AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
J	1 | 2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
0002	06-May-2010	PD010501DHDARDOJ	

6. ISSUED BY	CODE	7. ADMINISTERED BY (If other than item 6)	CODE
AFGHANISTAN DISTRICT NORTH (AEN) US ARMY CORPS OF ENGINEERS OPERATION ENDURING FREEDOM APO AE 09356	W5J9JE	**See Item 6**	

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		
	X	9A. AMENDMENT OF SOLICITATION NO. W5J9JE-10-R-0067
	X	9B. DATED (SEE ITEM 11) 24-Mar-2010
		10A. MOD. OF CONTRACT/ORDER NO.
		10B. DATED (SEE ITEM 13)
CODE / FACILITY CODE		

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer [X] is extended, [ ] 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 [ ] is not, [ ] 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.)

This amendment is to replace section 01010-Scope of Work & section 01015-Techniacal Requirements – Site Adapt. Please review your proposals. The date and time due for this solicitation has been extended to 24 May 2010, 3:00p.m. Kabul Time. Please review all three (3) attachments -- Section 01010, Section 01015, & Summary of Changes.

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 _____ (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY _____ (Signature of Contracting Officer)	16C. DATE SIGNED 06-May-2010

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION 00010 - SOLICITATION CONTRACT FORM

The required response date/time has changed from 14-May-2010 03:00 PM to 24-May-2010 03:00 PM.

The point of contract for this effort after 23 May 2010 will be Robert Winne at Robert.N.Winne@usace.army.mil.

This amendment is to replace section 01010-Scope of Work & section 01015-Techniacal Requirements – Site Adapt. Please review your proposals. Please review all three (3) attachments -- Section 01010, Section 01015, & Summary of Changes. The date and time due for this solicitation has been extended to 24 May 2010, 3:00p.m. Kabul Time.

SPECIFICATION SECTION 01010

SCOPE OF WORK

(1 STORY POLICE SECURITY BUILDING)

1.0 GENERAL

This project consists of the design and construction of Afghanistan National Police (ANP) Uniformed Police District Headquarters facilities to be located at Dardoj District, Badakhshan Province, Afghanistan. This project is defined as the management, planning, design, material, labor, and equipment, to site adapt and construct all utilities, vehicular access, buildings, force protection measures, site security, de-mining activities, and other features as referenced herein. The work within this contract shall meet and be constructed in accordance with current U.S. design and International Building Codes (IBC), Life Safety Codes (NFPA-101), Force Protection and security standards. A partial listing of references is:

IBC, International Building Codes 2006

NFPA 101, Life Safety Codes

UFC 4-010-01, DoD Minimum Anti-Terrorism Standards for Buildings.

Coordination with Occupants of Existing Buildings

The Contractor shall identify all occupants of existing buildings within the construction boundary and hold a meeting with them to discuss, at a minimum, the scope of the project, access to the existing buildings during construction, impacts to utilities, site security and construction safety precautions. During this meeting, the Contractor will solicit comments and concerns about the project.

The Contractor shall provide meeting minutes to the Contracting Officer's Representative within seven (7) days after the meeting. Meeting minutes shall include, at a minimum, name, position title and phone number of those in attendance; and a record of issues that were discussed and proposed solutions to the issues.

1.1 ENGLISH LANGUAGE REQUIREMENT

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

1.2 PERIOD OF PERFORMANCE

All work under this contract by the contractor shall be completed within the period of performance. Period of performance is the sum of 365 calendar days and the number of total weather days appropriate for the province in which the project is located, as defined by Section 1060 – 1.20.1. This period of performance starts from receipt of notice to proceed, and is the total period of performance for the Base Items and all Optional Items, inclusive. Liquidated damages in the amount of $628.00 dollars shall be assessed for each calendar day beyond the scheduled contract completion date until contract completion and charged to the Contractor. Contract completion includes both Base and Option Items, as applicable.

This schedule allows for up to 15 days for the Contractor to achieve approval of site specific submittals.

1.3 SUBMITTALS

SD-01 Preconstruction Submittals

Certificate of completion Construction Quality Management Course; G

Demining Plan; G

Demining Certificate; G

Right of Entry (ROE) Coordinate Data; G

SD-07 Certificates

Electrician Qualifications; G

Plumbing Qualifications; G

Sheetmetal Worker Qualifications; G

1.4 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 (USACE) Construction Quality Management (CQM) course, or equivalent. The CQM course will be offered periodically by the Afghanistan Engineer District (AED), USACE. Additional approved CQM courses will be offered by Afghan schools and/or trade organizations. The Quality Assurance Branch of the AED can provide information related to AED offerings of the CQM course, as well as contact information for training centers. All alternative sources for the CQM course must be approved by the Quality Assurance Branch.

The contractor's quality control plan, as defined in USACE Guide Specification 01451 (or 01 45 04.00 10), entitled "Contractor Quality Control", must include "The name, qualifications (in

resume format), duties, responsibilities, and authorities of each person assigned a CQC function." For the QC Manager, qualifications must include a certificate demonstrating completion of an AED-approved CQM course. This certificate shall be submitted and approved prior to commencement of construction. This submittal, which is considered a Division 01 requirement, is included in the submittal register. Approval is granted by the Contracting Officer's Representative with guidance by the Quality Assurance Branch

1.5 SECURITY

Security is critical to construction in Afghanistan, especially on roads and remote areas away from Coalition Force bases. The risk/threat level for the area surrounding this project site is (High,), relative to the chance of attack, improvised explosive devices (IEDs), kidnapping, theft, and vandalism. The Contractor must have an appropriate amount of security/protection to match the threat in the project area and along the supply routes. A detailed security plan in accordance with Section 01040 SECURITY shall be in accordance with Section 01335 SUBMITTAL PROCEDURES and approved by the Government before construction notice to proceed.

1.5.1 SITE SECURITY

The Contractor shall provide perimeter force protection security for the developing site. Security may include but is not limited to fence and private security guards. Perimeter security shall prevent unauthorized site access and provide safety protection to the Contractor work force and government personnel for the duration of the project. The contractor is solely responsible for security however local police shall be coordinated with regarding security.

1.6 ELECTRICAL WORKERS QUALIFICATIONS

Electrical work shall be performed by Qualified Personnel with verifiable credentials, who are thoroughly knowledgeable with applicable code requirements. Verifiable credentials consist of a certificate of graduation from an approved trade school and required amount of experience. Qualified personnel are those who have received training in and have demonstrated skills and knowledge in the construction and operation of electrical equipment and installations and the hazards involved. These skills and knowledge include the ability to distinguish exposed live parts from other parts of electric equipment, to determine the nominal voltage of exposed live parts, to identify the clearance distances and corresponding voltages to which the qualified person will be exposed.

1.6.1 JOURNEYMAN ELECTRICIANS

At least two (2) journeyman electricians must be present at each construction site. Journeyman electricians are defined herein as graduates of an approved trade school, with at least four (4) years of relevant electrician experience in residential and commercial construction. Approved trade school programs include but are not limited to the Afghanistan Technical and Vocational Institute (ATVI) in Kabul. . Other acceptable trade schools must have electrician curricula similar to ATVI. Work experience resumes and graduation certificates, to serve as proof of journeyman electrician qualifications, shall be submitted and approved prior to commencement of any design or construction involving electrical work. This submittal, which is considered a Division 01 requirement, is included in the submittal register. Approval is granted by the

Contracting Officer's Representative with guidance by the Quality Assurance Branch and/or the Safety Office of the Afghanistan Engineer District, U.S. Army Corps of Engineers.

1.6.2 APPRENTICE ELECTRICIANS

Apprentice electricians provide assistance to the journeyman electricians. Apprentice electricians must be graduates of ATVI or an approved alternate trade school and must have at least six (6) months of relevant electrician experience in residential and commercial construction. Work experience resumes and certificates of successful completion and graduation from an approved electrician trade school must be provided for each apprentice electrician, upon request by the Contracting Officer's Representative.

1.7 PLUMBING WORKERS QUALIFICATIONS

Plumbing work shall be performed by Qualified Personnel with verifiable credentials, who are thoroughly knowledgeable with applicable code requirements. Verifiable credentials consist of a certificate of graduation from an approved trade school and required amount of experience. Qualified personnel are those who have received training in and have demonstrated skills and knowledge in the construction and operation of plumbing equipment and installations.

1.7.1 JOURNEYMAN PLUMBERS

At least one (1) journeyman plumber must be present at each construction site for every two (2) apprentice plumbers working. The journeyman plumber is to supervise the work done by the apprentices and insure code and quality requirement are met. The journeyman plumber is expected to perform this supervisory role for minimum of 75% of the time that they are on site. The additional 25% of the time he may perform his own tasks in the performance of the project. Journeyman electricians are defined herein as graduates of an approved trade school, with at least four (4) years of relevant plumbing experience in residential and commercial construction. Approved trade school programs include but are not limited to the Afghanistan Technical and Vocational Institute (ATVI) in Kabul. Other acceptable trade schools must have electrician curricula similar to ATVI. Work experience resumes and graduation certificates, to serve as proof of journeyman plumber qualifications, shall be submitted and approved prior to commencement of any design or construction involving plumbing work. This submittal, which is considered a Division 01 requirement, is included in the submittal register. Approval is granted by the Contracting Officer's Representative with guidance by the Quality Assurance Branch and/or the Safety Office of the Afghanistan Engineer District, U.S. Army Corps of Engineers.

1.7.2 APPRENTICE PLUMBERS

Apprentice plumbers provide assistance to the journeyman plumber. Apprentice plumbers must either be currently enrolled in or graduates of ATVI or an approved alternate trade school. Certificates of successful completion and graduation or documentation of current enrollment from an approved plumbing trade school must be provided for each apprentice plumber, upon request by the Contracting Officer's Representative.

1.8 SHEET METAL WORKERS QUALIFICATIONS

Sheet metal work shall be performed by Qualified Personnel with verifiable credentials, who are thoroughly knowledgeable with applicable code requirements. Verifiable credentials consist of a certificate of graduation from an approved trade school and required amount of experience. Qualified personnel are those who have received training in and have demonstrated skills and knowledge in the construction of sheet metal installations.

1.8.1 JOURNEYMAN SHEET METAL WORKER

At least one (1) journeyman sheet metal worker must be present at each construction site for every two (2) apprentices working. The journeyman is to supervise the work done by the apprentices and insure code and quality requirement are met. The journeyman is expected to perform this supervisory role for minimum of 75% of the time that they are on site. The additional 25% of the time he may perform his own tasks in the performance of the project. Journeyman sheet metal workers are defined herein as graduates of an approved trade school, with at least four (4) years of relevant sheet metal working experience in residential and commercial construction. Approved trade school programs include but are not limited to the Afghanistan Technical and Vocational Institute (ATVI) in Kabul. . Other acceptable trade schools must have metal works curricula similar to ATVI. Work experience resumes and graduation certificates, to serve as proof of journeyman qualifications, shall be submitted and approved prior to commencement of any design or construction involving sheet metal work. This submittal, which is considered a Division 01 requirement, is included in the submittal register. Approval is granted by the Contracting Officer's Representative with guidance by the Quality Assurance Branch and/or the Safety Office of the Afghanistan Engineer District, U.S. Army Corps of Engineers.

1.8.2 APPRENTICE SHEET METAL WORKERS

Apprentice sheet metal workers provide assistance to the journeyman. Apprentices must either be currently enrolled in or graduates of ATVI or an approved alternate trade school. Certificates of successful completion and graduation or documentation of current enrollment from an approved sheet metal trade school must be provided for each apprentice, upon request by the Contracting Officer's Representative.

2.0 LOCATION

The site is in Dardoj District, Badakhshan Province Province, Afghanistan located 57 km southeast of Faizabad city center, at an average elevation of 1665 meters, with center coordinates of 36.917779◦ Northing, 71.059687◦ Easting.

The coordinates of the four corners of the site available for construction are:

Points	Northing	Easting	Elevations
Corner #1	36.918120◦	71.059355◦	1665 m

Corner #2	36.918116°	71.060200°	1666 m
Corner #3	36.917441°	71.060198°	1665 m
Corner #4	36.917447°	71.059355°	1665 m

The contractor is to verify the coordinates provided and submit to the COR for approval, confirmation of the accuracy of coordinates provided. The development and construction of the site is required to be within the Right of Entry ROE. The contractor is to notify the COR should the development of the proposed site require an encroachment of the ROE boundary. The contractor is to obtain the necessary ROE for the access road connecting the proposed site development into an existing road. The submittal will include an exhibit illustrating the limits, boundaries, and coordinates representing the ROE.

3.0 UNEXPLODED ORDNANCE (UXO)

3.1 UXO REMOVAL AND CLEARANCE

The contractor shall search for, identify and clear all mines and unexploded ordnance (UXO) from the entire site. The contractor may only provide clearance/removal services via UN Mine Action Center for Afghanistan (UNMACA) accredited entities, and clearance shall be accomplished to the anticipated foundation depth as indicated in the contract. If sub-surface construction activities are to be performed on this site the minimum clearance depth will be 1 meter. Sub-surface clearance for construction activities in excess of 1 meter as defined by the contract parameters will also be the responsibility of the contractor. Clearance by definition is an investigation and clearance of all sub-surface metallic anomalies on the site. Clearance/removal may only be undertaken in accordance with International Mine Action Standards (IMAS), Afghanistan Mine Action Standards (AMAS), and applicable U.S. Army Corps of Engineer (USACE) Ordnance & Explosives (OE) safety standards. When mines and/or UXO's are identified, the Contractor shall place them in a location in accordance with IMAS/AMAS/USACE until destruction of the items can take place. Construction work shall not occur inside the safety exclusion zone based on the most probable munition (MPM) expected on the site. Construction will not commence in any area that has not been cleared to the specified depth. If sub-surface activities

The contractor will provide a standard UXO/Demining safety work plan to the US Army Corps of Engineers UXO / Demining COR for review prior to commencement of all UXO clearance / demining activities on the project sites. Once the UXO/ Demining clearance has concluded, the contractor shall provide the US Army Corps of Engineers UXO / Demining COR a clearance certificate for review and approval before any construction activities are to commence.

NOTE 1: The USACE does not need written clearance certificate approval from the UNMACA to approve the construction start activities. However, the contractor is responsible for providing a copy of the clearance certificate to the UNMACA for entry into their country wide database. A final signed copy of the UNMACE certificate must then be provided to the USACE UXO/Demining COR.

It is the responsibility of the Contractor to be aware of the risk of encountering UXO/mines and to take all actions necessary to assure a safe work area to perform the requirements of this contract. The Contractor assumes the risk of any and all personal injury, property damage or other liability arising out of or resulting from any Contractor action taken hereunder. The Contractor and its subcontractors may not handle, work with, move, transport, render safe, or disarm any UXO/mine, unless they have appropriate accreditations under the IMAS/AMAS from the UNMACA.

If a UXO/mine is encountered after a UNMACA-approved clearance certificate is provided to the Government, UXO/mine disposal shall be handled in accordance with Section 01015, Technical Requirements.

