

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. CONTRACT ID CODE	PAGE OF PAGES	
			J	1	2
2. AMENDMENT/MODIFICATION NO. 0004	3. EFFECTIVE DATE 26-Jul-2007	4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO.(If applicable)	
6. ISSUED BY US ARMY CORPS OF ENGINEERS - CETAC-CT-M 201 PRINCE FREDERICK DRIVE WINCHESTER VA 22602	CODE W912ER	7. ADMINISTERED BY (If other than item 6)		CODE	
		See Item 6			
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)			X	9A. AMENDMENT OF SOLICITATION NO. W912ER-07-R-0011	
			X	9B. DATED (SEE ITEM 11) 22-Jun-2007	
				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.) See Continuation Sheet					
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.					
15A. NAME AND TITLE OF SIGNER (Type or print)			16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)		
			TEL:	EMAIL:	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA		16C. DATE SIGNED	
_____ (Signature of person authorized to sign)		BY _____ (Signature of Contracting Officer)		26-Jul-2007	

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

The following items are applicable to this modification:AMENDMENT 0004

1. The attachments are forwarded for changes to the scope of work.
2. The amendment is issued to change the scope of work. The requirement for Range #2 (CLIN 0015) and Range #2 Roads (CLIN 0016) have been deleted from the solicitation. Range #1 (CLIN 0013) has been changed to add the requirements to handle 50 lb. explosives IAW Army FM 3-34.2.14.
3. Revised cost proposal are required by 2 August 2007. Request a revised Cost Breakdown Schedule be e-mailed to Lynn.C.Johnson@tac01.usace.army.mil.
4. Changes to the non-pricing (technical) proposals are not required. If changes are made to the non-pricing proposal request changes by underlining the new text and the deleted text shown using highlighted by strikeout.

SECTION 01015
TECHNICAL REQUIREMENTS

(This Section Replaced In Its Entirety By Amendment No. 0004)

1. GENERAL

1.1 The Contractor's design and construction must comply with technical requirements contained herein. The Contractor shall provide design and construction using the best combination of cost, construction efficiency, system durability, ease of maintenance and environmental compatibility. The Contractor is responsible for master planning and site design; site development, construction, including UXO/Mine Removal (as required), debris removal, grading and storm water management; connect to water well, water line, connect to sanitary sewer, and connect to storm sewer construction; road construction; connect to electric system; security systems, communications systems connections and all facilities as described in this Request for Proposal (RFP).

1.2 These design and product requirements are minimum standards. The Contractor is encouraged to propose alternate design or products (equipment and material) that are more commonly used in the region; equipment and materials 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. Life expectation for this facility is for twenty-five (25) years minimum. Material and methods used for this project must meet this design requirement. All requirements set forth in the RFP, but not included in the Scope of Work (SOW) shall be considered as set forth in both, and vice versa. Contractor shall provide all hardware, fixtures, etc. to make this a complete usable facility. Any time two or more statements in the RFP, building codes, or standards are in conflict, the most stringent shall apply. This project consists of new construction of the infrastructure and buildings for an ANA CE School and Ranges as defined in Section 01010 SCOPE OF WORK and shall be executed in accordance with the following requirements.

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 materials would be cost prohibitive, a waiver for the use of asbestos-containing materials must be obtained from the Contracting Officer.

1.4 SAFETY

1.4.1 UXO/MINE DISCOVERY DURING PROJECT CONSTRUCTION

It is the responsibility of the Contractor to be aware of the risk of encountering UXO and to take all actions necessary to assure a safe work area

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to perform the requirements of this contract. Any digging/excavation work associated with the Counter Explosives School will have to be cleared of any potential subsurface mines/UXOs. This will be the responsibility of the Contractor. If, after the entire site has been cleared of UXO/mines per the International Mine Action Standards (IMAS) and clearance is done to the anticipated foundation depth, the Contractor becomes aware of or encounters UXO or potential UXO during construction, the Contractor shall immediately stop work at the site of the encounter, move to a safe location, notify the COR, and mitigate any delays to scheduled or unscheduled contract work. The Contractor shall remove and dispose of UXOs per the International Mine Action Standards (IMAS). These standards can be found at <http://www.mineactionstandards.org>. 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 these cases, the Contractor shall be required to identify and dispose of the ordnance.

NOTE: For previous Demining information, the following points of contact for the UN Mine Action Center for Afghanistan are provided:

Reiko Kurihara, project manager, email reiko@unmaca.org
Cell phone: +93 070 284 686
Kerei Ruru, chief Operations Officer, Kereiruru@gmail.com
<mailto:>Cell phone: +93 (0) 79 330 992

1.4.2 ACTIVITY HAZARD ANALYSIS (AHA)

a. Activity Hazard Analysis 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 requirements 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.

1.5 NOTIFICATION OF NONCOMPLIANCE

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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.

1.6 WARRANTY

The Contractor shall repair and/or replace all defective materials or workmanship, except for roofs, at his own cost for a warranty period of one (1) year commencing upon the date of final acceptance of the entire project. See roof construction under Section 01015 3.9 Roof Construction for warranty.

1.7 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.

1.8 MAN-HOUR EXPOSURE REPORTING REQUIREMENTS

Prime Contractors are required to maintain records for both prime and subcontractor employees to include exposure work hours, a log of occupational injuries and illness and local/international economic data. The Prime Contractor shall submit the information on CEAED Form 385-1-1 to the COR by the 25th of each month. The COR shall submit the information to the Chief, Safety, and the AED Economist by the end of the month. The COR shall assure that the form is properly filled out and that the complete contract number or task order number are clearly indicated. Section III of the form is the Economic Analysis Report and it must contain data itemized by location if the contract has more than one work location. It is extremely important that the economic data be broken out by work location. The Contractor may develop their own spreadsheet for a contract with multiple work sites provided the spreadsheet includes the basic information detailed on the Economic Data Report. Accident exposure data does not need to be itemized by location and should be submitted as a total for the entire contract.

2. CIVIL

2.1 GENERAL OVERVIEW OF EXISTING AND PLANNED INFRASTRUCTURE

Assume survey mapping and topographical maps are not obtainable. If existing and will be used, the accuracy shall be verified. There are two existing wells adjacent to site which will provide water for 250 occupants. There is no water piping, pumping or distribution on site; no sanitary sewer collection system, lift stations or sewage treatment facility. Assume solid waste management and/or collection facilities are non-existent on site. For

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the project site, it is anticipated that the sole source of water will be the existing Ground Water Wells (GWW) to be located on the adjacent site. The estimated water demand is 41 gallons per day per soldier, with the estimated total strength of 250 occupants. Hence a new pumping and distribution infrastructure will include to convey water from two wells from adjacent site: A) Well pump(s), valves, flow meters, flow control devices, air and vacuum, B) Water transmission main to the proposed water distribution network planned to serve the CE School and support activities, C) Water Storage Tank (minimum 1 day's storage and one days use), and D) Service booster pumps plus jockey (if necessary based on engineering site investigation An entirely new sanitary sewer collection system shall be constructed to include: 1) Sewage Lift Station (if necessary based on engineering site investigation), 2) Complete sewage collection system, gravity sewer in service areas and force main as needed to move CO sewage to processing plant on adjacent site,3) Building service connections.

Design and construct the road network connecting the main road to the main entrance of the compound. All roads shall be graded and constructed with 300mm subbase course and surfaced with 100mm well graded, crushed aggregate. The minimum roadway width shall be 7 meters. The road network for CE School Facility shall be asphalt surfaced, with 100 mm of asphalt. Road construction shall include the installation of all required drainage structures. See Appendix A.

2.1.1 ROADS PARKING AND WALKWAYS

Approximately one (1) kilometer of asphalt roads is required within the compound area field verify exact amount. Approximately two (2) kilometers of gravel roads is required from the existing roads to ranges, provide roads to the Ranges these roads shall be constructed with 300mm sub base course and surfaced with 100mm well graded, crushed aggregate. Base course shall be compacted to 95% proctor density and mechanically stabilized by compaction. Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557. Provide Base Parking per Section 01010, paragraph 4.5, surfaced with crushed stone per Section 01010 paragraph 4.3. Crushed stone shall also be provided around buildings and pathways at range areas. All pre-existing conditions are developed and undeveloped land with moderate slopes, without substantial vegetation and with natural drainage channels of moderate size and spacing that are dry most of the time. All roads shall be of wearing surface 7 meters wide, graded for proper drainage, provided with necessary drainage structures, drainage ditches and completed with prescribed surfaces in accordance with applicable sections of TM 5-822-2 and TM 5-822-5 standards. The compound road sections shall have compacted crushed aggregate base course with an asphalt topping and shall be provided with necessary drainage structures and completed with prescribed surfaces in accordance with applicable sections of TM 5-822-2 and TM 5-822-5 standards. Crushed stone shall also be provided around buildings and pathways at range areas. All walkways shall be 1200 mm wide concrete between buildings at CE School site. Contractor shall notify the Contracting Officer immediately if initial site survey determines that area hydrology requires major drainage structures or bridges. Also, the Contracting Officer shall be immediately notified if the required lengths of road or pre-existing conditions are determined to be substantially or materially different than the above-described

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conditions/estimates.

2.1.2 SITE GRADING PLAN

The Contractor shall design a site grading plan that provides positive drainage and minimizes the requirements for major structures in a cost effective manner. Also, the Contracting Officer shall be immediately notified if the required lengths of road or pre-existing conditions are determined to be substantially or materially different than the above-described conditions/estimates.

2.2 SURVEY AND MAPPING

General Work to be performed - Conduct topographic survey and mapping of the project site to include any existing and/or associated utilities, wet/dry creek beds, hydrological, geological, botanical or other physical conditions that could impact on design. Topographic survey data shall include horizontal and vertical (H&V) controls.

2.2.1 Survey Requirements

2.2.1.1 Horizontal and Vertical Control The mapping shall be based on the base coordinate system. If the base system cannot be found, the surveyor shall use any established monuments. If monuments have been destroyed or do not exist, an assumed horizontal and vertical datum shall be established, using arbitrary coordinates of 10,000n and 10,000e and an elevation of 1,000 meters. The horizontal and vertical control established on site shall be a closed loop with third order accuracy and procedures.

2.2.1.2 Provide three (3) concrete survey monuments at the survey site.

2.2.1.3 All of the control points established at the site shall be plotted at the appropriate coordinate points and shall be identified by name or number, and adjusted elevations.

2.2.1.4 The location of the project site, as determined by the surveyor shall be submitted in writing to the Contracting Officer. The site location shall be identified by temporary markers, approved by the Contracting Officer before proceeding with the surveying work.

2.2.2 Topography Requirements

2.2.2.1 A sufficient quantity of horizontal and vertical control shall be established to provide a detailed topographic survey at 1:500 scale with (25) centimeter contour intervals. Intermediate elevations shall be provided as necessary to show breaks in grade and changes in terrain.

2.2.2.2 The contours shall accurately express the relief detail and topographic shapes. In addition, 90 percent of the elevations or profiles interpolated from the contours shall be correct to within one-half of the contour interval and spot elevations shall be correct within plus or minus 2 centimeters.

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2.2.2.3 Spot elevations affecting design of facilities shall be provided. Specifically, break points or control points in grades of terrain such as tops of hills, bottoms of ditches and gullies, high bank elevations, and so forth.

2.2.2.4 All surface and sub-surface structures features within the area to be surveyed shall be shown and identified on the topographic maps. In addition, these features shall be located by sufficient distance ties and labeled on the topographic sheets to permit accurate scaling and identification. 2.2.2.5 The location and sizes of potable, sanitary, electrical and mechanical utilities within the survey site shall be shown on the survey map. Sanitary manholes and appurtenances shall show top elevations and invert elevations.

2.3 WATER

2.3.1 General

The water for CE School shall be supplied from existing wells on adjacent site. Infrastructure design and construction shall be designed for a total population of 250 personnel. The Contractor shall install water distribution mains, branches, laterals, lines and service connections to include all pipe, valves, fittings and appurtenances. Exterior water line construction shall include service to all buildings as described in RFP. Also reference the Overall Site Map attached to this document. The required Average Daily Demand (ADD) approximation is ultimately 39,000 liters (or 10,250 gallons) of potable water, derived from approximately 155 liters per capita per day (lpcd) or 41 gallons per capita per day (gpcd). 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) freeze proof outside water hydrant (hose spigot) for each building.

2.3.2 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.

2.3.3 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

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Wastewater by a qualified lab as approved by the Contracting Officer.

2.3.4 Service Booster Pumps - (Direct Pressure System Pending Engineering Site Investigation) Contractor shall provide a booster pump station with end suction or split case double suction horizontal split case (frame mounted) centrifugal pumps arranged in parallel for pumping water storage into the main distribution system. The pumps and controls shall be designed to supply and maintain acceptable system pressure throughout the distribution network given the full range of flow conditions (low flow to peak). For conditions of low demand and to prevent short cycling of primary pumps, provide a low demand jockey pump with capacity of one-third (1/3) of the Average Daily Demand (ADD). Each booster pump, two (2), shall be capable of delivering 2 times (2x) the average daily demand. Provide suitable expansion tank. The suction side of the service booster pumps shall have an eccentric reducer and gate valve installed. The discharge side shall have a gate valve, check valve (between the pump and the gate valve and concentric reducer, pressure gauge and air relief valve).

2.3 WATER DISTRIBUTION SYSTEM

Design and construct a water distribution system that connects to existing wells (at existing ANA Commando Complex) which shall include; pumps and service booster pumps, distribution system chlorination and water storage tank(s) sized for the entire CE School Master Plan of 250 occupants with one day of storage and one day of usage; and water distribution system to serve the entire installation CE School facility with a minimum of 40 psi pressures throughout. Provide steel tanks with non toxic Epoxy coating inside and primed and painted on the outside. Provide chain link fence and gates around entire water facility on CE School Facility; see fence Section 01015 paragraph 3.10.10 Chain Link Fence.

and service connections to include all pipe, valves, fittings and appurtenances. Exterior water line construction shall include service to all buildings as described in RFP. Also reference the Overall Site Map attached to this document. The required Average Daily Demand (ADD) approximation is ultimately 39,000 liters (or 10,250 gallons) of potable water, derived from approximately 155 liters per capita per day (lpcd) or 41 gallons per capita per day (gpcd). In the event potable or non-potable use water is

2.3.6 Water Storage Tank(s)

Contractor shall provide a circular steel ground storage reservoir (GST) to be located at ground level and supported on a concrete pad. Volume of the GST shall be a minimum storage per Master Plan of 250 occupants with one day of storage and one day of usage volume of a full day's demand of 78,000 liters (or 20,500 gallons) of potable water The Contractor shall verify storage volume requirements based on final design population. The storage facility shall be located above drainage areas and locations subject to flooding as approved by the Contracting Officer. The storage facility shall be located on the highest elevations of the site to promote gravity flow and reduce pumping requirements. Overflow and air vents shall be screened so that birds, rodents and debris cannot enter the reservoir.

2.3.7 Disinfection & Chlorination System

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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 2 to 4 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.

2.3.8 Chlorine Building

Contractor shall furnish a CMU building size as per chlorine manufacturer's installation requirements. Provide heat as required to prevent equipment freezing. The Contractor shall provide manufacturers catalog information and shop drawings to the Contracting Officer for approval. 2.4 WATER DISTRIBUTION SYSTEM 2.4.1 General The Contractor shall provide a water distribution system described as follows: Pipe diameters used in the network shall be 150mm and 100mm, 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 is 140kPa (20psi) to all points of the distribution system and maximum pressure of 690kPa (75psi). If high pressures (greater than 690kPa) cannot be avoided, pressure-reducing valves shall be used. Water service connections to buildings shall vary from 19mm, 25mm or 38mm to 75mm, as calculated, depending on the usage requirement. 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

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type, use similar piping materials for all buildings for efficiency of future maintenance activities. The distribution network shall be laid out in a combination grid and looped pattern with dead ends not exceeding 30m. Dead end sections shall not be less than 150mm diameter and shall either have blow off valves or fire hydrants (flushing valves) installed for periodic flushing of the line. Any pipe with a fire hydrant on the line shall be at least 150mm in diameter. Water supply distribution shall connect to a building service at a point approximately 1.5m outside the building or structure to which the service is required. Adequate cover must be provided for frost protection. A minimum cover of 80cm is required to protect the water distribution system against freezing. Water lines less than 1.25 meters deep under road crossings shall have a reinforced concrete cover of at least 150 mm thickness around the pipe.

