

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. CONTRACT ID CODE	PAGE OF PAGES 1 100
2. AMENDMENT/MODIFICATION NO. 0004	3. EFFECTIVE DATE 22-Mar-2010	4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO.(If applicable)
6. ISSUED BY AFGHANISTAN DISTRICT NORTH (AEN) US ARMY CORPS OF ENGINEERS OPERATION ENDURING FREEDOM APO AE 09356	CODE W5J9JE	7. ADMINISTERED BY (If other than item 6) See Item 6		
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		X	9A. AMENDMENT OF SOLICITATION NO. W5J9JE-10-R-0051	
		X	9B. DATED (SEE ITEM 11) 24-Feb-2010	
			10A. MOD. OF CONTRACT/ORDER NO.	
			10B. DATED (SEE ITEM 13)	
CODE	FACILITY CODE			
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS				
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer <input type="checkbox"/> is extended, <input checked="" type="checkbox"/> is not extended. Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning <u>1</u> copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12. ACCOUNTING AND APPROPRIATION DATA (If required)				
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.				
A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).				
C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
D. OTHER (Specify type of modification and authority)				
E. IMPORTANT: Contractor <input type="checkbox"/> is not, <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.) Refer to the Summary of Changes for a listing of corrections/additions incorporated into this amendment.				
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.				
15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)		
		TEL:	EMAIL:	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA		16C. DATE SIGNED
_____ (Signature of person authorized to sign)		BY _____ (Signature of Contracting Officer)		22-Mar-2010

Questions and Answers

Q1: Generally the US policy is to give contracts to Afghan Companies, but you say that is not important, just the capacity is important.

A2: This solicitation is Full & Open competition/Best Value. The US Government will select the offer that represents the “Best Value” to the US Government by using the trade-off process described in FAR Part 15.101-1. This process permits trade-offs between cost/price and technical (non-cost) factors and allows the Government to accept other than the lowest priced offer.

Q2: Could you please make or give in detail about work plan or methodology, 3rd part of technical proposal

A2: The US Government requires that the Offeror submit a Management Work Plan identifying all major work phases of the project and how the sequencing of these phases will be completed within the performance period of 450 calendar days. This request can be accomplished by developing a Flow Chart and attaching it to the Management Work Plan.

Q3: Is the Security Plan needs to be submitted with the proposal or need to be submitted after the project award?

A3: The US Government requires that the Security Plan be included in the Technical Proposal, TAB 4. The Security Plan must describe how the Offeror intends to meet the specific requirements found in Technical Specification Section 01040 – Standard Contract Security.

Q4: Can we accommodate a staff in the compound?

A4: Neither the contractor nor his labors will be allowed to reside inside the confines of the Garrison. Referring to the attached figure, a storage lay-down area has identified adjacent to Phase IV.

Q5: Can we install a concrete batching plant on site?

A5: No a concrete batching plant cannot be accommodated within the confines of the Garrison.

Q6: Is there an existing sewage system to connect to?

A6: Yes there is an existing sewage system that the contractor is required to connect to. Please refer to Section 01010, Subsection 10.4 Sanitary Sewer System.

Q7: Is there an existing Power Supply Plant and Water Wells?

A7: Yes, there is an existing Power Supply Plant that the contractor is required to connect to. Please refer to Section 01010, Subsection 10.3 Water System.

Q8: Will the US Government expand the province requirement?

A8: Under Amendment 0004, at least one (1) of the projects provided must have been successfully completed in the Laghman **OR** Nangarhar Province.

Q9: Questions pertaining to the Power and Water System Requirements are Now clarified within Amendment 0004.

Q10: Will Afghan First Companies have an advantage?

A10: No. Afghan First Companies will not have an advantage over non-Afghan Companies. This solicitation is Full & Open competition/Best Value. The US Government will select the offer that represents the “Best Value” to the US Government by using the trade-off process described in FAR Part 15.101-1.

QUESTIONS RECEIVED AFTER THE 10 MARCH 2010 PREPROPOSAL CONFERENCE

Question - Reference to Solicitation Documents; Section 00120 Item 5.A.Factor 1: Experience: “At least one (1) project must be valued at over \$10,000,000.00 and must have been underway at least 50 percent completed or completed within the last three (3) years. Of the two (2) projects at least one (1) of the projects must have been successfully completed in the Laghman Province in which the solicitation project is to be located.”

Response: We understand this clause as a “must have” requirement and failure to provide a project in Laghman Province will result in receiving an ‘Unacceptable Rating’ for the Technical Proposal.

The information we have reveals a very limited number of companies with similar experience in this comparatively small province, Laghman, all who have held contracts from the previous construction phases of the Gamberi ANA Garrison. The flip side to that is, there are several construction companies in the region holding numerous similar U.S. Army contracts completed in Northern and Central Afghanistan, as well as in Northern and North-Western Pakistan, all we know as regions with identical working conditions, security situation and thus areas which require handling of risks in a very similar manner as it should be done in the province of subject works.

In light of the above, we believe this requirement being pass/fail criteria may result in a remarkable loss of competition and thus a higher-than-expected cost to U.S. Government, or a failure of the tender procedure with no source to be found complying with all the technical criteria’s. Therefore, we kindly request a revision on this requirement in the form of a “should have” requirement which will still favor the companies having past experience in Laghman Province, but also will avoid the elimination of several other experienced U.S. Government

contractors dedicated to assist the construction and logistics operations of U.S. Government in this challenging region.

RESPONSE – Factor 1 Experience as amended by Amendment 0004, requires the Contractor to submit a minimum of two (2), but no more than five (5), “Experience Information” forms. At least two (2) of the projects submitted must be the same or similar to the design build solicitation. Similar projects are permanent vertical construction projects that include design, and utilities development. At least one (1) of the projects provided must be valued at over \$10,000,000.00 and must have been underway with at least 50 percent completed or completed within the last three (3) years. In addition, at least one (1) of the projects provided must have been successfully completed in the Laghman or Nangarhar Province.

Question – In the attachments, there are no drawings for NCO, SOQ facilities, please provide.

RESPONSE - The NCO barrack is labeled NCO-Officer on the drawings, in addition, the NCO-Officer is the same size as the BOQ. There are full and complete drawings for all the barracks.

Question - At “Section 01010, Subsection 10.8 ROAD NETWORK, SIDEWALK, AND PARKING, it is stated that “Provide parking area for 20 vehicles inside the compound as shown”. However; at drawings, parking area is demonstrated as for 40 vehicles. Please clarify.

RESPONSE – A minimum of 20 vehicles are required for the parking area.

Question – Please clarify the cleared depth of the construction area.

RESPONSE – The construction area has been cleared to a one (1) meter depth with a LOW probability of UXO.

Question – Section 01010, Subsection 10.5 states that minor site demolition is required. Could you tell us the site condition (existing structure, debris, etc.)?

RESPONSE – The probability of demolition of a buried structure in LOW. The building site layout is within an existing minor wadi.

Question - How far the existing power plant to the site?

RESPONSE – The contractor will be required to verify the actual distance from the power plant to the 201st HQ site. An accurate estimate can be made from the drawings which were provided with the solicitation.

Question - Can you please explain “padmounted transformers shall be loop fed” in more detail?

RESPONSE – The intent of this installation is to provide a pad-mounted transformer which has the future capability to be fed from two (2) feeders to provide redundancy. When the specification is written for the transformer, design for “loop-feed with breaker switch” instead of “radial-feed”.

Question - Please confirm that three (3) new feeder will be installed and identify the brand name of switchgear that consists of a Generator Bus and a Distribution Bus?

RESPONSE – Section 01015, Subsection 20.4.1 Electrical Distribution System Action – Replace “The contractor shall provide a medium voltage 20kV primary distribution system with three (3) distribution feeders” with “The contractor shall provide a medium voltage 20kV primary distribution system with one (1) distribution feeder.”

Question - Can you please confirm that three (3) pad mounted type Transformer substations is required?

RESPONSE – The number of pad-mounted transformers that are used shall be determined by the contractor as part of the design that is submitted.

Question - As per the subject RFP W5J9JE-10-R-0051, Subsection 21.3, it is stated that “The contractor shall extend the existing manhole/handhole and duct system”. Can you please explain where these manholes/handholes are?

RESPONSE – Amendment 0004 deletes the following wording “The contractor shall extend the existing manhole/handhole and duct system”.

Question - As per the subject RFP W5J9JE-10-R-0051, Subsection 21.5, it is stated that “The Contractor shall install copper and fiber optic cable in accordance with the references and the cable requirements listed below”. Please be noted that there is no such list. Please clarify only installation of these cables or both installation and material supply included? Please confirm if the material will be provided by you.

RESPONSE – The list of Applicable Specifications is listed in Subsection 21.1. See Subsection 21.2 “The communications system is to be designed, supplied, and constructed by the Contractor. The construction of the systems shall be in accordance with the references and the requirements contained herein”.

Question - As per the subject RFP W5J9JE-10-R-0051, Subsection 21.7, it is stated that “The contractor shall route all communications to the Main Distribution Frame in the existing communications building”. Please clarify exact location of this communication building and distance to the site?

RESPONSE – The existing communications building is located in Bldg 1010, ETTC Communications (see drawing ANA-E-01). Contractor shall verify the distance to the site and all communications manholes and services that supply Building 1010.

Question - As per the subject RFP W5J9JE-10-R-0051, Subsection 21.11, please clarify who is going to provide a coax cable television signal distribution system for the Main Building TV room? It is also stated that “A 50 mm conduit shall be run to each room and then connect to the outside for incoming satellite television station” but no location is clarified. Please confirm?

RESPONSE - Amendment 0004 deletes Section 21.11, entitled Coax Cable Television Signal Distribution System.

Question – Section 00150, Subsection 2.2.1.b The Design Phase Will Consist of Four Parts As Follows: The solicitation states, “Part I also include incorporating the revisions identified in the First submittal review.” Clarification Request: Please clarify this paragraph; it seems to mix Part 1 and Part 2 of the design process.

RESPONSE – 2nd sentence, change “Part 1” to “Part 2”. 3rd sentence, change “Part 1” to “Part 2”.

Question - Section 00150, subsection 4 Project Schedule - The solicitation states, “Prospective offerors shall be required to submit a complete schedule for design and construction...” Question a: Is this required as a part of the proposal? Question b: If so, is it excluded from the page count?

RESPONSE – A submission of a complete schedule for the design and construction of the project is NOT part of the Technical Proposal Volume I.

Question – Section 00150, Subsection 10.1.1, 10.3 - In paragraph 10.1.1 the solicitation states that utilities should be designed for a population of 650, in 10.3 it states that water storage capacity be designed for 3,650, and in 15.4.1.1 it says to multiply the population by a capacity factor of 1.5 ($650 \times 1.5 = 975$) to calculate the average daily water flow. What is the correct method for estimating water requirements?

RESPONSE – The design population for Phase IV 201st Corps HQ Building is 650 personnel.

Question – Section 01010, Subsection 10.1.1 - states, “All toilets shall be mixed eastern and western style.”, but paragraph 10.9.4 states, “Latrines for LN residents shall be eastern style...” Where are western-style toilets required on this project?

RESPONSE – During the design process, the contractor shall determine and submit their recommendation.

Question – Section 01010, Subsection 37.19 Instructions and Training for Operation and Maintenance - How many individuals are to be trained? Can training be conducted concurrent with construction activities, or must it be done after the completion of all installation and construction?

RESPONSE – The number of individuals to be trained will be determined by the COR at the first RedZone Meeting. The training will be conducted within thirty (30) days from turnover/completion of the project.

Question - Will the contractor be able to establish any life support facilities in space provided for the mobilization area, or will some other suitable area be provided?

RESPONSE – The contractor will be confined to the construction storage area.

Question - Can you provide us with the exact pipe locations, pipe diameters, existing well depths, water distribution pressure?

RESPONSE – Refer to Section 00150, Subsection 15.4.1.2 for the Water Wells requirements. Water distribution system sizes range from 40 mm for individual building connections to 200 mm for the main feed.

Question - As per SOR 10.3 (Water System) the new well shall be located 100 meters away from the existing wells, and SOR 15.4.1.2 says new wells shall be located 60 meters away from the existing wells, please Confirm is it 60 meters or 100 meters.

RESPONSE – The new wells shall be located at least 100 meters from any existing wells.

Question - In SOR section 15.4.1.2 says we need to drill the two wells to a minimum depth of 120 meter, and SOR 10.3 says drill the well to a minimum depth of 240 meters. Please specify the number of wells and the depth of the respective wells needs to be drilled.

RESPONSE – Two (2) wells to a minimum depth of 240 meters will be required.

Question - SOR 15.4.1.9 Which Ground Storage Reservoir to use: Steel or Concrete? Please Clarify.

RESPONSE – During the submittal process, the contractor will submit a design and type of storage reservoir for approval.

Question - What is the location of the Water Storage Tank?

RESPONSE – The storage facility shall be located above the drainage areas and locations subject to flooding as approved by the Contracting Officer.

Question - In SOW the Headquarters Building say 7,500 SM and on Drawing C-102 of Appendix A it shows Headquarter Building 4,085 SM, Please clarify the area of the Headquarter Building.

RESPONSE – 7,500 SM

Question - Can you provide us with the schedule for Required Furnishing for all the facilities?

RESPONSE – No available at this time.

Question - It appears to be an error on the cover page of the 0003 Amendment wherein it “removes para 5.12 form Sec. 01015” In reviewing this, are you referring to the Environmental Protection Section, Para 15.2?

RESPONSE – Disregard reference for removing para. 5.12 from Section 01015.

Question - Could you make an exception and allow a project from another neighboring Province (such as Nangarhar, Paktia, Kabul, Konar, etc....) to be acceptable in the Experience and Past Performance Sections?

RESPONSE - At least one (1) of the projects provided must have been successfully completed in the Laghman **OR** Nangarhar Province.”

Question - Is there any cut included?

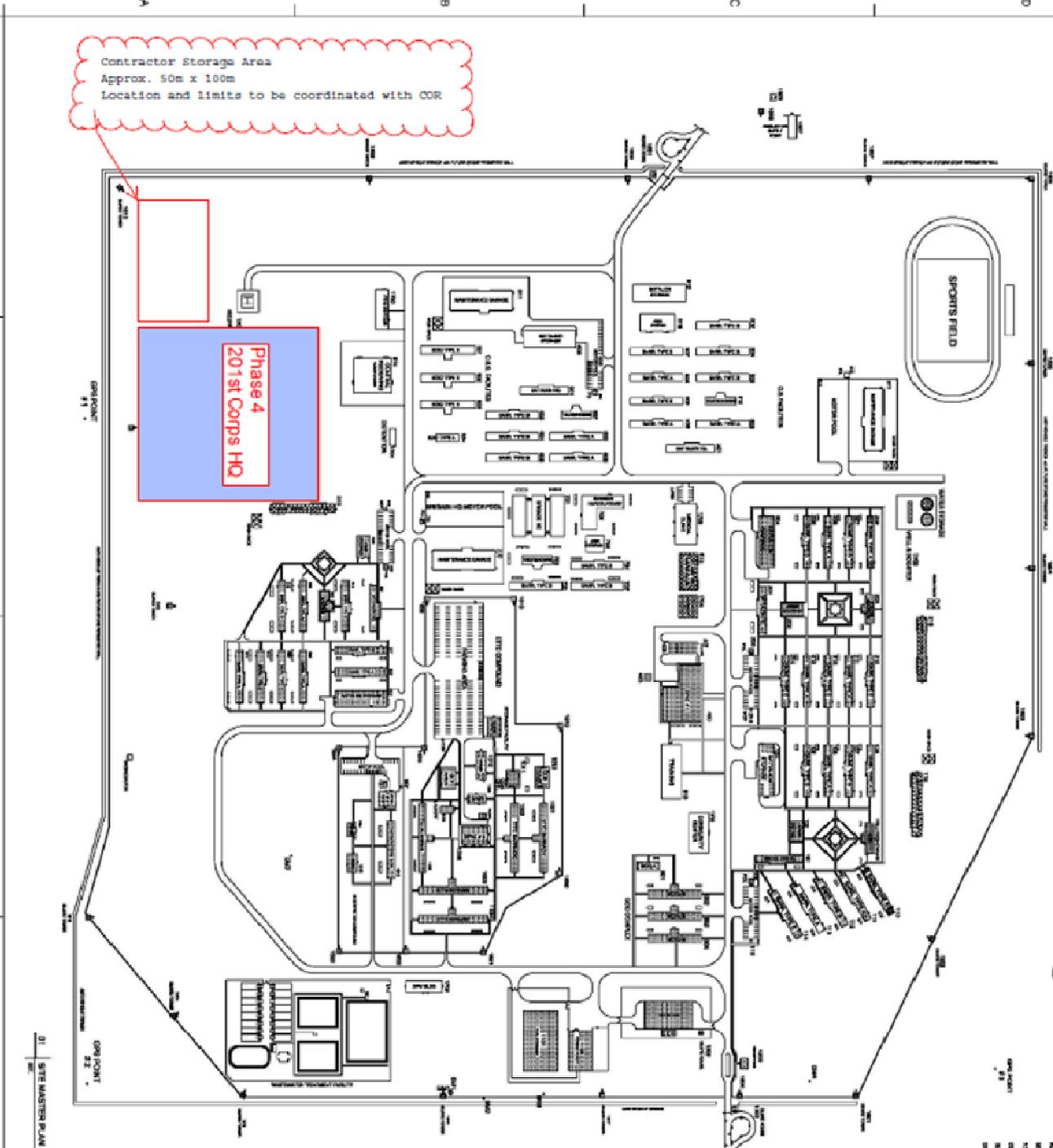
RESPONSE – Unclear on the specific intent of the question.

Question - Do we have to import fill or is fill available on the project site for use?

RESPONSE – The contractor is responsible for furnishing, placing and compacting acceptable fill material.

Contractor Storage Area
Approx. 50m x 100m
Location and limits to be coordinated with COR

Phase 4
201st Corps HQ



01 SITE MASTER PLAN

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION 00100 - BIDDING SCHEDULE/INSTRUCTIONS TO BIDDERS

The following have been modified:

**SECTION 00110
ANA: DESIGN-BUILD CONSTRUCTION
BEST VALUE**

INSTRUCTIONS, CONDITIONS, AND NOTICES TO BIDDERS

1. DEFINITION

This solicitation is for a firm fixed price type contract used to acquire site-adapt construction of Afghan National Army (ANA) facility (approximately AM #4... ~~200,000~~ 63,000 SM in size and a population of ~~2,700 persons~~ 650 people ...AM #4; see furnished drawings and specifications) to be located at Gamberi, Qarghayi District, Lagham Province, Afghanistan

This work includes, but is not limited to, 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).

When the word 'Offeror' is encountered throughout this Section 00110, it is intended to mean a company seeking to do business with the Government that submits a proposal in response to this solicitation.

A proposal is documentation prepared by the Offeror and submitted to the Government for evaluation purposes in response to this solicitation.

When the word 'Government' is encountered throughout this Section 00110, it is intended to mean U.S. Army Corps of Engineers Afghanistan District-North (AED-N).

Proposals for this solicitation will be accepted until the date and time indicated on Standard Form 1442. Perspective Offerors should submit inquiries related to this solicitation only in writing by letter or e-mail to:

U.S. Army Corps of Engineers (USACE)
Afghanistan Engineer District-North (AED-N)
Qalaa House, Attention: **Monica H. Bardsley**
Kabul, Afghanistan
E-MAIL ADDRESS: Monica.h.bardsley@usace.army.mil

Please include the solicitation number, and project title with your questions. Written inquiries must be received by this office not later than 10 calendar days prior to the date set for receipt of offers. TELEPHONE INQUIRIES WILL NOT BE ACCEPTED.

Oral explanations or instructions are not binding. Any information given to an Offeror which impacts the solicitation and/or offer will be given in the form of a written amendment to the solicitation.

As this is a competitive negotiation acquisition, there is no public bid opening and no information will be given out as to the number of Offerors or the results of the competition until all awards are made.

2. DIRECTIONS FOR SUBMITTING PROPOSALS

Offers must be in sealed envelopes/packages, marked and addressed as follows:

MARK PACKAGES:

Solicitation No. **W5J9JE-10-R-0051**

Offer Closing Date: 31 **March 2010**

Offer Closing Time: 2:00 p.m. (LOCAL KABUL TIME)

ADDRESS PACKAGES TO:

U.S. Army Corps of Engineers (USACE)

Afghanistan Engineer District-North (AED-N)

Qalaa House, Attention: **Contract Specialist Monica H. Bardsley**

Kabul, Afghanistan

Special Instructions Pertaining to Hand Carried Offers: Hand-carried offers must be delivered to the USACE AED offices, Qalaa House, Kabul, Afghanistan. Offers who desire to hand-deliver their offers must give properly marked package(s) to the guard at the entrance gate to Qalaa House Compound no later than the time specified above (hand receipts provided upon request).

3. PREPROPOSAL CONFERENCE / SITE VISIT

A Pre-proposal Conference will be held the Corp of Engineers Afghanistan District Headquarter in Kabul at Qalaa House Compound on **10 March 2010 at 1330 hours (1:30 pm)**.

All prospective attendees must register at <http://www.aed.usace.army.mil/Conf-Registration310.asp>

to attend the pre-proposal conference. Because space is limited, only two (2) representatives per company will be admitted. If you are not registered, you will not be admitted onto the Qalaa House compound. You must register no later than 8 March, 2010.

Please plan to arrive early, as it may take time to be processed and screened through the security checkpoint. All attendees must possess a Government issued Identification Document such as National ID Card, CAC Card, Passport, etc. Security will begin screening attendees at 13:00 (1:00 PM). If you are not registered, security will not admit you.

There will **NOT** be an official Site Visit scheduled.

IMPORTANT NOTES. (1) Remarks and explanations addressed during the conference shall not qualify or alter the terms and conditions of the solicitation. (2) The terms and conditions of the solicitation remain unchanged unless the solicitation is formally amended in writing.

4. ELECTRONIC OFFERS

FAXED PROPOSALS, MODIFICATIONS THERETO, OR CANCELLATIONS WILL NOT BE ACCEPTED. However, offers may be withdrawn in writing by letter or e-mail. Any written notice to withdraw an offer sent to this office must be received in the office designated in the Request for Proposal (RFP) for receipt of offers not later than the exact date and time set for receipt of proposals.

5. PROPOSALS SHALL BE SUBMITTED IN THE FOLLOWING FORMAT:

Proposal Package	Original	Copies
VOLUME 1 – Technical Proposal	1	3
FACTOR 1 –Experience		
FACTOR 2 – Resources		
Sub-factor 1. Key Personnel		
Sub-factor 2. Capacity		
FACTOR 3 - Management and Performance Management		
Sub-factor 1. Management Plan		
Sub-factor 2. Capacity Development		
Sub-factor 3. Prompt Payment		
Sub-factor 4. DBA		
Sub-factor 5. Performance of Work by the Contractor		
FACTOR 4 – Security		
FACTOR 5 – Past Performance		
Name, Address, DUNS, CAGE and TAX Identification Number of the Contractor submitting the proposal (If you do not currently have a DUNS number, please note this in your documentation).		
 VOLUME 2– Price Proposal and Administrative Submission		
	1	1
FACTOR 6 – Price Proposal		
SF1442, Solicitation offer and award		
Representation and Certifications, Section 00600		
All Amendments (SF1442)		

Offeror's e-mail address and cell phone number
Name, Address, DUNS, CAGE and TAX Identification Number of the Contractor
submitting the proposal

b. Failure to submit these documents may result in rejection of the proposal. The Government will not make assumptions concerning intent, capabilities, or experience. Clear identification of proposal details shall be the sole responsibility of the Offeror. The Government will reject incomplete proposals after initial evaluation without further consideration. Therefore the proposal shall meet the following basic requirements:

6. PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS

a. REQUIREMENT FOR SEPARATE PRICE AND TECHNICAL PROPOSALS.

(1) The Proposal shall be typed and submitted in English, and easy to read.

(2) Each Offeror must submit both a Price Proposal and a Technical Proposal. The Price Proposal and the Technical Proposal must be submitted as separate volumes. **DO NOT MIX CONTENTS OF VOLUME 1 AND VOLUME 2 IN THE SAME BINDER.** The outside of each separate volume must be clearly marked to indicate its contents; and the identity of the Offeror including DUNS number. Additionally, clearly identify the "original" cost/price proposal and the "original" technical proposal on the outside cover.

