screws. Provide all necessary metal framing for roof fascia and soffits. See structural paragraph for structural characteristics of steel joists.

3.8.2 Metal Window Sills

Galvanized metal window sills, 1 mm (20 gage), shall be installed on the exterior of all windows. The metal window sills shall have a turn down of 50 mm over the exterior masonry and stucco. Metal sills

shall extend from side to side of the masonry opening in a single piece. Extend the metal windowsill a minimum of 20 mm under the bottom of the aluminum windows. Install masonry mortar as required for a smooth surface under the window sills. Sills shall slope a minimum of 6mm to the exterior and not allow water to puddle.

3.8.3 Metal Fascia and soffit

Metal fascia and soffit shall be prefinished, 24 gauge, galvanized, sheet metal to match roof color. Fascia shall extend minimum 100mm up under roofing and shall have a drip edge at the bottom. Soffit shall be vented with at least 30% free area for proper venting of the attic space. Laps at joints in fascia and soffit cover pieces shall be minimum 150mm.

3.8.4 Steel Handrails

Steel handrails shall be steel pipe conforming to ASTM A 53/A 53M, and shall have a nominal diameter of 50mm. Handrails shall be designed to resist a concentrated load of 490 N in any direction at any point on the top of the rail or 290 N applied horizontally to the top of the rail, whichever is more severe. Installation of handrails shall be with expansion shields and bolts into masonry and/or concrete. Railings shall be hot dipped galvanized and shop painted. Pipe collars of the same material and finish as the handrail shall be provided.

3.8.5 Safety Nosings for Concrete Treads

Safety nosings shall be cast iron with cross-hatched abrasive surfaces. Nosings shall be 100mm wide, 6mm thick, and shall terminate not more than 150mm from both ends of treads. Provide safety nosings with anchors embedded a minimum of 20mm in the concrete with tops flush with the top of the traffic surface.

3.9 CARPENTRY

3.9.1 METAL ROOF and WOOD FRAMING

Roof framing details noted below if the optional metal roofing is used.

3.9.2 Lumber

Mark each piece of framing and board lumber or each bundle of small pieces of lumber with the grade mark and the species. Distinguish structural, framing, and board lumbars.

3.9.3 Preservative Treated Lumber

The contractor shall be responsible for the quality of treated wood products which shall be inspected in accordance with AWPA M2. Treated lumber shall be in compliance with applicable AWPA treatment standards and shall be marked in accordance with AWPA M6 and shall.

3.9.4 Preservative Treatment

Treat wood products with waterborne wood preservatives conforming to AWPA P5. Pressure treatment of wood products shall conform to the requirements of AWPA U1 and AWPA T1. Pressure-treated wood products shall not contain arsenic, chromium, or other agents classified as carcinogenic, or possibly carcinogenic to humans. All lumber and wood work for ground contact, contact with masonry and concrete, and for underground uses shall be preservative treated.

3.9.5 Natural Decay and Insect Resistant Wood

Natural decay-resistant and insect-resistant wood may be used as an alternative to preservative treated wood.

3.9.6 Structural Lumber

Except where a specific grade is indicated or specified, any of the species and grades shall have allowable unit stresses in kPa per code requirements. Use for rafters, beams, and all other members shall be stress rated. Design of members and fastenings shall conform to AITC OT-01.

3.9.7 Framing Lumber and Board Lumber

Framing lumber such as studs, plates, caps, collar beams, cant strips, bucks, sleepers, nailing strips, and nailers, and board lumber such as roof sheathing shall be the species and grades per WWPA G-5.

3.9.8 Hardware

Unless otherwise indicated or specified, rough hardware shall be the type and size necessary for project requirements. Sizes, types, and spacings of fastenings of manufactured building materials shall be as recommended by the product manufacturer unless otherwise indicated or specified. Hardware exposed to the weather or embedded or in contact with preservative treated wood, exterior masonry, or concrete walls shall be zinc coated.

3.9.8.1 Bolts, Nuts, Studs, and Rivets

ANSI B18.2.1, ANSI B18.5.2.1M, ASME B18.5.2.2M, ASME B18.2.2, and ASTM A 687.

3.9.8.2 Anchor Bolts

ASTM A 307, size as indicated, complete with nuts and washers.

3.9.8.3 Lag Screws and Lag Nuts

ANSI B18.2.1.

3.9.8.4 Nails

Nails shall be the size and type best suited for the purpose and shall conform to ASTM F 547. Nails shall be hot-dipped galvanized when used on exterior work.

3.10 INSULATION

3.10.1 Board Insulation

Provide only thermal insulating materials recommended by the manufacturer for the type of application indicated. Board thermal insulation shall conform to the following standard: Extruded Preformed Cellular Polystyrene: ASTM C 578.

3.10.1.1 Thermal Resistance

Minimum R-values for board insulation shall be R-16 for wall insulation and R-32 for ceilings.

3.10.2 ACCESSORIES

3.10.2.1 Adhesive

As recommended by the insulation manufacturer

3.10.2.2 Mechanical Fasteners

Corrosion resistant fasteners as recommended by the insulation manufacturer.

3.10.3 INSTALLATION

Apply board directly to masonry with adhesive or fasteners as recommended by the insulation manufacturer. Apply in parallel courses with joints breaking midway over the course below. Put end in moderate contact with adjoining insulation without forcing. Cut and shape as required to fit around wall penetrations, projections or openings to accommodate conduit or other services. Seal around cut-outs with sealant.

3.11 ROOFING AND WEATHER PROOFING

3.11.1.1 BUILT UP ROOFING

The proposed base bid roofing is a one-way sloped concrete slab (deck); minimum slope is 250mm per meter. (Actual slope shall be determined by the contractor as part of the design, dependent upon site climatic and elevation conditions). Weather proofing shall be constructed by a built-up roofing section.

The building up roofing construction is composed of the following layers on the concrete roofing deck (1) water proof reinforced bitumen roofing felt layer (adhered to concrete deck by mastic) at 100 mm overlapping per ASTM D 6380-03 requirements under (2) asphalt-aggregate course layer, applied at a rate of 2.9 kg/SM embedded with gravel at 19.5 kg/SM. The aggregate for roofing shall meet ASTM 1863 requirements, roofing asphalt shall meet ASTM D 312 or European equivalent as determined by the Contracting Officer.

3.11.1.2 SLOPED ROOFS*

On sloping roofs provide and install prefinished, .70 mm (24 gauge) galvanized steel in standing seam design. Color to be selected by the Contracting Officer. Metal roofing shall be anchored to the wood deck sheathing or steel "Z" purlins using fasteners as recommended by the roofing manufacturer or, at minimum, 300 mm on center at all seams. Roof sealant or adhesive shall be placed over any exposed fasteners. Roofing system shall include all edge, ridge and penetration flashings necessary for a watertight installation and as described in this section. Provide continuous vents on all roof ridges. (* Applicable only if the Standing Seam Metal Roof Option is exercised)

3.11.2 FLASHING AND SHEET METAL

3.11.2.1 Materials

Any metal listed by ASTM, DIN, BS or EN standards. Manual for a particular item may be used, unless otherwise specified or indicated. Materials shall conform to the requirements specified below and to the thicknesses and configurations established in ASTM, DIN, BS or EN standards. Different items need not be of the same metal, except that if copper is selected for any exposed item, all exposed items shall be copper.

3.11.2.1.1 Steel Sheet, Zinc-Coated (Galvanized)

Zinc coated steel conforming to ASTM A 525, DIN BS or EN Standards.

3.11.2.1.2 Aluminum wall capping and expansion joint profiles.

Aluminum wall capping conforming to ASTM B 209 M, DIN 18339, BS or EN Standards.

3.11.2.2 General

Downspouts shall be designed and fabricated on site. Unless otherwise specified or indicated, exposed edges shall be folded back to form a 13 mm (1/2 inch) hem on the concealed side, and bottom edges of exposed vertical surfaces shall be angled to form drips. Bituminous cement shall not be placed in contact with roofing membranes other than built-up roofing.

3.11.2.3 Wall, Floor, Ceiling Expansion Joints Over Plaster

Expansion joints shall be provided as specified in ASTM, DIN 18339, BS or EN Standards.

3.11.2.4 Connections and Jointing

3.11.2.4.1 Soldering

Soldering shall apply to copper, and stainless steel items. Edges of sheet metal shall be pre-tinned before soldering is begun. Soldering shall be done slowly with well heated soldering irons so as to thoroughly heat the seams and completely sweat the solder through the full width of the seam. Edges of stainless steel to be pre-tinned shall be treated with soldering acid flux. Soldering shall follow immediately after application of the flux. Upon completion of soldering, the acid flux residue shall be thoroughly cleaned from the sheet metal with a water solution of washing soda and rinsed with clean water.

3.11.2.4.2 Seaming

Flat-lock and soldered-lap seams shall finish not less than 25 mm. wide. Unsoldered plain-lap seams shall lap not less than 75 mm. unless otherwise specified. Flat seams shall be made in the direction of the flow.

3.11.2.4.3 Cleats

A continuous cleat shall be provided where indicated or specified to secure loose edges of the sheet metalwork. Butt joints of cleats shall be spaced approximately 3 mm. apart. The cleat shall be fastened to supporting wood construction with nails evenly spaced not over 300 mm. on centers. Where the fastening is to be made to concrete or masonry, screws shall be used and shall be driven in expansion shields set in concrete or masonry.

3.11.2.5 Downspouts

Downspouts and gutters shall be installed as indicated. Downspouts shall be rigidly attached to the building. Supports for downspouts shall be spaced according to manufacturer's recommendations.

3.11.2.6 Flashing

Flashing shall be installed at locations indicated and as specified below. Sealing shall be according to the flashing manufacturer's recommendations. Flashings shall be installed at intersections of roof with vertical surfaces and at projections through roof, except that flashing for heating and plumbing, including piping, roof and floor drains, and for electrical conduit projections through roof or walls are specified in other sections. Except as otherwise indicated, counter flashings shall be provided over base flashings. Perforations in flashings made by masonry anchors shall be installed on top of joint reinforcement. Lashing shall be formed to direct water to the outside of the system.

3.11.2.6.1 Through-wall Flashing

Through-wall flashing includes sill, lintel, and spandrel flashing. The flashing shall be laid with a layer of mortar above and below the flashing so that the total thickness of the two layers of the mortar and flashing are the same thickness as the regular mortar joints. Flashing shall not extend further in to the masonry backup wall than the first mortar joint. Joints in flashing shall be lapped and sealed. Flashing shall be one piece for lintels and sills.

3.11.2.6.2 Lintel Flashing

Lintel flashing shall extend the full length of lintel. Flashing shall extend through the wall one masonry course above the lintels and shall be bent down over the vertical leg of the outer steel lintel angle not less than 50 mm, or shall be applied over top of masonry and pre-cast concrete lintels. Bed joints of lintels at joints shall be under laid with sheet metal bond breaker.

3.11.2.6.3 Sill Flashing

Sill flashing shall extend the full width of the sill and not less than 100 mm beyond ends of sill except at joint where the flashing shall be terminated at the end of the sill.