2.4.2 Pipe

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, et al, 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, 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 1.03Mpa (150psi) working pressure and 1,38Mpa (200psi) hydrostatic test pressure.

2.4.3 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.

2.4.3.1 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 (150psi).

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.

2.4.3.2 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 (5psi) 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:

$$L = 0.0001351ND (P)^{0.5}$$

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

Metric:

$$Q \text{ (lt/s)} = 8.952 \text{ E-7} * N * D \text{ (mm)} * (p \text{ (KPa)})^{0.5}$$

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.

2.4.3.3 Bacteriological Disinfection

2.4.3.3.1 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 either 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

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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. During the flushing period, each fire hydrant on the line shall be opened and closed several times.

2.4.3.3.2 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.

2.4.3.3.3 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.

2.4.3.4 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.

2.4.3.5 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.

2.4.4 Valves

Valves (Gate valves with 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 300m. Gate valves shall be in accordance with AWWA C 500 and/or C509. Butterfly valves (rubber seated) shall be in accordance with C504 et al. 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

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square, for all valve boxes.

2.4.5 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.

2.4.6 Blow-off valves

The Contractor shall provide 40-50mm 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.

2.4.7 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.

2.5 SANITARY SEWER

2.5.1 General

There are no sanitary sewer collection facilities on CE School Site. The Contractor shall obtain topographic information or other maps 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. If maps are not available, or do not provide satisfactory information or sufficient detail of the site, field surveys shall be performed. Sanitary sewers less than 1.25 meters under road crossings shall have reinforced concrete cover at least 150 mm thick around the pipe. Sewer system shall provide service for all new buildings. Sewage shall be piped new treatment plant on adjacent Site for all options, and future buildings defined in contract.

Exterior sanitary sewer line construction shall include service to all buildings as described in the Scope of Work Section 01010. Contractor shall design sanitary sewer collection system using approved field survey data and finished floor elevations. Depending upon the topography and building location, the most practical location of sanitary sewer lines is along one side of the street. In other cases, they may be located behind buildings midway between streets. Main collection sewers will follow the most feasible route to the point of discharge. The sewer collection system shall be

designed to accommodate a total occupant load of (325) persons. 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 all buildings at CE School Site.

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) Locate manholes at intersections of streets where possible, 7) Avoid placing manholes where the tops will be submerged or subject to surface water inflow, 8) Evaluate alternative sewer routes where applicable, and 9) 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.

2.5.2 Protection of Water supplies - The Contractor shall ensure that the sewer design meets the following criteria:

2.5.2.1 Sanitary sewers will be located no closer than 15m horizontally to water wells or reservoirs to be used for potable water supply.

2.5.2.2 Sanitary sewers will be no closer than 3m horizontally to potable water lines; where the bottom of the water pipe will be at least 305mm above the top of the sanitary sewer, and horizontal spacing shall be a minimum of 1.8m.

2.5.2.3 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 on each side of the crossing. Pressure pipe will be as required for force mains in accordance with building codes and shall have no joint closer than 0.9m horizontally to the crossing, unless the joint is encased in concrete.

2.5.3 Quantity of Wastewater

The Contractor shall verify the average daily flow considering both resident (full occupancy) and non-resident (8 hrs per day) population. The average daily flow will represent the total waste volume generated over a 24-hour period, and shall be based on a population of 325 persons and usage rate of 155 lt (41 gallons) per capita day (water usage) equaling 51,500 liters or 13,500 gallons per day. The wastewater flow rate shall be calculated as 80% of average daily flow or 41,000 liters or 11,000 gallons per day. Design criteria guideline shall be based on an average influent wastewater characteristics as BOD of 400mg/l, SS of 400mg/l, BOD load of 750ppd, and SS

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load of 750ppd.

2.5.4 Gravity Sewer

Sanitary sewers shall be designed to flow at 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, (1.0fps) 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 80cm will be required to protect the sewer against freezing.

2.5.5 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 pre-cast manhole option shall taper to a 75cm (30-inch) cast iron frame that provides a minimum clear opening of 600mm (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.

2.5.5.1 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.

2.5.5.2 Spacing

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

2.5.5.3 Pipe connections

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

2.5.6 Pipe

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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 380mm (15inch) or less in diameter. PVC shall be certified as meeting the requirements of ASTM D 1784, cell Class 12454 B.

2.5.6.1 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.

2.5.6.2 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.

2.5.6.3 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.

2.5.6.4 Frames and Covers

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

2.5.6.5 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 300mm (12 inches)) on center.

2.5.6.6 The minimum depth of cover over the pipe crown shall be shall 0.8m.

2.5.7 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 or 30-60 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 100mm diameter and laid at a minimum 1% grade, but up to 2% as design parameters dictate. Service laterals shall be 150mm and sloped to maintain the minimum velocity as described in paragraph "Gravity Sewer."

2.5.8 Cleanouts

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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 100mm.

2.5.9 Field Quality Control

2.5.9.1 Field Tests and Inspections

2.5.9.1.1 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.

2.5.9.1.2 Check each straight run of pipeline for gross deficiencies by holding a light in a manhole; it shall show 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.

2.5.9.1.3 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.

2.5.9.1.3.1 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.

2.5.9.1.3.2 Low-pressure air tests: Perform tests as follows: 1) Concrete pipe: Test in accordance with ASTM C 924M, ASTM C 924. Allowable pressure drop shall be given in ASTM C 924M ASTM C 924. Make calculations in accordance with the Appendix to ASTM C 924M, ASTM C 924; 2) Ductile-iron pipe: Test in accordance with the applicable requirements of ASTM C 924M, ASTM C 924. Allowable pressure drop shall be as given in ASTM C 924M, ASTM C 924. Make calculations in accordance with the Appendix to ASTM C 924M, ASTM C 924; 3) PVC Plastic pipe: Test in accordance with applicable requirements of UBPPA UNI-B-6. Allowable pressure drop shall be as given in UBPPA UNI-B-6. Make calculations in accordance with the Appendix to UBPPA UNI-B-6.

2.5.9.2 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.

2.6 SOLID WASTE MANAGEMENT AND DISPOSAL

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Provide and install collection points for solid waste until it is picked up and removed to the landfill/burn site.

2.6.1 At School Headquarters, Classrooms, and barracks construct three (3) collection points 1 for Headquarters, 1 for Classroom area, and 1 for Barracks area, suitable for solid waste temporary storage areas with a 2 meter high wall and metal roof, enclosure shall have two metal gates in a 2 meter opening. Storage area shall be 4 meters X 5 meters with reinforced concrete slab and reinforced CMU or stone walls and metal roof on metal trusses. Eve shall match typical buildings. The Contractor shall prepare design plans showing location of collection points. Indicate locations on site plan. Provide each collection next to hard surface road and 25 meters from inhabited buildings.

2.6.2 At Range 1 ~~and Range 2~~ construct one (1) collection point ~~at each range~~ suitable for solid waste disposal temporary storage areas with a 2 meter high wall and metal roof on metal trusses. Eve shall match typical building profiles. Enclosure shall have two metal gates in a 2 meter opening. Storage area shall be 4 meters X 5 meters with reinforced concrete slab and reinforced CMU w/plaster or stone walls. The Contractor shall prepare design plans showing location of collection.

3. ARCHITECTURAL

3.1 GENERAL

3.1.1 The Scope of Work is stated in Section 01010. All materials approved shall become standardized material to be used throughout the facilities under contract. Different sub-contractors shall not use different materials or standards under the contract.

3.1.2 Intent of the project is to meet the requirements per the RFP, Codes and Standards, and if possible use locally procured materials and labor to the maximum extent possible.

3.1.3 The site is located on developed land where many old unreinforced masonry buildings were removed. Reference the site map for the project location.

3.1.4 The Contractor shall survey and produce detailed documentation of the site utilities, buildings, and systems for the entire compound. Contractor shall perform detailed site measurement as needed to verify available printed and electronic documentation. Drawings shall clearly distinguish existing conditions for work performed under this contract. Documentation work shall be performed on computer assisted design and drafting (CADD). New documentation shall be performed on AutoCAD version 2006, conforming to A/E/C Tri Services standards. Units shall be metric. Language for all documents shall be in American English.

3.2 DESIGN PRODUCTS

3.2.1 General

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

3.2.2 Design Analysis

The design analysis should be written in the English Language for review by the Government for all buildings and to have indexes, table of contents and each page numbered. Each building shall be listed as indicated in Section 01010. The design analysis is a written explanation of the project design which is expanded and revised (updated) as the design progresses. The design analysis shall contain all explanatory material giving the design rationale for any design decisions which would not be obvious to an engineer reviewing the final drawings and specifications. The design analysis contains the criteria for and the history of the project design, including criteria furnished by the Government, letters, codes, references, conference minutes, and pertinent research. Design calculations, computerized and manual, are included in the design analysis. Narrative descriptions of design solutions are also included. Written material may be illustrated by diagrams and sketches to convey design concepts. Catalog cuts and manufacturer's data for all equipment items required, shall be submitted. Copies of all previous design phase review comments and the actions assigned to them shall be included with each submission of the design analysis. Specific requirements for the design analysis, listed by submittal phase, are contained hereinafter. Provide Code Analysis for each building based on the following items and code sections.

3.2.3 Code Analysis

The following analysis information is required for all buildings submitted in this proposal. List: Seismic Design Category, Wind Speed, and Snow Load.

Analysis Items	Code
References - International Building Code (IBC) 2003	
1. Type of Construction	IBC Chapter 6
2. Occupancy Classification Table 302.3.2	IBC Chapter 3 and
3. Actual Allowable Area Table 503	IBC 503, 505-508 &
4. Actual Allowable Height	IBC 504 & Table 503
5. Occupant Load (per use) 1004.1.2	IBC 1004 & Table
6. Exits Required/Provided 1004.1.2	IBC 1004 & Table
	IBC 1014, 1018, and 1018.2
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7. Required Opening Protection

IBC Table 602

8. Fire Resistive Construction

IBC Table 601

3.2.4 Design Calculations

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

3.2.5 Specifications

Specifications shall be prepared in accordance with the Construction Specifications Institute (CSI) format. The Design-Build Contractor prepared specifications shall include as a minimum, all applicable specifications sections referenced by the CSI. Where the CSI does not reference a specification section for specific work to be performed by this contract, the Design-Build Contractor shall be responsible for creating the required specification. All materials specified shall use CSI Standards and shall be listed in Section 1.1 References of each Specification Section. It shall be the Contractor's responsibility to show that equivalency requirements are met if the Standard is not per (CSI) format. Designer shall not edit out any references, standards, etc. relating to any materials or items used in the project.

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

3.2.6 Insulation: In all habitable buildings and where heating or cooling is required, provide the minimum insulation values as follows:

Walls R Value of $R = 3.5 \text{ m}^2\text{-}^\circ\text{C/watt}$ (R 20)

Roof R Value of $R = 5.5 \text{ m}^2\text{-}^\circ\text{C/watt}$ (R 30)

3.2.7 Colors

Designer of record shall provide one Color Board comprised of all finishes to be used on project and submit at 65% for approval. Upon approval two Color Boards shall be submitted for record. Color Boards shall be kept at job site for approval of materials used at jobsite. NOTE: Contractor shall coordinate the materials, colors and design to match adjacent Commando Compound.

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3.3 DEMOLITION

3.3.1 Limited site clearing is required; the site is located on developed land where many old unreinforced masonry buildings were removed by previous contract. The majority of demolition work will be removing any hidden structures uncovered during excavating for new foundations. Reference the site map for the project location.

3.3.2 As all buildings to be constructed under this Contract are new, there is no interior demolition required.

3.4 EXCAVATION and BACKFILL

3.4.1 Extensive Backfilling and compaction will be required in areas where previous buildings were removed under different contract. Care shall be taken when backfilling
In areas of existing trees.

3.4.2 Trench excavation shall be made for concrete footings. Trenches shall be a minimum of .8 meter deep or below the frost depth, whichever is greater. Trenches deeper than 1.5 meters shall have protective shoring to protect workers or have the sides of the trench laid back at a slope of 1.5:1.

3.4.3 Care shall be taken when backfilling of foundation trenches to avoid damage to walls.

3.4.4 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.

3.4.5 Care shall be taken when backfilling of foundation trenches to avoid damage to walls.

3.5 CONCRETE

3.5.1 Place 150 mm (6") of crushed stone capillary water barrier below areas to receive a concrete slab on properly compacted soil free of organic material.

3.5.2 A plastic 6 mil vapor barrier shall be placed over the capillary water barrier prior to placing of concrete slabs.

3.5.3 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.

3.5.4 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.

3.5.5 See paragraph 4 for structural characteristics of concrete and

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reinforcing steel for foundations and slabs.

3.6 MASONRY

3.6.1 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.

3.6.2 Concrete masonry units (CMU) shall be 20cm x 40cm x 20cm high or 10cm x 40cm x 20cm high plastered on each side. They shall be installed in running bond level and plumb. Mortar joints shall be 9mm on all sides between CMU. Install only quality units. All materials of structural (bearing) masonry wall assemblies shall be rated at a minimum of 141 kg/cm² (2,000 psi) compressive strength. 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. All building materials shall meet seismic building code and mortar mix shall be in accordance with paragraph 4, Structural. For force protection, all masonry shall be grouted, and reinforced to resist the design loads. All CMU walls shall be plastered interior/exterior and painted.

3.6.3 3-D Panel System: Contractor may substitute 3-D Panel System for reinforced CMU; this applies to all barracks type buildings, Communication building, DPW shop building, Detention Facility, Embedded Training Team Compound, Interpreter Facilities, and Fire Station. All 3-D buildings shall have a metal roof meeting the requirements of RFP. All 3-D walls & ceilings shall be plastered interior/exterior and painted.

3.7 METAL

3.7.1 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 details 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 design, metal framing for roof fascia, gable, and soffits.

3.7.2 See paragraph 4 for structural characteristics of steel joists.

3.7.3 Roof flashings and Fascia, see 3.9 Roof Construction.

3.8 PRE-ENGINEERED METAL BUILDING

All roof slopes in Pre-Engineered metal buildings and all buildings in Brigade, the roof slopes shall be 4 in 12.

Provide reinforced plastered CMU walls with the Pre-Engineered metal building built above CMU wall height. All supports shall be inbound of the interior face of the reinforced CMU wall.

Pre-engineered Metal Building shall conform to all requirements in Uniform Facility Guide Specification (UFGS) SECTION 13120 PREENGINEERED METAL BUILDINGS

Steel Framing: Steel framing shall conform to American Iron and Steel Institute (AISI), Cold Formed Steel Design Manual, American Institute of Steel Construction (AISC) ASD, Manual of Steel Construction, Allowable Stress Design, and TI 809-07, Design of Cold-Formed Load Bearing Steel Systems and Masonry Veneer/Steel Stud Walls. Cold-formed framing shall consist of steel studs, top and bottom tracks, runners, horizontal bridging, and other cold-formed members and other accessories. All members and components made of sheet steel shall be hot-dip galvanized in accordance with ASTM A 653/A 653M with a minimum coating thickness of G 60. This framing shall be used only in framing the exterior steel stud wall system. Design metal siding and flashing to overhang CMU wall or concrete 50 cm.