(3) Both the Price Proposal and the Technical Proposal must be received by the closing date and time set for receipt of proposals.

(4) No dollar amounts from the Price Proposal are to be included in the Technical Proposal.

(5) All information intended to be evaluated as part of the Technical Proposal must be submitted as part of the Technical Proposal. Do not cross-reference similar material in the Price Proposal, or vice versa. Also, do not include links to websites in lieu of incorporating information into your proposal.

(6) Do not include exceptions to the terms and conditions of the solicitation in either the technical or price proposal. Should the offer include any standard company terms and conditions that conflict with the terms and conditions of the solicitation, the offer may be determined "unacceptable" and thus ineligible for award. Should the Offeror have any questions related to specific terms and conditions, these should be resolved prior to submission of the offer. Notwithstanding the above, the Offeror must clearly describe in the Proposal Cover Sheet submitted with the Price Proposal any exceptions to the contractual and/or technical terms and conditions of the solicitation contained in the Offer.

(7) Failure to submit required documents or failing to complete them properly will result in rejection of the offer without further evaluation. Therefore, Offerors are urged to follow instructions and speak with the Contracting Officer if instructions are not understood.

b. DISCUSSIONS. The Government **does not** intend to enter into discussions with Offerors prior to determining those contractors within the competitive range, in accordance with FAR 52.215-1, Instructions to Offerors—Competitive Acquisitions.

c. GENERAL INSTRUCTIONS.

(1) Submit only the hard-copy paper documents and the electronic files specifically authorized and/or required elsewhere in this section. Do not submit excess information, to include audio-visual materials, electronic media, etc.

(2) Use only 8 ½ by 11 inch paper or A4 paper for hard copy submissions, unless another paper size is specifically authorized elsewhere in this section for a particular submission. Do not use fold-outs (e.g., 11" x 14" or 11" x 17" sheets) unless specifically authorized in this section for a particular submission. Do not use a font size smaller than 10, an unusual font style such as script, or condensed print for any submission. All page margins must be at least 1 inch wide, but may include headers and footers.

(3) The preferred method for assembling your proposals is to use three-ring binders; however, the use of pressboard or other report covers with compression or other type fasteners is acceptable. Do not use spring clamps or exceed the recommended capacity of the fastener or binder. Do not use plastic multi-hole/spiral binding systems, heat binding systems, or other systems which do not facilitate the ready insertion of additional pages. Do not include loose papers.

(4) "Confidential" projects cannot be submitted to demonstrate capability unless all of the information required for evaluation as specified herein can be provided to the Government as part of the Offeror's technical proposal. Offerors that include in their proposals information they do not want disclosed to the public for any purpose, or used by the Government except for evaluation purposes, must be clearly marked in accordance with the instructions at FAR 52.215-1, "Instructions to Offerors—Competitive Acquisition", paragraph (e), "Restriction on disclosure and use of data".

(5) In the case of an Offeror that is part of a large, multi-segmented business concern, provide information directly pertaining to the specific segment of the business concern (i.e., the division, group, unit, etc.) that will perform work under the prospective contract.

(6) For submissions with page limitations, the pages will be counted as follows: One side of the paper is one page; information on both the back and front of one sheet of paper will be counted as two pages. Where authorized, fold-out pages (11" x 14" or 11" x 17") will count as one page. Pages furnished for organizational purposes only, such as a "Table of Contents" or divider tabs, are not included in the page limitation.

7. JOINT VENTURES

A company that is part of a Joint Venture must submit a legally binding joint venture agreement. The Government will not evaluate the capability of any contractors that are not included in the Joint Venture agreement. Joint Ventures must include a copy of the legal joint venture signed by an authorized officer from each of the firms comprising the Joint Venture with the chief executive of each entity identified and must be translated into English, if the original agreement is in a language other than English.

If submitting a proposal as a Joint Venture, the experience, past performance, and management approach of each of the Joint Venture Partners can be submitted for the Joint Venture Entity. The experience for each Joint Venture Partner will be considered the experience of the Joint Venture entity. Joint ventures shall submit the following additional documentation regarding their business entities:

- a. A copy of their Joint Venture agreement in English.
- b. A detailed statement outlining the following in terms of percentages, where appropriate.
 - (1) The relationship of the joint venture parties in terms of business ownership, capital contribution, and profit distribution or loss sharing.
 - (2) The management approach of the joint venture in terms of who will conduct, direct, supervise and control the project and have custody and control of the assets of the joint venture and perform the duties necessary to complete the work.
 - (3) The structure of the joint venture and decision-ranking responsibilities of the joint venture parties in terms of who will control the manner and method of performance of the work.
 - (4) Identification of the key personnel having authority to legally bind the joint venture to subcontracts and state who will provide or contract for the labor and materials for the joint venture.
 - (5) Identification of the party maintaining the joint venture bank accounts for the payment of all expenses and the deposits of all receipts, keep the books and records, and pay applicable taxes for the joint venture.
 - (6) Identification of the party furnishing the facilities, such as office supplies and telephone service.
 - (7) Identification of party having overall control of the joint venture.

Other sections of the proposal shall identify, where appropriate, whether key personnel are employees of the individual joint venture parties and identify the party, or hired as employees of the joint venture.

If one of the joint venture parties possesses relevant experience and/or past performance, the experience and/or past performance of that firm will be considered as the experience and/or past performance of the joint venture.

A complete and legally binding document with all the information required under this section titled "Joint Ventures" shall be included.

SUBCONTRACTORS

If an Offeror wishes to be credited with a subcontractor or supplier, i.e. a firm that is not the prime contractor or part of the joint venture, a letter of commitment signed by the subcontractor and the prime contractor must be submitted. The commitment letter must be submitted even if the firm is in some way related to a joint venture partner (for example, the subcontractor is subsidiary of a joint venture partner, or a subsidiary of a firm to which the joint venture partner is also a subsidiary). If an Offeror submits projects demonstrating experience by a subcontractor, a subsidiary, or a supplier, as opposed to the prime or one of the joint venture partners, the Offeror **MUST** submit a signed letter of commitment from the contractor who performed and completed the work. If a letter of commitment is not submitted, the experience will not be considered. **Letters of Commitment shall be included in Volume I, Factor 1, Experience.**

8. SPECIFIC INSTRUCTIONS FOR THE PRICE PROPOSAL

(1) Number of Sets of the Price Proposal. Submit the ORIGINAL and ONE additional hard copy of the Price Proposal.

(2) Size Restrictions and Page Limits. Use only 8 ½" x 11" or A4 pages. There are no page limits set for the price proposal. However, limit your response to information required by this solicitation. Excess information will not be considered in the Government's evaluation.

(3) Format and Contents of the Price Proposal and List of Tabs. The Price Proposal shall be appropriately labeled as such and shall be organized as indicated in the following chart.

TAB	CONTENTS OF THE PRICE PROPOSAL
#1	The Proposal Cover Sheet
#2	The SF 1442 and Acknowledgement of Amendments (Signed)
#3	Section 00010, Pricing Schedule
#4	Representations, Certifications, and Other Statements of Offerors

#5	JV Agreement, if applicable.
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(4) Detailed Submission Instructions for the Price Proposal

TAB 1: The proposal cover sheet is required by FAR 52.215-1(2) (c) (i)-(v) and must be submitted by all Offerors. This provision, titled “Instructions to Offerors—Competitive Acquisition,” and the format for the proposal cover sheet are furnished elsewhere in this section.

TAB 2: The SF 1442, Solicitation, Offer, and Award is to be completed by all Offerors and duly executed with an original signature by an official authorized to bind the company in accordance with FAR 4.102. Any and all amendments must be acknowledged by all Offerors in accordance with the instructions on the Standard Form 30, Amendment of Solicitation.

TAB 3: Section 00010 is to be completed in its entirety by all Offerors. See Sections 00010 with attached notes, for further instructions.

TAB 4: All Offerors must have electronically completed the annual representations and certifications on the “Online Representations and Certifications Application” (ORCA) website or respond with the completed representations / certifications found in the solicitation. Offerors are responsible for ensuring that these on-line Representations and Certifications are updated as necessary to reflect changes, but at least annually to ensure that they are kept current, accurate and complete. If the ORCA is not completed the Offeror must complete and return the “Representations, Certifications, and Other Statements of Offerors” included in the solicitation. If the Offeror is a Joint Venture, all participants must separately complete both the ORCA Representations and Certifications.

TAB 5: If the Offeror is a Joint Venture (JV), include a copy of the JV Agreement. If a JV Agreement has not yet been finalized/approved, indicate its status. JV Agreements must clearly indicate the percentages of the JV participants, in particular the percent of the controlling party, and a clear delineation of responsibilities and authorities between the JV parties.

9. SPECIFIC INSTRUCTIONS FOR THE TECHNICAL PROPOSAL

(1) Number of Sets of the Technical Proposal. Submit the ORIGINAL and THREE (3) additional sets of the written Technical Proposal, with each set separately packaged.

(2) Format and Contents of the Technical Proposal and List of Tabs. The original and all copies of the technical proposal shall be appropriately labeled as such. Each set shall be organized using the tabs specified in the following chart. Note: The main tabs directly correlate to the evaluation factors identified in Section 00120.

TAB	CONTENTS OF THE TECHNICAL PROPOSAL
Factor #1	EXPERIENCE

Factor #2	RESOURCES Sub-factor 1. Key Personnel Sub-factor 2. Capacity
Factor #3	MANAGEMENT AND PERFORMANCE Sub-factor 1. Management Plan Sub-factor 2. Capacity Development Sub-factor 3. Prompt Payment Sub-factor 4. DBA Sub-factor 5. Performance of Work by the Contractor
Factor #4	SECURITY
Factor #5	PAST PERFORMANCE

(3) Page Limitations. See paragraphs 6.d.(2) and 6.d.(6) above for format and page count instructions. The following page limitations are established for each factor described above:

- Factor #1, Experience – Limited to 5 pages (maximum of 5 forms) **Letters of Commitment with subcontractors will NOT count against your page limitation.**
- Factor #2, Resources– Limited to 1 page for each resume provided and 3 pages to discuss Capacity
- Factor #3, Management and Performance – 10 page limitation **Letters of Commitment with subcontractors will NOT count against your page limitation.**
- Factor #4, Security – Limited to 2 pages
- Factor #5, Past Performance – Limited to 6 pages (maximum of 6 forms)

Pages submitted which exceed limitations listed above will not be evaluated. Tables of content, proposal cover letters, and tabs between proposal information do not count toward any page limitations in the proposal.

10. PROPOSAL FORMAT - VOLUME I

Submission Requirements: The Proposal must contain no more than 5 projects as outlined by Attachment Experience Overview Sheet, representing the Contractor’s experience performing work required on this solicitation.

- (i) **TAB 1: FACTOR 1, EXPERIENCE:** Demonstrate the experience of the Offeror and/or the proposed team, including sub-contractors, on projects that are the same or similar to that described in the solicitation for ~~AM #4...site-adapt, ... AM #4~~ design-build construction work. The Contractor shall complete a minimum of two (2), but no more than five (5), “Experience Information” forms, attached at the end of this section, in response to this factor. All blocks must be filled in and all data must be accurate, current,

and complete. At least two (2) of the projects submitted must be the same or similar to the site adapt, design build solicitation. Similar projects are permanent vertical construction projects that include design, and utilities development. At least one (1) of the projects provided must be valued at over \$10,000,000.00 and must have been underway with at least 50% completed or completed within the last 3 years. ~~AM #4... , and of the two (2) similar projects, at least one (1) of the projects must have been successfully completed in the Laghman Province in which the solicitation project is to be located.~~ In addition, at least one (1) of the projects provided must have been successfully completed in the Laghman or Nangarhar Province. ... **AM #4**

If any of the information required by the Experience Information Form is not included in the form then the offeror will be considered non-responsive and evaluated as unacceptable.

(ii) **TAB 2: FACTOR 2, RESOURCES:**

A. Subfactor 1 - KEY PERSONNEL: The Offeror must provide resume data for the following key personnel:

Project Manager for Design
 Project Manager for Construction
 Safety Officer,
 Quality Control Manager
 Project Scheduler
 Senior Electrical Engineer,
 Senior Mechanical Engineer,
 Senior Civil Engineer,
 Construction Superintendent,
 Capacity Development Manager

Resume information to be provided shall be limited to no more than one (1) page per person and shall include the following information as a minimum:

- Name and title
- Project assignment
- Name of firm with which associated
- Years experience with this firm and with other firms
- Education degree(s), year, specialization, institution if applicable
- Active professional registration, year first registered, if applicable
- Other experience and qualifications relevant to same/similar work required under this contract

The following key personnel must have degrees in the required disciplines:

- Project Managers – Architectural or Engineering Degree in any discipline

- Senior Electrical Engineer – Electrical Engineering Degree
- Senior Mechanical Engineer – Mechanical Engineering Degree
- Senior Civil Engineer – Civil Engineering Degree
- Project Scheduler – Degree in any engineering discipline or four year Construction Management degree

ALL key personnel shall have a minimum of five (5) years of professional experience in their field. For example, a Civil Engineer must have a degree in Civil Engineering and a minimum of ten (10) years of professional civil engineering experience.

B. **Subfactor 2 - CAPACITY:** The offeror shall demonstrate his/her ability to take on this additional project to include management resources, equipment (owned or rented), and financial capability to fully execute the project. The contractor shall also demonstrate that if the project schedule slips how additional resources (management, labor, and equipment) could be provided in a timely manner to ensure completion in accordance with the performance period.

(iii) **TAB 3: FACTOR 3, MANAGEMENT AND PERFORMANCE:**

A. **Subfactor 1: MANAGEMENT PLAN:** Describe in detail your proposed plan for managing all phases of this project throughout construction execution to completion and project turnover, ensuring you maintain schedule in accordance with the specified performance period. Provide a list of your major subcontractors and the features of work each will accomplish and whether or not you have previously teamed with your firm. Provide a letter of commitment from each subcontractor indicating their availability and intent to perform work on this project and the labor, equipment, and resources they will bring to the project. Provide a Management Organizational Flow Chart, which includes Project Management, Construction, Contractor Quality Control (CQC), Safety, and Afghan Capacity Development Manager showing lines of authority and responsibilities for each position indicated. Describe your plan to control time during construction of the project and proposed methods to regain schedule should it slip. Discuss how subcontractors will be integrated into the project and how they will be controlled (as it relates to timely completion and quality of work). Provide a general discussion of the project Quality Control Plan (QCP), which specifically addresses how quality will be assured on this project.

B. **Subfactor 2: CAPACITY DEVELOPMENT:** The offeror shall provide an Afghan Capacity Development Plan. This plan must demonstrate how the offeror will promote the education and skills development of Afghan citizens. The offeror must also submit a copy of the form found at the end of this section entitled “Afghan Capacity Development.” Specifically, the plan must address the following elements, as a minimum. The term “offeror” here includes subcontractors, if applicable.

- How the offeror will recruit, hire, train and maintain a staff of skilled Afghan workers for construction trades including, but not limited to: equipment operators, masons,

reinforcing steel workers, concrete finishers, laboratory technicians, painters, and carpenters.

- How the offeror will recruit, hire, train and maintain a staff of Afghan journeymen, including but not limited to electricians and plumbers.
- How the offeror will recruit and hire educated Afghans or educate Afghan citizens so that they can assume construction engineering and management positions. These positions will include, but are not limited to safety and health officers, quality control managers, schedulers, cost estimators, construction superintendents, and project managers.
- How the offeror plans to interface with the technical and trade schools in the province where the project is being built to maximize the use of graduates from the schools and provide opportunities for the students and graduates of the schools to get on-the-job training and experience.
- The name and resume for an Afghan Capacity Development Manager, whose responsibility it will be to manage the capacity development efforts. The person's position within the company organizational chart must be shown.

C. Subfactor 3: PROMPT PAYMENT: The Offeror must demonstrate how they plan to enforce the prompt payment requirements in accordance with Technical Specification Section 01060 Special Contract Requirements paragraph 2.8 Prompt Payment of Subcontractors.

D. Subfactor 4: DEFENSE BASE ACT (DBA) INSURANCE The offeror must provide a detailed narrative demonstrating how they intend to meet the DBA Insurance requirements in accordance with Technical Specification Section 01060 Special Contract Requirements paragraph 2.11.

E. Subfactor 5: PERFORMANCE OF WORK BY THE CONTRACTOR: The offeror must demonstrate how they will achieve the stated percentage of work in accordance with Contract Clause 52.236-1 Performance of Work by the Contractor (Apr 1984).

(iv) **TAB 4: FACTOR 4, SECURITY PLAN:** The Offeror must provide a summary draft Security Plan specific to the geographic area of the project location. The plan must discuss how the specific requirements documented in Technical Specification Section 01040 Titled: Security will be met. The plan must specifically address your plan to hire, train, and arm the security force; and a description of your employee vetting/screening process. You must provide either a letter of commitment from a licensed Private Security Contractor (PSC) or make note of your intention to request to self-perform security functions. (Letter of commitment will not count against the page limitation)

(v) **TAB 5: FACTOR 5, PAST PERFORMANCE:** For past performance, the offeror must provide a list of all projects currently underway and letters of recommendation, commendations, and/or awards on projects, which demonstrate construction experience. In addition, “Past Performance” forms, attached at the end of this section, must be submitted in response to this factor. All blocks must be filled in and all data must be accurate, current, and complete. A minimum of three (3), but no more than five (5), references must be on projects at least 50% underway or completed within the last three (3) years. At least one (1) reference must refer to a project that has been completed in the Laghman or Nangarhar Province in which the solicitation project is located. Space is provided in Past Performance form for Data Universal Numbering System (DUNS). DUNS number must be provided if and when contractor has obtained number and it is available.

11. PROPOSAL FORMAT - VOLUME II PRICE PROPOSAL

Submission Requirements: The following Administrative requirement shall be submitted at the same time as the submission of the Technical Proposal (Volume 1).

Information to be provided in Volume II:

- a. Completed Bidding Schedule, containing the Contractor determined Prices.
- b. SF1442, Solicitation offer and award
- c. Representation and Certifications, Section 00600
- d. All Amendments (SF1442)
- e. Offeror’s e-mail address and cell phone number
- f. Name, Address, DUNS, CAGE and TAX Identification Number of the Contractor submitting the proposal (If you do not currently have a DUNS number, please note this in your documentation).

FACTOR 6 – PRICE

Contractor’s prices shall contain all costs, in addition to those contained in the Bidding Schedule that is part of this solicitation. Prices shall represent costs (indirect and direct costs) including profit. The Contractor's prices shall contain all Contractor’s costs inclusive of profit, all overhead (to include office and field overhead), labor burden, insurance, adjustments to listed prices, general and administrative expenses, subcontractor mark-up, mobilization and demobilization, and all other costs including, but not limited to, compliance with environmental laws, permits, preparation of reports, correspondence and documentation required by law or these specifications, tax laws, protection and/or moving of government property and engineering services. (Engineering services include those services that are incidental to construction, and completing submittals for construction work.) The prices shall also include costs necessary to interface with Government representatives, and coordination with occupants and other contractors as necessary. For more information see the Summary of Work.

COST/PRICE PROPOSAL EVALUATION. An initial price analysis will be conducted on the offeror’s prices using techniques pursuant to FAR 15.404-1(b) and in accordance with the solicitation. An evaluation for acceptability will be performed on each proposal in accordance with FAR 15.101-1. The Government will evaluate proposals as follows.

First, the Government price evaluators will conduct a price analysis of overall prices and then perform a realism analysis for the purpose of measuring each offeror's understanding of the requirements and to assess the risk inherent in an offeror's proposal. ~~AM #4... Total prices submitted by the offeror that are determined to be more than 25% above or below the Independent Government Estimate and more than 25% above or below the average of all the price proposals received in response to the solicitation will be considered to be unreasonably high or unrealistically low and will not be considered for award. Second, the Government price evaluators will determine which of the proposals meeting the price reasonableness and realism analysis and rank them by total proposal price. ... AM #4~~

a. Price will be evaluated and considered but will not be scored or combined with other aspects of the proposal evaluation. The proposed prices will be analyzed for reasonableness. They may also be analyzed to determine whether they are realistic for the work to be performed; reflect a clear understanding of the requirements; and are consistent with the Offeror's Technical Proposal. Additionally, all offers will be analyzed for unbalanced pricing.

b. The price will be used along with the technical evaluation to make selection for award. Since evaluation of the price proposal will represent a portion of the total evaluation, it is possible that an offeror might not be selected for award because of unreasonable, unrealistic, or incomplete price proposal information. The Government will evaluate the format and clarity of the price proposal.

c. Other Award Factors: The Contracting Officer shall consider several factors in the selection process which are important, but not quantified, such as:

(1) Agreement by the offeror to all general and special contract provisions and clauses.

(2) Determination of responsibility of the contractor by the Contracting Officer in accordance with the provisions of the Federal Acquisition Regulation, Part 9.1. In order to be determined responsible, a prospective contractor must:

(a) Have adequate financial resources to perform the contract or the ability to obtain them.

(b) Be able to comply with the required or proposed delivery or performance schedule taking into consideration all existing commercial and Governmental business commitments.;

(c) Have a satisfactory performance record.

(d) Have a satisfactory record of integrity and business ethics.

(e) Have the necessary organization, experience, accounting and operational controls, and technical skills, or the ability to obtain them.

(f) Have the necessary production, construction, and technical equipment and facilities, or the ability to obtain them.

(g) Be otherwise qualified and eligible to receive an award under applicable laws and regulations. **AM #4** ...No award will be made to an offeror who has not fully complied with this paragraph. ... **AM #4**

12. Proposal Cover Sheet

PROPOSAL COVER SHEET

1. Solicitation Number:
2. The name, address, and telephone and cell phone numbers of the Offeror, DUNS number (and electronic address if available):
3. A statement specifying the extent of agreement with all terms, conditions, and provisions included in the solicitation and agreement to furnish any or all items upon which prices are offered at the price set opposite each item. Statement to include any exceptions in technical or cost/price proposal or exceptions inherent in Offeror's standard terms and conditions.
4. Names, titles, and telephone and cell phone numbers (and electronic addresses if available) of persons authorized to negotiate on the Offeror's behalf with the Government in connection with this solicitation:
5. Name, title, and signature of person authorized to sign the proposal. Proposals signed by an agent shall be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the issuing office.

13. SOURCE SELECTION USING THE BEST VALUE PROCESS. An evaluation for acceptability will be performed on each proposal in accordance with FAR 15. The Government will select the offer that represents the best value to the Government by using the trade-off process described in FAR Part 15.101-1. This process permits tradeoffs between cost/price and technical ("non-cost") factors and allows the Government to accept other than the lowest priced offer. The award decision will be based on a comparative assessment of proposals against all source selection criteria in the solicitation. See Section 00120. To be considered technically acceptable, no technical factor in the proposal may be determined to be unacceptable. The failure of a proposal to meet any of the factors will result in a technically unacceptable rating and preclude award. See also Section 00120.AM #4 ... All factors from the technical proposal will be weighted equally for the evaluation process. ... AM #4

Attached is a checklist for the convenience of the offeror. It is intended to assist in preparation of proposals. These are areas which should be addressed in a proper and complete proposal, but are not all inclusive. This checklist does NOT need to be returned, but is provided for information only.

Contractor Check List for information only

FACTORS	MAKE SURE THE FOLLOWING ITEMS ARE INCLUDED OR ADDRESSED IN THE PROPOSAL	YES/NO (if NO contractor will not be considered technically acceptable)
FACTOR 1: EXPERIENCE	Project completed in the Province?	