NOTE 2: Point of Contact for UXO/Demining Safety Work Plan review and approval shall be directed to the US Army Corps of Engineers Demining Safety/COR:

UXO Safety/ Demining COR, USACE
tan.uxo.demining.safety@usace.army.mil, Roshan:079-778-6848 Comm:540-667-2127

4.0 SUMMARY OF WORK

4.1 GENERAL REQUIREMENTS FOR FACILITIES

Work shall be executed in accordance with the Section 01015 TECHNICAL REQUIREMENTS, furnished drawings and specifications. All requirements set forth in this Section, but not included in the Technical Requirements and/or drawings and specifications, shall be considered as set forth in both and vice versa. In case of question or ambiguity, the Contracting Officer (KO) shall make the final decision. The KO shall furnish the decision in writing if requested by the Contractor. Site adaptation of the provided designs and specifications shall be approved by the Contracting Officer's Representative (COR) prior to the start of work. The Contractor shall verify all dimensions provided in the scope of work prior to the start of any construction.

The contractor is encouraged to use Afghan labor and subcontractors to the maximum extent possible commensurate with technical, security or other requirements or necessary considerations. The intent of this contract is also to use locally procured materials and labor to the maximum extent possible, but this does not allow the contractor to make changes to the Government-provided drawings or specifications.

The Site Adapt work shall include the preparation of design documents and the subsequent construction of the site improvements described within this Section, Section 01015 and the Government-furnished drawings and specifications, with design adaptations to fit the actual site selected. The facilities required for each site shall include structures and all utilities as indicated in the drawings and/or specifications as provided. Site work and facilities may require design adaptations to meet site conditions, and these adaptations shall be designed and constructed in accordance with current U.S. and International Building Codes and standards and as described in these documents. The contractor must submit any changes to the Government-provided drawings and specifications in accordance with Contract Section 1335, Paragraph "Variations."

Any standard that can be determined to be substantially equivalent to the standards specified in this document may be used, but it is the Contractor's responsibility to show the equivalency of

the alternate standard. Reviewable documentation must be provided to the KO for approval prior to use. Equivalency documentation must be submitted in a timely manner so as not to affect the schedule of the project. No part of the time lost due to such actions shall be made the subject of claim for extension of time, excess costs, or damages by the Contractor. A partial listing of references is included within the Request for Proposal.

Work at individual projects sites consists of the construction of a District Headquarters compound in accordance with the contract documentation. The compound consists of a one-story Multi-Purpose Police Security facility (approx 27 m x 24 m) for sixty (60) police which includes a Dining Facility (DFAC), berthing areas and offices/conference areas, armory and jail cells. It also includes force protection structures, electrical system, plumbing/sewage system, and water system. The contractor will insure that all seismic requirements are met in the construction of the facilities.

Site assessments will be provided for all of the sites, but must be verified by the contractor. The contractor is responsible for surveying, grading and drainage, and de-mining activities for the entire site. The entire site is defined by the limits of the Rights of Entry (ROE) and the site assessment.

Development of the compound contained within the required perimeter wall should utilize the most suitable land for construction based on a maximum 75 meters by 75 meters area. Area developed within the perimeter wall should not exceed 5625 square meters, nor should the length of perimeter wall exceed 300 meters. Site plans should be submitted that conform to this requirement and the requirements of the contract documents.

Leach fields may be installed outside the perimeter wall but must be installed within the limits defined by the ROE.

Manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period shall be provided.

4.2 SEQUENCE OF WORK

After de-mining, but prior to the construction of any structures, the Contractor shall submit a well test plan, drill and test the water well, conduct well design activities, and submit all required information to AED for review and acceptance **prior** to installing any permanent well features (per AED Design Requirements document). Failure to follow this process may, at AED's discretion, result in the contractor having to remove the well casing and screen, re-drill the well and reinstall the proper features per the approved design. It is acknowledged that water may not be available at the site despite Contractor good faith efforts to find it. The Contractor shall drill one or two wells per section 01015 in an attempt to find water. If water cannot be found the contractor shall immediately notify the Contracting Officer's Representative (COR). The Contractor will be considered to have fulfilled the terms of the contract and will be entitled to the full price of the contract CLIN for well drilling, however, the Contractor must still furnish all other parts of the water distribution system as described in the specifications.

Dry wells must be de-commissioned in accordance with ASTM D 5299. The contractor must submit a written plan for de-commissioning wells.

4.3 PROGRAMATIC DESIGN CHARRETTE

The contractor shall prepare a programmatic Master Site Plan that will be generally applied to all construction locations. The Master Site Plan shall include all locations of construction office/storage containers, lay-down and construction debris removal area. The development of the master plan will include participation in a charrette that will be conducted at the Corps of Engineers Area or Resident Office administering the contract. The charrette shall be scheduled by the Government to occur within ten (10) calendar days of notice to proceed. The programmatic Master Site Plan shall be submitted to the Government no later than twenty (20) days after Notice to Proceed. Site specific adaptations of the programmatic Master Site Plan shall be submitted to the Government according to the schedule provided above.

4.4 SITE SPECIFIC SURVEYS & SUBMITTALS

For each individual construction site, the Contractor shall perform a geotechnical investigation as defined in Section 01015, perform a topographic survey of the site; adapt the programmatic Master Site Plan to the conditions applicable for specific locations; prepare a complete grading and drainage plan with existing grades, proposed grades, and building finished floor elevations based on the technical requirements; prepare a landscaping plan; prepare a water supply, disinfection, and distribution layout plan; and prepare a wastewater collection, septic tank, and leach field layout plan. If there is a requirement for on-site demolition, the Contractor shall prepare and submit a demolition plan for that particular site. The Contractor shall not locate facilities in wadis or dry river beds. The finish floor elevation of all facilities and slabs shall be a minimum of 150 mm above the 10-year flood elevation. The contractor shall provide drawings and details to describe any adaptations to the standard design that will be required for individual project sites as a site specific submittal as necessary. At a minimum, site specific submittals shall include: the geotechnical investigation report; drawings, details and calculations associated with well construction; drawings and details associated with demolition; drawings, and details associated with site grading; drawings, details, and calculations associated with well pump, disinfection system, distribution system construction; and drawings, details and calculations associated with sanitary sewer and leach field construction.

4.5 DEMOLITION AND GRADING

The Contractor shall remove and dispose of all debris, concrete, and foundations. The Contractor shall verify the location of debris disposal with the Contracting Officer's Representative. No demolition of the existing education building, district building, DHQ building, and Afghan telecom building will be allowed. They are to remain on site and left in the same condition as prior to start of construction. Planning will be required to ensure that existing and new facilities will fit on site. Also on site is an existing Afghan telecom antenna that may be relocated if required and coordinated with the appropriate on site officials and owners of the antennae. The Contractor shall perform complete final site grading after installation of all required drainage structures per the Drainage Plan that shall be prepared as part of this project and after installation of any other buried utilities or other project components.

Native crushed stone 100 mm thick shall be placed around all buildings, from the building wall or building landscaping out 2,000 mm and all areas of anticipated foot or vehicle traffic to reduce erosion and to provide dust control. Contractor shall compact underlying subgrade to a

minimum 95% of the laboratory maximum dry density as determined by ASTM D 1557, Modified Proctor test.

4.6 WATER SYSTEM

Design and construct a Potable Water System (PWS), to include a well, protected in an enclosed water well house, water well pump(s), elevated water storage tank, and an underground pipe distribution network system. The elevated water storage tank shall be constructed in strict conformance with the furnished drawings and specifications. The water system shall be designed and constructed in accordance with the AED Design Requirements, latest version, and UFC 3-230-03A Water Supply which include the use of a capacity factor. Water demand required for fire fighting and for irrigation and landscaping needs shall not be included in design demand calculations.

A manually operated, lever, hand pump shall be installed at the well head. The pump shall be used to supply water when there is no electricity.

4.7 SANITARY SEWER SYSTEM

The sanitary sewer collection and treatment system shall be designed and constructed by the Contractor. The sanitary sewer collection system shall consist of gravity sewer pipe network and accessories such as manholes, cleanouts, and building service connections.

The sanitary sewer system shall be designed to accommodate the total facility compound population as specified in the Scope of Work and verified by the contractor, including use of the required Capacity Factor from UFC 3-240-09FA Domestic Water Treatment, Chapter 4.

System capacity shall be calculated based on a hydraulic waste load equivalent to 80 percent of the water usage rate.

The gravity sewer collection system shall connect to the sewage treatment system which shall be a traditional septic tank absorption field effluent disposal system, facultative pond system or other low maintenance, cost effective system.

Geotechnical investigation of the proposed sewage treatment site is required and the contractor shall design the sewage treatment system to be compatible with site and soil conditions.

At a minimum, design shall include the following:

(a) Site Survey. The Contractor shall conduct a topographic survey to determine existing site characteristics. The Contractor shall conduct a utility survey to determine the locations of any nearby water lines, wells, sanitary sewers, storm sewers and electrical lines.

(b) Percolation Testing. At proposed sites for holding ponds and the absorption field, the Contractor shall perform percolation tests in accordance with AED Design Requirements: Sanitary Sewer and Septic Systems. Percolation testing may be carried out with a shovel, posthole digger, solid auger or other appropriate digging instruments. Percolation tests shall be accomplished uniformly throughout the area where the absorption field is to be located. Percolation tests determine the acceptability of the site and serve as the basis of design for the liquid absorption.

(c) Sanitary system layout. The Contactor shall design a sanitary system layout following

requirements of Section 01015 this contract. Pipe, fittings, and connections shall conform to the respective specifications and other requirements as listed in Contract Section 01015 and all of its referenced codes.

(d) Septic system design. The Contractor shall design a septic tank and absorption field system including all tank geometry, hydraulic loading, and inlet and outlet configurations, number of compartments and related site preparation and earthwork. Design will be per specifications provided in Section 01015.

4.8 SITE POWER, ELECTRICAL, DISTRIBUTION SYSTEM, AND FUEL STORAGE

Contractor shall site adapt the provided electrical design, modifying it where required to meet NEC (NFPA 70) requirements. Contractor shall refer to Section 01015 for detail descriptions and requirements of the Systems. Major Electrical Systems are, but not limited to: (a) On-Site Power Plant, (b) Site Secondary Power Distribution System, and (c) Interior Secondary Power Distribution System. A bulk fuel storage tank is required for a 30 day supply of fuel and shall be filled with fuel upon completion of the contract.

4.8.1 ON-SITE POWER PLANT

Power Plant shall consist of one (1) 80 KW (100 KVA) generator to provide service to the Headquarters Compound. Generator shall be provided inside "weather-proof" (IP54 or better) enclosure. Generator pad shall be constructed with a reinforced concrete floor slab. A covered shelter shall be provided. The shelter shall be pole mounted and shall provide coverage for the generator and switchboard pads.

4.8.2 SITE SECONDARY POWER DISTRIBUTION SYSTEM:

Site Secondary Power Distribution System shall include installation of underground cables in direct buried, thick walled, Schedule 80 PVC conduit from the Power Plant to the individual facilities. Except under traffic areas where the conduit shall concrete encased.

4.8.3 INTERIOR SECONDARY POWER DISTRIBUTION SYSTEM:

Interior Secondary Power Distribution System, rated at 380/220 volts, 3 phase, 4 wire and 50 Hz. with wiring installed in surface mounted metal conduits, shall be provided in all facilities, including guard towers and guard shacks.

4.8.4 GENERATOR FUEL STORAGE:

The work shall include the fabrication and installation of the entire fuel storage and distribution system. Tanks shall be skid mounted and be provided with a concrete dike. The dike shall have enough capacity for the entire contents of the tank, plus 10 percent. Provide a molded neoprene isolation pad to isolate an above-ground tank from the concrete pad underneath. Steel tank supports specifically are prone to encounter premature rusting due to constant exposure to moisture and their incompatibility with concrete. Tank shall be designed and manufactured for horizontal installation. Tank shall be mounted on the tank manufacturer's standard support skid.

Skid shall span the entire length of the tank and shall separate the tank from the reinforced concrete slab by a minimum of 200 mm. Indicate on the drawings the number and size of each tank man way required. Tanks of 3,780 to 45,430 L to capacity will be provided with 760 mm diameter man ways. Tanks larger than 45,430 L will be provided with 915 mm diameter man ways. Tanks 3,780 L and larger will be provided with a minimum of 1 tank man way to allow for internal tank access. Piping will not penetrate through access man ways. Tank shall be provided with a combination cleanout and gauge connection. Vent pipe sizing shall be not less than 32 mm nominal inside diameter. Vent shall be the rupture disc type calibrated to burst at 13.8 kPa pressure, and operate at 80 percent of burst setting. Tank shall be provided with an overfill alarm system. Tank shall be provided with 2 stick gauges graduated in m and mm. Stick gauge shall be of wood and treated after graduating to prevent swelling or damage from the fuel being stored. Each storage tank shall be provided with an automatic analog reading gauge which is directly mounted to a tank's man way cover. Provide an in-line centrifugal pump as part of the day tank package for fuel transfer from the bulk storage tanks to the day tank. Day tanks shall provide sufficient fuel for four hours of generator operation without refill. Provide cathode protection for metal components. Storage tanks shall be handled with extreme care to prevent damage during placement and shall be installed in accordance with the manufacturer's installation instructions. Piping shall be inspected, tested, and approved before buying, covering, or concealing. Piping shall be installed straight and true to bear evenly on supports. Piping shall be free of traps, shall not be embedded in concrete pavement, and shall drain toward the corresponding storage tank. Any pipe, fittings, or appurtenances found defective after installation shall be replaced. Below ground nonmetallic pipe shall be installed in accordance with pipe manufacturer's instructions. Belowground piping shall be laid with a minimum pitch of 25 mm per 6 m.

4.9 FORCE PROTECTION MEASURES

The Contractor shall construct force protection measures as detailed in the drawings which include perimeter walls, gates, vehicle barriers, guard shacks and guard towers. Construct perimeter walls as indicated on the site plan from native stone, as shown on the drawings. Install outriggers and single-strand concertina wire on top of the wall. The walls shall measure at least 2.4 m high from grade inside the compound. Interior grade shall be higher than exterior grade. Wall thickness shall be not less than 600 mm. Guard towers shall be constructed at all four site corners at an offset to allow visual observation along the outside face of the wall. Outrigger supporting arms shall be "Y" shaped with post securely embedded into the top of the wall. Posts shall conform to the IBC standard for Pipe, Steel, Hot Dipped Zinc Coated (Galvanized) Welded.

4.9.1 PERIMETER WALL

Masonry or native stone walls shall be constructed around the perimeter of the site. The height of the walls shall measure at least 2.4 meters from the inside and outside grades. The wall shall be topped with barbed wire outriggers and single-coil concertina style razor wire. The ground grade shall slope away from the wall for at least 5 meters and shall be kept a minimum of 2.4 meters below the top of wall for a minimum distance of 10 meters. The wall shall be designed to keep all pedestrian and truck traffic outside the compound from having a visual line of site into the compound.

4.9.2 ECP

The Entry Control Point (ECP) will include a manually operated swing steel gate for vehicles and a separate steel swing gate for personnel. The ECP will also include two guard shacks. Design vehicle for ECP entrance is a fuel delivery/septic tank truck typical for region of project site.

The Escape Hatch will include a manually operated, steel, swing gate.