3.11.2.6.4 Wall Capping

Wall Capping shall be installed according to the manufacturer's recommendations.

3.11.3 SEALANTS

3.11.3.1 Interior Sealant

ASTM C 834 or ASTM C 920, Type S or M, Grade NS, Class 12.5, Use NT, DIN, BS, or EN equal standards.

3.11.3.2 Exterior Sealant

For joints in vertical and horizontal surfaces, provide ASTM C 920, Type S or M, Grade NS, DIN, BS, or EN equal standards.

3.11.3.3 Floor Joint Sealant

(ASTM C 920) Type S or M, Grade P, class 25, use T

3.11.3.4 Primers

Provide a non-staining, quick-drying type and consistency recommended by the sealant manufacturer for the particular application.

3.11.3.5 Bond Breakers

Provide the type and consistency recommended by the sealant manufacturer to prevent adhesion of the sealant to backing or to bottom of the joint.

3.11.3.6 Backstops

Backing shall be 25 to 33 percent oversize for closed cell and 40 to 50 percent oversize for open cell material, unless otherwise indicated.

3.11.3.7 Cleaning Solvents

Provide type(s) recommended by the sealant manufacturer except for aluminum and bronze surfaces that will be in contact with sealant.

3.11.3.8 Surface Preparation

Surfaces shall be clean, dry to the touch, and free from dirt, frost, moisture, grease, oil, wax, lacquer, paint, or other foreign matter that would tend to destroy or impair adhesion. Oil and grease shall be removed with solvent and surfaces shall be wiped dry with clean cloths. When resealing an existing joint, remove existing caulk or sealant prior to applying new sealant. For surface types not listed below, the sealant manufacturer shall be contacted for specific recommendations.

3.11.3.9 Masking Tape

Masking tape shall be placed on the finish surface on one or both sides of a joint cavity to protect adjacent finish surfaces from primer or sealant smears. Masking tape shall be removed within 10 minutes after joint has been filled and tooled.

3.11.3.10 Backstops

Install backstops dry and free of tears or holes. Tightly pack the back or bottom of joint cavities with backstop material to provide a joint of the depth specified.

3.11.3.11 Primer

Immediately prior to application of the sealant, clean out loose particles from joints. Where recommended by sealant manufacturer, apply primer to joints in concrete masonry units, wood, and other porous surfaces in accordance with sealant manufacturer's instructions. Do not apply primer to exposed finish surfaces.

3.11.3.12 Bond Breaker

Provide bond breakers to the back or bottom of joint cavities, as recommended by the sealant manufacturer for each type of joint and sealant used, to prevent sealant from adhering to these surfaces. Carefully apply the bond breaker to avoid contamination of adjoining surfaces or breaking bond with surfaces other than those covered by the bond breaker.

3.11.3.13 Sealants

Provide a sealant compatible with the material(s) to which it is applied. Do not use a sealant that has exceeded shelf life or has jelled and can not be discharged in a continuous flow from the gun. Apply the sealant in accordance with the manufacturer's instructions with a gun having a nozzle that fits the joint width. Force sealant into joints to fill the joints solidly without air pockets. Tool sealant after application to ensure adhesion. Sealant shall be uniformly smooth and free of wrinkles. Upon completion of sealant application, roughen partially filled or unfilled joints, apply sealant, and tool smooth as specified. Sealer shall be applied over the sealant when and as specified by the sealant manufacturer.

3.11.3.14 Protection

Protect areas adjacent to joints from sealant smears. Masking tape may be used for this purpose if

removed 5 to 10 minutes after the joint is filled.

3.11.3.15 Final Cleaning

Upon completion of sealant application, remove remaining smears and stains and leave the work in a clean and neat condition.

a. Masonry and Other Porous Surfaces: Immediately scrape off fresh sealant that has been smeared on masonry and rub clean with a solvent as recommended by the sealant manufacturer. Allow excess sealant to cure for 24 hour then remove by wire brushing or sanding.

b. Metal and Other Non-Porous Surfaces: Remove excess sealant with a solvent-moistened cloth.

3.12 WINDOWS, DOORS & GLAZING

3.12.1 WINDOWS

3.12.1.1 Materials

A. Aluminum Extrusions: Provide alloy and temper recommended by the window manufacturer for the strength, corrosion resistance, and application of required finish, meeting the DIN 1725 raw material requirements, but not less than 215 N/mm² ultimate tensile strength and not less than 1.5 mm thick at any location for main frame and sash members.

B. Fasteners: Provide aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by the manufacturer to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors, and other components of window units.

1. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125 inch thick, reinforce the interior with aluminum or nonmagnetic stainless steel to receive screw threads or provide standard non-corrosive pressed-in splined grommet nuts.

2. Exposed Fasteners: Except where unavoidable for application of hardware, do not use exposed fasteners. For application of hardware, use fasteners that match the finish of the member or hardware being fastened, as appropriate.

C. Anchors, Clips, and Window Accessories: Fabricate anchors, clips, and window accessories of aluminum, nonmagnetic stainless steel, or hot-dip zinc-coated steel or iron complying with the requirements of DIN 1748; provide sufficient strength to withstand design pressure indicated. As a minimum provide 3 anchors on each side of the frame.

D. Compression-Type Glazing Strips and Weatherstripping: Unless otherwise indicated, and at the manufacturer's option, provide compressible stripping for glazing and weatherstripping such as molded EPDM or neoprene gaskets.

E. Sealant: For sealants required within fabricated window units, provide type recommended by the manufacturer for joint size and movement. Sealant shall remain permanently elastic non-shrinking, and non-migrating. Comply with Sealants of these specifications for selection and installation of sealants.

F. Wire Fabric Insect Screen shall be permanently fixed to the exterior, except for guard towers.

3.12.1.2 Hardware

General: Provide the manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum and of sufficient strength to perform the function for which it is intended.

3.12.1.3 Fixed, Casement, and Horizontal Sliding Windows

All windows shall utilize laminated and insulating glazing consisting of two panes of 6mm laminated glazing separated by minimum 12mm airspace..

3.12.1.4 Fabrication

Provide aluminum windows with factory finish in all buildings to fit the masonry openings. Window openings shall be provided with insect screening. Provide a locking device on the interior of each window. Provide anchors on each side of the frame into the adjoining masonry, 3 on each side. Provide weather stripping system for all exterior windows and doors.

3.12.1.5 Finishes

Apply compliance with paint manufacturer's specifications for cleaning, conversion coating, and painting.

3.12.1.6 Inspection

Inspect openings before beginning installation. Verify that rough or masonry opening is correct and the sill plate is level. Masonry surfaces shall be visibly dry and free of excess mortar, sand, and other construction debris.

3.12.1.7 Installation

Comply with manufacturer's specifications and recommendations for installation of window units, hardware, operators, and other components of the work. Set window units plumb, level, and true to line, without warp or rack of frames or sash. Provide proper support and anchor securely in place. Set sill members and other members in a bed of compound or with joint fillers or gaskets, as shown, to provide weathertight construction. Refer to the Sealant sections for compounds, fillers, and gaskets to be installed concurrently with window units. Coordinate installation with wall flashings and other components of the work.

3.12.1.8 Adjusting

Adjust operating sash and hardware to provide a tight fit at contact points and at weatherstripping for smooth operation and a weathertight closure.

3.12.1.9 Cleaning

Clean aluminum surfaces promptly after installation of windows. Exercise care to avoid damage to protective coatings and finishes. Remove excess glazing and sealant compounds, dirt, and other substances. Lubricate hardware and other moving parts.

3.12.2 DOORS

All exterior doors (entry and exist doors) shall be heavy duty metal doors with metal frames. Interior door shall be solid core wood doors with steel frames. Corridor doors shall have 20 minute fire rating. All glazed doors shall have glazing in the upper half of the door, Glazing in fire rated doors shall be fire rated and not exceed 0.77 SM (100 sq inches). Commercial (industrial) grade duty lock sets and hardware shall be used on all doors. Provide (3) industrial grade heavy hinges on all doors. Hinges shall be the 5 knuckle type or equivalent. Provide door handles and locksets that can be locked with a key on all doors. All door locks shall have a thumb latch on inside of door such that no key is necessary to exit the room or building. Coordinate the final keying schedule with Contracting Officer prior to ordering lock sets. Generally each building should have 8 master keys fitting all locks, 8 sub-master keys fitting all exterior doors and 3 keys each for each interior door. Include 25% spare key blanks for the amount of keys provided per building. Provide numbering system identifying key to associated room door. All glazing in or adjacent to doors shall be fire rated or tempered per IBC. Provide weather stripping system for all exterior doors.

3.12.2.1 Exterior Steel Doors

SDI A250.8, except as specified otherwise. Prepare doors to receive specified hardware. Undercut where indicated. Exterior doors shall have top edge closed flush and sealed to prevent water intrusion. Doors shall be 44.5 mm thick, unless otherwise indicated. Doors shall be constructed using heavy gauge

steel with minimum thickness of 1.2 mm.

3.12.2.1.1 Accessories

3.12.2.1.1.1 Louvers: Not used.

3.12.2.1.1.2 Astragals: (only used for laboratories)

For interior pairs of fire rated wood laboratory doors, provide stainless steel astragals complying with NFPA 80 for fire rated assemblies and NFPA 105 for smoke control assemblies.

3.12.2.1.1.3 Moldings

Provide moldings around glass of exterior doors. Provide non-removable moldings on outside of exterior doors .

3.12.2.1.2 Standard Steel Frames

SDI A250.8, except as otherwise specified. Form frames to sizes and shapes indicated, with welded corners or knock-down field-assembled corners. Provide steel frames for doors, transoms, sidelights, mullions, cased openings, and interior glazed panels, unless otherwise indicated.

3.12.2.1.3 Welded Frames

Continuously weld frame faces at corner joints. Mechanically interlock or continuously weld stops and rabbets. Grind welds smooth.

3.12.2.1.4 Mullions and Transom Bars

Mullions and transom bars shall be closed or tubular construction and shall member with heads and jambs butt-welded thereto or knock-down for field assembly. Bottom of door mullions shall have adjustable floor anchors and spreader connections.

3.12.2.1.5 Stops and Beads

Form stops and beads from 0.9 mm thick steel. Provide for glazed and other openings in standard steel frames. Secure beads to frames with oval-head, countersunk Phillips self-tapping sheet metal screws or concealed clips and fasteners. Space fasteners approximately 300 to 400 mm on centers. Miter molded shapes at corners. Butt or miter square or rectangular beads at corners.

3.12.2.1.6 Anchors

Provide anchors to secure the frame to adjoining construction. Provide steel anchors, zinc-coated or painted with rust-inhibitive paint, anchors not lighter than 1.2 mm thick.

3.12.2.1.6.1 Wall Anchors

Provide at least three anchors for each jamb.

a. Masonry: Provide anchors of corrugated or perforated steel straps or 5 mm diameter steel wire, adjustable or T-shaped;

b. Completed openings: Secure frames to previously placed concrete or masonry with expansion bolts

3.12.2.1.6.2 Floor Anchors

Provide floor anchors drilled for 10 mm anchor bolts at bottom of each jamb member. [Where floor fill occurs, terminate bottom of frames at the indicated finished floor levels and support by adjustable extension clips resting on and anchored to the structural slabs.