FACTORS	MAKE SURE THE FOLLOWING ITEMS ARE INCLUDED OR ADDRESSED IN THE PROPOSAL	YES/NO (if NO contractor will not be considered technically acceptable)
	One (1) Project at least \$10,000,000.00 Completed or underway in the last 3 years?	
	Construction projects must show Design, Vertical Construction and Utilities Development	
FACTOR 2: RESOURCES	Clearly show education, Experience and required degree	
	List of all equipment (owned or rented)	
	Explain Financial Capability	
FACTOR 3: MANAGEMENT AND PERFORMANCE	List of Subcontractors with letters of commitment from each tell what portion of work the sub contractor will be performing	
	Provide Organization Flow Chart reflecting ALL Key Personnel	
	Provide Afghan Capacity Development Plan	
	Include resume for the Afghan Capacity Development Manager	
	Return Afghan Capacity Development Form Completely filled out	
	Skill Trade minimum 50% Afghan Journeymen minimum 35% Afghan	
	Address both how you plan to file a claim and your plan to make sure the family receives the funds	
FACTOR 4: SECURITY	Letter of commitment from the security subcontractor	
FACTOR 5: PAST PERFORMANCE	List of ALL ongoing Projects	
	All Letters of Recommendation, commendation and/or awards on all projects submitted for construction experience	

1. Have you assembled your proposal in the manner outlined by Section 00110?
2. Have you acknowledged all amendments?
3. Have you included One (1) original and Three (3) copies of Volume 1 – Technical Proposal?
(Each copy must be in a separate binder)
4. Have you included One (1) original and One (1) copy of Volume 2 – Price Proposal and Administrative Submission?
5. DO NOT MIX CONTENTS OF VOLUME 1 AND 2 IN THE SAME BINDER.

Telephone Number and E-mail:

Certificate of Commitment to Employing Afghan Citizens

Position	Minimum Percentage of Workforce to be Afghan	Minimum Allowable Value to be Used in Column 2.
Skilled Trades		50
Journeyman		35

The undersigned confirms that the offeror (to include subcontractors) will meet or exceed the minimum percentages of Afghan employees, as listed in Column 2 above. The performance of the Afghan Capacity Development Manager will be evaluated based on his or her ability to meet or exceed the commitment for employing Afghans, as defined by this certificate..

Signature _____

Printed Name _____

Title _____

Past Performance Form

1. Project Identification

Project name:

Contract number:

Location:

2. Customer Point of Contact (Note: the Government may contact this customer to verify the information provided on this form):

Name:
Address:
Phone number:
Email Address:

3. Problems encountered and corrective actions taken:
4. List Change Orders and their circumstances:
5. Project scheduled completion date and actual completion date. IF the scheduled and actual completion dates are different, explain reason for the change.
6. Initial Project Budget (US Dollars) and Final Actual Project Cost (US Dollars). IF the Project Budget and Final Actual Project Cost are different, explain reason for the change.
7. Safety record and accident reports:
8. References (submit the following if available):

Customer Satisfaction letters
Letters of Appreciation
Performance Evaluations
Certification of Achievements
Letters of Recommendations

SECTION 00120
ANA: DESIGN-BUILD
BEST VALUE

PROPOSAL EVALUATION AND CONTRACT AWARD

1. ELIGIBILITY FOR CONTRACT AWARD. In accordance with the FAR, no contract shall be entered into unless the contracting officer ensures that all requirements of law, executive orders, regulations, and all other applicable procedures, including clearances and approvals, have been met. This includes the FAR requirement that no award shall be made unless the contracting officer makes an affirmative determination of responsibility. To be determined responsible, a prospective contractor must meet the general standards in FAR Part 9 and any special standards set forth in the solicitation.

2. SOURCE SELECTION USING THE BEST VALUE PROCESS

The Government will select the offer that represents the best value to the Government by using the trade-off process described in FAR Part 15. This process permits tradeoffs between cost/price and technical (“non-cost”) factors and allows the Government to accept other than the lowest priced offer. The award decision will be based on a comparative assessment of proposals against

all source selection criteria in the solicitation. **AM #4** ... All factors from the technical proposal will be weighted equally for the evaluation process. ... **AM #4**

3. RELATIVE IMPORTANCE OF PRICE TO THE TECHNICAL EVALUATION FACTORS

All evaluation factors other than cost or price, when combined, are significantly more important than price. All non price factors will be treated equally and all non price subfactors will be treated equally. The Government is concerned with striking the most advantageous balance between technical merit (“quality”) and price to the Government (i.e., the price). The degree of importance of price could become greater depending upon the equality of the technical proposals. If competing technical proposals are determined to be essentially equal, price could become the controlling factor.

4. EVALUATION OF THE PRICE PROPOSALS

a. Price will be evaluated and considered but will not be scored or combined with other aspects of the proposal evaluation. The proposed prices will be analyzed for reasonableness. They may also be analyzed to determine whether they are realistic for the work to be performed; reflect a clear understanding of the requirements; and are consistent with the Offeror’s Technical Proposal. Additionally, all offers will be analyzed for unbalanced pricing.

b. The price will be used along with the technical evaluation to make selection for award. Since evaluation of the price proposal will represent a portion of the total evaluation, it is possible that an offeror might not be selected for award because of unreasonable, unrealistic, or incomplete price proposal information. The Government will evaluate the format and clarity of the price proposal.

c. Other Award Factors: The Contracting Officer shall consider several factors in the selection process which are important, but not quantified, such as:

(1) Agreement by the offeror to all general and special contract provisions and clauses.

(2) Determination of responsibility of the contractor by the Contracting Officer in accordance with the provisions of the Federal Acquisition Regulation, Part 9.1. In order to be determined responsible, a prospective contractor must:

(a) Have adequate financial resources to perform the contract or the ability to obtain them.

(b) Be able to comply with the required or proposed delivery or performance schedule taking into consideration all existing commercial and Governmental business commitments.;

(c) Have a satisfactory performance record.

(d) Have a satisfactory record of integrity and business ethics.

(e) Have the necessary organization, experience, accounting and operational controls, and technical skills, or the ability to obtain them.

(f) Have the necessary production, construction, and technical equipment and facilities, or the ability to obtain them.

(g) Be otherwise qualified and eligible to receive an award under applicable laws and regulations. **AM #4...** No award will be made to an offeror who has not fully complied with this paragraph. **...AM #4**

5. EVALUATION OF THE TECHNICAL PROPOSAL. The Technical Proposal will be evaluated based on the following evaluation criteria:

A. FACTOR 1: EXPERIENCE: The Government will review the project experience of the offeror, including subcontractors, on projects provided in response to Section 00110, Factor 1.:

- Offeror shall complete a minimum of two (2), but no more than five (5), “Experience Information” forms attached at the end of this section for projects that have been successfully completed or are near a successful completion, in response to this factor. All blocks must be filled in and all data must be accurate, current, and complete. At least two (2) of the projects submitted must be the same or similar to the site adapt, design build solicitation. Similar projects are permanent vertical construction projects, which include design, and utilities development.
- At least one (1) project must be valued at over \$10,000,000.00 and must have been underway at least 50% completed or completed within the last 3 years.

AM #4 ...

- ~~Of the two (2) projects at least one (1) of the projects must have been successfully completed in the Laghman Province in which the solicitation project is to be located.~~ In addition, at least one (1) of the projects provided must have been successfully completed in the Lagham or Nangarhar Province. **...AM #4**

B. FACTOR 2: RESOURCES: The Government will review the resumes provided in response to Section 00110, Factor 2.

Subfactor 1 - KEY PERSONNEL:

The offeror must submit resumes for the following key personnel:

Project Manager for Design
 Project Manager for Construction
 Safety Officer,
 Quality Control Manager,
 Project Scheduler
 Senior Electrical Engineer,

Senior Mechanical Engineer
Senior Civil Engineer,
Construction Superintendent,
Capacity Development Manager

All resumes must include the following information and not exceed one page.

The following key personnel must have degrees in the required disciplines:

- Project Manager – Architectural or Engineering Degree in any discipline
- Senior Electrical Engineer – Electrical Engineering Degree
- Senior Mechanical Engineering – Mechanical Engineering Degree
- Senior Civil Engineer – Civil Engineering Degree
- Project Scheduler – Degree in any Engineering discipline or 4 year Construction Management degree

ALL key personnel shall have a minimum of five (5) years of professional experience in that field. For example, a Civil Engineer must have a degree in Civil Engineering and 3 years of professional civil engineering experience.

Subfactor 2 - CAPACITY: The Government will review the description of capacity the contractor is able to bring to bear in executing the solicitation requirements provided in response to Section 00110, Factor 2. Offerors must demonstrate they have ability, equipment, financial capacity and management resources to successfully complete the project on time within the prescribed performance period.

C. FACTOR 3- MANAGEMENT AND PERFORMANCE:

Subfactor 1 – MANAGEMENT PLAN: The Government will review the offeror's proposed plan for managing all phases of the project verifying his intent to complete the project on schedule. The offeror must provide a list of its major subcontractors (if any) and the specific work each will accomplish. The contractor must state whether or not he has previously teamed with a specific subcontractor and they successfully completed the work on time. If subcontractors are used the contractor must provide a letter of commitment from each subcontractor indicating their availability and intent to perform work on the project. The offeror must provide a Management Organizational Flow Chart, which includes detailed information concerning Project Management, Construction, CQC, Safety, and Capacity Development. The chart must clearly indicate lines of authority and responsibilities for each of the positions indicated. The offeror must describe his plan to control time during construction to meet the project completion date and specify methods to be used in an effort to regain schedule should it slip. The contractor must discuss how subcontractors will be integrated into the project and how they will be controlled (as it relates to timely completion and quality of work). The offeror must provide a general discussion of his project Quality Control Plan (QCP), specifically addressing how quality will be assured on the project.

Subfactor 2 – CAPACITY DEVELOPMENT: The Government will review the offeror's proposed plan to determine if it demonstrates how the offeror will promote the education and skills development of Afghan citizens. Specifically, the plant must demonstrate the following:

- How the offeror will recruit, hire, train and maintain a staff of skilled Afghan workers for construction trades including, but not limited to: equipment operators, masons, reinforcing steel workers, concrete finishers, laboratory technicians, painters, and carpenters.
- How the contractor will recruit, hire, train and maintain a staff of Afghan journeymen, including but not limited to electricians and plumbers.
- How the offeror will recruit and hire educated Afghans or educate Afghans citizens so that they can assume construction engineering and management positions. These positions will include, but are not limited to safety and health officers, quality control managers, schedulers, cost estimators, construction superintendents, and project managers.
- How the offeror plans to interface with the technical and trade schools in the province where the project is being built to maximize the use of graduates from the schools and provide opportunities for the students and graduates of the schools to get on-the-job training and experience.
- The name and resume for an Afghan Capacity Development Manager whose responsibility it will be to manage the capacity development efforts. The person's position within the company organizational chart must be shown.

Offerors must demonstrate that they have an achievable plan to achieve all of the requirements listed above.

Subfactor 3 – PROMPT PAYMENT: The government will review the offeror's description of how they will ensure the prompt payment of all subcontractors, suppliers, and their employees in accordance with local Afghan laws and the requirements specified in Technical Specification Section 01060 Special Contract Requirements paragraph 2.8 Prompt Payment of Subcontractors. Offerors must demonstrate how they will meet their payment responsibility as a prime contractor and ensure all subcontractors, suppliers, and all employees are promptly paid in a timely manner.

Subfactor 4 - DEFENSE BASE ACT (DBA) INSURANCE: The government will review offeror's description of how they will properly submit a claim, to include necessary actions / preparations to gather contact information for the injured / deceased family, and both the notification and follow up processes to facilitate replacing the lost income of the worker. The government will also review the proposed process for immediate and required follow-on reports being submitted in a timely manner to the appropriate individuals in accordance with the DBA Insurance requirements specified in Technical Specification Section 01060 Special

Contract Requirements paragraph 2.11. The offer's process must demonstrate how the requirements will be met.

Subfactor 5 - PERFORMANCE OF WORK BY THE CONTRACTOR: The government will review the offeror's description of how they will achieve the stated percentage of work in accordance with the contract clause, by either self performing specific features of work, providing materials to be incorporated in the works, providing a list of owned equipment to be charged against the project to meet the percentage identified in Contract Clause 52.236-1 Performance of Work by the Contractor (Apr 1984). The offeror must demonstrate how the required percentage of work will be met.

D. FACTOR 4: SECURITY PLAN: The government will review the offeror's security plan describing how they intend to meet the specific requirements found in Technical Specification Section 01040 Standard Contract Security. In the plan, offerors must demonstrate that they will meet each of the requirements if self-performing, or must include a letter of commitment from a licensed PSC.,

E. FACTOR 5: PAST PERFORMANCE: For past performance, government will review the offeror's letters of recommendation, commendations and/or awards on projects to see that they demonstrate successful construction experience. The government will also review the "Past Performance" forms required to be submitted in response to this factor to ensure that all blocks are filled in and all data is accurate, current, and complete, a minimum of three (3), but no more than five (5), references are on projects at least 50% underway or completed within the last three (3) years. ~~AM #4... and at least one (1) reference refers to a project that has been completed in the Laghman Province in which the solicitation project is located.~~ In addition, at least one (1) of the projects provided must have been successfully completed in the Laghman or Nangarhar Province. ...AM #4

The Contractor Performance Assessment Reporting System (to include ACASS, CCASS, and CPARS) will be utilized to validate past performance ratings on Department of Defense contracts, as well as any other past performance information source the Government deems necessary to evaluate a contractor's past performance.

The US Army Corps of Engineers, Afghanistan Engineer District-North, maintains final evaluations of Offeror's performance in the Resident Management System (RMS), hard copies in contract files, and previous past performance evaluations conducted by the Government. Any and all of this information may be used when evaluating past performance of Offerors if it is determined to be recent and relevant by the Contracting Officer.

The Government may use the list of projects under way, and other information, to contact references provided as part of Factor 1 – Experience, or any other sources, for information regarding the offeror's past performance on projects and for the purposes of assessing and verifying the scope of the work performed. **Offerors should provide accurate, current, and complete contact information for references provided in the past performance worksheet.**

Failure to meet all the requirements under this factor will result in a “NO GO” or unacceptable rating. Offerors with no past performance information will receive a “NEUTRAL” rating for this factor.

6. GENERAL TECHNICAL CRITERIA

- a. Material omission(s) may cause the technical proposal to be rejected as unacceptable.
- b. Technical proposals which do not provide the specified information in the specified location in accordance with the submission instructions may be downgraded. The Government is under no obligation to search for information that is not in the specified location.
- c. Proposals which are generic, vague, or lacking in detail may be considered unacceptable. The offeror’s failure to include information that the Government has indicated should be included may result in the proposal being found deficient if inadequate detail is provided.
- d. The Government cannot make award based on a deficient offer. Therefore, a rating of “Unsatisfactory” under any subfactor will make the offer ineligible for award, unless the Government elects to enter into discussions with that Offeror and all deficiencies are remedied in a revised proposal.

52.236-27 SITE VISIT (CONSTRUCTION) (FEB 1995)

(a) The clauses at 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigations and Conditions Affecting the Work, will be included in any contract awarded as a result of this solicitation. Accordingly, offerors or quoters are urged and expected to inspect the site where the work will be performed.

(b) There will **NOT** be an official Site Visit scheduled. **AM #4...** ~~Contractors are welcome to visit the site on their own, however all site visits must be coordinated with the Resident Engineer Office at Gamberi Garrison. Contact information — roger.a.green@usacc.army.mil~~ **...AM #4**

(End of provision)

SECTION 00800 - SPECIAL CONTRACT REQUIREMENTS

The following have been modified:

SECTION 01010

SECTION 01010 SCOPE OF WORK

1.0 GENERAL

The project consists of the design and construction of a Headquarters facility for the ANA 201st Battalion use in Gamberi, Qarghayi District, Lagham Province, Afghanistan. Site is located near the existing Gamberi ANA installation. Refer to appendices for approximate site location. The project is defined as the design, material, labor, and equipment to develop 63,000 SM of site (approximately 250 x 250 meters site size) construct buildings, roadways, parking, utilities and other infrastructure for one (1) 7,500 SM Headquarters administration building, fifteen (15) barracks facilities, two (2) Toilet/Shower/Laundry Facilities, and one (1) 2500 SM two-story administration facility serving a population of 650 PEOPLE. This project is a Design-Build contract with the following design documents required and are described in detail per section 01335.

- 1) Headquarters Bldg: 35%, 65%, 99% and Final Design submittals
- 2) Barracks Bldgs: 35%, 65%, 99% and Final Design submittals
- 3) Toilet/Shower/Laundry Facility: 99% and Final Design submittals
- 4) Administration Bldg: 35%, 65%, 99% and Final Design submittals
- 5) Gate House for Secondary ECP: 35%, 65%, 99% and Final Design submittals
- 6) Site plan: 35%, 65%, 99% and Final Design submittals

Government furnished drawings are provided as attachment A which consist of concept designs for each facility and a site plan showing locations of each facility. The site plan is for info purposes only; the exact building locations and dimensions are the responsibility of the contractor as part of the design effort. Water and site data and analysis are required to be submitted and considered a concept 10% design of the facility. Exact design and other submittal requirements are detailed in section 01335 of this contract. A detailed cost estimate is required as part of the contractor submittal documents as shown in spec section 00150.

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 included herein:

- IBC, International Building Codes 2006
- NFPA 101, Life Safety Codes, 2009
- UFC 4-010-01, DoD Minimum Anti-Terrorism Standards for Buildings.

1.1 ENGLISH LANGUAGE REQUIREMENT

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

1.2 SUBMITTALS

Submittals and a Submittal Register are required as specified in Section 01335 SUBMITTAL PROCEDURES of the Basic Contract.

1.3 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 Moderate, 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 approved by the Government before construction notice to proceed.

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 include those offered by the Commercial Technical Training Center (in Jalalabad) and the Champion Technical Training Center (in Kabul). 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. Alternative CQM courses, other than those mentioned above, 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 approved CQM course.

1.5 ELECTRICAL WORKERS QUALIFICATIONS

Electrical work shall be performed by Qualified Personnel with verifiable credentials that are thoroughly knowledgeable with applicable code requirements. Verifiable credentials consist of a certificate of graduations from an approved trade school and required amount of experience, depending on work being performed, and should be identified in the proposal that is submitted. A qualified person is one who has received training in and has demonstrated skills and knowledge in the construction and operation of electrical equipment and installations and the hazards involved. This includes the skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment, to determine the nominal voltage of exposed live parts, the clearance distances and corresponding voltages to which the qualified person will be exposed.

1.5.1 SUPERVISORY ELECTRICIAN

Supervisory electricians must be graduates of an approved trade school, and must have two (2) years of relevant electrician experience. Approved programs include but are not limited to the Afghanistan Technical and Vocational Institute (in Kabul), the Kunar Trades Training Center, and the Commercial Technical Training Center (in Jalalabad). Work experience resumes and graduation certificates shall be submitted and approved prior to commencement of any design or construction involving electrical work. 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, US of the Army Corps of Engineers.

1.5.2 ELECTRICIANS

Electricians must be graduates of an approved trade school and must be able to provide upon request a certification of successful course work completion and graduation in addition to a resume of work experience.

1.6 AED DESIGN REQUIREMENTS DOCUMENTS

AED Design Requirements documents shall be adhered to in this contract. These documents are listed in Section 01015 (References) and are available from the COR. These documents shall be used as the basis for design and construction, and for selecting options within the United Facilities Guide Specifications (UFGS) discussed below. 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. Data and requirements in the AED Design Requirements documents shall supersede UFGS language where there are conflicts.

1.7 CONSTRUCTION PROJECT SIGN

The contractor shall fabricate and display at least one sign to identify the project site as an Islamic Republic of Afghanistan sponsored project. The sign shall meet or exceed the requirements provided in Section 01060 SPECIAL CONTRACT REQUIREMENTS. Exact placement of the sign at the project site shall be coordinated with the COR.

2.0 LOCATION

The site, approximately 250 x 250 meters in size, is located at Gamberi Garrison, Jalalabad province, Afghanistan, as shown on attached drawings. Coordinates provided shall be verified with the COR prior to any work commencing on site.

Corner 1	34.52842 N	70.34894 E
Corner 2	34.52194 N	70.34889 E
Corner 3	34.52814 N	70.35964 E
Corner 4	34.52158 N	70.35944 E

3.0 UNEXPLODED ORDNANCE (UXO)

3.1 UXO REMOVAL AND CLEARANCE

The contractor is not responsible for the clearance or removal of mines and unexploded ordnance (UXO) from the site prior to the commencement of construction. The site has been cleared to a minimum depth of 1 meter and the certificate of clearance is available for review. No construction activities are to be conducted without review of the written clearance certification for the site. If sub-surface construction activities will be performed on this site the clearance certification must state that the clearance depth was conducted to a minimum 1 meter in depth. ***If the contract parameters for sub-surface construction exceed the minimum 1 meter clearance depth the contractor WILL be responsible for clearance to these depths.*** The contractor may only provide clearance/removal services via UN Mine Action Center for Afghanistan (UNMACA) accredited entities and 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. **NOTE 1:** 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

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

NOTE 2: *For construction in excess of 1 meter in depth on areas previously cleared.* 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 3: The contractor should be aware that many areas demined by NGOs and other groups may have been cleared to a depth of 1 m.

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 from the MAC.

If a UXO/mine is encountered during project construction, the Contractor shall immediately stop work in the affected area, mark the area of the UXO/Mine and immediately notify the Contracting Officer, COR or the Government Construction Representative. UXO/Mine disposal will not be the responsibility of the Contractor unless the area exceeds the 1 meter clearance depth of the original clearance certificate.

4.0 SUMMARY OF WORK

4.1 CONTRACTOR REQUIREMENTS

The contractor shall design and construct the facilities as a design-construct contract (design-build,) and shall be in accordance with the requirements stated in Section 01015: TECHNICAL REQUIREMENTS. Refer to attachment following this section for more specifics for required spaces. The design and construction work shall include but not be limited to that shown within attached table and described herein.

The contractor may be required to coordinate the efforts required under this contract with at least one other contractor at the site. Such coordination requirements will be required as part of this contract. All coordination shall be in agreement with the COR.

4.1.1 GENERAL REQUIREMENTS FOR FACILITIES

All requirements set forth in the Scope of Work, but not included in the Technical Requirements, shall be considered as set forth in both, and vice versa. Provide heating and cooling for all facilities unless otherwise stated in Section 01010 or 01015. All toilets shall be mixed eastern and western style. All eastern toilets shall face north or south.

All buildings shall be constructed with reinforced concrete roof structures.

All standard construction amenities and details such as heating, lighting, site drainage, utility connections, etc. shall be implied as a design and construction requirement for a design population of 650 people. Drawings referenced are contained in Section 01015 or Appendix A. Concrete walkways are required to connect all buildings, facilities, and features such as parking lots, power plants, etc.

The design and construction work shall include but not be limited to the following sub-paragraphs.

In general, this project consists of designing and constructing of the following:

- Item 1: Site Survey/A-E Design
- Item 2: As-built Drawings
- Item 3: Mobilization, Demobilization
- Item 4: Construct Utilities
- Item 5: Construct Roads and Walkways
- Item 6: Site Improvement/Grading
- Item 7: Geo-Technical Investigation
- Item 8: Other Site Work
- Item 9: Secondary ECP and Gate House
- Item 10: Construct Barracks (15)
- Item 11: Construct Headquarters Building (1)
- Item 12: Construct Administration Building (1)
- Item 13: Latrine/Laundry Facilities (2)
- Item 14: Spare Parts

4.2 MASTER PLANNING

The Contractor shall prepare a site Master Plan based on information contained in the Request for Proposal. The development of the master plan will include participation in a design charrette that will be conducted at the Corps of Engineers Headquarters Office in Kabul. Concept drawings provided are only concepts and to be used for general information purposes only, the Contractor must verify the exact space and site requirements and code compliance in accordance of section 01010 and section 01015 of this contract. The contractor is highly encouraged to coordinate a site visit prior to preparing a proposal; site visit will be coordinated with the KO.

The contractor may be required to coordinate the efforts required under this contract with at least one other contractor at the site. Such coordination requirements will be required as part of this contract. The coordination effort may be significant and may include such tasks as the exchange of information with other contractors such as design data, drawings, calculations, and technical information. Additionally it may be necessary for the contractor to conduct meetings, hold teleconferences, and prepare the submittal of additional information to the COR that demonstrates the coordination and integration of new work with existing and future work of other contractors. All coordination shall be in agreement with the COR and approved prior to the commencement of any work.

