

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. CONTRACT ID CODE	PAGE OF PAGES
2. AMENDMENT/MODIFICATION NO. 0001	3. EFFECTIVE DATE 21-Mar-2007	4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO.(If applicable) 1 46
6. ISSUED BY AFGHANISTAN ENGINEER DISTRICT US ARMY CORPS OF ENGINEERS KABUL APO AE 09356	CODE W917PM	7. ADMINISTERED BY (If other than item 6) See Item 6		
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		X	9A. AMENDMENT OF SOLICITATION NO. W917PM-07-R-0032	
		X	9B. DATED (SEE ITEM 11) 14-Mar-2007	
			10A. MOD. OF CONTRACT/ORDER NO.	
			10B. DATED (SEE ITEM 13)	
CODE	FACILITY CODE			
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS				
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer <input 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.) Three (3) Afghanistan National Police (ANP) UP HQ; Panjsher, Wardak, and Parwaw Provinces. Delete Section 01015 Technical Requirements in its entirety and replace with Revised Section 01015 Technical requirements. Delete Drawings in its entirety and replace with Revised Drawings. All other terms and conditions remain unchanged.				
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)		21-Mar-2007

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION 00800 - SPECIAL CONTRACT REQUIREMENTS

The following have been modified:

SECTION 01015

SECTION 01015
Revised
TECHNICAL REQUIREMENTS

1. GENERAL

1.1 The Contractor's site adaptation of the design and construction must comply with technical requirements contained herein. All requirements set forth in Section 01010 (Scope of Work) but not included in the Technical Requirements, shall be considered as set forth in both, and vice versa. The Contractor shall provide design and construction using the best blend of cost, construction efficiency, system durability, ease of maintenance and environmental compatibility.

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

1.3 ASBESTOS CONTAINING MATERIALS

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

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

The Contractor shall perform search and clearing operations for clearance of mines and UXO's and provide the government a letter indicating that the site is clear of unexploded ordnance and is available for construction operations to proceed. The Contractor shall be responsible for clearing the entire site of all mines and unexploded ordnance (UXO). All mine and UXO clearing shall be done in accordance with the International Mine Action Standards (IMAS), or Afghanistan Mine Action Standards (AMAS) whichever is more stringent, and clearance shall be accomplished to the anticipated foundation depth. These standards can be found at <http://www.mineactionstandards.org/imas.htm>. No work will commence in any area that has not been cleared. If during the performance of the work under this contract, the Contractor encounters U.S. UXO, the Contractor is to immediately stop work in this area and notify the Contracting Officer.

NOTE: For previous de-mining information, the following points of contact from the UN Mine Action Center for Afghanistan are provided:

Reiko Kurihara, project manager, email reiko@unmaca.org
Cell phone: +93 070 284 686

Sandy Powell, chief Operations Officer, sandy@unmaca.org
Cell phone: +93 (0) 79 330 992

1.4.1.1 Unexploded Ordnance (UXO) Safety Support During Construction

It is the responsibility of the Contractor to be aware of the risk of encountering UXO and to take all actions necessary to assure a safe work area to perform the requirements of this contract. If after the entire site has been cleared of UXO/mines per the International Mine Action Standards (IMAS) and clearance is done to the anticipated foundation depth, the Contractor becomes aware of or encounters UXO or potential UXO during construction, the Contractor shall immediately stop work at the site of the encounter, move to a safe location, notify the COR, and mitigate any delays to scheduled or unscheduled contract work.

1.4.1.2 Explosives Safety

1.4.1.2.1 General Safety Considerations

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

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

1.4.1.2.2 Activity Hazard Analysis (AHA) Briefings

- a. Activity Hazard Analysis's shall be prepared in accordance with the Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1.
- b. Hazard analyses will be prepared and briefed by personnel that are knowledgeable in UXO and explosives safety standards and requirements. These personnel should understand the specific operational requirement and hazard analysis methodologies. A hazard analysis will be performed for each activity to determine the significance of any potential explosive-related hazards. Explosive residues may be discovered or exposed during UXO operations in the form of powder or various granular and powder based pellets. These contaminants can enter the body through the skin or by ingestion if proper personal hygiene practices are not followed. Explosive fillers such as white phosphorus are dangerously reactive in air and acute exposure can result in serious injury to the skin, eyes, and mucous membranes. They are also a fire hazard.

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

1.4.1.3 Notification of Noncompliance

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the

Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall make no part of the time lost due to such stop orders the subject of claim for extension of time or for excess costs or damages.

1.5 LIMITATION OF WORKING SPACE

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

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

1.6 TEMPORARY STRUCTURES

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

1.7 SUBCONTRACTORS

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

1.8 LIST OF CODES AND TECHNICAL CRITERIA

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

American Water Works Association, ANSI/AWWA C651-99 standard
 ASCE 7-02, Minimum Design Loads for Buildings and Other Structures, 2002
 ASTM - American Society for Testing and Materials
 AWS - American Welding Society
 EIA ANSI/TIA/EIA-607: (1994) Commercial Building Grounding/Bonding Requirement Standard.
 Factory Mutual (FM) Approval Guide-Fire Protection (2002).
 IBC - International Building Code (and its referenced codes including those inset below)
 IPC – International Plumbing Code
 Lighting Handbook, IESNA, latest edition
 Codes and Standards of the National Fire Protection Association (NFPA)
 [as applicable and enacted in 2003, unless otherwise noted].
 NFPA 10, Portable Fire Extinguishers, 2002 edition
 NFPA 70, National Electrical Code, 2005 edition
 International Mine Action Standards, latest edition; see <http://www.mineactionstandards.org> for copy of standards.
 UFC 1-200-01, Design: General Building Requirements, 31 July 2002
 UFC 3-230-19N Water Supply Systems
 UFC 3-240-03, Operation and Maintenance: Wastewater Treatment System Augmenting Handbook
 UFC 3-240-04A Wastewater Collection
 UFC 3-240-07FA Sanitary and Industrial Wastewater Collection
 UFC 3-280-01A Guidance for Ground Water/Fuel Extraction and Ground Water Injection Systems
 UFC 3-230-17FA Drainage in Areas Other than Airfields

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

The publications to be taken into consideration shall be those of the most recent editions. Standards other than those mentioned above may be accepted if the standards chosen are internationally recognized and meet the minimum

requirements of the specified standards. The Contractor shall be prepared to submit proof of this if requested by the Contracting Officer.

2. SITE DEVELOPMENT

The project includes furnishing all materials, equipment and labor for constructing water, sanitary sewer and storm sewer systems, as applicable. Work also includes, but is not limited to, geotechnical and topographic surveys, site clearing and grading, demolition, installation of roads and sidewalks, perimeter wall and gates, entry control points, and other facilities as described in Section 01010.

2.1 GEOTECHNICAL, FOUNDATIONS AND SURVEY

2.1.1 General

The foundations shall be constructed using reinforced concrete materials as shown on the drawings and stated in the specifications. A bearing capacity of 0.75 kg/sq. cm was assumed and used in designing the building foundations; see foundation plans and paragraph 5, STRUCTURAL. The contractor is responsible for performing a geotechnical investigation to determine if the assumed bearing capacity and foundations as shown and designed will perform satisfactory. The maximum allowable settlement between footings shall be less than 2.5 cm. If the contractor determines, after completing his geotechnical investigation, that the foundations as designed will not perform satisfactory, the contractor shall redesign the foundations accordingly. The contractor is responsible for the design and construction of the foundations.

2.1.2 Geotechnical Investigation

The contractor shall perform a site specific geotechnical investigation to verify the foundations, pavements, material, earthwork and any other geotechnical related items shown on the contract drawings and specifications will perform satisfactory. The contractor shall determine all necessary geotechnical conditions by appropriate field and laboratory testing and analyses.

2.1.3 Geotechnical Qualifications

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

2.1.4 Design Certification

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

2.1.5 Survey and Mapping

2.1.5.1 General Work to be performed - Conduct topographic survey, mapping and documentation of the project site to include surface physical features, buildings, existing utilities, hydrological, geological, botanical or other physical conditions that could impact design. Topographic survey data shall include horizontal and vertical (H&V) controls. The limits of the survey shall be 10 meter outside of the anticipated construction area and 15 meter wide along utility lines to be replaced.

2.1.5.2 For Horizontal and Vertical Control, the surveyor shall use established monuments, if available. If monuments have been destroyed or do not exist, the mapping shall be based on WGS84 geodetic system and converted to UTM coordinates. 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. The horizontal

and vertical control established on site shall be a closed loop with third order accuracy and procedures.

2.1.5.3 All of the existing control points used at the site shall be plotted at the appropriate coordinate point and shall be identified by name or number, and adjusted elevations.

2.2 ENVIRONMENTAL PROTECTION

2.2.1 Applicable Regulations

The Contractor shall comply with all Afghani 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 local environmental regulations with the contracting officer prior to design and discharge of any liquid wastes into natural streams or manmade channels.

2.2.2 Notification

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

2.2.3 Spillages

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

2.2.4 Disposal

Disposal 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.

2.3 CIVIL SITE DEVELOPMENT

2.3.1 Site Plan

The contractor shall locate the facilities in general agreement with the drawings included and any requirements in these technical specifications.. All buildings, roads, parking areas, entry control points, guard towers, fence, utility structures, and other 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.

2.3.2 Demolition

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

2.3.3 Grading and Drainage

The contractor will provide all necessary site grading to insure adequate drainage so that no buildings or pavements will be flooded due to a rainfall of a 10-year frequency. Drainage of the area should be compatible with the existing terrain. Building floor elevations shall be a minimum 150 mm above finish grade. Finished grades shall slope away from the building on all sides at a minimum of 2%.

2.3.4 Paving

2.3.4.1 Roads

Contractor shall construct roads and parking areas using aggregate surface. Subgrade shall be a minimum of 150mm (6 inches) minimum in depth scarified and compacted to 95% proctor density. Aggregate surfacing shall be a minimum of 150mm (6 inches). All roads shall be of wearing surface 7.3 meters (24 feet) wide, unless otherwise noted, graded for proper drainage, provided with necessary drainage structures and completed with prescribed surfaces in accordance with applicable sections of TM 5-822-2 and TM 5-822-5 standards. If geotechnical report indicates that thicker pavement sections are required then the Contractor shall adjust thicknesses accordingly. Aggregate surfacing material must be well graded, durable aggregate 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 presented in ASTM D 1557 or equivalent DIN, BS, or EN standards.

2.3.4.2 Bridges and Site Grading Plan

The Contractor shall notify the Contracting Officer immediately if initial site survey determines that area hydrology requires major drainage structures or bridges. The contractor shall design a site grading plan that provides positive drainage and minimizes the requirement for major structures in a cost effective manner. Drainage shall be designed for a 10 year storm frequency.

2.3.4.3 Sidewalks

Sidewalks shall be provided to connect parking areas with buildings and adjoining buildings where foot traffic is anticipated. Sidewalks shall be constructed with aggregate surfacing. Aggregate surfacing shall be 100mm (4 inches). Aggregate surfacing material must be well graded, durable aggregate uniformly moistened and mechanically stabilized by compaction.

2.3.5 Masonry/Stone Compound Walls

2.3.5.1 Exterior Compound Wall

Construct perimeter walls where indicated on the site plan from masonry or native stone when available, as shown on drawing details. Install outriggers and single-strand concertina wire on top of the wall. The walls shall measure at least 2.4 m high with a thickness of the walls not less than 0.60 m.

2.3.5.2 Gates

The gates shall be swing type. Hinged gates shall be a pair of 3.65 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.

2.3.5.3 Reinforced Barbed Tape

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

2.3.5.4 Outriggers

Outrigger supporting arms shall be “Y” shaped with post securely embedded into the top of the wall. Posts shall conform to ASTM F 1083, Pipe, Steel, Hot Dipped Zinc Coated (Galvanized) Welded.

2.3.5.5 Vehicle Barriers

2.3.5.5.1 Active Barriers

Active barriers shall be tire shredder type with manual latch down capability. Shredders shall extend the entire width of the roadway opening where installed.

2.3.5.5.2 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 using counter balance. 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.

2.3.5.5.3 Passive Barriers

Barriers shall be concrete blocks of one meter by one meter by one meter dimensions. Similar arrangements of Concrete jersey barriers, large stones (one cubic meter size), concrete filled 55-gal drums or equal sized obstacles may be used.

2.3.6 Civil Utilities

2.3.6.1 General

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

2.3.6.2 Water Supply The contractor shall construct water well(s) inside the compound, to provide sufficient supply for the facility. If unavailable within the compound, Contractor shall notify the COR for resolution. Off site

water wells then may become a possibility. Unless noted elsewhere, wells shall be capable of supplying one day demand with 16 hours of pumping time. Well construction shall be in accordance with AWWA A100 Water Wells.

Well installation - Well shall be drilled or augured to a minimum depth of 20 meters below the existing water table. Refer to contract documentation (drawings and technical provisions) for installation of well and pump.

Casing - In unconsolidated material, casing shall be extended to the top of the well screen. In rock formations (drilled wells) the hole may be left open with casing extended 3 meters into the rock formation. All wells will be cased 0.5 m 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. The bottom of the casing will be fitted with a metal or PVC well screen that will permit maximum transmission of water without clogging. The minimum length of screen shall be at least 3 meters. A base plate with reverse ball valve (check valve) will be placed at the base of the screen. A watertight Pump suction pipe will be placed inside the casing, with a submerged piston pump cylinder at the base of the pipe. The piston pump cylinder will be no more than 1.5 m from the base of excavation. The pump suction pipe will have a weep hole in pipe 2.0 meters below grade. Casing size shall be 100mm to 200mm in inside diameter. Casing material shall be Schedule 40 steel, Schedule 40 PVC, or equivalent material.

Sealing - The drilling process will create a hole (borehole) larger than the casing. 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 meters 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 crushed stone or gravel (gravel pack). Average gravel particle size will be approximately 1 centimeter in diameter.
- c. The space between the top of the gravel pack and the base of the grout seal may be backfilled with overburden or other clean earth material.

Disinfection - Disinfection of the source will be provided in accordance with locally accepted methods and standards. At a minimum the source will be developed until all suspended material associated with drilling have been removed.

Source protection - Surface drainage within 30 m of wellhead will 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 will 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) – 30 m
 Septic fields (infiltration galleries) - 30 m
 Animal pens and yards – 60 m
 Fuel storage, engine maintenance/repair – 30 m

Pumps - A standard hand pump will be attached to well with approved seal and air gap with concrete pad around it.

Crushed stone for well sealing - Shall consist of crushed stone containing angular shapes and surfaces with no rounded surfaces with the following gradation:

Sieve Size	% Total Wt. Passing
12.5 mm	100
4.75 mm	75 +/- 13
1.18 mm	25 +/- 15
75 um	8 +/- 4

All aggregate shall contain less than 5% of shale, clay lumps, coal, lignite, soft or unfragmented stone, or other deleterious materials.

Cement Grout for well sealing - Mixture shall consist of one part Portland cement to 4 parts washed sand. Water shall be mixed to produce a flowable consistency in order to fill all cracks and voids around the well casing.

Concrete - Mixture shall consist of seven sacks per cubic meter. Each sack is 49 kg of Portland cement. The mix ratio shall be 1:2:4 (Portland cement: sand: crushed angular aggregate (12.5 mm max)).

Quality control and testing

a. Pump Testing: In order to ensure that the source is capable of providing the required demand capacity, the completed well shall be tested for yield and drawdown by pumping at a minimum sustained rate of 20 liters/minute for four hours duration. The well must maintain a minimum head under sustained pumping conditions of $\frac{1}{4}$ the depth of the well. (for example, for a 40m deep well, head should be maintained at 10m from the bottom of the well).

b. Water quality testing: Water will be provided from the source that is acceptable for the intended use. Sources that do not meet the requirements of the intended use will be deemed unacceptable and another source must be established at no additional cost. Water quality testing (i.e., bacteria, chemical, turbidity, etc.) will be conducted in accordance with locally accepted methods and standards.

c. Well house: At new wells, construct a permanent well house. The floor of the well house shall slope away from the casing approximately 1 cm per 100 cm (1/8" per foot). Floor of well house shall be above floodplain. The well house design should be such that the well pump, motor and drop pipe could be removed readily. 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. The well house shall have door locks and hatch lock on roof.

The well is to be drilled at a location recommended in writing by the contractor. The water source should be located at the highest elevation possible within the adjacent area. The well house shall have a 2.4 meter high chain link security fence with gate surrounding it. The fence and gate shall be topped with barbed wire and outriggers.

d. The site population is 120 personnel.

2.3.6.3 Water Storage

Tank capacity shall be at least 6,000 gallons (1 day at a use of 50 gal per person per day). The tank shall be adjacent to the well house and Booster Pump Station as indicated on the drawings. The tank shall be concrete as indicated on drawings.

The tank shall be lined with sheet material. Material shall be chlorosulfonated polyethylene 1.14 mm thick with a plus or minus 0.100 mm, thickness tolerance. The liners shall be Hypalon product, or approved equal, NSF 54 and NSF 61 approved for potable water storage. White material is required so that any mechanical damage to the liner can be easily found when the tank is empty. Potable grade chlorosulfonated polyethylene reinforced liner shall be compounded from the first quality material and specifically can be used in hydraulic structures. Only virgin materials shall be used with no regrind or reprocessed materials added. The liner compound shall be specifically designed for liner applications. The liner shall be constructed from two plies of sheeting laminated together over one ply of 10 x 10 - 1000 denier polyester fabric. Liner resin shall comprise greater than 45% by weight of the total sheeting formulation. Fabric shall be fully encapsulated by same material at roll edges. Exposed fabric will not be accepted. The finished lining shall be a sunlight and weather resistance membrane that is flexible, durable, watertight and free from pinholes, blisters and contaminants. The liner shall not impart any impurity to the water so as to render it impotable for human consumption.

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

Contractor shall locate the hypochlorite system in the Well House.. The Contractor shall provide manufacturers catalog information and shop drawing to the Contracting Officer for approval.

2.3.6.4 Water Distribution

The Contractor shall provide a hydro pneumatic system with pumps, hydro pneumatic tank and other appurtenances as necessary to supply the pressure required to all facilities. The equipment shall be protected from the environment, especially freezing temperatures. The distribution system shall be designed to provide a minimum 276 kPa (40 psi) at ground level at all points in the systems. Minimum pressures of 207 kPa (30 psi), under peak domestic flow conditions, can be tolerated in small areas as long as all peak flow requirements can be satisfied. Maximum water pressures in distribution mains and service lines shall not exceed 517 kPa (75 psi) at ground elevation.

The Contractor shall install water distribution mains, branches, laterals, lines and service connections to include all pipe, valves, fittings and appurtenances. Exterior water line construction shall include service to all buildings as described in the Scope of Work. Adequate cover must be provided for frost protection. The required Average Daily Demand (ADD) is 50 gallons per capita per day (gpcd). Provide one outside water tap per building for landscaping purposes.

The Contractor shall provide pipe of adequate strength, durability and be corrosion resistant with no adverse effect on water quality. The exterior surface of the pipe must be corrosion resistant. If the pipe is installed underground pipe shall be encased with polyethylene in accordance with AWWA C105. Water distribution pipe material shall be PVC or Ductile Iron (DI). Ductile iron pipe shall conform to AWWA C104, et al. DI fittings shall be suitable for 690kPa (75psi) pressure unless otherwise specified. Fittings for mechanical joint pipe shall conform to AWWA C110. Fittings for use with push-on joint pipe shall conform to AWWA C110 and C111. Fittings and specials shall be cement mortar lined (standard thickness) in accordance with C104. Polyvinyl Chloride (PVC) pipe shall conform to ASTM D 1785. Plastic pipe coupling and fittings shall be manufactured of material conforming to ASTM D 1784, Class 12454B. PVC screw joint shall be in accordance with ASTM D 1785. PVC pipe couplings and fittings shall be manufactured of material conforming to ASTM D 1784, Class 12454B. Pipe less than 80mm (3 inch), screw joint, shall conform to dimensional requirements of ASTM D schedule 80. Elastomeric gasket-joint, shall conform to dimensional requirements of ASTM D 1785 Schedule 40. All pipe and joints shall be capable of 690kPa (75psi) working pressure.

2.3.6.5. Hydrostatic, Leakage and Disinfection Tests

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

thrust blocking, unless otherwise approved.

2.3.6.5.1 Pressure Test

After the pipe is laid, the joints completed, and the trench partially backfilled leaving the joints exposed for examination, the newly laid piping or any valve section of piping shall, unless otherwise specified, be subjected for 1 hour to a hydrostatic pressure test of 690kPa (75psi). Each valve shall be opened and closed several times during the test. Exposed pipe, joints, fittings, hydrants and valves shall be carefully examined during the partially opened trench test. Joints showing visible leakage shall be replaced or remade as necessary. Cracked or defective pipe, joints, fittings, hydrants and valves discovered following this pressure test shall be removed and replaced and retested until the test results are satisfactory.

2.3.6.5.2 Leakage Test

Leakage test shall be conducted after the pressure tests have been satisfactorily completed. The duration of each leakage test shall be at least 2 hours and during the test the water line shall be subjected to not less than 690kPa (75psi). Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valve or approved section, necessary to maintain pressure to within 34.5kPa (5 psi) of the specified leakage test pressure after the pipe has been filled with water and the air expelled. Pipe installation will not be accepted if leakage exceeds the allowable leakage, which is determined by the following formula:

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

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

2.3.6.5.3 Disinfection Procedure

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

2.3.6.5.4 Sampling

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

2.3.6.5.5 Acceptance Requirements

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

2.3.6.5.6 Time for Making Tests

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

2.3.6.5.7 Concurrent Tests

The Contractor may elect to conduct the hydrostatic tests using either or both of the following procedures. Regardless of the sequence of tests employed, the results of pressure tests, leakage tests, and disinfection shall be recorded for submission and approval. Replacement, repair or retesting required shall be accomplished by the Contractor at no additional cost to the Government.

- a. Pressure test and leakage test may be conducted concurrently,
- b. Hydrostatic tests and disinfection may be conducted concurrently, using water treated for disinfection to accomplish the hydrostatic tests. If water is lost when treated for disinfection and air is admitted to the unit being tested, or if any repair procedure results in contamination of the unit, disinfection shall be re-accomplished.

2.3.6.6 Sanitary Sewer

- a. Construct a sanitary sewer system in accordance with the contract documentation, providing service from all buildings requiring sewage collection.. Leach fields and septic tanks are specified in the contract documentation. Leach fields and septic tanks are to be located inside the perimeter compound (see site plan). If leach field is found to be unsuitable, the Contractor shall notify the COR. Septic tank capacity shall be a minimum of 5000 gallons. Leach field shall be sized to accommodate the average daily flow of 4800 gallons per day.
- b. Exterior sanitary sewer line construction includes service to all buildings requiring sewage collection. Contractor shall construct the sanitary sewer collection system using finished floor elevations. Main collection sewers will follow the most feasible route to the point of discharge. The sewer collection system shall be constructed to accommodate the facility. Construction required shall include appurtenant structures and building sewers to points of connection with Building drains 1.5m outside the building, to which the sewer collection system is to be connected.
- c. The Contractor shall use the following criteria where possible to provide a layout which is practical, economical and meets hydraulic requirements:
 - Follow slopes of natural topography.
 - Avoid routing sewers through areas which require extensive restoration or underground demolition.
 - Avoid areas of high groundwater and placement of sewer below the groundwater table.
 - Locate manholes at change in direction, size or slope of gravity sewers.
 - Use straight sections between manholes, curved alignment shall not be permitted.
 - Avoid placing manholes where the tops will be submerged or subject to surface water inflow.

- Evaluate alternative sewer routes where applicable.
- Verify that final routing selected is the most cost effective alternative that meets service requirements.

d. Protection of water supplies - Unless noted elsewhere, the Contractor shall construct an appropriate size leach field inside the district headquarter compound; ensure that the sewer design meets the following criteria:

- Sanitary sewers will be located no closer than 15m horizontally to water wells or reservoirs to be used for potable water supply.
- Sanitary sewers will be no closer than 3m horizontally to potable water lines; where the bottom of the water pipe will be at least 305mm above the top of the sanitary sewer, horizontal spacing shall be a minimum of 1.8m.
- Sanitary sewers crossing above potable water lines shall be constructed of suitable pressure pipe or fully encased in concrete for a distance of 2.7m on each side of the crossing. Pressure pipe will be as required for force mains in accordance with local standards and shall have no joint closer than 0.9m horizontally to the crossing, unless the joint is encased in concrete.
- Sanitary sewers shall be constructed to allow flow at 90 to 95 percent full. Sanitary sewer velocities shall be designed to provide a minimum velocity of 0.6 meters per second (mps) at the ADD flow rate and a minimum velocity of 0.8 to 1.05 mps at the peak diurnal flow rate. In no case shall the velocity drop below 0.3 mps, to prevent settlement of organic solids suspended in the wastewater. Pipe slopes shall be sufficient to provide the required minimum velocities and depths of cover on the pipe. Unless otherwise indicated. Gravity sewer pipe shall be installed in straight and true runs in between manholes with constant slope and direction. Adequate cover must be provided for frost protection. A minimum cover of 80cm will be required to protect the sewer against freezing.
- The Contractor shall provide standard depth manholes (MH), that best meets the specific depth required, with an inside dimension of 1.2 meters. Manholes shall be made of cast-in-place reinforced concrete with reinforced concrete cover. 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.
 - 1) Manholes are required at junctions of gravity sewers and at each change in pipe direction, size or slope, except as noted hereinafter for building connections.
 - 2) Spacing. The distance between manholes must not exceed 120m in sewers of less than 460mm in diameter. For sewers 460mm and larger, a spacing of up to 180m is allowed provided the velocity is sufficient to prevent the settlement of solids.

2.3.6.7 Storm Drainage System

2.3.6.7.1 Hydraulic Design

New storm drain pipes, if required, shall be designed for gravity flow during the 10-year design storm unless otherwise approved by the Government. The hydraulic grade line shall be calculated for the storm drain system and all energy losses accounted for.

2.3.6.7.2 Manholes

Diameter of manholes shall be large enough to accommodate pipes entering/exiting the manhole. Manhole cast iron frames shall have a minimum opening diameter of 600mm.

2.3.6.7.3 Area Inlets

Area inlets shall be properly sized and designed to accommodate the design flows.

2.3.6.7.4 Head walls and Flared End Sections

Unless otherwise approved, head walls or flared end sections shall be provided at the ends of culverts and at storm drain outfalls. Protection from erosion and scouring at head wall and flared end section outfalls shall be provided as needed.

2.3.6.7.5 Culverts

Culvert pipes shall have a minimum diameter of 450mm wherever possible.

2.3.6.7.6 Storm Drain and Culvert Pipe

The Contractor shall select the appropriate storm drain and culvert pipe materials from local sources. Pipe, bedding, and backfill shall be of adequate strength (or stiffness) to support the earth, live, and construction loads imposed on the pipe. If using an open channel earth ditch such as a trapezoidal or V-ditch, apply slope protection and erosion control measures on the surface of the ditch.

2.3.7 Trash Point

The Contractor shall place, in a location convenient for easy removal, a trash collection point. It shall be located outside the compound walls. The trash point shall be a 1.8 m X 1.8 m concrete pad with a 1.8 meter tall wooden fence about the perimeter. One side shall have a 1.2 m wide gate entrance.

3. NOT USED

4. ARCHITECTURAL

4.1 GENERAL

All material approved shall become standardized material to be used throughout the facilities under contract. Different sub-contractors shall not use different material or standards under the contract. Intent of the project is to use locally procured materials (unless specified otherwise) and labor to the maximum extent possible while satisfying seismic building code. Conflicts between criteria and local standards 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.

4.2 DESIGN CRITERIA

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

IBC- International Building Code

4.3 EXCAVATION

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

4.4 CONCRETE

Place 10cm (4") of capillary water barrier below areas to receive a concrete slab on properly compacted soil free of organic material. A plastic vapor barrier (10 mils thick) shall be placed over the crushed stone prior to placing of concrete slabs. Concrete flooring in wet areas shall slope to the floor drain and not allow for water to puddle. Concrete slabs in all areas shall not be placed prior to inspection and approval of piping and sub-surface by the Contracting Officer. Foundation trenches shall be level and free of loose material. Trenches shall be inspected and approved by the Contracting Officer prior to placing of any concrete foundations. See paragraph 5 for structural characteristics of concrete and reinforcing steel for foundations and slabs.

4.5 MASONRY

Storage of masonry materials shall be in a dry place or materials shall be covered with a plastic protective layer. Cover open walls each day to keep them protected and dry. Concrete masonry units (CMU) shall be 200mm wide x 400mm x 200mm high as shown on drawings. They shall be installed in running bond level and plumb. Mortar joints shall be 9mm 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. CMU shall conform to ASTM C 90. For other requirements, see paragraph 5 "Structural."

4.6 METAL

4.6.1 Metal Window Sills

Galvanized metal window sills, 1mm (20 gauge) shall be installed on the exterior of all windows. The metal window sills shall have a turn down of 5cm 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 2 cm under the bottom of the metal window frame. Install masonry mortar as required for a smooth surface under the window sills. Sills shall slope a minimum of 6mm to the exterior and not allow water to puddle. Sealants shall be applied between joints of two (2) different materials.