4.9.3 GATES

The gates shall be swing type. Hinged gates shall be a pair of 3.65 m wide x 2.4 m high leafs, constructed of steel plates, steel tube frame, and steel tube intermediate posts and rails at the ECP and a single gate, 3.65 m wide x 2.4 m high and similarly constructed at the Escape Hatch. Where site constraints prohibit vehicular sized swing gate at the Escape Hatch provide personnel sized steel swing gate.

The design of the gates shall insure that it is dimensionally stable, square, true and planar. Gate leafs shall not rack or deflect when install on its hinges. Gates shall have a sufficient number of hinges, anchor mounted to the exterior masonry walls, to support each gate leaf. Provide a locking mechanism that holds the gates together when in the closed position as well as a drop bolt that engages a steel sleeve embedded in the pavement.

4.9.4 GUARD SHACKS

Construct one guard shack, located outside the compound at the stand-off ECP location of 3.1 meters. Construct a second guard shack inside the perimeter wall adjacent to the personnel gate. Construction shall be in accordance with the drawings.

4.9.5 GUARD TOWERS

The contractor shall construct four (4) guard towers in accordance with the drawings at the four corners of the compound. Guard towers shall be offset from force protection wall corner to allow sight down the outside face of the wall. Access ladders shall be constructed per OSHA Standards. Guard towers shall be provided with general lighting and shall be fitted with one 360-degree omni- directional searchlight. Two weather-resistant duplex receptacles shall be provided as required for general use. The area in the immediate exterior vicinity of the guard tower shall be provided with an all weather non-slip surface and shall be graded to sufficiently drain away from structure.

4.10 FENCING AND BARRICADES

Fencing shall consist of the types shown or described herein. Chain link fences, 2 meters in height, shall be provided around both the water supply and power generation/fuel storage areas. Double swinging gates should be provided in both fences to allow direct vehicular access to the well, and to the generator. Gates should include locking mechanisms that can be secured with a padlock to prevent unauthorized entry. Entire fences, including gates, should be topped with triple strand barb wire.

4.11 PARKING, ROADS, & WALKWAYS

The Contractor shall design and construct the entire road and parking network. The roads shall be designed to carry traffic of a 40 metric-ton five-axle vehicle. A storm drainage system shall also be included. The road layout shall provide access to entry control points, parking lots, vehicle maintenance facilities, fuel points, generator yard, sewage septic tank, and the trash collection point. Provide parking area for a minimum of 4 vehicles inside the compound. Road design shall be designed per Section 01015, Technical Requirements. Roadways and sidewalks are required as shown on attached drawings and shall be designed and constructed based upon recommendations from geotechnical analysis as required herein.

Design and provide a network of sidewalks to connect the buildings.

4.12 VEHICLE RE-FUELING POINT

The Contractor shall design and construct a low profile vehicle re-fueling point, as specified in Section 01015, capable of storing 19,000 liters of diesel. It shall be located as near as practicable to the Generator fuel storage facility. The Contractor shall provide a full supply of fuel to the tanks at the time of turnover to the Government. The Contractor shall provide capability for fuel delivery from two locations – one from outside the wall surrounding the compound and one directly into the fuel tanks. The delivery point outside the compound wall shall be lockable and securable from tampering or sabotage. Provide a fuel dispensing island with one fuel dispenser. Vehicle Re-Fueling Point shall have a metal roof covering.

A typical vehicle refueling point drawing is provided in the Appendix. Contractor shall modify the vehicle refueling point for only diesel fuel and one dispensing pump.

4.13 TRASH POINT

The Contractor shall place, in a location convenient for easy removal, a trash collection point. It shall be located outside the compound walls. The trash point shall be a 1.8 m x 1.8 m concrete pad with 1.8 meter high stucco finished masonry wall about the perimeter. Wall shall be paced on reinforced concrete footings and shall have a concrete coping similar to the force protection wall. One side shall have a 1.2 m wide gate entrance.

4.14 DISTRICT HEADQUARTERS BUILDING

The contractor shall site adapt and construct the Police Security Building in accordance with the scope of work, technical specifications, and drawings. The District Headquarters Building shall consist of a reinforced concrete frame, foundation, floor slab, and roof slab, with masonry infill walls. Truss supported metal roof shall be provided over concrete roof slab.

This facility will contain the following functions: berthing of personnel; kitchen/dining; latrines to include sinks, toilets, showers; security area to include holding cells, latrines, weapons storage, and guard room; and administrative space (offices). An outside wood stove kitchen shall be provided. Specific requirements are as indicated below:

(a) Foundation Work and Floor - Construct the foundation in accordance with the contract documentation. Foundation excavation shall extend a sufficient distance from walls and footings to allow for placing and removal of forms. The

Contractor shall direct surface water away from the excavation to prevent erosion and undermining the foundation by constructing diversion ditches, dikes, or other site grading.

(b) Holding Cells - Construct holding cells in accordance with all contract documents. The holding cells shall not have windows and each holding cell shall have solid reinforced walls as indicated in the drawings. Each holding cell will have a 11-13 gauge steel door with a dead-bolt lock. The door shall have a pass-through slot for passing of food trays with a hinged cover lockable from the outside. Built into the bottom of the door shall be a 300 mm wide by 500 mm tall door for passing a bucket in and out with a hinged cover lockable from the outside. Install a 2400 mm long bench securely bolted to the floor with a wall mounted steel bar. Contractor will construct an Afghan toilet (eastern style) oriented in the correct cultural direction with a screen about 1300 mm high in front of the toilet. Per design, separate gender holding cells will be constructed. An adjacent small mechanical room, as shown on drawing A-1, is required for hot water tank storage and a small air handling unit to provide ventilation and heating to the cells.

(c) Armory (Weapons Storage) - The armory shall have solid reinforced walls, as indicated in the drawings, with a 11-13 gauge steel door with a dead-bolt lock. Roof slab shall be a 200mm reinforced concrete slab.

(d) Dining Area and Kitchen – The Contractor shall design and construct a kitchen and dining area in accordance with the contract documents. The complete and functional dining and kitchen facility shall be capable of feeding up to thirty (30) personnel at one sitting based on the menu and functional requirements of the ANP and the local availability of food service equipment and supplies. Dining area walls and doors shall have no interior glazing. The contractor shall provide 14 gauge, type 304, (18-8) minimum stainless steel work counters, shelving, scullery sink, stoves, electrical capacity, outlets, and space for future refrigerators and freezers (not in contract) within the DFAC. A 1200 x 1800 mm serving opening (serving counter may be stainless steel or marble) is required between the dining area and kitchen with the purpose of both serving food and for dish return. Opening shall have fire rated shutter and no glazing allowed. Equipment shall be durable, easy to operate, maintain, clean, and be locally available. All work counters and scullery shall have an 800 mm deep work surface at 900 mm above the floor and supported by pairs of stainless steel legs (front and back of counters) at 1800 mm maximum centers. Provide integral stainless steel backsplashes at each side adjoining a wall (trim as required at the pass-thru opening). Work counters shall be continuous and fixed to the walls or 800 x 1800 minimum units. See floor plan for proposed kitchen layout. Design must be submitted and approved by the contracting officer prior to purchasing or installing any equipment or furnishings.
The stoves in the kitchen shall be propane type. Stoves in exterior kitchen annex shall be wood burning type. Propane shall be provided with standard 100 lb bottles. Trench type floor drains shall be installed in front of the dishwashing area and the propane and cooking stoves. Install a large wash basin with a low rim height designed for washing very large pots. Fire protection is to be provided by portable fire extinguishers at easily accessible locations. Kitchen adjacent pantry room storage is required.
Technical requirements for the propane stoves, kitchen ventilation and wood stoves are provided in Section 01015.

(i) Plumbing – Plumbing fixtures shall be in accordance with section 01015

(j) Clotheslines – Provide clotheslines behind the building, approximately 5 m in length with 4 lines across spaced 410 mm apart and of sufficient strength to prevent sagging when all of the lines are loaded.

4.15 FIRE PROTECTION FEATURES:

No sprinkler system is required, but alarm and smoke detection system is required and detailed in section 01015. All walls, both interior and exterior area 200 mm CMU construction and constitute fire wall protection. All corridor doors shall be 20 minute rated. Both dining room doors shall be 90 minute rated, contain no glazing and have panic hardware. All door glazing must be fire rated and not exceed 0.065 SM in area. Complete fire door requirements are shown on the attached drawings.

-- END OF SECTION --

SECTION 01015

TECHNICAL REQUIREMENTS – SITE ADAPT

1.0 GENERAL

1.1 COMPLIANCE

The Contractor's design and construction must comply with technical requirements contained herein. The designer shall have a minimum of 5 years experience with the design and construction of the same magnitude and complexity as required in this project. The Contractor shall provide design and construction using the best blend of cost, construction efficiency, system durability, ease of maintenance and environmental compatibility.

1.2 MINIMUM & ALTERNATE REQUIREMENTS

The design and product requirements stated in these documents are minimum requirements. The technical requirements listed in Codes and Technical Criteria, Section 1.8, apply to this project. Any deviation from the technical requirements and furnished drawings and specifications shall be approved by the Contracting Officer. Request for deviations shall be submitted for approval. The Contractor is encouraged to propose alternate design or products (equipment and material) that are more commonly used in the region; but these variations shall be equal in performance from a technical standpoint as well as more cost effective or allow for more timely completion. Variations shall furnish the same system safety, durability, ease of maintenance and environmental compatibility. The Contractor will be required to submit information as specified in Section 01335, 3.6.4 Variations, for all proposed variations with which to make a comprehensive comparison of the proposed alternate. All variations of approved designs must be approved by the Contracting Officer.

1.3 ASBESTOS CONTAINING MATERIALS

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

1.4 SAFETY

1.4.1 UNEXPLODED ORDNANCE (UXO)

It is the responsibility of the Contractor to be aware of the risk of encountering UXO/mines and to take all actions necessary to assure a safe work area to perform the requirements of this contract. If during construction, the contractor becomes aware of or encounters UXO/mines or potential UXO/mines, the contractor shall immediately notify the COR, mitigate any delays to

scheduled or unscheduled contract work, and clear/remove the UXO/mines. The contractor may only provide clearance/removal services via UNMACA accredited entities. Clearance/removal may only be undertaken in accordance with IMAS/AMAS/USACE standards. The Contractor assumes the risk of any and all personal injury, property damage or other liability arising out of or resulting from any Contractor action taken hereunder. Scrap metal shall be the property of the Host Government. The scrap metal on site shall be moved to an area away from the site perimeter as directed by the Contracting Officer's Representative and left for the Host Government to remove and/or salvage.

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

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

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

1.4.2 UNEXPLODED ORDNANCE (UXO) SAFETY SUPPORT DURING 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 to perform the requirements of this contract. 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 Demining Contractor/ Demining Sub-Contractor, and mitigate any delays to scheduled or unscheduled contract work. The Demining Contractor/ Demining Sub-Contractor shall remove and dispose of UXO's 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.

1.5 LIMITATION OF WORKING SPACE

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

Areas located immediately outside the construction area are known to contain mines and unexploded ordnance (UXO). Contractors assume all risks when venturing in or out of the designated work area.

1.6 TEMPORARY STRUCTURES

The Contractor shall erect suitable temporary fences, lighting, and necessary structures to safeguard the site, materials and plant against damage or theft and for the protection of the general public and shall adequately maintain the same throughout the course of the contract.

1.7 SUBCONTRACTORS

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

1.8 LIST OF CODES AND TECHNICAL CRITERIA

The following codes and technical criteria and those referenced therein shall be required for this project. References within each reference below shall be required and adhered to. If there is conflict in the criteria the most stringent requirement shall be applied. This list is not exhaustive and is not necessarily complete.

ACI 318 Building Code Requirements for Structural Concrete (2002), American Concrete Institute

ACI 530/ASCE 5/TMS 402, Building Code Requirements for Masonry Structures latest

Air Force Manual 32-1071, Security Engineering, volumes 1-4, 1 May 1994

American Institute of Steel Construction (AISC), Specifications for Structural Steel Buildings

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

ASCE 7, Minimum Design Loads for Buildings and Other Structures latest

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

ASME - American Society for Mechanical Engineering

ASTM - American Society for Testing and Materials

ASTM-D-1586 Standard Test Method for Standard Penetration Test

AWS D1.1, Structural Welding Code – Steel (2000), American Welding Society

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

Factory Mutual (FM) Approval Guide-Fire Protection latest

IBC - International Building Codes, 2006 edition (and its referenced codes including those inset below); except structural design.

IEEE C2, National Electrical Safety Code (NESC), latest edition

IFGC – International Fuel Gas Code, latest edition

IMC – International Mechanical Code, latest edition

IPC – International Plumbing Code, latest edition

Lighting Handbook, IESNA, latest edition

NFPA 1, General Fire Protection, latest edition

NFPA 10, Portable Fire Extinguishers, latest edition

NFPA 58, Liquefied Petroleum Gas Code, latest edition

NFPA 70, National Electrical Code, latest edition

NFPA 72, National Fire Alarm Code, latest edition

NFPA 75, Standard for the Protection of Information Technology Equipment

NFPA 80, Fire Rated Doors and Windows, latest edition

NFPA 101, Life Safety Code, latest edition

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

NFPA 221, Standard for

Chimneys, Fireplaces, Vents, And Solid Fuel–Burning Appliances, latest edition

NFPA 1141, Site Fire Protection, latest edition

SMACNA - Sheet Metal and Air Conditioning Contractors' National Association, Standards and Guides, latest editions

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

TM 5-811-1 Electrical Power Supply and Distribution

UFC 1-200-01, Design: General Building Requirements

UFC 1-300-07A Design Build Technical Requirements

UFC 3-220-03fa Soils and Geology

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

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

UFC 3-230-06a, Subsurface Drainage, 16 Jan 2004

UFC 3-230-07a, Water Supply: Sources and General Considerations, 16 Jan 2004

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

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

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

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

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

UFC 3-240-03N, Operation and Maintenance: Wastewater Treatment System Augmenting Handbook, 16 Jan 2004

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

UFC 3-240-09fa Domestic Wastewater Treatment 16 Jan 2004

UFC 3-240-07fa Gravity Sewers 16 Jan 2004

UFC 3-240-04A Wastewater Collection 16 Jan 2004

UFC 3-250-01FA Pavement Design for Roads, Streets, Walks, and Open Storage Areas

UFC 3-250-18FA General Provisions and Geometric Design for Roads, Streets, Walks, and Open Storage Areas

UFC 1-300-09N, Design Procedures

UFC 3-310-01, Structural Load Data

UFC 3-310-02A, Structural Design Criteria for Buildings

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

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

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

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

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

UFC 4-020-03, Security Engineering: Fences, Gates, and Guard Facilities, 14 June 2007

UFC 4-022-01, Security Engineering: Entry Control Facilities/Access Control Points, 25 May 2005

UL 752, Bullet Resisting Equipment, 2000 or later

USCINCCENT OPORD 97-1

Overseas Environmental Baseline Guidance Document, Department of Defense, May 2007

The publications to be taken into consideration shall be those of the most recent editions.