4.3 WATER SYSTEM

Design a potable water system, to include a ground well water source, water well pump, and hydro-peoleumatic water storage tank, and underground pipe distribution system. The well shall be constructed to deliver a flow rate per section 01015. The new well shall be located at least 100 meters away from existing wells and the existing wastewater treatment facility; exact location to be coordinated with the COR. The well shall be provided as a water source to the water storage tank(s) required as part of this contract. ~~AM #4... The well will be drilled to a minimum depth of 240 meters.~~ Two (2) wells will be drilled to a minimum depth of 240 meters... ~~AM #4~~ if water is not found, the COR will provide direction. The storage tank(s) shall provide capacity for a population of 3,650 personnel based on 155 L/capita/day (41 gal/capita/day) unless specified otherwise in these documents. The storage tank(s) shall be located in close proximity and be connected to the existing water storage tanks providing water to the Gamberi Garrison. Exact location to be coordinated with the COR. Per customer, fire flow and irrigation systems shall not be included in design calculations. Provide an enclosed water well house and chlorination unit/system. An analysis of the site and water availability, to include a drawdown test of existing well(s), is required and forms part of the 10% site concept design submittal as detailed in section 01335. The underground pipe distribution system will be connected to the existing water supply and distribution system. At least 2 connection stub outs will be provided for the future RMTC project at Gamberi. The stub outs will be located such that a loop system will be possible for the future facility. Additionally, the contractor shall conduct any testing or analysis deemed necessary by the COR to determine existing water distribution working pressures, exact pipe locations, pipe diameters, and existing well depth(s). All as-built information available for the existing or currently under construction facilities will be provided to the contractor for use in this analysis by the COR. The contractor may be required to coordinate the efforts required under this contract with at least one other contractor at the site, as there may be more than one contractor working at Gamberi when this contract is awarded. Such coordination requirements will be required as part of this contract. All coordination shall be in agreement with the COR.

4.4 SANITARY SEWER SYSTEM

Sanitary sewer system shall be designed and constructed by contractor. Sewer collection system shall consist of gravity sewer pipe and appurtenances such as manholes, cleanouts, building service connections, and lift stations.

The gravity sewer collection system shall connect to the existing sewage treatment and effluent disposal system. System capacity shall be calculated based on a hydraulic waste load that is equivalent to 80 percent of the Required Daily Demand for the water system as specified in these technical requirements, or as 33 gallons per capita per day (gpcd), whichever is greater. The sewage collection system shall be designed to accommodate the total facility compound population as specified in the Scope of Work to include capacity factors as used in the AED Design Guides and the UFCs and verified by the contractor. The contractor shall conduct any testing or analysis deemed necessary by the COR to determine existing conditions. The contractor may be required to coordinate the efforts required under this contract with at least one other contractor at the site. Such coordination requirements will be required as part of this contract. All coordination shall be in agreement with the COR.

4.5 DEMOLITION AND GRADING

There is an estimated 400,000 cubic meters of earthwork at the project site (see Appendix B). The Contractor shall provide a satisfactory fill across the entire site compacted in lifts no greater than 250mm at a minimum of 95% Maximum Dry Density in accordance with ASTM D 1557. A site layout with grade contours is provided in Appendix B for bidding purposes. The contractor is responsible to conduct a topo survey of the site as part of this contract.

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

Native crushed stone 100 mm thick shall be placed around all buildings, from the building wall or building landscaping out 3m and all areas of anticipated foot or vehicle traffic to reduce erosion and to provide dust control. Concrete walkways shall be installed between buildings and parking areas.

4.6

AM #4 ... The contractor shall design and construct an underground manhole duct bank electrical distribution system for supply and distribution to all site buildings in accordance with UFC 3-550-01, NFPA 70 (NEC) and ANSI C2 (NESC) requirements. The site Primary power distribution shall be a 20KV, 50 Hz system. Secondary power distribution, 380Y/220V, 50Hz, shall be routed through a secondary distribution manhole/handhole duct bank system to each site/facility to be constructed and shall utilize pad mounted transformer substations (PTS). Each PTS shall be a standard manufactured substation with a secondary distribution switchboard. Each substation switchboard shall have a secondary distribution circuit breaker for each site/facility. The Primary power distribution shall be routed west from the power plant along the perimeter fence to the 201st HQ site. The contractor shall verify and comply with the minimum 30 foot "clear-zone" requirements and security fence patrol road access.

The contractor shall design and construct the Primary power distribution system so that all ducts and manholes are provided for three feeders and one spare duct; only one feeder shall be installed in the primary distribution manhole and duct bank system; the other two feeder ducts and one spare duct will be reserved for future use. Pull ropes shall be installed in each empty duct and the empty ducts shall be capped or taped to prevent the entrance of moisture, insects, or rodents into the empty ducts. All electrical design and installation shall meet UFC 3-550-01, NFPA 70 (NEC), and ANSI C2 (NESC) requirements. All wiring shall be run and pulled through conduits. Electrical receptacles shall be provided as indicated. Conductors and circuits shall be sized for the specific loads.

POWER SOURCE: Contractor shall connect to existing 20kV power plant available at the Gamberi ANA garrison and shall provide a fully functional 20kV / 1250A primary feeder to the Primary Electrical Distribution system. The source of power for the primary distribution system is the existing diesel power plant. The contractor shall match the existing switchgear system and provide a switchgear feeder assembly with 1250A vacuum circuit breaker. Each feeder breaker shall be furnished with, but not be limited to, necessary relays, ammeter, voltmeter, current and potential transformers, etc. for recording current and voltage readings. All feeders shall be provided with feeder-to-feeder tie capabilities to transfer loads between feeders.

Additionally, a feeder tie-point shall be designed and constructed adjacent to an existing pad-mounted three-way switch (see sheet ANA-E-02). The Primary power manhole/duct bank distribution system shall be extended to the feeder tie-point. The contractor shall field-verify whether empty switch sections are available at the pad-mounted three-way switch. The location and proposed design for the feeder tie-point shall be provided with the 65% design submittal.

Any planned visits or construction at the Gamberi power plant must be coordinated with the COR at least two weeks prior to the start of the construction and prior to any visit to the Gamberi power plant.

The contractor shall design and construct all interior electrical systems as described in section 01015 (Technical Requirements) and shall design and install any required exterior lighting, as described in section 01015.

4.7 FORCE PROTECTION MEASURES:

The Contractor shall design and construct force protection measures to include chain-link fence, secondary Entry Control Points (ECP), illumination system, and communication systems. The designer shall incorporate force protection setbacks for new facilities to maximum extent possible as permitted by size of the site and the requirements of the user. Force protection design shall be in accordance with Joint Security Directorate Antiterrorism/Force Protection Guide, March 2002.

4.6.1 SECONDARY ENTRY CONTROL POINT

A Secondary ECP is required at the main entrance of the 201st HQ site entrance roadway as shown on the attached site plan in Appendix A. The function of this ECP is to control all traffic entering and exiting the 201st HQ site. The Secondary ECP shall include an asphalt paved entrance, manually operated, sliding steel gate or hinged steel gate; a guard house; and vehicle drop arm barrier. The gate house shall be an 8.6 SM building consisting of a reinforced concrete foundation and floor slab, CMU masonry walls and a steel framed, sloping roof with a metal door and horizontal sliding windows with metal window frame, 800mm high x 1000mm wide. The floor finish shall be sealed concrete. The exterior wall finish shall be stucco and the interior finish shall be plaster (no wall insulation is required). The finished ceiling shall be plaster. Provide mineral fiber insulation in the ceiling space. Glazing for the windows shall be a 16mm thick laminated glass. The roof shall have a minimum of 2:12 slope with metal roofing. The building shall have 4 horizontal sliding windows, one located in each wall.

4.7 ROAD NETWORK, SIDEWALK, AND PARKING

The Contractor shall design and construct the entire asphalt road and parking network as shown on the site plan attached as part of Appendix A. 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 all facilities and the trash collection point. Provide parking area for 20 vehicles inside the compound as shown. 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. Sidewalks are required to connect all facilities.

Sidewalks shall be wide enough to be used as fire-lane/ service roads. Provide outdoor benches, lighting, and gathering areas.

4.8 FACILITIES

This project shall consist of the following facilities as detailed below. All facilities are to be constructed of reinforced concrete (RCC) structure with reinforced CMU walls. All facilities require concrete stoops at all exterior doors. Connecting concrete sidewalks are required to connect all facilities.

4.8.1 TRASH POINT

The Contractor shall design, in a location convenient for easy removal, trash collection points adjacent to each facility (Headquarters building shall have four (4) and Administration building shall have two (2)). The trash point shall be a 1.8 m X 1.8 m concrete pad with a 1.8 meter tall chain link fence around the perimeter. One side shall have a 1.2 m wide gate entrance. Trash Points shall have a metal roof covering.

4.8.2 BARRACKS

The Contractor shall design and construct fifteen (15) barracks facilities (required to house a design population of 650 PEOPLE) based on the site plan, information contained below and the attached building plans in attachment A. The building shall be a reinforced concrete frame structure with CMU infill walls. There are separate plans provided for the Senior Officer Quarters (SOQ), Bachelor Officer Quarters (BOQ), Non-Commissioned Officer Quarters (NCO) and Enlisted personnel (ENL). The number and location of each type of barrack facilities are shown on the site plan attached in Appendix A. The plans provided for each type of barrack facility (SOQ, BOQ, NCO and ENL) represent the scope, function and dimensions (sizes) of the facilities. The housing facilities required as follows:

Senior Officer Quarters (SOQ) (2 each): each SOQ houses 4 people for a total of 8 people

Bachelor Officer Quarters (BOQ) (2 each): each BOQ houses 46 people for a total of 92 people

Non-Commissioned Officers (NCO) (4 each): each NCO houses 50 people for a total of 200 people

Enlisted (ENL) Personnel: (7 each): each ENL houses 50 people for a total of 350 people total Barracks Facilities: 15 each to house 650 people

Number of Personnel Assigned to each Barracks Facility			
SOQ	Officer	NCO	Enlisted
8	92	200	350

The Contractor shall incorporate the following special features into the barracks:

- 1) Split pack heat pump units shall be provided for the Senior Officer Quarters.
- 2) Ceiling fans and electric resistance unit heaters shall be provided for all Officer, NCO and Enlisted Barracks.
- 3) Clotheslines shall be installed behind each barracks, approximately 5m in length with 4 lines across spaced 410mm apart and of sufficient strength to prevent sagging when all of the lines are loaded.

4.8.3 ADMINISTRATION (HEADQUARTERS) BUILDING

The contractor shall design and construct a two story Headquarters Administration building (approximate size 7500 SM) required for office spaces for approximately 450 people ANA staff personnel. A building plan layout showing required spaces, functions and dimensions is attached in Appendix A. The floor plans represent the scope of the facility. The building shall be a reinforced concrete frame structure with CMU infill walls.

The General Officers wing shall be provided with a ducted, packaged heat pump unit to cool and heat the spaces.

The small conference and communication rooms shall be provided with split pack heat pump units. The large JOC, Fusion and Shura rooms and adjacent rooms without windows shall be provided with ducted, packaged heat pump units. All other occupied spaces with windows shall be provided with ceiling fans and electric unit heaters. The windows shall be opened to introduce outside air.

4.8.4 TOILET, SHOWER, AND LAUNDRY BUILDING

The Contractor shall design and construct a toilet, shower, laundry building; a floor plan and other drawings are shown in appendix A. The building shall be a reinforced concrete frame structure with CMU infill walls. Toilets, showers, and sinks shall be provided at a 1:20 ratio and based upon the entire LN enlisted population; two (2) buildings are required for this contract. Latrines for LN residents shall be eastern style units and be facing north and south. The Contractor shall incorporate the following special features into the building:

All sinks shall be trough type constructed of block and concrete with ceramic tile exterior and lining capable of withstanding abuse.

Showers shall contain a single mixing valve for hot and cold water mixing and a wall mounted shower head.

Electric hot water heaters shall be installed to provide hot water to the showers and sinks.

Electric unit heaters suitable for wet areas shall be utilized to provide heat in the facility.

The building shall be constructed with exhaust fans to ventilate steam to the outside environment and, where required, insulated piping to prevent freezing of water pipes in winter.

All water supply plumbing shall be exposed PVC pipes or galvanized metal.

Accessories shall include but not limited to; toilet paper holders, soap dishes, curtains and curtain rods, robe hooks, mirrors, paper towel dispenser, metal shelf, and grab bars.

4.8.5 GENERAL ADMINISTRATION BUILDING

The contractor shall design and construct a two story Administration building (approximate size 2500 SM) required for office spaces for approximately 200 people ANA staff personnel. A building plan layout showing required spaces, functions and dimensions is attached in Appendix A. The floor plans represent the scope of the facility. The building shall be a reinforced concrete frame structure with CMU infill walls.

4.9 HVAC, HEATING VENTILATION AIR-CONDITIONING

Environmental control of the facilities shall be achieved as described in Section 01015.

4.10 LIFE SAFETY

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

4.11 LIGHTING

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

~~AM #4... Exterior lighting shall be high intensity discharge luminaires on 10 meter high minimum spun aluminum or galvanized steel poles. The type of luminaires shall match existing predominant type within installation. ...AM #4~~

4.12 FOUNDATION DESIGN

Foundations, including subgrade, shall be designed and constructed based on recommendations from geotechnical investigation required herein.

5.0 COMPLETION OF WORK

All work required under this contract shall be completed within **450** calendar days including government review time from Notice to Proceed.

6.0 SPARE PARTS

The Contractor shall provide a six (6) month's supply of all spare parts for all facilities and all systems as recommended by the various manufacturers' instructions. Prior to purchase the contractor shall forward the lists of spare parts with pricing, by vendor to the Government (COR) for approval. A set budget amount of \$50,000.00 has been established for spare parts. See Section 01060 SPECIAL CONTRACT REQUIREMENTS; paragraph 1.17 SPARE PARTS for more information.

7.0 REFERENCES

Refer to Section 01015 for required references.

-- END OF SECTION --

SECTION 01015

SECTION 01015

TECHNICAL REQUIREMENTS – DESIGN/BUILD

8.0 GENERAL

8.1 COMPLIANCE

The Contractor's design and construction must comply with technical requirements contained herein. The designer shall have a minimum of five (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.

8.2 MINIMUM & ALTERNATE REQUIREMENTS

The design and product requirements stated in these documents are minimum requirements. Exceeding the minimum requirements as improvements to the design stated herein is highly encouraged at no additional cost and as approved by the government. The technical requirements listed in Codes and Technical Criteria, Section 1.8, apply to this project. Any deviation from the technical requirements 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.

8.3 ASBESTOS CONTAINING MATERIALS

Asbestos containing material (ACM) (defined as 1% or less by weight) 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.

8.4 SAFETY

8.4.1 UNEXPLODED ORDNANCE (UXO)

8.4.1.1 UXO/MINE DISCOVERY DURING PROJECT CONSTRUCTION

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. It is highly recommended that all construction ground guide / ground observation personnel maintain a minimum 16 meter buffer zone from all heavy equipment during excavation activities. A daily check of the area for signs of recently emplaced UXO/IED's is also highly recommended, to include unusual disturbed soil areas or mounds of soil from the previous day. If during construction, the contractor becomes aware of or encounters UXO/Mine or potential UXO/Mine, the contractor shall immediately stop work at the site of encounter, clearly mark the area of UXO/Mine, move to a safe location, notify the COR, and mitigate any delays to scheduled or unscheduled contract work. Once the contractor has informed the COR, the contractor will await further direction. 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.

Note: The Contractor and its subcontractors may not handle, work with, move, transport, render safe, or disarm any UXO/mine, unless they have appropriate accreditations from the UNMACA.

8.5 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.

8.6 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.

8.7 SUBCONTRACTORS

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

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

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

ACI 301M Specifications for Structural Concrete (2005), American Concrete Institute

ACI 318 Building Code Requirements for Structural Concrete (2005), American Concrete Institute

ACI 530/ASCE 5/TMS 402, Building Code Requirements for Masonry Structures (2005)

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
ARI - Air Conditioning and Refrigeration Institute
ASCE 7, Minimum Design Loads for Buildings and Other Structures (2005)
ASHRAE - American Society of Heating, Refrigeration and Air-Conditioning
ASHRAE Standard 62.1-latest edition, Ventilation for Acceptable Indoor Air Quality
ASME - American Society for Mechanical Engineering
ASTM - American Society for Testing and Materials
ASTM-D-1586 Standard Test Method for Standard Penetration Test
ASTM-D-5299 Standard Guide for Decommissioning Ground Water Wells
AWS D1.1, Structural Welding Code – Steel (2002), American Welding Society
DCID 6/9 Physical Security Standards for Sensitive Compartmented Information Facilities
DCID 1/21, Manual for Physical Security Standards For Sensitive Compartmented Information Facilities (SCIF)
EIA ANSI/TIA/EIA-607: (1994) Commercial Building Grounding/Bonding Requirement Standard
Factory Mutual (FM) Approval Guide-Fire Protection (2002)
IBC - International Building Codes, 2006 edition (and its referenced codes including those inset below)
IEEE C2, National Electrical Safety Code (NESEC), 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
MIL-HDBK-1190, Facility Planning and Design Guide
Codes and Standards of the National Fire Protection Association (NFPA)
[as applicable and enacted in 2002 or later, unless otherwise noted]
National Electrical Safety Code (NESEC), Institute of Electrical and Electronic Engineers (IEEE C2), latest edition
NFPA 1, General Fire Protection, latest edition
NFPA 10, Portable Fire Extinguishers, 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 90A, Air Conditioning and Ventilating Systems, latest edition
NFPA 96, Fire Protection for Commercial Kitchens, latest edition
NFPA 101, Life Safety Code, 2009 edition
NFPA 110, Standard for Emergency and Standby Power Systems, 2005 edition
NFPA 221, Standard for Chimneys, Fireplaces, Vents, And Solid Fuel–Burning Appliances, latest edition
NFPA 1141, Site Fire Protection, latest edition
Plumbing and Drainage Institute (PDI-WH-201) water hammer arrestors
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 1-300-09N, Design Procedures
 UFC 3-310-01, Structural Load Data
 UFC 3-310-02A, Structural Design Criteria for Buildings
 UFC 3-410-01FA Heating, Ventilating and Air Conditioning, latest edition
 UFC 3-410-02A, HVAC Control Systems, latest edition
 UFC 3-420-01, Plumbing Systems Design, latest edition
 UFC 3-430-01FA, Heating and Cooling Distribution Systems, latest edition
 UFC 3-501-03N, Electrical Engineering Preliminary Considerations, 04 Dec 07
 UFC 3-500-10, Electrical Engineering, 20 October 2009
 UFC 3-550-01, Exterior Electrical Power Distribution, 20 October 2009
 UFC 3-520-01, Interior Electrical Systems, latest edition
 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 4-010-01, Design: Minimum DoD Antiterrorism Standards for Buildings, 22 Jan 2007
 UFC 4-020-03, Security Engineering: Fences, Gates, and Guard Facilities, 14 June 2007
 UFC 4-020-03FA, Security Engineering: Final Design, 1 Mar 2005
 UFC 4-020-04FA, Electronic Security Systems: Security Engineering, 1 Mar 2005
 UFC 4-021-01, Design and O&M: Mass Notification Systems, draft 1 May 2006
 UFC 4-022-01, Security Engineering: Entry Control Facilities/Access Control Points, 25 May 2005
 Underwriters' Laboratories (UL) Fire Protection Equipment Directory (2002)
 USCINCCENT OPORD 97-1
 Overseas Environmental Baseline Guidance Document, Department of Defense, May 2007

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 - Booster Pumps, latest version
 AED Design Requirements – Chlorinators, latest version
 AED Design Requirements - Hydro-Pneumatic Tanks, latest version
 AED Design Requirements - Jockey Pumps, latest version
 AED Design Requirements - Water Tanks, latest version
 AED Design Requirements – Hydrology, latest version
 AED Design Requirements - Culvert and Causeway Design, 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 - Vertical Curves, latest version
 AED Design Requirements – Horizontal Curves & Super elevation , latest version
 AED Design Requirements – Geotechnical Investigations for USACE Projects, 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.

8.9 AED DESIGN REQUIREMENTS DOCUMENTS

AED Design Requirements documents (latest version) listed above shall be adhered to in this contract. These documents are available from the Contracting Officer. These documents 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.

9.0 SITE DEVELOPMENT

9.1 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.

9.2 ENVIRONMENTAL PROTECTION

9.2.1 APPLICABLE REGULATIONS

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

9.2.2 NOTIFICATION

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

9.2.3 SPILLAGES

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

9.2.4 DISPOSAL

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

9.3 CIVIL SITE DEVELOPMENT

9.3.1 SITE PLAN

The contractor shall prepare plat or plan of property as part of the design package consists of a Boundary Survey of Gamberi located in ~~AM #4...Nangahar Province~~ ...AM #4 near the city of Jalalabad, Afghanistan. Site consists of a 250 x 250 meter area due east of N34.5.2194 E70.34889 on the existing Gamberi Afghan National Army Garrison. 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 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

9.3.2 DEMOLITION

Demolition shall include removal of all structures, foundations, pavements, and utilities, to include clearing and grubbing. All refuse and debris shall be disposed of off-site as described in paragraph DISPOSAL. Holes and depressions shall be backfilled and compacted in lifts not to exceed 200mm in height unless specified otherwise. 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

9.3.3 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 25-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 3% 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 on road projects.

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, latest edition 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.

9.3.4 ROADS

Hot-Mix Asphalt (HMA) roads are required within the compound. Paved roads are required where stated. All roads shall be a 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

9.3.4.1 BRIDGES AND SITE GRADING PLAN

Preliminary investigation indicates no need for bridges. The Contractor shall notify the Contracting Officer immediately if initial site survey determines that area hydrology requires 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. The contractor is responsible for conveying any off-site flows that naturally run through the site, as well as any flows developed on site.

9.3.4.2 PARKING AREAS AND MOTOR POOLS

Contractor shall construct parking and storage areas using HMA pavement. Aggregate pavement 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 and 50mm (2 inches) of HMA wearing course. Provide 1.0 meter wide shoulder around all parking areas and motor pools, consisting of a surface of an ABC material and it should be 150mm thick @ 2.0% slope. The 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

9.3.5 FORCE PROTECTION DESIGN

The Contractor shall design and construct force protection measures to include a complete perimeter chain link fence, Compound Illumination System, Security Communication Systems and Entry Control Points (ECP). ECP shall be composed of a Secondary ECP and vehicle drop arm. 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. Force protection design shall be in accordance with Joint Security Directorate Antiterrorism/Force Protection Guide, March 2002. Force Protection design shall also meet the requirements of UFC 4-010-01, Design: Minimum DoD Antiterrorism Standards for Buildings, 8 Oct 2003 and UFC 4-010-02, DoD Minimum Antiterrorism Standoff Distances for Buildings, 8 Oct 2003 and Joint Security Directorate Antiterrorism/Force Protection Guide, March 2002.

See Appendix A for Guard House building designs with standard details for Perimeter Security Fence.

9.3.5.1 PERIMETER SECURITY FENCE

Chain link fence shall be constructed around the perimeter of the site. The height of the fence shall measure at least 2.4 meters from the inside grade. Inside grade shall in all cases be higher than outside grade. Outriggers see paragraph below, to support 3 strands of barbed wires installed by the contractor. Site grading must slope away from the fence for at least a distance of 5 meters. Any penetrations through the Perimeter Security Fence 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.

9.3.5.2 PERIMETER ACCESS GATES

9.3.5.2.1 SWINGING GATES

Double Vehicular Swing Gates shall be provided for vehicle access at Entry Control Points and be constructed of steel and be a pair of 3.65 m wide x 2.4 m high steel leaves, constructed of 5mm steel plate skins, steel tube frame, and steel tube intermediate posts and rails. Provide a locking mechanism that holds the Double Vehicular Swing Gates together when in the closed position as well as a drop bolt that engages a steel sleeve embedded in the pavement. A Single Vehicular 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. All vehicular swing gates shall be K4 swing type and shall be certified to stop a 6,800KG (15,000lb) vehicle traveling at 48kph (30mph). All vehicular swing gates shall be able to stop the vehicle and cargo, although an allowable gate deflection of 0.9m (3ft) is permitted. 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. All gate designs shall insure it is dimensionally stable, square, true and planar. All gates 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. All gates shall have a sufficient number of hinges anchor mounted to the exterior masonry walls, to support each gate leaf. All gates shall be provided with viewports 200mm x 50mm. All gates will have three strands of tensioned wire installed on top. All gates will be painted two (2) coats of a good quality metal primer and two (2) coats of a good quality finish coating. The final color selection will be made by the COR from samples provided by the contractor.