3.9 ROOF CONSTRUCTION

3.9.1 All roofing shall be standing seam metal roofing. Roofing system shall include all edge, ridge and penetration flashings necessary for a watertight installation. Provide continuous soffit and ridge vents meeting the venting requirements of the IBC Code. Roof slopes shall be continuous to the perimeter of the building, without interior valleys or depressions where ponds can form. Provide reinforcing at roof and nonskid walk surface at each HEAT/COOL UNIT if installed on roof for access, maintenance, and changing filters.

3.9.2 Sloped roofs shall be standing seam metal roofing. Roof slopes shall be 4 in 12 minimum. Roof Panels: Panels shall be 0.85-070 mm (22 - 24 gauge) standing seam metal. Roof deck assemblies shall be Class 90 as defined in UL 580. Length of sheet shall be sufficient to cover the entire length of any unbroken roof slope when such slope is 9.000 mm or less. When length of run exceeds 9, 000 mm and panel splices are provided contractor shall provide details in the drawing package indicating how splices are fabricated; each sheet in the run shall extend over three or more supports. Sheets longer than 9.000 mm may be furnished if approved by the Contracting Officer. Width of sheets shall provide not more than 450 mm of coverage in place. SSMRS with roofing panels greater than 300 mm in width shall have standing seams rolled during installation by an electrically driven seaming machine. Height of standing seams shall be not less than 60 mm. All sheets shall be cut in the shop to correspond to the roof slope and may have a horizontal joint at the eave line.

Steel Panels: Zinc-coated steel conforming to ASTM A 446, G 90 coating designation. Panels shall be 0.85-070 mm (22 - 24 gauge).

3.9.3 Performance Standards: The SSMRS shall be tested for wind uplift resistance in accordance with ASTM E 1592. The uplift resistance of the SSMRS shall be established as indicated in the "STANDARD TEST METHOD FOR STRUCTURAL PERFORMANCE OF SSMRS BY UNIFORM STATIC AIR PRESSURE DIFFERENCE". The SSMRS

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design shall be adequate for uplift if the established allowable pressure from testing causes no failure as defined in the Corps of Engineers' STANDARD TEST METHOD FOR STRUCTURAL PERFORMANCE OF SSMRS BY UNIFORM STATIC AIR PRESSURE DIFFERENCE. Testing to ultimate capacity is not required.

3.9.4 Accessories: Accessories shall be furnished with the Standing Seam Metal Roof System. Flashing, gutters, soffits, eaves, fascias, trim; metal closure strips, caps, and similar metal accessories shall be not less than the minimum thickness specified for roofing panels. Exposed metal accessories shall be finished to match the panels furnished. Molded closure strips shall be closed-cell or solid-cell synthetic rubber or neoprene, or polyvinyl chloride; premolded to match configuration of the covering and shall not absorb or retain water. Thermal spacer blocks and other thermal barriers at concealed clip fasteners shall be as recommended by the manufacturer.

Fasteners: Concealed fasteners for steel roof panels shall be zinc-coated steel, aluminum, corrosion resisting steel, or nylon capped steel, type and size specified below or as otherwise approved for the applicable requirements. Concealed fasteners for aluminum roof panels shall be aluminum or corrosion resisting steel. Fasteners for structural connections shall provide both tensile and shear strength of not less than 350 kilograms per fastener. Fasteners for accessories shall be the manufacturer's standard.

Exposed roof fasteners shall not be used.

Screws: Screws shall be as recommended by the manufacturer to meet the strength design requirements of the panels. Roof panels shall be detailed and fabricated in such a way that there are no screws penetrating building exterior skin.

Bolts: Bolts shall be not less than 6 mm diameter, shouldered or plain shank as required, with locking washers and nuts.

Structural Blind Fasteners: Blind screw-type expandable fasteners shall be not less than 6 mm diameter. Blind rivets shall be .28 mm minimum diameter.

3.9.5 Thermal resistance of insulation shall be not less than the R-30. R-values shall be determined at 75 degrees F in accordance with ASTM C 518. Insulation shall have a flame spread not in excess of 25 and a smoke developed rating not in excess of 50 when tested in accordance with ASTM E 84. Insulation shall be a standard product of a manufacturer, factory-marked or identified with manufacturer's name or trademark and R-value. Identification shall be on individual pieces or individual packages. Facing shall be white, either of reinforced foil with a vinyl finish or sheet vinyl except unreinforced foil with a natural finish may be used in concealed locations. Insulation shall have a facing providing a permeability of 0.02 perm or less when tested in accordance with ASTM E 96. Facing shall be of 2 mil thick white vinyl backed with 150 mm by 150 mm glass scrim and 0.7 mil thick metal foil laminate. Reinforced foil with a natural finish may be used for facing in concealed locations. Facings and finishes shall be factory applied.

Rigid or Semi-rigid Board Insulation: Rigid board insulation shall conform to ASTM C 612, Form A, Class 1. All foam plastic insulation shall have a thermal

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barrier per IBC. Insulation shall not be exposed; any covering required shall meet the life expectation for this facility.

Blanket Insulation: Blanket insulation shall conform to FS HH-ISS8, Form B, Type I, Class 6. Insulation shall not be exposed; any covering required shall meet the life expectation for this facility, and conform to applicable codes.

Insulation Retainers: Insulation retainers shall be type, size, and design necessary to adequately hold the insulation and to provide a neat appearance. Metallic retaining members shall be nonferrous or have a nonferrous coating. Nonmetallic retaining members, including adhesives used in conjunction with mechanical retainers or at insulation seams shall have a fire resistance classification not less than that permitted for the insulation.

Concealed Anchor Clips: Concealed anchor clips shall be as recommended by the manufacturer for the roofing system furnished. Clip bases shall have factory punched or drilled holes for attachment. Clips used with panel width greater than 300 mm shall be made from multiple pieces with the allowance for the total thermal movement required to take place within the clip.

Sealant: Except as stated below, sealants shall be elastomeric type containing no oil or asphalt. Exposed sealant shall cure to a rubber like consistency. All sealants shall be the non-hardening type. Roof panel standing seam ribs shall have continuous sealant that is factory installed.

Gaskets and Insulating Compounds: Gaskets and insulating compounds shall be non-absorptive and suitable for insulating contact points of incompatible materials. Insulating compounds shall be non-running after drying.

Sub-purlins: Sub-purlins, when required by the system design, shall be formed from steel sheet as standard with the manufacturer. The uncoated thickness may be a minimum of 1.5 mm if bolts or structural blind fasteners are used for attachment of the concealed anchor clips to the sub purlins.

Vapor Retarder: Vapor retarder material shall be polyethylene sheeting conforming to the requirements of ASTM D 4397. A fully compatible tape shall be provided which has equal or better water vapor control characteristics than the vapor retarder material. A general-purpose tape, which has some resiliency and cushioning abilities, shall also be provided.

EPDM Rubber Boots: Flashing devices around pipe penetrations shall be flexible, one-piece devices molded from weather-resistant EPDM rubber. Rubber boot material shall be as recommended by the manufacturer. The boots shall have base rings made of stainless steel that conform to the contours of the roof panel to form a weather-tight seal.

Gutters and Downspouts: Provide eave-mounted gutters on all roof sections over doors and openings extend gutter 1,200 mm past door opening or walk surface whichever is greater. Provide downspouts for all gutter locations. Roof water shall be channeled away from building thru 0.85 MM (22 ga) downspouts with cast iron boots (at grade) and slope grade 2 %. Water from downspouts shall not drain onto or across walkways.

Provide roof coverings, roof gutters or roof water diverter's at all exterior door entry ways to keep rain water off of these walking surfaces.

Warranties: The SSSMR system shall be warranted as outlined below. Any emergency temporary repairs conducted by the owner shall not negate the warranties. Such warranties shall start upon final acceptance of the work or the date the Government takes possession, whichever is earlier.

Ventilation: A minimum of 50 mm of airspace shall be provided between the insulation and the roof sheathing. The net free ventilating area shall not be less than 1/300 of the area of the space ventilated, with 100 percent of the required ventilating area provided by ventilators located in the upper portion of the space.

3.9.6 Contractor's Weather Tightness Warranty: The SSSMR system shall be warranted by the Contractor on a no penal sum basis for a period of five years against material and workmanship deficiencies; system deterioration caused by exposure to the elements and/or inadequate resistance to specified service design loads, water leaks, and wind uplift damage. The SSSMR system covered under this warranty shall include the entire roofing system including, but not limited to, the standing seam metal roof panels, fasteners, connectors, roof securement components, and assemblies tested and approved in. In addition, the system shall consist of panel finishes, slip sheet, insulation, vapor retarder, all accessories, components, and trim and all connections with roof panels. This includes roof penetration items such as vents, curbs, and skylights; gutters and downspouts; soffits, eaves, ridge, hip, valley, rake, gable, wall, or other roof system flashings installed and any other components specified within the contract to provide a weather tight roof system; and items specified in other sections of the specifications that are part of the SSSMR system. All material and workmanship deficiencies, system deterioration caused by exposure to the elements and/or inadequate resistance to specified design loads, water leaks and wind uplift damage shall be repaired. This warranty shall warrant and cover the entire cost of repair or replacement, including all material, labor, and related markups. The Contractor shall supplement this warranty with written warranties from the installer and system manufacturer, which shall be submitted along with Contractor's warranty; however, the Contractor shall be ultimately responsible for this warranty. The Contractor's written warranty shall be as outlined in the Corps of Engineers Guide Specifications for WARRANTY FOR STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM, and shall start upon final acceptance of the facility. It shall be required that the Contractor provide a separate bond in an amount equal to the installed total roofing system cost in favor of the owner (Government) covering the Contractor's warranty responsibilities effective throughout the five-year Contractor's warranty period for the entire SSSMR system as outlined above.

Manufacturer's Material Warranties: Contractor shall furnish, in writing, the following manufacturer's material warranties which cover all SSSMR system components such as roof panels, anchor clips and fasteners, flashing, accessories, and trim, fabricated from coil material.

A manufacturer's 2-year material warranty guaranteeing that the aluminum, zinc-coated steel, aluminum-zinc alloy coated steel or aluminum-coated steel as specified herein will not rupture, structurally fail, fracture,

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deteriorate, or become perforated under normal design atmospheric conditions and service design loads. Liability under this warranty shall be limited exclusively to the cost of either repairing or replacing nonconforming, ruptured, perforated, or structurally failed coil material.

A manufacturer's 20-year exterior material finish warranty on the factory finish warranting that the finish, under normal atmospheric conditions at the site, will not crack, peel, or delaminate; chalk in excess of a numerical rating of eight as determined in ASTM D 4214 test procedures; or change color in excess of five CIE or Hunter Lab color difference (delta E) units in accordance with ASTM D 2244. Liability under this warranty is exclusively limited to refinishing with an air-drying version of the specified finish or replacing the defective coated material. Color of Roof shall be included in the Color Board Submittal provided by the Contractor.

A roofing system manufacturer's 20-year system weather tightness warranty.

3.9.7 Sheet Metalwork: Flashing shall be installed in conformance with the SMACNA Architectural Sheet Metal Manual.

3.9.8 SIGNAGE

Exterior Signs: Exterior signage shall be provided so that a person entering the facility would be able to use them to find a given destination. The Contracting Officer shall approve signage. Exterior signs are to be provided as follows:

Identification Directory. Facility Directory shall consist of a permanent header panel with a map of facility indicating location of building or function on site. Each building or function shall be labeled in Pashto and Dari with a building Number. Directory shall be 2000 mm sq, constructed of a durable material mounted per Contracting Officer's direction. Provide one inside main entry and at DFAC N0. 1.

Service identification signs are used to identify toilet rooms and other like services. The standard pictograph symbols shall be used. Service name shall be labeled in Pashto and Dari. The Contracting Officer shall approve signage.

Building signs shall be readable from 175 meters and shall be labeled in Pashto and Dari with a building Number at top.

Signs: Provide signs that comply with the sign standards provided in TM 5-807-10; "Signage". Contractor shall provide drawings indicating Sign Placement Plan and details of signs.

3.10 WINDOWS AND DOORS

3.10.1 Provide horizontally sliding aluminum windows in all buildings to fit the masonry openings, with factory baked finish off-white to match doors. All windows shall be single 6 mm laminated glazing. Windows openings shall be provided with insect screening permanently fixed to the exterior frame. Provide a locking device on the interior of each window. Provide anchors on

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each side of the frame into the adjoining masonry, 3 on each side, 2 top and bottom. Provide weather stripping system for all exterior windows and doors.

3.10.2 Insulation Provide the minimum insulation values as follows:

Exterior Doors R Value of $R = 0.7 \text{ m}^2\text{-}^\circ\text{C/watt}$ (R 4)

Exterior Roll-up Doors R Value of $R = 2.0 \text{ m}^2\text{-}^\circ\text{C/watt}$ (R 11)

3.10.3 Interior Steel Doors: All Interior doors shall be 44 mm hollow metal 1.00 mm (20 gauge) steel. Hollow metal frames shall be 1.30 mm (18 gauge) steel comply with ASTM A-366 cold rolled 3-piece knock down or equal Steel doors, frames, and steel glazing frames shall be painted. Door lights on interior doors shall be sized in accordance with building codes and positioned at a height above finished floor to allow vision on both sides. All doors in corridors shall have 150 mm X 600 mm X 6 mm minimum tempered glass lights 150 mm from door edge at lock side. Steel doors, frames, and steel glazing frames shall be painted to match factory finish off-white window frames. Doors shall be 900 mm wide X 2100 mm high.

3.10.4 Exterior Steel Doors: All exterior doors shall be 44 mm hollow metal 1.30 mm (18 gauge) steel with rigid foam core insulation. Hollow metal frames shall be 1.30 mm (18 gauge) steel and comply with ASTM A-366 cold rolled 3-piece knock down or equal Steel doors, frames, and steel glazing frames shall be painted to match factory finish off-white window frames. Doors shall be 900 mm wide X 2100 mm high.

3.10.5 Toilet Compartment Door: Provide a durable non wood, water/rust proof door and frame in all Toilet Compartments that will not rust or delaminate for life of building. Install bottom of door and frame 150 mm off the above finish floor. Provide a standard toilet compartment latch. Provide robe pair hooks on all these doors.

3.10.6 Overhead Rollup Door: Provide all steel overhead roll-up doors at all locations per RFP. Roll-up doors shall be 1.00 mm (20 gauge) galvanized steel, Standard springs 25,000 cycles, Styles 1.60 mm (16 gauge) min, Weather-stripping bottom and jambs, All gears, hardware, etc shall be made of steel. Chain hoist operator, and heavy-duty hasp at each door with padlock keyed to Brigade master key system.

3.10.7 Caulk all joints between masonry/plaster and metal window and doorframes and metal sills and metal window frames to prevent the passage of wind and water. Material shall be a 100% silicone, white or clear, applied with a caulking gun, if painting is not required. Where caulk is to be painted, siliconized acrylic or siliconized acrylic latex shall be used. Surfaces must be clean, dry, and free of dirt. Caulking bead should be 6mm. Smooth to produce a concave filet between the adjoining 90-degree angle surfaces. Allow to cure 2-4 days before painting.

3.10.8 HARDWARE. All finish hardware in this project shall be consistent throughout and shall be a brushed stainless steel #4 or satin-chrome finish. Provide hardware schedule for approval by USACE Engineering.