4.6.2 Steel Cook Top

Provide steel cook top in kitchens minimum thickness of 1cm. Provide circular cut outs. Consult with the Contracting Officer for the diameter of circular cutouts. Provide steel infill plates for all cut out openings. Cook top can be made of several pieces for ease of handling. Adjacent plates shall be tight fitting to each other. The Contractor shall submit detailed shop drawings for review and approval prior to fabrication and installation.

4.6.3 Pass-Through Counter Top

Provide 1.6mm (16 gauge) stainless steel, or 4cm marble, pass through counter tops at openings between the kitchen and dining area. Edges shall be turned down 3 cm and corners shall be welded and ground smooth. Provide anchor angles welded to the bottom of the counters to anchor tops to masonry walls below. Provide eight (8) anchors on the Serving Counter, four (4) on each side of the wall. Anchor angles to wall with masonry expansion sleeves and stainless steel screws. Counter tops are to be 60cm wide x length of opening shown.

4.6.4 Mirror Frames

Frames for plate glass mirrors larger than 450 by 750 mm shall be fabricated from extruded aluminum with anodized finish. Frames shall be provided with concealed fittings and tamperproof mountings.

4.6.5 Trench Covers and Frames

Trench covers shall be designed to meet the indicated load requirements. Trench frames and anchors shall be all welded steel construction designed to match cover. Covers shall have flush drop handles formed of 6 mm round stock, and shall be steel floor plate. Grating opening widths shall not exceed 25 mm.

4.7 CARPENTRY

4.7.1 Metal Roof Wood Framing

Submit calculations and drawings for wood framing for metal sloping roof. See drawing details for roofing configuration. Typical roof slope shall be 1 in 10.

4.7.2 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 30 mm boards over roof structure and nail into wood purlins. New roofing shall extend a minimum of 300 mm past the exterior surface of the wall.

4.7.3 Data Required

Submit calculations and drawings for all proposed structural members.

4.7.4 Natural Decay- and Insect-Resistant Wood

Natural decay-resistant and insect-resistant wood can be an alternative to treated wood.

4.7.5 Structural Lumber

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

4.7.6 Framing Lumber and Board Lumber

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

4.7.7 Hardware

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

4.7.7.1 Bolts, Nuts, Studs, and Rivets

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

4.7.7.2 Anchor Bolts

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

4.7.7.3 Lag Screws and Lag Bolts

ANSI B18.2.1.

4.7.7.4 Nails

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

4.7.8 Trim, Finish, and Frames

Provide species and grades listed for materials to be paint finished. Provide materials that are to be stain, natural, or transparent finished one grade higher than that listed. Provide species indicated for materials to be transparent finished.

4.7.9 Steel Ladder

Shop drawings shall be submitted for the ladder to the guard towers as shown. The Contractor shall design all steel framing.

4.8 ROOFING AND WEATHERPROOFING

4.8.1 Sloped Roofs

On sloping roofs provide and install .70mm (24 gauge) galvanized steel in either corrugated or standing seam design. Metal roofing shall be anchored to wood deck sub-surface using exposed fasteners at 30cm on center at all seams and at 60cm on center in the panel field. 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. 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.

4.8.2 Not Used

4.8.3 Sheet Metal

4.8.3.1 Materials

Any metal listed by ASTM, DIN, BS or EN standards. Manual for a particular item may be used, unless otherwise specified or indicated. Materials shall conform to the requirements specified below and to the thicknesses and configurations established in ASTM, DIN, BS or EN standards. Standards other than those mentioned may be accepted provided they meet the minimum requirements, and the Contractor shall submit written proof of equivalency for approval. Written proof shall constitute a copy of the alternative standard and an analysis of equivalency.

4.8.3.2 Steel Sheet, Zinc-Coated (Galvanized)

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

4.8.3.3 Aluminum Wall Capping

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

4.8.3.4 Scuppers, Gutters and Downspouts

Galvanized scuppers, gutters and downspouts shall be installed as indicated. Gutters and downspouts shall be rigidly attached to the building. Supports shall be spaced according to manufacturer's recommendations. Gutters and downspouts shall be designed and fabricated on site. Unless otherwise specified or indicated, exposed edges shall be folded back to form a 13 mm (1/2 inch) hem on the concealed side, and bottom edges of exposed vertical surfaces shall be angled to form drips.

4.8.3.5 Wall, Floor, and Ceiling Control Joints Over Plaster and Stucco

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

4.8.3.6 Connections and Jointing

4.8.3.6.1 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.

4.8.3.6.2 Seaming

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

4.8.3.7 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.

4.8.3.8 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.

4.8.3.9 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.

4.8.3.10 Wall Capping

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

4.8.4 Sealants

4.8.4.1 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.

4.8.4.2 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.

4.8.4.3 Floor Joint Sealant

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

4.8.4.4 Primers

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

4.8.4.5 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.

4.8.4.6 Backstops

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

4.8.4.7 Cleaning Solvents

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

4.8.4.8 Surface Preparation

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

4.8.4.9 Masking Tape

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

4.8.4.10 Backstops

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

4.8.4.11 Primer

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

4.8.4.12 Bond Breaker

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

4.8.4.13 Sealants

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

4.8.4.14 Protection

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

4.8.4.15 Final Cleaning

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

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

4.9 WINDOWS, DOORS & GLAZING

4.9.1 Windows

4.9.1.1 Materials

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

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

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

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

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

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

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

F. Wire Fabric Insect Screen shall be permanently fixed to the exterior.

4.9.1.2 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.

4.9.1.3 Fixed, Casement, Projected and Sliding Windows

Provide window units meeting UL 752, level 5, but no less than 16 mm laminated single glazed. This standard shall apply to all window units within guard shack, guard house, guard tower, and guard rooms in Headquarters Building.

4.9.1.4 Fabrication

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

4.9.1.5 Finishes

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

Color: Selections by Contracting Officer

4.9.1.6 Inspection

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

4.9.1.7 Installation

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

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

4.9.1.8 Adjusting

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

4.9.1.9 Cleaning

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

4.9.2 Doors

Generally, doors shall be hollow metal doors, sizes as shown on the drawings with hollow metal frames to match door masonry openings. All glazed doors shall have 6 mm tempered or laminated glass glazing in the upper half of the door. Heavy gauge metal exterior doors are required for higher security areas. Doors and frames within ballistic required areas shall meet UL 752, level 5. Commercial duty lock sets and hardware shall be used on all doors. Install required louvers, as called for in paragraph 6, in the lower portion of the door. Within ballistic rated door and frame units, louvers shall be rated to the same ballistic requirement as the door assembly. Provide 3 hinges on all doors. Provide door handles and locksets that can be locked with a key on all doors. Coordinate the final keying schedule with Contracting Officer prior to ordering lock sets. Generally each building should have 8 master keys fitting all locks, 8 sub-master keys fitting all exterior doors and 3 keys each for each interior door. Include 25% spare key blanks for the amount of keys provided per building. Provide numbering system identifying key to associated room door. All glazing in or adjacent to doors shall be tempered per IBC. Provide weather stripping system for all exterior doors. Submit shop drawings together with lock sets for approval. Door hardware sets shall be provided as follows:

HW-1

1-1/2 pr Hinges, A5111
 1 ea Lockset, F04 Entry Lock w/levers, Grade 1, Exit Devices
 1 ea Door Closer, C02061
 1 ea Threshold, J32130

HW-2

3 pr Hinges, A5111
 2 ea Exit Device, Conc Vert Rod, F04 w/Levers, Grade 1
 2 ea Door Closers, C02061
 1 ea Threshold, J32130
 1 ea Removable Astragal

HW-3

1-1/2 pr Hinges, 8112
 1 ea Latch Set, F01 w/Levers, Grade 1
 1 ea Door Closer, C02061
 3 ea Silencers

HW-4

1-1/2 pr Hinges, A8112
 1 ea Lockset, F05

1 ea Stop, L02101 or L02161
 3 ea Silencers

HW-5

1-1/2 pr Hinges, 8112
 1 ea Door Pull, J405
 1 ea Door Closer, C02051
 1 ea Stop, L02101 or L02161
 3 ea Silencers
 1 ea Kick Plate, J102
 1 ea Mop Plate, J103
 1 ea Marble Threshold

HW-6

1-1/2 pr Hinges, 8112
 1 ea Lockset, F07 Storeroom Lock
 1 ea Stop, L02101 or L02161
 3 ea Silencers

HW-7

1-1/2 pr Hinges, A8112
 1 ea Lockset, F02
 1 ea Stop, L02101 or L02161
 3 ea Silencers
 1 ea Marble Threshold

HW-8 Heavy Duty Steel Door
 1-1/2 pr Hinges A8112
 1 ea Heavy Duty Dead Bolt Lock

HW-9 Not Used

HW-10 Not Used

HW-11

1-1/2 pr Hinges A8112
 1 ea Heavy Duty Dead Bolt Lock – see paragraph 4.9.2.1 for prison cell door

4.9.2.1 Steel Doors

SDI A250.8, except as specified otherwise. Prepare door to receive specified hardware. 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.

4.9.2.1.1 Steel Doors (Armory)

Doors shall be constructed using heavy gauge steel with minimum thickness of 3 mm (11 gauge steel door) with a dead-bolt lock. The door shall have a heavy duty dead bolt lock. Door frames shall have minimum (4) anchors per jamb at least 10cm into structural reinforced wall. Door frame shall be grouted solid.

4.9.2.1.2 Steel Doors (Cell Doors)

Doors shall be constructed using heavy gauge steel with minimum thickness of 3 mm (11 gauge steel door) with a dead-bolt lock. The door shall have a pass-through slot for passing food trays with a hinged cover lockable from

the outside. Built into the bottom of the door shall be a 0.3m wide by 0.5m tall door for passing a bucket in and out with a hinged cover lockable from the outside. Door frames shall have minimum (4) anchors per jamb at least 10cm into structural reinforced wall. Door frame shall be grouted solid.

4.9.2.1.3 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, and mullions unless otherwise indicated.

4.9.2.1.4 Welded Frames

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

4.9.2.1.5 Not Used

4.9.2.1.6 Stops and Beads

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

4.9.2.1.7 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.

4.9.2.1.7.1 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.

- a. Masonry: Provide anchors of corrugated or perforated steel straps or 5 mm diameter steel wire, adjustable or T-shaped;
- b. Completed openings: Secure frames to previously placed concrete or masonry with expansion bolts

4.9.2.1.7.2 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.

4.9.2.1.8 Hardware Preparation

Provide minimum hardware reinforcing gages as specified in ANSI A250.6. Drill and tap doors and frames to receive finish hardware. Prepare doors and frames for hardware in accordance with the applicable requirements of SDI A250.8 and ANSI A250.6. For additional requirements refer to BHMA A115. Drill and tap for surface-applied hardware at the project site. Build additional reinforcing for surface-applied hardware into the door. Locate hardware in accordance with the requirements of SDI A250.8, as applicable. Punch door frames, with the exception of frames that will have weatherstripping 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.

4.9.2.1.9 Finishes

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

4.9.2.1.10 Fabrication and Workmanship

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

4.9.2.1.10.1 Grouted Frames

For frames to be installed 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.

4.9.2.1.11 Installation

4.9.2.1.11.1 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.

4.9.2.1.11.2 Doors

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

4.9.2.1.12 Protection and Cleaning

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

4.9.2.1.13 Weatherstripping

Provide weatherstripping that is a standard cataloged product of a manufacturer regularly engaged in the manufacture of this specialized item. Weather stripping shall be looped neoprene or vinyl held in an extruded non-ferrous metal housing. Air leakage of weather stripped doors shall not exceed 0.003125 cubic meter per second of air per square meter of door area when tested in accordance with ASTM E 283

4.9.2.1.14 Prefitting

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.

4.9.2.1.15 Finishes

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

4.9.2.1.16 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.

4.9.2.1.17 Weather stripping

Install doors in strict accordance with the manufacturer's printed instructions and details. Weather strip 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.

4.9.3 Glazing

ASTM C 1036, or ASTM C 1172 or equal. Acceptable manufacturer: Gürsan or equal

4.9.3.1 Tempered Glass

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

4.9.3.2 Plastic Glazing (Acrylic Sheets)

ASTM D 4802, Type II, heat resistant, clear and smooth on both sides, ultraviolet stabilized, scratch resistant, 5 mm thick.

4.9.3.3 Glazing Accessories

4.9.3.3.1 Sealant

Sealant shall be elastomeric conforming to ASTM, DIN, BS, or EN standards. Type S or M, Grade NS, Class 12.5, Use G. Color of sealant shall be as selected from manufacturer's full range of standard colors by Contracting Officer.

4.9.3.3.2 Glazing Gaskets

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

4.9.3.3.3 Fixed Glazing Gaskets

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

4.9.3.3.4 Wedge Glazing Gaskets

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

4.9.3.3.5 Putty and Glazing Compound

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

4.9.3.3.6 Setting and Edge Blocking

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

4.9.3.4 Preparation

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

4.9.3.5 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.

4.9.3.6 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.

4.9.3.7 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.

4.10 FINISHES

Provide color boards with all materials for COR approval prior to ordering materials.

- 4.10.1** The exterior of all buildings shall be stucco. A temperature of between 4 and 27 degrees C shall exist for a period of not less than 48 hours prior to application of plaster and for a period of at least 48 hours after plaster has set. Control joints shall be designed for expansion and contraction of plaster work due to thermal exposure. Control joints shall comprise of back to back casing beads. Install new stucco in 2 coats. The first coat shall be a scratch coat approximately 1 cm thick. Allow 7 days to cure. The second coat shall be finish stucco, smooth finish, approximately 1 cm thick. Allow 7 days to cure before painting. Stucco showing oversanding, cracks, blisters, pits, checks, discoloration or other defects is not acceptable. Defective plaster work shall be removed and replaced with new plaster at the expense of the Contractor. Patching of defective work will be permitted only when approved by the Contracting Officer. Patching shall match existing work in texture and color. Paint shall be designated for exterior use, with less than .06% lead by weight. Stucco shall be painted with one coat of primer and two coats of finish paint, color to be selected by the Contracting Officer from the color board provided by the Contractor.
- 4.10.2** Interior walls shall be cement 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.
- 4.10.3** Ceilings shall be plaster applied over cast-in-place concrete slabs or beams. Paint ceiling with 2 coats of flat white, with less than .06% lead by weight.
- 4.10.4** Not Used
- 4.10.5** Not Used
- 4.10.6** Exposed exterior steel trim, frames, doors and pipe railings: Paint with one coat water-based primer, with 2 coats of water-based paint, color to be selected by the Contracting Officer from the color board provided by the Contractor.
- 4.10.7** Not Used
- 4.10.8** Tile: Tile work shall not be performed unless the substrate and ambient temperature is at least 10 degrees C and rising. Temperature shall be maintained above 10 degrees C while the work is being performed and for at least 7 days after completion of work. Upon completion, tile surfaces shall be thoroughly cleaned in accordance with manufacturer's approved cleaning instructions. Acid shall not be used for cleaning glazed tile. Floor tile with resinous grout or with factory mixed grout shall be cleaned in accordance with instructions of the grout manufacturer. After the grout has set, tile wall surfaces shall be given a protective coat of a non-corrosive soap or other approved method of protection.
- 4.10.8.1** Floors in wet areas shall be ceramic tile. Joints shall be 2-3mm. 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 2cm thickness. Provide continuous waterproofing membrane beneath sloping mortar bed, turn up wall 30cm 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.
- 4.10.8.2** Floors in administration areas/living quarters, dining, and corridors shall be 30cm x 30cm terrazzo tile with thin set mortar. Joints shall be 2-3mm. 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.
- 4.10.8.3** Walls in wet areas shall be tiled with 150mm x 150mm glazed ceramic tile up to 2.2 meters above the floor to include interior of toilet stalls, showers and behind sinks. Joints shall be 2-3mm. 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.

4.10.9 See Finish Schedule for finish types.

4.10.10 Kitchen shall be covered with quarry tile flooring. Walls in kitchen shall be ceramic tile up to 2.2 meters above finished floor. Floor in dining area shall be terrazzo tile.

4.11 SPECIALTIES

4.11.1 Mirrors

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

4.11.2 Toilet Paper Holders.

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

4.11.3 Shower Curtain Rods & Shower Curtain.

Shower curtain rods, stainless steel, heavy duty, 18 gauge shall be mounted between the screen walls of each shower stall. Mount rod at 2.0 m above finished floor. Provide a shower curtain with support rings for each shower stall.

4.11.4 Grab Bars

Stainless steel grab bars, heavy duty, 18 gauge, two each 900 mm and 1050 mm long, 40 mm diameter. shall be mounted behind and beside all eastern toilets, and bathtubs as occur.

4.11.5 Paper Towel Dispensers

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

4.11.6 Light Duty Metal Shelf

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

4.11.7 Robe hooks on all toilet and shower stalls required.

4.11.8 Other toilet accessories shall be as shown on drawings.

4.12 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 for design and installation of all concrete structures.

Concrete	280.0 kg./sq.cm cylinder strength @ 28 days (ASTM-. C 31M)
Steel Reinforcement	4218.0 kg./sq.cm(Fy= 60.0 ksi),yield strength.
Welded Wire Fabric	ASTM A185
Anchor Bolts	ASTM A307 using A36 steel.
Concrete Masonry Units	ASTM C90, Type I (normal wt, moisture Cntrl).
Mortar	ASTM C270, Type S (Ultimate compressive strength of 130.0 kg/sq. cm.)
Proportion	1 part cement, 0-1/2 part lime and 4-1/2 parts aggregate
Grout	ASTM C476 (Slump between 200 mm to 250 and Compressive Strength 14 MPa (2000 psi) at 28 days.

Joint Reinforcement	Standard 9 gage minimum, Ladder Type
Structural Steel	ASTM A36: 2530.0 kg./sq.cm (Fy = 36,000psi)
Welding	AWS (American Welding Society) D1.1-2002.

5 STRUCTURAL

5.1 GENERAL

The project consists of various structures. The new buildings shall be constructed as shown on the drawings and stated in the specifications. However, the building foundations have been designed based on assumed geotechnical design parameters. These assume parameters are shown on the foundation plans and stated in Paragraph 5.8, FOUNDATIONS. The contractor shall perform a geotechnical investigation as required in paragraph 2.1 GEOTECHNICAL, FOUNDATIONS AND SURVEY, to verify that the foundations as designed will perform satisfactory. If the contractor determines the building foundations as designed will not function satisfactory, the contractor shall redesign the foundations accordingly. The contractor is responsible for the foundation design and construction of the foundations. Building foundations shall be founded a minimum of 800 mm below grade.

5.2 DESIGN

Foundation design shall be performed and design documents signed by a registered professional structural engineer. Calculations shall be in SI (metric) units of measurements. All components of the building shall be designed and constructed to support safely all loads without exceeding the allowable stress for the materials of construction in the structural members and connections.

5.3 DEAD AND LIVE LOADS

Dead loads consist of the weight of all materials of construction incorporated in the buildings. Live loads used for design shall be in accordance with the American Society of Civil Engineers, ASCE STANDARD, and Minimum Design Loads for Buildings and Other Structures, ASCE 7, edition as referenced herein.

5.4 WIND LOADS

Wind loads shall be calculated in accordance with ASCE 7 using a "3-second gust" wind speed of 125 km/hr. All facilities shall be classified as a minimum of Category II in accordance with Table 1-1 in ASCE 7, referenced herein.

5.5 SEISMIC

The building and all parts thereof shall be designed for the seismic requirements as defined by the International Building Code referenced herein. Site-specific data: Spectral ordinates SS=1.65g and S1=0.75g.

5.6 STRUCTURAL CONCRETE

Concrete structural elements shall be designed and constructed in accordance with the provisions of the American Concrete Institute, Building Code Requirements for Structural Concrete, ACI 318, latest edition. A minimum cylinder compressive strength of 4000 psi (28 mPa) shall be used for design and construction of all concrete. Reinforcing steel shall be deformed bars conforming to American Society for Testing and Materials (ASTM) publication ASTM a 615, Deformed and Plain Billet-Steel Bars for Concrete Reinforcement. Concrete at or below grade shall have maximum water-cement ration of 0.40. 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 3" (75 millimeters).

5.7 MASONRY

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

5.8 FOUNDATIONS

The foundations shall be constructed by using reinforced concrete materials. The foundations system for the two-story building shall be spread footings for individual column footings and grade beams as shown on the drawings. Minimum length and width of spread footings shall be as shown on the drawings. A bearing capacity of 0.75 kg/sq. cm was assumed and used in designing the building foundations. The allowable bearing pressure shall be determined by the Contractor after performing his geotechnical investigation. The maximum allowable settlement between footings shall be less than 2.5 cm. It is the contractors' responsible to perform a geotechnical investigation and determine if the foundations as shown and designed will perform satisfactory, see paragraph 2.1 GEOTECHNICAL, FOUNDATIONS AND SURVEY. If the contractor determines the foundations as designed will not perform satisfactory, the contractor shall redesign the foundations accordingly.

6 NOT USED

7 MECHANICAL

7.1 GENERAL

Heating and cooling shall be provided by the use of split system heat pumps, liquid propane (LP) gas heaters, multi-speed ceiling and wall oscillating fans, ceiling or wall exhaust fans or electric unit heaters as indicated on the drawings. Gas heaters shall be vented type and installed in accordance with local standards, complete with direct and conventional flue vents or stacks to ventilate combustion gases to the outside environment.

7.2 SPECIALIST SUB-CONTRACTORS QUALIFICATIONS

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

7.3 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.

7.4 DESIGN CONDITIONS

Air-conditioning in the selected offices and bedrooms to maintain 23.8°C (75°F) in summer at 50% RH and 21.1°C (70°F) in winter.

Heating using gas or wood stoves in other areas to maintain 21.1°C (70°F) indoor temperature in winter

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

7.4.1 THERMAL PERFORMANCE

Assemblies shall meet the requirements of TI-800, Design Criteria, UFC 3-400-01 Design: Energy Conservation,

and ASHRAE Standard 90.1, latest editions, but shall meet the following minimum requirements:

Assembly	Minimum Thermal Value
exterior walls (above grade)	RSI 2.288 (R 13)
ceilings/roof	RSI 6.688(R 38)
basement wall	RSI
floor (over unheated space)	RSI 5.28 (R 30)
exterior doors	RSI 0.25 (R 1.43)
exterior windows/ (glazing within doors)	RSI 0.308(R 1.75)

7.5 VENTILATION AND EXHAUST SYSTEMS

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

Kitchen shall be provided with exhaust hood located over major heat producing equipment. System design and installation shall be in accordance with the requirements of NFPA 96 and the recommendations of the 1999 ASHRAE Applications handbook. Each hood shall exhaust air to the outside of the facility and contain grease (washable) filters.

7.5.1 Duct & Piping Insulation.

All intake and exhaust ductwork as required and refrigerant piping, shall be provided insulation and vapor barrier for thermal efficiency, to prevent condensation, and for energy conservation. Insulation exposed to weather or physical damage shall be protected with aluminum jacketing.

7.5.2 Submittals

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

7.6 ELECTRIC RESISTANCE SPACE HEATERS

7.6.1 Unit Heater

Provide a self-contained electric heating unit, suspended from ceiling or structure, with fan and heating elements. Provide control-circuit terminals and single source of power supply with disconnect. Heating wire element shall be nickel chromium. Include limit controls for overheat protection of heaters. Provide tamper resistant integral thermostat.

7.6.2 Cabinet Heater

Provide a self-contained electric heating unit, surface mounted in wall or structure, with fan and heating elements. Provide control-circuit terminals and single source of power supply with disconnect. Heating wire element shall be nickel chromium. Include limit controls for overheat protection of heaters. Provide tamper resistant integral

thermostat.

7.6.3 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.

7.7 CEILING AND WALL FANS

7.7.1 Ceiling Fan

Provide 1320mm blade ceiling fans at one per 40 square meters of floor space. Fans shall have reversible motors. Center or distribute evenly in room. Coordinate placement with the lighting plan to prevent conflict or casting shadows. Fan mount shall be flush, standard, or angle mount depending on ceiling height. Fan shall be mounted such that the fan blade is approximately 2.4 meters above the finished floor. The fan shall be provided with out light kit. The finish shall be factory painted white. The controls shall be from either a single pole switch or from two 3 way switches to provide on/off operation. The electrical supply shall be 220volts, single phase, and 50 hertz. Install per manufacturers' instructions.

7.7.2 Oscillating Wall Fans

Provide 460mm diameter wall fans as shown on plans. Coordinate placement with the lighting plan to prevent conflict or casting shadows. Fan mount shall be painted steel wall bracket and mounted such that the fan blade is approximately 2.1 meters above the finished floor. The finish shall be factory painted white. The controls shall be from either a single pole switch or from two 3 way switches to provide on/off operation. The electrical supply shall be 220volts, single phase, and 50 hertz. Install per manufacturers' instructions.

7.7.3 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.

7.8 SPLIT SYSTEM HEAT PUMPS

7.8.1 Split System Heat Pumps

Unit shall be a split type, factory made assembly, consisting of an indoor section and an outdoor section, designed to work together to provide year round heating and cooling, air-circulating, ventilating, air-cleaning, and dehumidifying functions. The separate sections shall be standard commercial products of the same manufacturer, and shall have ratings based on their being used as matched assemblies.

Minimum Coefficient of Performance (COP) shall be 2.9. Minimum Seasonal Energy Efficiency Ratio (SEER) shall be 10. Refrigerant shall be non-CFC.

7.8.1.1 Indoor Section

Indoor section shall be a factory assembled unit consisting of indoor coil, centrifugal blower, motor, motor controls, filters, electric resistance heaters, enclosure, and condensate pan, with controls, relief devices, piping, wiring, controls and accessories required for operation. Outlet grille shall be constructed to permit adjustable directional air flow. Unit shall be wall mounted console type construction. The sound level rating shall be less than 45 decibels (dB).

7.8.1.2 Outdoor Section

Outdoor section shall be a factory assembled unit consisting of outdoor coil, propeller type fans arranged for horizontal discharge, refrigerant circuit with filter-dryer, and hermetically sealed compressor with crankcase heater, internal overload protection and pressure relief valve, all contained in a weather resistant outer casing. Defrost controls, and necessary tubing, piping, controls, control circuits, and required accessories shall be provided. System shall be factory pre-charged with oil and refrigerant. Air inlet and discharge grilles with bird screens shall be provided. The sound level rating shall be less than 60 dB. The unit shall be mounted on a fabricated metal stand a minimum of 300mm on a concrete pad at grade.

7.8.2 Electrical Requirements

Each section shall be equipped with a main power panel and shall include complete branch circuit protection for every electrical component. Main power panel shall completely protect the unit from primary single phasing and over current. Fuses and protective devices shall be provided by the manufacturer and installed at the factory. All components of the main power panel and all control devices shall be UL listed. Wiring shall be in accordance with UL and NFPA 70 requirements. Equipment shall operate on 220 volt, single phase, 50 hertz electrical service.

7.8.3 Controls

A switch with fan/off/cool positions shall be mounted in the unit or with the remote thermostat. Thermostat shall be remotely mounted where shown on the drawing.

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.

7.8.4 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.

7.9 Space Heating

Refer to Spec section 01010, Paragraph 2.10 for using propane gas as the preferred fuel for space heating and cooking as indicated on the plans. For the Compound sites where there is no commercial availability of propane gas, the Contractor shall consider use of wood stove for cooking and space heating only after approval by the Contracting Officer.

7.9.1 Wood Stove (*only in area where propane can not be found*)

Provide Cast Iron stoves, minimum cast iron wall thickness shall be 5mm. Install with adequate clearances per manufactures installation guide. Route the chimney runs inside the building envelope (inside the heated space) so air and flue gases stay at least as warm as the air in the building until they are expelled outside. The chimney shall penetrate the highest part of the building envelope so the chimney functions better. The chimney shall rise at least 60 cm (24 inches) above the roof ridge and its top is clear of obstacles to wind flow so it can produce stable draft and it has a chimney (rain) cap because without one any chimney is vulnerable to adverse wind pressures. The chimney flue shall be insulated and be the correct size for the appliance so flue gases are kept warm and flow quickly through the system. The flue pipe, if used, shall run straight up from the appliance to the chimney and the chimney has no offsets because each change in direction presents resistance to flow. The appliance and venting system shall be reasonably well-sealed to prevent leaks that introduce cool air and make the system more vulnerable to adverse pressures. The stove shall be certified for low smoke emissions or have equivalent characteristics so it is unlikely to

smolder. The system shall be installed in a building that has a balanced ventilation system. There shall be no exhaust fan in the stove exhaust.

7.9.2 PROPANE HEATER SPACE HEATING

Provide vented propane heaters at the locations indicated. Install with adequate clearances per manufactures installation guide. Provide isolation valve and drip leg at each heater connection point. The appliance shall be designed for vented indoor installation and be provided with either a standing pilot or electronic ignition system. The system shall be installed in a building that has a ventilation system to introduce. Combustion air route vents through nearest wall or roof as coordinated with the Resident Engineer.