9.3.5.2.2 SLIDING GATES

Sliding gates shall be K4 sliding type and shall be certified to stop 6,800KG (15,000lb) vehicle traveling at 48kph (30mph). The gates shall be able to stop the vehicle and cargo, although an allowable gate deflection of 0.9m (3ft) is permitted. Gate shall be a minimum 3 M tall, with 0.5 M of high tension razor wire mounted on top. Gate shall be constructed of 100 mm x 100 mm x 5 mm square steel tubing, faced with 5mm steel plate. The design and construction of the gates shall insure that it is dimensionally stable, square, true and planar. Sliding Gate shall not rack or deflect when open, closed, or in motion. Gate tracks shall be anchor mounted to galvanized steel stanchions. The gate tracks will be an upside down "V" and the gate wheels will be heavy duty steel wheels with a "V" cut out of them to prevent snow and other debris making the gate inoperable. Provide a locking mechanism that holds the gate closed. The gate will have three strands of tensioned barbed wire installed on top. Provide reinforced grade beam across gateway flush with pavement to lock gate with flush mounted vertical sliding bolts, bolts shall be 50 mm dia solid steel. The sliding gate will also have a built- in personnel gate with its own locking mechanism. The gates will be painted two (2) coats of a good quality metal primer and two (2) coats of a good quality finish coating. The final color selection will be made by the COR from samples provided by the contractor.

9.3.5.3 OUTRIGGERS

Outrigger supporting arms shall be 50mm diameter metal tube middle post, securely embedded 400mm 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.

9.3.5.4 CHAIN-LINK FENCE AND GATES

Provide chain-link fence and gates around the perimeter and Well House. All 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 3 strands of barbed wire as indicated above. Post sizes shall be as shown on drawings.

The gates shall be swing type. Hinged gates shall be a pair of 3.00 m wide x 2.4 m high leaves, 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.

9.3.5.5 ENTRY CONTROL POINT (ECP)

Secondary ECP shall be laid out and constructed by the Contractor to facilitate secure entrance of authorized vehicles into the compound. A Guard House shall be provided both inside and outside the compound as part of the ECP. Entrance to the ECP shall be paved with the same surface as required for the interior roads of the compound, and shall have a single-leaf manually operated sliding steel gate or 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 House drawings.

9.3.5.5.1 VEHICLE BARRIERS

9.3.5.5.1.1 ACTIVE BARRIERS - 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 4.0 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 a 6,800KG (15,000lb) vehicle allowing a deflection of 0.9m (3ft), in addition to heavy duty steel gates into the compound.

9.4 CIVIL UTILITIES

9.4.1 WATER

9.4.1.1 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 155 liters (or 41 gallons) per capita per day (lpcd) – times a capacity factor, times the effective population. A capacity factor of 1.5 shall be used if the effective population is less than or equal to 5,000. The capacity factor for larger populations is found in UFC 3-230-07a, Water Supply: Sources and General Considerations guidance. 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. All buildings with water supply shall have a water meter installed in a locked cabinet area inside the building.

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, that value is to be taken as the average daily storage capacity and will be multiplied by the capacity factor to determine the actual required storage volume for the facility.)
- Booster Pumps – For installations with fewer than 400 persons, the capacity shall be based on the installation wide, total fixture unit flow. For installations with greater than 400 persons, the capacity shall be based on the installation wide, total fixture unit flow or 2 times the average daily flow (16 hour basis), whichever is greater. Three identical pumps shall be provided which are all sized to deliver 50% of the calculated capacity. Pumps shall automatically alternate to distribute wear and shall automatically turn on and off based on demand and system pressures. The total dynamic head (TDH) of the booster pumps shall be calculated to maintain a minimum, residual system pressure of 40 psi at the calculated capacity unless stated otherwise in the contract documents. Either a bladder style expansion tank or a hydro-pneumatic tank shall be supplied when booster pumps are used in the water system.
- Hydro pneumatic tanks – Volume and pressure regulation to maintain a pressure range provided in the technical requirements based on a rate equal to the ADF (ADD x c x CF).
- Water Mains – Diameter based on the installation fixture unit flow or two times the ADF (ADD x c x CF) and velocity requirements per this guide unless a minimum diameter is specified which is adequate to provide flow and meet the specified maximum velocity. 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

9.4.1.2 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 Design Requirements - Well Pumps & Well Design/Specifications, latest version. The new well site shall be at a location approved by the Government. ~~AM #4... The new well site shall be no closer than 60 meters from any existing wells.~~ The two (2) new well sites shall be no closer than 100 meters from any existing wells and the existing waste water treatment facility. ... **AM #4** Well construction shall be in accordance with the USACE-AED Well Design Guide and Water Well Guide Specification.

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 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 drill a minimum of two wells to a minimum depth of 120 meters 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. 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 150 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

9.4.1.3 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/Specifications, latest version or most recent version. ■

9.4.1.4 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. Raw water quality criteria for Water Quality and Criteria Standards, and shall address the

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.

9.4.1.5 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 300 mm 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 pumping equipment plus provide freeze protection for the pump discharge piping beyond the check valve. 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.

9.4.1.6 WELL WATER PUMPS (FOR HYDRO-PNEUMATIC SYSTEM)

An electric submersible well pump will pressurize the system by supplying water to a hydro-pneumatic tank and be capable of providing output for twice the average daily demand and provide hydro-pneumatic tank pressure. A mechanical hand pump capable of providing a flow equal to 25 gallons per capita per day is required as a backup. The hand pump will be connected directly to the electric well pump effluent piping thereby allowing the system to be pressurized by either pump, although the mechanical pump shall provide discharge pressure of 172 kPa (25 psi) when the system is supplied by the hand pump alone. The pumps and controls shall be designed to supply and maintain acceptable system pressure throughout the distribution network given the full range of flow conditions (low flow to peak). The pump discharge shall have a gate valve, check valve, pressure gage, and air relief valve.

9.4.1.7 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.

9.4.1.8 SERVICE BOOSTER PUMPS

Contractor shall provide a booster pump station with capacities defined above with end suction or split case double suction horizontal split case (frame mounted) centrifugal pumps arranged in parallel for pumping water storage into the main distribution system. The pumps and controls shall be designed to supply and maintain acceptable system pressure throughout the distribution network given the full range of flow conditions (low flow to peak). Provide suitable expansion tank for booster pump system sized for anticipated pressure surges, if hydro pneumatic tanks are not to be used. The suction side of the service booster pumps shall have an eccentric reducer and gate valve installed. The discharge side shall have a gate valve, check valve between the pump and the gate valve and concentric reducer, pressure gage and air relief valve.

9.4.1.9 WATER STORAGE TANK

Contractor shall provide a steel or concrete ground storage reservoir (GST) to be located on the ground surface. Volume of the GST 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. The storage facility shall be located on the higher elevations of the site to promote gravity flow and reduce pumping requirements. Overflow and air vents shall be screened so that birds, rodents and debris cannot enter the reservoir. The tank shall meet all applicable codes for potable water storage. The interior coatings for the tank shall meet NSF/ANSI 61 requirements. Contractor shall provide a steel, water storage tank. 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 highest building ground floor. 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.

9.4.1.9.1 HYDRO-PNEUMATIC WATER STORAGE TANK

The Contractor shall provide horizontally mounted and insulated above ground hydro-pneumatic tank(s) containing water and compressed air located adjacent to the well house to maintain system pressures between 275 kPa to 282 kPa (40 psi to 70 psi).. A compressor is required to charge the tank with air. At low level the water remaining in the tank shall be at least ten percent of the capacity of the tank. The tank size shall be determined such that the pump cycles not less than 4 times per hour nor more than 10 times per hour. Storage may be divided between duplicate units in cases where a single tank would be too long to easily transport to the site. Volume of the 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.

9.4.1.10 DISINFECTION & CHLORINATION SYSTEM

Use hypochlorite compounds for disinfection. A manufacturer assembled, self-contained, skid-mounted, hypo-chlorinator consisting of mixer, mixing tank, pump and control panel 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, mixer, 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.

9.4.2 WATER DISTRIBUTION SYSTEM

9.4.2.1 GENERAL

The Contractor shall provide a water distribution system. The distribution network shall be laid out in a combination grid and looped pattern with dead ends not exceeding 30m (99 feet). Use similar piping materials for all buildings and pipe runs in the distribution system for efficiency of future maintenance activities. Distribution lines shall not be less than 100mm (4 inches) in diameter. Dead end sections shall not be less than 150mm (6 inch) diameter and shall either have blow off valves or fire hydrants (flushing valves) installed for periodic flushing of the line. Any pipe with a fire hydrant on the line shall be at least 150mm (6 inch) 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. Pipe diameters shall be

adequate to carry the maximum flow of water at velocities less than 1.5m/sec (5 ft/sec). Piping segments where velocities less than 0.15 m/sec (0.5 ft/sec) are anticipated shall be noted and brought to the attention of AED. The operating pressure range shall be between 276kPa (40 psi) to 517kPa (75 psi) at all points of the distribution system. If pressures greater than 690kPa (100 psi) cannot be avoided, pressure-reducing valves shall be used. A system pressure of 30 psi is acceptable at extreme peak flow conditions. A system pressure below 30 psi shall be considered a deviation in the technical requirements requiring Contracting Officer approval.

Contractor shall not use HDPE pipe and fittings without specific approval from AED through the variation process. This applies even if the existing project water distribution system had this pipe material. Pipe material shall meet the requirements of Pipe below

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.

9.4.2.2 PIPE

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

9.4.2.2.1 WATER MAINS AND BRANCHES

Pipe material for water mains and branches shall be PVC or Ductile Iron (DI). The exterior surface of the pipe must be corrosion resistant. Distribution lines shall be 100mm (4 inch) and larger and shall be reduced only at the junction of building connections. Pipe diameters shall be selected to meet the previously specified flow, velocity, and pressure conditions. If Ductile Iron (DI) pipe is installed underground the pipe shall be encased with polyethylene in accordance with AWWA C105. Ductile iron pipe shall conform to AWWA C104. DI fittings shall be suitable for 1.03MPa (150psi) pressure unless otherwise specified. Fittings for mechanical joint pipe shall conform to AWWA C110. Fittings for use with push-on joint pipe shall conform to AWWA C110 and C111. DI fittings shall be cement mortar lined (standard thickness) in accordance with C104. 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.

9.4.2.2.2 WATER SERVICE

Building service lines will be sized according to the following guidance. Water service connections from the mains to the buildings shall vary from 19 mm, 25 mm, 38 mm, 75mm, to 100 mm as calculated, depending on the maximum flow velocity and minimum pressure requirements as determined by hydraulic analysis of fixture flows. Pipe service connections from the distribution main to the building shall be either Polyvinyl Chloride (PVC) plastic Schedule 80 ASTM D 1785 or copper tubing conforming to ASTM B 88M, Type K, annealed. 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.

9.4.2.3 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.

9.4.2.4 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.

9.4.2.5 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:

$L = 0.0001351ND (P \text{ raised to } 0.5 \text{ power}), \text{ where:}$

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.

9.4.2.6 BACTERIOLOGICAL DISINFECTION

9.4.2.6.1 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.

9.4.2.6.2 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.

9.4.2.6.3 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.

9.4.2.6.4 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.

9.4.2.6.5 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.

9.4.2.6.6 VALVES

Valves (Gate valves with 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).

9.4.2.6.7 VACUUM AND AIR RELEASE VALVES

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

9.4.2.6.7.1 BLOW-OFF VALVES

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

9.4.2.7 THRUST BLOCKING

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

9.4.3 SANITARY SEWER

9.4.3.1 GENERAL

There is a fully functional sewer treatment and disposal facility 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 and connection to the existing treatment facility. 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. Construction required shall include appurtenant structures and building sewers to points of connection with building drains 1.5m (5 feet) outside the building to which the sewer collection system is to be connected.

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

- a. Follow slopes of natural topography for gravity sewers.
- b. 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.
- c. Avoid routing sewers through areas which require extensive restoration or underground demolition
- d. 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.

- e. 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.
- f. Sewer lines shall have a minimum of 800 mm of cover for frost protection.
- g. Locate manholes at change in direction, pipe size, or slope of gravity sewers.
- h. Sewer sections between manholes shall be straight. The use of a curved alignment shall not be permitted.
- i. If required by the design, locate manholes at intersections of streets where possible. This minimizes vehicular traffic disruptions if maintenance is required.
- j. 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.
- k. Verify that final routing selected is the most cost effective alternative that meets service requirements.

9.4.3.2 PROTECTION OF WATER SUPPLIES

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

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

9.4.3.3 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 155 liters (41 gallons) per capita per day (water usage). The wastewater flow rate shall be calculated as approximately 80% of water usage rate, or 124 liters (33 gallons) per capita per day times the capacity factor requirements.

9.4.3.4 GRAVITY SEWER

Sanitary sewers shall be designed in accordance with the AED Design Requirements for Sanitary Sewer and Septic Systems, latest version 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), 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. Minimum pipe slopes are provided in the AED Design Requirements for Sanitary Sewer and Septic Systems.

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.

9.4.3.5 SITE SELECTION FOR SUBMERSIBLE INFLUENT SEWAGE LIFT STATION

The Contractor shall locate sewage lift stations as needed site based primarily on topographic considerations. The lift stations will be located, so that all points within the intended service areas of the facility can be served adequately by gravity sewers en route to the lift station.

9.4.3.5.1 SUBMERSIBLE INFLUENT LIFT STATION PUMP CAPACITY

The number and capacity of pumps provided will be sufficient to discharge minimum, average, peak daily and extreme peak flow rates as calculated in TM 5-814-1/AFM 88-11, Vol 1 or UFC 3-240-08FA. Pumping capacity will be adequate to discharge the peak flow rates with the largest pump out of service. Each pumping unit will be a constant speed type, and will be capable of discharging the extreme peak flow rate. Influent lift stations will be used to pump major wastewater flows to the treatment facility and operate on a continuous basis. The rate of pumpage must change in increments as the flow to the station varies. The Contractor will provide two or more wastewater pumps of the constant speed type, as required to match the incoming flow rate.

9.4.3.5.2 FORCE MAIN

The Contractor will design and construct a force main designed as pressure pipe adequate in strength to withstand internal operating pressure, equal to the discharge head plus transient pressures. The Contractor will design a force main to maintain minimum velocities of 2.0 feet per second at low flows to prevent the deposition of solids and to develop sufficient velocity to re-suspend any solids that may have settled in the line. The Contractor must also construct the most economical size of force main on the basis of power costs required for pumping. Regardless of pipe sizes required for minimum velocities, the minimum diameter to be used shall be a 4-inch force main.

9.4.3.5.3 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.

9.4.3.5.4 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.

9.4.3.5.5 SPACING

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

9.4.3.5.6 PIPE CONNECTIONS

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

9.4.3.5.7 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.

9.4.3.5.8 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.

9.4.3.6 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 200mm (8 inch) diameter and service lines/laterals shall be a minimum of 150 mm (6 inch) diameter. Smaller diameters shall not be used. Contractor may use uPVC or HDPE pipe provided the SDR and strength properties of the pipe equal or exceed the properties of ASTM D 1784 for PVC.

9.4.3.6.1 FITTINGS

Fittings shall be compatible with pipe supplied and shall have a strength not less than that of the pipe. Fittings shall conform to the respective specifications and requirements as follows: provide PVC fittings conforming to ASTM D 3034 for type PSM pipe.

9.4.3.6.2 JOINTS

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

9.4.3.6.3 BRANCH CONNECTIONS

Branch connections for new piping installations shall be made using regular fittings. Branch connections for upgrades or repairs may be made using 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").

9.4.3.6.4 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. Tee connections to the main or branch are not allowed. Service connection lines will be a minimum of 150 mm (6 inch) diameter and laid at a minimum 1% grade. Service laterals shall be at least 150 mm (6 inch) and sloped to maintain the minimum velocity as described in paragraph "Gravity Sewer."

9.4.3.6.5 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.

9.4.3.7 FIELD QUALITY CONTROL

9.4.3.7.1 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:

- o. Concrete pipe: Test in accordance with ASTM C 924M, ASTM C 924. Allowable pressure drop shall be given in ASTM C 924M ASTM C 924. Make calculations in accordance with the Appendix to ASTM C 924M, ASTM C 924;
- p. Ductile-iron pipe: Test in accordance with the applicable requirements of ASTM C 924M, ASTM C 924. Allowable pressure drop shall be as given in ASTM C 924M, ASTM C 924. Make calculations in accordance with the Appendix to ASTM C 924M, ASTM C 924;
- q. 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.

9.4.3.7.2 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.

9.4.4 STORM SEWER SYSTEMS

9.4.4.1 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.

9.4.4.2 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.

9.4.4.3 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.

9.4.4.4 AREA INLETS

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

9.4.4.4.1 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.

9.4.4.4.2 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).

9.4.5 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.

9.5 GEOTECHNICAL

9.5.1 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.

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.

9.5.2 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.

10.0 STRUCTURAL

10.1 GENERAL

The project consists of various structures. Foundation shall be properly placed on suitable compacted ground area and shall be in accordance with the recommendations from the geotechnical investigation. Foundations shall be reinforced concrete. Building foundations shall be founded a minimum of 800mm below grade. Foundation designs shall be corroborated with the geotechnical findings and recommendations.

All buildings shall be constructed with reinforced concrete roof structures.

Field welding should not be used for any part of the Main Structural Force Resisting System of core structures. The Main Structural Force Resisting System is that part of the structural system providing the required resistance to all gravity loads (dead; live) and all lateral loads (wind; seismic).

If Main Structural Force Resisting members are field welded, then Certified Welders shall be employed, Non-Destructive Testing (NDT) shall be required, and Certified Welding Inspectors shall be engaged. The United Facilities Guide Specification (UFGS) 05 05 23 Structural Welding shall be included with the construction specifications.

In lieu of field welding and specifying NDT, bolted connections are recommended.

Exemptions to these guidelines would be minor structural connections; including metal trusses bearing on a reinforced concrete roof, and non-load bearing applications.

10.2 DESIGN

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 safely all loads without exceeding the allowable stress for the materials of construction in the structural members and connections.

10.3 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 ($f'_c = 4,000\text{psi}$) minimum specified compressive strength @ 28 days, and maximum water-cement ratio of 0.45.
Steel Reinforcement	ASTM A 615; 420 MPa ($F_y = 60\text{ksi}$) yield strength.
Welded Wire Fabric	ASTM A 185.
Anchor Bolts	ASTM F 1554; Grade 36 steel.
Bolts and Studs	ASTM A 307.
Plaster	ASTM C 926.
Concrete Masonry Units	ASTM C 90; Type I (normal weight, moisture control).
Mortar	ASTM C 270; Type S (ultimate compressive strength of 13 MPa).
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 ($F_y = 36,000\text{psi}$).
Welding	AWS D1.1 (American Welding Society).

10.4 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 the Structural Load Data, UFC-3-310-01, and edition as referenced herein.

10.5 WIND LOADS

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

10.6 SEISMIC

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

Spectral ordinates shall be $S_s = 1.28g$ and $S_1 = 0.51g$.

10.7 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, latest edition. A minimum cylinder 28 day compressive strength of 28 MPa (4,000 psi) shall be used for design and construction of all concrete, except that 24 MPa (3,500 psi) shall be used for Shotcrete applications. 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. Concrete members at or below grade shall have a minimum concrete cover over reinforcement of 75 mm (3 inches).

10.8 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, latest editions. 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 shall be grouted. All interior and exterior 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 any buildings.

10.9 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 (latest edition). Design of cold-formed steel structural members shall be in accordance with the provisions of American Iron and Steel Institute (AISI), Specifications for Design of Cold-Formed Steel Structural Members.

10.9.1.1 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. Steel "hat channels" can be installed for the connection to the CONEX box module. Provide all necessary metal framing for roof fascia and soffits. See structural paragraph for structural characteristics of steel joists.

10.9.1.2 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.

10.10 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.

10.11 FOUNDATIONS

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

10.12 EARTHWORK AND FOUNDATION PREPARATION

10.12.1 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."

10.12.2 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.

10.12.3 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.

10.12.4 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 460 mm below existing surface.

10.12.5 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.

10.12.6 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.

10.13 STRUCTURES WITH SPREAD FOOTINGS

Ensure that footing subgrades have been inspected and approved by the Contracting Officer prior to concrete placement. Fill over excavations with concrete during foundation placement.

11.0 ARCHITECTURAL REQUIREMENTS

11.1 GENERAL

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

11.2 DESIGN CRITERIA

Schematic designs for the facility types requested in this proposal are provided in Appendix A. These designs shall be used to create a complete and usable facility meeting the minimum requirements stated in these documents. The Codes, Standards, and Regulations listed in these documents shall be used in the construction of this project. The publications shall be the most recent editions. Standards other than those mentioned may be accepted provided they meet the minimum requirements and the contractor shall submit proof of equivalency to the Contracting Officer for approval.

All facilities shall be constructed as follows: all construction is reinforced concrete structure (floors, ceilings, columns and beams) with reinforced CMU

IBC - International Building Code, latest edition

NFPA 101 - Life Safety Code, latest edition (2009)

11.2.1 LIFE SAFETY/ FIRE PROTECTION/ HANDICAPPED ACCESSIBILITY

A life safety and fire protection analysis shall be completed prior to construction commencement. This analysis shall be documented in plans and in the design analysis. All spaces shall be classified following NFPA 101 or IBC. Whichever code is used shall be stated and referenced in the life safety plan. The facility shall comply with all other safety requirements of the NFPA 101. To the extent possible, all facilities shall be designed in accordance with recognized industry standards for life safety and building egress. An adequate fire alarm system, fire extinguishers, and smoke alarms shall all be included as required. Due to the lack of adequate water volume and pressure, sprinkler systems are not feasible. In keeping with the intended function of these facilities, handicapped accessibility will not be incorporated in this project. Due to the war contingency requirement, it is assumed that only able-bodied military and civilian personnel will use the facilities listed herein.

11.2.2 ANTITERRORISM / FORCE PROTECTION

Force protection/anti-terrorism measures for this location shall be followed and incorporated into this project as indicated, in accordance with the referenced DoD Regulations. Information regarding force protection may be found herein and at the following link: www.tisp.org. UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings, including change 1, July 2009; is the primary DoD AT/FP regulation for projects.

11.3 CONCRETE

11.3.1 FINISH

Horizontal finish shall be troweled or screed. If finish is exposed concrete, then the floor shall be a broom finish for texture and shall not interfere with sloping for drainage of the surface. Vertical work shall have a form finish. Exposed concrete shall be sealed with an approved sealer.

11.3.2 PRECAST

Storage of precast units shall be in a dry place or materials shall be covered with a plastic or protective layer. Units shall be detailed to provide size, shape and location of installation. Precast units shall meet the minimum concrete strength requirements.

11.4 MASONRY

Storage of masonry materials shall be in a dry place or materials shall be covered with a plastic protective layer. Cover open walls each day to keep them protected and dry. Masonry construction systems shall be reinforced.

11.4.1 CONCRETE MASONRY UNITS

Concrete masonry units (CMU) for exterior walls shall be either 190 mm or 290 mm wide x 390 mm x 190 mm high as shown on drawings. They shall be installed in running bond level and plumb. Mortar joints shall be 10 mm on all sides between CMU. Joints shall be struck with a concave tool to provide a smooth recessed curved surface. Install only quality units. The surface shall be free of chips, cracks, or other imperfections that would detract from the overall appearance of the finished wall. Defective CMU or mortar shall be rejected.

11.5 THERMAL PERFORMANCE OF EXTERNAL BUILDING ASSEMBLIES

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

Assembly	Minimum Thermal Value
Exterior walls (above grade)	RSI 0.880 (R 5)

Ceilings/roof	RSI 5.284 (R 30)
Floor (over unheated space)	RSI 3.346 (R 19)
Exterior doors	RSI 0.252 (R 1.43)
Exterior windows/(glazing within doors)	RSI 0.308(R 1.75)

This table is a summary of ANSI/ ASHRAE 90.1 Table 5.5-5, Climate Zone 5 (A,B,C)
RSI measured in K-m²/W, R measured in SF-F-hr/BTU. 1 K-m²/W = 5.678 SF-F-hr/BTU.
The building design shall utilize solar heating by orientating the buildings and wind breaks, insulation and exterior window shading techniques to reduce building heat loss and heat gain. Contractors shall include energy efficient heating and cooling solutions to minimize energy consumption.

11.6 CARPENTRY

The use of wood framing as indicated below is acceptable only where allowed by IBC and NFPA 101.

11.6.1 WOOD PURLINS

If Contractor chooses to utilize wood purlins, provide and install roof purlins of natural wood, locally available material 1 meter on center securely wedged between steel H structural joists. Tightly fit 25mm or 30 mm boards over roof structure and nail into wood purlins. New roofing shall extend a minimum of 600 mm past the exterior surface of the wall.