Unified Facility Criteria (UFC) is available online at
http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4

In addition, technical criteria provided in USACE-AED Design Requirements (most recent version) shall be required for use in design and construction specifications as indicated in the following documents. The following design criteria shall be used:

AED Design Requirements - Site Layout Guidance, latest version

AED Design Requirements - Well Pumps & Well Design/Specifications, latest version AED Design Requirements – Water Tank and Water Distribution Systems, latest version AED Design Requirements – Chlorinators, latest version AED Design Requirements - Hydro-Pneumatic Tanks, latest version

AED Design Requirements – Hydrology, latest version

AED Design Requirements - Sanitary Sewer and Septic Systems, latest version AED Design Requirements - Grease Trap, latest version AED Design Requirements - Oil-Water Separator, latest version

AED Design Requirements - Package Wastewater Treatment Plants and Lagoons, latest version

AED Design Requirements – Geotechnical Investigations for USACE Projects, latest version

AED Design Requirements – Voltage Drop Calculations Process, latest version

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

1.9 AED DESIGN REQUIREMENTS DOCUMENTS

AED Design Requirements documents listed above shall be adhered to in this contract. These documents are available from the Contracting Officer and shall be used as the basis for design and construction, and for selecting options within the United Facilities Guide Specifications (UFGS). It is the contractor's option to use specifications contained in the AED Design Requirements Documents, when provided, or to adapt the UFGS specifications to match the requirements provided in the AED Design Documents and specifications. Site or project specific data and requirements in the AED Design Requirements documents shall supersede UFGS language where there are differing criteria which must be evaluated and selected.

2.0 SITE DEVELOPMENT

2.1 GENERAL

The project includes furnishing all materials, equipment and labor for constructing electrical, water, communication, sanitary sewer and storm sewer service lines, as applicable, and connecting to the existing utility networks.

2.2 ENVIRONMENTAL PROTECTION

The Contractor shall comply with all requirements of Section 01355 ENVIRONMENTAL PROTECTION.

2.3 CIVIL SITE DEVELOPMENT

2.3.1 SITE PLAN

The contractor shall prepare plat or plan of property as part of the design package consists of a Boundary Survey. The survey shall show the closure of the property boundary consisting of identifying all property corners, establishing horizontal and vertical control listing all bearing and distances of property lines from the centerline of all adjacent roads. The contractor shall place property corner markers and a monument on the property showing site elevations, coordinate grid systems and WGS 84 latitude longitude. This survey shall meet the requirements of World Geodetic System 1984 (WGS 84 UTM Zone 42N in decimal degrees. The survey design shall include topographic map and the locations of all building corners, structures, major trees, road right of ways, names of roads, widths of roads, easements, right of ways, setbacks, parking and paving areas, storage containers, stoops, sidewalks and walkways, above ground utilities, electrical and bunker locations. The contractor shall identify and show perimeter walls, fences, Hesco barriers, guard towers and entry control point structures. The contractor shall

locate the facilities in general agreement with the drawings included and any requirements in the Scope of Work 01010. All site features shall be clearly defined and dimensioned on the site plan. Buildings shall be located to provide access for emergency vehicles and fire fighting. Roads and parking areas shall be designed for turning radius of the largest vehicle entering the compound. The site plan shall show geometric design of the site, including applicable dimensions of all exterior facilities, mechanical equipment, pavements, utilities, etc. Required facilities are described in the following sections of this specification. All roads and areas where tractor-trailer vehicles will travel shall be designed for the worst case turning radius. Design and construction of roads and pavements shall be based on recommendations from geotechnical investigation required herein. All site plans and master plans shall be drawn in the following projection and datum for incorporation into the U.S. Army Corps of Engineers GIS system: WGS 1984 UTM Zone 42 N

2.3.2 DEMOLITION

Demolition shall include removal of concrete, foundations, pavements, and utilities, to include clearing and grubbing not associated with the education building, district building, DHQ building, and Afghan telecom building. These four buildings will be left in the same condition as prior to start of construction. All refuse and debris shall be disposed of off of the site as described in paragraph 2.2.4 DISPOSAL. Holes and depressions shall be backfilled and compacted in lifts not to exceed 300mm in height. Fill materials shall be composed of satisfactory soils or aggregates defined in ASTM D 2487 as GW, GP, GM, SP, SM, and SW. Minimum soil compaction shall be 95 percent of maximum density as defined in ASTM D 1557

Scrap metal shall be the property of the Host Government. The scrap metal on site shall be moved to an area away from the site perimeter as directed by the Contracting Officer's Representative and left for the Host Government to remove and/or salvage. Demolished fencing and concertina wire shall be neatly rolled up for reuse by the host government. Likewise, used fence posts and outriggers shall be neatly stockpiled for reuse by the host government.

2.3.3 SITE GRADING & DRAINAGE

The contractor will provide all necessary site grading to insure adequate drainage so that no areas will be flooded due to a rainfall of a 10-year frequency. Drainage of the area should be compatible with the existing terrain. Building floor elevation shall be a minimum 150mm above grade and slope away from the building on all sides at a minimum of 5% for 3 meters. Protection of facilities from flood waters originating offsite of an installation is required and shall be based on a rainfall for a 25-year frequency event. This shall include the design or evaluation of bridges, culverts, and causeways.

Rainfall data utilized for hydrology calculations shall be based on data obtained from meteorological records collected in Afghanistan. National agencies may be consulted for data. In the absence of site specific data, intensity-duration-frequency curves contained in the AED Design Requirements – Hydrology July 2009 shall be used by extrapolating the rainfall intensity information from the stations in closest proximity to the project. Under no circumstances will relationships developed by extrapolation from foreign countries be used for hydrologic studies.

2.3.4 ROADS

Aggregate roads are required within the compound. All roads shall be a surface 7.3 meters (24 feet) wide, unless otherwise noted, graded for proper drainage, provided with necessary drainage structures and completed with prescribed surfaces in accordance with applicable sections of UFC 3-250-18FA and UFC 3-250-01FA. Aggregate pavement surface should consist of 150mm (6 inches) thick aggregate base course material compacted to 95% maximum proctor density, placed above 150mm of scarified subgrade compacted to 95% maximum density. Provide 1.0 meter wide shoulder on both sides of roadways, consisting of a surface of aggregate base course material and it should be 150mm thick @ 2.0% slope. Contractor shall notify the Contracting Officer immediately if initial site survey determines that the area hydrology requires major drainage structures or bridges.

For Optional Item: Paved roads are required where stated. All roads shall be of wearing surface 7.3 meters (24 feet) wide, unless otherwise noted, graded for proper drainage, provided with necessary drainage structures and completed with prescribed surfaces in accordance with applicable sections of UFC 3-250-18FA and UFC 3-250-01FA. The compound (cantonment area) roads sections shall have 200 mm (8 inch) base course minimum compacted at 98% maximum proctor density and shall be surfaced with minimum 50 mm (2 inch) hot mix asphalt concrete compacted at 100%, unless otherwise noted. 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

2.3.4.1 BRIDGES AND SITE GRADING PLAN

Preliminary investigation indicates no need for bridges or major drainage structures. The Contractor shall notify the Contracting Officer immediately if initial site survey determines that area hydrology requires major drainage structures or bridges. The contractor shall design a site grading plan that provides positive drainage and minimizes the requirement for major structures in a cost effective manner.

2.3.4.2 PARKING AREAS AND MOTOR POOLS

Contractor shall construct parking and storage areas using aggregate surface (AC pavement is an option item that will be itemized on the 00010 Proposal Schedule). Aggregate surface should consist of 150mm (6 inches) thick Aggregate Base Course (ABC) material compacted to 95% maximum proctor density, placed above 150mm of scarified subgrade compacted to 95% maximum density. Provide 1.0 meter wide shoulder around all parking areas and motor pools, consisting of a surface of ABC material and it should be 150mm thick @ 2.0% minimum slope.

ABC material must be well graded, durable, uniformly moistened, and mechanically stabilized by compaction. Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure in ASTM D 1557.

2.3.5 FORCE PROTECTION DESIGN

The Contractor shall design and construct force protection measures to include a complete perimeter wall, Guard Towers, Compound Illumination System, Security Communication Systems and Entry Control Points (ECP). ECP shall be composed of a Primary ECP, a Stand-Off ECP, and a Secondary ECP. The Force Protection design shall incorporate minimum setbacks for new facilities to maximum extent possible as permitted by size of the site and the requirements of the user. See Appendix A for Guard Shack and Guard Tower building designs with standard details for Perimeter Security wall, and Active and Passive Vehicle Barriers.

2.3.5.1 PERIMETER SECURITY WALL

Native stone masonry walls, 600mm thick, shall be constructed around the perimeter of the site. The height of the walls shall measure at least 2.4 meters from the inside grade. Inside grade shall in all cases be higher than outside grade. The foundation width shall be based on USACE standard drawings. The wall shall be capped with a cast-in-place reinforced concrete capping. Outriggers see paragraph 2.3.5.2.3, to support 6 strands of barbed wires and a single-coil concertina style razor wire shall be provided and installed by the contractor. Site grading must slope away from the walls for at least a distance of 5 meters. The wall shall be designed to prevent visual access to the inside of compound by all pedestrian and vehicular traffic outside the compound which may require the wall to be built at a higher level in some locations. Any penetrations through the Perimeter Security Wall shall only be for site drainage purposes and shall have force protection such as a welded bar grill, welded grating, or other pre-engineered barrier.

2.3.5.2 PERIMETER WALL ACCESS GATES

2.3.5.2.1 SWINGING GATES

Double Swing Gates shall be provided for vehicle access at the Primary Entry Control Point and be constructed of steel and be a pair of 3.65 m wide x 2.4 m high steel leaves, constructed of 6mm steel plate skins, steel tube frame, and steel tube intermediate posts and rails. A Personnel Gate shall be provided for personnel access and be constructed of steel and be 1.5 m wide x 2.4 m high steel leaves, constructed of 6mm steel plate skins, steel tube frame, and steel tube intermediate posts and rails. A single swing gate shall be provided on the opposite side of the compound for an escape hatch and shall be a minimum of 3.65m x 2.4 m. Gate design shall insure it is dimensionally stable, square, true and planar. Gate leaves shall not rack, shake or deflect during operation and the hinges are to be designed and constructed to support the entire weight of each leaf. Gates shall have a sufficient number of hinges, anchor mounted to the exterior masonry walls, to support each gate leaf. Provide a locking mechanism that holds the gates together when in the closed position as well as a drop bolt that engages a steel sleeve embedded in the pavement. Each gate shall be provided with viewports 200mm x 50mm.

2.3.5.3 OUTRIGGERS

Outrigger supporting arms shall be “Y” shaped with middle post, securely embedded 400mm by a 50mm diameter metal tube into the top of the wall. Posts shall conform to ASTM F 1083,

Pipe, Steel, Hot Dipped Zinc Coated (Galvanized) Welded. Outriggers shall be spaced a maximum of 3000mm on center.

2.3.5.4 REINFORCED BARBED TAPE

Reinforced barbed tape shall be 600 mm diameter concertina style coil consisting of 31 loops. Each loop shall consist of 19 barb clusters per loop. Adjacent coils loops shall be alternately clipped together at three points about the circumference to produce the concertina effect upon deployment. Spacing between attachments points when deployed shall be 400 mm. The reinforced barbed tape shall be fabricated from 430 series stainless steel with hardness range of Rockwell (30N) 37-45 conforming to the requirements of ASTM A 176. Each barb shall be a minimum of 30.5 mm (1.2 inch) in length, in groups of 4, spaced on 102 mm (4 inch) centers. The stainless steel core wire shall have a 2.5 mm (0.098 inch) diameter with a minimum tensile strength of 895 MPa. Sixteen gauge stainless steel twistable wire ties shall be used for attaching the barbed tape to the barbed wire. The reinforced barbed tape shall be equivalent to NSN: 5660-01-457-9852.

2.3.5.5 CHAIN-LINK FENCE AND GATES

Provide chain-link fence and gates around Well House chain link fence and gate fabric shall be No. 9 gage wires woven into a 50 mm diamond mesh. Fabric shall be coated with 366 grams per square meter zinc galvanizing. Posts shall be ASTM F 1083 Pipe, Steel, Hot Dipped Zinc Coated (Galvanized) Welded or equal. Top of fence and gates shall be provided with outriggers and reinforced barbed tape as indicated above. Post sizes shall be as shown on drawings.

The gates shall be swing type. Hinged gates shall be a pair of 3 m wide x 2.4 m high leafs, constructed of a steel tube frame and steel tube intermediate posts and rails. The design of the gates shall insure that it is dimensionally stable, square, true and planar. Gate leafs shall not rack or deflect when install on its hinges. Gates shall have a sufficient number of hinges, anchor mounted to the exterior masonry walls, to support each gate leaf. Provide a locking mechanism that holds the gates together when in the closed position as well as a drop bolt that engages a steel sleeve embedded in the pavement.

2.3.5.6 PRIMARY ENTRY CONTROL POINT (ECP)

Primary ECP shall be laid out and constructed by the Contractor to facilitate secure entrance of authorized vehicles into the compound. A Guard Shack shall be provided both inside and outside the compound as part of the Primary ECP. Entrance to the Primary ECP shall be paved with the same surface as required for the interior roads of the compound, and shall have a two-leaf steel swinging gate. The gate shall be considered the Active Vehicular Barrier (AVB). A drop arm and guard shack shall be provided and located at a distance of one and a half vehicles away from the entrance to serve as a checkpoint. Jersey Barriers or other approved alternatives shall be used to design and construct a Passive Vehicular Barrier (PVB) beyond and away from the checkpoint to significantly slow down approaching vehicles. The PVB shall be laid out to force approaching vehicles into a snake-like manoeuvre while approaching the checkpoint and to significantly slow them down. See Appendix A for Guard Shack drawings.

Provide a rejection lane after vehicle inspection and before entrance to the compound.

2.3.5.6.1 DROP ARM GATES

The height of the beam shall be a minimum of 30 inches above finished grade. The crash beam must be capable of blocking a minimum road width of 7.3 meters. The crash beam shall be manually raised and lowered with less than 30 pounds of force. The end of the crash beam should include a locking pin with padlock acceptance for securing the beam when it is in the down position capable of stopping large (10,000 lb.) trucks, in addition to heavy duty steel gates into the compound.

2.3.5.6.2 TIRE SHREDDER AVB

Additional active barriers shall be tire shredder type with manual latch down capability. Shredders shall extend the entire width of the roadway opening where installed. At minimum provide one shredder at rejection lane entrance to prevent unauthorized gate access.

2.3.5.6.3 CONCRETE PVB

Barriers shall be concrete blocks of one meter by one meter by one meter dimensions. Similar arrangements of large stones (one cubic meter size), jersey barriers or equal sized obstacles may be used.

2.3.5.6.3.1 HESCO PVB

Hesco barriers shall be made of geo-textile fabric shall be 2mm (0.08”) non-woven polypropylene and bound with 8 gauge galvanized steel wire mesh size 7.62 cm (3”) grid. The coil hinges and joining pins shall be 8 gauge hardened steel. Fill material shall be a mixture of sand and gravel. The gravel shall not be more than 1.8 cm (¾”) in size. The materials shall be compacted in lifts no greater than 25 cm (10”).