7.9.3 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; drawings indicating location and installation details.

7.10.A Propane Stove Cooking

Cooking area shall be provided canopy type exhaust only kitchen hoods and associated exhaust fans. These exhaust hoods shall include baffle type aluminum filters to trap grease/oil. The exhaust fan sizing calculations should recognize the use of propane stoves in the kitchen. Sizing should accommodate all propane burning stoves running simultaneously. Additionally, the placement of the exhaust hood should allow enough clearance for an average sized male to stand on top of the stove platform unobstructed, for standing on the stove is common local cooking practice. The higher than average placement of the hood will require the extension of the lip of the hood out further than normal, in order to catch the majority of the smoke and adequately vent the area.

Make-up air for kitchen hood exhaust shall be pulled in from roof mounted intake hood with permanent washable air filter and from adjoining Kitchen/Dining areas.

7.10.B Wood Stove Cooking

Route the chimney runs inside the building envelope (inside the heated space) so air and flue gases stay at least as warm as the air in the building until they are expelled outside. The Contractor shall protect chimney by means of metal rails or masonry wall from damage from large pots during cooking. The chimney shall penetrate the highest part of the building envelope so the chimney functions better. The chimney shall rise at least 60 cm (24 inches) above the roof ridge and its top is clear of obstacles to wind flow so it can produce stable draft and it has a chimney (rain) cap because without one, any chimney is vulnerable to adverse wind pressures. The chimney flue shall be insulated and be the correct size for the appliance so flue gases are kept warm and flow quickly through the system. The flue pipe, if used, shall run straight up from the appliance to the chimney and the chimney has no offsets because each change in direction presents resistance to flow. The appliance and venting system shall be reasonably well-sealed to prevent leaks that introduce cool air and make the system more vulnerable to adverse pressures. The system shall be installed in a building that has a balanced ventilation system. There shall be no exhaust fan in the stove exhaust. The Wood stove kitchen shall be well vented with louvers located high at walls on the building ends.

7.11 TESTS 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 is intended. The Contractor shall test, adjust, balance and regulate the section or sections of concern as necessary until the required conditions are obtained. 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.

8 PLUMBING

8.1 SYSTEM REQUIREMENTS

Domestic water and waste systems shall be provided to each area with fixtures requiring water and/or waste connections such as toilets, etc. The entire water system shall include cold water to each fixture as well as to a water heater. Hot water shall be distributed to all kitchen sinks, showers, etc. as indicated. The water distribution and waste systems shall be in complete accordance with the requirements of the International Plumbing Code (IPC, latest edition). The Contractor shall furnish, install and test the domestic water supply system as shown on the drawings. Each supply system shall comprise of a booster pump, booster tank and water heater. Mechanical equipment shall be housed inside an insulated enclosure designed for year around operation and suitably protected from weather elements. Contractor shall design and install a domestic water tank system that can be easily converted to a permanent system in the future. All water distribution system components exposed to the outdoors shall be provided with freeze protection to ensure water is available throughout the year.

8.2 PIPING MATERIALS

Domestic water shall be distributed by means of PVC (cold water only), CPVC (cold or hot water) or copper for the pressure to be utilized. PVC and CPVC shall not be used in areas where it will be exposed to outdoor sun.

8.2.1 Insulation

All domestic water pipe and fittings exposed and not inside an insulated wall shall be insulated. In addition, all water pipe that is exposed shall also be covered with metal jacketing. Water piping exposed to outdoor conditions shall be insulated and jacketed and provided with heat trace to prevent freezing.

8.3 FIXTURES

All plumbing fixtures shall be provided with p-traps and shall be vented to the roof per International Plumbing Code, latest edition. Plumbing fixtures within holding and/or detention cells shall be jail grade type with no exposed valves or plumbing lines.

8.3.1 Eastern Style Water Closet with Flush Tank

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 wall mounted faucet on the right hand side of the water closet stall as viewed from the in-use position. Toilets shall be oriented north and south. Toilets shall not face east or west.

8.3.2 Lavatories

All sinks shall be trough type constructed of block and concrete with ceramic tile exterior and lining capable of withstanding abuse. Faucets shall be chrome plated brass single lever mixing type. Provide maintenance access to waste piping and P-traps from under the sink. Lavatories inside the prison cells shall be temper-proof with integral spout, soap depression, and outlet connection to slip 40mm OD tubing.

8.3.3 Water Heater

Electric type water heaters shall conform to UL 174 with dual heating elements. Each element shall be 4.5 KW. The elements shall be wired so that only one element can operate at a time. Each water heater shall have controls with an adjustable range that includes 32 to 71 degrees C. Electrical wiring shall be installed per the NEC and the manufacturer's instructions. Piping and fittings for hot, cold, drain, and pressure temp connections shall be installed per the manufacturer's recommendations.

8.3.4 Plastic Shower Stalls

Provide one piece or four piece white solid acrylic pressure molded fiberglass reinforced plastic shower stalls. Shower stalls shall be scratch resistant, waterproof, and reinforced. Provide recessed type shower stalls approximately 914 mm wide, 914 mm front to rear, 1829 mm high, and 125 mm high curb with shower stall bottom or feet firmly supported by a smooth level floor. Provide PVC shower floor drains and stainless steel strainers. Install shower stall in accordance with the manufacturer's written instructions. Provide smooth 100 percent silicone rubber white bathtub calk between the top, sides, and bottom of shower stalls and bathroom walls and floors.

8.3.5 Scullery Sink (Kitchen Area)

Provide 14 gauge, type 304, (18-8) stainless steel, sink with drain board. Compartments shall be large enough to wash posts 1 meter in diameter. Sink shall be supported on four stainless steel legs. Sink shall have pre-drilled in backsplash at manufacturer for commercial faucet. Commercial faucet shall be solid brass construction, chrome finish, wall mount 203mm center arc tube.

8.3.6 Floor Drain and Shower Drain

Floor drains and shower drains shall consist of a galvanized body, integral seepage pan, and adjustable perforated or slotted chromium-plated bronze, nickel-bronze, or nickel-brass strainer, consisting of grate and threaded collar. Floor drains shall be cast iron except where metallic waterproofing membrane is installed.

8.3.7 Trench Type Floor Drain

Trench type floor drains shall consist of a cast iron or galvanized body, integral seepage pan, and slotted chromium-plated bronze, nickel-bronze, or nickel-brass grate. Grate shall be 300 mm wide and 2000 mm long.

8.3.8 Floor Sink

Floor sink shall be circular or square, with 300mm overall width or diameter and 250 nominal overall depth. It shall have acid resistant enamel interior with cast iron body, aluminum sediment bucket and perforated grate of cast iron. Outlet size as indicated on plans.

8.3.9 Grease Interceptor

Steel construction, manual cleaning type with removable checker-plate cover; complete with flow control valve. Tested and rated in accordance with PDI G-101. Concrete shall have 21 MPa (3045 PSI) minimum compressive strength in 28 days.

8.3.9 Hose Bibb (HB)

Room hose bibs and building wall hydrants shall be provided as required. Hose bibs shall be provided at interior locations as follows and in other locations where required.

8.4 Not Used

8.5 Generator Fuel Storage

The work shall include the fabrication and installation of the entire fuel storage and distribution system. Tanks shall be skid mounted. Tanks of this type that have a capacity above 2640 L will be provided with either a dike or a spill containment system. The dike or spill containment system should have enough capacity for the entire contents of the tank plus 10 percent. Provide a molded neoprene isolation pad to isolate an aboveground tank from the concrete pad underneath. Steel tank supports specifically are prone to encounter premature rusting due to constant exposure to

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

External Fuel Fill Point: For each specific site, the Contractor shall coordinate with the Resident Engineer and provide a fuel unloading point outside of the perimeter wall to facilitate transfer of fuel from the commercial fuel tanker to the bulk fuel storage at the Power Plant. This transfer shall include interconnecting piping and valves between the fuel point and the two bulk fuel storage tanks.

8.5.1 Testing

A tightness test shall be performed on each aboveground storage tank. The tests shall be performed prior to making piping connections. Tests shall be capable of detecting a 0.1 mL/s leak rate from any portion of the tank while accounting for effects of thermal expansion or contraction. Each storage tank shall be pressurized with air to 35 kPa and monitored for a drop in pressure over a 2-hour period during which there shall be no drop in pressure in the tank greater than that allowed for pressure variations due to thermal effects. Following the tank tightness test, each storage tank shall be leak tested in accordance with the manufacturer's written test procedure if the manufacturer's test procedure is different from the tightness tests already performed. Each storage tank shall be filled with the proper fuel.

8.5.2 Submittals

The Contractor shall submit the following for the equipment to be provided under this section of the specification: Manufacturer's standard catalog data, Installation Manual Operation and Maintenance Manuals and test results.

Tests Results:

Six copies of each test containing the information described below in bound letter-size booklets. Individual reports shall be provided for the storage tank tests, the piping tests, the system performance tests, the high level alarm test, and the system leak tests. Drawings shall be folded blue lines, with the title block visible.

- a. The date the tests were performed.
- b. A list of equipment used, with calibration certifications.
- c. A copy of measurements taken.
- d. The parameters to be verified.

- e. The condition specified for the parameter.
- f. The inspection results, signed, dated, and certified by the installer. The certification shall state that required procedures were accomplished, that the procedures were conducted in compliance with the plans and specifications.
- g. A description of adjustments performed.

8.6 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, drawings indicating location and installation details and test results.

8.7 Testing and Inspection

Testing of each piping system shall be as per International Plumbing Codes. The contractor's designer shall specify that all new, altered, extended, or replaced plumbing systems shall be left uncovered and unconcealed until it has been tested and approved. The installation contractor shall furnish all equipment, materials, and labor required for testing a plumbing system. All such tests shall be carried out in the presence of the Contracting Officer and full written records of the test data and final settings shall be submitted to the Contracting Officer.

The final test shall include a smoke test for drainage and vent system and pressure test for the domestic water piping. After completing the work, the Contractor shall demonstrate that all plumbing systems operate to fully satisfy the function for which these systems have been designed. The Contractor shall test, adjust, balance and regulate the system and its controls as necessary until the required designed conditions are met. The Contractor shall include tests for interlocks, safety cutouts and other protective devices to demonstrate safe operation. After all tests are complete, the entire domestic hot and cold water distribution system shall be disinfected. The system shall not be accepted until satisfactory bacteriological results have been obtained.

9 FIRE PROTECTION

9.1 GENERAL

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

9.2 BUILDING CONSTRUCTION

Building construction shall conform to fire resistance requirements, allowable floor area, building height limitations and building separation distance requirements of the building code.

9.3 FIRE PROTECTION EQUIPMENT

Per user, a sprinkler system is not required and is not provided.

9.4 FIRE ALARM AND DETECTION

Per user, a fire alarm and detection system is not required and is not provided.

9.5 WATER SUPPLY FOR FIRE PROTECTION

Water supply for fire protection is not required and is not provided.

9.6 PORTABLE FIRE EXTINGUISHERS

Portable fire extinguishers (PFEs) shall be provided (and installed) in the Kitchen, DFAC, and in each hallway in accordance with the requirements of NFPA 10. Portable fire extinguishers shall be Multi-purpose Dry Chemical rated 4A:60B:C. Extinguishers shall be wall-mounted on hanger hooks with at least 12 inches clearance from the floor in easily accessible locations. Travel distance to an extinguisher from any location in the building shall be no greater than 75 feet.

10 ELECTRICAL

10.1 SCOPE OF WORK

10.1.1 General. Contractor shall construct following systems in compliance with the attached contract drawing and as described below. Systems shall include but not limited to:

- (a) On-site Prime Power Generating Plant
- (b) Exterior Underground Secondary Power Distribution System
- (c) Interior Secondary Distribution System
- (d) Lighting and power branch circuitry
- (e) Interior telephone wiring
- (f) Closed Circuit Television (CCTV) System.
- (g) Lightning Protection System

All of the systems shall be designed for the ultimate demand loads, plus 20% spare capacity. Above Systems shall be designed for and to provide service to the following facilities as a minimum:

- 1. ANP Headquarters
- 2. Guard Shacks (2)
- 3. Guard House (1)
- 4. Guard Towers (4)
- 5. Power Plant
- 6. Administration Building - A (Future) Not-In-Contract
- 7. Administration Building - B (Future) Not-In-Contract
- 8. Well House

See Site Plan for details.

10.2 DESIGN CRITERIA

10.2.1 Applicable Standards

- a. National Fire Protection Association, NFPA 70 (National Electric Code, 2005 Edition).
- b. National Fire Protection Association, Life Safety Code, NFPA 101
- c. National Fire Protection Association, Lightning Protection Code, NFPA 780
- d. Illuminating Engineering Society of North America (IES)

10.2.2 Design shall be in metric units.

10.2.3 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.

10.3 MATERIAL

- 10.3.1 General: Unless noted otherwise, all material used shall be in compliance with the requirements of the applicable German (DIN) Standards. In the event DIN Standard material is unavailable, contractor may then select comparable British Standard (BS), or Underwriters Laboratories Inc. (UL) listed material. Equipment enclosure types shall be in compliance with the National Electrical Manufacturer's Association (NEMA) or the International Electro-Technical Committee (IEC) standards. Material and equipment installed under this contract shall be for the appropriate application.
- 10.3.2 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.
- 10.3.3 Design Conditions: All equipment shall be rated and designed for 50 Degree Centigrade and elevation of 2000 meters above sea level.
- 10.3.4 Restrictions: Aluminum conductors shall not be used or specified. Neutral conductors shall be considered current carrying conductors and shall be sized the same as phase conductors. Reduced sized neutral conductors shall NOT be permitted.

10.4 DESIGN REQUIREMENTS

- 10.4.1 Power Plant: On-site Prime Power Generating Plant shall be provided for this Compound as per that attached drawings. Electrical equipment shall include, but not be limited to, diesel engine generators, secondary voltage switchboard, day tanks, relaying equipment and all other auxiliary equipment that is necessary for operating a Prime Power Plant. All major equipment shall have brief operating instructions posted on them in English and Afghan languages. Secondary wiring within the building shall be per paragraph 'Secondary Power Distribution System', as noted below. All cabling within the Power Plant associated with Power Generation (Generator to Switchboard) shall be installed underground in direct buried PVC Schedule 40 (Sch 40) conduits. Power plant shall be provided with a Lightning Protection System.
- 10.4.1.1 Generators: Two (2) generators, rated at 120 kW each, shall be provided inside 'weather-proof' enclosures and shall be for exterior application. Generators shall be skid mounted standard industry size, 1500 RPM; diesel-engine Prime Power rated units. Generating voltage shall be 3 phase, 380 volts and 50 Hertz, for Compound wide Secondary Power Distribution, through the generator switchboard as described below. Generator starting shall be electric. Each generator shall be provided with a day tank with a minimum fuel capacity of 8 hours operating at 100% generator rating (name plate kW rating). Sharing of Compound demand load between the generators shall be via generator synchronizing equipment. See drawings for detail requirements.
- 10.4.1.2 Load Bank: Contractor shall provide a factory manufactured, industry standard permanent load bank connected to the generator secondary switchboard bus to supplement for low demand load on the operating generator. Load bank shall be rated at a minimum of 40 kW, with 5, 10, or 20 kW load steps. Unit shall be provided with a control panel and necessary circuit protection. Load bank shall automatically prevent the generator(s) from operating at less than 40% load and keep the generator(s) from "wet-stacking".
- 10.4.1.3 Fuel Storage / Distribution System: Refer to Mechanical Section 01015 and design drawings for generator fuel storage / distribution system requirements.
- 10.4.1.4 Miscellaneous: Contractor shall be responsible for providing all relaying, metering and power plant grounding equipment necessary for safe and efficient operation of the power plant. Relaying shall include, but not be limited to, differential, locking-out, over current, directional and reverse power.

- 10.4.1.5 Generator Switchboard: Generator Switchboard shall be located with the generators and shall be the central distributing point for the Site Secondary Power Distribution System. Switchboard shall be circuit breaker type, consisting of a main circuit breaker, feeder circuit breakers for service to various facilities on the Compound. Switchboard shall be sized and provided with the required number of circuit breakers to service all facilities in this Contract and future facilities identified on the Site Plan. In addition, the Switchboard shall be provided with two (2) spaces for any future 3 pole circuit breakers. See Power Plant design drawings for details. Switchboard shall be provided inside a 'weather-proof' enclosure and shall be for exterior application.
- 10.4.1.6 Operating Instructions: Contractor shall provide, mounted in a frame, a complete electrical one-line diagram of the power plant with detail operating instruction. Instructions shall be mounted inside respective generator and switchboard enclosures. Similarly, complete fuel and cooling system schematic diagrams shall also be provided with the operating instructions. Brief operating instructions shall be posted on major components at the power plant. These instructions shall be written in English and Afghanistan languages.
- 10.4.2 Site Secondary Power Distribution System: This shall include installation of Secondary Power Distribution Systems in underground, direct buried PVC Schedule 40 conduits system. System shall include hand-holes for secondary power cables.
- 10.4.2.1 Raceways: Exterior raceways (conduits) shall be installed at a slope towards the hand-hole to avoid collection of water in the raceway. Conduit shall be PVC, Schedule 40. Secondary cable shall be installed in conduit no less than 50mm (2 inch). Duct bank conduits shall be cleaned with a wire mandrel prior to the installation of cables. Minimum of two (2) spare conduits shall be provided in all main trunks and capped at both ends. Top of the conduits shall be below the frost line or a minimum of 24 inch (600mm) below grade.
- 10.4.2.2 Cables: All secondary voltage cables shall be copper, designed for underground installation and shall have appropriate secondary voltage ratings.
- 10.4.3 Secondary Power Distribution System: Secondary Power shall be 380/220 volts, 3 phase, 4 wire, 50 Hz. Building secondary power distribution system shall include main distribution panel. All panel boards shall be factory fabricated, 'bolt-on' circuit breaker type and each provided with a main circuit breaker. In large buildings, with 225 Amp or greater service, separate lighting and power panels shall be provided. Minimum size circuit breaker shall be rated at 16 amperes. Circuit breakers shall be connected to bus bar(s) within the panel boards. Daisy chain (breaker-to-breaker) connection(s) shall not be acceptable. Indoor distribution panels and load centers shall be flush mounted in finished areas. All circuit breakers shall be labeled with an identification number corresponding to the panel schedule. A 3-pole circuit breaker shall be a single unit and not made up of 3 single pole circuit breakers connected with a wire or bridged to make a 3-pole breaker. All wiring shall be copper, minimum # 12 AWG (4mm sq) and installed in surface mounted metal conduits. All panels shall be provided with a minimum of 20% spare capacity for future load growth. Power receptacles (outlets) shall be duplex, 240 volts, 50 HZ, German (DIN) Standard. All splicing and terminations of wires shall be performed in a junction or device boxes. Proper wire nuts/connectors shall be used for splicing wire. No twist-wire connections with electrical tape wrapped around it shall be acceptable. All electrical installation shall be in accordance with the requirements of NFPA 70 (National Electric Code). Main Distribution Panel in large buildings shall be provided with an ammeter, voltmeter and kilowatt-hour meter. Selector switch shall be provided for reading all 3 phases. All service entrance cables and equipment, such as main distribution panels etc., to the facilities shall be sized for the ultimate facility loads, to include any heating and air-conditioning loads, initial and / or future, to be provided by others.
- 10.4.3.1 All panels shall be phase balanced; phase imbalance shall not exceed 10% at each panel.
- 10.4.3.2 Receptacles: General purpose receptacles shall be duplex, grounding (earthed) type, 'surface' wall mounted type, color ivory and installed 500 mm above finished floor (AFF). In general, provide a minimum of one (1) receptacle on each wall 0.6 meter or wider. On longer walls provide one (1) receptacle spaced at every three (3) meters intervals. Each corridor shall be provided with at least one (1) receptacle. CEE Type receptacles with plugs (2P+E (240v) or 3P+E (380v) and with appropriate rating, shall be provided for, but

not be limited to, kitchen equipment and any other type of large plug-able equipment. Receptacle shall be complete to include box, cover plate and necessary screws/connectors and of the type most commonly used in Afghanistan. Receptacles near sinks or lavatories shall be switch operated and Ground Fault Circuit Interrupter (GFCI), or Residual Current Disconnect (RCD) type, with the trip setting of 30 milliampere or less.

- 10.4.3.3 Lighting: Light Fixtures: Lighting fixtures shall be a standard manufacturer's product. Fluorescent light fixtures shall be power factor corrected and equipped with standard magnetic ballast(s). All light fixtures shall be capable of receiving standard lamps used and available locally. Light fixtures shall be mounted at 2.7M, minimum, AFF. Fixtures may be pendant or ceiling mounted, depending on the ceiling height and type. Emergency lighting, emergency egress 'exit' lights and exterior building lighting shall be provided, as shown on the drawings.
Light fixtures provided inside jail cells shall be vandal resistant and detention center grade fixtures. All fixtures shall be fully factory wired.
- 10.4.3.3.1 Light Switch: Light switch shall be single pole. Minimum of one light switch shall be provided in every room. Lighting in large rooms/areas may be controlled from multiple switches. Lighting contactors may be used to operate lighting in open or large bay areas.
- 10.5** Search Light: Search light shall be prison / security search light and provided on top of each Guard Tower. Search light shall be operable from inside the guard tower cab. See design drawings for details.
- 10.6** Conductors: All cable and wire conductors shall be copper. Conductor jacket or insulation shall be color coded to satisfy local utility requirements.
- 10.7** Grounding & Bonding: Grounding and bonding shall comply with the requirements of NFPA 70. Underground connections shall be exothermal welded. All exposed non-current carrying metallic parts of electrical equipment in the electrical system shall be grounded. Insulated grounding conductor (separate from the electrical system neutral conductor) shall be installed in all feeder and branch circuit raceways. Grounding conductor shall be green-colored, unless the local authority requires a different color-coded conductor. Ground rods shall be 20mm in diameter, 3 meter long and of copper-clad steel. Ground resistance shall not exceed 25 ohms when measured more than 48 hours after rainfall.
- 10.8** Enclosures: Enclosures for exterior and interior applications shall be NEMA Type 3S (IEC Classification IP54) and NEMA Type 1 (IEC Classification IP10), respectively.
- 10.9** Closed Circuit Television (CCTV): CCTV System shall be complete and basic. System shall include CCTV cameras, cable installed in metal conduit system, digital video recorder and monitor(s). CCTV cameras shall be placed such that to monitor the jail cells. CCTV monitor shall be located in the Guard Room. Final location of the CCTV monitor(s) and cameras shall be coordinated with the Contracting Officer. See design drawings for details.
- 10.10** Telephone/DATA System: Telephone/DATA System shall include cross-connect box, duplex RJ-45 telephone outlets with a minimum of 4 pair Category 5E (CAT 5E) cable terminating at each outlet (jack). The Contracting Officer shall determine outlet locations for individual rooms. Telephone wiring shall be surface mounted in metal conduits. Two (2) 50mm conduits with pull-wire shall be provided from the cross connect box to the outside communication hand-hole. Exterior plant telephone cabling shall be provided/installed by others/User. See design drawings for details.
- 10.11** Lightning Protection System: Lightning Protection System shall be provided in accordance with the requirements of NFPA 780 and shall be for all facilities to be built under this Contract.
- 10.12** Identification Nameplates: Major items of electrical equipment, such as the generators, switchboard, panel boards and load centers, shall be provided with a permanently installed engraved identification nameplate.

- 10.13** Schedules: All panel boards and load centers shall be provided with a panel schedule. Schedule shall be typed written in English and Afghan languages.
- 10.14** Single Line Diagrams: Complete single line diagram shall be provided in the Power Plant Switchboard Room and in Panelboards in each building. Single line diagram shall show all panels serviced from the generator switchboard and from main distribution panel in each building.
- 10.15** Acceptance Tests: All systems shall be tested in the presence of the COR for satisfactory operation prior to the turnover and acceptance of the facilities by the Government.

-- End of Section --

(End of Summary of Changes)

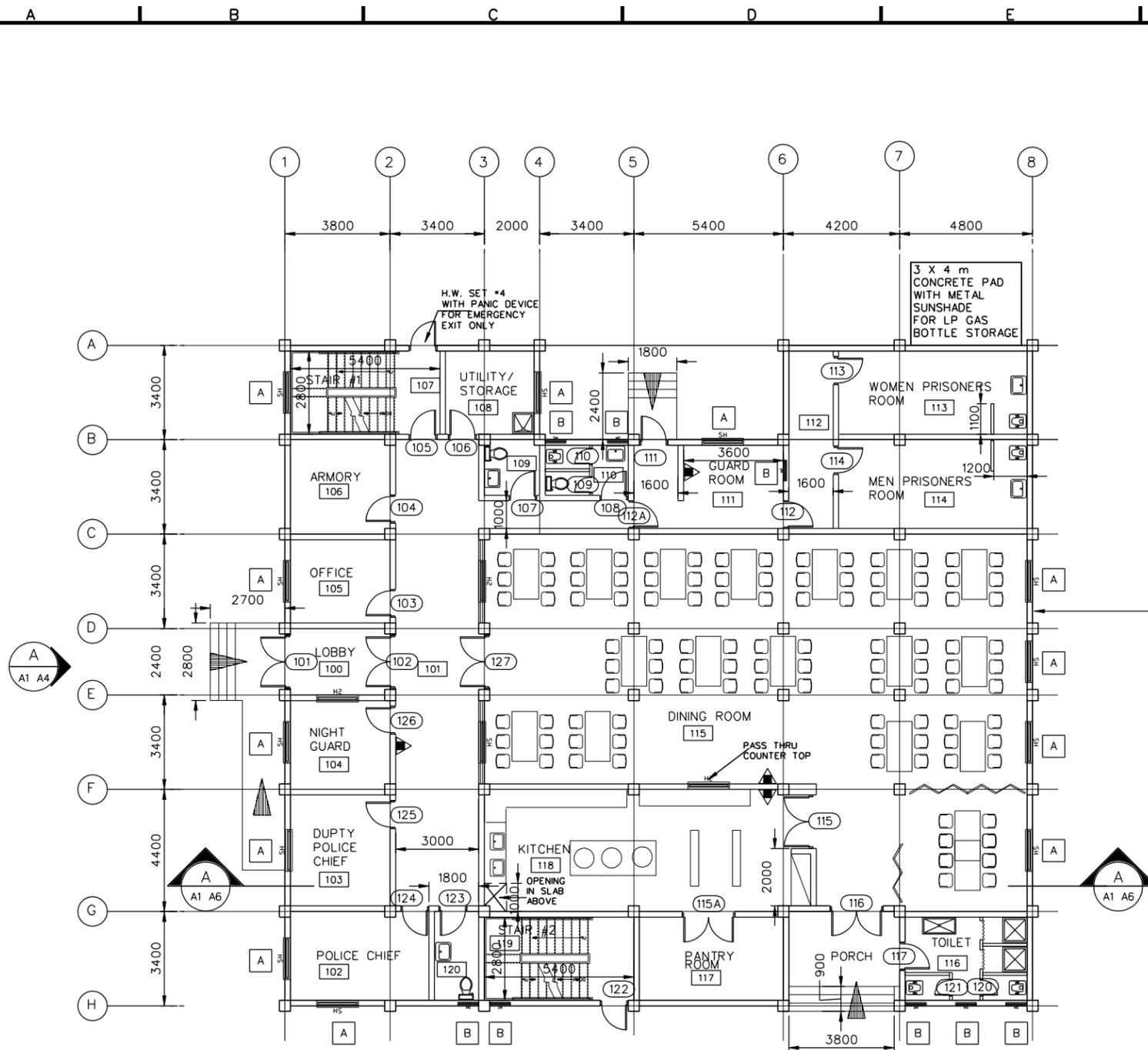
Afghanistan National Police (ANP) Headquarters (2 Story) Compound Afghanistan



US Army Corps
of Engineers
Transatlantic Programs Center

09 March 2007

3/9/2007
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FLOOR PLAN
 SCALE=1 : 100

- FLOOR PLAN NOTES:
1. ALL INTERIOR WALLS ARE 200 CMU EXTENDING TO THE ROOF SLAB UNLESS NOTED OTHERWISE.
 2. ALL SHOWER WILL BE PROVIDED WITH SHOWER CURTAIN SEE PARAGRAPH 4.11.3 OF SECTION 01015.
 3. ALL EXTERIOR WALL SHALL BE CAVITY WALL, SEE SA-2 FOR WALL SECTION DETAIL.
 4. SEE SA-4 FOR WINDOW DETAILS