11.6.2 WOOD BATTENS

If Contractor chooses to utilize wood ceiling batten strips, wood ceiling batten strips, 20 mm x 60 mm, shall be nailed to the bottom of the wood purlins. Battens shall be spaced at 400 mm on center (or per UBC requirements if sheetrock is substituted for plaster). This is for the support of a plaster ceiling.

11.7 ROOFING AND WEATHERPROOFING

All buildings shall have a sloped metal roof, with metal eaves, and soffits. All exterior entry ways to be covered and protected by canopies as to not have water falling on the entry ways to all buildings.

11.7.1 SLOPED ROOFS

A sloping roof shall be as defined in the IBC. On sloping roofs provide and install 0.60 mm (24 gauge) galvanized steel in either corrugated or standing seam design. Metal roofing shall be anchored to the steel "Z" purlins or wood deck sub-surface using exposed fasteners at 300 mm on center at all seams and at 600 mm on center in the panel field. Wood deck sub-surface shall either be solid wood boards or plywood. Fasteners shall be placed at the top of the corrugation taking care not to dent panel. Roof sealant or adhesive shall be placed over each anchor head. Roofing system shall include all edge, ridge and penetration flashings necessary for a watertight installation and as described in this section. Roofing shall be galvanized mil finish. Panels shall be overlapped two corrugations side to side and be continuous sheets from ridge to eave. Provide continuous ridge vents on all gable roofs. All eaves and rakes shall be 600 mm width. Provide soffit ventilation.

11.8 CONNECTIONS AND JOINTING

11.8.1 SOLDERING

Soldering shall apply to copper and stainless steel items. Edges of sheet metal shall be pre-tinned before soldering is begun. Soldering shall be done slowly with well heated soldering irons so as to thoroughly heat the seams and

completely sweat the solder through the full width of the seam. Edges of stainless steel to be pre-tinned shall be treated with soldering acid flux. Soldering shall follow immediately after application of the flux. Upon completion of soldering, the acid flux residue shall be thoroughly cleaned from the sheet metal with a water solution of washing soda and rinsed with clean water.

11.8.1.1 SEAMING

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

11.8.1.2 CLEATS

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

11.9 METAL

11.9.1 STEEL HANDRAILS

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

11.9.2 MATERIALS

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

11.9.2.1 STEEL SHEET, ZINC-COATED (GALVANIZED)

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

11.9.2.2 ALUMINUM WALL CAPPING

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

11.9.3 FLASHING

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

11.9.3.1 THROUGH-WALL FLASHING

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

11.9.3.2 LINTEL FLASHING

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

11.9.3.3 VALLEY FLASHING

Valley flashing shall be provided at intersections of roofs where a valley is formed. Flashing shall be a minimum of 500 mm centered on the valley (extending each direction a minimum of 250 mm). Valley flashing shall have a small ridge in the center to allow for expansion and contraction. Material shall be stainless steel, galvanized or match finished roofing metal.

11.9.3.4 SILL FLASHING

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

11.9.4 METAL FASCIA & SOFFIT

No wood fascias and/or soffits are allowed. Use metal fascias and soffits throughout. Extend roof decking out over fascia a minimum of 20 mm. Provide a 40 mm drip flashing over edge of roof decking so that it extends past bottom of decking on all sides of the building. Soffits shall be a width of 600mm extending from the building wall.

11.9.5 CONTINUOUS SOFFIT VENT

Enclose soffits and return to vertical wall. Provide continuous soffit venting of all overhangs on the underside of the soffit. The opening shall be no larger than 100 mm and set in a minimum of 50 mm from the exterior fascia edge.

11.9.6 RIDGE VENT

For sloping roofs, provide continuous metal ridge vent at the top of roof along the ridge. Ridge vent shall be sized to provide adequate ventilation of the roofing system.

11.9.7 SCREEN

Provide insect screen for all soffit, ridge, vents, louvers and all openings except for doors and windows unless otherwise specified.

11.9.8 EXPANSION JOINT PROFILES

Metal expansion joints shall have a profile to allow deflection and expansion in two directions. Metal shall be treated for exterior conditions. Expansion joints shall be water proof.

11.9.9 ROOF GUTTERS

No gutters are to be used for this contract. Any gutters indicated on the Appendix A drawings are to be disregarded.

11.10 SEALANTS

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

11.10.1 INTERIOR SEALANT

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

11.10.2 EXTERIOR SEALANT

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

11.10.3 FLOOR JOINT SEALANT

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

11.10.4 PRIMERS

Provide a non-staining, quick-drying type and consistency recommended by the sealant manufacturer for the particular application. Immediately prior to application of the sealant, clean out loose particles from joints. Where recommended by sealant manufacturer, apply primer to joints in concrete masonry units, wood, and other porous surfaces in accordance with sealant manufacturer's instructions. Do not apply primer to exposed finish surfaces.

11.10.5 BOND BREAKERS

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

11.10.6 BACKING

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

11.10.7 SURFACE PREPARATION

Surfaces shall be clean, dry to the touch, and free from dirt, frost, moisture, grease, oil, wax, lacquer, paint, or other foreign matter that would tend to destroy or impair adhesion. Oil and grease shall be removed with solvent and surfaces shall be wiped dry with clean cloths. When resealing an existing joint, remove existing calk or sealant prior

to applying new sealant. For surface types not listed below, the sealant manufacturer shall be contacted for specific recommendations.

11.10.8 MASKING TAPE

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

11.10.9 BACKSTOPS

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

11.10.10 PROTECTION

Protect areas adjacent to joints from sealant smears. Masking tape may be used for this purpose if removed 5 to 10 minutes after the joint is filled.

11.10.10.1 FINAL CLEANING

Provide cleaning solvent type(s) recommended by the sealant manufacturer except for aluminum and bronze surfaces that will be in contact with sealant. Upon completion of sealant application, remove remaining smears and stains and leave the work in a clean and neat condition.

11.10.10.1.1 MASONRY AND OTHER POROUS SURFACES

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

11.10.10.1.2 METAL AND OTHER NON-POROUS SURFACES

- s. Remove excess sealant with a solvent-moistened cloth.

11.11 LOUVERS

11.11.1 INTERIOR LOUVERS

SDI 111-C, Louvers shall be stationary sight-proof or lightproof type as required. Louvers for lightproof doors shall not transmit light. Detachable moldings on room or non security side of door; on security side of door, moldings to be integral part of louver. Form louver frames of 0.90 mm thick steel and louver blades of a minimum 0.60 mm. Louvers for lightproof doors shall have minimum of 20 percent net-free opening. Sight-proof louvers shall be inverted "V" blade design with minimum 55 or inverted "Y" blade design with minimum 40 percent net-free opening.

11.11.2 EXTERIOR LOUVERS

Louvers shall be inverted "Y", "V" or "Z" type. Weld or tenon louver blades to continuous channel frame and weld

assembly to door to form watertight assembly. Form louvers of hot-dip galvanized steel of same gage as door facings. Louvers shall have steel-framed insect screens secured to room side and readily removable. Provide aluminum wire cloth, 7 by 7 per 10 mm or 7 by 6 per 10 mm mesh, for insect screens.

11.12 WINDOWS, DOORS & GLAZING

11.12.1 WINDOWS

Windows shall be operable . Operable windows shall be slider or awning type.

11.12.1.1 WINDOW GLAZING

All door glazing shall be laminated.. Laminated glazing shall be constructed of two panes of minimum 3 mm annealed glass laminated to a minimum 0.75 mm polyvinyl-butylal (PVB) interlayer, in accordance with UFC 4-010-01. Two panes of laminated glazing shall be installed in each window

11.12.1.2 MATERIALS

11.12.1.2.1 ALUMINUM EXTRUSIONS

Provide alloy and temper recommended by the window manufacturer for the strength, corrosion resistance, and application of required finish, meeting the DIN 1725 raw material requirements, but not less than 215 N/mm² ultimate tensile strength and not less than 1.5 mm thick at any location for main frame and sash members. Note: At the contractor's option extruded PVC windows may be provided in lieu of aluminum windows.

11.12.1.2.2 FASTENERS:

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

11.12.1.2.3 REINFORCEMENT

Where fasteners screw-anchor into aluminum less than 3 mm (0.125 inch) thick, reinforce the interior with aluminum or nonmagnetic stainless steel to receive screw threads or provide standard non-corrosive pressed-in splined grommet nuts.

11.12.1.2.4 EXPOSED FASTENERS

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

11.12.1.2.5 ANCHORS, CLIPS, AND WINDOW ACCESSORIES

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

11.12.1.2.6 COMPRESSION-TYPE GLAZING STRIPS AND WEATHERSTRIPPING

Unless otherwise indicated, and at the manufacturer's option, provide compressible stripping for glazing and weather-stripping such as molded EPDM or neoprene gaskets.

11.12.1.2.7 SEALANT

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

11.12.1.2.8 WIRE FABRIC INSECT SCREEN

Wire Fabric Insect Screen shall be permanently fixed to the exterior of operable windows.

11.12.1.3 HARDWARE

Provide the manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum and of sufficient strength to perform the function for which it is intended. Provide at a minimum one locking device on the interior of each window. Any operable window over 2 square meters shall have two locking devices as a minimum.

11.12.1.4 FABRICATION

Provide aluminum windows with factory finish in all buildings as indicated in the design drawings. Window openings shall be provided with insect screening permanently fixed to the exterior. Provide a minimum of 3 anchors on each side of the frame into the adjoining structure. Provide weather stripping system for all exterior windows and doors.

11.12.1.5 METAL WINDOW SILLS

Galvanized metal window sills, 0.90 mm (20 gauge), shall be installed on the exterior of all windows. The metal window sills shall have a turn down of 50 mm over the exterior masonry and stucco. Metal sills shall extend from side to side of the masonry opening in a single piece. Extend the metal window sill a minimum of 20 mm under the bottom of the aluminum windows. Install masonry mortar as required for a smooth surface under the window sills. Sills shall slope a minimum of 6 mm to the exterior and not allow water to puddle.

11.12.1.6 FINISHES

Apply baked enamel in compliance with paint manufacturer's specifications for cleaning, conversion coating, and painting. Color shall be white meeting the requirements of DIN 50018

11.12.1.7 INSPECTION

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

11.12.1.8 INSTALLATION

Comply with manufacturer's specifications and recommendations for installation of window units, hardware, operators, and other components of the work. Set window units plumb, level, and true to line, without warp or rack of frames or sash. Provide proper support and anchor securely in place. Set sill members and other members in a bed

of compound or with joint fillers or gaskets, as shown, to provide weather tight construction. Refer to the Sealant sections for compounds, fillers, and gaskets to be installed concurrently with window units. Coordinate installation with wall flashings and other components of the work.

11.12.1.9 ADJUSTING

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

11.12.1.10 CLEANING

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

11.12.2 DOORS

Fire rated door assemblies including hollow metal frame and hardware shall be provided as indicated in the design drawings. Rated doors and frames shall be tested and approved as an assembly and shall be provided by a single manufacturer/distributor. Hardware for fire rated door assemblies shall be labeled as appropriate for fire rated applications and shall be coordinated with door manufacturer. All exterior doors shall be heavy duty metal doors with metal frames. Interior door shall be hollow metal doors with hollow metal frames. Commercial duty lock sets and hardware shall be used on all doors. Hinges shall be the 5 knuckle type or equivalent. Provide door handles and locksets that can be locked with a key on all doors. All door locks shall have a thumb latch on inside of door such that no key is necessary to exit the room or building. Coordinate the final keying schedule with Contracting Officer prior to ordering lock sets. Generally each building should have 8 master keys fitting all locks, 8 sub-master keys fitting all exterior doors and 3 keys each for each interior door. Include 25% spare key blanks for the amount of keys provided per building. Provide numbering system identifying key to associated room door. Provide weather stripping system for all exterior doors.

11.12.2.1 STEEL DOORS

SDI A250.8, except as specified otherwise. Prepare doors to receive specified hardware. Undercut where indicated. Exterior doors shall have top edge closed flush and sealed to prevent water intrusion. Doors shall be 44.5 mm thick, unless otherwise indicated. Doors shall be constructed using heavy gauge steel with minimum thickness of 1.2 mm.

11.12.2.2 SOLID PLASTIC & PHENOLIC DOORS

Solid Plastic & Phenolic doors and frames are for interior wet room use only. Solid Plastic & Phenolic doors and frames may be used for bath stalls, shower stalls, and toilets stalls.

11.12.2.3 FIRE AND SMOKE DOORS AND FRAMES

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

11.12.2.4 THRESHOLDS

All exterior doors (except Mech/Elect rooms) shall be provided with manufactured metal thresholds conforming to ANSI/BHMA A156.21. Doors at all wet areas with terrazzo tile flooring shall be provided with solid marble thresholds with marble threshold set 13 mm above tile. Thresholds shall span continuously from jamb to jamb.

11.12.2.5 STANDARD STEEL FRAMES

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

11.12.2.6 WELDED FRAMES

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

11.12.2.7 STOPS AND BEADS

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

11.12.2.8 WEATHER-STRIPPING, INTEGRAL GASKET

Provide weather-stripping that is a standard cataloged product of a manufacturer regularly engaged in the manufacture of this specialized item. Black synthetic rubber gasket with tabs for factory fitting into factory slotted frames, or extruded neoprene foam gasket made to fit into a continuous groove formed in the frame, may be provided in lieu of head and jamb seals. Weather stripping shall be looped neoprene, synthetic rubber gasket, or vinyl held in an extruded non-ferrous metal housing. Air leakage of weather stripped doors shall not exceed 0.003125 cubic meters per second of air per square meter of door area when tested in accordance with ASTM E 283.

11.12.2.9 ANCHORS

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

11.12.2.9.1 WALL ANCHORS

Provide at least three anchors for each jamb. For frames which are more than 2285 mm in height, provide one additional anchor for each jamb for each additional 760 mm or fraction thereof.

11.12.2.9.2 FLOOR ANCHORS

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

11.12.2.10 HARDWARE PREPARATION

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

11.12.2.11 HINGES

Exterior hinges shall have non-removable pins and be satin-chrome steel or stainless steel; Grade 1 anti-friction or ball bearing; and 3 each of 115 mm x 115 mm per leaf up to 900 mm wide door 125 mm x 125 mm for doors 900 mm to 1,200 mm wide. Interior hinges shall be Grade 1; anti-friction or ball bearing; and 3 each of 115 mm x 115 mm per leaf up to 900 mm wide door 125 mm x 125 mm for doors 900 mm to 1,200mm wide. Hinges for labeled fire doors must be either steel or stainless steel. Hinges shall conform to ANSI/BHMA A156.1 and A156.7.

Locksets, Latchets, Exit Devices, and Push and Pull Plates: Exterior doors shall have mortise locks conforming to ANSI/BHMA A156.13 for metal doors. Emergency exit devices shall be Grade 1, flush mounted type. Interior doors shall have mortise locksets conforming to ANSI/BHMA A156.13, Series1000, Grade 1. All locks and latch sets shall be the product of the same manufacturer. Locksets, padlocks and latch sets shall be provided, as required, with lever handles on each side. Provide heavy duty hasp and locks at all fuel storage tanks.

11.12.2.12 CLOSERS

Closers shall be provided on all exterior doors and fire-rated doors. All exterior doors and interior doors that require security or privacy such as toilet room shall be provided with heavy-duty hydraulic closers. Closers shall conform to ANSI/BHMA A156.4, Grade 1. Closers shall be surface-mounted, modern type, with cover. Closer shall be adjustable type and have slow-down control to prevent door leaf from slamming to frame. Provide door silencers on all door frames provided with closers.

11.12.2.13 DOOR STOPS

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

11.12.2.14 KEYING SYSTEM & LOCK CYLINDERS

Provide locks for all doors. A Master key system shall be provided. Master key system shall include a separate & different key for each door with a master key provided to open any & all doors. Cylinders: Lock cylinders shall comply with BHMA A156.5. Lock cylinder shall have six pins. Cylinders shall have key removable type cores. All locksets, exit devices, and padlocks shall accept same interchangeable cores.

11.12.2.15 FINISHES

All surfaces of doors and frames shall be thoroughly cleaned, chemically treated and factory primed with a rust inhibiting coating as specified in SDI A250.8, or paintable A25 galv-annealed steel without primer. Where coating is removed by welding, apply touchup of factory primer. Provide door finish colors as selected by the Contracting Officer from the color selection samples.

11.12.2.16 WATER-RESISTANT SEALER

Provide a water-resistant sealer compatible with the specified finish as approved and as recommended by the door manufacturer.

11.12.2.17 FABRICATION AND WORKMANSHIP

Finished doors and frames shall be strong and rigid, neat in appearance, and free from defects, waves, scratches, cuts, dents, ridges, holes, warp, and buckle. Molded members shall be clean cut, straight, and true, with joints coped or mitered, well formed, and in true alignment. Dress exposed welded and soldered joints smooth. Design door frame sections for use with the wall construction indicated. Corner joints shall be well formed and in true alignment. Conceal fastenings where practicable. On wraparound frames for masonry partitions, provide a throat

opening 3 mm larger than the actual masonry thickness. Design other frames in exposed masonry walls or partitions to allow sufficient space between the inside back of trim and masonry to receive caulking compound.

11.12.2.18 INSTALLATION

Before installation, seal top and bottom edges of doors with the approved water-resistant sealer. Seal cuts made on the job immediately after cutting using approved water-resistant sealer. Fit, trim, and hang doors with a 2 mm minimum, 3 mm maximum clearance at sides and top, and a 5 mm minimum, 6 mm maximum clearance over thresholds. Provide 10 mm minimum, 11 mm maximum clearance at bottom where no threshold occurs. Bevel edges of doors at the rate of 3 mm in 50 mm. Door warp shall not exceed 6 mm when measured in accordance with WDMA I.S. 1-A. Hang doors in accordance with clearances specified in SDI A250.8. After erection and glazing, clean and adjust hardware.

11.12.2.18.1 FRAMES

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

11.12.2.18.2 GROUTED FRAMES

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

11.12.2.19 PROTECTION AND CLEANING

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

11.12.2.20 WEATHER STRIPPING

Install doors in strict accordance with the manufacturer's printed instructions and details. Weather strip the exterior swing-type doors at sills, heads and jambs to provide weather tight installation. Apply weather stripping at sills to bottom rails of doors and hold in place with a brass or bronze plate. Apply weather stripping to door frames at jambs and head. Shape weather stripping at sills to suit the threshold. Insert gasket in groove after frame is finish painted.

11.12.2.21 PRE-FITTING

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

11.12.3 GLAZING

All door glazing shall be laminated.. Laminated glazing shall be constructed of two panes of minimum 3 mm annealed glass laminated to a minimum 0.75 mm polyvinyl-butylal (PVB) interlayer, in accordance with UFC 4-

010-01. Two panes of laminated glazing shall be installed in each window.

11.12.3.1 TEMPERED GLAZING

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

11.12.3.2 SEALANT

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

11.12.3.3 GLAZING GASKETS

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

11.12.3.4 FIXED GLAZING GASKETS

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

11.12.3.5 WEDGE GLAZING GASKETS

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

11.12.3.6 PUTTY AND GLAZING COMPOUND

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

11.12.3.7 SETTING AND EDGE BLOCKING

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

11.12.3.8 PREPARATION

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

11.12.3.9 INSTALLATION

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

11.12.3.10 CLEANING

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

11.12.3.11 PROTECTION

Glass work shall be protected immediately after installation. Glazed openings shall be identified with suitable warning tapes, cloth, or paper flags, attached with non-staining adhesives. Reflective glass shall be protected with a protective material to eliminate any contamination of the reflective coating. Protective material shall be placed far enough away from the coated glass to allow air to circulate to reduce heat buildup and moisture accumulation on the glass. Glass units which are broken chipped, cracked, abraded, or otherwise damaged during construction activities shall be removed and replaced with new units.

11.13 FINISHES

All exterior metal surfaces, including container exterior shall be painted to match existing adjacent buildings. Interior shall be painted gypsum board or plaster ceilings and walls. Provide color boards with all materials, paints and finishes for COR approval prior to ordering materials. Color boards shall remain on site in view or with the project engineer until completion of the facility.

11.13.1 PAINTS & COATINGS

Paints and coatings shall be provided as a specification 09 90 00 Finishes, Paints and Coatings.

11.13.2 CONCRETE HARDENER

Concrete sealers shall be a liquid chemical sealer-hardener compound. Apply a minimum of two coats. Sealer shall be compatible with climate temperatures and not reduce the adhesion of resilient flooring, tile, paint, roofing, waterproofing or other materials applied to the concrete.

11.13.3 PAINT

Paint shall be oil based or latex. A primer shall be placed prior to any coats of paint. A minimum of two (2) coats of paint shall be used for each surface.

11.13.3.1 EXPOSED EXTERIOR STEEL

Exposed exterior steel shall include items such as trim, frames, door, pipe rails and other exposed steel surfaces. Paint with one coat oil-based primer, with 2 coats of oil-based alkyd gloss enamel, color to be selected by the Contracting Officer from the color board provided by the Contractor.

11.13.3.2 EXPOSED WOOD

Exposed wood shall include items such as trim, frames, doors and other exposed wood surfaces. Paint with one coat

oil-based primer, 2 coats of gloss enamel, color to be selected by the Contracting Officer from the color board provided by the Contractor

11.13.4 EXPANSION JOINTS IN PLASTER & STUCCO

Expansion joints shall be provided as specified in ASTM, DIN 18339, BS or EN Standards for all walls, floors and ceilings.

11.13.5 EXTERIOR WALLS

The exterior of all buildings shall be stucco and/or plaster conforming to ASTM C926. A temperature of between 4 and 27 degrees C shall exist for a period of not less than 48 hours prior to application of plaster and for a period of at least 48 hours after plaster has set. Control joints shall be designed for expansion and contraction of plaster work due to thermal exposure. Control joints shall comprise of back to back casing beads. Install new stucco in 2 coats. The first coat shall be a scratch coat approximately 10 mm thick. Allow 7 days to cure. The second coat shall be finish stucco, smooth finish, approximately 10 mm thick. Allow 7 days to cure before painting. Stucco showing over sanding, cracks, blisters, pits, checks, discoloration or other defects is not acceptable. Defective plaster work shall be removed and replaced with new plaster at the expense of the Contractor. Patching of defective work will be permitted only when approved by the Contracting Officer. Patching shall match existing adjacent work in texture and color. All exterior color finish shall be integral with the stucco finish. No painted stucco shall be permitted due to minimize future maintenance.

11.13.6 INTERIOR WALLS

11.13.6.1 PLASTER WALLS

Interior walls shall be plaster applied in a similar manner as exterior stucco. Paint with 2 coats of semi-gloss off-white with less than .06% lead by weight color to be selected by the Contracting Officer from the color board provided by the Contractor. No gypsum wall board finishes are permitted for any facility in this contract.

11.13.6.2 SOUND CONTROL

Walls between sleeping rooms shall have a Sound Transmission Class (STC) minimum 45-55 or better, An STC value is a single number rating used to characterize the sound insulating value of a partition (wall, floor, or ceiling). All walls shall be caulked at floor and ceiling prior to installing wall base. All openings between rooms shall be caulked or sealed. Doors shall have rubber seal around frames and threshold.

11.13.6.3 HARDEN INTERIOR WALLS

IMPORTANT: INTERIOR WALL STRUCTURE SHALL BE CMU (MIN THICKNESS = 100 mm), OR REINFORCED CONCRETE. Interior walls shall be plaster applied in a similar manner as exterior stucco. Paint with 2 coats of semi-gloss off-white with less than .06% lead by weight color to be selected by the Contracting Officer from the color board provided by the Contractor.

11.13.7 INTERIOR CEILINGS

11.13.7.1 CEILINGS

All ceilings shall be concrete construction for all facilities, regardless of finish schedule shown for barracks facilities drawings in Appendix A Paint ceiling with 2 coats of flat white, with less than .06% lead by weight. No gypsum board ceiling finishes are permitted.

11.13.7.2 CONCRETE CEILINGS

Concrete ceilings shall be exposed concrete painted with 2 coats of flat white, with less than .06% lead by weight. All ceilings are concrete for all facilities in this contract.