Bastions shall be provided with suitable foundations as recommended by the manufacturer depending on the height, and filled with a sand & gravel mixture. Provide a gravel base at least 50 cm (20”) deep, and extending around the bottom edge of the barrier by at least 50 cm (20”), for proper support and drainage. The gravel base material shall have no stones large than 2.5 cm (1”), due to the risk of becoming projectiles in a blast.

Protection from UV light shall be provided with an application of a protective coating such as UV CAM, cement slurry not greater than 0.3 cm (1/8”) thick. The cement slurry is a mixture of cement powder and water, mixed to a proportion of 1:1, but this may be adjusted to suit the application method. Sand may also be added as necessary.

Submittal Requirements:

a. The manufacturer of this product must have been in this business for at least 5 years.

b. Welded mesh and wire shall meet the requirements of ASTM A641, Class 3.

c. Geo-textile shall meet the requirements of ASTM D4632, D6241, D4355, D4751 & D4491.

2.3.6 LOUDSPEAKERS AND ALARM SYSTEM

Install Loud Speaker & Alarm System that can alert the entire compound via panic button from any tower or guard post station. Speaker & Alarm System shall be exterior grade components to withstand severe weather conditions of cold, heat, rain, sleet, and dust storms and to be completely understandable during these conditions from any point within the compound. All wires shall be installed in conduits.

2.4 CIVIL UTILITIES

2.4.1 WATER

2.4.1.1 GENERAL

The Contractor shall provide water distribution mains, branches, service connections to include all pipe, valves, bends, thrust blocking, fittings and appurtenances. Exterior water line construction shall include service to all buildings as described in the Scope of Work Section 01010. The required average daily flow (ADF) shall be the average daily demand (ADD) per person - derived from 190 liters (or 50 gallons) per capita per day (lpcd) – times a capacity factor, times the effective population. A capacity factor of 1.5 shall be used. The capacity factor shall be utilized as described in the following paragraph. In the event potable or non-potable use water is required prior to completion of the water facilities infrastructure the Contractor may be issued a Request for Proposal to provide non-potable (tank truck) and potable (bottled or other reliable source) consumption. Provide a minimum of one (1) outside water hydrant (hose spigot) for all buildings with water service.

Features of the water system shall be sized to provide flow or storage capacity as follows:

- Water Well Pump Capacity - Capacity and total dynamic head (TDH) shall be based on an adjusted ADF (ADD, times the population, times the capacity factor) over a 16 hour period).

- Water Tanks - Capacity shall be based on ADF (ADD x c x CF). (NOTE: If a minimum volume of storage is provided in the contract documents, and it is determined that the value provided does not account for the capacity factor, that value will be multiplied by the capacity factor to determine the actual required storage volume for the facility.)

- Water Mains – Diameter shall be 100mm. A larger diameter may be installed based on maximum velocities determined using the installation fixture unit flow or two times the ADF (ADD x c x CF). The flow through the system shall be distributed on the basis of fixture unit flow in each the buildings serviced or per contract

- Water Service Lines - Diameter based on fixture units of the building serviced or per contract

2.4.1.2 WATER WELLS

The contractor shall construct water well(s) inside the compound, to provide sufficient supply for the facility. The new well capacity shall be based on the allowable safe yield of the new well determined by a well pump test as described in the USACE-AED Water Well Guide Specification. The new well site shall be at a location approved by the Government. The new well site shall be no closer than 60 meters from any existing wells. Well construction shall be in accordance with the USACE-AED Water Well Guide Specification.

After de-mining, but prior to the construction of any structures, the Contractor shall submit a well test plan to drill and test the water well, conduct well design activities, and submit all required information to AED for review prior to installing any permanent well features. Drilling shall not proceed without an AED Engineering approved well drilling plan. A plan for decommissioning dry wells shall be included with the well drilling plan. It is acknowledged that water may not be available at the site despite Contractor good faith efforts to find it. The Contractor shall include in his proposal, services required to drill two (2) wells each to a maximum of 120m or one (1) well to a maximum depth of 240m. The decision whether to drill one or two wells shall be at the discretion of the COR and shall be made at any point before or during the drilling of the initial well. The contractor is responsible for having appropriate equipment on site to execute either drilling scenario at the contract price. If water is not found after drilling a total linear depth of 240m, the Contractor will be considered to have fulfilled the terms of the contract and will be entitled to the full price of the contract CLIN for well drilling. Even if water is not found, the Contractor must still furnish all other parts of the water distribution system as described in the specifications. At this time, off site water wells and other alternatives may be considered upon approval by the COR.

Well Capacity shall be equal to one day's demand delivered over 16 hours of pumping time.

Well construction shall be in accordance with AED Design Requirements - Well Pumps & Well Design/Specifications, latest version - which includes, but is not limited to, requirements for well screen, casing, gravel pack, well pump, disinfection, and testing requirements. All design requirements, material specifications, and testing contained in this document shall be used and submittals shall be made promptly in accordance with Section 01335. Failure to follow the construction and submittal procedures outlined may, at AED's discretion, result in rejection of the well and, the contractor having to remove the well casing and screen, re-drill the well and reinstall the proper features per the approved design.

Well Depth. The well shall be drilled to a minimum depth of 20 m below the existing water table. The depth of the permanent well shall take into consideration the drawdown depth, screen depth and pump submergence as described in the AED Design Requirements document.

Casing. Selection of the casing diameter, material and depth shall be per the AED Design Requirements document. All wells will be cased 610 mm above grade (i.e., base of pit, ground surface, etc.) and be fitted with a lockable cap with air gap (vacuum relief during pumping). Each section of casing will be joined with standard couplings and full-threaded joints, or by proper welding, so that all joints are sound and watertight. Well casing alignment shall not interfere with the proper installation and operation of the pump.

Screen. The casing will be fitted with a well screen that will permit maximum transmission of water without clogging. The material of construction, opening requirements, minimum lengths and placement shall be per the AED Design Requirements document

Sealing - The drilling process will create a hole (borehole) larger than the casing. To protect the well and properly finish construction, the entire space between the casing and the edge of the borehole will be filled with gravel, overburden, or concrete as follows:

a. The upper 3 m of the well bore will be sealed with cement grout. Grout shall be placed in one continuous mass and be impermeable.

b. The space around the well screen will be filled with material that will form a filter and not clog the slots in the screen (e.g. washed coarse sand for a fine bore wall material).

c. The space between the top of the filter pack and the base of the grout seal may be backfilled with overburden or other clean earth material.

Crushed Stone. Per the AED Design Requirements, crushed stone for well sealing shall consist of crushed stone containing angular shapes and surfaces with no rounded surfaces shall be used for sealing the solid wall casing and edge of the borehole area. All aggregate shall contain less than 5% of shale, clay lumps, coal, lignite, soft or unfragmented stone, or other deleterious materials.

Source protection - Surface drainage within 30 m of wellhead shall ensure no ponding, flooding or collection of runoff adjacent to the well. This can be accomplished through surface grading or use of gravel drains to modify site drainage in the vicinity of the well. Contractor shall identify all sources of contamination and ensure the proposed well site meets minimum standoff distances as indicated below:

Sewage storage areas (outhouses, tanks, individual sewage pits, lagoons, and WWTP) – 30 m

Septic fields (infiltration galleries) – 30 m

Fuel storage, engine maintenance/repair – 30 m

Well Pump – A submersible, centrifugal pump shall be installed inside the casing set no more than 1.5 meters from the base of the excavation. Control of the pump shall be by means of a Hand-Off-Auto (HOA) switch. In the “Auto” position, the pump shall be started and stopped automatically by water levels in the water storage tank. Pump shall start at low level and shall stop at high level. Level controls shall be adjustable. Manual start shall be the Hand position.

Expansion Tank – Provide bladder style expansion tank for well pump to minimize pressure surges and water hammer effects

2.4.1.3 WELL PUMP TESTING

Well pump testing and water clarity testing after well development shall be per the requirements in AED Design Requirements - Well Pumps & Well Design, latest version.

2.4.1.4 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.

See USACE-AED Well Pumps & Well Design Guide with Attachment A – Guide Specifications for Drinking Water Wells, latest version and Appendix A of TM 5-813-3 (UFC 3 230 08a Water Supply Water Treatment, January 2004) for requirements for laboratory testing.

2.4.1.5 WELL HOUSE

At new wells or springs, construct a permanent well house with reinforced concrete slab floor. The floor of the well house shall slope away from the casing approximately 3 mm per 300 mm (1/8" per foot) and drain to the outside. Floor of well house shall be minimum 300mm above adjacent grade. The well house design should be such that the well pump, motor, and drop pipe could be removed readily by providing an insulated hatch in the building roof provided with a hasp and lock. The well house shall protect valves and provide physical security and freeze protection for protect piping, valves, hand pump, and chlorination equipment. The well house shall be insulated and have a heating unit provided. The entry door shall be made of heavy duty metal and metal frame with no louvers. The well shall be protected from unauthorized use by a security fence with lockable gate. Provide outriggers, barbed wire and concertina wire on fence and gate.

2.4.1.6 RAW WATER DISINFECTION

Contractor shall perform disinfection of the well water in accordance with AED Design Requirements - Well Pumps & Well Design/Specifications, latest version. Bacteriological samples shall be collected and examined in accordance with Standard Methods for the Examination of Water and Wastewater by a qualified lab as approved by the Contracting Officer.

2.4.1.7 WATER STORAGE TANK

Contractor shall provide a steel, elevated water storage tank. The construction of the water tower supporting the water storage tank shall be performed in strict conformance with the furnished drawings and specifications. Geotechnical investigations specifically related to the water tower are outlined in the AED Dsign Requirements for Geotechnical Investigations. These investigations shall be conducted as part of the geotechnical work for the site and submitted in the 10% submittal per Section 01335. The bottom of the storage tank shall be 20 meters above the finished grade at the base of the tank and shall be at least 20 meters above the finished floor elevation of the headquarters building. Volume of the water storage tank shall be a minimum storage volume of a full days demand. 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. Overflow and air vents shall be screened so that birds, rodents and debris cannot enter the reservoir. The tank shall meet all applicable codes for potable water storage. The interior coatings for the tank shall meet NSF/ANSI 61 requirements.

2.4.1.8 DISINFECTION & CHLORINATION SYSTEM

Use hypochlorite compounds for disinfection. A hypo-chlorinator shall be used to feed a sodium hypochlorite solution of 5-15% available chlorine into the system. Hypochlorite compound may be a liquid or solid form. The hypo chlorination system shall consist of a chemical solution tank for hypochlorite, diaphragm-type pump, power supply, water pump, pressure switch and storage tank (optional hydro-pneumatic/storage). The pump shall feed a hypochlorite solution in proportion to the water demand. The hypo-chlorinator shall have a pumping rate, liters per day (lpd) (gallons per day (gpd)) adequate to deliver 5 percent (%) available hypochlorite solution adjustable to the quantity of water being produced from the source. Dosage rate will vary somewhat depending on actual pump production rate and available residual chlorine in the system. Contractor shall determine the required dosage rate milligrams per liter (mg/l) to maintain the required chlorine residual (usually 0.2-0.4mg/l) in the distribution system. Chlorine solution tank shall be large enough to hold a three days supply of hypochlorite solution. A fresh solution shall be prepared every two or three days because the solution may lose its strength over time and this will affect the actual chlorine feed rate. The hypochlorite shall be stored in a cool dry place. Sodium hypochlorite can lose from two to four percent of its available chlorine content per month at room temperature. Contractor shall verify required minimum residual chlorine in accordance with local requirements verified and approved by the Contracting Officer. The chlorination system shall have the capability for manually adjusting the dosage rate and be installed in such a manner that the system can be easily disconnected and bypassed in the event of health safety or routine maintenance and repair. Disinfection of water mains shall be in accordance with AWWA standard C651-86 and disinfection of storage facilities in accordance with AWWA standard C652-86. The package disinfection system shall be located in the well pump house.

2.4.1.9 HAND PUMP

The Contractor shall provide a hand pump with separate intake piping in the well casing to allow water supply during periods without electricity. Water drawn from the well by the hand pump shall not flow through the electric well pump. The pump shall be valved so that it can be used to fill the water storage tank or discharge to a spigot outside the well house. The capacity of the pump shall be at least 20 liters per minute (5.3 gpm). The pump shall be lever operated while standing in the well house.

2.4.2 WATER DISTRIBUTION SYSTEM

2.4.2.1 GENERAL

The Contractor shall provide a water distribution system. Distribution lines shall be 100mm (4 inches) in diameter. Water supply distribution shall connect to a building service at a point approximately 1.5m (5 feet) outside the building or structure to which the service is required. All piping and joints shall be capable of at least 1.03 MPA (150 psi) leakage testing and 1.38 MPa (200 psi) hydrostatic test pressure unless otherwise specified. Pipes should be adequate to carry the maximum quantity of water at acceptable velocities not to exceed 1.5m/sec (5 ft/sec) at maximum flows not to exceed 2.8m/sec (9.2ft/sec). Pressure shall not exceed 517kPa (75 psi) at

any point of the distribution system. If high pressures greater than 517kPa (75 psi) cannot be avoided, pressure-reducing valves shall be used.

Contractor shall not use HDPE pipe and fittings.

Adequate cover must be provided for frost protection. A minimum cover of 800mm (2'-8") is required to protect the water distribution system against freezing. Water lines less than 1.25 meters (4 feet) deep under road crossings shall have a reinforced concrete cover of at least 150 mm (6 inch) thickness around the pipe extending out to 1m from each road edge.

2.4.2.2 PIPE

The Contractor shall provide PVC pipe of adequate strength, durability and be corrosion resistant with no adverse effect on water quality.

2.4.2.2.1 WATER MAINS AND BRANCHES

Water pipe material for water mains and branches shall be PVC. Pipe diameters used in the network shall be a minimum 100mm (4 inch). Building service lines will be sized according to guidance provided below. The exterior surface of the pipe must be corrosion resistant. All pipes and joints shall be capable of at least 1.03 MPa (150 psi) and 1.38 MPa (200psi) hydrostatic test pressure unless otherwise specified herein. 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, Schedules 40, 80 and 120. PVCu pipe couplings and fittings shall be manufactured of material conforming to ASTM D 1784, Class 12454B. Pipe less than 80mm (3 inch), screw joint, shall conform to dimensional requirements of ASTM D schedule 80. Elastomeric gasket-joint, shall conform to dimensional requirements of ASTM D 1785 Schedule 40, PVCu (or uPVC) pipe and fittings shall have SDR that provide equal or superior strength properties to ASTM 1785 SCH 40 or SCH 80 pipe and fittings.

2.4.2.2.2 WATER SERVICE

Water service connections to buildings shall vary from 19mm, 25mm, 38mm, 75mm, to 100mm as calculated, depending on the maximum flow velocity and minimum pressure requirements as determined by hydraulic analysis. Pipes for service connections may be smaller as required by plumbing code (IPC). Pipe service connections from the distribution main to the building shall be Polyvinyl Chloride (PVC) plastic Schedule 80 ASTM D 1785. PVC pipe couplings and fittings shall be manufactured of material conforming to ASTM D 1784, Class 12454B. Contractor shall not use HDPE for any of the water pipes.

2.4.2.3 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 concrete thrust blocking, unless otherwise approved. Pressure and leakage testing shall be as specified in AED Design Requirements – Water Tank and Water Distribution Systems, latest version.