3.12.2.1.7 Weather-stripping, Integral Gasket

All exterior doors shall have weather-stripping. Black synthetic rubber gasket with tabs for factory fitting into factory slotted frames, or extruded neoprene foam gasket made to fit into a continuous groove formed in the frame, may be provided in lieu of head and jamb seals. Insert gasket in groove after frame is finish painted.

3.12.2.1.8 Hardware Preparation

Provide minimum hardware reinforcing gages as specified in ANSI A250.6. Drill and tap doors and frames to receive finish hardware. Prepare doors and frames for hardware in accordance with the applicable requirements of SDI A250.8 and ANSI A250.6. For additional requirements refer to BHMA A115. Drill and tap for surface-applied hardware at the project site. Build additional reinforcing for surface-applied hardware into the door at the factory. Locate hardware in accordance with the requirements of SDI A250.8, as applicable. Punch door frames, with the exception of frames that will have weather-stripping or lightproof or soundproof gasketing, to receive a minimum of two rubber or vinyl door silencers on lock side of single doors and one silencer for each leaf at heads of double doors. Set lock strikes out to provide clearance for silencers.

3.12.2.1.9 Finishes

All surfaces of doors and frames shall be thoroughly cleaned, chemically treated and factory primed with a rust inhibiting coating as specified in SDI A250.8, or paintable A25 galvanized steel without primer. Where coating is removed by welding, apply touchup of factory primer.

3.12.2.1.10 Fabrication and Workmanship

Finished doors and frames shall be strong and rigid, neat in appearance, and free from defects, waves, scratches, cuts, dents, ridges, holes, warp, and buckle. Molded members shall be clean cut, straight, and true, with joints coped or mitered, well formed, and in true alignment. Dress exposed welded and soldered joints smooth. Design door frame sections for use with the wall construction indicated. Corner joints shall be well formed and in true alignment. Conceal fastenings where practicable. On wraparound frames for masonry partitions, provide a throat opening 3 mm larger than the actual masonry thickness. Design other frames in exposed masonry walls or partitions to allow sufficient space between the inside back of trim and masonry to receive calking compound.

3.12.2.1.11 Grouted Frames

For frames to be installed in exterior walls and to be filled with mortar or grout, fill the stops with strips of rigid insulation to keep the grout out of the stops and to facilitate installation of stop-applied head and jamb seals.

3.12.2.1.12 Fire and Smoke Doors and Frames

The requirements of NFPA 80 and NFPA 105 respectfully shall take precedence over details indicated or specified.

3.12.2.13 Installation

3.12.2.1.13.1 Frames

Set frames in accordance with SDI 105. Plumb, align, and brace securely until permanent anchors are set. Anchor bottoms of frames with expansion bolts or powder-actuated fasteners. Build in or secure wall anchors to adjoining construction. Backfill frames with mortar. When an additive is provided in the mortar, coat inside of frames with corrosion-inhibiting bituminous material. For frames in exterior walls, ensure that stops are filled with rigid insulation before grout is placed.

3.12.2.1.13.2 Doors

Hang doors in accordance with clearances specified in SDI A250.8. After erection and glazing, clean and adjust hardware.

3.12.2.1.13.3 Fire and Smoke Doors and Frames

Install fire doors and frames, including hardware, in accordance with NFPA 80. Most notable are panic hardware installed for exterior exit doors.

3.12.2.1.14 Protection and Cleaning

Protect doors and frames from damage. Repair damaged doors and frames prior to completion and acceptance of the project or replace with new, as directed. Wire brush rusted frames until rust is removed. Clean thoroughly. Apply an all-over coat of rust-inhibitive paint of the same type used for shop coat. Upon completion, clean exposed surfaces of doors and frames thoroughly. Remove mastic smears and other unsightly marks.

3.12.2.2 Interior Wood Doors

Provide doors that are wood, solid core, 900 and 1350 mm Wide x 2100 mm. High x 45 mm. Thick with steel frame to match new door masonry openings. All glazed doors shall have 5 mm. single tempered glazing, 20 minute fire rated for corridor doors.

3.12.2.2.1 Accessories

3.12.2.2.1.1 Door Louvers – do not use, door undercuts are to be used for transfer ventilation.

3.12.2.2.1.2 Astragals (only used for laboratories)

For interior pairs of fire rated wood laboratory doors, provide stainless steel astragals complying with NFPA 80 for fire rated assemblies and NFPA 105 for smoke control assemblies.

3.12.2.2.2 Pre-fitting

At the Contractor's option, doors may be provided factory pre-fit. Doors shall be sized and machined at the factory by the door manufacturer in accordance with the standards under which they are produced. The work shall include sizing, beveled edges, mortising, and drilling for hardware and providing necessary beaded openings for glass and louvers. Provide the door manufacturer with the necessary hardware samples, and frame and hardware schedules as required to coordinate the work.

3.12.2.2.3 Finishes

Provide door finish colors as selected by the Contracting Officer from the color selection samples.

3.12.2.2.4 Installation

Before installation, seal top and bottom edges of doors with the approved water-resistant sealer. Seal cuts made on the job immediately after cutting using approved water-resistant sealer. Fit, trim, and hang doors with a 2 mm minimum, 3 mm maximum clearance at sides and top, and a 5 mm minimum, 6 mm maximum clearance over thresholds. Provide 10 mm minimum, 11 mm maximum clearance at bottom where no threshold occurs. Bevel edges of doors at the rate of 3

mm in 50 mm. Door warp shall not exceed 6 mm when measured in accordance with WDMA I.S. 1-A.

3.12.3. GLAZING

ASTM C 1036, or ASTM C 1172 or equal.

3.12.3.1 Tempered Glass

Tempered glass shall be kind FT fully tempered flat type. Class 1 clear, condition A uncoated surface, Quality q3-glazing select, conforming to ASTM, DIN, BS or EN standards. Color shall be clear.

3.12.3.2 Laminated Glass

Laminated glass shall be constructed out of two, 3mm glass panes bonded together with a minimum .75mm polyvinyl-butylal (PVB) interlayer.

3.12.3.3 Insulated Glass

All exterior glazing shall be insulated, constructed of two panes of laminated glass separated by a hermetically sealed 12mm airspace.

3.12.3.4 Glazing Accessories

3.12.3.4.1 Sealant

Sealant shall be elastomeric conforming to ASTM, DIN, BS, or EN standards. Type S or M, Grade NS, Class 12.5, Use G, of type chemically compatible with setting blocks, preformed sealing tape and sealants used in manufacturing insulation glass. Color of sealant shall be as selected from manufacturer's full range of standard colors by Contracting Officer.

3.12.3.4.2 Glazing Gaskets

Glazing gaskets shall be extruded with continuous integral locking projection designed to engage into metal glass holding members to provide a watertight seal during dynamic loading, building movements and thermal movements. Glazing gaskets for a single glazed opening shall be continuous one-piece units with factory-fabricated injection-molded corners free of flashing and burrs. Glazing gaskets shall be in lengths or units recommended by manufacturer to ensure against pull-back at corners.

3.12.3.4.3 Fixed Glazing Gaskets

Fixed glazing gaskets shall be closed-cell (sponge) smooth extruded compression gaskets of cured elastomeric virgin neoprene compounds conforming to ASTM, DIN, BS, Or EN standards.

3.12.3.4.4 Wedge Glazing Gaskets

Wedge glazing gaskets shall be high-quality extrusions of cured elastomeric virgin neoprene compounds, ozone resistant, conforming to ASTM, DIN, BS, or EN standards.

3.12.3.4.5 Putty and glazing Compound

Glazing compound shall conform to ASTM, DIN, BS, or EN standards for face-glazing metal sash. Putty shall be linseed oil type conforming to DIN, BS, or EN standards for face-glazing primed wood sash. Putty and glazing compounds shall not be used with insulating glass or laminated glass.

3.12.3.4.6 Setting and Edge Blocking

Neoprene setting blocks shall be dense extruded type conforming to ASTM, DIN, BS, or EN standards. Silicone setting blocks shall be required when blocks are in contact with silicone sealant. Profiles, lengths and locations shall be as required and recommended in writing by glass manufacturer.

3.12.3.5 Preparation

Openings and framing systems scheduled to receive glass shall be examined for compliance with glass manufacturer's recommendations including size, squareness, offsets at corners, presence and function of weep system, face and edge clearance requirements and effective sealing between joints of glass-framing members. Detrimental materials shall be removed from glazing rabbet and glass surfaced and wiped dry with solvent. Glazing surfaces shall be dry and free of frost.

3.12.3.6 Installation

Glass and glazing work shall be performed in accordance with, glass manufacturer's instructions and warranty requirements. Glass shall be installed with factory labels intact and removed only when instructed. Edges and corners shall not be ground, nipped or cut after leaving factory. Springing, forcing or twisting of units during installation will not be permitted.

3.12.3.7 Cleaning

Upon completion of project, outside surfaces of glass shall be washed clean and the inside surfaces of glass shall be washed and polished in accordance with glass manufacturer's recommendations.

3.12.3.8 Protection

Glass work shall be protected immediately after installation. Glazed openings shall be identified with suitable warning tapes, cloth, or paper flags, attached with non-staining adhesives. Reflective glass shall be protected with a protective material to eliminate any contamination of the reflective coating. Protective material shall be placed far enough away from the coated glass to allow air to circulate to reduce heat

buildup and moisture accumulation on the glass. Glass units which are broken, chipped, cracked, abraded, or otherwise damaged during construction activities shall be removed and replaced with new units.

3.13 FINISHES

All finishes, colors and materials shall be as indicated in the conceptual drawings.

3.13.1 EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

EIFS shall be a job-fabricated exterior wall covering consisting of insulation board, reinforcing fabric, base coat, finish coat, adhesive and mechanical fasteners as applicable. The system components shall be compatible with each other and with the substrate as recommended or approved by, and the products of, a single manufacturer regularly engaged in furnishing EIFS. Manufacturer shall have been in the practice of manufacturing and designing EIFS for a period of not less than 5 years, and shall have been involved in at least five projects similar to this project in size, scope, and complexity, in the same or similar climate as this project. The EIFS installer shall be trained by the EIFS manufacturer to perform the system installation and shall have successfully installed at least five projects at or near the size and complexity of this project. EIFS color shall match color indicated in the drawings.

3.13.2 STUCCO

Where EIFS products or installers are not readily available for installation, the exterior of all buildings may be stucco over insulation. Complete system design shall be provided indicating a durable system that will provide adequate support for the stucco finish. A temperature of between 4 and 27 degrees C shall exist for a period of not less than 48 hours prior to application of plaster and for a period of at least 48 hours after plaster has set. Control joints shall be designed for expansion and contraction of plaster work due to thermal exposure. Control joints shall comprise of back to back casing beads. Install new stucco in 2 coats. The first coat shall be a scratch coat approximately 1 cm thick. Allow 7 days to cure. The second coat shall be finish stucco, smooth finish, approximately 1 cm thick. Allow 7 days to cure before painting. Stucco showing over sanding, cracks, blisters, pits, checks, discoloration or other defects is not acceptable. Defective plaster work shall be removed and replaced with new plaster at the expense of the Contractor. Patching of defective work will be permitted only when approved by the Contracting Officer. Patching shall match existing work in texture and color. All exterior color finish shall be integral with the stucco finish. No painted stucco shall be permitted due to minimize future maintenance. Color shall match colors indicated in the drawings.