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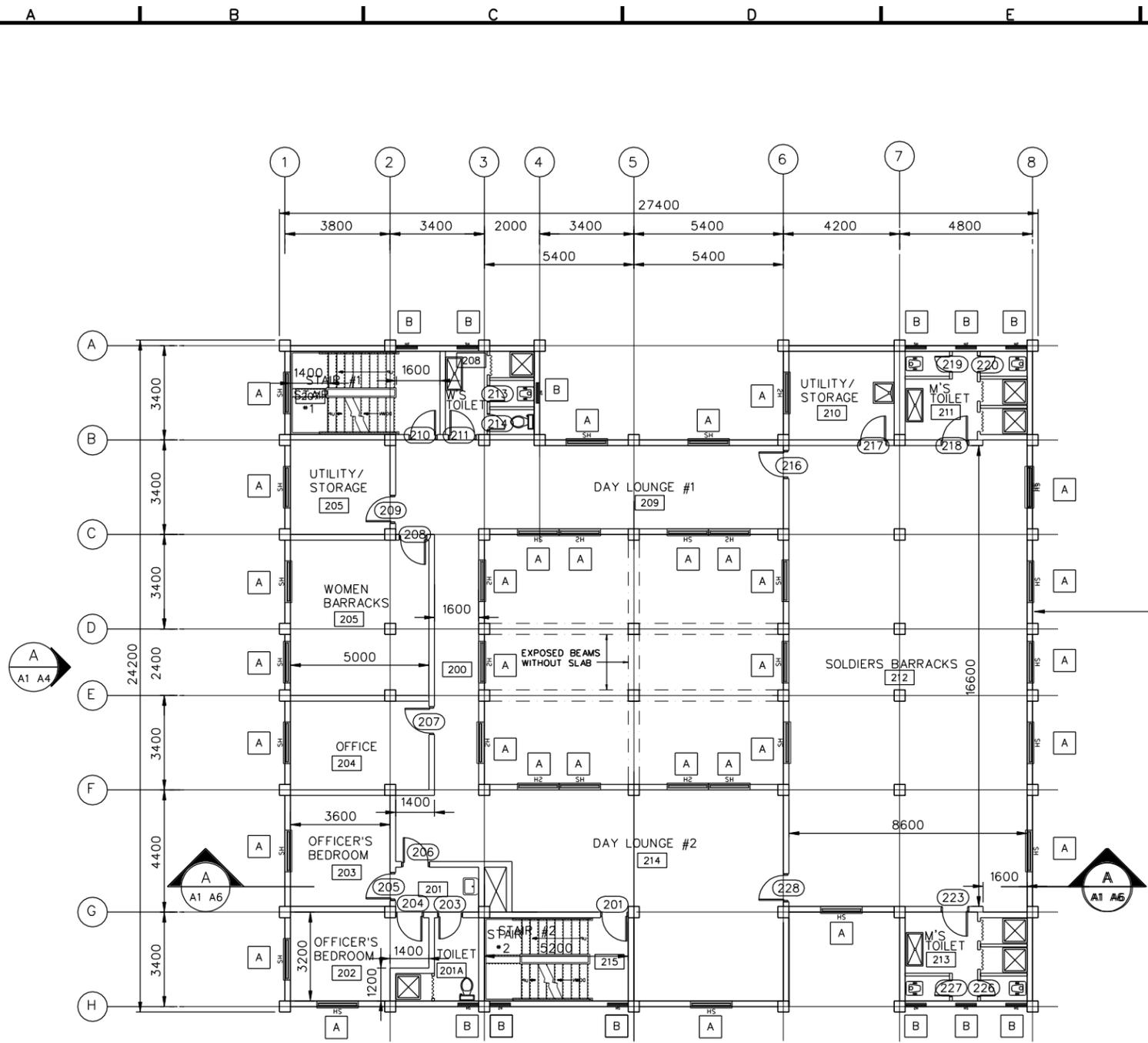
SYMBOL	DESCRIPTION	DATE	APP

DESIGNED BY: S. Hanna	DATE: 02-05-07	SUBMITTED BY: PHILIP S. Hanna	PROJECT: POLICE HEADQUARTERS	FILE NO.: AF0701-A-AR01PN
DWN BY: S. Hanna		CHK BY: S. Hanna		
US Army Corps of Engineers Transatlantic Programs Center				

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
 POLICE HEADQUARTERS FIRST FLOOR PLAN

SHEET REFERENCE NUMBER:
 A
 A-1

3/9/2007
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FLOOR PLAN
 SCALE=1 : 100

- FLOOR PLAN NOTES:
- ALL INTERIOR WALLS ARE 200 CMU EXTENDING TO THE ROOF SLAB UNLESS NOTED OTHERWISE.
 - PROVIDE PORTABLE FIRE EXTINGUISHERS, ABC DRY CHEMICAL 4A:60B:C
 - ALL SHOWER WILL BE PROVIDED WITH SHOWER CURTAIN SEE PARAGRAPH 4.11.3 OF SECTION 01015.
 - ALL EXTERIOR WALL SHALL BE CAVITY WALL, SEE SA-2 FOR WALL SECTION DETAIL.
 - SEE SA-4 FOR WINDOW DETAILS



UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

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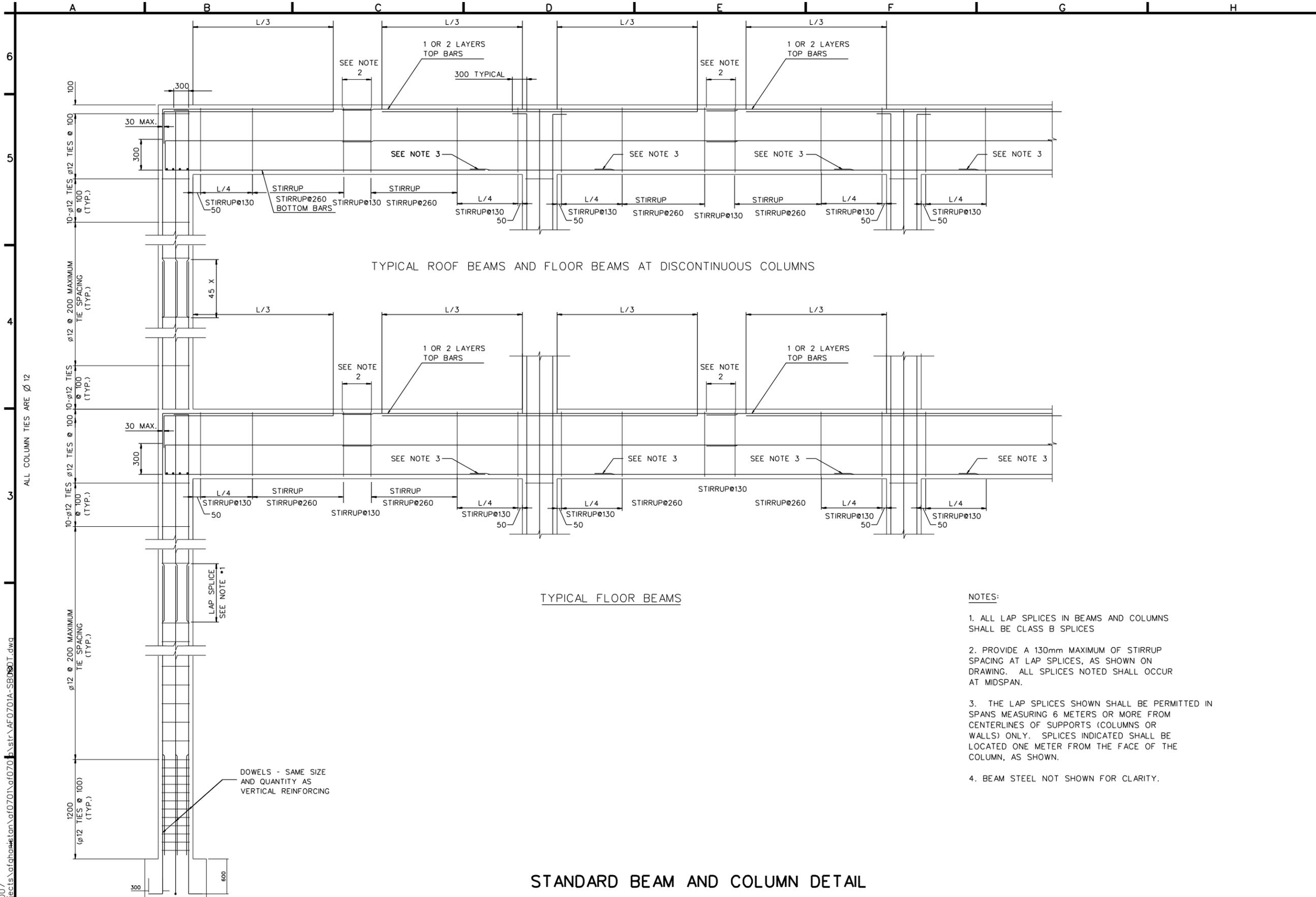
SYMBOL	DESCRIPTION	DATE	APP

DESIGNED BY: S.Hanna	DATE: 02-05-07	SUBMITTED BY: PHILIP S. Hanna	PROJECT: POLICE HEADQUARTERS
DWN BY: S. Hanna	FILE NO: AF0701 A-AR02PN	CHEK BY: PHILIP S. Hanna	TRANSITION CENTER

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
 POLICE HEADQUARTERS SECOND FLOOR PLAN

SHEET REFERENCE NUMBER:
 A
 A-2

3/9/2007
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STANDARD BEAM AND COLUMN DETAIL

- NOTES:
1. ALL LAP SPLICES IN BEAMS AND COLUMNS SHALL BE CLASS B SPLICES
 2. PROVIDE A 130mm MAXIMUM OF STIRRUP SPACING AT LAP SPLICES, AS SHOWN ON DRAWING. ALL SPLICES NOTED SHALL OCCUR AT MIDSPAN.
 3. THE LAP SPLICES SHOWN SHALL BE PERMITTED IN SPANS MEASURING 6 METERS OR MORE FROM CENTERLINES OF SUPPORTS (COLUMNS OR WALLS) ONLY. SPLICES INDICATED SHALL BE LOCATED ONE METER FROM THE FACE OF THE COLUMN, AS SHOWN.
 4. BEAM STEEL NOT SHOWN FOR CLARITY.

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SYMBOL	DESCRIPTION	DATE	APP

DESIGNED BY: TCP	DATE: 02-05-07
DWN BY: RC	SUBMITTED BY: PHILIP DINELLO
CHK BY: KGO	CHIEF, PBT FACILITIES DES
	FILE NO: AF0701 A-SB08DT

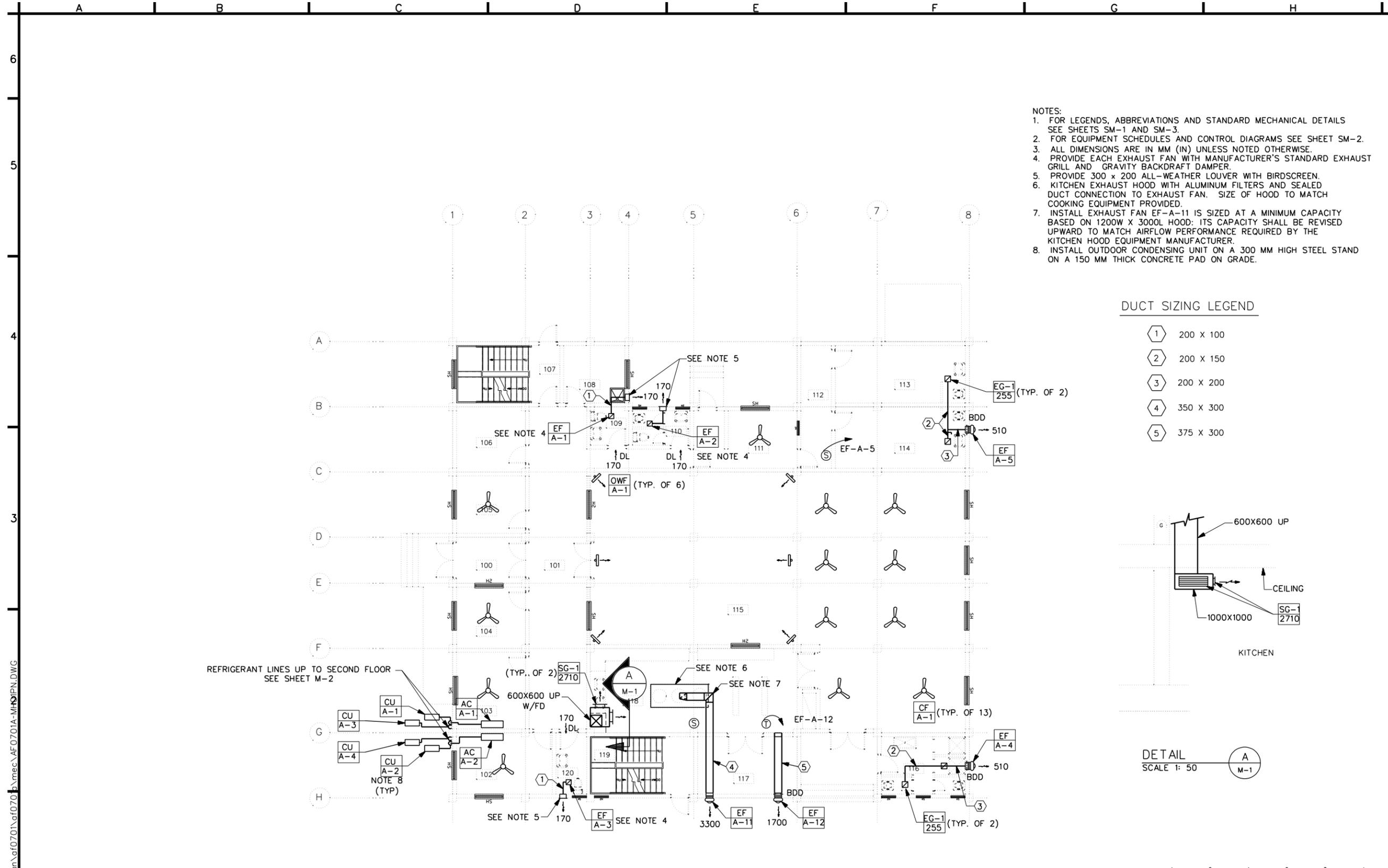
US Army Corps of Engineers
 Transatlantic Programs Center

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
 POLICE HEADQUARTERS STANDARD BEAM AND COLUMN DETAIL

SHEET REFERENCE NUMBER:
 A
 S-8

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

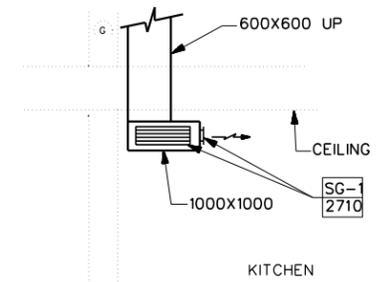
3/9/2007
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- NOTES:
1. FOR LEGENDS, ABBREVIATIONS AND STANDARD MECHANICAL DETAILS SEE SHEETS SM-1 AND SM-3.
 2. FOR EQUIPMENT SCHEDULES AND CONTROL DIAGRAMS SEE SHEET SM-2.
 3. ALL DIMENSIONS ARE IN MM (IN) UNLESS NOTED OTHERWISE.
 4. PROVIDE EACH EXHAUST FAN WITH MANUFACTURER'S STANDARD EXHAUST GRILL AND GRAVITY BACKDRAFT DAMPER.
 5. PROVIDE 300 x 200 ALL-WEATHER LOUVER WITH BIRDSCREEN.
 6. KITCHEN EXHAUST HOOD WITH ALUMINUM FILTERS AND SEALED DUCT CONNECTION TO EXHAUST FAN. SIZE OF HOOD TO MATCH COOKING EQUIPMENT PROVIDED.
 7. INSTALL EXHAUST FAN EF-A-11 IS SIZED AT A MINIMUM CAPACITY BASED ON 1200W X 3000L HOOD. ITS CAPACITY SHALL BE REVISED UPWARD TO MATCH AIRFLOW PERFORMANCE REQUIRED BY THE KITCHEN HOOD EQUIPMENT MANUFACTURER.
 8. INSTALL OUTDOOR CONDENSING UNIT ON A 300 MM HIGH STEEL STAND ON A 150 MM THICK CONCRETE PAD ON GRADE.

DUCT SIZING LEGEND

- ① 200 X 100
- ② 200 X 150
- ③ 200 X 200
- ④ 350 X 300
- ⑤ 375 X 300

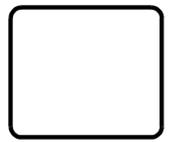


DETAIL A
 SCALE 1: 50



FIRST FLOOR HVAC PLAN
 SCALE= 1:100

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.



NO.	DESCRIPTION	DATE	APP.

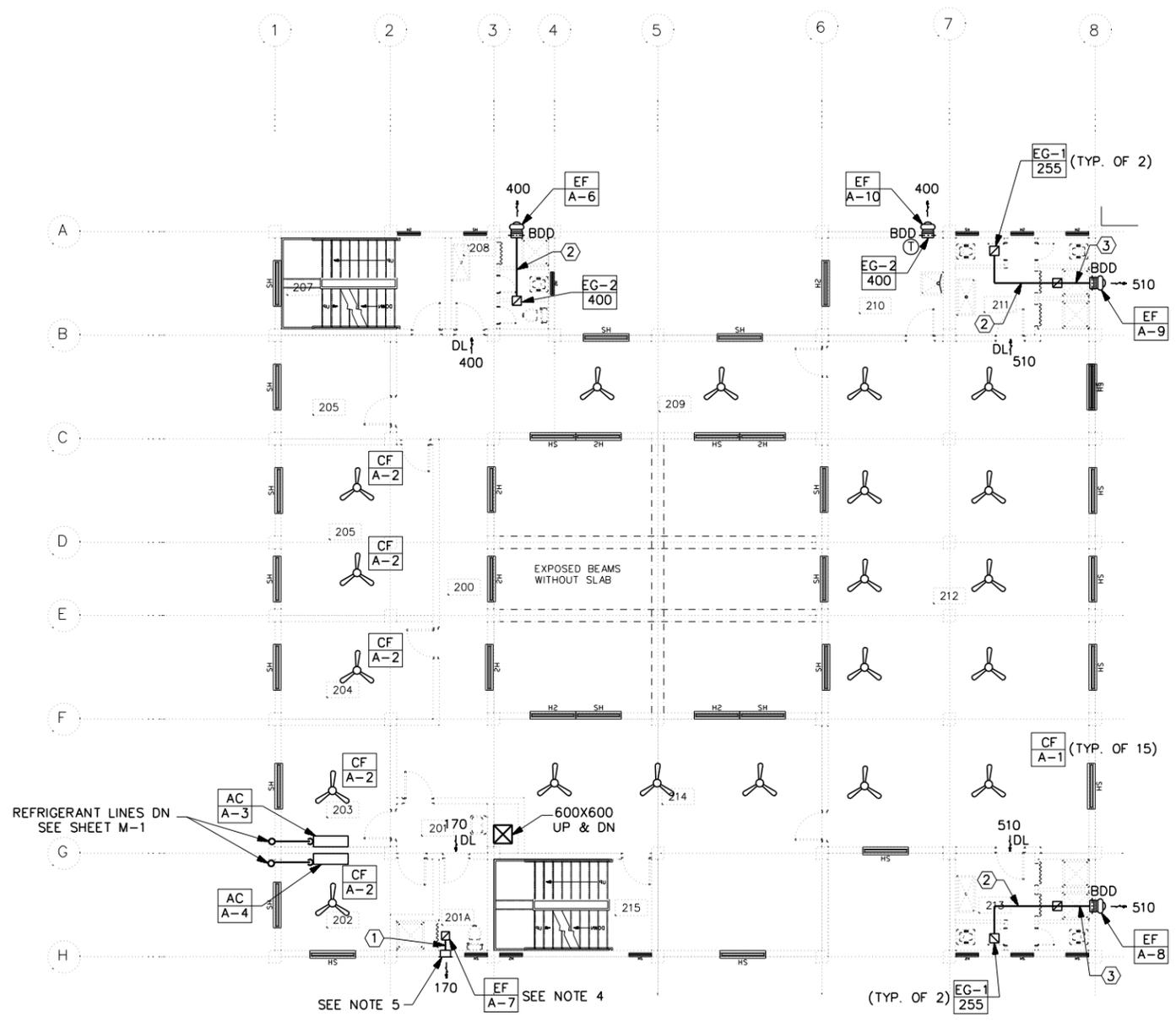
DESIGNED BY: DATE: 02-05-07
 RMS
 DWN BY: SUBMITTED BY: SVED ENAYATULLA
 RMS CHEF. PDI BLDG SYSTEMS
 CHK BY: SE FILE NO: AF0701 A-MF01PN

US Army Corps of Engineers
 Translational Programs Center

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
 POLICE HEADQUARTERS
 FIRST FLOOR HVAC PLAN

SHEET REFERENCE NUMBER:
 A
 M-1

3/9/2007
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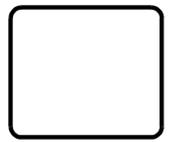
DUCT SIZING LEGEND

- ① 200 X 100
- ② 200 X 150
- ③ 200 X 200

SECOND FLOOR HVAC PLAN
 SCALE = 1:100



UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.



SYMBOL	DESCRIPTION	DATE	APP

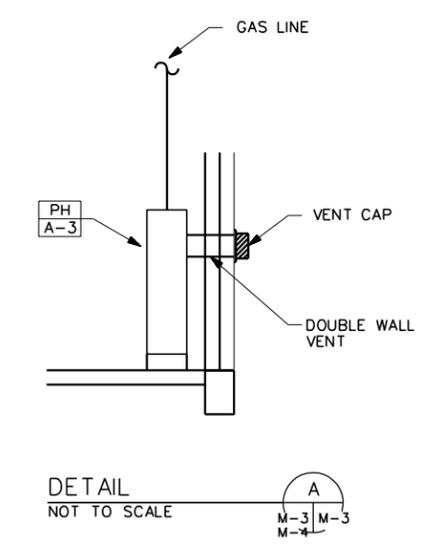
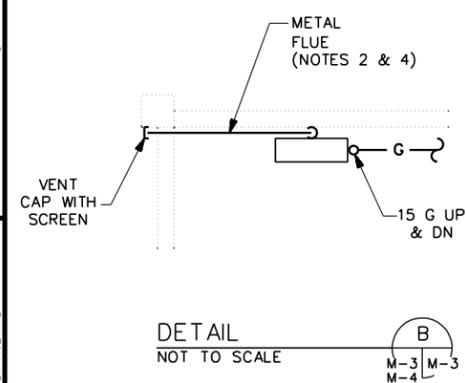
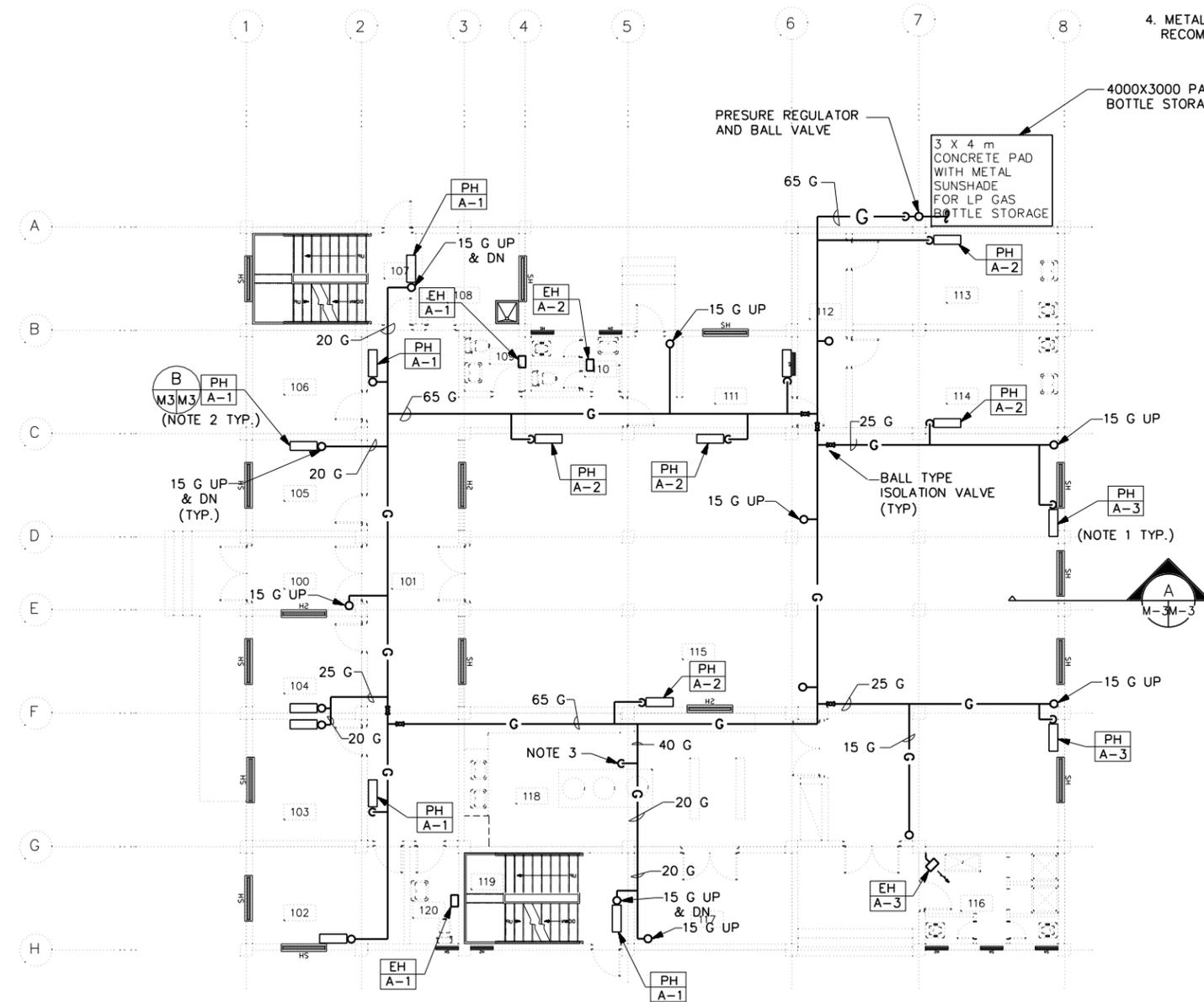
DESIGNED BY: RMS	DATE: 02-05-07
DWN BY: RMS	SUBMITTED BY: SYED ENAYATULLA CHIEF, PDI BLDG SYSTEMS
CHK BY: SE	FILE NO: AF0701 A-MH02PN

US Army Corps of Engineers
 Transatlantic Programs Center

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
 POLICE HEADQUARTERS
 SECOND FLOOR HVAC PLAN

SHEET REFERENCE NUMBER:
 A
 M-2

- NOTES:
- FOR ALL GAS SPACE HEATERS LOCATED NEXT TO EXTERIOR WALL, PROVIDE A DIRECT VENT (DOUBLE WALL TYPE) THROUGH REAR WALL TO ALLOW FOR FRESH AIR INTAKE AND FOR DIRECT VENTING OF ALL COMBUSTION PRODUCTS. INSTALL VENT PIPE, FITTINGS AND CAP AS PROVIDED BY AND IN ACCORDANCE WITH THE FURNACE MANUFACTURER RECOMMENDATIONS.
 - FOR ALL GAS SPACE HEATERS LOCATED AWAY FROM THE EXTERIOR WALL PROVIDE CONVENTIONAL VENT OR STACK AS PER THE HEATER MANUFACTURER RECOMMENDATION. PRIOR TO INSTALLATION THE CONTRACTOR SHALL VERIFY LOCATION OF EACH HEATER AND SUBMIT VENT ROUTING AND DISCHARGE LOCATIONS FOR APPROVAL BY THE CONTRACTING OFFICER.
 - PROVIDE 25MM GAS SUPPLY LINE WITH A SERVICE SHUT-OFF VALVE DOWN TO THE COOKING STOVES. GAS PIPING AND CONNECTION TO INDIVIDUAL STOVES SHALL BE IN CONFORMANCE WITH STOVE MANUFACTURER RECOMMENDATIONS.
 - METAL FLUE SIZE SHALL BE AS PER HEATER MANUFACTURER RECOMMENDATION AND ROUTED CLOSE TO THE CEILING.