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Hinges: Exterior hinges shall have non-removable pins and be satin-chrome steel or stainless steel; Grade 1 anti-friction or ball bearing; and 3 each of 115 mm x 115 mm per leaf up to 900 mm wide door and 125 mm x 125 mm for doors 900 mm to 1.200 mm wide. Interior hinges shall be Grade 1 and anti-friction or ball bearing; and 3 each of 115 mm x 115 mm per leaf up to 900 mm wide door and 125 mm x 125 mm for doors 900 mm to 1200mm wide. Hinges for labeled fire doors must be either steel or stainless steel. Hinges shall conform to ANSI/BHMA A156.1 and A156.7. Locksets, Latchets, Exit Devices, and Push and Pull Plates: Exterior doors shall have mortise locks conforming to ANSI/BHMA A156.13 for metal doors. Emergency exit devices shall be Grade 1, flush mounted type. Interior doors shall have mortise locksets conforming to ANSI/BHMA A156.13, Series1000, Grade 1. All locks and latchsets shall be the product of the same manufacturer. Locksets, padlocks and latchsets shall be provided, as required, with lever handles on each side. Provide heavy duty hasp and locks at all fuel storage tanks.

Cylinders: Lock cylinders shall comply with BHMA A156.5. Lock cylinder shall have six pins. Cylinders shall have key removable type cores. All locksets, exit devices, and padlocks shall accept same interchangeable cores. Closers: Closers shall be provided on all exterior doors and fire-rated doors. Closers shall conform to ANSI/BHMA A156.4, Grade 1. Closers shall be surface-mounted, modern type, and with cover. Thresholds: All exterior doors (except Mech/Elect rooms) shall be provided with aluminum thresholds conforming to ANSI/BHMA A156.21. Doors at ceramic tile flooring shall be provided with marble thresholds and set marble threshold 13 mm above tile at all wet areas.

Kick Plates and Mop Plates: Metal Kick plates or mop plates shall be provided on all wood doors. Match metal finish with door hardware finish as specified in this section. Kick plates and mop plates shall comply with ANSI/BHMA A156.6, shall be 400 mm high by 50 mm less than the width of the door. Edges shall be beveled.

Door Stops: Doorstops shall be provided on all exterior and interior doors. Doorstops shall comply with ANSI/BHMA A156.16 and shall be satin chrome on bronze, Grade 1.

All hardware required for exiting, etc. shall be per Codes for exiting and shall comply with ANSI/BHMA and finishes shall match hardware specified above.

All submittals/shop drawings referring to keys and keying shall be submitted to AED Engineering for evaluation. A key cabinet shall be provided with a capacity of 50% greater than the number of key changes used for door locks. Location of Key cabinet shall as directed by Contracting Officer. Lock cylinder shall have not less than six (6) pins "Small Format Interchangeable Core (SFIC)" manufactured by Best Lock Company or equal. A grand master keying system shall be provided from the factory. Locks shall be keyed in sets or subsets based on building groups as indicated in Section 01010 and submitted to for evaluation to engineering. Keys shall be supplied as follows:

Locks: 3 change keys each lock
Master keyed sets: 3 keys each set
Grand Master keys: 10 total

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3.10.9 CHAIN LINK FENCE

3, 10.9.1 Chain link shall be 2400 millimeters above finish grade and aligned at top of chain link with peak of concrete cap on stone wall. Provided with 'V' extension arms at top of posts with 3 strands of barbed wire at each side, top of concertina wire at 3000 mm minimum above finish grade (AFG). All chain link type fencing as shown in the drawings and RFP shall be: Fence fabric shall be galvanized chain link with galvanized framework, 9-gauge thick wire woven in 50x50 mm mesh and shall be twisted and barbed on the top selvage and knuckled on the bottom selvage. Provide details and elevations of fence indicating how fence will transition from level to slope and over ridges.

3.10.9.2 Clips and top rail will not be used. Fence fabric will be installed no higher than 50 mm from the ground. Supporting arms will be securely anchored with rivets to the line posts. Fences shall have a bottom rail bolted to double rail ends and double rail ends shall be securely fastened to the posts. Bolts shall be peened to prevent easy removal. Bottom rail shall be installed before chain link fabric. Posts will be limited to ASTM F 1083, (1993) Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded and PVC coated for Fence Structures Group IA or Group IC steel pipe only. The fence shall be provided with the cable system shown on the attached figures. Cable shall conform to ASTM A 475, 19.05 mm (3/4-inch), extra high strength, Class A zinc coating. Turnbuckles, for the cable, shall conform to ASTM F 1145, 31.8 mm x 610 mm (1-1/4 inch x 24 inches) Type I, galvanized. Clamps shall be of equal or greater strength than the shear strength of the cable. All cable accessories shall be galvanized. Placement of cables will be at 760 mm and 890 mm above finish grade, measured to the centerline of the cables. Place the cable between the fence fabric and the line posts with U-bolts as shown. Reduce the slack by anchoring and tightening the cable so that it will not move along or slide through the U-bolts. Cable connections shall be of equal or greater strength than the shear strength of the cable. Dead man spacing shall be as shown on drawings. The next dead man shall start two fence panels back, overlapping the previous cable run, to cover the gap of the last dead man and to eliminate the need for pipe guards at those locations.

Provide chain link fence and gates around entire water facility on CE School Facility; see fence Section 01015 paragraph 3.10.10 Chain Link Fence.

3.11 FINISHES

3.11.1 The exterior of all buildings shall be plaster over CMU or concrete. Install new plaster in 2 coats which shall have color integral with the finish. The first coat shall be a scratch coat approximately 1 cm thick. Allow 7 days to cure. The second coat shall be finish plaster, smooth finish, approximately 1 cm thick. Allow 7 days to cure before painting.

3.11.2 Interior walls shall be plaster applied in a similar manner as exterior plaster but paint with 2 coats of semi-gloss off-white with less than .06% lead by weight.

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3.11.3 Ceilings of all buildings shall be plaster applied in 2 coats over metal lath, which is to be stapled to the steel supports. Paint ceiling with 2 coats of flat white, with less than .06% lead by weight. Gypsum board may be used in lieu of plaster but framing supports for Gypsum board shall be as follows: For ½" thick gypsum board structural fastener supports shall be not further apart than 40 cm. If gypsum board is thicker, follow guidelines in ASTM C 840 for supports and fastener frequency.

3.11.4 Ceilings of Dining Facility shall be painted with 2 coats of gloss white, with less than .06% lead by weight.

3.11.5 Paint all doors and frames with 2 coats of semi-gloss enamel, off white.

3.11.6 Floors shall be 300 mm x 300 mm terrazzo tile with thin set mortar. Joints shall be 2-3mm. Waterproof tan grout shall be applied to the full depth of the tile. Floors shall slope to floor drains. Color of tile shall be included in the Color Board Submittal provided by the Contractor.

3.11.7 Walls in wet areas shall be tiled with 150 mm x 150 mm glazed ceramic tile up to 2 meters above the floor to include interior of toilet stalls, showers and behind sinks. Joints shall be 2-3 mm. Waterproof gray grout shall be applied full depth of the tile. Grout shall cure for 72 hours and then be sealed with a commercial grout sealant in two coats. Color of tile shall be included in the Color Board Submittal provided by the Contractor.

3.11.8 The ablution drain areas shall be recessed below the floor level 200 mm and lined with ceramic tile. Ceramic tile shall extend up the wall past the water spigots to a height of 2 meters above the finished floor. Seats shall be formed concrete with terrazzo tile, finish to match the floor, 300 mm x 300 mm x 300 mm high-finished dimensions. Color of ceramic tile shall be selected by the Contracting Officer from samples provided by the Contractor. Spacing between tiles shall be similar to terrazzo tile.

3.11.9 All floors in utility rooms, storage rooms, warehouses, garages, and utility buildings shall be completely cleaned and the concrete sealed with a clear concrete sealer.

3.11.10 Marble window sills, 25 mm one piece marble window sills shall be installed on the exterior of all windows. The marble window sills shall have a overhang of 30 mm. Marble sills shall extend from side to side of the masonry opening in a single piece. Extend the marble windowsill a minimum of 10 cm 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.

3.11.11. Chalk Boards: Provide porcelain on metal 4' X 8' Black Chalkboard on wall across entire wall at the front of each class of 7 classrooms. Chalkboards shall have aluminum frame with map rail and full length tray.

3.12 SPECIALTIES

3.12.1 Mirrors, .6 m x .9 m, 6 mm plate glass, shall be mounted above all

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lavatories. Mount bottom of mirrors 1.1 m above the finished floor.

3.12.2 Toilet paper holders, stainless steel, shall be installed in all Toilet stalls. Toilet paper holders, stainless steel, shall be installed approximately 20 cm above the floor.

3.12.3 Robe Hooks shall be provided and installed in all toilet and shower stalls.

3.12.4 Shower curtain rods, stainless steel, heavy duty, 18 gauge shall be mounted between the screens walls of each shower stall. Mount rod at 2 meters above the finished floor. Provide a shower curtain with support rings for each shower stall.

4. STRUCTURAL

4.1 GENERAL

Most of the facilities will be single-story construction. The single-story buildings will be constructed using CMU (concrete masonry units) load bearing walls with steel beams supporting the roofing system. Several new facilities will be constructed using pre-engineered metal building systems with metal roof deck and siding and with reinforced CMU exterior masonry walls. The ground floor slab shall be minimum 150 mm thick reinforced concrete. Slab shall be placed on clean vapor barrier over 150 mm thick capillary water barrier on compacted soil.

4.2 DESIGN LOADS

The facilities shall be designed by using service gravity loads and considering basic combinations of appropriate service loads, wind and seismic.

Basic wind speed, using 3-second gust, of 66 Knots (122 Kph) with Exposure Category C and Importance Factor of 1.0.

4.2.4 Seismic Loads

The computations of seismic loads shall be based on International Building Code using Spectral Ordinates $S_s = 1.65g$ & $S_1 = 0.75g$.

4.3 CRACK CONTROL

The work shall include crack control measures to minimize cracks in slab-on-grade, concrete construction, such as crack control joints, expansion joints and isolation joints, as necessary. Expansion joints and control joints shall be determined and shown on the drawings.

4.4 NOT USED

4.5 DESIGN CRITERIA

The Contractor shall be familiar with codes/standards. the use of American codes/standards, etc., to include but not be limited to:

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Minimum Design loads	ANSI/ASCE 7-1995.
Concrete	American Conc. Institute (ACI) 318-99
Structural Steel	AISC MANUAL, 9 th Edition
Masonry	Technical Manual, TM5-809-3 (working stress)
Seismic	IBC-2003, Seismic Design for Buildings.
Bunkers	ARMY STANDARDS MAGAZINE STD

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ARMY: AR 385-64 / DA

PAM 385-64

4.6 MATERIALS

The followings are few typical American Standards. The Contractor should use these standards to provide sound structural integrity. The Contractor shall follow American Concrete Institute Standards for design and installation of all concrete structures.

Concrete	280.0 kg./sq.cm cylinder strength @ 28 days.
Steel Reinforcing	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 Control).
	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 Reinforcements: Standard 9 gauge minimum Ladder Type
Structural Steel.	ASTM A36: 2530.0 kg./sq.cm (Fy = 36,000psi)
	Welding: AWS (American Welding Society) D1.1-2002.

4.7 FOUNDATIONS

The foundations and stem walls shall be constructed by using reinforced concrete materials. The foundations shall be strip-footing type for continuous walls and spread type for individual column footings and shall be reinforced as required per design. Minimum strip footing width shall be 80 cm and minimum depth shall be 80 cm to meet frost requirement. The allowable bearing pressure shall be determined by the Contractor and be put in accordance with the Contractor's Geotechnical Investigation.

5. GEOTECHNICAL

5.1 Site Specific Information.

Site specific geotechnical information necessary to design and construct the

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foundations, pavements and other geotechnically related items contained in this project shall be the Contractor's responsibility. The Contractor shall determine all necessary geotechnical conditions by appropriate field and laboratory investigations and supporting calculations.

5.2 Geotechnical Report.

The Contractor shall produce a detailed geotechnical report containing field exploration and testing results, laboratory testing results, evaluations, recommendations, calculations and descriptive supporting text. Information in the report shall include, but not limited to: existing geotechnical (e.g. surface and subsurface) conditions, location of subsurface exploration logs, exploration point, foundations selected, bearing capacity, pavement design criteria (e.g. CBR values, K values), ground-water levels, and construction materials (e.g. concrete cement, asphalt, and aggregates). Two copies of the detailed geotechnical report shall be submitted to the Contracting Officer.

5.3 Geotechnical Qualifications.

A geotechnical engineer or geotechnical firm responsible to the Contractor shall develop all geotechnical engineering design parameters. The geotechnical engineer or geotechnical firm shall be qualified by: education in geotechnical engineering; professional registration; and a minimum of ten (10) years of experience in geotechnical engineering design.

5.4 Design Certification.

The Contractor shall certify in writing that the design of the project has been developed consistent with the site-specific geotechnical conditions. The certification shall be stamped by the geotechnical engineer of the geotechnical firm and shall be submitted with the final design.

6. MECHANICAL

6.1 SCOPE OF WORK

6.1.1 General

The Contractor shall design, supply, fabricate and install new ventilation and heating systems and special mechanical systems in the facilities identified in Section 1010 Scope of Work and as described herein. Heating, Ventilation, and Air-Conditioning (HVAC) requirements for typical facilities are described hereinafter in paragraph 6.0 Mechanical. The contractor shall be responsible for complete design and construction of all HVAC and special mechanical systems required in the Generator Plant, Water Storage and other facility or structures required as part of this contract.

The work also includes the delivery to site, erection, setting to work, adjusting, testing and balancing, and handing over in full operating conditions all of the ventilation equipment and associated mechanical works. All mechanical/electrical controls accessible by the general public shall be lockable and tamper proof.

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Contractor shall ensure that all mechanical equipment is sited outside of flood planes and not subject to damage from run-off, floods, debris, etc.

6.1.2 Sub-Contractors Qualifications

The ventilating and heating works shall be executed by a specialist sub-contractor experienced in the design and construction of these types of systems.

6.1.3 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.

6.2 CODES, STANDARDS AND REGULATIONS

The design and installation of equipment, materials and works covered under the mechanical, heating, ventilation, and air-conditioning services shall conform to the following standards, codes and regulations as applicable except where otherwise indicated under particular clause. The publications to be taken into consideration shall be those of the most recent editions. Standards other than those mentioned-above 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 to the Contracting Officer for approval.

IBC - International Building Code

IMC - International Mechanical Code

NFPA - National Fire Protection Association Including the following:

NFPA 31 - Standard for the Installation of Oil Burning Equipment (see annex D for diesel-fuel adaptation)

NFPA 54 - National Fuel Gas Code

NFPA 58 - Liquefied Petroleum Gas Code

NFPA 86 - Standard for Ovens and Furnaces

NFPA 92A - Recommended Practice for Smoke-Control Systems.

NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations

NFPA 97 - Standard Glossary of Terms Relating to Chimneys, Vents, and Heat Producing Appliances

NFPA 204 - Standard for Smoke and Heat Venting

NFPA 211 - Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning

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Appliances

ASHRAE - American Society of Heating, Refrigeration and Air-Conditioning Engineers Including the following: ASHRAE 62, ASHRAE 154

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

ARI - Air-Conditioning and Refrigeration Institute

ASME - American Society of Mechanical Engineers

ASTM - American Society for Testing and Materials

AWS - American Welding Society

SMACNA - Sheet Metal and Air Conditioning Contractors' National Association

ACGIH - American Conference of Governmental Industrial Hygienists

6.2.1 Heating & Cooling of all habitable areas (offices, barracks, DFAC, clinic, repair shops, training bldg. etc.) shall be by an integrated, diesel-fired furnace & evaporative cooler Unit, as shown in the SOW Sect. 4.2 c. The installed heat output shall be a minimum of 0.15 tkW/m² (0.20 for DFAC) of floor area. Evaporative Cooling shall be at a minimum rate of 20 m³/h (25 for DEFAC) outside air flow / m² floor area.

Contractor will install galvanized steel ducts for supply warm/cool air distribution to all areas of the building. Return air (for heating) will be thru the building and door louvers for closed off rooms. Maximum duct air velocity is 6.0 m/s (1180 fpm). See concept drawing "ANA HEAT-COOL DESIGN-02" dated 10 Dec 06.