2.4.2.4 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 1.38 MPa (200 psi). Each valve shall be opened and closed several times during the test. Exposed pipe, joints, fittings, hydrants and valves shall be carefully examined during the partially opened trench test. Joints showing visible leakage shall be replaced or remade as necessary. Cracked or defective pipe, joints, fittings, hydrants and valves discovered following this pressure test shall be removed and replaced and retested until the test results are satisfactory.

2.4.2.5 LEAKAGE TEST

Leakage tests shall be conducted after all pressure tests have been satisfactorily completed. The duration of each leakage test shall be at least 2 hours, and, during the test, water lines shall be subjected to not less than 1.38 MPa (200 psi). Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved or approved section, necessary to maintain pressure to within 34.5kPa (5 psi) of the specified leakage test pressure after the pipe has been filled with water and all air expelled. Pipe installation will not be accepted if leakage exceeds the allowable leakage, as determined by the following formula:

L = 0.0001351ND (P raised to 0.5 power), where:

L = Allowable leakage in gallons per hour
N = Number of joints in the length of pipeline tested
D = Nominal diameter of the pipe in inches
P = Average test pressure during the leakage test, in psi gauge

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

2.4.2.6 BACTERIOLOGICAL DISINFECTION

2.4.2.6.1 DISINFECTION PROCEDURE

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

retention time shall be at least 24 hours and shall produce not less than 25 ppm of free chlorine residual throughout the line at the end of the retention period. Valves on the lines being disinfected shall be opened and closed several times during the contact period. The line shall then be flushed with clean water until the residual chlorine is reduced to less than 1.0 ppm. During the flushing period, each fire hydrant on the line shall be opened and closed several times.

2.4.2.6.2 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. Contractor shall submit a water sampling protocol for approval. This shall include at a minimum the name of the laboratory, parameters to be tested, the Company conducting the sampling, and the sample locations.

2.4.2.6.3 ACCEPTANCE REQUIREMENTS

The disinfection shall be repeated until tests indicate the absence of bacteria for at least 2 full days. The unit will not be accepted until satisfactory bacteriological results have been obtained. All retests shall be conducted at the Contractor’s expense.

2.4.2.6.4 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.

2.4.2.6.5 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. Pressure and leakage testing may be conducted concurrently. 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.

2.4.2.7 VALVES

Valves (Gate valves w/box) shall be placed at all pipe network tees and cross intersections, and the number of valves shall be one less than the number of lines leading into and away from the intersection. For isolation purposes valves shall be spaced not to exceed 3600 mm (12 feet). Gate valves shall be in accordance with AWWA C 500 and/or C509. Butterfly valves (rubber

seated) shall be in accordance with C504 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 (3'-4") square, for all valve boxes. Valves shall be pressure rated to 1.38 MPa (200 psi).

2.4.2.8 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.

2.4.2.9 THRUST BLOCKING

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

2.4.3 SANITARY SEWER

2.4.3.1 GENERAL

There are no functional or salvageable sanitary sewer collection, treatment or disposal facilities at this 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 (4 feet) under road crossings shall have reinforced concrete cover at least 150 mm (6 inch) thick around the pipe. Concrete cover will extend out to at least 1 m from each road edge.

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 the initial occupancy and a reasonable expansion capability. Sewer collection capacity shall be based on the two times the average daily wastewater flow unless minimum diameter specified is adequate to provide flow and required maximum velocity; wastewater flow through the system shall be distributed on the basis of fixture unit flow in each the buildings serviced by multiplying the proportion of the total fixture flow from each building or facility times the total wastewater flow for the project or installation as determined above.

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.

The Contractor shall use the following criteria where possible to provide a layout which is practical, economical and meets hydraulic requirements:

d. Follow slopes of natural topography for gravity sewers.

e. Check subsurface investigations for groundwater levels and types of subsoil encountered. If possible, avoid areas of high groundwater and the placement of sewers below the groundwater table.

f. Avoid routing sewers through areas which require extensive restoration or underground demolition

g. Depending upon the topography and building locates, 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. The intent is to provide future access to the lines for maintenance without impacting vehicular traffic.

h. Avoid placing manholes in low-lying areas where they could be submerged by surface water or subject to surface water inflow. In addition, all manholes shall be constructed 50 mm higher than the finished grade, with the ground sloped away from each manhole for drainage.

i. Sewer lines shall have a minimum of 800 mm of cover for frost protection.

j. Locate manholes at change in direction, pipe size, or slope of gravity sewers.

k. Sewer sections between manholes shall be straight. The use of a curved alignment shall not be permitted.

l. If required by the design, locate manholes at intersections of streets where possible. This minimizes vehicular traffic disruptions if maintenance is required.

m. Sewer lines less than 1.25 meters deep under road crossings shall have a reinforced concrete cover of at least 150mm thickness around the pipe or shall utilize a steel or ductile iron carrier pipe. It is recommended to continue the reinforced concrete cover or carrier pipe a minimum of one (1) meter beyond the designated roadway.

n. Verify that final routing selected is the most cost effective alternative that meets service requirements.

2.4.3.2 PROTECTION OF WATER SUPPLIES

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

o. Sanitary sewers shall be located no closer than 30m (100 feet) horizontally to water wells or reservoirs to be used for potable water supply.

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

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

2.4.3.3 QUANTITY OF WASTEWATER

The Contractor shall verify the average daily flow considering both resident (full occupancy) and non-resident (8hr per day) population. The average daily flow will represent the total waste volume generated over a 24-hour period, and shall be based on the total population of the facility and water usage rate of 190 liters (50 gallons) per capita per day (water usage). The wastewater flow rate shall be calculated as approximately 80% of water usage rate, or 155 liters (41 gallons) per capita per day times the capacity factor requirements.

2.4.3.4 GRAVITY SEWER

Sanitary sewers shall be designed to flow at a maximum in the following way: 1) sanitary sewer laterals, mains and trunk lines flow 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, 2) a minimum velocity of 0.8 to 1.05 mps (2.5-3.5fps) at the peak diurnal flow rate, 3) flows shall be based on allocating the proportion of the average daily or peak daily flow to each building or facility on the basis of fixture unit flow developed for the plumbing design, and 4) minimum pipe slopes shall be provided regardless of the calculated flow velocities to prevent settlement of solids suspended in the wastewater. The minimum slopes are shown in the following table from AED Design Requirements for Sanitary Sewer and Septic Systems. This table does not state that slopes are designed at this slope regardless of flow depth and velocity. Other criteria must also be used to determine grade stated above. The word "minimum" is defined as "the least quantity or amount possible, assignable, allowable, or the like". Greater slopes shall be used as needed to achieve all the design requirements.

Minimum Slopes for Sewers	
Sewer Pipe Size (mm)	Minimum Slope in meters per 100 meters
100	1.00
150	1.0

Unless otherwise indicated (see Building Connections and Service Lines), gravity sewer pipe shall be installed in straight and true runs in between manholes with constant slope and direction. Adequate cover must be provided for frost protection. A minimum cover of 800 mm (2'-8") will be required to protect the sewer against freezing.

2.4.3.4.1 MANHOLES

The Contractor shall provide standard depth manholes (MH), (depth may vary) an inside dimension of 1.2m (4 ft). Manholes shall be made of cast-in-place reinforced concrete with reinforced concrete cover. Alternate pre-cast manhole option shall taper to a 750 mm (30-inch) cast iron frame that provides a minimum clear opening of 600 mm (24 inches). In every case, the manholes, frames and covers shall be traffic rated, H-20 load rating. All manholes shall be provided with a concrete bench with a flow line trough, smoothly formed to guide waste flow to the outlet pipe from the inlet pipe(s). The top surface of the bench shall be above the crown of all pipes within the manhole. All surfaces of the bench shall be sloped smoothly toward the trough to guide flow, even under peak flow conditions. Sanitary sewer lines shall enter at the manhole flow line. Where the invert of the inlet pipe would be more than 0.5 meter above the manhole floor, a drop inlet shall be provided. No internal drop structures shall be permitted at lift stations. Inlet to lift station wet wells shall enter below the lowest water level of the pump operating range, and if necessary a drop inlet approach pipe external to the lift station may be used to avoid cascading influent flow.

2.4.3.4.2 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. Manholes shall be installed at start of all main runs.

2.4.3.4.3 SPACING

The distance between manholes must not exceed 120m (400 ft) in sewers of less than 460mm (18 in) in diameter.

2.4.3.4.4 PIPE CONNECTIONS

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

2.4.3.4.5 FRAMES AND COVERS

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

2.4.3.4.6 STEPS FOR MANHOLES

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

2.4.3.5 PIPE

Pipe shall conform to the respective specifications and other requirements as follows: Provide Polyvinyl Vinyl Chloride (PVC) conforming to ASTM D 3034, Type PSM with a maximum

SDR of 35, size 380 mm (15inch) or less in diameter. PVC shall be certified as meeting the requirements of ASTM D 1784, cell Class 12454 B. Minimum pipe sizes for the main lines shall be 150mm (6 inch) diameter and service lines/laterals shall be a minimum of 100 mm (4 inch) diameter. Contractor may use uPVC pipe provided the SDR and strength properties of the pipe equal or exceed the properties of ASTM D 1784 for PVC. Manufacturer supplied data stating that all aspects of the ASTM are met will be required for approval.

2.4.3.5.1 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.

2.4.3.5.2 JOINTS

Joints installation requirements shall comply with the manufacturers installation instructions. Flexible plastic pipe (PVC) gasket joints shall conform to ASTM D3212.

2.4.3.5.3 BRANCH CONNECTIONS

Branch connections for new piping installations shall be made using regular fittings. Branch connections for upgrades or repairs 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.The minimum depth of the cover over the pipe crown shall be 0.8m (2 ft 8”).

2.4.3.5.4 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. Service connection lines will be a minimum of 100 mm (4 inch) diameter and laid at a minimum 1% grade. Service laterals shall be 150 mm (6 inch) and sloped to maintain the minimum velocity as described in paragraph “Gravity Sewer.”

2.4.3.5.5 CLEANOUTS

Cleanouts must be installed on all sewer-building connections to provide a means for inserting cleaning rods into the underground pipe. Install manufactured wye fittings. In lieu of a wye fitting, an inspection chamber may be installed. The inspection chamber shall be of the same construction as a manhole. Preferably the cleanout will be of the same diameter as the building sewer, and never be smaller than 150mm (6 in). Cleanouts shall be located within 1m from the building.

2.4.3.6 GREASE INTERCEPTORS

Grease interceptors are used to remove grease from wastewater to prevent it from entering the sanitary sewer and septic systems. All Dining Facilities (DFACs) shall incorporate preliminary treatment with use of a grease interceptor prior to the sanitary sewer system. The only waste lines upstream of the grease interceptor shall be grease laden waste from the kitchen or other areas. Grease interceptor design shall be based on AED Design Requirements - Grease Trap, latest version. The grease interceptor shall be of reinforced cast-in-place concrete, reinforced precast concrete or equivalent capacity commercially available steel, with removable three-section, 9.5 mm checker-plate cover, and shall be installed outside the building. Steel grease interceptors shall in be installed in a concrete pit and shall be epoxy-coated to resist corrosion as recommended by the manufacturer. Concrete shall have 21 MPa minimum compressive strength at 28 days. The grease interceptor shall connect to the sanitary sewer system.

Contractor shall provide bollards around the tank and construct a minimum 4 m wide access road from the closest roadway to the grease interceptor for a pump truck. The access road shall be of the same material as the main roads in the compound. Under no circumstance shall the grease interceptor be installed inside the building. Provide outside water spigot for cleaning.

2.4.3.7 FIELD QUALITY CONTROL

2.4.3.7.1 FIELD TESTS AND INSPECTIONS

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

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

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

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

Low-pressure air tests: Perform tests as follows:

r. 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.

2.4.3.7.2 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.

2.4.4 WASTEWATER TREATMENT SYSTEMS

Septic systems shall be designed and installed in accordance with AED Design Requirements - Sanitary Sewer and Septic Systems, latest version. Contractor shall provide a minimum 4 m wide access road to the septic tank. Bollards shall be installed around the absorption field as well as the septic tank. The access road construction shall be of the same thickness and material as the roadway on the compound. The access roadway shall tie to the nearest road network. Septic tank and leach field disposal systems shall be limited to effective design populations under 300 personnel.

Contractor shall not use sewage holding tanks for wastewater disposal system unless specifically required as the only method in the contract section 01010 and 01015. When soil conditions make septic systems with leach fields unfeasible, the contractor may request consideration for sewage holding tanks from the USACE-AED Engineering Branch. This policy applies only for facilities with 60 personnel or less and shall be considered on a case by case basis.

Medical waste water treatment shall be designed in accordance with UFC 4-51-01 Design: Medical Military Facilities. Contractor shall provide a medical waste incinerator for all regulate medical waste (RMW) as defined in the UFC. The facility shall be located on a reinforced concrete pad with minimum 2 m high chain link fence and gate per Section 1015.

2.4.5 SEPTIC SYSTEM

Generally when determining an appropriate septic tank location, the Contractor shall provide protection for the septic system by ensuring that vehicles, material storage, and future expansion shall be kept away from the area. Signage or other prevention methods (i.e. pipe bollards) shall be used to provide this protection. The finished grade for the site shall ensure that storm water runoff shall drain away from the site to prevent ponding, inflow, and infiltration. Once an appropriate site is located, the Contractor shall conduct soil investigations for the site to determine ground water levels, soil conditions, and the percolation rate. Septic systems shall be designed and installed in accordance with UFC 3-240-09A, Domestic Wastewater Treatment, 16 January 2004 edition, and the following guidance:

2.4.5.1 SITE SURVEY

The Contractor shall conduct a topographic survey to determine existing site characteristics. The Contractor shall conduct a utility survey to determine the locations of any nearby water lines, wells, sanitary sewers, storm sewers and electrical lines.

2.4.5.2 PERCOLATION TESTING

At proposed sites for holding ponds and the absorption field, the Contractor shall perform percolation tests. Percolation testing shall be conducted in accordance with AED Design Requirements - Sanitary Sewer and Septic Systems (latest version).

2.4.5.3 SEPTIC TANK

A baffled, multi-compartment or dual chamber design shall be utilized. Refer to AED Design Requirements - Sanitary Sewer and Septic Systems (latest version) for sizing and design details. The septic tank shall be designed with a length-to-width ratio of 2:1 to 3:1 and the liquid depth shall be between 1.2 m and 1.8m. This depth is determined by the outlet pipe invert elevation. If not specified in the contract, the septic tank shall be sized based on the average daily demand of 190 liters/capita/day, plus an additional 100% for sludge storage capacity and peak flows. The tank shall be constructed of reinforced, cast-in-place concrete, with a minimum compressive strength of 21MPa at 28 days. When feasible, wastewater influent and effluent shall enter and exit on the short sides of the tank, in order to allow the wastewater longer detention and settling time. The baffle tank shall have two compartments, with the first compartment (influent entry point) having 2/3 thirds the volume capacity of the tank. The tank shall have a minimum earth backfill cover of 300mm. Access shall be provided at the entry (influent) and exit (effluent) points of the tank by installing reinforced concrete risers, with steel access hatches, that will rise 50mm above the finished grade.