3.13.3 Interior walls shall be plaster applied in a similar manner as exterior stucco. Paint with 2 coats of semi-gloss paint with less than .06% lead by weight. Color shall be as indicated in the conceptual drawings.

3.13.4 Ceilings: shall be plaster applied in 2 coats over wire mesh, which is to be stapled to the 20 mm x 60 mm wood battens. Paint ceiling with 2 coats of flat white, with less than .06% lead by weight, except in toilet rooms where ceiling paint shall be semi-gloss.

3.13.5 Paint all exposed exterior wood with 2 coats of gloss enamel, color to be selected by the Contracting Officer.

3.13.6 Exposed exterior steel trim, frames, doors and pipe railings: Paint with one coat oil-based primer, with 2 coats of oil-based alkyd gloss enamel, color to be selected by the Contracting Officer from the color board provided by the Contractor.

3.13.7 Exposed wood trim, frames and doors: Paint with one coat oil-based primer, 2 coats of gloss enamel, color to be selected by the Contracting Officer from the color board provided by the Contractor

3.13.8 Tile: Tile work shall not be performed unless the substrate and ambient temperature is at least 10 degrees C and rising. Temperature shall be maintained above 10 degrees C while the work is being performed and for at least 7 days after completion of work. Upon completion, tile surfaces shall be

thoroughly cleaned in accordance with manufacturer's approved cleaning instructions. Acid shall not be used for cleaning glazed tile. Floor tile with resinous grout or with factory mixed grout shall be cleaned in accordance with instructions of the grout manufacturer. After the grout has set, tile wall surfaces shall be given a protective coat of a non-corrosive soap or other approved method of protection.

3.13.8.1 Floors in wet areas shall be 300 mm x 300 mm terrazzo tile with thin set mortar. Joints shall be 2-3 mm. Waterproof gray grout shall be applied the full depth of the tile. Floors shall slope, minimum 1/50, to floor drains. Slope shall be obtained with sloping mortar bed of minimum 20 mm thickness. Provide continuous waterproofing membrane beneath sloping mortar bed, turn up wall 300 mm behind wall base. Membrane shall be fully sealed at joints and shall shed water into body of floor drain. Color of tile shall be selected by the Contracting Officer from samples provided by the Contractor.

3.13.8.2 Floors in administration areas, classrooms, corridors, and all rooms unless indicated or stated otherwise shall be terrazzo flooring. Color of tile shall be selected by the Contracting Officer from samples provided by the Contractor.

3.13.8.3 All other floors (storage and electrical rooms) are to be sealed concrete.

3.14 SPECIALTIES

3.14.1 Mirrors

0.6 m x 0.9 m, 6 mm plate glass or stainless steel, shall be mounted above all lavatories. Mount bottom of mirrors 1.1m above finished floor.

3.14.2 Toilet Paper Holders

Toilet paper holders, stainless steel, shall be installed approximately 200 mm above floor in Eastern Toilets 600 mm above floor.

3.14.3 Light Duty Metal Shelf

Provide a 600 mm long, light duty stainless steel shelf and brackets over each lavatory.

4. STRUCTURAL

The Contractor should use the following American standards to provide sound structural design if local standards are not available, relevant, or applicable. The Contractor shall follow American Concrete Institute Standards for design and installation of all concrete structures.

Concrete	210.0 kg./sq.cm (f'c), minimum specified compressive strength @ 28 days (ASTM-. C 31M)
Steel Reinforcement	4218.0 kg./sq.cm(Fy= 60.0 ksi),yield strength.
Welded Wire Fabric	ASTM A185
Anchor Bolts	ASTM A307 using A36 steel.
Concrete Masonry Units	ASTM C90, Type I (normal wt, moisture Cntrl).
Mortar	ASTM C270, Type S (Ultimate compressive strength of 130.0 kg/sq. cm.)
Proportion	1 part cement, 0-1/2 part lime and 4-1/2 parts aggregate
Grout	ASTM C476 (Slump between 200 mm to 250 and Compressive Strength 14 MPa (2000 psi) at 28 days.
Joint Reinforcement	Standard 9 gage minimum, Ladder Type
Structural Steel	ASTM A36: 2530.0 kg./sq.cm (Fy = 36,000psi)
Welding	AWS (American Welding Society) D1.1-2002.

4.1 GENERAL

The project consists of various structures. The new buildings shall be provided with a reinforced concrete slab foundation that is properly placed on suitable compacted ground area and shall be in

accordance with the recommendations from the geotechnical investigation. The reinforced concrete foundation shall be designed by the Contractor. Building foundations shall be founded a minimum of 800 mm below grade.

4.2 DESIGN

Design shall be performed and design documents signed by a registered professional architect and/or engineer (qualifications as determined by the COR). Calculations shall be in SI (metric) units of measurements. All components of the building shall be designed and constructed to support safely all loads without exceeding the allowable stress for the materials of construction in the structural members and connections. All building exterior walls shall be constructed with reinforced CMU or reinforced concrete unless otherwise stated in Sections 1010 or 1015.

4.3 DEAD AND LIVE LOADS

Dead loads consist of the weight of all materials of construction incorporated in the buildings. Live loads used for design shall be in accordance with the Structural Load Data, UFC 3-310-01 as referenced herein.

4.4 WIND LOADS

Wind loads shall be calculated using a "3-second gust" wind speed of 135 km/hr.

4.5 SEISMIC

The building and all parts thereof shall be designed for the seismic requirements as defined by the International Building Code referenced herein. Spectral ordinates shall be $S_s = 1.28g$ and $S_1 = 0.51g$.

4.6 STRUCTURAL CONCRETE

Concrete structural elements shall be designed and constructed in accordance with the provisions of the American Concrete Institute, Building Code Requirements for Structural Concrete, ACI 318, latest edition. A minimum specified compressive strength at 28 days of 21 MPa (3000 psi) shall be used for design and construction of all concrete, except that 24 MPa (3500 psi) shall be used for Shotcrete applications. Reinforcing steel shall be deformed bars conforming to American Society for Testing and Materials (ASTM) publication ASTM A 615, Deformed and Plain Billet-Steel Bars for Concrete Reinforcement. Concrete at or below grade shall have maximum water-cement ratio of 0.50. No concrete shall be placed when the ambient air temperature exceeds 32 degrees C (90 degrees F) unless an appropriate chemical retardant is used. In all cases when concrete is placed at 32 degrees C (90 degrees F) or hotter it shall be covered and kept continuously wet for a minimum of 48 hours. Concrete members at or below grade shall have a minimum concrete cover over reinforcement of 75 mm (3 inch).

4.7 MASONRY

Masonry shall be designed and constructed in accordance with the provisions of Building Code Requirements for Masonry Structures, ACI 530/ASCE 5/TMS 402, latest editions. Mortar shall be Type S and conform to ASTM C 270, latest edition. Masonry shall not be used below grade, unless for fully grouted and reinforced foundation stem walls. All cells of exterior and shear walls shall be fully grouted and reinforced.

4.8 STRUCTURAL STEEL

Structural steel shall be designed and constructed in accordance with the provisions of American Institute of Steel Construction (AISC), Specifications for Structural Steel Buildings, 9th Edition. Design of cold-formed steel structural members shall be in accordance with the provisions of American Iron and Steel Institute (AISI), Specifications for Design of Cold-Formed Steel Structural Members.

4.9 METAL DECK

Deck units shall conform to SDI Pub. No. 29. Panels of maximum possible lengths shall be used to minimize end laps. Deck units shall be fabricated in lengths to span three or more supports with flush, telescoped or nested 50 mm (2 inch) laps at ends, and interlocking, or nested side laps. Metal deck units shall be fabricated of steel thickness required by the design and shall be galvanized.

4.10 OPEN WEB STEEL JOIST

Open web steel joists shall conform to SJI Specifications and Tables. Joists shall be designed to support the loads given in the standard load tables of SJI Specifications and Tables.

4.11 FOUNDATIONS

Foundations shall be in accordance with the Geotechnical requirements of this RFP.

5. GEOTECHNICAL

Existing geotechnical information is not available at the project site. Any site-specific geotechnical data required to develop foundations, materials, earthwork, and other geotechnical related design and construction activities for this project shall be the Contractor's responsibility. The Contractor shall develop all pertinent geotechnical design and construction parameters by appropriate field and laboratory investigations and analyses. The geotechnical information shall include, but not limited to, boring locations on site plan, particle size & distribution, liquid & plastic limit test, moisture & density test, and allowable soil bearing capacity & foundation recommendation, etc.

6. MECHANICAL**6.1 GENERAL**

The work covered by this section consists of design, supply, fabrication and installation of new building heating and ventilation (HV) systems. It also includes the delivery to site, erection, setting to work, adjusting, testing, balancing and handing over in perfect operating and running condition all of the HV equipment including all necessary associated mechanical works.

6.2 SPECIALIST SUB-CONTRACTORS QUALIFICATIONS

The heating and ventilation works shall be executed by an air-conditioning specialist sub-contractor experienced in the design and construction of these types of systems.

6.3 CODES, STANDARDS AND REGULATIONS

The equipment, materials and works covered under the heating and ventilation services shall conform to the referenced standards, codes and regulations where applicable except where otherwise mentioned under each particular clause.

6.4 DESIGN CONDITIONS (note only heating and ventilation are required for this project; no air-conditioning is required).

6.4.1 OUTSIDE DESIGN CONDITIONS (Contractor shall verify the ambient conditions with available and reliable local weather data.)

6.4.2 INDOOR DESIGN CONDITIONS

Administrative buildings	Cooling: Ceiling Fans; Heating 20 C (68 F)
Classrooms/Labs	Cooling: Ceiling Fans; Heating 20 C (68 F)
Bathrooms	Heating 20 C (68 F)

6.4.3 Noise Levels

Noise levels inside occupied spaces generated by HV systems shall not exceed NC 35

6.4.4 Internal Loads

- Occupancy: Use ASHRAE standards to calculate sensible and latent heat from people
- Lighting (Fluor.): 21.5 W/m² (2 W/Ft²) maximum (however lighting levels shall meet minimum requirements)
- Outdoor Air: 34 CMH/Person (20 CFM)
Latrine – 85 CMH/WC or Urinal (50 CFM) exhaust.