Design Criteria: Insulated walls of R = 3.5 m²-°C/watt, Roofs of R = 5.5 m²-°C/watt: Average 3 m² floor / person: Winter heating 25% outside air, Summer cooling 100% outside air. Winter outside air ventilation is 15 m³/h/person (20 for defac) which is 5 m³/h/m² floor (6.7 for defac) : Summer outside air ventilation (cooling) is 60 m³/h/person (80 for defac) which is 20 m³/h/m² floor (27 for defac).
Conversion factors: Btu/h = 3413 * tkW. CFM = 0.589 - m³/h. R(h-sf-°F/Btu) = 5.68 * R(m²-°C/watt)

6.2.2 Noise Levels

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

6.2.3 NOT USED

6.2.4 Ventilation Standards

Mechanical/Electrical Rooms: Mechanical ventilation sufficient to limit space temperature and to remove heat given out by operating equipment.

Maintenance shops and similar spaces that use solvents and oils shall be

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provided with mechanical exhaust air systems. 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 125 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.

6.2.5 Air Intakes

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.

6.3 EQUIPMENT

6.3.1 Filtration

6.3.1.1 Outside Air Intakes. All outside air intakes shall be through weatherproof louvers with a bird screen. Wall intakes and roof hoods shall have 50 mm thick permanent washable metal mesh type filters as first stage for filtration of dust.

6.3.1.2 Medium efficiency (30 percent, as defined by ASHRAE 52 Dust Spot Efficiency Criteria) filters, the 50 mm (2-inch) thick disposable panel type, shall be the second stage of filtration.

6.3.1.3 High efficiency (80-85 percent, as defined by ASHRAE 52 Dust Spot Efficiency Criteria) filters, 300 mm (12-inch) deep cell type, shall be provided as the final stage of filtration in special maintenance and inspection operations, food preparation, health care facilities, electronic facilities and corrosion control facilities.

6.3.2 Ventilation and Exhaust Fans

All fans used for ventilation and pressurization shall be selected for required performance and for minimum noise level. Unit-mounted supply and exhaust fans shall be centrifugal forward curved, or airfoil fans with non-overloading characteristics of high efficiency and quiet running design. The fans shall be heavy-duty type with durable construction and proven performance in arid and dusty desert environment. Each exhaust fan shall be provided with gravity dampers and shall be complete with vibration isolators, external lubricators, accessories and controls necessary for specified sequence of operation.

6.3.3 Refrigeration System. Only used for listed buildings. All other buildings are cooled by evaporative-cooling modules, which are a part of the diesel fired heating system. Direct Expansion (DX) air-cooled condensing unit shall be located outdoors and mounted slab-on-grade or on the roof. Grade mounted equipment shall be protected from the wind-blown sand by a 1-meter high enclosure walls or by mounting condensing unit using 1-meter high elevated steel support platform. Each unit shall consist of weatherproof

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casing, compressor(s), condenser coil, condenser fans, motor and appurtenances. Compressor shall be of the hermetic or semi-hermetic reciprocating type. Refrigeration system shall be connected to the refrigeration circuit of the split system air-conditioning unit.

6.3.4 AIR CONDITIONING EQUIPMENT

Environmental (heat, cool, ventilation) control of the facilities shall be achieved by HVAC equipment as specified in the SOW ,4.2.

6.3.4.1 If specifically required, Unitary (ductless split) DX Air Conditioning Units

Ductless split units shall be unitary in design and factory manufactured and ready for installation. Provide two indoor units with a single condensing unit for each housing module. Evaporator unit shall consist of a DX evaporator cooling coil, blower, electric heater and washable filter, all mounted in a housing finished for exposed installation. Cooling coil condensate piping shall route to and discharge to the sanitary sewer system. The condensing unit will contain compressor, condenser coil, and all internal controls/fittings complete to include a weatherized housing constructed and mounted on a 300 mm high steel stand on roof on the upper module. Copper refrigerant suction and liquid piping shall be sized, insulated and installed in accordance to unit manufacture recommendations. Unit temperature control shall include wall-mounted adjustable thermostat, blower on-off-auto switch and heating-cooling change over control.

6.3.4.2 Packaged Terminal Air Conditioners

Packaged Terminal Air Conditioners, if specifically required, shall be self-contained thru-the-wall type unit consisting of a completely self-contained, electrically operated unit, equipped with a factory assembled refrigeration system. The units shall consist of compressor, condenser, evaporator fans, motors, evaporator, heating and condenser coils/sections and all necessary appurtenances. The unit shall be provided with a steel/metal sleeve which can be permanently installed within the wall opening. The chassis of the unit shall be easily removable from the shell from inside the conditioned space. Adequate condenser air shall enter louvered openings. Provision of fresh air shall discharge through movable louvers. These units shall be mounted high on the wall to prevent infiltration of ground dust and in locations so as not to impede flow and function of the module.

6.3.5 Heating & Cooling of all habitable buildings, unless noted otherwise.

Heating & Cooling shall be as indicated in the SOW, 4.2.c. This consists of diesel-fired heater; evaporative-cooler; blower, filter, damper module (AHU), all mounted in a single Unit, and using a common supply and return ducts. See concept drawing "ANA HEAT-COOL DESIGN-02, dated 10 Dec 06.

Oil-fired, Fuel-Oil fired, or Diesel-fired stoves shall be in compliance with NFPA 31, NFPA 86, NFPA 92A, and NFPA 204.

6.3.6 Ductwork

Air shall be distributed from Heat-Cool Unit (Dwg. "ANA HEAT-COOL DESIGN-02")

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to achieve proper airflow throughout the facility by means of air distribution ductwork. Air distribution system shall be comprised of ductwork, fittings, grilles, registers, and/or diffusers. Ductwork shall be constructed of galvanized steel or aluminum sheets and installed as per SMACNA "HVAC Duct Construction Standards (Metal and Flexible)." Flexible non-metallic duct may be used for final unit/diffuser connection in ceiling plenums. These flexible duct run-outs shall be limited to 3 meters in length. Duct insulation shall be provided for all supply ductwork and for return ductwork not located within the conditioned area i.e. outdoors.

6.3.7 Duct Insulation

In general, interior ducts shall be exposed to the rooms and will not be insulated. The heat lost or gained from the un-insulated ducts shall be considered as part of the heating or cooling of the conditioned space.

6.3.8 Diffusers, registers and grilles shall be factory fabricated of steel or aluminum and distribute the specified air quantity evenly over the space intended. The devices shall be round, half round, square, rectangular, linear, or with perforated face as determined by the design. Units will be mounted in ceilings, high sidewalls, or directly to ductwork and shall be sized for the airflow to be delivered with a maximum NC rating of 35. Pressure loss through the diffuser shall be considered in sizing the duct system and the system static pressure calculations.

6.3.9 Branch Take-offs

Air extractors or 45° entry corners shall be provided at all branch duct take-offs. Manual volume control dampers shall be included at the branch duct take-offs as shown and where required to facilitate air balancing.

6.3.10 Wall Penetrations

Building wall penetrations shall be carefully made so as not to deteriorate the structural integrity of the wall system.

6.3.11 Control Wiring and Protection Devices

Control wiring and protection devices shall be the manufacturer's standard, pre-wired, and installed at the factory. Operation of the control system shall be manufacturer's standard configured for 220V/50Hz or 24V operation.

6.3.12 Thermostats

All thermostats shall be located near the return grilles and mounted 1.5 meters above the floor and shall be easily accessible. In lieu of a thermostat, a temperature sensor may be located in the room and connected to the control thermostat near the unit. Thermostats located inside occupied areas shall be provided with lockable covers.

6.3.13 Electric Motors

All HVAC motors shall be Totally Enclosed Fan Cooled (TEFC) type and rated

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for minimum 40 C ambient.

6.3.14 Outdoor Equipment

Screen walls or elevated platforms shall be provided for protection of outdoor HVAC equipment from wind-blown sand and debris.

6.4. HVAC SYSTEMS REQUIREMENTS

6.4.1 Power Plant, Wastewater Treatment Plant and Water Pump/Treatment Facility.

6.4.1.1 General

Air-conditioning HVAC shall be provided for personnel comfort where noted.

6.4.1.4 Special Mechanical Systems

6.4.1.4.1 Water Pump/Treatment Plant. Refer to Civil section for requirements and provide heating, cooling and ventilation as required for process control, safety and personnel comfort.

6.4.1.4.2 NOT USED

6.4.1.4.3 Exhaust Ventilation: Provide wall or roof mounted centrifugal exhaust fan(s) with explosion-proof construction with coated-metal ductwork suitable for corrosive fumes. Provide air intakes with washable louvers. Provide exhaust registers near ceiling and within 150 mm of the floor elevation.

6.4.1.4.4 Classrooms

Contractor shall design the electrical load for lighting, ceiling fans, and equipment. Heating and cooling shall be by Heat-Cool Units (diesel-heater and evaporative-cooler).

6.4.1.4.5 Headquarters Building

Provide HVAC in communications building. Toilet and all other areas: Provide 52-inch ceiling fans in offices and conference room(s). Provide exhaust ventilation in Toilets and generator room. Provide air intakes with washable filters and operable dampers for ventilation and exhaust make-up.

6.4.1.4.6 Heating Barracks, All Types

Provide Heat-Cool Unit (diesel-heater and evaporative-cooler) with interior air ducting to all rooms and open spaces. Install 52-inch ceiling fans for air circulation.

6.5 TESTING AND COMMISSIONING

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6.5.1 General

After completing the work, but prior to building acceptance, the Contractor shall demonstrate that the ventilation systems are adjusted and operated correctly 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 cut-outs and other protective devices to demonstrate safe operation. A description of all equipment or systems to be tested and balanced, including the test procedures, must be submitted prior to the scheduled testing that will be witnessed by the Government. All such tests shall be carried out in the presence of the Contracting Officer or representative and fully-written records of the test data and final settings, shall be submitted to the Contracting Officer.

6.5.2 The following tests data shall be submitted in a tabulated form:

- a. Date and time of the test.
- b. Outdoor DB and WB temperature.
- c. Indoor Room Conditions: DB and WB temperatures and supply return and exhaust airflow.
- d. Air Handling Equipment: Air quantities shall be measured by an anemometer.

6.5.3 Following readings shall be recorded:

- a. Supply, return and outside air CMH (CFM) supplied by each air handling system.
- b. Total CMH (CFM) exhausted by each fan.
- c. Motor speed, fan speed. (4) Input amperes and power input (KW) for each fan.

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, waste-oil collection and storage and fuel-oil storage and distribution systems required in the facilities identified in Section 1010 Scope of Work and as described herein. The Contractor shall be also responsible for complete design and construction of all domestic and

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special plumbing systems required for CE School and Range Facilities.

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.

Contractor shall ensure that all plumbing equipment is sited outside of flood planes and not subject to damage from run-off, floods, debris, etc. Pipe runs crossings of creeks, rivers, streams, etc shall be sufficiently protected from physical damage, water ingress, etc.

7.1.2 Sub-Contractors 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 a 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 the 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.

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 and hot water 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 a mechanical, toilet, storage,

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or similar type space. 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. All pipe shall be installed below the frost line or 800 mm minimum.

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:

- a. Eastern Water Closet (P-1) with flush tank assembly. Enameled cast iron, recessed floor mounted. Provide a cold water spigot 300 mm above the finished floor on the right (from a perspective of standing inside of the cubicle and looking out) sidewall of the cubicle.
- b. Western Water Closet (P-1A) with flush tank assembly as specified by the designer. Vitreous china floor mounted, elongated bowl type. Provide at least one (1) western type water closet in Dining Facility, Power Plant, Corps Brigade, and Garrison HQ Buildings.
- c. Lavatories (P-3). Enameled cast iron, wall or counter mounted. Brass fittings provided for water supplies. To be used in American or Afghan/American mixed facilities only.
- d. Janitor's Sink (P-4). Floor mount janitor, enameled cast iron with copper alloy rim guard. Provide hot and cold water valves with manual mixing. Faucet handles shall be copper alloy.
- e. Shower (P-5). Showerhead and faucet handles shall be copper alloy. Provide for manual mixing with hot and cold water valves. In addition to a shower head, provide each shower stall with a threaded faucet approximately 1.2 m AFF with hot and cold-water controls, mixing valve and a diverter type valve so water can be directed to either the shower or to the lower faucet. Shower shall be provided with low flow shower head. Provide each lower faucet with a 1.5 m long flexible, reinforced vinyl hose with nozzle and hangar to hold the nozzle end off floor.

The adequacy of water supply piping design will be based on the following:

International Plumbing Code, 2003: Water Supply Fixture Units (wsfu)

Dwg. Sym.	Plumbing Fixture	Cold	Hot	Total
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P-1	WC Eastern, Tank	5.0	-	5.0	
P-1A	WC Western, Tank	5.0	-	5.0	
P-3	Lavatory, Public	1.5	1.5	2.0	
P-4	Janitor's Sink		2.3	2.0	3.0
P-5	Shower, Public	3.0	3.0	4.0	

Water flow rates are calculated from curve-fitting formulas:

If $sfu > 2 < 250$ then $Q(m^3/h) = (sfu)^{0.56} * 0.76 + 0.5$
 If $sfu > 251 < 5000$ then $Q(m^3/h) = (sfu)^{0.61} * 0.8 - 6.4$
 If $sfu > 5001 < 10,000$ then $Q(m^3/h) = (sfu)^{0.56}$

Water flow velocity range is 0.5 to 2.4 m/s

Pipe I.D. Diameter (mm) = $(354 * Q(m^3/h) / V(m/s))^{0.5}$

f. Ablution Trench. See building floor plans for size and construction of trench and number of stations. Provide trench drain with brass grating and strainer. Provide each station with hot and cold water valves with manual mixing. Faucet handles shall be copper alloy.

g. Floor or Shower Drain (FD-A). Cast iron construction, and adjustable perforated or slotted chromium plated bronze, nickel-bronze, or nickel brass strainer consisting of a grate and threaded collar. Toilet room floor drains are similar except are provided with built-in, solid, hinged grate.

h. Room hose bibs and floor drains shall be provided as required. Provide clean-up spray nozzle with hose assembly in all eastern toilets, shower rooms, each ablution faucet.

i. Drinking Water Fountain: Non-refrigerated fountain with enamel cast iron or corrosion resistant bowl with brass fittings and faucets.

j. Provide detail of P-Traps to be provided. Traps shall meet the requirements of PC Section 10022.4 Each fixture shall have a liquid seal not less than 51 mm and not more than 102 mm.

7.3.4 Hot Water

Hot water shall be provided for the facility to supply 49°C (120°F) hot water to fixtures and outlets requiring hot water. Hot water of a higher temperature shall be provided only where required for special use or process. Hot water piping shall be routed parallel to the building lines and concealed within finished rooms. All hot water piping shall be insulated. A hot water re-circulating pump shall be provided if hot water piping run exceeds 30 meters.

7.3.5 Hot Water Heaters

The hot water shall be generated by electric water heaters. The unit shall be

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typically located inside a mechanical room, storage room, toilet/janitor room or similar type of space. The unit shall be of the commercially available tank type having low or medium watt density electric heating elements. In cases where the pressure of the water coming into the tank will violate manufacturer recommendations, and pressure reducer shall be installed in the line before the water heater. Also, all water heaters shall be equipped with a blowoff valve that will empty into a nearby floor drain.

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. Drains shall be located near urinals or toilet partitions in toilet rooms. In mechanical rooms, floor drains shall be provided to avoid running drain piping long distances above or over the floor. A trench drain shall be provided for the DFAC Kitchen. 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.

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 piping. 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 SCOPE OF WORK

8.1.1 Fire protection for these buildings will be limited to Architectural features such as providing adequate means of egress. Provide rated exit corridors, doors, and hardware per IBC and all other requirements developed in the Design Analysis.