11.13.8 TILE WORK

Tile work shall not be performed unless the substrate and ambient temperature is at least 10 degrees C and rising. Temperature shall be maintained above 10 degrees C while the work is being performed and for at least 7 days after completion of work. Upon completion, tile surfaces shall be thoroughly cleaned in accordance with manufacturer's approved cleaning instructions. Acid shall not be used for cleaning glazed tile. Floor tile with resinous grout or with factory mixed grout shall be cleaned in accordance with instructions of the grout manufacturer. After the grout has set, tile wall surfaces shall be given a protective coat of a non-corrosive soap or other approved method of protection.

- t. Floors in wet areas (toilets, showers, laundry, chai and mechanical rooms) shall be 300 mm x 300 mm terrazzo] tile with thin set mortar. Joints shall be 2-3 mm. Waterproof gray grout shall be applied the full depth of the tile. Floors shall slope, minimum 1/50, to floor drains. Slope shall be obtained with sloping mortar bed of minimum 20 mm thickness. Provide continuous waterproofing membrane beneath sloping mortar bed, turn up wall 300 mm behind wall base. Membrane shall be fully sealed at joints and shall shed water into body of floor drain. Color of tile shall be selected by the Contracting Officer from samples provided by the Contractor.
- u. Floors in administration areas, living quarters, corridors, and all rooms unless otherwise stated shall be sealed concrete. Joints shall be 2-3 mm. Waterproof gray grout shall be applied the full depth of the tile. Color of tile shall be selected by the Contracting Officer from samples provided by the Contractor. Floors in the General Officer administration area in the HQ bldg and the adjacent SAR room shall be terrazzo tile finish.
- v. Walls in wet areas shall be tiled with 150 mm x 150 mm glazed ceramic tile up to 2,000 mm above the floor to include interior of toilet stalls, showers and behind sinks. Joints shall be 2-3 mm. Waterproof gray grout shall be applied full depth of the tile. Grout shall cure for 72 hours and then be sealed with a commercial grout sealant in two coats. Color of tile shall be selected by the Contracting Officer from samples provided by the Contractor.
- w. The ablution drain areas shall be recessed below the floor level 200 mm and lined with ceramic tile. Ceramic tile shall extend up the wall past the water spigots to a height of 2,000 mm above finished floor. Seats shall be formed concrete with terrazzo tile finish to match the floor, 300 mm x 300 mm x 300 mm high finished dimensions. Color of ceramic tile shall be selected by the Contracting Officer from samples provided by the Contractor. Spacing between tiles shall be
- x. All other floors are to be completely cleaned and sealed epoxy. Color to be selected by the Contracting Officer from samples provided by the Contractor.

11.14 SPECIALTIES

11.14.1 MIRRORS

600 mm x 900 mm, 6 mm plate glass shall be mounted above all lavatories. Mount bottom of mirrors 1,100 mm above finished floor.

11.14.2 TOILET PAPER HOLDERS

Toilet paper holders with removable pin shall be stainless steel, installed approximately 200 mm above floor by eastern toilets and 600 mm above floor by western toilets.

11.14.3 SHOWER CURTAIN RODS & SHOWER CURTAIN

Shower curtain rods, stainless steel, heavy duty, 1.20 mm (18 gauge) shall be mounted between the walls of each shower stall. Mount rod 2000 mm above finished floor. Provide a shower curtain with support rings for each shower stall.

11.14.4 GRAB-BARS

Stainless steel grab-bars, heavy duty, 1.20 mm (18 gauge), two each 900 mm and 1,050 mm long, 40 mm diameter shall be mounted behind and beside all eastern toilets, and bathtubs as they occur. Mount grab-bars between 610mm - 900 mm height on the walls. Each bar shall support no less than 91 Kg (200 lbs) in any direction.

11.14.5 PAPER TOWEL DISPENSERS

Paper towel dispensers, 0.683 mm Type 304 stainless steel, surface mounted. Furnish tumbler key lock locking mechanism.

11.14.6 LIGHT DUTY METAL SHELF

Provide a 600 mm long x 150 mm wide, light duty stainless steel shelf with integral brackets over each lavatory and laundry sink.

11.14.7 ROBE HOOKS

Provide a minimum of two robe hooks on all toilet and shower stalls.

11.15 BUILDING SYSTEMS

11.15.1 CONCRETE STRUCTURE

General: All facilities are to be constructed by reinforced concrete structure and reinforced CMU walls. All roofs shall be 24 gauge metal, slope as determined by contractor as part of the design effort (no slope less than 2:12). Second floor ceilings shall be reinforced concrete structure. Windows are sized 1000 mm (W) x 1200 mm (H). All clear ceiling heights are 3000 mm Above Floor Finish (AFF). Ceiling insulation is R30 value (200 mm BATT insulation or equivalent). No wall insulation is required for any facility except for Senior Officer Quarters (see plans in Appendix A). All doors are metal.

11.16 FINISHES FOR SPECIFIC FACILITIES

11.16.1 ADMINISTRATION AND HEADQUARTERS FACILITIES

11.16.1.1 CEILING FINISH

Ceilings of each facility for each floor shall be exposed concrete painted with 2 coats of flat white, with less than .06% lead by weight. Ceiling height of administration and headquarters buildings shall be 3,000 mm AFF; barracks and toilet/shower facilities shall be as shown on the appendix A drawings. 200 mm BATT ceiling insulation required directly over the second floor concrete ceilings (do not place insulation on the roof side).

11.16.1.2 WALL FINISH

Exterior walls shall be 200 mm with painted plaster finish each side (plaster shall be two layers 10 mm each). No wall insulation shall be provided.

11.16.1.3 FLOOR FINISHES

Provide sealed concrete floor finish for all rooms of the Administration and Headquarters buildings, with the exception of terrazzo tile for toilet, chai and mechanical rooms. Additionally, the general officer rooms and surrounding area to include the SAR room shall have terrazzo floor finishes. The Barracks and Toilet/Shower rooms shall have floor finishes as provided by the drawings in Appendix A.

11.16.1.4 BARRACKS AND TOILET/SHOWER/LAUNDRY FACILITIES

Finishes for the Barracks and Toilet/Shower/Laundry buildings are provided on the drawings in Appendix A.

12.0 MECHANICAL

12.1 GENERAL

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

12.2 SPECIALIST SUB-CONTRACTORS QUALIFICATIONS

The HVAC works shall be executed by an air-conditioning specialist sub-contractor experienced in the design and construction HVAC equipment to include conventional compression systems, heat pump units, space heaters and knowledge in fabricating specialized units consisting of supplemental electric resistance heaters in satisfying the specified indoor design conditions. HVAC equipment will normally consist of split-pack heat pump units suitable for low ambient operation, ducted packaged heat pump units with supplemental duct mounted electric resistance heaters, industrial quality unit heaters, air ventilation systems and specialized industrial ventilation systems. The HVAC heating and cooling load calculations shall be prepared using recognized HVAC load analysis programs such as Trane "Trace" or Carrier "HAP". The heating and cooling load calculations shall take into account the site elevation and ambient design temperatures when determining required HVAC equipment capacities and airflows.

The HVAC specialist shall submit the complete HVAC analysis with equipment layout drawings at the 65% design submittal. The HVAC analysis shall clearly state and the drawings clearly show the type of systems to be used and how the system will satisfy the specified indoor design conditions. Provide related psychrometric charts showing the air wet bulb and dry bulb temperatures at each section of the heat/cool unit during both design heating and cooling operation.

Provide complete, edited specifications using the UFGS specs for selected HVAC system. The edited specifications shall be submitted along with the 65% design submittal. The specifications shall be coordinated with the manufacturer of the equipment.

12.3 CODES, STANDARDS AND REGULATIONS

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

12.4 DESIGN CONDITIONS

Outside Design Conditions (Contractor shall verify the ambient conditions with available and reliable local weather data).

Jalalabad area:

Latitude – (approx.) 34 deg. North

Longitude – (approx.) 70 deg. East

Elevation – (approx.) 580 M (1903 ft.)

Summer – 39.6 deg C (103 deg F) Dry Bulb (DB) [& 25.6 deg C (78 deg F)] Wet Bulb (WB)]

Winter – (4.6 deg C/40 deg F)

Daily Range – data unknown)

12.4.1 INDOOR DESIGN CONDITION

Cooling shall be 25.6 C (78 F) and heating shall be 20 C (68 F) for all occupied spaces, unless stated otherwise.

Mechanical rooms and storage rooms require no cooling. Provide heating to prevent any freezing of water piping. Freeze protection requires heating to 7.2 C (45 F).

12.4.2 NOISE LEVEL

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

12.4.3 INTERNAL LOADS

- y. Occupancy: Use ASHRAE standards to calculate sensible and latent heat from people. In general, light/moderate office work is 73watts sensible and 45watts latent.
- z. Lighting: 21.5 W/m² (2 W/Ft²) maximum (however lighting levels shall meet minimum requirements and shall be accounted for in the heating and cooling loads based on the actual lighting design).
- aa. Outdoor Air: Outdoor ventilation air shall be provided per International Mechanical Code (IMC) with the exception of guard towers, guard shacks, and storage rooms. In general this requires 2.5 L/s/Person (5 CFM/Person) and 0.3 L/s per square meter of floor space (0.06 CFM/sqft). For rooms with windows, the windows can be opened to introduce outside air. For interior rooms without windows, provide a makeup air system.

- bb. Latrine/Bathroom Exhaust– 85 CMH (50 CFM) per toilet, urinal, and shower head.
- cc. Building Pressurization: 1.3 mm W.G. (0.05 in W.G.); Maintain negative pressure in latrine areas. This is only applicable for areas provided with central ducted forced air systems

12.5 NEW AIR COOLING & HEATING EQUIPMENT

Environmental control of the facilities shall be achieved by HVAC equipment as listed below and approved by the U.S. Government. Unless otherwise noted, the Contractor may choose any combination of equipment to achieve the inside design conditions specified for the floor plans that is the most Life Cycle Cost Effective to the government. Contractor shall size and select equipment based on equipment manufacturer's performance data at the project site elevation and ensures the equipment's performance meets the design heating and cooling sizing requirements.

Facility/Room Type	Cooling	Heating	Type of HVAC System	Remarks
Officer, NCO, Enlisted Barracks	None	20C 68 F	Unit Heaters	Provide ceiling fans
Senior Officers Barracks	25.6C 78 F	20C 68 F	Split pack heat pump units	
Admin Bldg (occupied spaces with windows)	None	20C 68 F	Unit Heaters	Provide ceiling fans
Admin Bldg (occupied spaces without windows)	25.6C 78 F	20C 68 F	Split pack heat pump units	
Admin Bldg (General Officer Wing)	25.6C 78 F	20C 68 F	Ducted, packaged heat pump unit	
JOC, large conference rooms	25.6C 78 F	20C 68 F	Ducted, packaged heat pump unit	
Communication rooms	25.6C 78 F	20C 68 F	Split pack heat pump units	
Bathroom/Shower/Laundry	None	20C 68 F	Unit Heaters	Provide adequate ventilation
Guard House	None	20C 68 F	Unit Heaters	Provide ceiling Fan
Guard Tower	None	20C 68 F	Unit Heaters	Provide ceiling Fan

12.5.1 UNITARY DUCTED HEAT PUMP UNITS

Ducted, packaged heat pump units shall be provided for all large occupied spaces such as the General Officers wing, JOC, Shura and Fusion rooms. Ducted forced air systems are required to satisfy the indoor air quality as specified in ASHRAE 62.1 and to maintain positive pressure of 1.3 mm W.G. in the buildings. Ducted heat pump units shall be unitary in design and factory manufactured ready for installation. Heat pump units shall provide cooling during summer and heating during winter. The unit shall consist of DX coil, blower, supplemental electric heater elements, washable filter, and condenser unit containing the compressor, condenser coil, fans and all internal controls/fittings complete all mounted in a weatherized housing finished for exposed installation. The unit shall be suitable for exterior installation and be mounted on steel supports or on a concrete pad. Copper refrigerant suction and liquid piping shall be sized, insulated and installed in accordance to unit manufacture recommendations. Unit temperature control shall include wall mounted adjustable thermostat, blower on-off-auto switch and heating-cooling change over control.

12.5.2 UNITARY (DUCTLESS SPLIT-PACK) HEAT PUMP UNITS

Unitary ductless split-pack heat pump units shall be provided for small and isolated rooms, such as the guard tower, guard shed and remote small buildings. Ductless split units shall be unitary in design and factory manufactured ready for installation. Heat pump units shall provide cooling during summer and heating during winter. **Heat pump units shall be suitable for low ambient operation.** Interior evaporator fan coil units shall consist of a DX coil, blower, and washable filter all mounted in a housing finished for exposed installation. Cooling coil condensate piping shall be routed to the exterior and discharge into a French drain or concrete splash block. The exterior condensing units shall contain compressor, condenser coil, and all controls/fittings enclosed in a weatherized housing. Outdoor condensing unit shall be wall-mounted on steel supports or on a concrete pad. Copper refrigerant suction and liquid piping shall be sized, insulated and installed in accordance to unit manufacture recommendations. Unit temperature control shall include wall mounted adjustable thermostat, blower on-off-auto switch and heating-cooling change over control.

12.5.3 SUBMITTALS

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

12.6 DUCTWORK

Air shall be distributed from central Air Handling Units (AHUs) to achieve proper airflow throughout the facility by means of air distribution ductwork. Air distribution system shall be comprised of supply and return ductwork, fittings, manual volume control dampers, grilles, registers, and/or diffusers. Ductwork shall be constructed of galvanized steel or aluminum sheets and installed as per SMACNA "HVAC Duct Construction Standards (Metal and Flexible)." Flexible non-metallic duct may be used for final unit/diffuser connection in ceiling plenums. These flexible duct run-outs shall be limited to 3 meters in length.

12.6.1 DUCT INSULATION

Duct insulation shall be provided for all supply ductwork that is not located in the conditioned space and for return ductwork not located within the conditioned space. All ductwork exterior to the building shall be insulated with a minimum RSI=0.88 (R5).

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

12.6.2 DIFFUSERS, REGISTERS & GRILLES

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

12.6.3 BRANCH TAKE-OFFS

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

12.6.4 WALL PENETRATIONS

Building wall penetrations shall be carefully made so as not to deteriorate the structural integrity of the wall system. The Contractor shall consult with the building manufacturer, if possible, to determine the best way to penetrate the wall. If the building manufacturer is not available, a structural engineer shall be consulted. In either case, the recommendations of the engineer shall be strictly adhered to.

12.6.5 AIR FILTRATION

All supply air shall be filtered using manufacturer's standard washable filters mounted inside the unit. In addition, all outdoor air intakes shall be equipped with 50 mm (2 inch) thick washable filters.

12.6.6 CONTROL WIRING AND PROTECTION DEVICES

Control wiring and protection of the air conditioning units being offered must be the manufacturer's standard, pre-wired, installed in the unit at the factory or as recommended. Thermostats shall be located near the unit return, and shall include lockable housing that allows viewing of settings without permitting access. For units serving more than one area, the thermostat shall be located near the return of the space with the highest heat generation.

12.7 VENTILATION AND EXHAUST SYSTEMS

All fans used for building ventilation, exhaust, and pressurization shall be selected for minimum noise level generation. All fans used for supply or roof/wall exhaust shall be centrifugal forward curved, backward inclined, or airfoil fans with non-overloading characteristics of high efficiency and quiet running design. The fans shall be of the heavy-duty type with durable construction and proved performance in a desert environment. Each wall exhaust fan shall be provided with motorized or gravity dampers which close automatically when the fan is not running. Louvered intake openings (for exhaust fan system) shall be sized for a maximum static pressure (SP) drop (that includes filter resistance) of 25 Pa (0.10 inches of H₂O) to prevent excessive negative pressurization of the building. To reduce sand and dirt migration, outside air intakes shall be installed as high as possible within architectural constraints.

Toilet and Wash Area: Minimum exhaust ventilation shall be the largest of 35 m³/h / m² floor or 85 m³/h / toilet (WC).

12.7.1 OUTSIDE AIR INTAKE LOUVERS

Outside air louvers shall be factory fabricated of steel or aluminum and allow the specified air quantity into the space intended. Louvers shall be rectangular with rain-proof exterior face blades and internal grille. Louvers shall be mounted a minimum of 1.8 m (70 inches) above the floor on the sidewalls. Consideration shall be given to locating the louvers near the heating and cooling unit and encourage air flow across the room in conjunction with the exhaust fan.

12.7.2 WALL PENETRATIONS

Building wall penetrations for fans and louvers shall be carefully made so as not to deteriorate the structural integrity of the wall system. The Contractor shall consult with the building manufacturer, if possible, to determine the best way to penetrate the walls. If the building manufacturer is not available, the Contracting Officer shall be consulted. In either case, the recommendations of the manufacturer and/or Contracting Officer shall be strictly adhered to.

12.7.3 AIR FILTRATION

All outside air shall be filtered using manufacturer's standard washable filters mounted inside the louvers. Outdoor air intakes shall be equipped with 50 mm (2 inch) thick washable filters.

12.7.4 SUBMITTALS

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

12.8 ELECTRIC HEATERS

Electric heat trace cable for freeze protection shall not be provided as a substitute for space heating system.

12.8.1 UNIT HEATER

Electric resistance unit heaters shall be installed in spaces where only heating is required. Generally, unit heaters shall be mounted as high as possible. Unit heaters shall be of the industrial grade, very durable and securely fastened to the ceiling, wall or structure. Provide a self-contained electric heating unit, suspended from ceiling or structure, fan with at least two-speeds and heating elements. Provide control-circuit terminals and single source of power supply with disconnect. Heating wire element shall be nickel chromium. Include limit controls for overheat protection of heaters. Provide hard-wired tamper resistant integral thermostat located as indicated on the drawings.

12.8.2 SUBMITTALS

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

The manufacturer shall also submit a 2 year warranty for each of the units.

12.9 TEST ON COMPLETION

After completion of the work, the Contractor shall demonstrate to the Contracting Officer that the installation is adjusted and regulated correctly to fulfill the function for which it has been designed. The Contractor shall test, adjust, balance and regulate the section or sections of concern as necessary until the required conditions are obtained. Operational test shall be conducted once during the winter and once during the summer. Coordinate with the Contracting Officer on when the test shall be scheduled. Include tests for all interlocks, safety cutouts and other protective device to ensure correct functioning. All such tests shall be carried out and full records of the values obtained shall be prepared along with the final settings and submitted to the Contracting Officer in writing. The following tests and readings shall be made by the Contractor in the presence of the Contracting Officer and all results shall be recorded and submitted in a tabulated form.

- dd. Ambient DB and WB temperatures
- ee. Room Inside Conditions:
 - i. Inside room DB & WB temperatures
 - ii. Air flow supply, return and/or exhaust
 - iii. Plot all temperatures on psychrometric chart
- ff. Air Handling Equipment: Air quantities shall be obtained by anemometer readings and all necessary adjustments shall be made to obtain the specified quantities of air indicated at each inlet and outlet.

- gg. Following readings shall be made:
 - iv. Supply, return and outside air CMH (CFM) supplied by each air conditioning system.
 - v. Total CMH (CFM) exhausted by each exhaust fan
 - vi. Motor speed, fan speed and input ampere reading for each fan
 - vii. Supply, return and outside air temperature for each air-conditioning system.
- hh. Electric Motors: For each motor:
 - viii. (1) Speed in RPM
 - ix. (2) Amperes for each phase
 - x. (3) Power input in KW

12.10 ELECTRICAL REQUIREMENTS FOR HVAC EQUIPMENT

- ii. Note that electrical requirements for all HVAC systems shall be designed and installed to operate on the secondary power standard required herein. The Contractor is responsible to field verify all the conditions and provide complete shop drawings showing any incidental power upgrades. All electrical work shall comply with the National Electric Code.
- jj. Wall-mounted thermostats shall be mounted 1.5 meters (5 feet) above the finished floor and be easily accessible. Operation of the control system shall be at the manufacturer's standard voltage for the unit.
- kk. The following are the minimum requirements for motors regarding enclosure, insulation and protection:
 - xi. Compressor Hermetic: Provide inherent (internal) overload protection.
 - xii. Condenser: Provide internal thermal overload protection.
 - xiii. Evaporator (Open Class "A") fan motor type provides internal thermal overload protection.

12.11 CEILING FANS

12.11.1 CEILING FAN

Provide 5-blade ceiling fans[at one per 40 square meters of floor space] [as indicated]. Fans shall have reversible motors. Fans shall be centered or distributed evenly throughout the room. Coordinate placement with the lighting plan to prevent conflict or casting shadows. Fan mount shall be flush, standard, or angle mount depending on ceiling height. Fan shall be mounted such that the fan blade is approximately 2.5 meters (98 inches) above the finished floor. The fan shall be provided without light kit. The finish shall be factory painted white. The controls shall be wall-mounted from either a single pole switch or from two (2) 3-way switches to provide on/off operation. The electrical supply shall be 230 volts, single phase, and 50 hertz. Install per manufacturers' instructions.

12.11.2 SUBMITTALS

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

12.12 DELETED

12.13 OPERATIONS AND MAINTENANCE (O&M) FOR MECHANICAL

- ll. 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.
- mm. The O&M manuals must be provided prior to any training activities. Manuals shall be "tri-lingual" in Dari, Pashto and English.
- nn. All control panels shall have tri-lingual name plates in Dari, Pashto and English.
- oo. 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.

12.14 PLUMBING

12.14.1 GENERAL

The Contractor shall design and build domestic cold and hot water systems, waste, drain and vent systems, waste-oil collection and storage and fuel-oil storage and distribution systems required in the facilities identified in Section 01010 Scope of Work and as described herein. The Contractor shall also be responsible for complete design and construction of all domestic and special plumbing systems required for full and safe operations in the Generator Plant, Water Storage and other facility or structures required in this contract.

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

12.14.2 SUB-CONTRACTORS QUALIFICATIONS

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

12.14.3 STANDARD PRODUCTS

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

12.15 CODES, STANDARDS AND REGULATIONS

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

IPC – International Plumbing Code

NFPA - National Fire Protection Association

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

ASME – American Society of Mechanical Engineers

ASTM – American Society for Testing and Materials

AWS – American Welding Society

12.16 PLUMBING SYSTEMS REQUIREMENTS

12.16.1 WATER

Domestic cold and hot water shall be provided in the facilities to serve the water usage and plumbing fixtures provided for the facility. Water service to each facility shall enter the building in a mechanical, toilet, storage, or similar type space. The building service line shall be provided with a shut off valve installed inside the mechanical room or similar spaces. Water piping shall not be installed in or under the concrete foundation except for the service line. All water piping shall be exposed and routed parallel to the building lines. Insulation shall be provided where required to control sweating of pipes or to provide protection from freezing.

12.16.2 PIPING MATERIALS

Domestic cold water shall be distributed by means of standard weight (schedule 40) galvanized steel pipe, Polyvinyl Vinyl Chloride (PVC) or Polyethylene (PE) (ASTM D 2737) plastic piping. Domestic hot water shall be distributed by means of standard weight (schedule 40) galvanized steel pipe, or Chlorinated Polyvinyl Vinyl Chloride (CPVC) piping. Waste and vent piping can be made of either galvanized steel pipe (schedule 40), or Polyvinyl Vinyl Chloride (PVC) conforming to ASTM D 2665. Corrosion protection shall be provided if galvanized piping comes in contact with earth or masonry floors, walls or ceilings.

12.16.3 PLUMBING WATER FIXTURES

The following typical plumbing fixtures shall be provided:

pp. Eastern Water Closet with flush tank assembly. Provide acid resisting fired porcelain enameled cast iron water closet complete with rotating No-Hub 'P' trap and No-Hub coupling to meet piping requirements. Eastern Style water closet shall be furnished with integral non-skid foot pads and bowl wash down non-splashing flushing rim. The water closet shall be completely self supporting requiring no external mounting hardware and shall be flush with floor. The Eastern Style water closet shall incorporate waterproofing membrane flashing flange. Provide a cold water spigot 300mm above finished floor on the right (from a perspective of standing inside of the cubicle and looking out) sidewall of the cubicle. Spigot shall have a flexible hose and spray nozzle such that the occupant can wash over the water closet. Toilets shall be oriented north and south. Toilets shall not face east or west.

qq. Western style toilets with flush tanks shall be provided as requested by the User. Western style toilets shall be white vitreous china, siphon jet, round bowl, pressure assisted, floor mounted with floor outlet. Top of toilet seat height shall be 356 to 381 mm. Water closet shall be flush tank type.