6.4.5 Thermal Performance

Assemblies shall meet the requirements of TI-800, Design Criteria, UFC 3-400-01 Design: Energy Conservation, and ASHRAE Standard 90.1, latest editions, but shall meet the following minimum requirements:

Assembly	Minimum Thermal Value
Exterior walls (above grade)	RSI 2.288 (R 20)
Ceilings/roof	RSI 5.28 (R 30)
Floor (over unheated space)	RSI 5.28 (R 30)
Exterior doors	RSI 0.25 (R 1.43)
Exterior windows/(glazing within doors)	RSI 0.308(R 1.75)
Skylights	RSI 0.18 (R 1.02)

6.5 VENTILATION AND EXHAUST SYSTEMS

6.5.1 VENTILATION AND EXHAUST SYSTEMS

All fans shall be used for building ventilation and pressurization with capacities to be selected for minimum noise level generated. Unit mounted fans either used for supply or exhaust shall be centrifugal forward curved, backward inclined, or airfoil fans with non-overloading characteristics of high efficiency and quiet running design. The fans shall be of the heavy-duty type with durable construction and proved performance in a desert environment. Each exhaust fan shall be provided with motorized or gravity dampers which close automatically when the fan is not running. Also, each fan shall be complete with vibration isolator, external lubricators, and all accessories and sound attenuators as necessary. Supply intake openings shall be provided with motorized dampers which are interlocked with the exhaust fan. The dampers open or close when the exhaust fan is on or off respectively.

Exhaust fans shall be centrifugal wall mounted type. Intake openings shall be provided with motorized dampers which are interlocked with the exhaust fans. The systems shall consist of centrifugal fan, ductwork, exhaust grills, and interlock controls. Toilet and Wash Area: Minimum exhaust ventilation shall be the larger of 35 m³/h / m² floor or 85 m³/h / toilet (WC). At extreme cold in winter these values can be reduced for short periods to 10 m³/h / m² or 40 m³/h / toilet (WC) to conserve heat.

To reduce sand and dirt migration, outside air intakes shall be located as high as possible within architectural constraints. The intakes shall be sized so that free air velocities are below 2.5 m/s (500 fpm). For inhabited buildings locate all air intakes at least 1.5 (center-line of intake) meters above the ground. Each air intake shall be provided with a motorized damper which is interlocked with the exhaust fan.

Ceiling Fans. Ceiling fans are required for all rooms for summer usage. The fans shall be of the heavy-duty type with durable construction and proved performance in a desert environment. Provide 1320mm blade ceiling fans at one per 40 square meters of floor space. Fans shall have reversible motors. Center or distribute evenly in room. Coordinate placement with the lighting plan to prevent conflict or casting shadows. Fan mount shall be flush, standard, or angle mount depending on ceiling height. Fan shall be mounted such that the fan blade is approximately 2.44 meters above the finished floor. The fan shall be provided with out light kit. The finish shall be factory painted white. The controls shall be from either a single pole switch or from two 3 way switches to provide on/off operation. The electrical supply shall be 220volts, single phase, and 50 hertz. Install per manufacturers' instructions.

6.5.2 SUBMITTALS

The Contractor shall submit the following for the equipment to be provided under this section of the specification: manufacturer's data including performance characteristics at design conditions; catalog cuts showing dimensions, performance data, electrical requirements, compliance with standards as stated in paragraph CODES, STANDARDS AND REGULATIONS; drawings indicating location and installation details.

6.6 ELECTRIC RESISTANCE HEATERS

6.6.1 CABINET HEATER

Cabinet heaters shall be installed in all spaces. Provide a self contained electric heating unit, recessed mounted in wall or structure, with fan and heating elements. Provide control-circuit terminals and single source of power supply with disconnect. Heating wire element shall be nickel chromium. Include limit controls for overheat protection of heaters. Heater fans shall be three speeds and controlled by the thermostat. Provide tamper resistant integral thermostat.

6.6.2 SUBMITTALS

The Contractor shall submit the following for the equipment to be provided under this section of the specification: manufacturer's data including performance characteristics at design conditions; catalog cuts showing dimensions, performance data, electrical requirements, compliance with standards as stated in paragraph CODES, STANDARDS AND REGULATIONS; drawings indicating location and installation details.

7. PLUMBING

7.1 SCOPE OF WORK.

7.1.1 GENERAL

The Contractor shall design and build domestic cold and hot water systems, waste, drain and vent systems, required in the facilities identified in Section 1010 Scope of Work and as described herein.

The work covered in this scope also includes the delivery to site, erection, setting to work, adjusting, testing and balancing and handing over in full operating condition all of the plumbing equipment and associated plumbing works.

7.1.2 SUB-CONTRACTOR QUALIFICATIONS

The plumbing systems shall be executed by a plumbing specialist subcontractor experienced in the design and construction of these types of systems.

7.1.3 STANDARD PRODUCTS

All materials and equipment shall be standard product of a manufacturer regularly engaged in the manufacture of the product and shall duplicate items that have been in satisfactory use for at least two (2) years prior to bid opening.

7.2 CODES, STANDARDS AND REGULATIONS

The design and installation of equipment, materials and work covered under the plumbing services shall conform to the following standards, codes and regulations where applicable except where otherwise indicated under particular clause(s). The publications to be taken into consideration shall be those of the most recent editions. Standards other than those mentioned herein may be accepted provided that the standards chosen are internationally recognized and meet the minimum requirements of the specified standards. The Contractor shall submit proof of equivalency if requested by the Contracting Officer.

IPC – International Plumbing Code

NFPA - National Fire Protection Association

ASHRAE – American Society of Heating, Refrigeration and Air-Conditioning Engineers

ASME – American Society of Mechanical Engineers

ASTM – American Society for Testing and Materials

AWS – American Welding Society

7.3 PLUMBING SYSTEMS REQUIREMENTS

7.3.1 WATER

Domestic cold shall be provided in the facilities to serve the water usage and plumbing fixtures provided for the facility. Water service to each facility shall enter the building in toilet, and laboratory sink. The building service line shall be provided with a shut off valve installed either outside in a valve pit or inside the mechanical room or similar spaces. Water piping shall not be installed in or under the concrete foundation. All water piping shall be routed parallel to the building lines and concealed in all finished areas. Insulation shall be provided where required to control sweating of pipes or to provide protection from freezing.

Piping penetrating concrete foundation, floors and walls shall be provided with a pipe sleeve.

7.3.2 PIPING MATERIALS

Domestic water shall be distributed by means of standard weight (schedule 40) galvanized steel pipe. Waste and vent piping can be made of either galvanized steel pipe (schedule 40), or Polyvinyl Vinyl Chloride (PVC) conforming to ASTM D 2665. Corrosion protection shall be provided if galvanized piping comes in contact with earth or masonry floors, walls or ceilings.

7.3.3 PLUMBING FIXTURES

The following typical plumbing fixtures shall be provided: ALL FIXTURES AND ACCESSORIES MUST BE HEAVY INDUSTRIAL GRADE IN QUALITY AS DETERMINED AND APPROVED BY THE CONTRACTING OFFICER'S REPRESENTATIVE

- a. Eastern Water Closet (P-1) with flush tank assembly. . Provide acid resisting fired porcelain enameled cast iron water closet complete with rotating No-Hub 'P' trap and No-Hub coupling to meet piping requirements. Eastern Style water closet shall be furnished with integral non-skid foot pads and bowl wash down non-splashing flushing rim. The water closet shall be completely self supporting requiring no external mounting hardware and shall be flush with floor. The Eastern Style water closet shall incorporate waterproofing membrane flashing flange. Provide a cold water spigot 300mm above finished floor on the right (from a perspective of standing inside of the cubicle and looking out) sidewall of the cubicle. Spigot shall have a flexible hose and spray nozzle such that the occupant can wash over the water closet. Toilets shall be oriented north and south. Toilets shall not face east or west.
- b. Lavatories (P-2). Enameled cast iron, wall or counter mounted. Brass fittings provided for water supplies. (To be used in American or Afghan/American mixed facilities only.)
- c. Floor Sink (P-3). Provide floor sink, circular or square, with 300mm overall width or diameter and 250 nominal overall depth. Acid resistant enamel interior with cast iron body, aluminum sediment bucket and perforated grate of cast iron. Outlet size as indicated on plans.
- d. Provide P-Traps per International Plumbing Code IPC for all fixture drains, floor and trench drains, and shower drains. P-traps shall have minimum of 50 mm water seal.

7.4 WASTE, DRAIN AND VENT SYSTEM

Floor drains shall be provided in each room that contains a water source. Floor drains shall be provided in the mechanical equipment and toilet rooms as required. Floor drains shall be provided next to the electric water heaters. All waste and vent piping shall be provided in accordance with the latest edition of IPC. Drain outlet shall use p-trap system to trap sewer gases. P-trap drain should be a one-piece system without removable parts.

Every trap and trapped fixture shall be vented in accordance with the IPC.

7.5 TESTING AND COMMISSIONING

The Contractor shall test all piping systems in accordance with IPC International Plumbing Code. The final test shall include a smoke test for drainage and vent system and pressure test for the domestic water

pipng. After completing the work, the Contractor shall demonstrate that all plumbing systems operate to fully satisfy the function for which these systems have been designed. The Contractor shall test, adjust, balance and regulate the system and its controls as necessary until the required designed conditions are met. The Contractor shall include tests for interlocks, safety cutouts and other protective devices to demonstrate safe operation. All such tests shall be carried out in the presence of the Contracting Officer and full written records of the test data and final settings shall be submitted to the Contracting Officer. After all tests are complete, the entire domestic hot and cold water distribution system shall be disinfected. The system shall not be accepted until satisfactory bacteriological results have been obtained.

8. FIRE PROTECTION

8.1 GENERAL

Facility construction and fire protection systems shall be installed in accordance with the publications listed herein and the publications referenced therein. Where a conflict occurs among various criteria, the more stringent requirement shall take precedence.

8.2 BUILDING CONSTRUCTION

Building construction shall conform to fire resistance requirements, allowable floor area, building height limitations and building separation distance requirements of the building code. All corridor walls shall be one hour fire rated; all corridor doors shall be 20 minute fire rated. All storage and electrical room walls shall be one hour fire rated with 45 minute rated fire doors. There is no sprinkler protection system for this facility.

8.3 LIFE SAFETY

Facilities features will be provided in accordance with NFPA 101, among other references, to assure protection of occupants from fire or similar emergencies.

8.4 FIRE PROTECTION EQUIPMENT

All fire protection equipment shall be listed by Underwriters' Laboratories (UL) or approved by Factory Mutual (FM) or equivalent as determined by the COR and shall be listed in the current UL Fire Protection Equipment Directory or Factory Mutual Approval Guide or equivalent. Contractor is responsible to prove fire protection equipment is equal to the UL or FM standards.

8.5 FIRE ALARM AND DETECTION

Smoke detection— see electrical section for more fire alarm and detection details. Smoke detectors are required by NFPA 101 and 72. Smoke detectors shall have back up battery power and be installed according to all applicable fire protection codes. Smoke detectors shall be two-wire photo-electric type. Fire alarm evacuation systems shall be provided as required by NFPA 101 or IBC and listed herein. Smoke detection is hard wired, all cabling in conduit, supported by no more than 3000 mm intervals to the conventional Fire Alarm Control Panel (FACP). The FACP shall be located near the building main entrance. Manual pull stations for alarm activation shall be located within 1500 mm of each exterior exit. Pull stations shall accompany with alarm bells. Bell audible signal shall be at 85 dB level. The alarm system shall be class B, style C as described in the NFPA 72.