8.1.2 Exit doors shall be 90 cm wide providing a minimum clear opening of 82 cm. The egress path to each exit door shall be maintained clear and unobstructed. Exit signs shall be in the language most understood in the area.

8.1.3 Drawings: There are no separate Fire Protection Drawings. See Architectural drawings.

8.1.4 Sprinkler protection is not provided due to the extreme shortage of

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water in this region.

8.2 DESIGN CRITERIA

The requirements of the following codes shall be followed as for the installation of equipment, materials and works covered for Fire Protection.

IBC - International Building Code

NFPA - National Fire Protection Association

9. ELECTRICAL

9.1 SCOPE OF WORK

9.1.1 General. Contractor shall design and construct: (a) Primary Power Distribution System, (b) Interior Secondary Distribution System, (c) Lighting and power branch circuitry, (d) Premise telephone and network/data wiring, and (e) Interior Fire Detection and Alarm System. All of the systems shall be designed for the ultimate demand loads plus 20% spare capacity.

Contractor shall ensure that all electrical equipment is sited outside of flood planes and not subject to damage from run-off, floods, debris, etc. Electrical cable crossings of creeks, rivers, streams, etc shall be sufficiently protected from physical damage, water ingress, etc.

9.1.3 All equipment shall be tested, commissioned, and operational at time of turn-over to the Government. All final connections shall be made to provide a fully functional system. Contractor shall provide all necessary operating instructions, commissioning reports, spare parts, and related items at time of turn-over.

9.2 DESIGN CRITERIA

9.2.1 Applicable Standards

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

ANSI/TIA/EIA-942 Telecommunications Infrastructure Standard for Data Centers

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

ETL 1110-3-412 Transformer Application Guide

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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 (2003)

IMC - International Mechanical Code

IPC - International Plumbing Code

IEEE C2 National Electrical Safety Code (NESC)

IEEE C57.12.22

IEEE C57.12.28 - IEEE Standard for Pad-Mounted Equipment—Enclosure Integrity

IEEE C57.12.34-2004 - Errata to IEEE Standard Requirements for Pad-Mounted, Compartmental-Type, Self-Cooled, Three-phase Distribution Transformers (2500 kVA and Smaller)- High-Voltage: 34 500 GrdY/19 920 Volts and Below; Low Voltage: 480 Volts and Below

IEEE C57.12.80-2002 - IEEE Standard Terminology for Power and Distribution Transformers

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 81-1983

IEEE Std 81.2-1991

IEEE 100

IEEE 241 - 1990

IEEE 242 - 2001

IEEE standard 400-1991

IEEE standard 519-1992

IEEE standard 1100, Powering and Grounding Electronic Equipment (aka Emerald Book)

IESNA Lighting Handbook

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

MIL-HDBK-1003/11 Diesel-Electric Generating Plants

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MIL-HDBK-1004/21 Power Distribution Systems

MIL-HDBK-1012/3

NFPA 10, Portable Fire Extinguishers

NFPA 70, National Electrical Code

NFPA 72, National Fire Alarm Code, 2002 edition

NFPA 101, Life Safety Code, 2003 edition

NFPA 780, Lightning Protection

TI 800-01 Design Criteria

TM 5-684 Facilities Engineering - Electrical Exterior Facilities

TM 5-688 Foreign Voltages and Frequencies Guide

TM 5-803-14 Site Planning and Design

TM 5-811-1 Design: Electrical Power Supply and Distribution

TM 5-811-3 Electrical Design: Lightning and Static Electricity Protection

UFC 1-200-01, Design: General Building Requirements, 31 July 2002

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

UFC 3-501-03N Electrical Engineering Preliminary Considerations

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 3-550-03N Power Distribution Systems

UFC 3-560-10N, O&M: Safety of Electrical Transmission and Distribution Systems

UFC 3-600-01: Fire Protection Engineering for Facilities

Underwriters' Laboratories (UL) Fire Protection Equipment Directory (2002).

USCINCCENT OPORD 97-1

UL 467 Grounding and Bonding Equipment

MIL-HDBK-1004/21 Power Distribution Systems

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9.2.2 Design shall be in metric units.

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, or DIN listed material, but the Contractor must prove equivalence and must provide the Government with a full copy of the relevant specification(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 Conditions: All equipment shall be rated and designed for 50 Degree Centigrade and elevation of 2,000 meters above sea level.

All medium voltage installations shall comply with the requirements of the National Electrical Safety Code (NESC, aka IEEE C2) and the National Electrical Code (NEC, aka NFPA 70), as well as appropriate UFCs and IEEE standards listed above.

9.3.4 Restrictions: Aluminum conductors shall not be used. Aluminum windings shall NOT be used in transformers.

Any references to 120/208/220/277/480 volt, 60Hz systems in any code or standard shall be interpreted as 220/380 volt, 50Hz systems, unless otherwise modified or directed in this RFP. References in the National Electrical Code to 120 or 125 volt receptacles shall be taken to mean 220v receptacles.

Transformers shall be pad-mounted, dead front type, as defined by NESC. Distribution lines (distribution system) shall be underground.

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9.4 DESIGN REQUIREMENTS

9.4.1 Power Plant

Connect to existing base power system. No new power plant or generators are required.

9.4.2 Site Primary & Secondary Power Distribution System

Primary (15kV 'Delta') and secondary power distribution shall be underground. Design and installation of primary and secondary power distribution systems shall be complete and in compliance with the requirements of the National Electrical Safety Code (ANSI/IEEE C2), UFC 3-550-03FA (also called Army TM 5-811-1), National Electrical Code (NFPA 70), and other electrical references listed in this RFP. Primary power distribution shall be complete, to include but not be limited to, fused cut-outs, arresters, terminals, cable guards, circuit breakers, transformers, and related items. All primary feeder taps shall be protected with fused cutouts. Long feeder runs shall be provided with sectionalizing devices, such as, in-line fuses, sectionalizer or recloser, as necessary. Minimum of 3 fuses, with appropriate rating, shall be provided as spares at each fused cut-out location.

Primary Distribution shall be installed in accordance with the NESC, UFC 3-550-03FA, and other applicable standards listed in this RFP.

9.4.2.1 Raceways

Exterior raceways (conduits) shall be installed at a slope towards a manhole or hand-hole to avoid collection of water in the raceway. Conduit shall be PVC, thin-wall for concrete encasement and hard-wall (Schedule 40) for direct burial. Direct buried conduit shall only be installed for street lighting circuits. Direct buried conduits shall be encased in concrete, when under paved areas or under road crossings. High voltage cables shall be installed in conduit no less than 100 mm (4 inch) in diameter. Secondary cable shall be installed in conduit no less than 50 mm (2 inch). Direct buried conduit shall be installed 800 mm (32 inch) below grade.

All underground conduits shall use long-sweeping elbows. All communications conduits shall use long-sweeping elbows.

9.4.3 Transformer Stations: Transformer stations shall be strategically located close to the loads. Dedicated transformer stations shall be provided for large loads. Transformers shall be Primary 'Delta' and Secondary 'Wye' connected. Primary side load-break disconnecting means shall be provided with all transformers. All transformers shall be sized for known projected demand loads, plus (+) 20% spare capacity for future growth. Transformers shall be dead-front, loop-feed, pad-mounted, compartmental, and self-cooled type. Transformers shall come complete from manufacturer; use of third-party transformer housings or add-on transformer housings shall not be permitted. Transformers shall have no exposed live components.

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Transformer selection, design, and installation shall be governed by NEC, NESC, ETL 1110-3-412, TM 5-684, UFC 4-510-01, UFC 3-550-03FA, UFC 3-550-03N, IEEE C57.12.28, ANSI/IEEE C57.12.22, IEEE C57.12.34, and C57.12.80.

9.4.5 Underground Conductors: All underground conductors shall meet the requirements of the codes and standards listed in this RFP, including but not limited to: NESC, NEC, UFC 3-550-03FA, and related.

9.4.6 Secondary Power Distribution System

Secondary Power shall be 380/220 volts, 3 phase, 4 wire, 50 Hz. Building secondary power distribution system shall include main distribution, lighting and power panels as required. All panel boards shall be circuit breaker 'bolt-on' type panels. In large buildings separate lighting and power panels shall be provided. It is recommended that minimum size circuit breaker be rated at 20 amperes. Circuit breakers shall be connected to bus bar(s) within the panel boards. Daisy chain (breaker-to-breaker) connection(s) shall not be acceptable. Indoor distribution panels and load centers shall be flush mounted in finished 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 # 12 AWG (4mm sq), recessed in finished areas and surface mounted in metal conduits in unfinished areas. All panels shall be provided with a minimum of 20% spare capacity for future load growth. Power receptacles (outlets) shall be duplex, 240 volts, 50 HZ, German (DIN) Standard. All splicing and terminations of wires shall be performed in a junction or device boxes. Proper wire nuts/connectors shall be used for splicing wire. No twist-wire connections with electrical tape wrapped around it shall be acceptable. All electrical installation shall be in accordance with the requirements of NFPA 70 (National Electric Code). Main Distribution Panel shall be provided with an ammeter, voltmeter and kilowatt-hour meter. Selector switch shall be provided for reading all 3 phases. All service entrance cables and equipment, such as main distribution panels etc., to the facilities shall be sized for the ultimate facility loads, to include any heating loads (infrared heating), initial and future provided by others.

9.4.6.1 Receptacles

General purpose receptacles shall be duplex, grounding (earthed) type, "flush" or "semi-flush" wall mounted type, color ivory and installed 500 mm above finished floor (AFF). In office or similar areas receptacles shall be provided at every 1.8 meter intervals (or closer). In maintenance buildings, 3-duplex receptacles (minimum) shall be provided at each vehicle maintenance bay. In storage buildings, receptacles shall be provided in 5 meter intervals (or closer). In communications rooms, receptacles shall be provided at 1 meter intervals or closer. In areas not otherwise listed, receptacles shall be spaced every 3-meters or closer. CEE Type receptacles with plugs 2P+E (240v) or 3P+E (380v) and with appropriate rating, shall be provided for, but not be limited to, washers, dryers, kitchen equipment and any other type of large plug-able equipment. Receptacle shall be complete to include box, cover plate and necessary screws/connectors and of the type most commonly used in Afghanistan. Receptacles near sinks or lavatories shall be switch operated

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and Ground Fault Circuit Interrupter (GFCI), or Residual Current Disconnect (RCD) type, with the trip setting of 30 milliampere or less.

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 1 meter (~3 feet) of sinks, lavatories, or wash-down areas shall be ground fault circuit interrupter (GFCI) type or Residual Current Disconnect (RCD) type, with the trip setting of 30 milliamperes or less.

Total number of duplex receptacles shall be limited to six (6) per 16- or 20-ampere circuit breaker.

9.4.6.2 Lighting

Light Fixtures: Lighting fixtures shall be a standard manufacturer's product. Fluorescent light fixtures shall be power factor corrected and equipped with standard magnetic ballast(s). All light fixtures shall be capable of receiving standard lamps used locally. Light fixtures shall be mounted at 2.7 meters, minimum, AFF. Fixtures may be pendant or ceiling mounted, depending on the ceiling height. Lighting levels for the areas for which no design has been provided shall be calculated for the values given below. All fixtures shall be fully factory wired.

General Office Space/Computer Rooms	40 FC (400 Lux)
Conference Rooms	30 FC (300 Lux)
Dining Rooms	70 FC (700 Lux)
Laundry Rooms	30 FC (300 Lux)
Bedrooms	30 FC (300 Lux)
Kitchen	70 FC (700 Lux)
Lobbies	15 FC (150 Lux)
Lounges	15 FC (150 Lux)
Mechanical & Electrical Equipment Rooms	20 FC (200 Lux)
Stairways	20 FC (200 Lux)
Toilets	20 FC (200 Lux)

9.4.6.2.1 High Ceilings

Contractor may provide high bay High Pressure Sodium (HPS) vapor light fixtures in facilities with high ceilings, provided that the replacement lamps for the fixtures are available locally.

9.4.6.2.2 Light Switch

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. Lighting contactors may be used to operate lighting in open or large bay areas. Rooms with multiple entrances shall have multi-way switches.

9.4.6.3 Dedicated Service

Contractor shall provide and install a dedicated 3-phase service for X-Ray machine in X-Ray Room of the Clinic. Service shall include a 3-pole, 40 ampere circuit breaker at 440V, 50 Hz, with a safety disconnect switch

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provided in the X-Ray Room. Final location of disconnect switch shall be coordinated with the Contracting Officer. Wiring shall be installed in conduit.

9.5 CONDUCTORS

All cable and wire conductors shall be copper. Conductor jacket or insulation shall be color coded to satisfy local utility requirements. Conductors shall be sized in accordance with this RFP and the listed codes and standards.

For interior wiring, 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.

9.6 GROUNDING AND BONDING

In general, grounding and bonding shall comply with the requirements of NFPA 70 and NFPA 780. 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. Ground resistance shall not exceed 25 ohms when measured more than 48 hours after rainfall using the fall of potential method outlined in IEEE 81.

9.6.1 Lightning Protection

Provide per the NEC and NFPA 780, as well as other applicable standards listed in this document.

9.7 ENCLOSURES

Enclosures for exterior applications shall be NEMA Type 4X (IEC Classification IP56) or better and for dry interior locations NEMA Type 1 (IEC Classification IP10) or better. For wet indoor locations, NEMA type 3S (IEC Classification IP54) or better shall be used.

9.8 FIRE DETECTION & ALARM SYSTEM

Per directions from the Host Nation, no Fire Detection and Alarm System shall be provided in the facilities to be used by the Host Nation's personnel. However, Fire Alarm System shall be provided, as described below, in the facilities to be used by the U.S. Personnel. In U.S. Barracks Fire Detection and Alarm System shall consist of hard-wired, multi-station smoke detectors, with building wide annunciation. No Fire Alarm System shall be provided in the Dining Facility. In addition to building wide fire alarm annunciation, the system shall also be capable of automatically transmitting the alarm signal via telephone lines to the local Base Fire Department / Fire Station. System design shall be in accordance with the requirements of NFPA 72. Fire alarm system shall be complete and a standard product of one manufacturer.

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9.9 TELEPHONE/COMPUTER NETWORK SYSTEM

Each Corps, Brigade, and Battalion HQ building office, room shall have telephone and computer data outlets. Telephone/data System shall include cross-connect boxes, duplex RJ-45 telephone outlets with a minimum of ~~two~~ 4 pair Category 5 Enhanced (CAT 5e) cable terminating at each outlet (jack) one for voice and one for data connectivity. The Contracting Officer Representative (COR) shall determine outlet locations for individual rooms. Telephone wiring shall be recessed in finished areas and surface mounted in metal conduits in unfinished areas. Two (2) appropriately sized empty conduits shall be provided from the cross connect box to the outside communication hand-hole. See paragraphs 10 thru 10.3.2 below for additional requirements for communications systems.

9.10 TELEVISION SYSTEM

Television System shall consist of television outlets and an empty metal conduit raceway system, to include necessary junction boxes and pull wire. The Contracting Officer shall determine outlet locations. Television monitors, coaxial cable any amplification devices shall be provided by others. One 2-inch (50 mm) conduit shall be provided from the television junction box to the outside communication hand-hole.

9.11 IDENTIFICATION NAMEPLATES

Major items of electrical equipment, such as the transformers, manholes, hand holes, panel boards and load centers, shall be provided with a permanently installed engraved identification nameplate.

9.12 SCHEDULES

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

9.13 SINGLE LINE DIAGRAM

Complete single line diagram shall be provided in every transformer distribution panel and in the Main Distribution Panel in each building. Single line diagram shall show all panels serviced from the transformer distribution panel and the MDP respectively.

10 Installation Communication Systems

This facility will receive telephone and data service from Camp ~~Morhead~~ (Commando) Base Communications Building which is the installation's center for telecommunications, switching, and automation networking (including internet service).