2.4.5.4 ABSORPTION FIELD

Absorption fields (also termed “leach fields”) are used, in conjunction with septic tank treatment, as the final treatment and disposal process for the wastewater treatment system. Absorption fields normally consist of perforated distribution pipe laid in trenches or beds that are filled with rock. Refer to AED Design Requirements - Sanitary Sewer and Septic Systems (latest version) for absorption field sizing and performance requirements. The septic tank effluent shall be distributed by a perforate pipe and allowed to percolate through the ground, where it is filtered and treated by naturally occurring bacteria and oxygen. Once effluent is released from the septic tank, it shall travel by gravity through a solid 100mm diameter PVC pipe, at a minimum 1.0% slope, to a distribution box or dosing tank. The distribution box shall be a reinforced concrete structure that distributes the septic tank effluent evenly throughout the absorption field through several 100mm diameter perforated pipes. The distribution pipe shall be distributed evenly over the absorption trenches or beds; the perforated pipe shall have a maximum slope of 0.5% and shall be capped at the end of each pipe. If percolation testing indicates that soil absorption rates are not between 0.1 min/25cm and 60 min/25cm, the contractor shall notify the COR.

2.4.5.5 AS-BUILTS

Upon completion of installing the sanitary sewer and septic systems, the Contractor shall submit editable CAD format As-Built drawings. The drawings shall show the final product as it was constructed in the field, with the exact dimensions, locations, materials used, and any changes made to the original design.

2.4.6 STORM SEWER SYSTEMS

2.4.6.1 DESIGN STORM RETURN PERIOD (BASELINE FREQUENCY)

Developed portions of the site installation such as administration, industrial and barracks areas, shall be based on a rainfall of 10-year frequency. Basic system design shall be in accordance with UFC 3-230-17A, Chapter 2. Potential damage or operational requirements may warrant a

more severe criterion or in certain areas a lesser criterion may be appropriate. The design of roadway culverts and other on-site storm drainage features & structures will normally be based on 10-year rainfall event. Protection of installations against flood flows originating from areas exterior to the base installation shall be based on a 25-year or greater rainfall depending on cost vs. benefit considerations.

2.4.6.2 STORM DRAINAGE SYSTEM DESIGN

The Contractor shall be responsible for the complete design of the storm drainage system. Drainage of runoff from turf areas onto pavements shall be minimized. If storm drain piping is required it shall comply with the requirements in this section. Where storm drain pipes are of different diameters, the pipe crown elevations should be matched at the drainage structure. Storm drain lines shall be located outside of paved areas to the extent possible. Under no circumstance shall storm drain lines be located beneath buildings. Erosion control shall be provided for all storm drain structures during construction. Water from roof down spouts shall be drained off building site. All storm drain pipe and structures shall comply with the requirements specified in Section 33 40 01 STORM-DRAINAGE.

2.4.6.3 HYDRAULIC DESIGN

New storm drain pipes shall be designed for gravity flow during the design storm baseline unless otherwise approved by the Government. The hydraulic grade line shall be calculated for the storm drain system and all energy losses accounted for. Design computations shall adhere to procedures contained in UFC 3-230-17A. Storm drain systems shall be designed to provide a minimum flow velocity of .75 meters per second when the drains are one-third or more full. Storm drain pipes shall have a minimum diameter of 300mm. Rectangular culverts passing under roads and through perimeter walls shall have a minimum width of 300mm. Larger sizes shall be provided as required.

2.4.6.4 AREA INLETS

Area inlets shall be properly sized and designed to accommodate the design flows. All grates shall be of a “bicycle safe” design.

2.4.6.4.1 CONCRETE PIPE

Reinforced concrete pipe shall be a minimum Class III. Type I cement may be used only when sulfates in the soil are 0.1 percent or less and dissolved sulfates in the effluent are 150 ppm or less. Type II cement may be used only when sulfates in the soil are 0.2 percent or less and dissolved sulfates in the effluent are 1,500 ppm or less. Only Type V cement may be used if sulfates in the soil exceed 0.2 percent or dissolved sulfates in the effluent exceed 1,500 ppm. Concrete pipe shall be assumed to have a minimum design service life of 50 years unless the Contractor determines that conditions at the site will reduce the service life. Concrete culverts and storm drains shall be protected by a minimum of 1 meter of cover during construction to prevent damage by heavy construction equipment.

2.4.6.4.2 PLASTIC PIPE

Stiffness of the plastic pipe and soil envelope shall be such that the predicted long-term deflection shall not exceed 7.5 percent. Plastic culverts and storm drains shall be protected by a minimum of 1 meter of cover during construction to prevent damage by heavy construction equipment. Split couplers shall not be allowed for corrugated high-density polyethylene pipe. Plastic pipe shall be assumed to have a minimum design service life of 50 years unless the Contractor determines that conditions at the site will reduce the service life (then plastic pipe shall not be used).

2.4.7 OIL WATER SEPARATORS

Oil/water separators shall be utilized for all drains from industrial sites. Separators shall be installed as close as possible from the drain location. Storm sewer system shall not be mixed with sanitary sewer system and shall be in accordance with UFC 3-240-07FA, latest edition.

2.5 GEOTECHNICAL

2.5.1 SOIL INVESTIGATION

Existing geotechnical information is not available at the project site. Any site-specific geotechnical data required to develop foundations, materials, earthwork, and other geotechnical related design and construction activities for this project shall be the Contractor's responsibility. The Contractor shall develop all pertinent geotechnical design and construction parameters by appropriate field and laboratory investigations and analyses. The Contractor shall produce a detailed geotechnical report containing field exploration and testing results, laboratory testing results (particle sizes and distribution, liquid and plastic limit test, and moisture and density test, etc.). Information in the report shall include, but not limited to: existing geotechnical (e.g. surface and subsurface) conditions, location of subsurface exploration logs on site plan, exploration point, allowable soil bearing capacity and foundations recommendations, bearing capacity, pavement design criteria (e.g. CBR values, K values), ground-water levels, and construction materials (e.g. concrete cement, asphalt, and aggregates). For standard penetration test (SPT), the Contractor shall use ASTM D1586. All geotechnical laboratory and field work shall be based on standards set forth in the ASTM. Contractor shall not use any DIN standards for penetration tests in lieu of ASTM D 1586. Soil investigations shall conform with AED Design Requirements: Geotechnical Investigations for USACE Projects, latest version, or most recent version.

For foundation design, allowable soil bearing pressures, shall be based on the International Building Code (IBC) 2006 Table 1804.2. The contractor shall conduct soils classification per ASTM D 2487-06. There shall be no variation from the values listed in the table above, unless the soils investigation indicates lower allowable values should be used.

The contractor shall submit a geotechnical investigation plan prior to commencing any field investigation to the USACE-AED Engineering Branch through the COR for review and approval. Once the plan is reviewed and approved, the Contractor can start the field investigation. The Geotechnical report shall be submitted with all the design review submittals as specified in the 01335. No design review submittal shall be considered complete without an

approved geotechnical report. Geotechnical investigation plans and report of investigations shall be submitted promptly in accordance with Section 01335.

2.5.2 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. The geotechnical firm conducting either the field investigation or laboratory work shall be certified by the Chief, Quality Assurance Branch USACE-AED. Certification document shall be submitted as part of the Geotechnical Report.

3.0 STRUCTURAL

3.1 GENERAL

The project consists of various structures. The ANP 1-Story Headquarters Building, Guard Tower, Guard Shack, and Well House are existing structural designs based upon International Building Code 2003 and as specifically listed herein, paragraph 3.0 Structural.

The new buildings shall be provided with a reinforced concrete foundation that is properly placed on suitable compacted earth and shall be prepared in accordance with the recommendations from the geotechnical investigation. The reinforced concrete foundation shall be designed by the Contractor. Building foundations shall be founded a minimum of 800 mm below grade.

The new building foundations were designed for a soil bearing capacity of 0.75kg/cm^2. The geotechnical investigation shall confirm bearing capacity to be no less than 0.75kg/cm^2. If geotechnical investigation shows less than 0.75kg/cm^2, Contractor shall redesign footings based on the geotechnical investigation. Foundation design shall be corroborated with the geotechnical findings and recommendations.

Brick shall not be used as a construction material for the new buildings.

3.2 DESIGN

Designs for wood stove kitchen enclosure, generator sunshade, and roof trusses shall be performed and design documents signed by a registered professional architect and/or engineer. Design shall be performed and design documents signed by a registered professional architect and/or engineer. Calculations shall be in SI (metric) units of measurements.

All components of the structures shall be designed and constructed to support all loads, including all required factors of safety, without exceeding the allowable stresses for the materials of construction in the structural members and connections. All building exterior walls shall be constructed with reinforced CMU or reinforced concrete.

3.3 STANDARDS

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

Concrete	ASTM C 39 and ACI 318; 28 MPa (f'_c = 4,000psi) minimum specified compressive strength @ 28 days, and maximum water-cement ratio of 0.45.
Steel Reinforcement	ASTM A 615; 420 MPa (F_y = 60ksi) yield strength.
Welded Wire Fabric	ASTM A 185.
Anchor Bolts	ASTM A 36.
Bolts and Studs	ASTM A 325.
Plaster	ASTM C 926; 14 MPa (f'_c = 2,000psi).
Concrete Masonry Units	ASTM C 90; Type I (normal weight, moisture control).
Mortar	ASTM C 270; Type S (Ultimate compressive strength of 13 MPa) Proportion: 1 part cement, 0-½ part lime and 4½ parts aggregate.
Grout	ASTM C 476; 14 MPa (2,000psi) minimum compressive strength @ 28 days (Slump between 200 mm to 250mm).
Structural Steel	ASTM A 36; 250 MPa (F_y = 36,000psi).
Shaped Structural Tubing	ASTM A 500, Grade B; 315 MPa (F_y = 46,000psi).
Welding	AWS D1.1 (American Welding Society).

3.4 DEAD AND LIVE LOADS

Dead loads consist of the weight of all materials of construction incorporated in the buildings. Live loads used for design shall be in accordance with ASCE Standards and minimum design loads for buildings and other structures, ASCE 7-2005. All facilities shall be classified as a minimum of Category II in accordance with Table 1-1.

3.5 WIND LOADS

Wind loads shall be calculated in accordance with ASCE 7-2005 using a "3-second gust" wind speed of 135 km/hr. Exposure = C. Importance Factor = 1.0.

3.6 SEISMIC

The building and all parts thereof shall be designed for the seismic requirements as defined by the International Building Code 2006.

Spectral ordinates shall be S_s = 1.65g and S_1 = 0.75g.

3.7 STRUCTURAL CONCRETE

Concrete structural elements shall be designed and constructed in accordance with the provisions of the American Concrete Institute, Building Code Requirements for Structural Concrete, ACI 318. A minimum cylinder 28 day compressive strength of 28 MPa (4,000 psi) shall be used for design and construction of all concrete. Reinforcing steel shall be deformed bars conforming to American Society for Testing and Materials publication ASTM A 615, Deformed and Plain Billet-Steel Bars for Concrete Reinforcement. Concrete shall have maximum water-cement ratio of 0.45. No concrete shall be placed when the ambient air temperature exceeds 32 degrees C (90 degrees F) unless an appropriate chemical retardant is used. In all cases when concrete is placed at 32 degrees C (90 degrees F) or hotter it shall be covered and kept continuously wet for a minimum of 48 hours.

3.8 MASONRY

Masonry shall be designed and constructed in accordance with the provisions of Building Code Requirements for Masonry Structures, ACI 530/ASCE 5/TMS 402. Mortar shall be Type S and conform to ASTM C 270. Masonry shall not be used below grade.

All cells of exterior CMU walls shall be fully grouted. For interior CMU walls, only the reinforced cells need to be grouted. All CMU walls shall have reinforced horizontal bond beams at a maximum spacing of 1,200 mm on center.

Brick shall not be used as a construction material for the new buildings.

3.9 STRUCTURAL STEEL

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

3.9.1.1 STEEL ROOF JOISTS

Steel roof joists shall be placed according to the roof design and roof manufacturer specifications. Steel purlins shall be installed perpendicular to the steel beams. Use continuous metal roof sheets from ridge to eave to avoid constructing roof seams. In lieu of the continuous metal roof sheets, the Contractor can submit a plan for roofing seams; however, the plan must show a detail of how leaks will be avoided, and the Contracting Officer before application must approve the plan. Provide all necessary metal framing for roof fascia and soffits. See structural paragraph for structural characteristics of steel joists.

3.9.1.2 OPEN WEB STEEL JOISTS

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

3.10 METAL DECK

Deck units shall conform to SDI Publication Number 29. Panels of maximum possible lengths shall be used to minimize end laps. Deck units shall be fabricated in lengths to span three or more supports with flush, telescoped or nested 50 mm (2 inch) laps at ends, and interlocking, or nested side laps. Metal deck units shall be fabricated of steel thickness required by the design and shall be galvanized.

3.11 FOUNDATIONS

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

3.12 EARTHWORK AND FOUNDATION PREPARATION

3.12.1 CAPILLARY WATER BARRIER

ASTM C 33 fine aggregate grading with a maximum of 3 percent by weight passing ASTM D 1140, 75 micrometers, No. 200 sieve, or 37.5mm and no more than 2 percent by weight passing the 4.75mm No. 4 size sieve and conforming to the soil quality requirements specified in the paragraph entitled “Satisfactory Materials.”

3.12.2 SATISFACTORY MATERIALS

Any materials classified by ASTM D 2487 as GW, GW-GM, GW-GC, SW, SW-SM, or SW-SC and free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, or objectionable materials. Unless specified otherwise, the maximum particle diameter shall be one-half the lift thickness at the intended location.

3.12.3 UNSATISFACTORY MATERIALS

Any materials which do not comply with the requirements set forth in the Satisfactory Materials paragraph. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also includes material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than 75mm. The Contracting Officer shall be notified of any unsatisfactory materials.

3.12.4 CLEARING AND GRUBBING

Unless indicated otherwise, remove tress, stumps, logs, shrubs, brush and vegetation, and other items that would interfere with construction operations within lines 1.5 meters outside of the building and structure line. Remove stumps entirely. Grub out matted roots and roots over 50mm in diameter to at least 460mm below existing surface.

3.12.5 STRIPPING

Strip suitable soil from the site where excavation or grading is indicated and stockpile separately from other excavated material. Material unsuitable for use as topsoil shall be stockpiled and used for backfilling. Locate topsoil so that the material can be used readily for the finished

grading. Where sufficient existing topsoil conforming to the material requirements is not available on site, provide borrow materials suitable for use as topsoil. Protect topsoil and keep in segregated piles until needed.

3.12.6 EXCAVATION AND COMPACTION OF FILL

Excavate to contours, elevation, and dimensions indicated. Reuse excavated materials that meet the specified requirements for the material type required at the intended location. Keep excavations free from water. Excavate soil disturbed or weakened by Contractor's operations, soils softened or made unsuitable for subsequent construction due to exposure to weather. Excavations below indicated depths will not be permitted except to remove unsatisfactory material. Unsatisfactory material encountered below the grades shown shall be removed as directed. Refill with satisfactory material and compact to at least 95 percent of the maximum dry density, as determined by the Modified Proctor laboratory procedure. ASTM D 1557 shall be used for producing the Modified Proctor moisture-density curve, unless the soil to be compacted includes more than 30% retained on the 19 mm (3/4") sieve. In this case, the Contractor must replace the ASTM D 1557 laboratory compaction procedure with AASHTO T 180, Method D, corrected with AASHTO T 224.