8.6 WATER SUPPLY FOR FIRE PROTECTION

A dedicated fire protection water supply is unavailable.

8.7 PORTABLE FIRE EXTINGUISHERS

Portable fire extinguishers shall be provided inside all facilities and at exterior locations as required in accordance with NFPA 10. Generally, extinguishers will be of the multi-purpose dry chemical type except for occupancies requiring a special type extinguisher (e.g., carbon dioxide portable fire extinguishers for electrical rooms and laboratories).

9. ELECTRICAL

9.1 GENERAL

Contractor shall design and construct all electrical systems for the facility. This includes design, construction, all necessary labor, equipment, and material for a fully functional system. Secondary electrical distribution system shall be 220/380 volt, 3-phase, 4 wire, 50 hertz. Design of the electrical system within facilities shall include, but is not limited to (a) interior secondary power distribution system, (b) lighting and power branch circuit and devices, and (c) fire detection and alarm system. All systems shall be designed for the ultimate demand loads, plus 25% spare capacity.

9.2 DESIGN CRITERIA

9.2.1 APPLICABLE STANDARDS

- a. Design shall be in the required units as stipulated herein.
- b. Conflicts between criteria and/or local standards shall be brought to the attention of the Contracting Officer for resolution. In such instances, all available information shall be furnished to the Contracting Officer for approval.
- c. All electrical systems and equipment shall be installed in accordance with NFPA code requirements.
- d. Acceptance Testing: Contractor shall develop and submit for approval complete acceptance test procedures on all systems provided. As a minimum the testing procedures shall comply with the requirements of NFPA 70 (NEC) and International Electrical Testing Association Inc. (NETA).
- e. Any other applicable references listed herein, including the following:

ANSI/IEEE Std 81-1983

ANSI/NETA ETT-2000

ANSI/NETA MTS 7.2.2-2001

ANSI/TIA/EIA-568 Commercial Building Telecommunications Cabling Standard

ANSI/TIA/EIA-569 Commercial Building Standard for Telecommunication Pathways and Spaces

EIA ANSI/TIA/EIA-607: (1994) Commercial Building Grounding/Bonding Requirement Standard.

ETL 1110-3-412 Transformer Application Guide

ETL 1110-3-502, Telephone and Network Distribution System Design and Implementation Guide.

Factory Mutual (FM) Approval Guide-Fire Protection (2002).

IBC - International Building Code

IMC – International Mechanical Code

IPC – International Plumbing Code

IEEE C2 National Electrical Safety Code (NESCC)

IEEE 48 IEEE Standard Test Procedures and Requirements for Alternating- Current Cable Terminations

2.5 kV Through 765 Kv

IEEE Std 62™-1995 (R2005)

IEEE Std 81.2-1991

IEEE 100

IEEE 241 - 1990

IEEE 242 - 2001

IEEE standard 400-1991

IEEE standard 519-1992

IEEE C57.12.22

IEEE C57.12.34

IEEE C57.12.28

IEEE C57.12.80

IESNA Lighting Handbook

International Electrical Testing Association Inc. (NETA) Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems

NFPA 10, Portable Fire Extinguishers

NFPA 70, National Electrical Code

NFPA 72, National Fire Alarm Code, 2002 edition

NFPA 90A, Air Conditioning and Ventilating Systems, 2002 edition

NFPA 101, Life Safety Code, 2003 edition
NFPA 780, Lightning Protection
TM 5-811-3 Electrical Design: Lightning and Static Electricity Protection
UFC 3 410-01FA Heating, Ventilating and Air Conditioning
UFC 3 410-02A Heating, Ventilation and Air Conditioning (HVAC) Control Systems
UFC 3-520-01 Interior Electrical Systems, 10 June 2002
UFC 3-530-01AN Design: Interior and Exterior Lighting and Controls 19 Aug 2005
UFC 3-550-03FA Electrical Power Supply and Distribution
UFC 3-600-01 Fire Protection Engineering for Facilities
Underwriters' Laboratories (UL) Fire Protection Equipment Directory (2002).

9.3 MATERIAL

9.3.1 GENERAL

Unless noted otherwise, all material used shall be in compliance with the requirements of UL standards. In the event that UL compliant materials are not available, Contractor may then select applicable British Standards (BS), IEC, CE, CSA, GS, DIN listed material (or equivalent), but the contractor must prove equivalence and must provide the government with a full copy of the relevant specification(s)/standard(s). Material and equipment installed under this contract shall be for the appropriate application and installed in accordance with manufacturers recommendations.

Equipment enclosure types shall be in compliance with the National Electrical Manufacturer's Association (NEMA) or the International Electro-Technical Committee (IEC) standards.

Material and equipment installed under this contract shall be for the appropriate application. Materials and equipment shall be installed in accordance with recommendations of the manufacturer. Major components of equipment shall have the manufacturer's name, address, type or style, voltage and current rating, and catalog number on a non-corrosive and non-heat sensitive plate, securely attached to the equipment. All equipment delivered and placed in storage, prior to installation, shall be protected from the weather, humidity and temperature variation, dirt and dust, and any other contaminants. All equipment shall be in new condition, undamaged and unused.

9.3.2 STANDARD PRODUCT

All material and equipment shall be a standard product of a manufacturer regularly engaged in the manufacture of the product and shall essentially duplicate items that have been in satisfactory use for at least two (2) years prior to bid opening.

9.3.3 DESIGN CONSIDITIONS

All equipment shall be rated and designed for 49 degrees Celsius (120 degrees Fahrenheit) and minimum elevation of 1800 meters (6000 feet) above sea level.

9.3.4 RESTRICTIONS

Aluminum conductors shall not be specified or used. Aluminum windings shall not be used in transformers.

Transformer(s) shall be ANSI-style, pad-mounted, dead front type. "Pad mount", "dead front" and "pad mount, dead front transformer" are defined and described in the IEEE standards listed above in the standards section.

9.4 DESIGN REQUIREMENTS

9.4.1 ELECTRICAL DISTRIBUTION SYSTEM

Contractor shall perform a load calculation to determine the number of required transformers or generators to feed the facilities in this project with the required spare capacity. In the event the existing transformer(s), if present, cannot support the load of the entire facilities package, the contractor shall

notify the Contracting Officer. In such instances the contractor shall provide all the information regarding the required number of the new transformers to the Contracting Officer. Design and installation of any additional feeders required from the ATS(s) will be the responsibility of the contractor. Contractor shall limit power interruption to other services already connected. All wiring shall be run and pulled through conduits.

On-site generator power: Generator shall be provided for on site power when power from a local grid is unavailable or is unreliable for providing power 24 hours a day. Generator shall be pad mounted within an enclosure rated for exterior use. Generator shall be fitted with load bank matched to the load. Generator shall be sized for total electrical load plus twenty five percent (25 %) spare capacity minimum. Fuel storage capacity shall be based on usage at total electrical load for a minimum of 30 days at full load for the entire duration. Fuel storage shall either be in aboveground single wall steel tank(s) with containment pit or underground double wall with leak detection. The contractor shall provide and install properly sized service entrance feeder from the generator system to the service entrance equipment located inside the facility. Service entrance equipment shall include a distribution panel board properly sized to feed the facility. Contractor shall coordinate with the Contracting Officer in locating the main distribution panel board(s) as close as possible to the corresponding ATS.

Existing or FUTURE electrical distribution grid (including prime power): Contractor shall connect to local power grid and install generator to provide backup for the local utility supply when service is unreliable 24 hours a day. Transformers shall be sized at 125% of the total calculated demand load. Transformers shall be fully enclosed, outdoor rated, dead-front type, complete from a single manufacturer. Backup generator shall be sized to provide backup power for 125% of the maximum calculated demand load.

All panel boards shall be circuit breaker 'bolt-on' type panels. Minimum size circuit breaker shall be rated at no less than 20-amperes. Circuit breakers shall be connected to bus bar(s) within the panel boards. Daisy chain (breaker-to-breaker) connection(s) are not acceptable. Indoor distribution panels shall be flush mount in finished areas and surface mounted in unfinished areas. All circuit breakers shall be labeled with an identification number corresponding to the panel schedule. A 3-pole circuit breaker shall be a single unit and not made up of 3 single pole circuit breakers connected with a wire or bridged to make a 3-pole breaker. All wiring shall be copper, minimum 4.0mm sq (# 12 AWG) installed in metal conduit. Wiring shall be recessed in finished areas and surface mounted in unfinished areas. Flush mounted panels shall be provided with spare empty conduits from panel to unfinished area for future use. All panels shall be provided with a minimum of 25% spare capacity for future load growth. Electrical receptacles shall be duplex type 220 V, 50 hertz, type CEE 7/7 with Earth Ground rated for 20A or better and shall be compatible with the required secondary power. All splicing and terminations of wires shall be performed in junction or device boxes. Proper wire nuts/connectors shall be used for splicing wire. No twist-wire connections with electrical tape wrapped around it will be accepted. All electrical installations shall be in accordance with NFPA 70 (National Electric Code). For large panels, 225 Ampere and above, provide an ammeter, voltmeter and kilowatt-hour meter to monitor energy usage. A selector switch shall be provided for reading all 3 phases. Circuits shall be provided for all mechanical equipment and final connections made. Receptacle locations shall be coordinated with architectural requirements.

Contractor shall provide circuits for all mechanical equipment and any other equipment that requires power and make the final connections.

All loads shall be coordinated to provide balanced loading. Phase imbalance at each panel shall not exceed 5%.

Voltage Drop for branch circuits shall be limited to no more than 3%; voltage drop for branch and feeder circuits combined shall be limited to no more than 5%.

All circuit breakers shall use down-stream coordination to ensure the breaker nearest a fault or overload is the first to trip.

9.4.2 LIGHTING

Design levels shall be per IES standards as a minimum. For convenience, the following lighting level table is listed. Note: all spaces listed below may not be within the work required within this contract.

Classrooms/Labs	50 FC (500 Lux)
Toilets, Showers, Latrines, washrooms	20 FC (200 Lux)
Mechanical/Electrical rooms	15 FC (160 Lux)
Corridors and Stairways	20 FC (200 Lux)
Offices (private)	50 FC (500 Lux)
Offices (open)	30 FC (300 Lux)
Egress path (incl. exterior)	01 FC (10 Lux)
Areas adjacent to egress path	0.05 FC (0.5 Lux)
Auditoriums (assembly)	20 FC (220 Lux)

Indoor lighting for all areas shall consist of fluorescent light fixtures. Exterior lighting shall be installed at all three building exits. Moisture resistant/waterproof fluorescent light fixtures shall be provided in high humidity and wet areas such as latrines and showers. Battery powered 'emergency' and 'exit' lights shall be provided within each building, as applicable, for safe egress during a power outage. All light fixtures shall be factory finished, complete and operational, to include but not be limited to, lens, globe, lamp, ballast etc. Industrial type fluorescent light fixtures shall not be used. Every room shall be provided with a minimum of one light switch. Light fixtures shall be mounted approximately 2.5-meters (8 feet) above finished floor (AFF), minimum. Fixtures are pendant or ceiling mounted depending on the ceiling type and height.