10.1 Not used.

10.2 Outside Plant Infrastructure

10.2.1 Conduit System

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Provide underground conduit system, 4-6 inches schedule 40 no load and 80 load or 6- inch ASTM equivalent from the communications room to each building (with 25% growth expansion).

10.2.2 Maintenance and Hand Holes

The Contractor shall provide reinforced concrete maintenance-holes with communications and number marked on the steel cover.

Manhole/Hand Hole systems shall have no more than 100 meters between access points.

10.2.3 Not Used.

10.3 Inside Plant Infrastructure

10.3.1 Inside Plant (ISP) Cables

Terminate distant end of the copper cables on 110 blocks in each user building Telecommunications Room.

Terminate distant end of the fiber optic cables on SC type connectors in each user building Telecommunications Room.

Install CAT5e UTP or better and RJ-45 blocks (1 voice and 1 data) per 100 square feet in each user building utilizing U.S. standards (EIA/TIA 569)

10.3.2 Telecommunications Room (TR): (A.K.A.: Telephone Closet)

The telecommunications room is a space or area in a user's building that is designed to provide secure, suitable environment for the installation of cable, telecommunications equipment, and termination and cross-connect facilities. The telecommunications room is the point where the base backbone cabling interfaces to the buildings horizontal cabling (copper and fiber optic cables).

The telecommunications room is a floor serving distribution facility for horizontal cabling. A telecommunications room is required for each floor if the building has multiple floors and each should be vertically aligned over each other connected with a minimum of two 4" riser conduits.

The telecommunications room must be dedicated to the telecommunications function and related support facilities. Equipment not related to the support of telecommunications such as piping, duct work, and distribution of building power must not be located in, or pass through the telecommunications room.

The telecommunications room must be equipped with adequate electrical power which is normally 20A protected branch circuits for equipment, non-switched 3-wire alternating current duplex outlets for equipment, and separate continence outlets for test equipment/tools. All outlets must be non-switched (outlet power must not be controlled by a wall switch which may lead to inadvertent loss of service).

The telecommunications room must be locked with controlled access.

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11. SPARE PARTS AND CONSUMABLES

The Contractor shall provide for all systems, based upon the spare parts list described in 1.32.2.2.j. of Section 01060, a supply of spare parts, equipment and consumables necessary to maintain operations throughout the performance period and conduct preventive maintenance and repair for a 6 month period beyond the contract performance period, to include those items required to perform testing and commissioning.

12. ATTACHMENTS

The following attachments form an integral part of the technical requirements:

Appendix A - ANA CE School/Ranges List of Facilities

A-0	Site Layout
A-1	School Headquarters Plan
A-2	4 Classroom Floor Plan
A-3	3 Classroom Floor Plan
A-4	Covered Pavilion Plan
A-5	Enlisted Barracks E-1 - E- 6
A-6	Barracks Cadre, NCO, and Officers
A-7	Explosive Storage Bunker
A-8	Blasting Fuse Bunker
A-9	Personnel Bunker
L-1	Camp Morehead Location Map
L-2	Camp Morehead Site Layout
R-1	Range 1 Training and Proficiency Range
R-2	Range 2 Demolition Area
S-1	Typical Bunker Plan and Section Example
S-2	Typical Bunker Plan and Elevation Example
HC-1	Heat Cool Unit Schematic

-- End of Section --

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SECTION 01010

SCOPE OF WORK

(This Section replaced In Its Entirety By Amendment No. 0004)

1. GENERAL

Design, develop and build a fully functional, Counter Explosives School (CE School), with all related support facilities located with-in the ANA Commando Complex site near Kabul, Afghanistan. Complete the Civil, Site, Architectural, Structural, Mechanical, and Electrical work requirements as listed in this Scope of Work to create a fully functioning Afghanistan National Army/Afghanistan National Police CE School. Contract work will include, but will not be limited to the following: Education/training facility, including external school grounds, Headquarters Office, Billeting quarters, Range #1 Training and support facilities, ~~Range # 2 Demolition Area~~, Road improvements in the CE School area, connectors to Range #1 ~~both ranges~~, and connection to Camp Morehead Roads and general site preparations, site improvements. The Contractor shall perform work that consists of topographic survey, master planning, any site demolition (still required), grading and compacted fill, design and construction of new buildings, solid waste transfer points, connection to new prime power plant and electrical distribution system, connection to new waste water treatment plant, and new sanitary sewer system, connection to existing water source (existing wells are in place). The Contractor shall perform a geotechnical investigation as defined in Section 01015. A site grading and drainage plan shall be prepared and approved prior to any construction. All utilities and utility connections shall be complete and operational prior to occupancy. 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. All work under this contract shall be completed in accordance with Table 1.1 (see below). This table provides completion durations after the Notice to Proceed (NTP). The work within this contract shall meet and be constructed in accordance with current U.S. design and building codes, safety and security standards. Design concept drawings are attached and a partial listing of references is included herein. Refer to map in Appendix A for approximate site location.

1.1 SITE SECURITY

The Contractor shall provide chain link fence around mobilization areas. Perimeter security for entire compound is currently under construction and is not part of this contract.

1.2 LOCATION

CE School Complex is located in the ANA Commando Complex in a valley between two mountains, near the village of Rish Khvoor, Afghanistan, on the outskirts of Kabul.

Approximate Grid Coordinates are: 34.526602° N

70.348428° E

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TABLE 1.1 CE SCHOOL FACILITY

CE SCHOOL FACILITY	COMPLETION TIME
2.1 Site Survey/Master Planning	60 days
2.2 Site Grading	365 days
2.3 Water Distributation System	365 days
2.4 Sewer Distributation System	365 days
2.5 Power Distributation System	365 days
2.6 CE School Road Network and Connector	365 days
2.7 Parking	365 days
2.8 HQ Office building	365 days
2.9 Classroom Buildings	365 days
2.10 Covered Pavilion	365 days
2.11 Student Living Quarters	365 days
2.12 Cadre Living Quarters	365 days
2.13 Range Number 1	365 days
2.14 Range Number 1 Road & Parking	365 days
2.15 Range Number 2	365 days
2.16 Range Number 2 Road & Parking	365 days
2.17 2.15 Solid Waste Storage	365 days

1.2 The master plan site drawing shall include layout of all items in RFP. The Contractor shall provide utility connections designed and sized for the future connection of any option items in this contract. The Contractor shall provide and connect to existing adjacent compound as required water line, sewer line, electrical conduit, and communications conduit.

1.3 Design Documents including Drawings, Design Analysis, and Specifications shall be completed to 100% for all buildings including any options.

1.4 Work shall be executed in accordance with the Technical Requirements in Section 01015, and all solicitation requirements and the attached schematic building layouts.

1.5 Government shall provide to the selected contractor design schematics in AUTO Cad and specifications for Designs from a previous Brigade that the Contractor will need to supplement per RFP, Site Adaptation, and Code Analysis during the design phase. These government-provided design schematics that are not at the 100% design-stage for CE School Facility; they were developed and used for construction of an ANA Brigades elsewhere in Afghanistan. Note: Most buildings in CE School Facility are brand new and have no complete drawings available. The Contractor will need to design,

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redraw and edit as required to meet the requirements of this RFP. For all of the facilities, the Contractor shall prepare complete designs and specifications for all buildings and systems for review and approval by the Government. All designs and specifications created by the Contractor shall become the property of the Government and may be used in the future by the Government for construction of similar facilities without further compensation to the Contractor. The Contractor shall site-adapt the existing designs to assure that the designs reflect the requirements of this RFP, making all changes as required. Contractor shall provide Master Plan, Design Analysis, Specifications and Working Drawings for the entire CE School Complex including any options for the 35%, 65%, 99%, and 100%. In addition to printed full-sized copies, the Contractor shall provide electronic versions of all design documentation in AUTOCAD 2006 (version of later) to AED in Kabul and the Residence Office. Files shall be arranged on a CD with each facility, clearly identified as a separate subdirectory, with all files for that facility contained in that subdirectory. Each disk shall have an adhered printed label listing contents. Hand-written labels are unacceptable. See Section 01335 for Submittal requirements.

1.6 Liquidated Damages: It is critical that the contractor complete all work in the allotted time as customer usage is coinciding with completion. In addition, project personnel assigned to the management of the construction contract will continue to be utilized on this subject project through project conclusion. Therefore, failure by the contractor to meet the deadline will require the US Government to incur costs for continuing project and site management on the project beyond planned timelines. The US Government will then pass these additional costs to the contractor in the form of Liquidated Damages. The following is a summary of said costs:

	Hourly Rate	Hours	Total
GS-14 Area Engineer	\$177.20	1	\$177.20
GS-13 Resident Engineer	\$149.93	4	\$599.72
GS-12 Project Engineer	\$126.28	4	\$505.12
GS-11 Quality Assurance Rep	\$111.44	4	\$445.76

Total Liquidated Damages per day: \$ 1727.80

1.7 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 Construction Trades Training Center (CTTC) 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:

Mhd. Haris e-mail: mharis@afghanreconstruction.org
 Telephone: 0700 08 0602

Pervaiz e-mail: adpzmuj@yahoo.com
 Telephone: 0700 61 3133

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2. BASE BID ITEMS:

2.1 SITE SURVEY AND MASTER PLANNING

The approximate Site area is indicated in Appendix A. Survey shall indicate all existing trees. These trees will be incorporated into the Site Design to the extent possible. Any trees to be cut down will be justified and approved during the Design Charette. Master Plan shall indicate layout similar to plan attached, see attached map for grid coordinates in Appendix A. The Contractor shall perform a geotechnical investigation as defined in Section 01015; perform a site topographic survey; prepare a Master Plan for the entire CE School Facility including Ranges. Contractor shall provide a complete Landscaping and Site Drainage Plan with existing grades, proposed grades, and building finished floor elevations. The Contractor shall not locate any facilities in wadis, dry river beds or areas subject to flooding. The development of the master plan will include participation in a Planning Charette that will be conducted at the Afghanistan Engineer District (AED), Qalaa House in Kabul. The Charette shall be completed within 30 days of contract award. A 35% Concept Design and Master Plan review shall be conducted with the Contractor at the Qalaa House 30 days after completion of the Charrette. A required site plan for this project will be designed per this RFP.

2.2 SITE GRADING

Perform complete site grading and installation of all required drainage structures per the Drainage Plan that will be prepared as part of this scope of work. Existing buildings and ruins shall to be removed under a separate contract. Contractor under this contract is required to backfill and compact any and all holes left by the removal of existing buildings. No work shall commence until a complete Site Grading Plan is reviewed and signed off.

2.3 WATER DISTRIBUTATION SYSTEM

Design and construct a water distribution system that connects to existing wells (at existing ANA Commando Complex) which shall include; pumps and service booster pumps, distribution system chlorination and water storage tank(s) sized for the entire CE School Master Plan of 250 occupants with one day of storage and one day of usage; and water distribution system to serve the entire installation CE School facility with a minimum of 40 psi pressures throughout. Provide steel tanks with non toxic Epoxy coating inside and primed and painted on the outside. Provide chain link fence and gates around entire water facility on CE School Facility; see fence Section 01015 paragraph 3.10.10 Chain Link Fence.

2.4 SEWER DISTRIBUTION SYSTEM

Design and construct a sewer collection system that connects to existing system. Provide all plumbing in CE School buildings, sewer piping, manholes, cleanouts, ejector pumps, as required to connect to existing system.

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2.5 POWER DISTRIBUTION SYSTEM

Design and construct a power distribution system that connects to existing Prime Power Plant Generators (at existing ANA Commando Complex) and site power distribution system for the entire CE School Facility including all buildings, site lighting, bunkers, and ~~ranges~~ Range #1.

2.6 CE SCHOOL ROAD NETWORK and CONNECTORS

Design and construct the road network and connecting road at the main entrance of the CE School Facility Parking Lot, to the existing ANA Commando Complex and roads within the compound. Provide a road network completely around compound with access roads and minimum parking area at each building for loading/unloading and maintenance vehicles. All roads shall be graded with a stone base with minimum width of roadway of 7 meters and the road network within the compound and shall have an asphalt surface; finished surface shall be 50 mm of asphalt with 50 mm wear course. Road construction shall include the installation of all required drainage structures. Provide a 1200 mm wide concrete sidewalk connector system between all buildings and parking lot. See Ranges for additional road and parking requirements. See Appendix A, Site Plan for location.

2.7 PARKING

Provide 1,500 m² parking lot with 50 parking spaces adjacent to HQ Office Building. All parking shall be graded with a stone base and shall have an asphalt surface; finished surface shall be 50 mm of asphalt with 50 mm wear course. Parking construction shall include the installation of all required drainage structures. See Appendix A, Site Plan for location. Exact configuration of parking area to be determined during Charette.

2.8 HEADQUARTERS OFFICE BUILDING

This facility will include three (3) single person offices for the Commandant, Vice Commandant, and US/CF Administrator (Executive Officer); three (3) single person offices for the Academic SGM; Operations SGM and a Senior NCO; five (5) offices to be shared by nineteen (19) academic instructors; and one (1) office to be shared by three (3) Advisors. HQ Building will also include a conference room, adequate for twelve (12) persons, with additional space for chairs along each wall. The building will have Diesel Heat w/Evaporative Cooling. Provide 52-inch ceiling fan each room except utility rooms. All floors in building shall be terrazzo, except utility-type rooms. Provide Toilet Facilities and janitor room with a mop sink, mop rack and shelves. See Appendix A for layout. Provide 3 flag poles at main entry.

2.9 EDUCATIONAL/TRAINING FACILITY

Education/Training Facility will include seven (7) classrooms, capable of holding thirty (30) students each and up to four (4) instructors per classroom simultaneously. Classrooms must be large enough to house adequate furniture and equipment, typically associated with an education/training

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classroom environment. Provide Storage cabinets at the rear of each classroom with doors and hasp, and Chalkboards at the front of each Classroom. Facility will also include a student storage/locker area, enough for two hundred (200) students. Storage/locker areas shall be wooden shelves measuring approximately 16 x 16 inches. This break area should have a concrete hard-prepared surface and a rainproof overhang. This facility should also possess adequate, secure storage space to house all facility education/training materials/equipment. Design shall be 3 meter high CMU wall insulated building. Buildings shall have offices, break room, printing room, toilets, and janitor's room. The building will have Diesel Heat w/Evaporative Cooling. Provide 52-inch ceiling fans. All floors in building shall be terrazzo, except utility-type rooms. Provide a janitor room with a mop sink, mop rack and shelves. See Appendix A for layout.

2.9 COVERED PAVILION

The Contractor shall design and construct one Pavilion Structure which shall be Pre-Engineered Metal Building with sloped interior ceiling. The structure, upper eave/soffit and roof shall be a prefabricated metal building. Structure shall have an open space with a eave height 4,000 mm A.F.F. The upper portion of roof structure shall be screened to keep birds out. The Pavilion and storage shall have lights for night time operation. Provide heavy-duty aluminum bleachers (seating for 200 total) with 300 mm wide aluminum seats with non-skid surface, set bleachers in each quadrant of pavilion (seating for 50) on concrete pad with a concrete podium in front. See Appendix A for layout. Provide heavy-duty aluminum bleachers (seating for 200) with 10" wide aluminum seats with non-skid surface. All aluminum planks shall be furnished with smooth finish end caps that install easily with self-tapping screws. Framework understructure is heavy-duty galvanized steel with front and rear cross braces to stabilize frame. Understructure is robotic welded and hot dipped galvanized. Anchor entire assembly to concrete a foundation. See Appendix A for layout.