- rr. Lavatories. All sinks shall be trough type constructed of block and concrete with ceramic tile exterior and lining capable of withstanding abuse. Provide maintenance access to waste piping and P-traps from under the sink.
- ss. Sink Faucets. Faucets shall be chrome plated brass or bronze alloy with hot and cold water valves for manual mixing. Faucet handles shall be chrome plated brass or bronze alloy and non-lever type. **No goose neck faucet fixtures shall be used.**
- tt. Janitor's Sink. Floor mounted sink shall be concrete. Provide hot and cold water valves with manual mixing. Faucet handles shall chrome plated brass or bronze alloy. Include a stainless steel shelf and three mop holders.
- uu. Shower. Showerhead and faucet handles shall be chrome plated brass or bronze alloy. Provide hot and cold water valves for manual mixing. In addition to a shower head, provide each shower stall with a threaded faucet approximately 1.2 m AFF with hot and cold-water controls, mixing valve and a diverter type valve so water can be directed to either the shower or to the lower faucet. Shower shall be provided with low flow shower head. The shower head shall be heavy duty type and securely fastened to the wall.
- vv. Kitchen Sink. Single bowl sink shall be corrosion resisting formed stainless steel. Faucet bodies and spout shall be chrome plated brass or bronze alloy. Handles, drain assembly, and stopper shall be corrosion resisting steel or brass/bronze alloy.
- ww. Ablution Trench. Provide trench drain with brass grating and strainer. Provide each station with hot and cold water valves with manual mixing. Faucet handles shall be copper alloy.
- xx. Floor or Shower Drain: Cast iron construction with galvanized body, integral seepage pan, and adjustable perforated or slotted chromium plated bronze, nickel-bronze, or nickel brass strainer consisting of a grate and threaded collar. Toilet room floor drains are similar except are provided with built-in, solid, hinged grate.
- yy. Provide P-Traps per International Plumbing Code IPC for all fixture drains, floor and trench drains, and shower drains. P-traps shall have minimum of 50 mm water seal.

12.16.4 HOT WATER

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

12.16.5 HOT WATER HEATERS

The hot water shall be generated by electric water heaters. The unit(s) shall be typically located inside a mechanical room, storage room, toilet/janitor room or similar type space and be wall-mounted or be floor-mounted on a 100 mm (4 inch) raised concrete pad. The unit(s) shall be of the commercially available tank type having low or medium watt density electric heating elements.

In cases where the pressure of the water coming into the tank will violate manufacturer recommendations, a pressure reducer shall be installed in the line before the water heater. Each water heater shall be equipped with a vacuum relief valve and temperature and pressure (T&P) relief valve that discharge into a nearby floor drain; discharge piping shall terminate 50 mm (2 inches) above the floor drain. Multiple water heaters shall be connected by common inlet and outlet manifolds to ensure equal flow and drawdown rates.

12.17 WASTE, DRAIN AND VENT SYSTEM

Floor drains shall be provided in each room that contains a water source. Floor drains shall be provided in the mechanical equipment and toilet rooms as required. Floor drains shall be provided next to the electric water heaters. In mechanical rooms, floor drains shall be provided to avoid running drain piping long distances above or over the floor. All waste and vent piping shall be provided in accordance with the latest edition of IPC. Drain outlet shall use p-trap system to trap sewer gases. P-trap drain should be a one-piece system without removable parts. Every trap and trapped fixture shall be vented in accordance with the IPC. In order to minimize vent piping, consider incorporating circuit venting or combination drain and vent systems in accordance with Section 911 and 912 of the IPC. IPC Section 708.3 states that cleanouts be provided no more than 100 feet apart measured from the upstream entrance of the cleanout. AED standard is to provide cleanouts at 25 feet intervals due to the nature of Afghans plugging up the drains and the limitation of the cleanout routers available in Afghanistan

12.18 SPECIAL PLUMBING SYSTEMS

Contractor shall design and construct compressor air storage and distribution, waste-oil collection and storage, fuel-oil storage and distribution and other plumbing systems that are required for full performance of equipment and operations and for maintenance in the Power Plant and Vehicle Maintenance facilities. These systems shall be designed and built in accordance with codes and publications referenced herein before and in compliance with equipment manufacturer recommendations.

13.0 FIRE PROTECTION

13.1 PORTABLE FIRE EXTINGUISHERS

ELEC 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).

14.0 ELECTRICAL

14.1 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.

14.2 DESIGN CRITERIA

14.2.1 APPLICABLE STANDARDS

- zz. Design shall be in the required units as stipulated herein.
- aaa. 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.

- bbb. All electrical systems and equipment shall be installed in accordance with the requirements set forth in the documents referenced herein.
- ccc. 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).

14.3 MATERIAL

14.3.1 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.

14.3.2 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.

14.3.3 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.

14.3.4 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.

14.4 DESIGN REQUIREMENTS

14.4.1 ELECTRICAL DISTRIBUTION SYSTEM

Contractor shall connect to local electrical distribution system (utility) power.

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 portion of the 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.

~~AM #4 ... The contractor shall provide a medium voltage 20kV primary distribution system with three (3) distribution feeders.~~ The contractor shall provide a medium voltage 20kV primary distribution system with one (1) distribution feeder. ...~~AM #4~~ to supply power to padmounted transformers. The padmounted transformers shall be loop fed, dead front type with load break elbows. The system shall be configured as a loop system and the feeders shall be provided with tie capabilities through the use of padmounted load-break switches. Each padmounted transformer shall be sized to provide power for the total load of the facility served without being loaded to more than 110% of its rated capacity.

The existing switchgear is dead-front type (i.e. no live parts shall be exposed) switchgear that consists of a Generator Bus and a Distribution Bus. Both buses are connected via a bus-tie circuit breaker. The distribution Bus is provided with three (3) 20 kV feeder circuit breakers. The new circuit breakers in the switchgear shall be 1250 A vacuum. Each feeder breaker shall be furnished with, but not be limited to, necessary relays, ammeter, voltmeter, current and potential transformers etc. for recording current and voltage readings. All feeders shall be provided with feeder-to-feeder tie capabilities to transfer loads between feeders. ~~AM #4 ... Feeder tie points shall be located in the field and away from the Power Plant. Long feeder runs shall be provided with sectionalizing devices such as multiple bay sectionalizers. A separate feeder to feeder tie or a sectionalizer shall be installed for each feeder at the 201st HQ site for extensions of the (3) feeders into future areas. ...AM #4~~ Concrete encased high voltage feeder cable duct-bank shall be provided from each breaker cubicles to outside manhole(s). Spare conduit shall be providing in each duct-bank. Conduits shall be PVC, minimum 100 mm (4 inch) in diameter schedule 80. The existing switchgear is 20 KV, 1250A, 20KA. The switchgear furnished must be compatible with the existing switchgear. Contractor is encouraged to offer solutions that will minimize the stocking of multiple sources of parts. The Contractor shall complete a power system analysis for the entire site and shall provide site power load calculation to determine the total site power requirements. The Contractor shall perform load calculations to determine the number of required transformers to feed all facilities in this project. All power system analysis and load calculations shall be submitted as part of the 35% Design Analysis and shall be revised/updated for each design submittal. Voltage drops and proposed conductor sizes and types shall also be provided with each design submittal. Transformer substations shall be strategically located close to the loads. Dedicated transformer substations shall be provided for large loads. Transformers shall be Primary 'Delta' and Secondary 'Wye' connected. Primary side load-break disconnecting means shall be provided with all transformers. Transformer substations shall be dead front, loop-fed, pad-mounted, compartmental, self-cooled type. Transformers shall come complete from manufacturer; use of third party transformer housings or add-on transformer housings shall not be permitted. Transformers shall have no exposed live components. Transformer selection, design, and installation shall be governed by NEC, NESC, ETL 1110-3-412, TM 5-684, UFC 4-510-01, UFC 3-550-03FA, UFC 3-550-03N, IEEE C57.12.28, ANSI/IEEE C57.12.22, IEEE C57.12.34, and C57.12.80.

Size of transformers, generators, and power feeds shall be governed by UFC 4-510-01, NFPA 99, and the NEC. In case of conflict between transformer design criteria between the above named standards, UFC 4-510-01 shall govern; in cases where UFC 4-510-01 cannot resolve the conflict, it shall be brought to the attention of the Contracting Officer for resolution.

~~AM #4... The contractor shall provide a street lighting distribution system to supply power to the site's street lighting circuits. The street lighting system shall be underground in direct buried schedule 40 PVC not less than 50mm in diameter and not less than 660mm below grade. The street lighting ducts shall be concrete encased in areas subject to vehicular traffic, such as road crossings and parking areas. ...AM #4~~

Secondary electrical distribution system shall be 380/220 volt, 3-phase, 4 wire, 50 hertz. Design of the electrical system within facilities shall include, but is not limited to (a) interior secondary power distribution system, (b) lighting and power branch circuit and devices, and (c) fire detection and alarm system. All systems shall be designed

for the ultimate demand loads, plus 25% spare capacity.

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 1,220 mm below grade in concrete encased 100 mm minimum thin-wall PVC from pad mounted transformers. 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 mm² (#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.

14.4.2 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.

Living room/Quarters	35 FC (350 Lux)
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)
Auditoriums (assembly)	100 h (10 h Lux)
Conference	30 h/5 v FC (300 h/50 v Lux)
Egress path (incl. exterior)	10 Lux
Areas adjacent to egress path	0.5 Lux

FC = FootCandle

h = horizontal component

v = vertical component

Indoor lighting for all areas shall consist of fluorescent surface mounted light fixtures. Exterior lighting shall be HID (metal halide or 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.

14.4.3 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.

14.4.4 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 and 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.

14.4.5 ABOVE MIRROR LIGHTS

Above mirror lights shall be provided in toilet rooms.

14.4.6 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 220 volts. Emergency lighting fixtures shall be connected to the normal lighting system.

14.4.7 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.

14.4.8 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. Sinks will have a receptacle above, with one duplex receptacle serving two sinks that are side-by-side. Receptacles in wet/damp areas or within 1 meter (~3 feet) of sinks, lavatories, or wash-down areas shall be ground fault circuit interrupter (GFCI) type or residual current disconnect (RCD) type, with the trip setting of 10 milliamperes or less. Total number of duplex receptacles shall be limited to six (6) per 20-ampere circuit breaker.

14.4.9 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.

14.4.10 GROUNDING AND BONDING

Grounding and bonding shall comply with the requirements of NFPA 70 (NEC). 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.

14.4.11 ENCLOSURES

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

14.4.12 FIRE DETECTION & ALARM SYSTEM

A complete Fire Detection and Alarm System shall be provided throughout the buildings and installed in accordance with NFPA 72 requirements. System shall include, but not limited to, addressable Fire Alarm Control Panel (FACP), manual pull stations, horns, strobes, and smoke and/or heat detectors (with alarm verification feature). The system shall be capable of automatically transmitting the alarm signal, via telephone lines, to the local fire department/fire station or other location designated by the Contracting Officer. Fire alarm system shall be complete and a standard product of one manufacturer.

14.4.13 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.

14.4.14 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.

14.4.15 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.

14.4.16 IDENTIFICATION NAMEPLATES

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

14.4.17 SCHEDULES

All panel boards and load centers shall be provided with a directory. Directory shall be typed 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.

14.5 OPERATIONS AND MAINTENANCE (O&M) FOR ELECTRICAL

- ddd. 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.
- eee. The O&M manuals must be provided prior to any training activities. Manuals shall be "tri-lingual" in Dari, Pashto and English.
- fff. All control panels shall have tri-lingual name plates in Dari, Pashto and English.
- ggg. 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.

15.0 COMMUNICATIONS SYSTEM

15.1 APPLICABLE SPECIFICATIONS

The Publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by designation only.

American National Standards Institute/Telecommunications Industry Association/Electronics Industry Association
ANSI TIA/EIA 606-A (2002) Administration Standard for

The Telecommunications Infrastructure ANSI TIA/EIA 607-A (2002) Commercial Building Grounding (Earthing)
and Bonding Requirements for Telecommunications

The Telecommunications Infrastructure

ANSI TIA/EIA 607-A (2002) Commercial Building Grounding (Earthing) and Bonding Requirements for
Telecommunications

ANSI TIA/EIA 568 (2001) Commercial Building Telecommunications Cabling Standard

ANSI TIA/EIA 569-B (2004) Commercial Building Standard for Telecommunications Pathways and Spaces

ANSI TIA/EIA 758-A (2004) Customer-owned Outside Plant Telecommunications Infrastructure Standard

15.2 COMMUNICATION SYSTEMS DESIGN

The communications system is to be designed, supplied and constructed by the Contractor. The design and construction of the systems shall be in accordance with the references and the requirements contained herein.

15.3 EXTERIOR COMMUNICATION MANHOLE SYSTEM

~~AM #4... The contractor shall extend the existing manhole/handhole and duct system. ...~~ **AM #4** The manholes and hand-holes shall be constructed in accordance with the contract drawings. The maximum distance between manholes and/or hand-holes shall be 140 m (450 ft). The ducts shall be direct buried with a minimum of 1000 mm of properly tamped dirt/backfill on the top. Hand-holes shall be installed in laterals in between manholes and buildings and only where the distance between the main duct system and the building is 100 meters or more. The maximum number of ducts in a hand-hole wall shall be two, with one having four (4) inner ducts installed unless there are two buildings close by and can be fed from one hand hole. In this case, four (two with inner ducts) conduits can be installed in the walls.

15.4 EXTERIOR CONDUIT

The underground conduit for the manhole and duct system shall be direct buried (1 meter below surface), 100 mm DB type PVC or schedule 40, PVC. Inner ducts shall be four (4) 25mm PVC or PE inner ducts field installed in the outer-duct. The inner ducts shall be installed in the duct face and secured with properly sized duct plugs which expand to seal the duct. The ducts will be reinforced concrete encased where a road or taxi way is crossed. The ducts (inner and outer) shall be listed on the RUS list of materials acceptable for use on RUS projects. Cable racking diagrams (manhole/hand-hole butterflies) shall be provided for the manholes and hand-holes. The minimum duct configuration in the main duct system shall be a six way duct, being three conduits wide by two conduits deep (3 X 2) with two of the conduits having inner-ducts installed. Laterals off of the main duct system manhole to manhole shall be a minimum of a 4 way (2x2) with one duct having inner ducts. The duct system from the manhole/hand hole to a building with cable installed shall be a 1x 2, 100 mm PVC duct bank with one duct having inner ducts. The duct system from a manhole/hand hole to a building with allocations only shall be two (2), four inch (100mm) DB type PVC conduits stubbed out 3 meters from the manhole/hand hole. All conduits shall be terminated in ABS plastic terminators cast into the walls of the concrete structures. In manholes, all conduit windows shall be recessed.

15.5 EXTERIOR TELEPHONE CABLE

The Contractor shall install copper and fiber optic cable in accordance with the references and the cable requirements listed below. The copper cable shall be 24 AWG, RUS PE89 type, foam skin polyolefin, with an outer layer of solid colored polyolefin and a copolymer coated 8 mil aluminum tape shield. The fiber optic cable shall be a single mode, RUS PE90 type, with a 6 mil, copolymer coated steel shield. The fiber shall not have any internal splices and have a maximum loss of .4dB/Km at 1310nm and .3dB/Km at 1550nm. The copper and fiber optic cable shall be installed, grounded/bonded, spliced and tested in accordance with RUS standards.

15.6 SPLICES

15.6.1 COPPER SPLICES

25 pair modules shall be used on copper splices 25 pairs or greater and discrete connectors shall be used on lesser count cable splices. The copper splice closures shall be flash tested with nitrogen in accordance with the manufacturer's recommendations before encapsulation. The encapsulant shall fill all of the splice interstices. The copper splicing connectors, bonding hardware, splice closures and encapsulant shall be on the RUS list of material acceptable for use on RUS projects, IP 344-2. Bonding and grounding shall be in accordance with the RUS standards. The copper splice closure shall be installed by the copper splicer only. The copper cable splicer (s) shall

have 7 years documented unsupervised experience in the installation of the splice closure being used and 7 years experience splicing RUS type cable.

15.6.2 FIBER OPTIC SPLICES

The fiber optic splice closure shall be equipped with splice trays that properly hold the fusion splice protectors (stainless steel rod with heat shrink tube). The splice loss shall be .02dB or less as measured by the fusion splicing machine and .2dB as measured by an OTDR. The fiber optic splice closure shall be flash tested with nitrogen in accordance with the manufacturer's recommendations and also be listed in RUS IP 344-2. All bonding hardware shall also be listed in RUS IP 344-2. Bonding and grounding shall be in accordance with the RUS standards. The fiber optic splice closure shall be installed by the fiber optic splicer only. The fiber optic cable splicer (s) shall have 7 years documented unsupervised experience in the installation of the splice closure being used and with RUS cable. The fiber optic splice shall also have a minimum of 7 years documented unsupervised experience with fusion splicing machines and a minimum of three years with the particular make and model of the machine that will be used.

15.7 MAIN DISTRIBUTION FRAME

The contractor shall route all communications to the Main Distribution Frame in the existing communications building.

15.7.1 PROTECTED ENTRANCE TERMINALS

Building Protected Entrance Terminal, 25, 50 or 100 Pair

The PETs shall consist of an input splice chamber with punch down blocks for the copper cable pairs, a protector field for 5 pin connectors and a factory installed output punch down block terminal for each outside plant cable pair. The PET shall be listed in RUS 344-2. ~~AM #4~~... The station cables shall be terminated on a ~~field installed~~ category ~~5e~~, 6 110 station block. ... ~~AM #4~~ type punch down block and jumpers shall be installed between the PET block and the field installed block to connect dial tone to the outlet.

15.7.2 PROTECTED ENTRANCE TERMINAL, 6 OR 12 PAIR.

The PETS shall consist of blocks with two well type heavy duty gas tube protector units. The six pair shall consist of three units where as the 12 pair will consist of 6 units. Every building with terminated cable shall be equipped with gas tube protectors. The station cables will be terminated on a category ~~AM #4~~ ... ~~5e~~ 6 110 ... ~~AM #4~~ "station" block and jumpers shall be installed between the PET and the "station" block to connect dial tone to the outlet.

15.8 PATCH PANELS

15.8.1 FIBER OPTIC PATCH PANELS, ALL BUILDINGS WITH DATA OUTLETS.

The fiber optic terminations shall consist of the outside plant cable being fusion spliced to single mode pigtailed with factory installed SC connectors. The fusion splice shall have a splice loss of .02 dB or better as measured by the splicing machine and .2dB as measured by an OTDR. The pigtailed shall have a single mode insertion loss of less than .35dB with the typical being 15 dB and a single mode return loss better than -55dB. The fusion splices shall be protected by a stainless steel sleeve and heat shrink tube and placed in a splice tray. The terminations shall be contained in a wall mounted hinged door enclosure. The enclosure shall be equipped with hardware to properly store 1 meter of fiber slack. The enclosure shall be designed to handle adapter panels with three duplex SC connectors per adapter panel. The SC connectors shall have zirconia ceramic sleeves. The enclosure shall be capable of mounting four (4) adapter panels. Blank adapter plates shall be used wherever there are no fiber optic adapter panels. One duplex single mode fiber optic patch cord shall be provided for each duplex fiber optic port. The fiber patch cords

shall have a mated pair insertion loss of less than .35dB with a typical loss of .15dB and a typical mated return loss of less than -55dB.

15.8.2 COPPER PATCH PANELS, CATEGORY 5E - ALL BUILDINGS WITH DATA OUTLETS

Provide one patch panel port per data outlet plus 20% spare. The largest patch panel allowed shall be 48 port and the smallest 12 port. ~~AM #4... Where the 12 port is used, it shall be a category 5e, 12 port patch panel mounted on an 89 type block frame for the station cables.~~ Where the 12 port is used, it shall be a category 6, 12 port patch panel mounted on an 89 type block frame for the station cables. ... **AM #4** The 24 or 48 port patch panel shall be mounted on a swing down bracket mounted on the backboard. Cable guides and wire management bars shall be provided. ~~AM #4... Provide one category 5e patch cord, (RJ45-RJ45) per patch panel port.~~ Provide one category 6 patch cord, (RJ45-RJ45) per patch panel port. ... **AM #4** The Patch cords shall meet the minimum performance requirements specified in EIA/TIA-568B.1, EIA/TIA-568B.2 and EIA/TIA-568B.3.

15.9 OUTSIDE PLANT CABLE

The outside plant cable (cable size and cable counts) shall be engineered and installed in accordance with the referenced standards. The OSP cable engineering shall be approved at TAC before any cable is ordered. Under no circumstances will home runs from each building to the communications building be allowed; normal telephone cable distribution engineering standards will be used, meaning that large cables will be installed from the vault splices and the cables will get smaller as the buildings are provided service.

15.9.1 SPARE CABLE PAIRS AND FIBER OPTIC STRANDS

There shall be spare cable pairs and fiber strands in the manholes/hand holes as required ensuring that standard sized cables are used. Dead Cable pairs shall be spliced through and cleared and capped in proper connectors. The 25 pair binder grouping of the cable shall be maintained. When the smaller (6 pair or 12 pair) counts are used, the first 6 pair count or first two 6 pair counts are used, the 13th pair of the count is cleared and capped, and then the second pair counts 14th through 25 pair count will be used. Under no circumstances will a split binder count be used. The 6 strand grouping of the fiber optic cable plant shall also be maintained.

The Contractor shall provide cable (copper and fiber optic cable) count provisions, either installed in the building or allocated in cable stubs in manholes/handholes for all buildings on the site plan, (contracted buildings and future). Conduit stub outs in manholes/handholes shall be provided for all buildings on the site plan. ~~AM #4... The following~~ ... **AM #4** Buildings will either have the cables installed and terminated in the building OR have the cables allocated in the cable counts and left in the manhole/handhole cable stub out closures.

15.10 TELEPHONE/DATA CABLING DISTRIBUTION SYSTEM FOR EACH BUILDING.

The Contractor shall provide two telephone/data boxes per bedroom, one box on each of the long interior walls. The Contractor shall provide two telephone/data boxes per workstation. Conference rooms shall have two telephone/data boxes on each interior wall, three interior walls per conference room. Each box shall have dual RJ-45 outlets, one for telephone and one for data. Interior copper cable to each outlet shall be 4 pair, unshielded twisted pair (UTP), Category ~~AM #4... 5e 6 ... AM #4~~ or better. Each telephone/data junction box shall be fitted with two RJ-45 jacks (1-voice / 1-data). Two runs of Category ~~AM #4... 5e 6 ... AM #4~~(UTP) or better data cable shall be installed from each junction box back to the patch panel in the communications room and labeled on both ends with room number and jack number. Contractor shall be responsible for providing one enclosed 480 mm wide, 1 800 mm tall communications equipment rack with top-mounted cooling fans and front & rear closing doors. Contractor shall provide two 480 mm 48-port patch-panel mounted in the rack. Contractor shall coordinate the location of the communications rack (first or second floor) with the Contracting Officer Representative (COR). Corps of Engineers Representative (COR) shall punch-down the Category ~~AM #4... 5e 6 ... AM #4~~ cabling at both the patch panel and

at the data/communications jacks in the bedrooms/offices/workstations/conference rooms. Termination configuration shall be EIA/TIA T568B. A Corps of Engineers representative shall test each cable run and data jack after it have been installed. Two 103 mm empty conduits shall be provided from the room to the outside for to facilitate future telephone cabling installation into the building. Two additional 103 mm empty conduits shall be provided between the communications rooms of both buildings. Provide all empty conduits with a pull rope. Incoming telephone and data service is to be provided by others. Properly sized metallic conduit and cable tray shall be used as appropriate to distribute the telephone/data cabling throughout the building. Minimum conduit size shall be 20 mm inside diameter. Data/communications face plates shall be surface mounted to the wall.

AM #4 ...

~~15.11 CABLE TELEVISION SYSTEM~~

~~A coax cable television signal distribution system shall be provided for the Main Building TV room to distribute television programming. The system equipment such as signal and amplification equipment is to be provided and installed by others. A 50 mm conduit shall be run to each room and then connect to the outside for incoming satellite television station. The incoming cabling and signal is to be provided by others. Television cable shall be RG-6 Coax distributed in conduit. Wall cable outlet connectors shall be F type. All F type connectors shall be approved by the COR. CATV system shall be terminated in the provided rack using approved patch panel.~~

... AM #4

---END OF SECTION---

(End of Summary of Changes)