9.4.3 LIGHT FIXTURES

Lighting fixtures shall be a standard manufacturer's product. Fluorescent mounted light fixtures shall be power factor corrected and equipped with standard electronic ballast(s). All light fixtures shall properly operate using standard lamps available locally. Fixtures shall be fully factory wired and designed for appropriate application, i.e. appropriate for the location where installed.

9.4.4 EMERGENCY "EXIT" LIGHT FIXTURES

Emergency "EXIT" light fixture shall be provided in accordance with NFPA requirements. Fixtures shall be for wall/ceiling mounting. Unit shall illuminate continuously and be provided with self-contained nickel cadmium battery pack, to operate on floated-battery or trickle charge circuit. Fixture shall operate satisfactorily for 90 minutes during a power outage. Unit shall have test/re-set and lamp failure indication buttons. Primary operating voltage shall be 220 volts. Lettering "EXIT" shall be color red and not less than 6 inches (150 mm) in height and on matte white background in English and or local language. Illuminations shall be with LEDs.

9.4.5 ABOVE MIRROR LIGHTS

Above mirror lights shall be provided in toilet rooms.

9.4.6 EMERGENCY LIGHTING

Battery powered emergency lights shall be provided within each building per NFPA for safe egress during power outage. Fixtures shall be provided with self-contained nickel cadmium battery pack to operate on stand-by circuit for 90-minute minimum. Unit shall have test/re-set and lamp failure indication buttons. Primary operating voltage shall be 220 volts. Emergency lighting fixtures shall be connecting to normal lighting system.

9.4.7 LIGHT SWITCHES

Light switch shall be single pole. Minimum of one light switch shall be provided in every room. Lighting in large rooms/areas may be controlled from multiple switches. Three-way lighting shall be provided in all rooms / areas with multiple entrances.

9.4.8 RECEPTACLES

General-purpose receptacles shall be as required herein. All receptacles shall be duplex, unless otherwise specified in this section, section 01010, the NEC, or other referenced standard. Receptacles shall be placed at maximum 3-meter (10 feet) intervals in general or as shown on the drawings. Areas with computer work-stations or similar equipment will have additional receptacles. Sinks will have a receptacle above, with one dual receptacle serving two sinks that are side-by-side. Receptacles in wet/damp areas or within 2 meter (~6 feet) of sinks, lavatories, etc shall be ground fault circuit interrupter (GFCI) type or Residual Current Disconnect (RCD) type, with the trip setting of 10 milliamperes or less. Total number of duplex receptacles shall be limited to six (6) per 20-ampere circuit breaker.

9.4.9 CONDUCTORS

All cable and wire conductors shall be copper. Conductor jacket or insulation shall be color coded to satisfy NEC requirements. The use of 75 or 90 degree C (minimum) terminals and insulated conductors is required. Use of 75 degree C conductors on circuits with protective device terminals rated for 60 degree C is inappropriate.

9.4.10 GROUNDING AND BONDING

Grounding and bonding shall comply with the requirements of NFPA 70. Underground connections shall be exothermal welded. All exposed non-current carrying metallic parts of electrical equipment in the electrical system shall be grounded. Insulated grounding conductor (separate from the electrical system neutral conductor) shall be installed in all feeder and branch circuit raceways. Grounding conductor shall be green-colored, unless the local authority requires a different color-coded conductor. Ground rods shall be copper-clad steel. Final measurement of the ground resistance shall be in compliance with the requirements of the local authority but shall not exceed 25 ohms when measured less than 48 hours after rainfall.

9.4.11 ENCLOSURES

Enclosures for exterior and interior applications shall be NEMA Type 3S (IEC Classification IP54) and NEMA Type 1 (IEC Classification IP10), respectively.

9.4.12 FIRE DETECTION & ALARM SYSTEM

A complete Fire Detection and Alarm System shall be provided throughout the buildings and installed in accordance with NFPA 72 requirements. System shall include, but shall not be limited to, addressable Fire Alarm Control Panel (FACP), manual pull stations, horns, strobes, and smoke and/or heat detectors with alarm verification feature. Fire alarm system shall be complete and a standard product of one manufacturer. All fire alarm system cabling shall be metal mounted conduit, supported at no more than 3000 mm intervals.

9.4.13 TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS)

Transient Voltage Surge Suppression shall be provided utilizing surge arresters to protect sensitive and critical equipment. At a minimum, TVSS protection shall be provided at each panel. It is recommended that Metal Oxide Varistors (MOV) technology be used for such application.

9.4.14 CONDUIT RACEWAY SYSTEM

Metal conduit system shall be complete, to include but not limited to, necessary junction and pull-boxes. Smallest conduit size shall be no less than 20mm (0.75 inch) in diameter. All empty conduits shall be furnished with pullwire. System design and installation shall be per NFPA 70 requirements. Exterior conductors shall be installed in PVC conduit at a depth below the frost line, but not less than 24-inches.

9.4.15 IDENTIFICATION NAMEPLATES

Major electrical equipment, such as transformers, panel boards, and load centers, etc. shall be provided with permanently installed engraved identification nameplates.

9.4.16 SCHEDULES

All panel boards and load centers shall be provided with a panel schedule. Schedule shall be typed written in English.

9.4.17 SINGLE LINE DIAGRAM

Complete single line diagrams shall be provided for all systems installed. All major items in each system shall be identified and labeled for respective rating. Single line diagrams for each system, installed in a clear plastic frame, shall be provided.

10. COMMUNICATIONS – Public Address, Telecommunications, and Data Distribution**10.1 GENERAL**

The Contractor shall provide a data cabling system with conduit for computer systems. The Contractor shall provide two telephone/data boxes for workstations in offices. Conference rooms shall have two telephone/data boxes on each interior wall, three interior walls per conference room. Each box shall have dual RJ-45 outlets, one for telephone and one for data. Interior copper cable to each outlet shall be 4 pair, unshielded twisted pair (UTP), Category 5e or better. Two runs of Category 5e (UTP) or better data cable shall be installed from each junction box back to the patch panel in the communications room and labeled on both ends with room number and jack number. Contractor shall be responsible for providing one enclosed 480 mm wide, 1800 mm tall communications equipment rack with top-mounted cooling fans and front & rear closing doors. Contractor shall provide two 480 mm 48-port patch-panel mounted in the rack. Contractor shall coordinate the location of the communications rack (first or second floor) with the Contracting Officer Representative (COR). Corps of Engineers Representative (COR) shall punch-down the Category 5e cabling at both the patch panel and at the data/communications jacks in the bedrooms/offices/workstations/conference rooms. Termination configuration shall be EIA/TIA T568B. A Corps of Engineers representative shall test each cable run and data jack after it has been installed. Two 100 mm empty conduits shall be provided from the communications room to the outside to facilitate future telephone cabling installation into the building. Two additional 100 mm empty conduits shall be provided between the communications rooms on each floor. Provide all empty conduits with a pull rope. The system shall provide cable connection from the location identified on the drawings for the communications equipment. The computer equipment is to be provided by others. The incoming communications cabling connection to the building is to be provided by others. The Contractor's system shall be fully capable of interface with the future equipment and future connection to the site and data systems. The contractor is to submit a computing cable plan with conduit as part of the design submittal, based upon the individual requirements of each project location site. Properly sized metallic conduit shall be used as appropriate to distribute the telephone/data cabling throughout the building. Minimum conduit size shall be 20 mm inside diameter. Data/communications face plates shall be surface mounted to the wall.

10.2 PUBLIC ADDRESS

The Contractor shall provide a commercial grade Public Address system, with control panel located in the Administrative area. Each occupied space shall have a speaker in addition to the corridor speakers as noted on the drawings, to include all cabling and conduits. System shall be procured complete as one package from commercial manufacturer, delivered to site and installed. Public address speaker zoning shall be determined at each site as directed by the COR. Public address panel shall be capable of providing at least 5 zones. Public address system is separate and not connected to the fire alarm or any other system. All cabling shall be installed in metal conduit, exposed. Surface mounted conduits shall be supported at no greater than 3000 mm intervals.

- END OF SECTION -

SECTION 01451

SPECIFICATION SECTION 01451
CONTRACTOR QUALITY CONTROL
Revised 16 December 2008

PART 1 - GENERAL:

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

1.1.A. U.S. ARMY CORPS OF ENGINEERS (USACE):

1.1.A.1. ER 1110-1-12 (1993) Quality Management

1.1.A.2. EM 385-1-1 Safety and Health Requirements Manual

1.1.B. ASTM INTERNATIONAL (ASTM):

1.1.B.1. ASTM D 3740 (2004) Minimum Requirements for
Agencies Engaged in the Testing and/or Inspection of
Soil and Rock as Used in Engineering Design and
Construction

1.1.B.2. ASTM E 329 (2003) Agencies Engaged in the Testing
and/or Inspection of Materials Used in Construction

1.2. PAYMENT: Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

PART 2 - PRODUCTS: (Not Applicable)**PART 3 - EXECUTION:**

3.1. GENERAL REQUIREMENTS: The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clauses and this specification section. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The site project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The site project superintendent in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Contracting Officer, and shall be responsible for all construction and construction related activities at the site.

3.2. CQM TRAINING REQUIREMENT: Before project design and construction begin, the Contractor's Quality Control Manager is required to have completed the U.S. Army Corps of Engineers CQM course, or equivalent. The Commercial Technical Training Center (CTTC), operated by the United Rehabilitation

Bureau in Jalalabad, Afghanistan, provides a course that satisfies the requirement. Courses are offered at regular intervals. For enrollment and course information contact CTTC at the following:

3.2.A. Dr Pervez Mojadidi

Project Manager, United Rehabilitation Bureau

Email: adpzmuj@yahoo.com

Phone: (93) 0700-613-133, 0786489933

3.2.B. Engr. Said Wali Shinwari

Director, United Rehabilitation Bureau

Email: urb1992@yahoo.com

Phone: (93) 0700-287-626, 0797520380

3.3. QUALITY CONTROL PLAN: The Contractor shall furnish for review by the Government, not later than five (5) days after receipt of Notice-to-Proceed (NTP) the proposed Contractor Quality Control (CQC) Plan. The plan shall identify personnel, procedures, control, instructions, records, and forms to be used.

3.3.A. Content of the CQC Plan: The CQC Plan shall include, as a minimum, the following to cover all construction operations, both on site and off-site, including work by subcontractors, fabricators, suppliers and purchasing agents:

3.3.A.1. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project superintendent.

3.3.A.2. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

3.3.A.3. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.

3.3.A.4. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, consultants, and purchasing agents. These procedures shall be in accordance with Specification 01335 SUBMITTAL PROCEDURES.

3.3.A.5. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test.

3.3.A.6. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

3.3.A.7. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

3.3.A.8. Reporting procedures, including proposed reporting formats.