2.11 STUDENT LIVING QUARTERS

Building with a double loaded 2000 mm wide corridor built to the following space requirements. Provide housing for: (148) E1 - E6's @ 4 m² net per soldier; room shall be designed as 4 man rooms, shared toilets. Full height non-load bearing partitions shall be provided between the 4-man rooms , as shown on the drawing. Shared toilets shall be grouped in one area on the corridor and shall be constructed with a toilet/shower/sink/absolution ratio of 20:1 for all students. The building will have Diesel Heat w/Evaporative Cooling. Provide 52-inch ceiling fans. All floors in building shall be terrazzo, except utility-type rooms. Provide a janitor room with a mop sink, mop rack and shelves. See Appendix A for layout.

2.12 CADRE LIVING QUARTERS

Design and construct a Cadre Instructors Building with a double loaded 1500 mm wide corridor built to the following space requirements. Provide rooms for: (26) instructors @ 12 m² each single occupancy, occupancy, with shared

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toilets. Provide housing for: (20) E-8-E-9s/04-05 @ 12 m² single occupancy, all with shared toilets; Shared toilets shall be grouped in one area on the corridor and shall be constructed with a toilet/shower/sink/absolution ratio of 10:1, provide water closet mix of 50% eastern and 50% western. The building will have Diesel Heat w/Evaporative Cooling. Provide 52-inch ceiling fans. All floors in building shall be terrazzo, except utility-type rooms. Provide a janitor room with a mop sink, mop rack and shelves. See Appendix A for layout.

2.13 RANGE NUMBER 1

Range Number 1 should include adequate bleacher type seating .8 m² each occupant with a rain cover sufficient to seat 120 students. Range Number 1 should also include a reinforced magazine storage facility, capable of storing 2000 lbs of primary high explosives with an additional magazine to store blasting caps / initiating devices and adequate personnel safety bunkers specifically designed for range safety Range Number 1 should also have adequate personnel protection, consisting of Range Number 1 perimeter safety/security fence consistent with safety/security requirements typically associated with EOD/C-IED requirements. Provide electricity and lighting at all Bunkers, Bleachers, and Parking. Provide remote controlled camera on each personnel Bunker with viewing screen inside bunker. Provide Hesco Mil 4G Barriers at Barricade Wall. See Appendix A Drawings A-7, A-8, A-9, R-1, R-2, S-1, and S-2, for Bunker layouts and Range Schematic. Final location and layout will be developed at Design Charrette. For Reinforced Magazines (Bunkers) Use Army Standards Magazine STD 33-15-74. The range shall be able to handle 50 lb. explosives IAW Army FM 3-34.2.14.

2.14 RANGE NUMBER 1 ROAD & PARKING

Design and construct the road network and connecting road at the main entrance of Range Number 1 the existing ANA Commando Complex roads within the compound. See Site Plan for location; road to Range Number 1 approximately 1500 meters, and these roads shall be constructed with 300mm sub base course and surfaced with 100mm well graded, crushed aggregate. Base course shall be compacted to 95% proctor density and mechanically stabilized by compaction. Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557. Provide Range Parking area 1500 m² for 50 vehicles, surfaced with crushed stone. Crushed stone shall also be provided around buildings and pathways. Contractor shall notify the Contracting Officer immediately if initial site survey determines that area hydrology requires major drainage structures or bridges. Also, the Contracting Officer shall be immediately notified if the required lengths of road or preexisting conditions are determined to be substantially or materially different than the above-described conditions/estimates. See Appendix A and Site Plan for layout.

2.15 ~~RANGE NUMBER 2~~ NOT USED

~~Range Number 2 should include adequate bleacher type seating .8 m² each occupant with a rain cover sufficient to seat 120 students receiving CE Instruction. Range Number 2 should also include a magazine storage facility,~~

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~~capable of storing munitions and adequate safety bunkers specifically designed for range safety. Range Number 2 should also include adequate safety bunkers for personnel specifically designed for range safety. Range Number 2 Perimeter should also have a safety/security fence consistent with safety/security requirements typically associated with EOD/C IED requirements. Provide electricity and lighting at all Bunkers, Bleachers, and Parking. Provide remote controlled camera on each personnel Bunker with viewing screen inside bunker. Location of parking area to be determined during Charette. See Appendix A Drawings A 7, A 8, A 9, R 1, R 2, S 1, and S 2, for Bunker layouts and Range Schematic. Final location and layout will be developed at Design Charrette. For Reinforced Magazines (Bunkers) Use Army Standards Magazine STD 33-15-74.~~

~~2.16 RANGE NUMBER 2 ROAD & PARKING NOT USED~~

~~Design and construct the road network and connecting road at the main entrance of Range Number 1 the existing ANA Commando Complex roads within the compound. See Site Plan for location; road to Range Number 1 approximately 1500 meters in length, and these roads shall be constructed with 300mm sub base course and surfaced with 100mm well graded, crushed aggregate. Base course shall be compacted to 95% proctor density and mechanically stabilized by compaction. Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557. Provide Range Parking area 1500 m² for 50 vehicles, surfaced with crushed stone. Crushed stone shall also be provided around buildings and pathways. Contractor shall notify the Contracting Officer immediately if initial site survey determines that area hydrology requires major drainage structures or bridges. Also, the Contracting Officer shall be immediately notified if the required lengths of road or preexisting conditions are determined to be substantially or materially different than the above described conditions/estimates. Location parking area to be determined during Charette. See Appendix A and Site Plan for layout.~~

~~2.17 SOLID WASTE STORAGE~~

~~The Contractor shall design and construct Solid collection point suitable for solid waste disposal temporary storage area as required in RFP. See Appendix A for guide layout.~~

~~3. DESIGN GUIDE INFORMATION:~~

~~These design notes are intended as a part of the preparation of design documents for new facilities and supplement the design of those facilities that have been previously constructed at other garrisons in Afghanistan.~~

~~3.1 UNIQUE SITE REQUIREMENTS:~~

~~3.1.2 All buildings with water supply shall have a water meter and shut off valve installed in a locked cabinet or closet area inside the building.~~

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3.1.3 All buildings shall have a sloped metal roof, with metal eaves, and soffits. See Section 01015 for roof specifications and warranty.

3.2 The following notes shall be incorporated into the Master Plan for all Buildings:

a. Buildings shall be spaced far enough apart to minimize noise (minimum 15 meters between barracks). The spacing shall also be suitable for snow removal at entrances, where applicable, and allow for green space (trees and scrubs) for all sites.

b. Heating and cooling for all habitable buildings, shall be by forced-air diesel-fired furnaces; and cooling by an integral evaporative-cooler. At least one Heat-Cool Unit for each separate structure, with multi-Units for larger buildings. Units shall be at least 80% efficient on heating cycle; and hot/cold air distributed by ducts, with a maximum air velocity of 10 m/s (2,000 fpm). Each Heat-Cool Unit shall be in the heating output range of 75 to 100 tkW (250 MBH to 340 MBH); and shall have an integral "day" diesel tank for 2 days of continuous firing

c. All habitable buildings shall be thermally insulated to $R = 3.5 \text{ m}^2\text{-}^\circ\text{C/watt}$ (R 20) for walls; and $R = 5.5 \text{ m}^2\text{-}^\circ\text{C/watt}$ (R 30) for roofs. See building description for additional building requiring insulation.

d. All Barracks and building lighting shall be designed and constructed to provide a uniform level of minimum lighting in accordance with Section 01015 throughout the buildings. Fluorescent lighting shall be installed throughout barracks buildings.

e. The central toilet/shower facilities shall be installed in each barracks sized to accommodate occupant load of barracks See (.f) below for ratio and attached sketch as guide only, sizes will vary) with a central changing area, open lockers, private bathing/showers, ablution, and toilets. The central toilet/shower facilities shall be designed with toilets facing North/South away from Mecca, for cultural reasons. Do not provide urinals for cultural reasons. Provide one central toilet/shower facility at the center of barracks. With towel bars, hooks and industrial standard stainless steel benches.

f. Provide the following Toilet/Shower/Sink Ratios for the facilities unless otherwise noted (U.O.N).

Sink ratio	1:20
Shower Ratio	1:20
Toilet Ratio	1:20
Ablution Area	1:20

g. All toilets shall be eastern style with a wall-mounted faucet and spray hose.

h. Ablution areas shall contain hot and cold water spigots with a flexible 1.5m spray hose mounted below the control valves with a back flow prevented

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fitting at the hose bib and hanger. Ablution areas shall be provided with low flow water devices.

i. All sinks for the Garrison central toilet/shower facilities 1.8m wide trough-type constructed poured in place concrete or filled concrete block with ceramic tile exterior and stainless steel lining capable of withstanding abuse. Maximum width is 1.8m. Individual troughs shall serve only three (3) individuals with 3 spigots with hot and cold water and two drains.

j. Reversible 3-speed motor ceiling fans (minimum 52-inch blades) shall be furnished and installed offices, barracks areas, one- and two-man bedrooms, apartments, dining rooms, supply and storage areas, and classrooms.

k. Clothes lines, 1 each, shall be installed behind each barracks approximately 5 meters in length with 4 lines across, spaced 41 cm apart and of sufficient strength to prevent sagging when all of the lines are loaded. Use metal "T" post with non-rust type clothes lines.

l. Showers shall contain a valve for hot and cold water mixing. There shall be a showerhead mounted high on the wall and an additional spigot with a flexible 1.5 m spray hose mounted below the control valves with a hanger. The showerhead and the spigot shall each have a valve so that flow can be diverted to each. Showers shall be provided with low flow water devices.

m. Provide at all Buildings : Walk-off grates shall be provided at all exterior doors with removable galvanized steel grates and dirt wells, size full door width by one (1) meter long. Provide a 150 mm wide steel boot scraper fixed in concrete to the side of each door for boot cleaning.

n. Install carbon monoxide (CO) monitors in large occupancy areas, sleeping areas and enclosed facilities. If all the windows and doors are closed and there is no provision for intake air, if there is a possibility of carbon monoxide built up in the rooms. These CO monitors/alarms shall be hard-wired for reliability and to prevent pilferage.

o. All toilet rooms shall be designed with toilet fixtures facing North/South away from Mecca, for cultural reasons. Do not provide urinals for cultural reasons.

p. Do not install hot or cold water piping in exterior walls. All rooms/buildings with piping or plumbing shall be heated to prevent pipes from freezing.

3.3 SITE

a. Install crushed #2 stone around all buildings 1,200 mm wide from building edge. Layout a system of paths between building and install 1,200 wide crushed stone paths to reduce erosion and provide dust control.

b. Barracks shall be located no closer than 15 meters to each other.

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c. Install three 10 meter tapered rust resistant metal flagpoles with bases constructed of 600 mm reinforced concrete; imbed 2000 mm, with stainless steel pulleys top and bottom w/10 mm nylon line and 100 mm ball on top. Provide base hinge to tilt pole for maintenance.

d. Slope ground at building edges 5% away from building for 3000 mm.

3.3 Installation Communication Systems

Provide a CE School Facility wide communications system with all communications conduits and wiring terminating at the Communications Building at Commando Command. This facility will serve as the installation's center for telecommunications, switching, and automation networking (including internet service). Coordinate with Contractor for complete installation. See 01015, Section 10.

3.4 Foundations

All buildings and structures shall have reinforced concrete slab with reinforced concrete foundation below the frost line or 800 mm minimum.

PART 4 - PRODUCTS

4.1 DRAWINGS AND OTHER DATA TO BECOME PROPERTY OF THE GOVERNMENT

All designs, drawings, specifications, notes, and other works developed in the performance of this contract shall become the sole property of the Government and may be used on any other design without additional compensation to the Contractor. The Government shall be considered the "person for whom the work was prepared" for the purpose of authorship in a copyrightable work under 17 U.S.C. 201(b). With respect thereto, the Contractor agrees not to assert or authorize others to assert any rights or to establish any claim under the design patent or copyright laws. The Contractor for a period of three (3) years after completion of the project agrees to furnish all retained works on the request of the Contracting Officer. Unless otherwise provided in the contract, the Contractor shall have the right to retain copies of all works beyond such period.

PART 5 - EXECUTION

5.1 SCHEDULE

Review Section 00150 for Schedule requirements. The development of the master plan and conceptual plans will include participation in a 2 to 5-day Planning Charette meeting at the 10% to 15% design effort in Kabul to finalize design. The Charette shall consist of the Customer, the Contractor, the Design Team and U.S. Army Corps of Engineers personnel to finalize design. Completion of construction documents for 100%. After approval of a preliminary facility layout and landscape plan, the Contractor may commence Site Work. Any Options to be awarded shall be awarded no later than 180 calendar days after the Notice to Proceed (NTP). Contractor will prosecute the work diligently,

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and complete all options 180 days after option is awarded and ready for use. See Table 1.1 for completion dates for individual buildings and groups of buildings. The time stated for completion shall include final cleanup of the premises. The Contractor shall survey the site and verify the existing conditions and report to the Contracting Officer any interface problems that could potentially impact this work. The Contractor shall be responsible for submittals and developing and performing all operational and acceptance testing. Contractor shall construct the facilities as a Design-Build construction contract and shall be in accordance with all codes, regulations, and requirements outlined in this Request for Proposal (RFP).

--End of Section --

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TRANSATLANTIC PROGRAMS CENTER
U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 2250
WINCHESTER, VIRGINIA 22604-1450

Amendment No. 0004

SUBJECT: Amendment No.0004 to W912ER-07-R-0011 COUNTER EXPLOSIVES SCHOOL,
ANA COMMANDO COMPLEX, RISH KHOVOOR, AFGHANISTAN

1. Specifications: Revised Sections are replaced in their entirety. Revisions to the specification pages are shown on the pages in the following manner: New text is underlined and deleted text is shown using strikeout. Revised and/or new sections are identified by the Amendment number appearing as the last item of the section title. The contract number and Amendment number appear in the bottom margin on all pages of the new or revised section.

a. The following sections have been revised:

Section 01010

- Paragraph 1.0
- Paragraph 1.2 (Table 1.1)
- Paragraph 2.5
- Paragraph 2.13
- Paragraph 2.15
- Paragraph 2.16

Section 01015

- Paragraph 2.6.2
- Paragraph 9.9
- Paragraph 10.0
- Paragraph 12.0

2. Drawings:

a. The following drawings have been deleted:
R-2 Range 2 Demolition Area

C O S T B R E A K D O W N

RFP # W912ER-07-R-0011
 PROJECT: Counter Explosives School
 LOCATION: Afghanistan

PROPOSER:
 DATE:

WORK ITEM No.	DESCRIPTION	LABOR MAN- HOURS	DIRECT CONSTRUCTION LABOR COST	CONSTRUCTION EQUIPMENT COST	CONSTRUCTION MATERIALS COST	SUB CONTRACTOR COST	TOTAL DIRECT COST	OVERHEAD/ INDIRECT COST	PROFIT	TOTAL PROPOSED COST
0001	Site Survey and Master Planning	-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
0002	Site Grading	-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
0003	Water Distribution System	-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
0004	Sewer Distribution System	-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
0005	Power Distribution System	-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
0006	CE School Road Network and Connector	-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
0007	Parking	-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
0008	HQ Office Building	-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
0009	Classroom Buildings	-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
0010	Covered Pavilion	-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----

C O S T B R E A K D O W N

RFP # W912ER-07-R-0011
 PROJECT: Counter Explosives School
 LOCATION: Afghanistan

PROPOSER:
 DATE:

WORK ITEM No.	DESCRIPTION	LABOR MAN- HOURS	DIRECT CONSTRUCTION LABOR COST	CONSTRUCTION EQUIPMENT COST	CONSTRUCTION MATERIALS COST	SUB CONTRACTOR COST	TOTAL DIRECT COST	OVERHEAD/ INDIRECT COST	PROFIT	TOTAL PROPOSED COST
0011	Student Living Quarters	-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
0012	Cadre Living Quarters	-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
0013	Range Number 1	-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
0014	Range Number 1 Road and Parking	-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
0015	Range Number 2	-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
0016	Range Number 2 Road and Parking	-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
0017	Solid Waste Storage	-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
TOTAL COST (Items 0001 - 0017)		-----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----