FIRST FLOOR HEATING PLAN
 SCALE = 1:100



UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

SYMBOL	DESCRIPTION	DATE	APP

DESIGNED BY: DATE: 02-05-07
 RMS
 SUBMITTED BY: SVED ENAYATULLA
 DWN BY: RMS
 CHIEF, PDI BLDG SYSTEMS
 FILE NO: AF0701 A-MHO3PN
 CK BY: SE

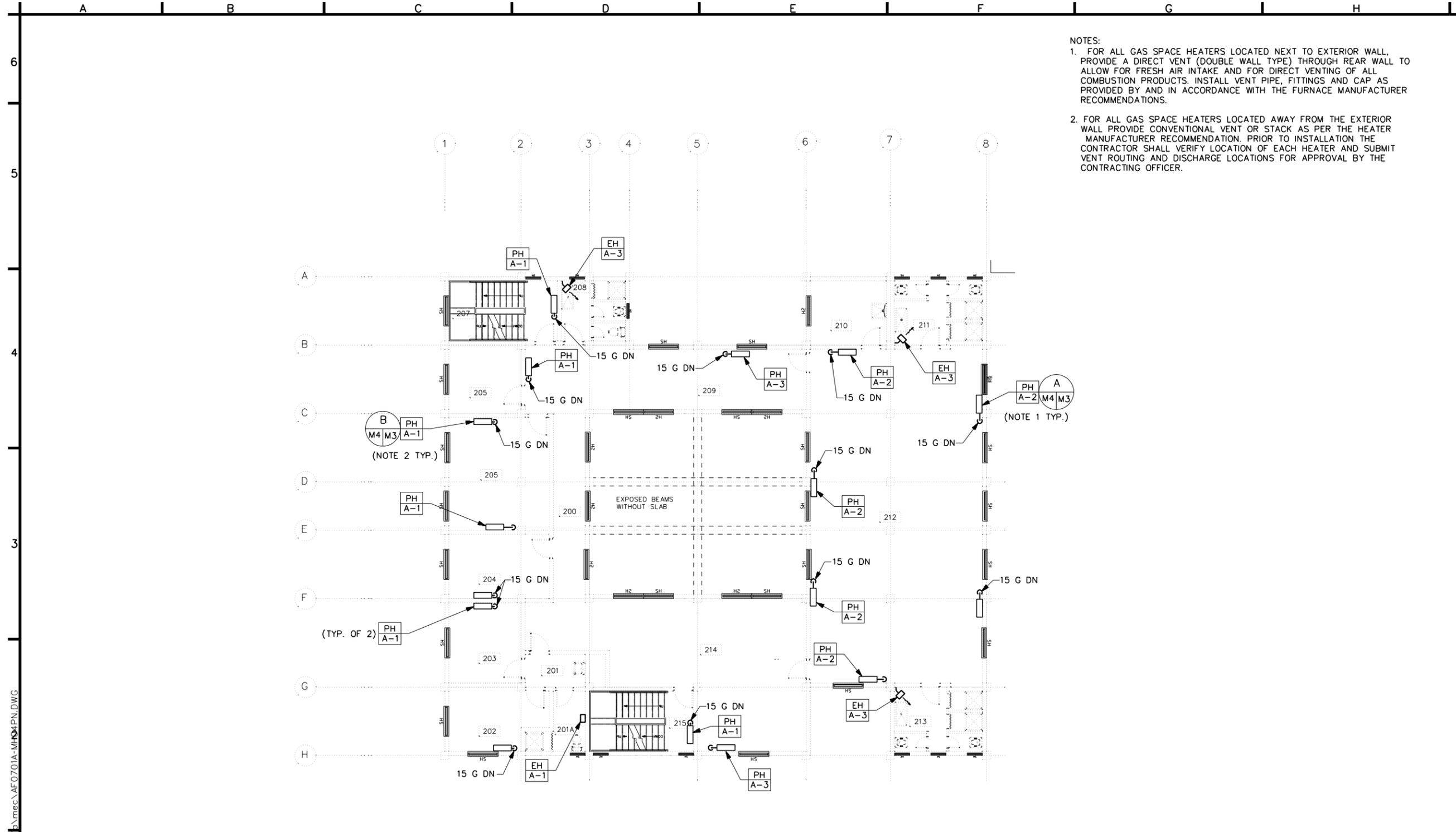
US Army Corps of Engineers
 Translational Programs Center

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
 POLICE HEADQUARTERS
 FIRST FLOOR HEATING PLAN

SHEET REFERENCE NUMBER:
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M-3

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- NOTES:
1. FOR ALL GAS SPACE HEATERS LOCATED NEXT TO EXTERIOR WALL, PROVIDE A DIRECT VENT (DOUBLE WALL TYPE) THROUGH REAR WALL TO ALLOW FOR FRESH AIR INTAKE AND FOR DIRECT VENTING OF ALL COMBUSTION PRODUCTS. INSTALL VENT PIPE, FITTINGS AND CAP AS PROVIDED BY AND IN ACCORDANCE WITH THE FURNACE MANUFACTURER RECOMMENDATIONS.
 2. FOR ALL GAS SPACE HEATERS LOCATED AWAY FROM THE EXTERIOR WALL PROVIDE CONVENTIONAL VENT OR STACK AS PER THE HEATER MANUFACTURER RECOMMENDATION. PRIOR TO INSTALLATION THE CONTRACTOR SHALL VERIFY LOCATION OF EACH HEATER AND SUBMIT VENT ROUTING AND DISCHARGE LOCATIONS FOR APPROVAL BY THE CONTRACTING OFFICER.

SECOND FLOOR HEATING PLAN
 SCALE = 1:100



UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

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SYMBOL	DESCRIPTION	DATE	APP

DESIGNED BY: RMS	DATE: 02-05-07
DWN BY: RMS	SUBMITTED BY: SYED ENAYATULLA
CHK BY: SE	CHEF, PDI BLDG SYSTEMS
	FILE NO: AF0701 A-MHO4PN

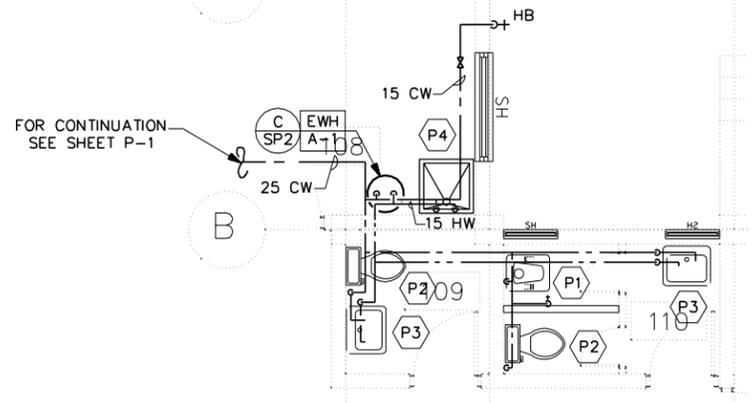
US Army Corps of Engineers
 Transatlantic Programs Center

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
 POLICE HEADQUARTERS
 SECOND FLOOR HEATING PLAN

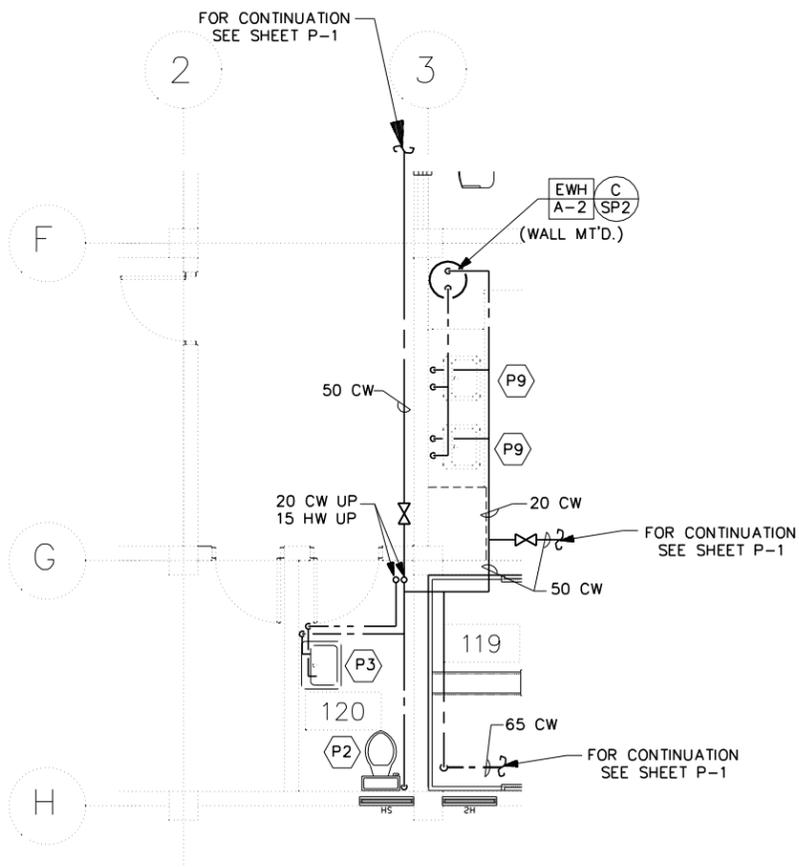
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3/9/2007
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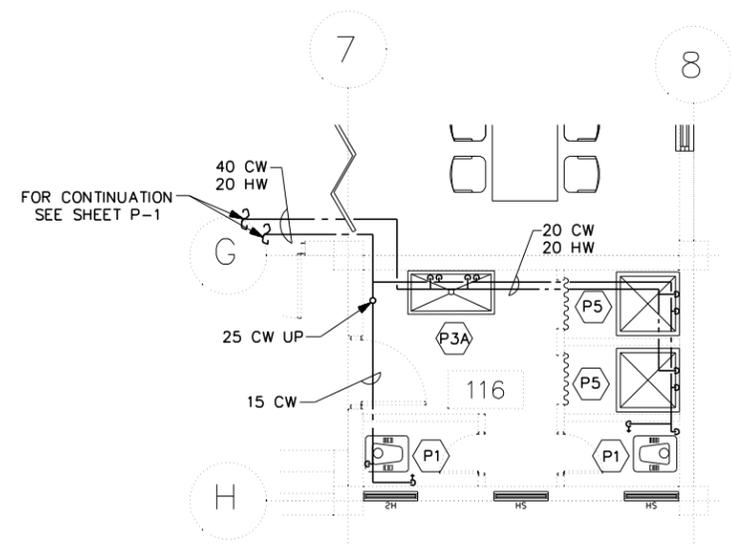
ENLARGED FIRST FLOOR TOILET PLAN "A"- WATER SUPPLY
 SCALE 1: 50



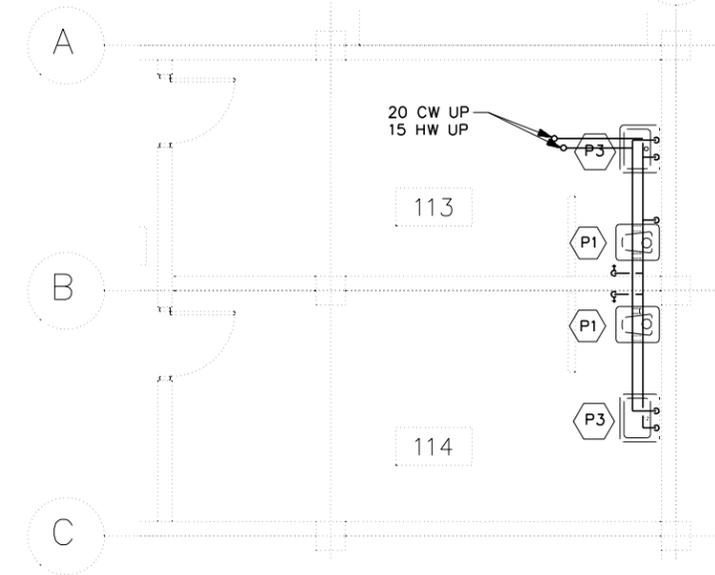
ENLARGED FIRST FLOOR TOILET PLAN "B"- WATER SUPPLY
 SCALE 1: 50



ENLARGED FIRST FLOOR TOILET PLAN "D"- WATER SUPPLY
 SCALE 1: 50



ENLARGED FIRST FLOOR TOILET PLAN "C"- WATER SUPPLY
 SCALE 1: 50



UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

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SYMBOL	DESCRIPTION	DATE	APP

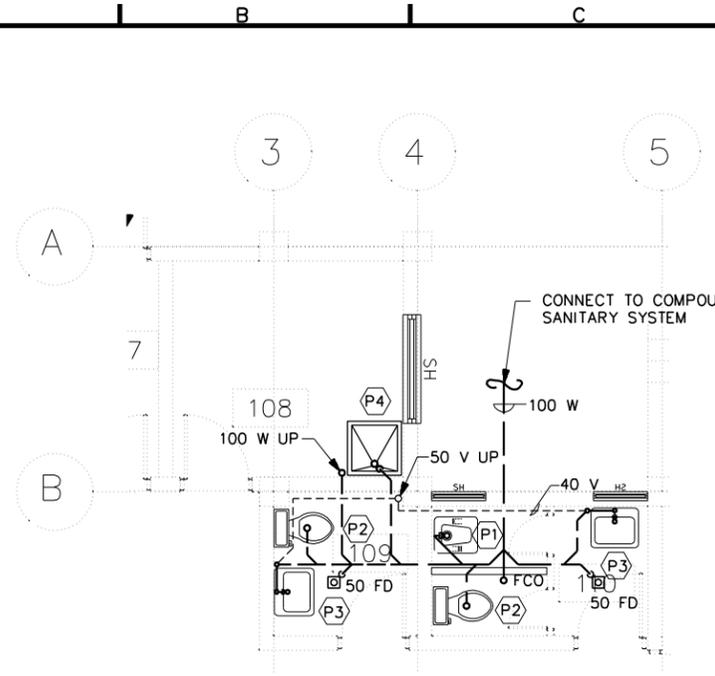
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DWN BY: RMS	SUBMITTED BY: SYED ENAYATULLA
CHK BY: SE	CHEF. PDI BLDG SYSTEMS
	FILE NO: AF0701 A-MPO31.S

US Army Corps of Engineers
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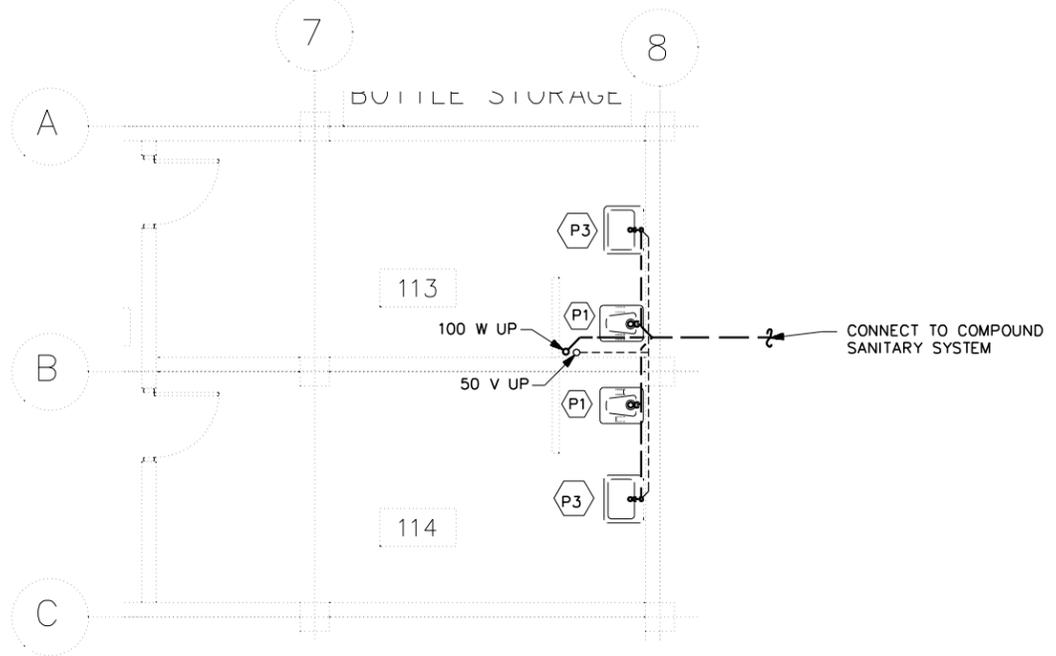
AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
 POLICE HEADQUARTERS FIRST FLOOR ENLARGED TOILET PLANS- WATER SUPPLY

SHEET REFERENCE NUMBER:
 A
 P-3

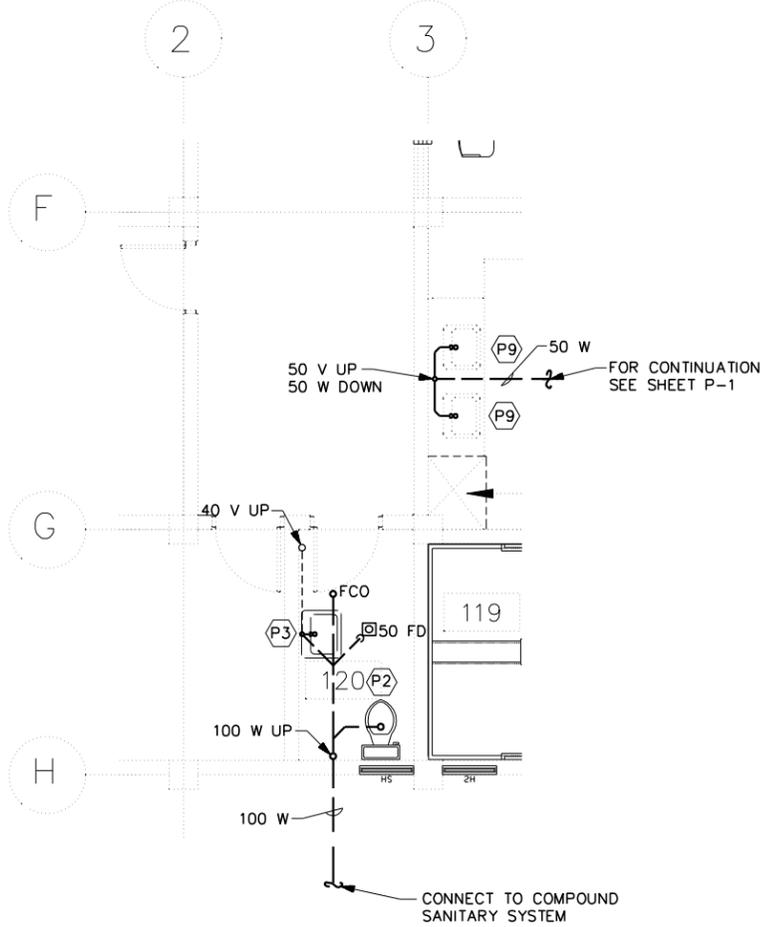
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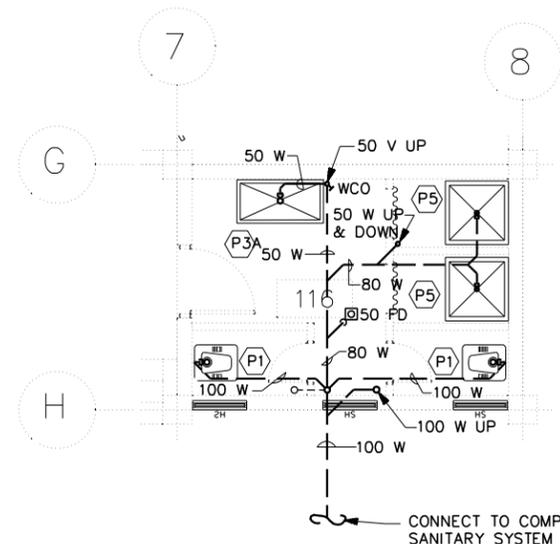
ENLARGED FIRST FLOOR TOILET PLAN "A"- WASTE AND VENT
 SCALE 1: 50



ENLARGED FIRST FLOOR TOILET PLAN "D"- WASTE AND VENT
 SCALE 1: 50



ENLARGED FIRST FLOOR TOILET PLAN "B"- WASTE AND VENT
 SCALE 1: 50



ENLARGED FIRST FLOOR TOILET PLAN "C"- WASTE AND VENT
 SCALE 1: 50



UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

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SYMBOL	DESCRIPTION	DATE	APP

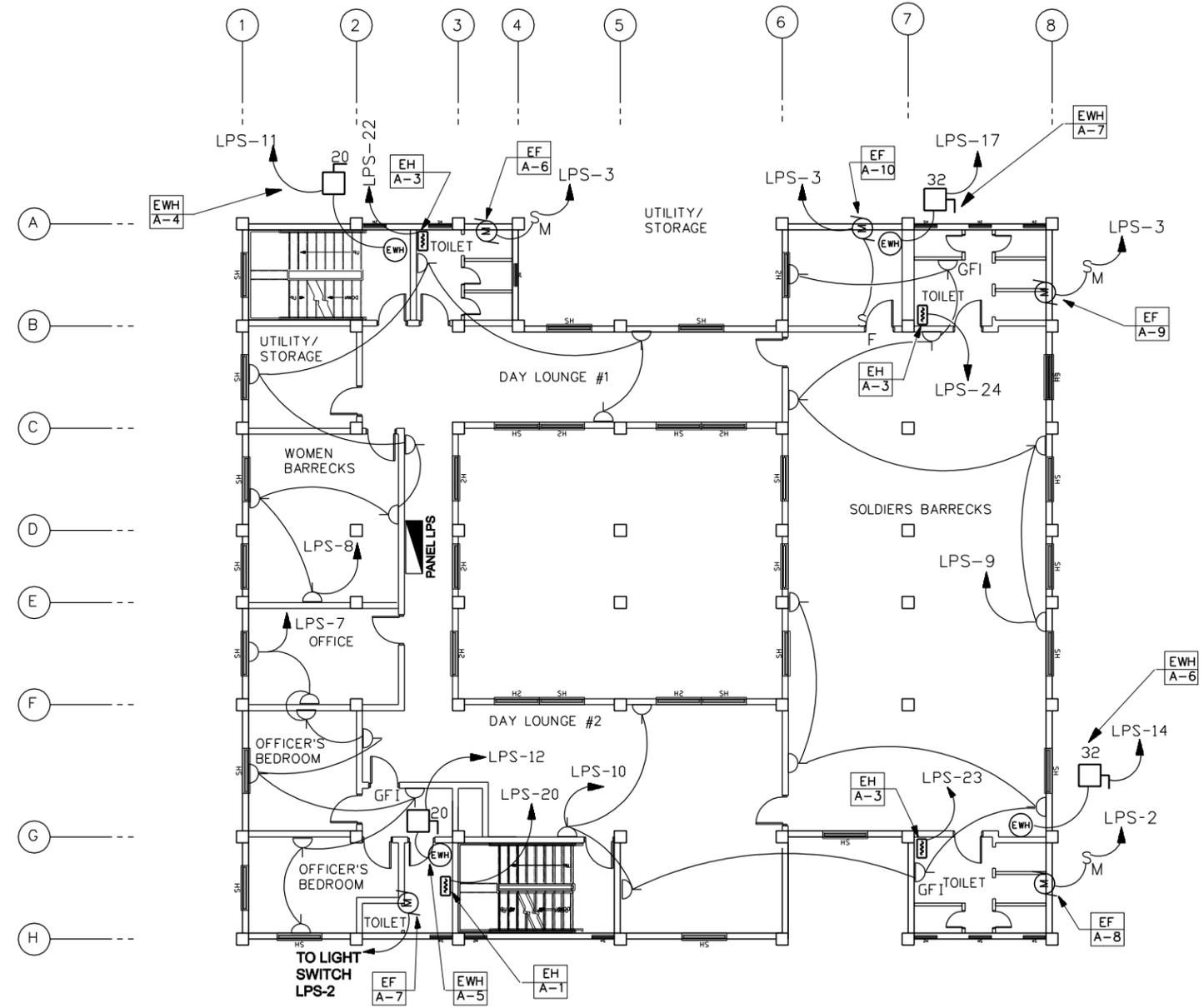
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DWN BY: RMS	SUBMITTED BY: SYED ENAYATULLA
CHK BY: SE	CHEF. PDI BLDG SYSTEMS
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AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
 POLICE HEADQUARTERS FIRST FLOOR ENLARGED TOILET PLANS- WASTE AND VENT

SHEET REFERENCE NUMBER:
 A
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3/9/2007
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SECOND FLOOR POWER PLAN
 SCALE - 1:100

- NOTES:
1. FOR LEGEND AND ABBREVIATIONS SEE DRAWING SE-1.
 2. COORDINATE LOCATION OF ALL ELECTRICAL FIXTURES AND EQUIPMENT WITH ALL OTHER TRADES.
 3. FOR ONE LINE DIAGRAM SEE DRAWING XE-2, POWER PLANT.
 4. ALL WIRING SHALL BE SURFACE MOUNTED IN METAL CONDUIT.
 5. FOR EXACT LOCATION OF MECHANICAL EQUIPMENT SEE MECHANICAL DRAWINGS.
 6. EXHAUST FANS A-4, A-5, A-6, A-8, AND A-9 SHALL BE CONTROLLED BY MANUAL MOTOR STARTER LOCATED BESIDE EACH EXHAUST FAN 2.4 METER ABOVE FINISHED FLOOR.
 7. EXHAUST FANS A-1, A-3, AND A-7 SHALL BE CONTROLLED BY LIGHT SWITCH IN ITS RESPECTIVE ROOM.
 8. EXHAUST FAN A-2, A-10, A-11 AND A-12 SHALL BE CONTROLLED BY LOCAL FAN SWITCH.
 9. ALL EXTERIOR DISCONNECT SWITCHES SHALL HAVE NEMA 4 STAINLESS STEEL ENCLOSURE.



UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

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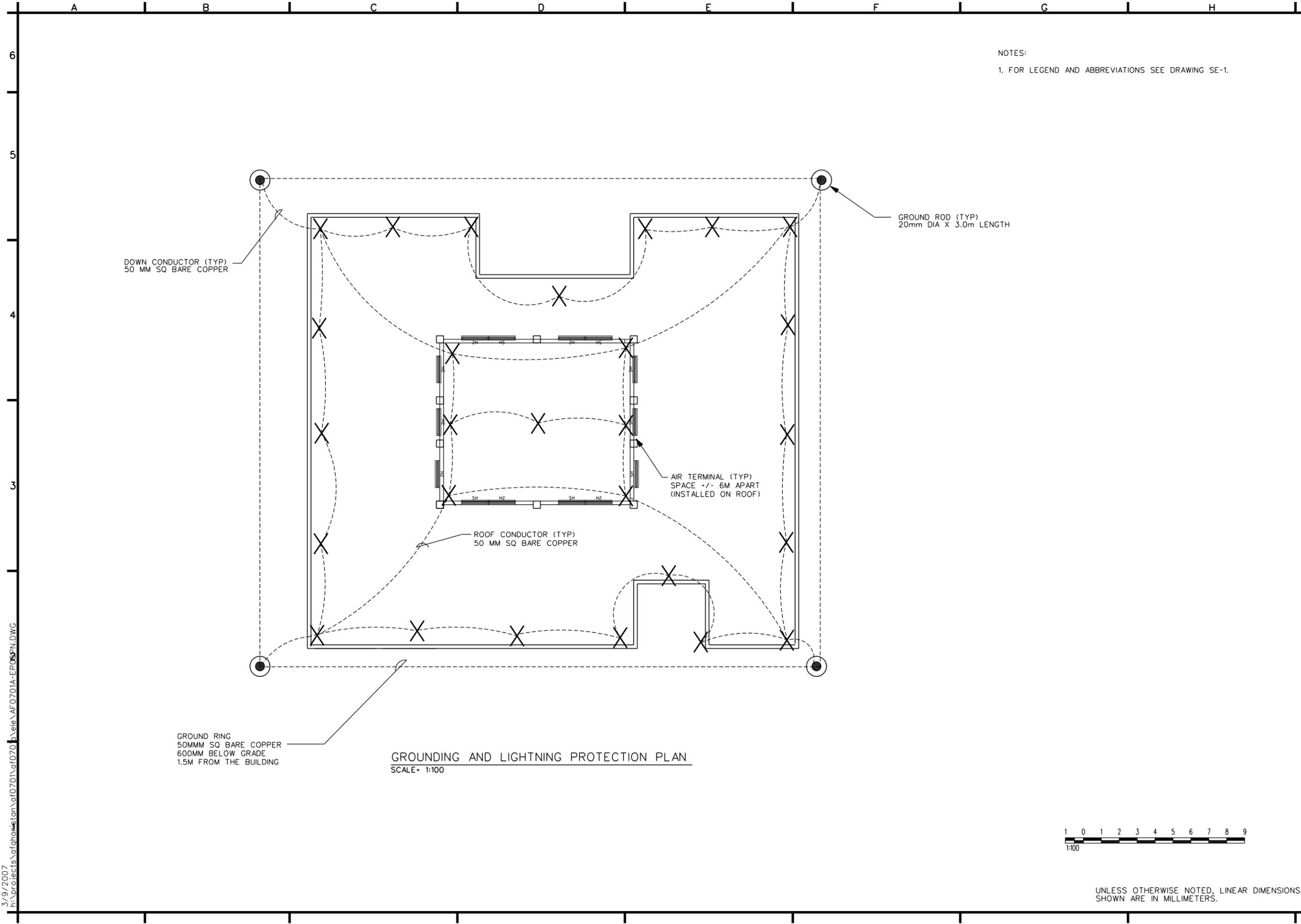
NO.	DATE	DESCRIPTION

DESIGNED BY: DATE: 02-05-07	MM	MM	MM	MM	MM	MM
DWN BY: SYED ENAYATULLA	MM	MM	MM	MM	MM	MM
CHIEF, PDI BLDG SYSTEMS	SE	SE	SE	SE	SE	SE
FILE NO: AF0701 A-EPO4PN						

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
 POLICE HEADQUARTERS
 SECOND FLOOR POWER PLAN

SHEET REFERENCE NUMBER:
 A
 E-4

3/9/2007
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DOWN CONDUCTOR (TYP)
50 MM SQ BARE COPPER

GROUND ROD (TYP)
20mm DIA X 3.0m LENGTH

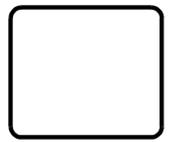
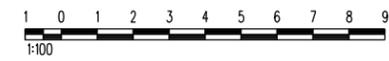
AIR TERMINAL (TYP)
SPACE +/- 6M APART
(INSTALLED ON ROOF)

ROOF CONDUCTOR (TYP)
50 MM SQ BARE COPPER

GROUND RING
50MM SQ BARE COPPER
600MM BELOW GRADE
1.5M FROM THE BUILDING

GROUNDING AND LIGHTNING PROTECTION PLAN
SCALE: 1:100

NOTES:
1. FOR LEGEND AND ABBREVIATIONS SEE DRAWING SE-1.