3.3.A.9. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work,

there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

3.3.B. Additional Requirements for Design Quality Control (DQC) Plan. The following additional requirements apply to the Design Quality Control (DQC) plan:

3.3.B.1. The Contractor shall provide and maintain a Design Quality Control (DQC) Plan as an effective quality control program which will assure that all services required by this design contract are performed and provided in a manner that meets professional architectural and engineering quality standards. As a minimum, all documents shall be technically reviewed by competent, independent reviewers identified in the DQC Plan. The same element that produced the product shall not perform the independent technical review (ITR). The Contractor shall correct errors and deficiencies in the design documents prior to submitting them to the Government.

3.3.B.2. The Contractor shall include the design schedule in the master project schedule, showing the sequence of events involved in carrying out the project design tasks within the specific contract period. This should be at a detailed level of scheduling sufficient to identify all major design tasks, including those that control the flow of work. The schedule shall include review and correction periods associated with each item. This should be a forward planning as well as a project monitoring tool. The schedule reflects calendar days and not dates for each activity. If the schedule is changed, the Contractor shall submit a revised schedule reflecting the change within 7 calendar days. The Contractor shall include in the DQC Plan the discipline-specific checklists to be used during the design and quality control of each submittal. These completed checklists shall be submitted at each design phase as part of the project documentation. Example checklists can be found in ER 1110-1-12.

3.3.B.3. The DQC Plan shall be implemented by a Design Quality Control Manager who has the responsibility of being cognizant of and assuring that all documents on the project have been coordinated. This individual shall be a person who has verifiable engineering or architectural design experience and is a registered professional engineer or architect. The Contractor shall notify the Contracting Officer, in writing, of the name of the individual, and the name of an alternate person assigned to the position.

3.3.C. Acceptance of Plan:

3.3.C.1. The Contracting Officer will notify the Contractor in writing of the acceptance of the DQC Plan. After acceptance, any changes proposed by the Contractor are subject to the acceptance of the Contracting Officer.

3.3.C.2. Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in the CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.3.D. Notification of Changes: Notification of Changes. After acceptance of the QC plan, the Contractor shall notify the Contracting Officer in writing a minimum of seven calendar days prior to any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.4. COORDINATION MEETING: After the Pre-construction Conference, before start of construction, and prior to acceptance by the Government of the Quality Control Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 5 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both on-site and off-site work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall

become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures, which may require corrective action by the Contractor.

3.5. QUALITY CONTROL ORGANIZATION:

3.5.A. Personnel Requirements: The requirements for the CQC organization are a CQC System Manager, and sufficient number of additional qualified personnel to ensure safety and contract compliance. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. The Contractor shall provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation shall be promptly furnished to the CQC organization by the Contractor. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.5.B. CQC System Manager: The Contractor shall identify an individual within his organization at the site of the work who shall be responsible for overall management of the CQC and have the authority to act in all CQC matters for the Contractor. The CQC system manager shall be a graduate engineer, graduate architect, or a graduate construction manager, with experience on construction projects similar in type to this contract OR a construction person with a minimum of ten (10) years in related work. The CQC System Manager shall be on the site at all times during construction and shall be employed by the Contractor. The CQC System Manager shall be assigned no other duties. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the CQC system manager's absence. The requirements for the alternate will be the same as for the designated CQC manager.

3.5.C. CQC Personnel: In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the following areas: electrical, mechanical, civil, structural, environmental, architectural, materials technician, and submittals clerk. These individuals shall be directly employed by the prime Contractor and may not be employed by a supplier or sub-Contractor on this project; be responsible to the CQC System Manager; be physically present at the construction site during work on their areas of responsibility; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan.

Experience Matrix		
	Area:	Qualifications:
a.	Civil	Graduate Civil Engineer with 2 years experience in the type of work being performed on this project or technician with 5 yrs related experience

b.	Mechanical	Graduate Mechanical Engineer with 2 yrs experience or person with 5 yrs related experience
c.	Electrical	Graduate Electrical Engineer with 2 yrs related experience or person with 5 yrs related experience
d.	Structural	Graduate Structural Engineer with 2 yrs experience or person with 5 yrs related experience
e.	Architectural	Graduate Architect with 2 yrs experience or person with 5 yrs related experience
f.	Environmental	Graduate Environmental Engineer with 3 yrs experience
g.	Submittals	Submittal Clerk with 1 yr experience
h.	Occupied family housing	Person, customer relations type, coordinator experience
i.	Concrete, Pavements and Soils	Materials Technician with 2 yrs experience for the appropriate area
j.	Testing, Adjusting and Balancing(TAB) Personnel	Specialist must be a member of AABC or an experienced technician of the firm certified by the NEBB.
k.	Design Quality Control Manager	Registered Architect or Professional Engineer

3.5.D. Additional Requirements: In addition to the above experience and/or education requirements, the CQC System Manager shall have completed the course entitled "Construction Quality Management For Contractors". This course is periodically offered by the government, and inquiries as to the next course offering may be directed to the local construction field office.

3.5.E. Organizational Changes: The Contractor shall maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.6. SUBMITTALS AND DELIVERABLES: Submittals, if needed, shall be made as specified in the STR titled SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals and deliverables are in compliance with the contract requirements.

3.7. CONTROL: Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of the construction work as follows:

- 3.7.A. Preparatory Phase:** This phase shall be performed prior to beginning work on each definable feature of work, after all required documents and materials are approved/accepted, and after copies are at the work site. This phase shall include:
- 3.7.A.1.** A review of each paragraph of applicable specifications, reference codes, and standards. A copy of those sections of referenced codes and standards, in the English language unless specifically approved otherwise by the Contracting Officer, applicable to that portion of the work to be accomplished in the field shall be made available by the Contractor at the preparatory inspection. These copies shall be maintained in the field and available for use by Government personnel until final acceptance of the work.
 - 3.7.A.2.** A review of the contract drawings.
 - 3.7.A.3.** A check to assure that all materials and/or equipment have been tested, submitted, and approved.
 - 3.7.A.4.** A check to assure that provisions have been made to provide required control inspection and testing.
 - 3.7.A.5.** Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
 - 3.7.A.6.** A physical examination of required materials, equipment, and sample work to verify that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
 - 3.7.A.7.** Reviews of the appropriate activity hazard analysis to ensure safety requirements are met.
 - 3.7.A.8.** Discussion of procedures for constructing the work including repetitive deficiencies, construction tolerances and workmanship standards for that feature of work.
 - 3.7.A.9.** A check to ensure that the Contracting Officer has accepted the portion of the plan for the work to be performed.
 - 3.7.A.10.** Discussion of the initial control phase.
 - 3.7.A.11.** The Government shall be notified at least 24 hours in advance of beginning any of the required action of the preparatory phase. This phase shall include a meeting conducted by the CQC system manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC system manager and attached to the daily QC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.
- 3.7.B. Initial Phase:** This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:
- 3.7.B.1.** A check of preliminary work to ensure that it is in compliance with contract requirements. Review minutes of the preparatory meeting.
 - 3.7.B.2.** Verification of full contract compliance. Verify required control inspection and testing.
 - 3.7.B.3.** Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with sample panels as appropriate.
 - 3.7.B.4.** Resolve all differences.
 - 3.7.B.5.** Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
 - 3.7.B.6.** The Government shall be notified at least 24 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC system manager and attached to the daily QC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

3.7.B.7. The initial phase should be repeated for each new crew to work on-site, or any time acceptable specified quality standards are not being met.

3.7.C. Follow-up Phase: Daily checks shall be performed to assure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted, and all noted deficiencies corrected, prior to the start of additional features of work that may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

3.7.D. Additional Preparatory and Initial Phases: Additional preparatory and initial phases may be required by the Contracting Officer on the same definable features of work if the quality of on-going work is unacceptable; if there are changes in the applicable QC staff or in the on-site production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.8. TESTS:

3.8.A. Testing Procedure: The Contractor shall perform tests specified or required to verify that control measures are adequate to provide a product that conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Testing includes operation and/or acceptance tests when specified. A list of tests to be performed shall be furnished as a part of the CQC plan. The list shall give the test name, frequency, specification paragraph containing the test requirements, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests required. The Contractor shall perform the following activities and record and provide the following data:

3.8.A.1. Verify that testing procedures comply with contract requirements.

3.8.A.2. Verify that facilities and testing equipment are available and comply with testing standards.

3.8.A.3. Check test instrument calibration data against certified standards.

3.8.A.4. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

3.8.A.5. Results of all tests taken, both passing and failing tests, shall be recorded on the Quality Control report for the date taken. Specification paragraph/item reference, location where tests were taken, and the sequential control number identifying the test will be given. Actual test reports may be submitted later, if approved by the Contracting Officer, with a reference to the test number and date taken. An information copy of tests performed by an off-site or commercial test facility will be provided directly to the Contracting Officer. Failure to submit timely test reports, as stated, may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.8.B. Testing Laboratories:

3.8.B.1. Capability Check: - The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.8.B.2. Capability Recheck: - If the selected laboratory fails the capability check, the Contractor will be assessed a charge of \$1000 to reimburse the Government for each succeeding recheck of the

laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

- 3.8.B.3. Onsite Laboratory:** - The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.
- 3.8.B.4. Furnishing or Transportation of Samples for Testing:** - Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Coordination for each specific test, exact delivery location, and dates will be made through the Area Office. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Corps of Engineers Division Laboratory, f.o.b., at the following address:

For delivery by mail:

US Army Corps of Engineers
Afghanistan Engineer District (AED)
Attn.: Qalaa House
APO AE 09356

For other deliveries:

U.S. Army Corps of Engineers
House # 1 , St. # 1 West
West Wazir Akbar Khan
Behind Amani High School
Kabul, Afghanistan

3.9. COMPLETION INSPECTION:

- 3.9.A. Punch-Out Inspection:** Near the end of the work, or any increment of the work established by a time stated in the SPECIAL CONTRACT REQUIREMENTS Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. A punch list of items which do not conform to the approved drawings and specifications shall be prepared and included in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.
- 3.9.B. Pre-Final Inspection:** The Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.
- 3.9.C. Final Acceptance Inspection:** The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled

by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.10. DOCUMENTATION: The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed.

3.10.A. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

3.10.A.1. Contractor/subcontractor and their area of responsibility.

3.10.A.2. Operating plant/equipment with hours worked, idle, or down for repair.

3.10.A.3. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

3.10.A.4. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase shall be identified (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.

3.10.A.5. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.

3.10.A.6. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.

3.10.A.7. Offsite surveillance activities, including actions taken.

3.10.A.8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

3.10.A.9. Instructions given/received and conflicts in plans and/or specifications.

3.10.A.10. Contractor's verification statement.

3.10.B. These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within forty-eight (48) hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.11. SAMPLE FORMS: In accordance with Specification 01312 QUALITY CONTROL SYSTEM, the contractor shall use the forms produced by and printed from QCS. Samples of any forms required to meet the requirements of this section which are not produced by that system shall be included in the contractors Quality Control Plan.

3.12. NOTIFICATION OF NONCOMPLIANCE: 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

work site, 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.

-- End Section --

(End of Summary of Changes)