During compaction, the moisture content of the soil shall be within 1.5 percent of the optimum moisture content, as determined by the Modified Proctor laboratory procedure. The thickness of compacted lifts shall not exceed 15 cm and the dry density of each compacted lift shall be tested by either sand cone (ASTM D 1556) or nuclear gage (ASTM D 2292). If the nuclear gage is used, it must first be compared to sand cone tests for each soil type to verify the accuracy of the nuclear gage measurements for moisture content, wet density, and dry density. Furthermore, every tenth nuclear gage test must be accompanied by a sand cone test and these verification data must be summarized and submitted to the Contracting Officer. Density tests shall be performed at a frequency of not less than one test for each 200 square meters and not less than two tests per compacted lift.

4.0 FIRE PROTECTION

4.1 PORTABLE FIRE EXTINGUISHERS

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

5.0 ELECTRICAL

5.1 GENERAL

Contractor shall design and construct all electrical systems for the facilities to be provided. This includes design, construction, all necessary labor, equipment, and material for a fully functional system.

5.2 DESIGN CRITERIA

5.2.1 APPLICABLE STANDARDS

s. Design shall be in the required units as stipulated herein.

t. Conflicts between criteria and/or local standards shall be brought to the attention of the Contracting Officer for resolution. In such instances, all available information shall be furnished to the Contracting Officer for approval.

u. All electrical systems and equipment shall be installed in accordance with the requirements set forth in the documents referenced herein.

v. Acceptance Testing: Contractor shall develop and submit for approval complete acceptance test procedures on all systems provided. As a minimum the testing procedures shall comply with the requirements of the National Fire Protection Association (NFPA) and the International Electrical Testing Association Inc. (NETA).

5.3 MATERIAL

5.3.1 GENERAL

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

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

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.

5.3.2 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.

5.3.3 DESIGN CONDITIONS

All equipment shall be rated and designed for the maximum ambient temperature and altitude of the construction site. Equipment that is altitude and temperature sensitive, such as generators, shall be derated according to the manufacturer's recommendations. Generic derating criteria for altitude and for ambient temperature may be used to approximate the required size of such equipment during the design phase, but a stipulation shall be placed on the construction plans to adjust the size according to the derating criteria specific to the manufacturer's equipment chosen before the equipment is ordered.

5.3.4 RESTRICTIONS

Aluminum conductors shall not be specified or used except as bare steel reinforced (ACSR) overhead conductors in an aerial primary distribution system. Aluminum windings shall not be used in transformers.

5.4 DESIGN REQUIREMENTS

5.4.1 ELECTRICAL DISTRIBUTION SYSTEM

The contractor shall provide generator power as described in the paragraph **Generator Power System** as a prime source of power for the facilities

The contractor shall provide a prime power distribution system to distribute power to the site's facilities and other loads as required. The distribution system shall be underground

The underground distribution system shall be in direct buried schedule 80 ductbanks, except for under roadways and heavy traffic areas, with the ducts not less than 1220mm below grade. Manholes and handholes shall be provided at changes of direction of more than 40 degrees and elsewhere as required to limit the pulling tension and sidewall pressure on the cables during installation to acceptable levels as defined by the cable manufacturer. Manholes shall be provided for ductbanks with more than 2 ducts. Handholes shall be provided wherever a manhole is not required by quantity of ducts or by cable manufacturer's installation recommendations. Underground ducts shall be not less than 100mm diameter Schedule 80 PVC for non roadway and light traffic areas and concrete encased schedule 40 for roadways and heavy traffic areas.

The contractor shall provide service entrance feeders from the distribution system to the service entrance equipment located inside of each facility and sized to the rating of the service entrance equipment. Service entrance equipment shall include a distribution panelboard sized to supply the total load of each facility. Service entrance feeder lengths shall be kept as short as possible

to minimize voltage drop. They shall be underground not less than 1220mm below grade. A spare conduit of equal size shall be provided.

All panelboards shall be circuit breaker 'bolt-on' type panels. Minimum size circuit breaker shall be rated at no less than 20-amperes. Circuit breakers shall be connected to bus bar(s) within the panelboards. Daisy chain (breaker-to-breaker) connection(s) are not acceptable. Indoor distribution panels shall be flush mounted in finished areas and surface mounted in unfinished areas. All circuit breakers shall be labeled with an identification number corresponding to the panel schedule. A 3-pole circuit breaker shall be a single unit and not made up of 3 single pole circuit breakers connected with a wire or bridge to make a 3-pole breaker. All branch circuit wiring shall be copper, minimum #4 mm^2 (#12 AWG) installed in metal conduit. Wiring shall be concealed in finished areas and surface mounted in unfinished areas. Flush mounted panels shall be provided with spare empty conduits from panel to unfinished area for future use. All panels shall be provided with a minimum of 25% spare capacity for future load growth. Power receptacles (outlets) shall be duplex type 220 V, 50 hertz, type CEE 7/7 with Earth Ground rated for 20A or better and shall be compatible with the required secondary power. All splicing and terminations of wires shall be performed in junction or device boxes. Proper wire nuts/connectors shall be used for splicing wire. No twist-wire connections with electrical tape wrapped around it shall be acceptable. All electrical installation shall be in accordance with NFPA 70 (National Electric Code). For large panels (225 Ampere and above) provide an ammeter, voltmeter and kilowatt-hour meter to monitor energy usage. Selector switches shall be provided for each meter to read all 3 phases. Receptacle locations shall be coordinated with architectural requirements.

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

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

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

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

5.4.1.1 GENERATOR POWER SYSTEM

The generator power system shall consist of one 80kW (100kVA) generator. The site's total load is defined as the site's total demand load + 25% spare capacity. The generators shall supply power at 380/220 V.

Generators shall be derated as necessary for the ambient temperature and altitude of the site.

Generator fuel storage capacity shall be based on usage at total load for a minimum of 30 days. For fuel storage requirements, see Mechanical paragraph: Generator Fuel Storage/Distribution.

5.4.2 LIGHTING

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

Toilets, Showers, Latrines, washrooms	20 FC (200 Lux)
Mechanical/Electrical rooms	30 FC (300 Lux)
Corridors and Stairways	20 FC (200 Lux)
Offices (private)	50 h/5 v FC (500 h/50 v Lux)
Office areas (open)	30 h/5 v FC (300 h/50 v Lux)
Conference	30 h/5 v FC (300 h/50 v Lux)
Video Conference	50 h/30 v FC (500 h/300 v Lux)
Armories	30 h/3 v FC (100 h/30 v Lux)
Reading (in chair-casual)	30 h/5 v FC (300 h/50 v Lux)
Reading (in chair-serious)	50 h/10 v FC (500 h/100 v Lux)
Reading (at desk-casual)	30 h/3 v FC (300 h/30 v Lux)
Reading (at desk-serious)	50 h/10 v FC (500 h/100v Lux)
Egress path (incl. exterior)	10 Lux
Areas adjacent to egress path	0.5 Lux

FC = Foot Candle

h = horizontal component

v = vertical component

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

5.4.3 LIGHT FIXTURES

Lighting fixtures shall be a standard manufacturer’s product. Fluorescent surface mounted light

fixtures shall be power factor corrected and equipped with standard electronic ballast(s), except in medical facilities where magnetic ballast(s) shall be required. All light fixtures shall properly operate using standard lamps available locally. Fixtures shall be fully factory wired and designed for appropriate application i.e. appropriate for that location where installed.

5.4.4 EMERGENCY "EXIT" LIGHT FIXTURES

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

5.4.5 ABOVE MIRROR LIGHTS

Above mirror lights shall be provided in toilet rooms.

5.4.6 EMERGENCY LIGHTING

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

5.4.7 LIGHT SWITCHES

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

5.4.8 RECEPTACLES

General-purpose receptacles shall be as required herein. All receptacles shall be duplex, unless otherwise specified in this section, the NEC, or other referenced standard.

Receptacles shall be placed at a maximum of 3-meter (10 feet) intervals. Areas with computer work-stations or similar equipment will have additional receptacles. 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 10 milliamperes or less. Total number of duplex receptacles shall be limited to six (6) per 20-ampere circuit breaker.

5.4.9 CONDUCTORS

All cable and wire conductors shall be copper. Conductor jacket or insulation shall be color

coded to satisfy NEC requirements. The use of 75 or 90 degree C (minimum) terminals and insulated conductors is required. Use of higher degree C rated conductors on circuits with protective device terminals rated at a lower degree C is allowed but must be derated to the rating of the device terminals.

5.4.10 GROUNDING AND BONDING

Grounding and bonding shall comply with the requirements of NFPA 70. Underground connections shall be exothermally 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 20 millimeters (0.75 inches) in diameter and 3 meters (~10 feet) long made of copper-clad steel. Final measurement of the ground resistance shall be in compliance with the requirements of the local authority but shall not exceed 25 ohms when measured more than 48 hours after rainfall.

5.4.11 ENCLOSURES

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

5.4.12 FIRE DETECTION & ALARM SYSTEM

Smoke detectors shall be provided in all rooms and hallways. Each detector shall be capable of alarming when activated. Detectors are not shown on the drawings. All detectors shall be battery operated.

5.4.13 TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS)

Transient Voltage Surge Suppression shall be provided utilizing surge arresters to protect sensitive and critical equipment. As a minimum TVSS protection shall be provided at each panel serving electronic loads and shall be shown on the panel schedule. It is recommended that Metal Oxide Varistors (MOV) technology be used for such applications.

5.4.14 CONDUIT RACEWAY SYSTEM

Metal conduit (EMT) system shall be complete, to include but not limited to, necessary junction and pull boxes for all surface mounted conduit systems. PVC conduit, junction and pull boxes are allowed for raceways located in masonry walls. Smallest conduit size shall be no less than 20mm (0.75 inch) in diameter. All empty conduits shall be furnished with pull wire or cord or rope (depending on the size of conduit and length of run). System design and installation shall be per NFPA 70 requirements. Exterior conductors below grade shall be installed in concrete encased PVC conduit at a depth of 1220 millimeters.

5.4.15 CABLE TRAY RACEWAY SYSTEM

Cable trays shall be ladder type and provided with, but not limited to, splices, end plates, dropouts and miscellaneous hardware. System shall be complete with manufacturer's minimum standard radius and shall be free of burrs and sharp edges. Nominal width of cable tray shall be 300mm (12 inch) and rung spaced at 150mm (6 inch). Nominal depth shall be 100mm (4 inch). System design and installation shall be per NFPA 70 requirements.

5.4.16 IDENTIFICATION NAMEPLATES

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

5.4.17 SCHEDULES

All panel boards and load centers shall be provided with a directory. Directory shall be typed written in English, Dari and Pashto

Single Line Diagram

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

5.5 OPERATIONS AND MAINTENANCE (O&M) FOR ELECTRICAL

w. Contractor is required to provide a 12 month supply of parts for operation and maintenance of equipment according to the manufacturer's recommendations. In addition to this, the contractors shall provide an inventory of all items, location/address stored and secured, and commissioning plans.

x. The O&M manuals must be provided prior to any training activities. Manuals shall be "tri-lingual" in Dari, Pashto and English.

y. All control panels shall have tri-lingual name plates in Dari, Pashto and English.

z. The contractor shall provide an outline of the training lesson plan (to be approved by the Government) prior to conducting training. CD recordings of training on video shall also be provided, after training is conducted.

-END OF SECTION-

SUMMARY OF CHANGES

A. NARRATIVE CHANGES:

1. Section 01010, paragraph 1.0 General is changed to read as follows:

1.0 GENERAL

This project consists of the design and construction of Afghanistan National Police (ANP) Uniformed Police District Headquarters facilities to be located at Dardoj District, Badakhshan Province, Afghanistan. This project is defined as the management, planning, design, material, labor, and equipment, to site adapt and construct all utilities, vehicular access, buildings, force protection measures, site security, de-mining activities, and other features as referenced herein. The work within this contract shall meet and be constructed in accordance with current U.S. design and International Building Codes (IBC), Life Safety Codes (NFPA-101), Force Protection and security standards. A partial listing of references is:

IBC, International Building Codes 2006

NFPA 101, Life Safety Codes

UFC 4-010-01, DoD Minimum Anti-Terrorism Standards for Buildings.

Coordination with Occupants of Existing Buildings

The Contractor shall identify all occupants of existing buildings within the construction boundary and hold a meeting with them to discuss, at a minimum, the scope of the project, access to the existing buildings during construction, impacts to utilities, site security and construction safety precautions. During this meeting, the Contractor will solicit comments and concerns about the project.

The Contractor shall provide meeting minutes to the Contracting Officer's Representative within seven (7) days after the meeting. Meeting minutes shall include, at a minimum, name, position title and phone number of those in attendance; and a record of issues that were discussed and proposed solutions to the issues.

2. Section 01010, paragraph 4.5 Demolition and Grading is changed to read as follows:

4.5 DEMOLITION AND GRADING

The Contractor shall remove and dispose of all debris, concrete, and foundations. The Contractor shall verify the location of debris disposal with the Contracting Officer's Representative. No demolition of the existing education building, district building, DHQ building, and Afghan telecom building will be allowed. They are to remain on site and left in the same condition as prior to start of construction. Planning will be required to ensure that existing and new facilities will fit on site. Also on site is an existing Afghan telecom antenna that may be relocated if required and coordinated with the appropriate on site officials and owners of the antennae. The Contractor shall perform complete final site grading after installation of all required drainage structures per the Drainage Plan that shall be prepared as part of this project and after installation of any other buried utilities or other project components.

Native crushed stone 100 mm thick shall be placed around all buildings, from the building wall or building landscaping out 2,000 mm and all areas of anticipated foot or vehicle traffic to reduce erosion and to provide dust control. Contractor shall compact underlying subgrade to a

3. Section 01015, paragraph 2.3.2 Demolition is changed to read as follows:

2.3.2 DEMOLITION

Demolition shall include removal of concrete, foundations, pavements, and utilities, to include clearing and grubbing not associated with the education building, district building, DHQ building, and Afghan telecom building. These four buildings will be left in the same condition as prior to start of construction. All refuse and debris shall be disposed of off of the site as described in paragraph 2.2.4 DISPOSAL. Holes and depressions shall be backfilled and compacted in lifts not to exceed 300mm in height. Fill materials shall be composed of satisfactory soils or aggregates defined in ASTM D 2487 as GW, GP, GM, SP, SM, and SW. Minimum soil compaction shall be 95 percent of maximum density as defined in ASTM D 1557

Scrap metal shall be the property of the Host Government. The scrap metal on site shall be moved to an area away from the site perimeter as directed by the Contracting Officer's Representative and left for the Host Government to remove and/or salvage. Demolished fencing and concertina wire shall be neatly rolled up for reuse by the host government. Likewise, used fence posts and outriggers shall be neatly stockpiled for reuse by the host government.