SYMBOL	DESCRIPTION	DATE	APP

DESIGNED BY: MM	DATE: 02-05-07
DWN BY: MM	SUBMITTED BY: SYED ENAYATULLA CHIEF, PDI BLDG SYSTEMS
CHK BY: SE	FILE NO: AF0701 A-EPO5PN

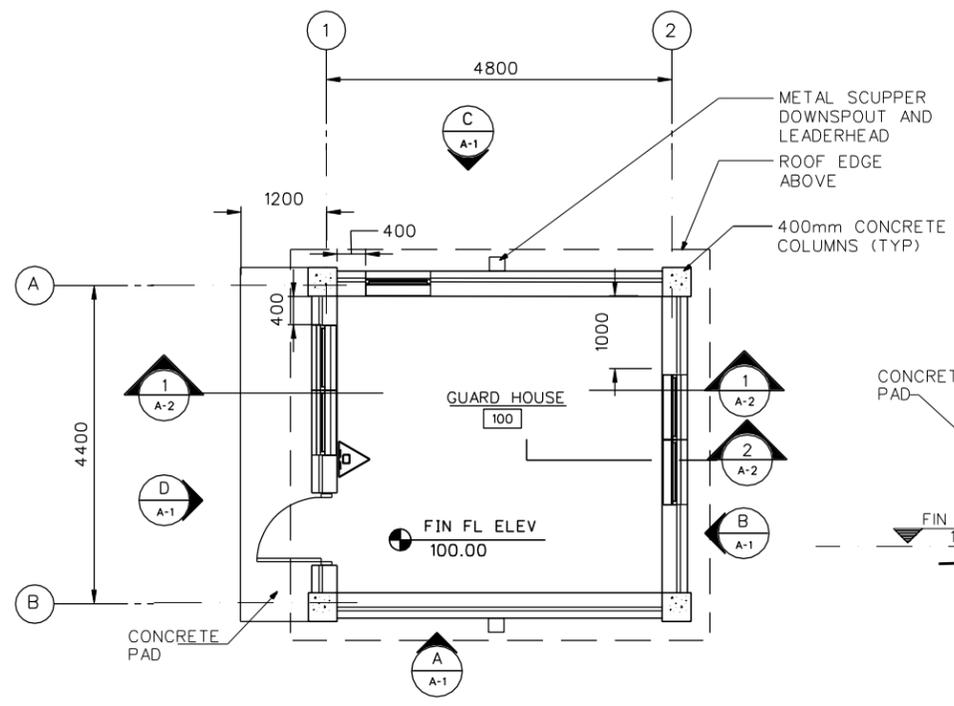
US Army Corps
of Engineers
Transatlantic Programs
Center

AFGHAN NATIONAL POLICE
HEADQUARTERS (2 STORY)
COMPOUND
AFGHANISTAN
POLICE HEADQUARTERS
GROUNDING AND LIGHTNING
PROTECTION PLAN

SHEET
REFERENCE
NUMBER:
A
E-5

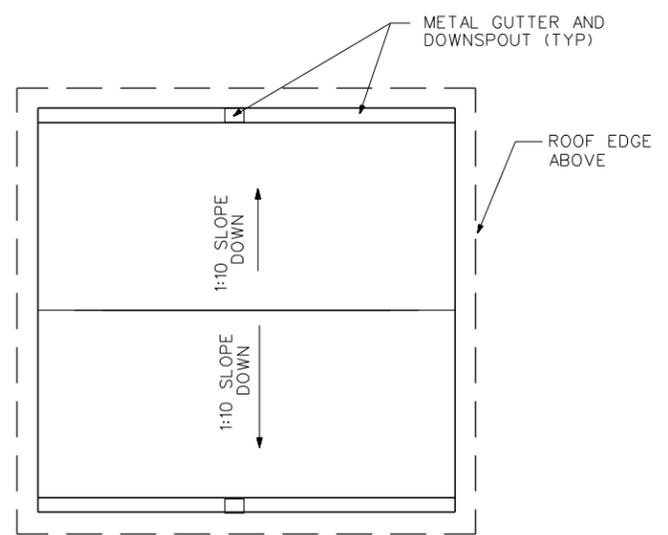
UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS
SHOWN ARE IN MILLIMETERS.

3/9/2007
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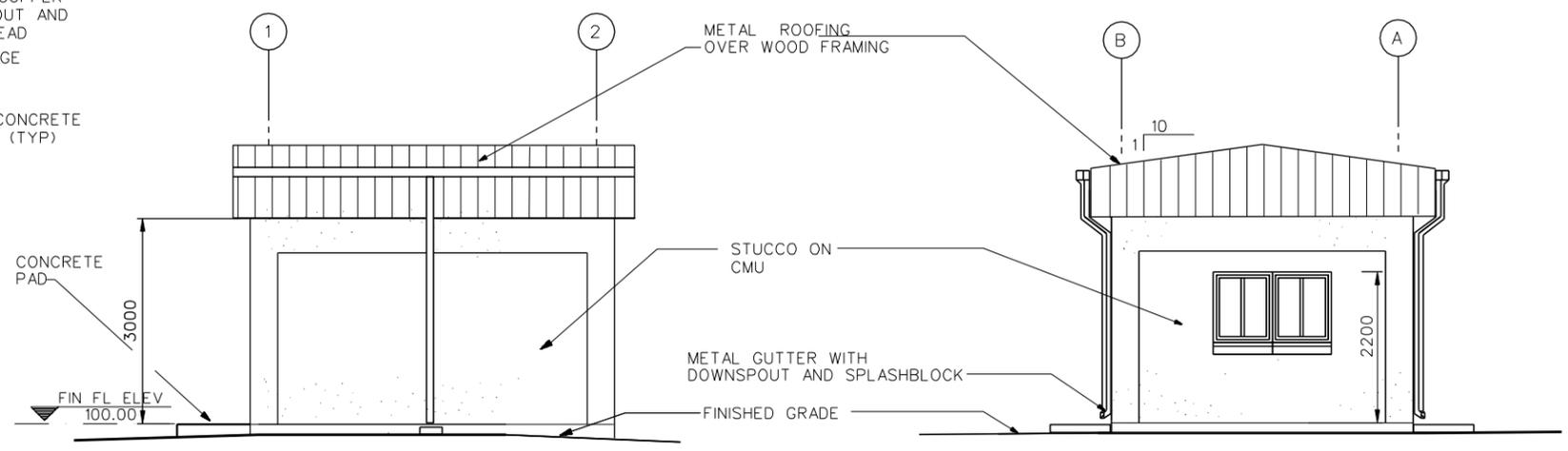


FLOOR PLAN
 SCALE= 1:50

△ PROVIDE PORTABLE FIRE EXTINGUISHER, ABC
 DRY CHEMICAL 4A:60B:C

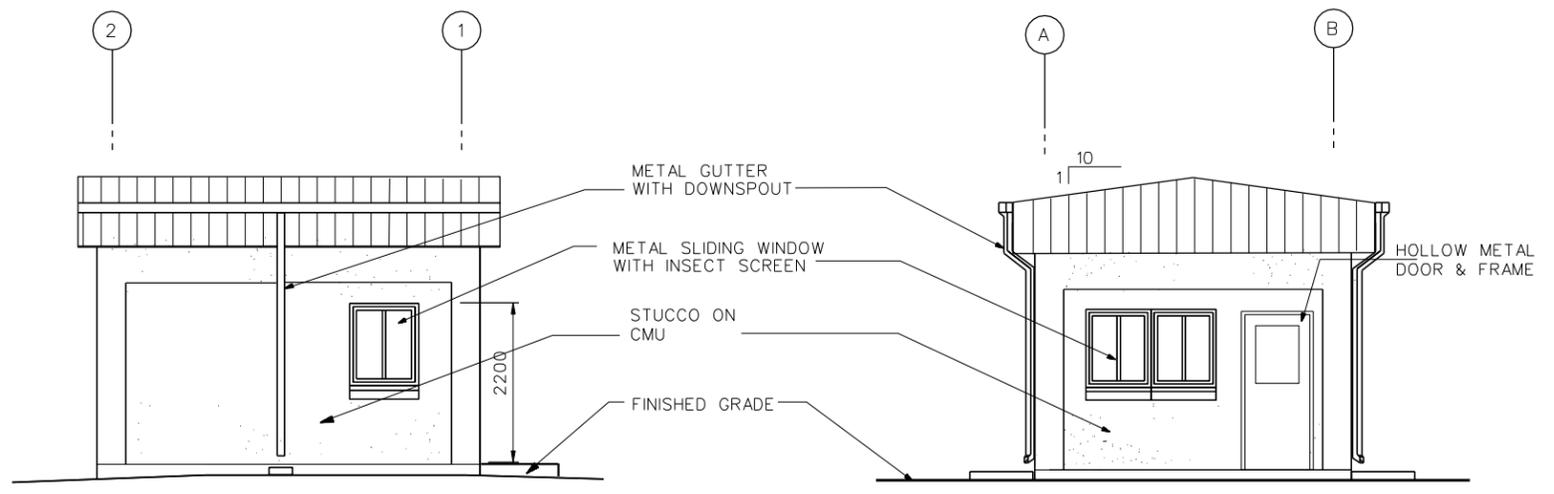


ROOF PLAN
 SCALE= 1:50



ELEVATION
 SCALE= 1: 50

ELEVATION
 SCALE= 1: 50



ELEVATION
 SCALE= 1: 50

ELEVATION
 SCALE= 1: 50

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SYMBOL	DESCRIPTION	DATE

DESIGNED BY: S. Hanna	DATE: 02-05-07
DWN BY: S. Hanna	SUBMITTED BY: PHILIP D. DANIELLO
CHK BY: S. Hanna	FILE NO: AF0701 D-ARO/ptn
CHECK-BY: S. Hanna	

US Army Corps of Engineers
 Translational Programs Center

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY)
 AFGHANISTAN
 GUARD HOUSE
 BUILDING PLANS & ELEVATIONS

SHEET REFERENCE NUMBER:
 D
 A-1

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

3/9/2007
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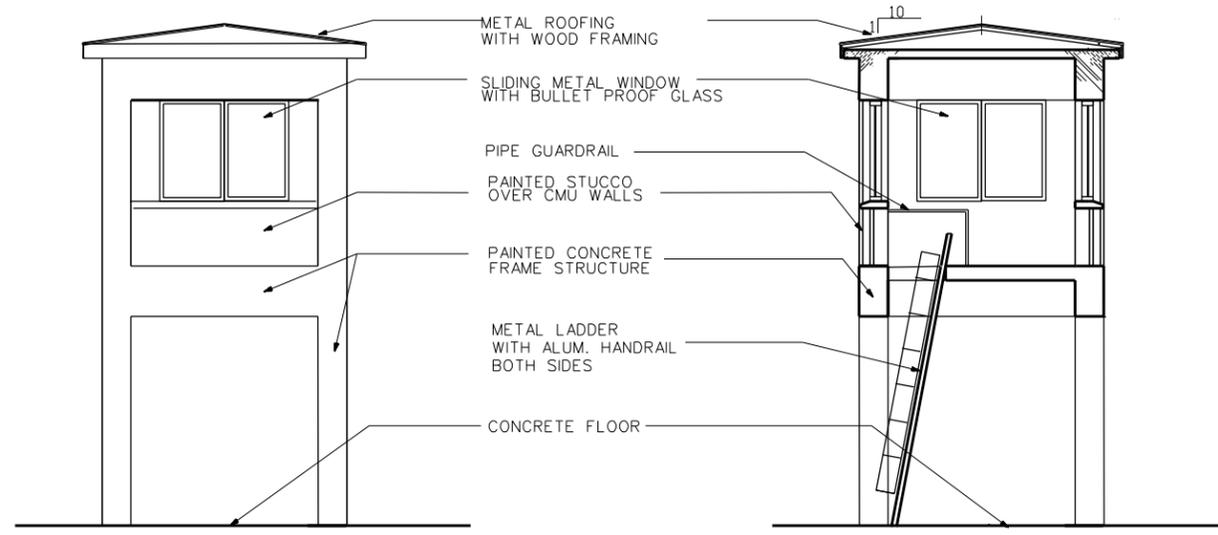
A B C D E F G H

6

5

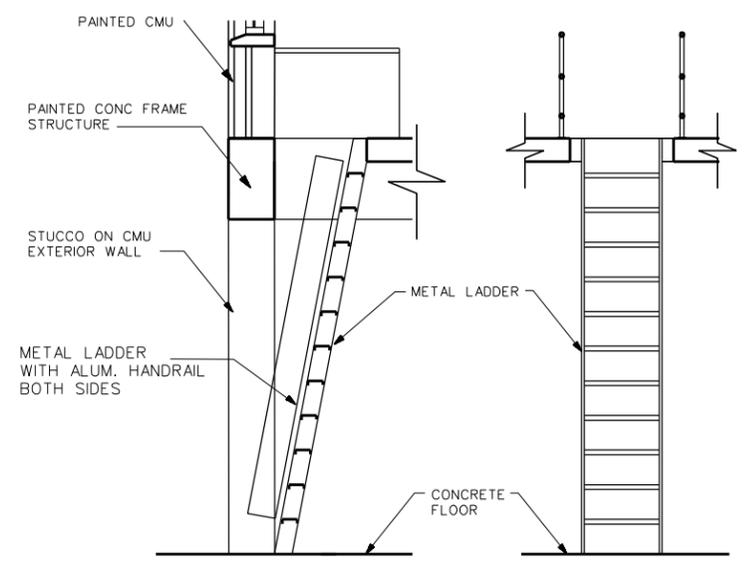
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3



ELEVATION
 SCALE=1:50

SECTION
 SCALE=1:50

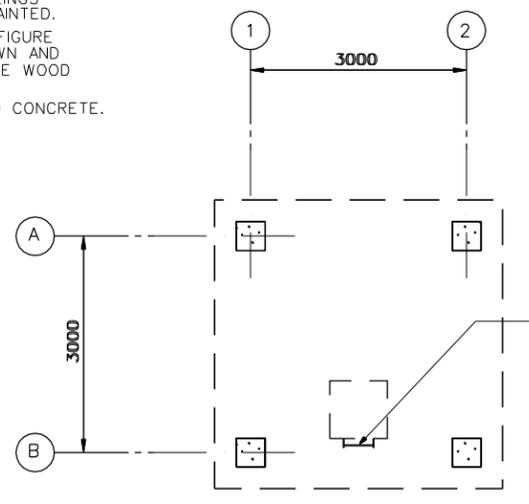


SECTION

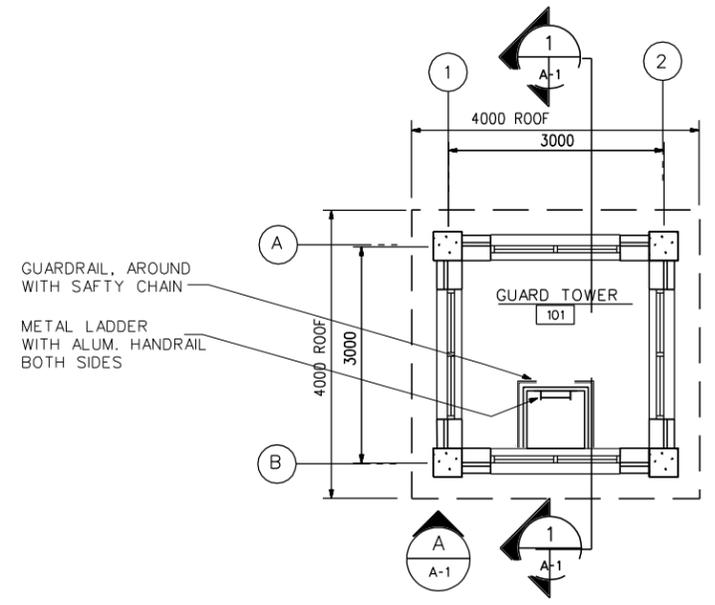
ELEVATION

GUARD TOWER ACCESS LADDER
 (NOT TO SCALE)

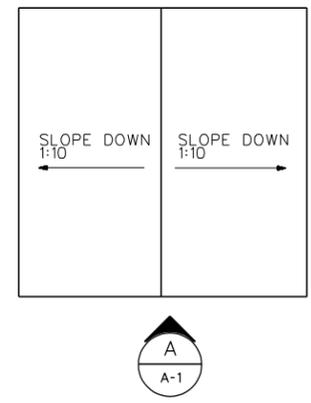
- GENERAL NOTES:
1. ALL CMU WALLS AND CEILINGS SHALL BE PLASTERED AND PAINTED.
 2. CONTRACTOR SHALL CONFIGURE THE METAL ROOFING AS SHOWN AND CONSTRUCT WITH APPROPRIATE WOOD FRAMING.
 3. FLOOR SHALL BE SEALED CONCRETE.



GROUND LEVEL PLAN
 SCALE=1:50



FIRST FLOOR PLAN
 SCALE=1:50



ROOF PLAN
 SCALE=1:50

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SYMBOL	DESCRIPTION	DATE	APP

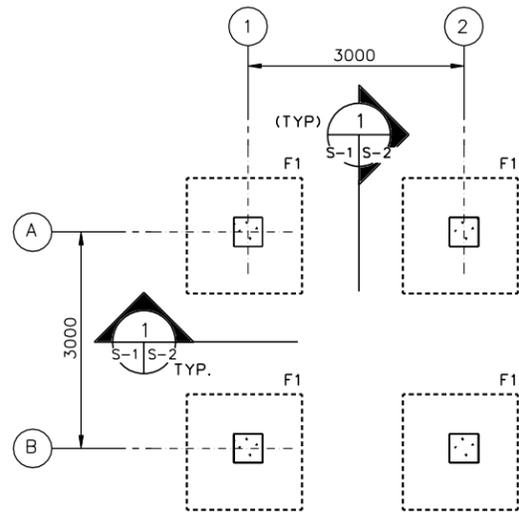
DESIGNED BY: S. Hanna	DATE: 02-05-07
DWN BY: S. Hanna	SUBMITTED BY: PHILIP S. DANIELLO
CHK BY: S. Hanna	FILE NO: AF0701 E-AR01PN

US Army Corps of Engineers
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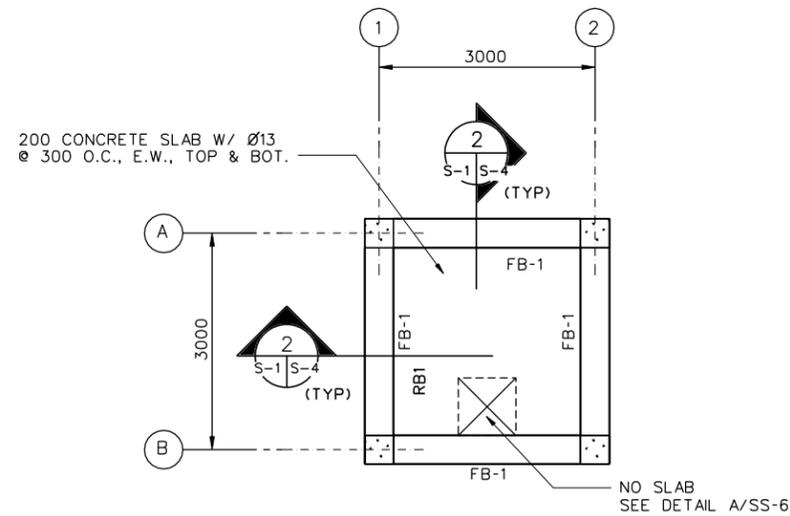
AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
 GUARD TOWER
 FLOOR PLANS AND ELEVATIONS

SHEET REFERENCE NUMBER:
E
A-1

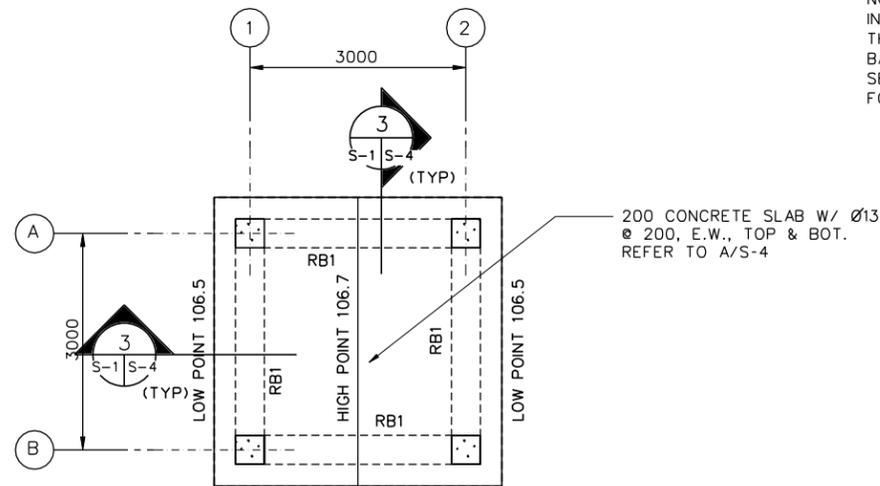
UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.



FOUNDATION AND SLAB PLAN
SCALE: 1:50



FIRST FLOOR PLAN
SCALE: 1:50



ROOF FRAMING PLAN
SCALE: 1:50

- DESIGN LOADS (SERVICE)
 - LIVE LOADS:
 - ROOF: 1.0 KPA (20 PSF)
 - OTHERS: 4.8 KPA (100 PSF)
 - 8.9 KN (2.0 K) CONCENTRATED LOAD
 - WIND LOADS PER IBC-2003
 - USING A "3-SECOND" WIND VELOCITY OF 125 KPH (78 MPH), EXPOSURE C AND IMPORTANCE FACTOR I=1.0
 - EARTHQUAKE LOADS PER IBC-2003:
 - USING A SEISMICITY: $S_s=1.65g$ AND $S_1=0.75g$
- MATERIALS:
 - CONCRETE: 28 MPa (4 KSI) CYLINDER STRENGTH AT 28 DAYS
 - REINFORCING: ASTM A615 GRADE 60 (60 KSI)
 - WELDED WIRE FABRIC: ASTM A185
 - CONCRETE MASONRY UNITS:
 - ASTM C90, TYPE I (NORMAL WEIGHT, MOISTURE CONTROLLED) MORTAR, ASTM C270, TYPE S
 - GROUT, ASTM C 476
 - JOINT REINFORCEMENT, LADDER TYPE
- WORK THESE STRUCTURAL DRAWINGS WITH THE STANDARD-DETAILS DRAWINGS.
- A RELATIVE (DATUM) FINISH FLOOR ELEVATION EQUAL TO 100.00 M. IS USED AS REFERENCE ELEVATION FOR ALL STRUCTURAL DRAWINGS. REFER TO CIVIL DRAWINGS FOR ACTUAL FINISH ELEVATIONS.
- FOUNDATIONS ARE DESIGNED USING AN ALLOWABLE BEARING PRESSURE OF 0.75 KG/SQ. CM (1500 PSF), AND BOTTOM OF FOOTINGS ARE PLACED AS SHOWN ON DRAWINGS. GEOTECHNICAL INVESTIGATION SHALL CONFIRM BEARING CAPACITY TO BE NO LESS THAN 0.75 KG/SQ CM. IF GEOTECHNICAL INVESTIGATION SHOWS LESS THAN 0.75 KG/SQ CM THE CONTRACTOR SHALL REDESIGN FOOTINGS BASED ON THE GEOTECHNICAL INVESTIGATION. SEE SPECIFICATION 01015 PARAGRAPH, GEOTECHNICAL, FOUNDATION AND SURVEY.



UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

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SYMBOL	DESCRIPTION	DATE	APP.

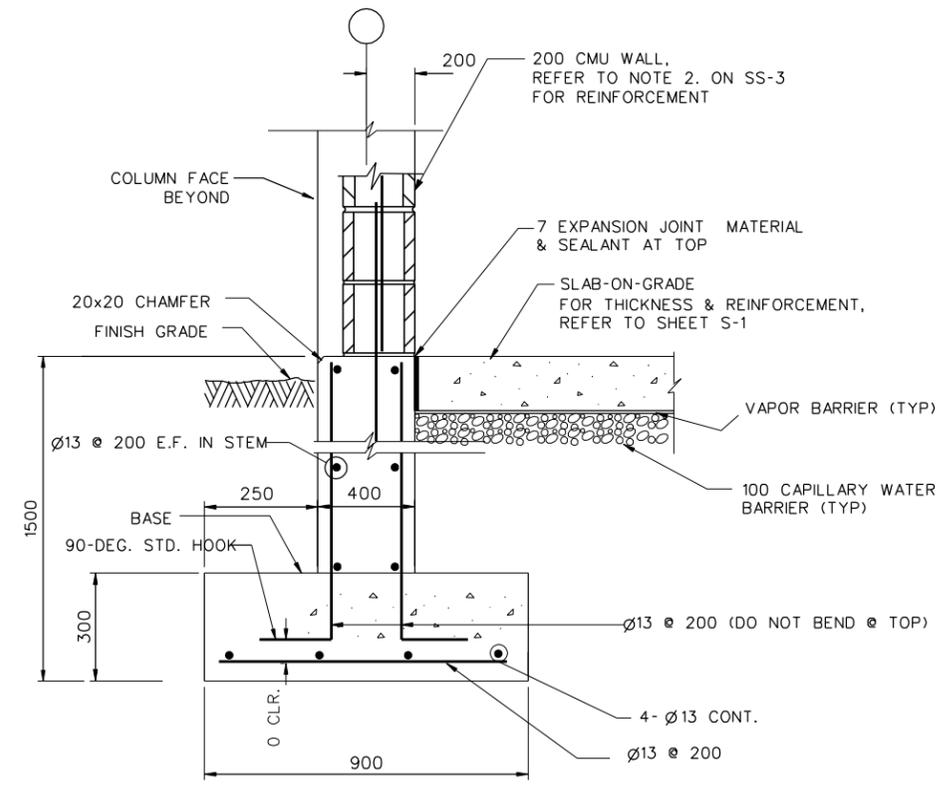
DESIGNED BY: RC	DATE: 02-05-07	SUBMITTED BY: PHILIP DELLO	PROJECT: PDI FACILITIES DES.
DWN BY: TCP	CHK BY: KGO	FILE NO: AF0701 E-SB01PN	
US Army Corps of Engineers Translational Programs Center			

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN GUARD TOWER FOUNDATION AND SLAB PLAN ROOF FRAMING PLAN

SHEET REFERENCE NUMBER:
F
S-1

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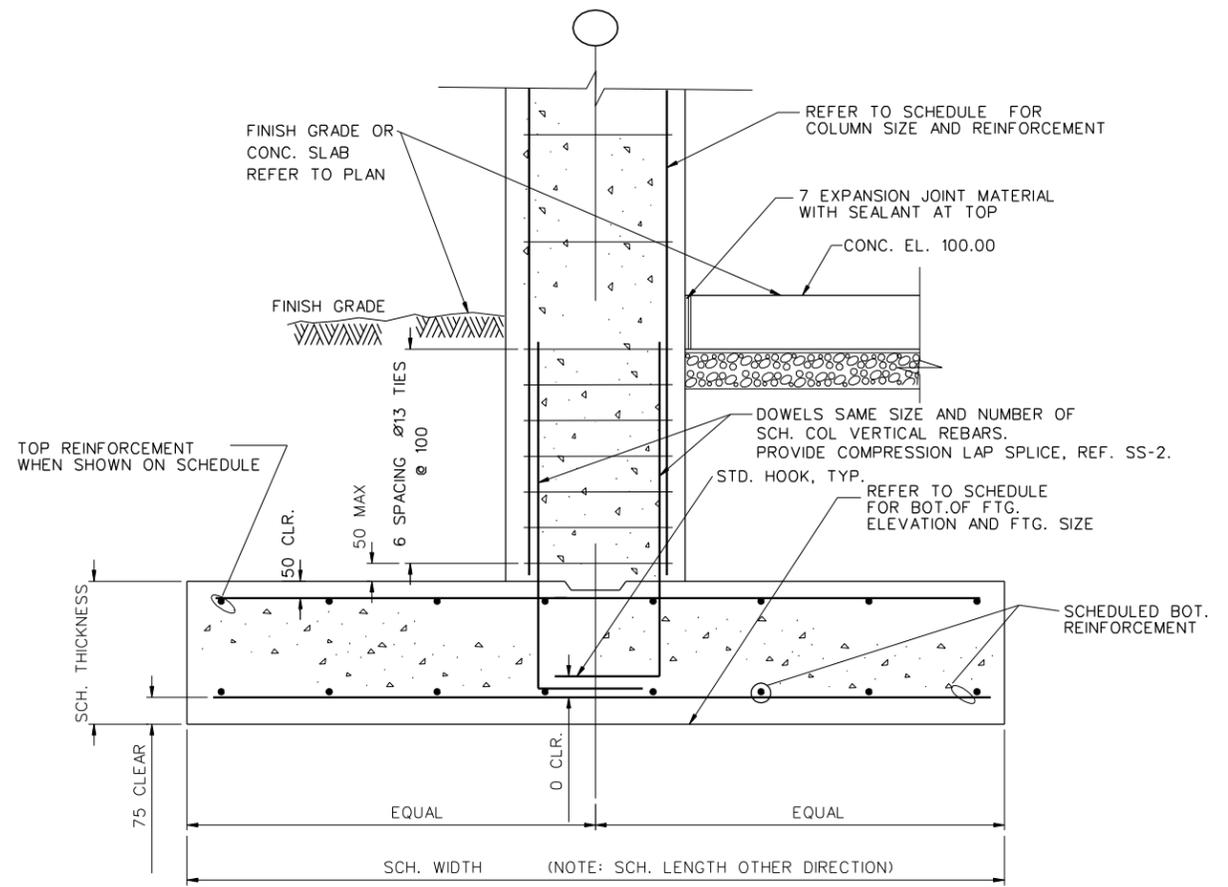
FOOTING SCHEDULE							NOTE: REFER TO A/S-2 FOR TYPICAL SECTION OF FOOTINGS.
MARK	CONCRETE DIMENSIONS			REINFORCEMENT		FTG. BOTTOM EL. METERS	REMARKS
	WIDTH	LENGTH	THICKNESS	TOP	BOTTOM		
F1	1600	1600	300	—	5-Ø25 E.W.	98.5	



TYPICAL WALL FOOTING

SECTION 1
SCALE-N.T.S. S-1 S-2

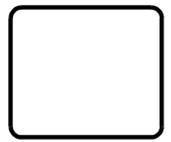
- NOTES:
- HORIZONTAL STEM WALL AND FOOTING REINFORCEMENTS ARE CONTINUOUS THROUGH COLUMN AND COLUMN FOOTING
 - AT DISCONTINUOUS STEM WALL BARS TERMINATE WITH STANDARD HOOK IN COLUMN. FOOTING BARS TERMINATE WITH 600 MM EMBEDMENT IN COLUMN FOOTING.
 - REFER TO CIVIL DWGS FOR ACTUAL FINISH FLOOR ELEVATIONS.



TYPICAL COLUMN FOOTING

DETAIL A
SCALE-N.T.S. S-2 S-2

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SYMBOL	DESCRIPTION	DATE	APP.

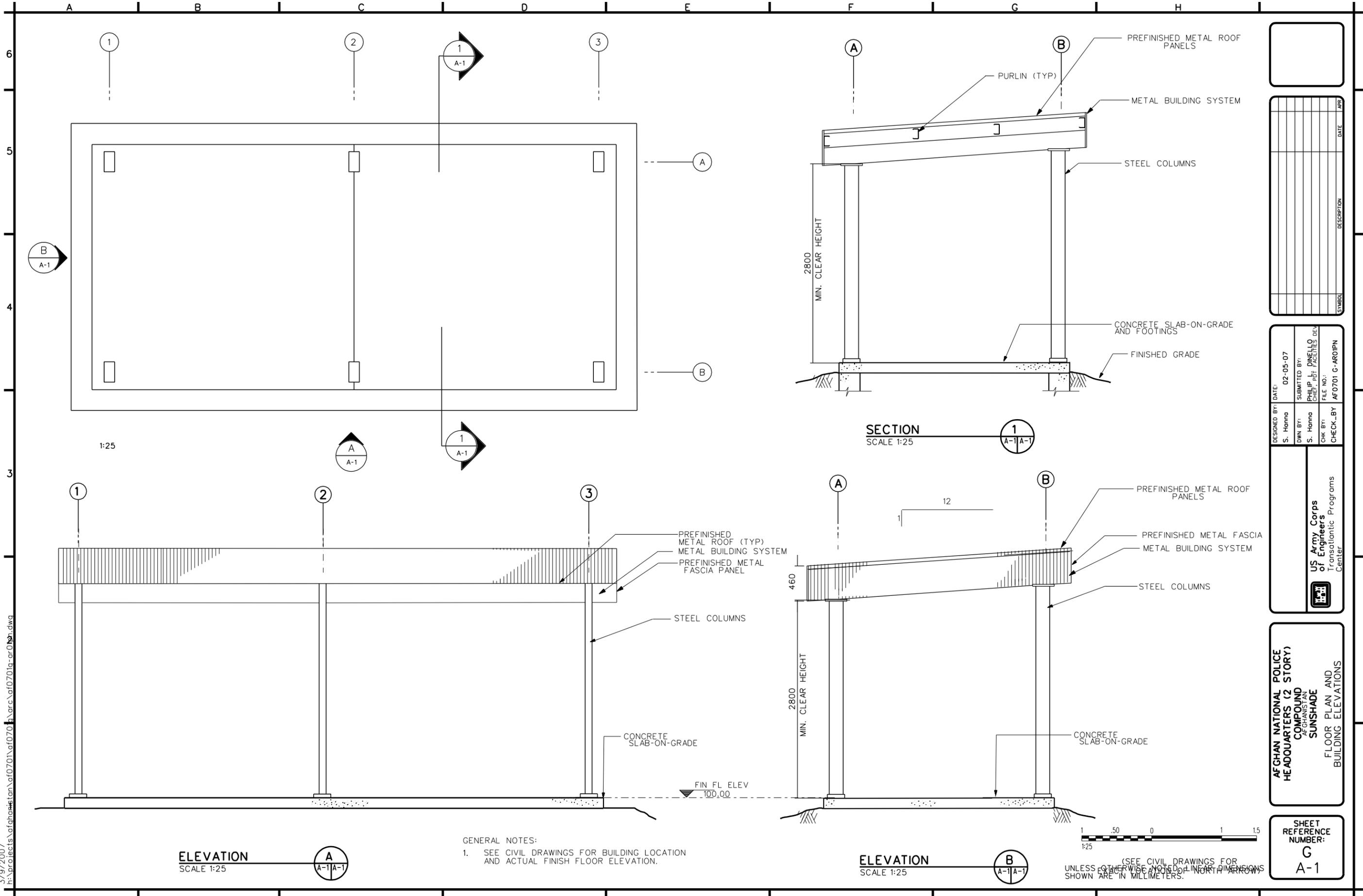
DESIGNED BY: RC	DATE: 02-05-07
DWN BY: TCP	SUBMITTED BY: DANIELLO
CHK BY: KGO	PHILIP_PDF FACILITIES DES
	FILE NO: AF0701 F-SB0201

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AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
GUARD SHACK FOOTING DETAILS

SHEET REFERENCE NUMBER:
F
S-2

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.



1:25

SECTION
SCALE 1:25

ELEVATION
SCALE 1:25

ELEVATION
SCALE 1:25

GENERAL NOTES:
1. SEE CIVIL DRAWINGS FOR BUILDING LOCATION AND ACTUAL FINISH FLOOR ELEVATION.

1 0 1 1.5
1:25

(SEE CIVIL DRAWINGS FOR EXTERIOR FINISH AND DIMENSIONS UNLESS OTHERWISE NOTED. NORTH ARROW SHOWN ARE IN MILLIMETERS.)

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SYMBOL	DESCRIPTION	DATE	APP.

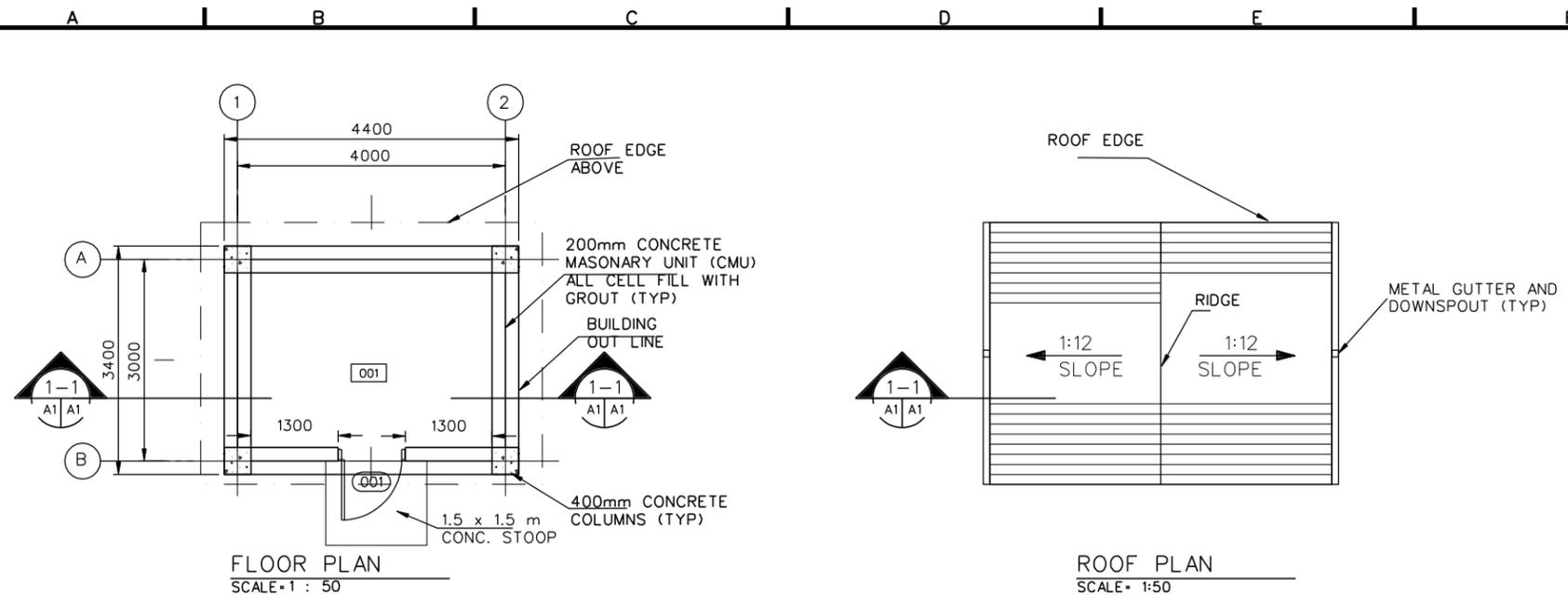
DESIGNED BY: S. Hanna	DATE: 02-05-07
DWN BY: S. Hanna	SUBMITTED BY: PHILIP PINELLO
CHK BY: S. Hanna	CHEK. PDF FACILITIES DES.
CHECK-BY: AF0701 G-AR01P	FILE NO.:

US Army Corps of Engineers
Translational Programs Center

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN SUNSHADE FLOOR PLAN AND BUILDING ELEVATIONS

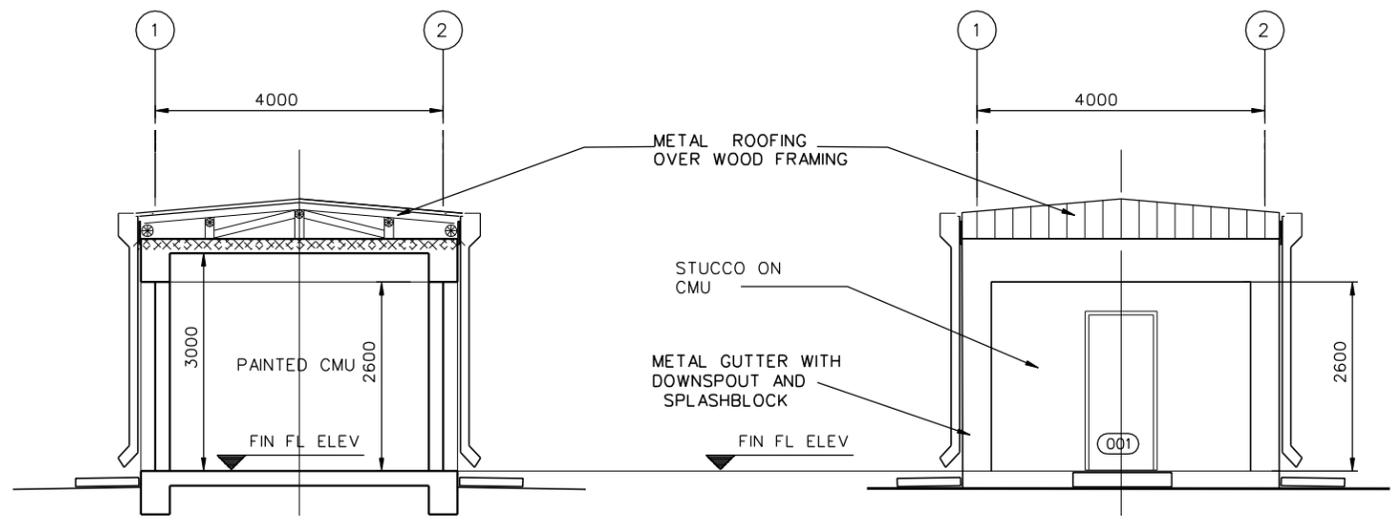
SHEET REFERENCE NUMBER:
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A-1

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FLOOR PLAN
SCALE = 1 : 50

ROOF PLAN
SCALE = 1:50



BUILDING SECTION
SCALE = 1 = 100

ELEVATION
SCALE = 1: 50

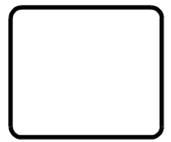
ROOM FINISH SCHEDULE LEGEND

- FLOOR TYPE**
F1 SEALED CONCRETE
- FLOOR COLOR**
1 SEALED CONCRETE - NATURAL FINISH
- WALL TYPE**
W1 PAINTED CMU
- WALL COLOR**
20 PAINTED CMU -HEMPEL, 1005-Y50R-25400,
- CEILING TYPE**
C1 PAINTED EXPOSED STRUCTURE
- CEILING COLOR**
30 PAINTED EXPOSED STRUCTURE - HEMPEL, 0502-Y-15420, OFF WHITE

- ROOM FINISH SCHEDULE NOTES:
- ALL WALL PENETRATIONS SHALL BE SEALED TO PROVIDE A NEAT APPEARANCE. PENETRATIONS OF EXTERIOR WALLS SHALL BE SEALED TO BE WATER-TIGHT.
 - SEALANTS SHALL MATCH THE COLOR OF ADJACENT SURFACES.

ROOM FINISH SCHEDULE											
ROOM NO.	ROOM NAME	FLOOR		BASE		WALLS		CEILING			REMARKS
		MAT'L.	COLOR	MAT'L.	COLOR	MAT'L.	COLOR	MAT'L.	COLOR	HEIGHT	
001	WELL HOUSE ROOM	F1	1	--	--	W1	20	C1	30	3400	

DOOR SCHEDULE													
NO.	LOCATION	TYPE	DOOR			FRAME				FIRE LABEL	HDW SET	REMARKS	
			MAT'L	WIDTH	HEIGHT	THICK	HEAD	JAMB	SILL				MAT'L
001	WELL HOUSE ROOM	F	HM	900	2150	45	H-1/SA2	J-1/SA2	S-1/SA2	HM	--	6	



SYMBOL	DESCRIPTION	DATE	APP

DESIGNED BY: S. Hanna
 DATE: 02-05-07
 SUBMITTED BY: PHILIP S. Hanna
 CHECKED BY: PHILIP S. Hanna
 FILE NO.: AF0701 H-AF01PN

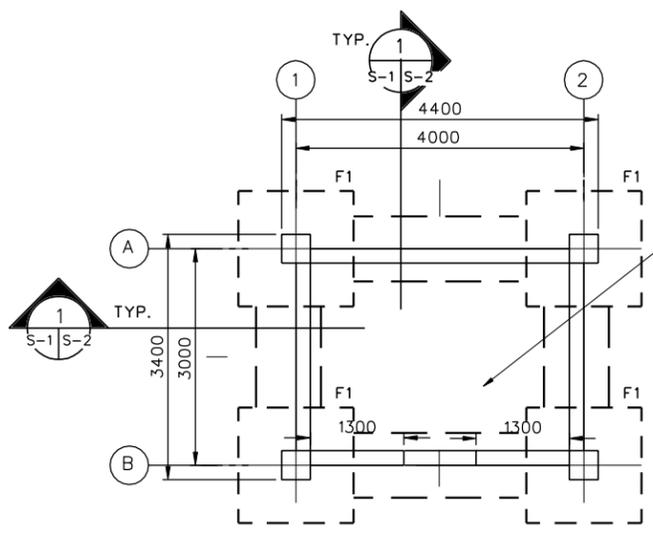
US Army Corps of Engineers
 Transatlantic Programs Center

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
 WELL HOUSE BUILDING
 FLOOR PLAN/ELEVATION/SCHEDULE

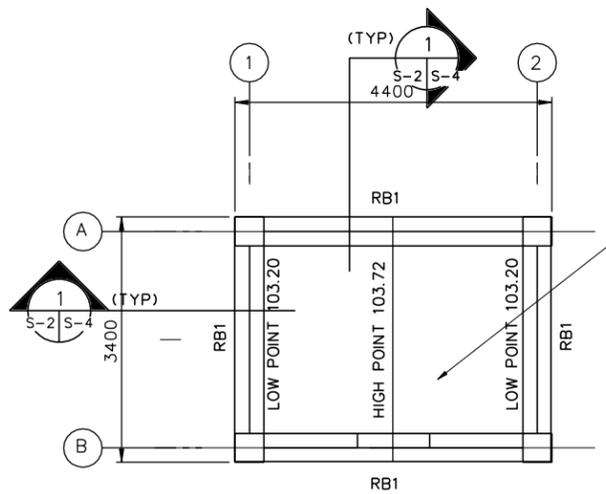
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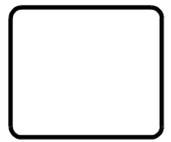


FOUNDATION AND SLAB PLAN
 SCALE=1:50



ROOF FRAMING PLAN
 SCALE=1:50

- DESIGN LOADS (SERVICE)
 LIVE LOADS:
 ROOF: 1.0 KPA (20 PSF)
 OTHERS: 4.8 KPA (100 PSF)
 8.9 KN (2.0 K) CONCENTRATED LOAD
 WIND LOADS PER IBC-2003
 USING A "3-SECOND" WIND VELOCITY OF 125 KPH (78 MPH),
 EXPOSURE C AND IMPORTANCE FACTOR I=1.0
 EARTHQUAKE LOADS PER IBC-2003:
 USING A SEISMICITY: $S_s=1.65g$ AND $S_1=0.75g$
- MATERIALS:
 CONCRETE: 28 MPa (4 KSI)
 CYLINDER STRENGTH AT 28 DAYS
 REINFORCING: ASTM A615 GRADE 60 (60 KSI)
- WORK THESE STRUCTURAL DRAWINGS WITH THE STANDARD-DETAILS DRAWINGS.
- A RELATIVE (DATUM) FINISH FLOOR ELEVATION EQUAL TO 100.00 M. IS USED AS REFERENCE ELEVATION FOR ALL STRUCTURAL DRAWINGS. REFER TO CIVIL DRAWINGS FOR ACTUAL FINISH ELEVATIONS.
- FOUNDATIONS ARE DESIGNED USING AN ALLOWABLE BEARING PRESSURE OF 0.75 KG/SQ. CM (1500 PSF), AND BOTTOM OF FOOTINGS ARE PLACED AS SHOWN ON DRAWINGS. GEOTECHNICAL INVESTIGATION SHALL CONFIRM BEARING CAPACITY TO BE NO LESS THAN 0.75 KG/SQ CM. IF GEOTECHNICAL INVESTIGATION SHOWS LESS THAN 0.75 KG/SQ CM THE CONTRACTOR SHALL REDESIGN FOOTINGS BASED ON THE GEOTECHNICAL INVESTIGATION. SEE SPECIFICATION 01015 PARAGRAPH, GEOTECHNICAL, FOUNDATION AND SURVEY.



SYMBOL	DESCRIPTION	DATE	APP

DESIGNED BY: TCP	DATE: 02-05-07	SUBMITTED BY: DINELLO	PROJECT: PHILIP PDI FACILITIES DEV
DWN BY: TCP	CHK BY: KGO	FILE NO.:AF0701 H-SB01N	

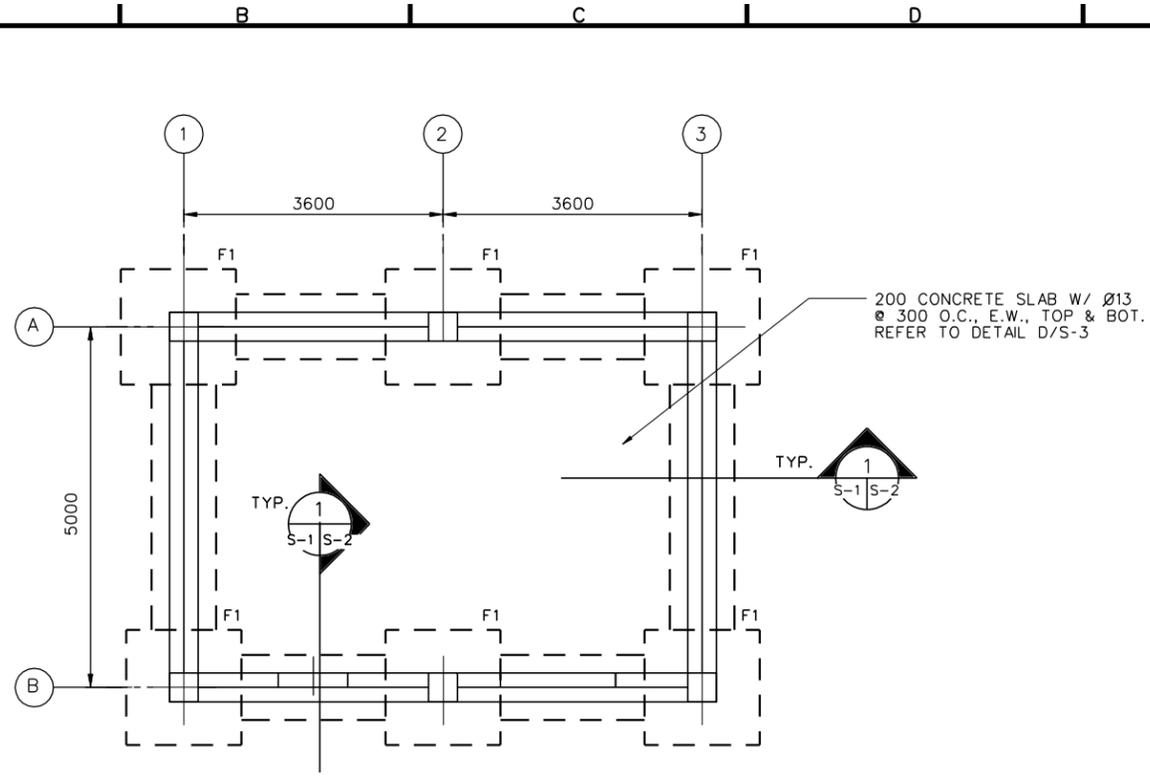
US Army Corps of Engineers
 Translational Programs Center

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
 WELL HOUSE BUILDING FOUNDATION PLAN AND ROOF PLAN

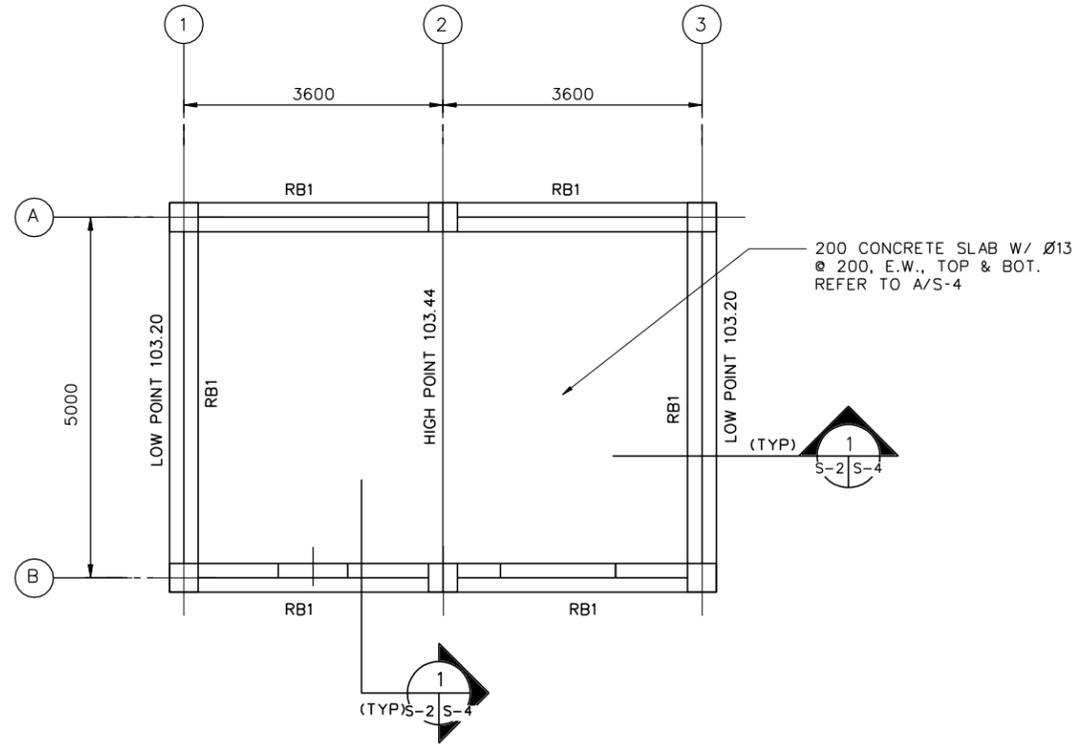
SHEET REFERENCE NUMBER:
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 S-1

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FOUNDATION AND SLAB PLAN
 SCALE=1:50



1. DESIGN LOADS (SERVICE)
 LIVE LOADS:
 ROOF: 1.0 KPA (20 PSF)
 OTHERS: 4.8 KPA (100 PSF)
 8.9 KN (2.0 K) CONCENTRATED LOAD

WIND LOADS PER IBC-2003

USING A "3-SECOND" WIND VELOCITY OF 125 KPH (78 MPH),
 EXPOSURE C AND IMPORTANCE FACTOR I=1.0

EARTHQUAKE LOADS PER IBC-2003:

USING A SEISMICITY: $S_s=1.65g$ AND $S_1=0.75g$

2. MATERIALS:

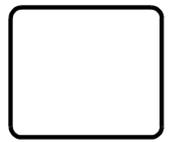
CONCRETE: 28 MPa (4 KSI)
 CYLINDER STRENGTH AT 28 DAYS

REINFORCING: ASTM A615 GRADE 60 (60 KSI)

3. WORK THESE STRUCTURAL DRAWINGS WITH THE
 STANDARD-DETAILS DRAWINGS.

4. A RELATIVE (DATUM) FINISH FLOOR ELEVATION EQUAL TO
 100.00 M. IS USED AS REFERENCE ELEVATION FOR ALL
 STRUCTURAL DRAWINGS. REFER TO CIVIL DRAWINGS FOR
 ACTUAL FINISH ELEVATIONS.

5. FOUNDATIONS ARE DESIGNED USING
 AN ALLOWABLE BEARING PRESSURE OF
 0.75 KG/SQ. CM (1500 PSF), AND BOTTOM
 OF FOOTINGS ARE PLACED AS SHOWN
 ON DRAWINGS. GEOTECHNICAL INVESTIGATION
 SHALL CONFIRM BEARING CAPACITY TO BE
 NO LESS THAN 0.75 KG/SQ CM. IF GEOTECHNICAL
 INVESTIGATION SHOWS LESS THAN 0.75 KG/SQ CM
 THE CONTRACTOR SHALL REDESIGN FOOTINGS
 BASED ON THE GEOTECHNICAL INVESTIGATION.
 SEE SPECIFICATION 01015 PARAGRAPH, GEOTECHNICAL,
 FOUNDATION AND SURVEY.



SYMBOL	DESCRIPTION	DATE	APP.

DESIGNED BY: DATE: 02-05-07	SUBMITTED BY: DANIELLO
TCP	PHILIP
DWN BY: TCP	CHIEF, PBT FACILITIES DES
CHK BY: KGO	FILE NO: AF0701 I-SB01FN

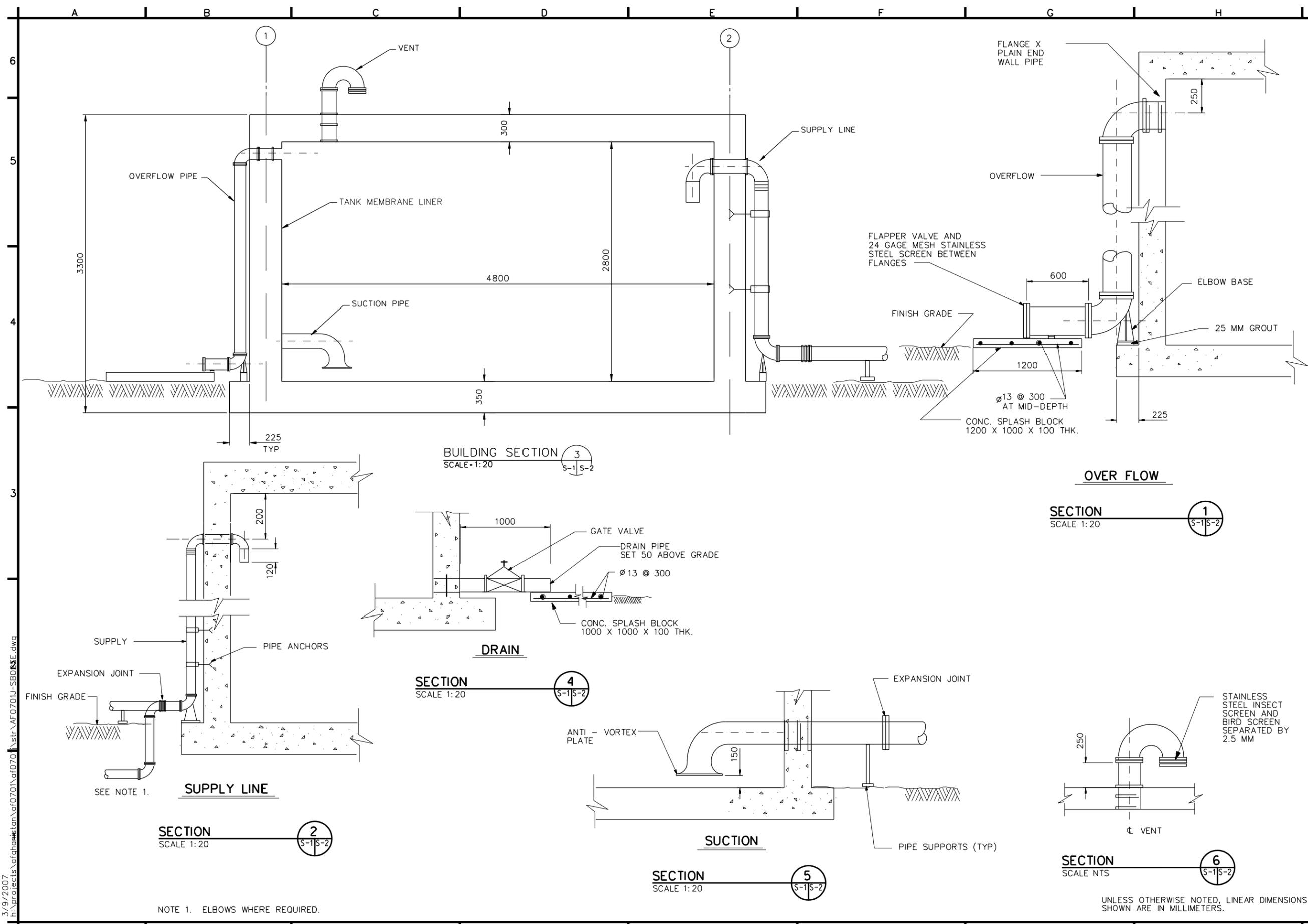
US Army Corps of Engineers
 Transatlantic Programs Center

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
 BOOSTER PUMP HOUSE FOUNDATION, SLAB AND ROOF PLAN

SHEET REFERENCE NUMBER:
 I
 S-1

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

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SECTION 2
 SCALE 1:20

BUILDING SECTION 3
 SCALE 1:20

SECTION 4
 SCALE 1:20

SECTION 5
 SCALE 1:20

SECTION 1
 SCALE 1:20

SECTION 6
 SCALE NTS

NOTE 1. ELBOWS WHERE REQUIRED.

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

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SYMBOL	DESCRIPTION	DATE	APP.

DESIGNED BY: DATE:	02-05-07
TCP	
DWN BY: PHILIP PINELLO	
TCP	
CHK BY: KGO	
FILE NO:	AF0701 J-SB02SE

US Army Corps of Engineers
 Translational Programs Center

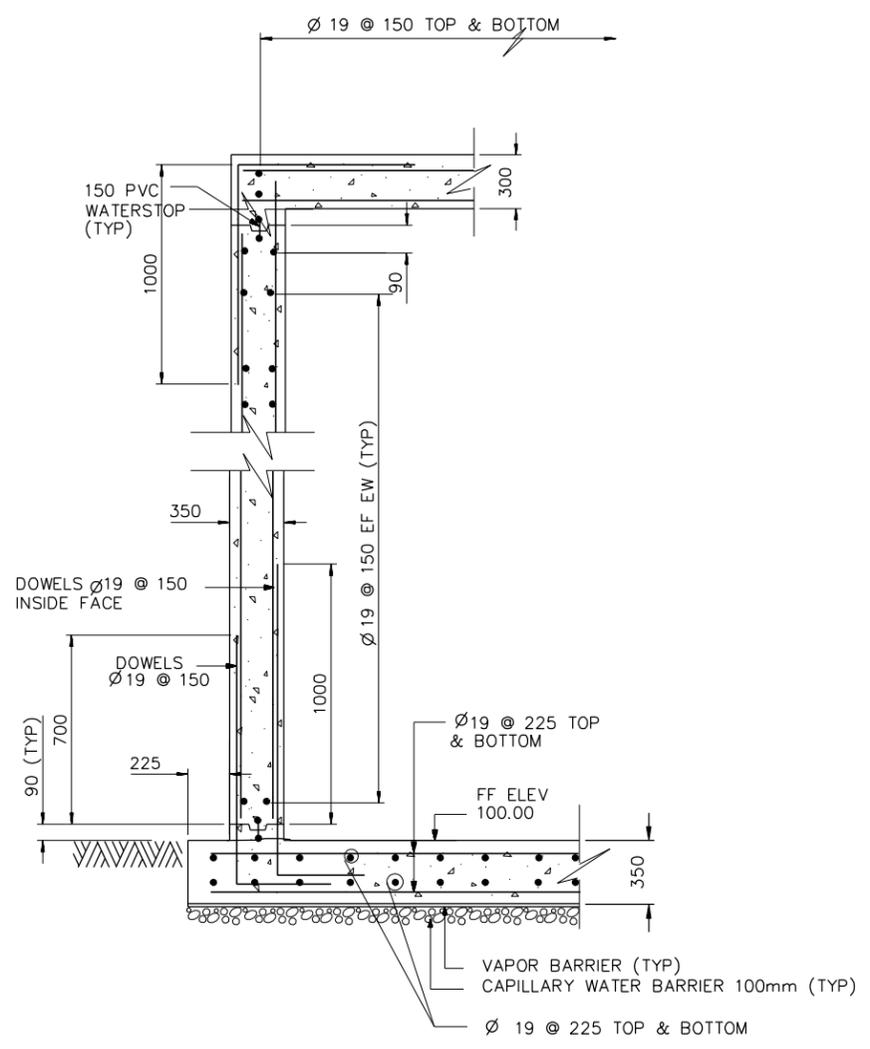
AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
 WATER TANK WATER STORAGE TANK SECTION AND DETAILS

SHEET REFERENCE NUMBER:
 J
 S-2

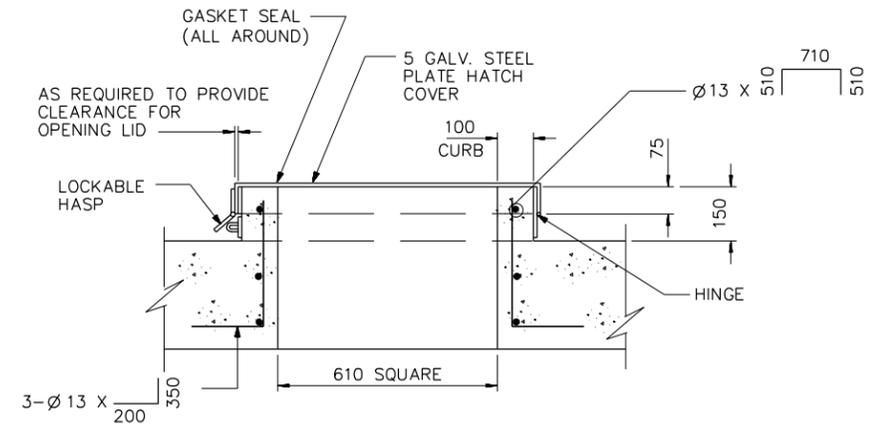
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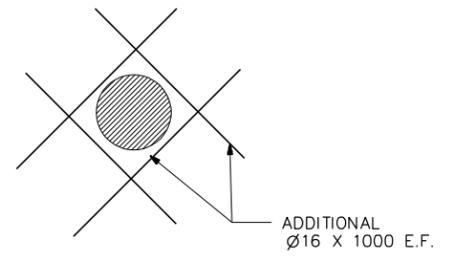
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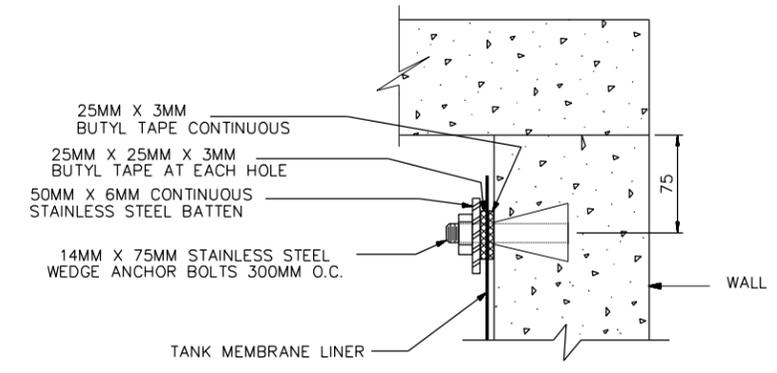
SECTION
 SCALE 1:20



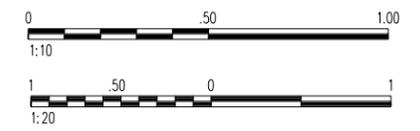
ACCESS HATCH DETAIL
 SCALE = 1:10



PIPE THROUGH WALL DETAIL
 N.T.S.



LINER FASTENER DETAIL
 NOT TO SCALE



UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

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SYMBOL	DESCRIPTION	DATE	APP

DESIGNED BY: TCP	DATE: 02-05-07	SUBMITTED BY: PHILIP D'AMICO	DESIGNED BY: PHILIP D'AMICO
DWN BY: TCP	CHK BY: KGO	FILE NO: AF0701 J-SB03SE	
US Army Corps of Engineers Transatlantic Programs Center			

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN WATER TANK
 SECTION AND DETAILS

SHEET REFERENCE NUMBER:
 J
 S-3

LEGENDS AND NOTATIONS:

- A. PLATE SIZES ARE GIVEN IN MILLIMETERS, THUS, PL 10 X 200 X 600.
- B. ROLLED STEEL SHAPES ARE INDICATED BY AISC METRIC NOTATION THUS, W200 X 150.
- C. ANGLE SIZES ARE GIVEN IN MILLIMETERS. THUS, L100 X 100 X 600 LG.
- D. WELDING NOTATION SIZE, LENGTH AND SPACING ARE GIVEN IN MILLIMETERS WITH SYMBOLS IN ACCORDANCE WITH AWS.
- E. BOLT SIZE AND LENGTH ARE GIVEN IN MILLIMETERS, THUS, ϕ 19 X 300 LG.

ABBREVIATIONS

A.B.	ANCHOR BOLT	PEJ	PRE MOLDED EXPANSION JOINT
ADD	ADDED OR ADDITIONAL	PL	PLATE
AFF	ABOVE FINISH FLOOR	PSF	POUNDS PER SQUARE FOOT
ARCH	ARCHITECTURAL	PSI	POUNDS PER SQUARE INCH
@	AT THE RATE OF	REINF	REINFORCEMENT
BM	BEAM	REF	REFERENCE
BRG	BEARING	REQ	REQUIRED
B OR BOT	BOTTOM	SCH	SCHEDULE
CL	CENTERLINE	SHT	SHEET
CONC	CONCRETE	SIM	SIMILAR
CJ	CONTROL JOINT	STD	STANDARD
CJT	CONSTRUCTION JOINT	SQ	SQUARE
CIP	CAST-IN-PLACE	T	TOP
COL	COLUMN	TB	TIE BEAM
CONT	CONTINUOUS	T & B	TOP AND BOTTOM
DIA OR ϕ	DIAMETER	TOC	TOP OF CONCRETE
DIR	DIRECTION	TOF	TOP OF FOOTING
DWG	DRAWING	TOS	TOP OF SLAB OR TOP OF STEEL
EE	EACH END	TYP	TYPICAL
EF	EACH FACE	UL	UPPER LAYER
\odot OR ELEV	ELEVATION	UON	UNLESS OTHERWISE NOTED
ES	EACH SIDE	VERT	VERTICAL
EW	EACH WAY	WWF	WELDED WIRE FABRIC
EJT	EXPANSION JOINT	WP	WORKING POINT
FF	FAR FACE	W/	WITH
FTG	FOOTING		
FDN	FOUNDATION		
GB	GRADE BEAM		
H OR HORZ	HORIZONTAL		
HP	HIGH POINT		
IJ	ISOLATION JOINT		
JT	JOINT		
KSM	KILOGRAMS PER SQUARE METER		
LG	LONG		
LL	LOWER LAYER		
LP	LOW POINT		
MCJ	MASONRY CONTROL JOINT		
M	METERS		
MM	MILLIMETERS		
MAX	MAXIMUM		
MECH	MECHANICAL		
MIN	MINIMUM		
NF	NEAR FACE		
NO OR #	NUMBER		
NTS	NOT TO SCALE		
O/C	ON CENTER		
OPNG	OPENING		
PC	PRECAST		

SPLICES

LOCATION OF SOME SPLICES ARE SHOWN ON DRAWINGS. SPLICES NOT SHOWN ON DRAWINGS SHALL BE IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS FOR DETAILING REINFORCEMENT AND AS APPROVED BY THE CONTRACTING OFFICER.

WHEN REINFORCEMENT OF DIFFERENT SIZE SPLICES, THE LAP LENGTH IS GOVERNED BY THE SMALLER BAR UNLESS NOTED OTHERWISE.

WALL AND SLAB REINFORCEMENT SPLICES ARE TO BE MADE SO THAT REQUIRED CLEARANCES ARE MAINTAINED.

TENSION LAP SPLICES		
AS (PROVIDED)	MAXIMUM % OF REBARS SPLICED WITHIN REQ. LAP LENGTH	
AS (REQUIRED)	50	100
EQUAL TO OR GREATER THAN 2	CLASS A	CLASS B
LESS THAN 2	CLASS B	CLASS B

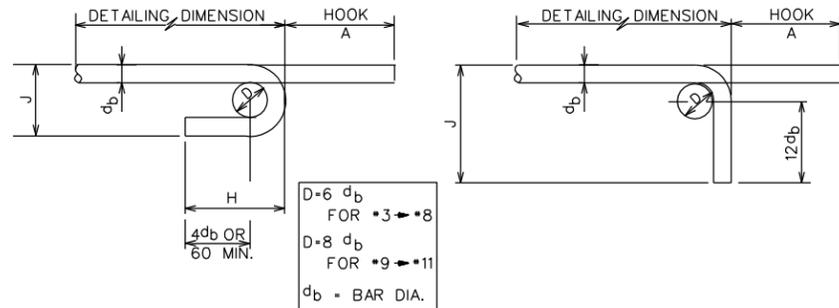
TENSION LAP SPlice LENGTH SHALL BE AS FOLLOWS:

TEFOR CLASS "A" SPLICES 1.0 l_d
FOR CLASS "B" SPLICES 1.3 l_d

WHERE l_d IS THE BASIC TENSION DEVELOPMENT LENGTH.

BASIC TENSION DEVELOPMENT l_d (mm) & TENSION DOWEL EMBEDMENT LENGTH

CONCRETE	TYPE OF BARS	BAR SIZE									
		#3	#4	#5	#6	#7	#8	#9	#10	#11	
28 MPa	TOP BARS	400	500	600	700	800	1000	1200	1600	2000	
	OTHER	300	400	450	600	600	750	950	1200	1500	



SIZES OF 180° HOOK			
BAR SIZE	A	J	APPROX H
# 3	130	80	100
# 4	150	100	110
# 5	180	130	130
# 6	200	150	150
# 7	250	180	180
# 8	280	200	200
# 9	380	290	260
#10	430	320	290
#11	480	360	320

SIZES OF 90° HOOK		
BAR SIZE	A	J
# 3	140	150
# 4	190	220
# 5	230	270
# 6	270	320
# 7	320	370
# 8	370	430
# 9	420	480
#10	470	580
#11	520	610

FILLET WELD STRENGTH *	
SIZE INCHES	STRENGTH KIPS/INCH
1/8	1.86
3/16	2.78
1/4	3.71
5/16	4.64
3/8	5.57
7/16	6.50
1/2	7.42
9/16	8.35

* AWS A5.1 OR A5.5 E70 XX ELECTRODES FOR A36 MATCHING BASE MATERIAL

BAR BENDING DETAILS

NOTES:

- FOR BARS WITH CLEAR SPACING NOT LESS THAN 5 TIMES BAR DIAMETER AND WITH COVER FROM FACE OF MEMBER TO EDGE BARS, MEASURED IN THE PLANE OF THE BARS, NOT LESS THAN 2.5 TIMES BAR DIAMETER USE 0.8 l_d , BUT THE LAP SPlice LENGTH SHALL NOT BE LESS THAN 300mm.
- TOP BARS ARE HORIZONTAL AND INCLINED REINFORCING BARS PLACED SO THAT MORE THAN 300mm OF CONCRETE IS CAST IN THE MEMBER BELOW THE BARS.

STANDARD COMPRESSION LAP SPlice LENGTH (MM)

BAR SIZE	#3	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH	300	380	480	580	660	760	860	960	1070

BASIC COMPRESSION DEVELOPMENT (MM) & COMPRESSION DOWEL EMBEDMENT LENGTH

CONCRETE	BAR SIZE									
	#3	#4	#5	#6	#7	#8	#9	#10	#11	
4000 PSI	200	250	300	360	420	480	550	610	680	

ALL BARS MARKED CONTINUOUS SHALL BE PROPERLY LAPPED AT SPLICES AND CORNERS AND HOOKED AT NON-CONTINUOUS ENDS.

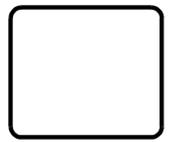
DESIGN LOADS

SERVICE LOADS

DEAD -----CALCULATED
LIVE -----REFER TO INDIVIDUAL SHEETS

EQUIVALENT REINFORCING BAR SIZE CHART	
ACI DESIGNATION	METRIC DIAMETER (MM)
# 3	ϕ 10
# 4	ϕ 13
# 5	ϕ 16
# 6	ϕ 19
# 7	ϕ 22
# 8	ϕ 25
# 9	ϕ 29
# 10	ϕ 32
# 11	ϕ 36

EQUIVALENT STEEL FABRIC SIZE CHART		
WIRE REINFORCING INSTITUTE DESIGNATION	METRIC SIZES (MM)	
	WIRE SPACING	WIRE DIAMETER
6 x 6 - W1.4 x W1.4	150 x 150	3.0 x 3.0
6 x 6 - W2.1 x W2.1	150 x 150	4.0 x 4.0
6 x 6 - W2.9 x W2.9	150 x 150	5.0 x 5.0
6 x 6 - W4.0 x W4.0	150 x 150	6.0 x 6.0



NO.	DATE	DESCRIPTION	SYMBOL

DESIGNED BY: DATE: 02-05-07
RC
SUBMITTED BY: PHILIP PINELLO
DWN BY: TCP
CHK BY: KGO
FILE NO: AF0701 \$-5802GN

US Army Corps of Engineers
Transatlantic Programs Center

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
STANDARD DETAILS NOTATIONS AND BAR DEVELOPMENT LENGTHS

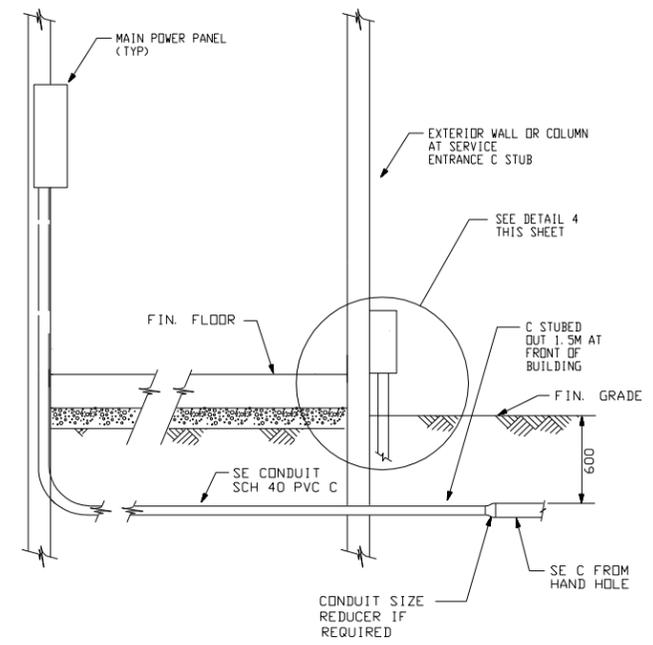
SHEET REFERENCE NUMBER:
SS-2

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

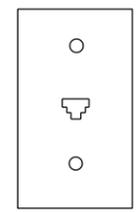
3/9/2007
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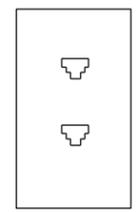
6
5
4
3



SERVICE PANEL CABLE ENTRANCE DIAGRAM
 NOT TO SCALE

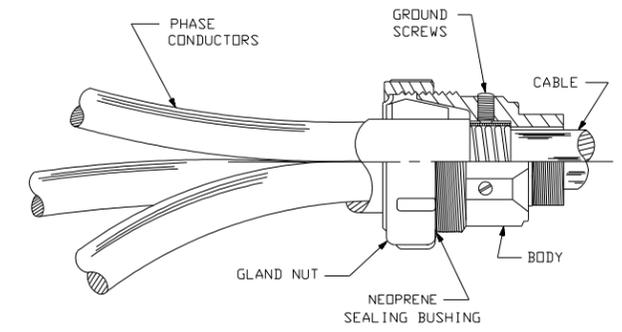


▲ W
 SYMBOL
 TELEPHONE ONLY, WALL MOUNTED

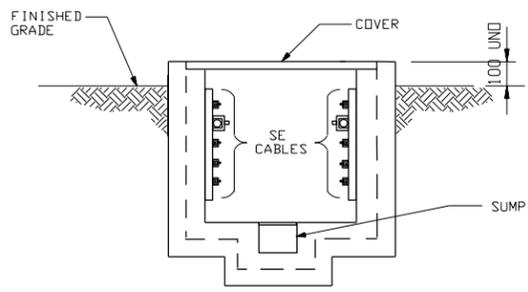


▲
 SYMBOL
 TELEPHONE/DATA OUTLET

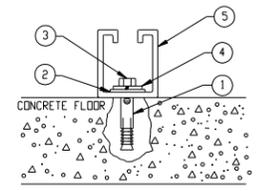
TELEPHONE AND DATA OUTLET DETAILS
 NOT TO SCALE



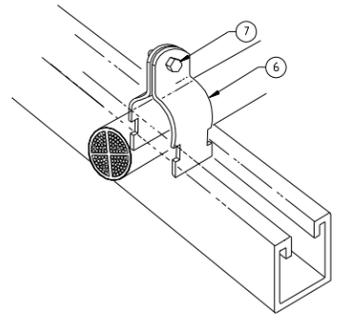
TYPICAL 600V CABLE TERMINATOR DETAIL
 NOT TO SCALE



HANDHOLE CABLE INSTALLATION
 NOT TO SCALE



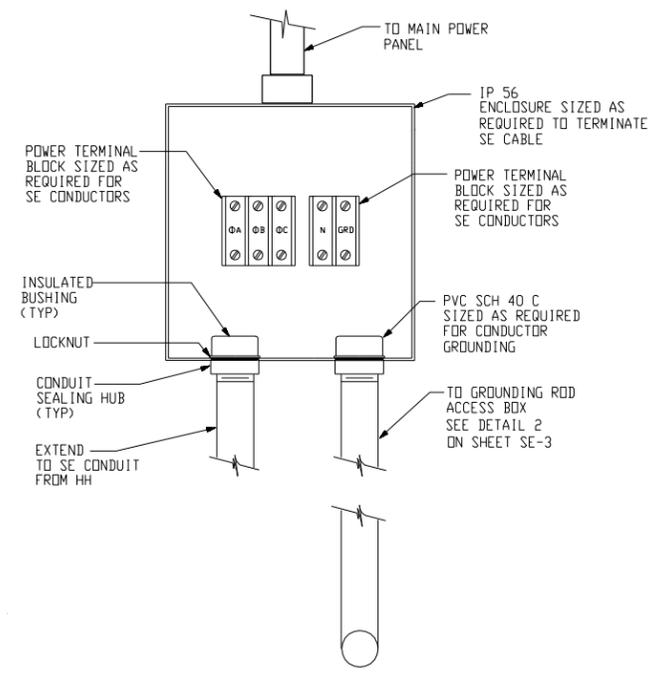
CHANNEL STRUT INSTALLATION



CABLE CLAMP INSTALLATION
 NOT TO SCALE

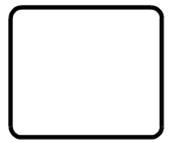
CHANNEL SYSTEM LIST OF MATERIALS						
ITEM	SML	DESCRIPTION	PART NO/NSN	UI	QTY	
1		SHIELD, EXPANSION				
2		WASHER, FLAT 3/8" ID				
3		BOLT, LAG, HEX HEAD, 3/8" -16 X 1 1/4"				
4		WASHER, LOCK 3/8" ID				
5		CHANNEL, CONT. SLOTTED 1-5/8"				
6		CONDUIT / CONDUCTOR CLAMP				
7		SLOTTED HEX MACHINE SCREW & SQUARE NUT				

CONDUIT / CONDUCTOR CHANNEL SYSTEM INSTALLATION DETAIL
 NOT TO SCALE



SE JUNCTION BOX
 NOT TO SCALE

DETAIL 4
 NOT TO SCALE



NO.	DESCRIPTION	DATE	APP.

DESIGNED BY: DATE: 02-05-07	SUBMITTED BY: SVED ENAYATULLA	FILE NO: AF0701 \$-EL050T
MM	MM	SE
DWN BY: MM	CHK BY: SE	

US Army Corps of Engineers
 Transatlantic Programs Center

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND AFGHANISTAN
 STANDARD ELECTRICAL DETAILS

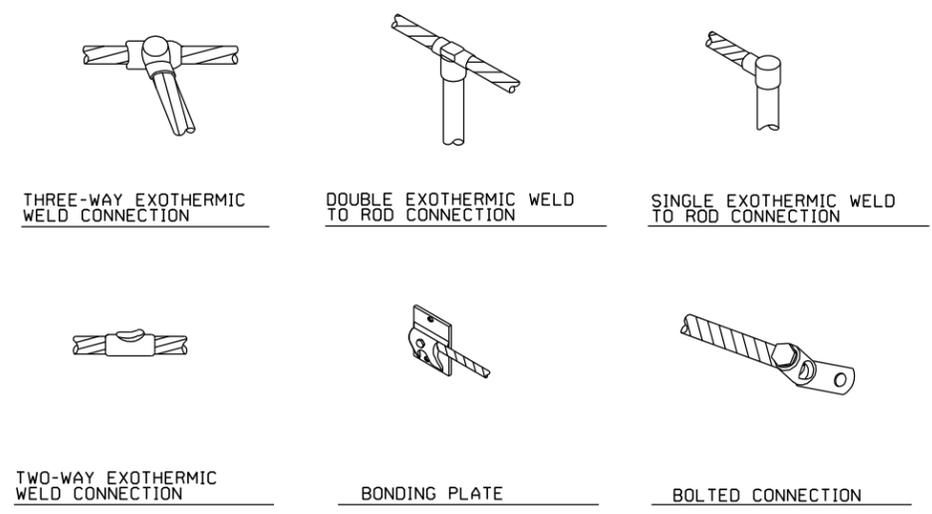
SHEET REFERENCE NUMBER:
 SE-5

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

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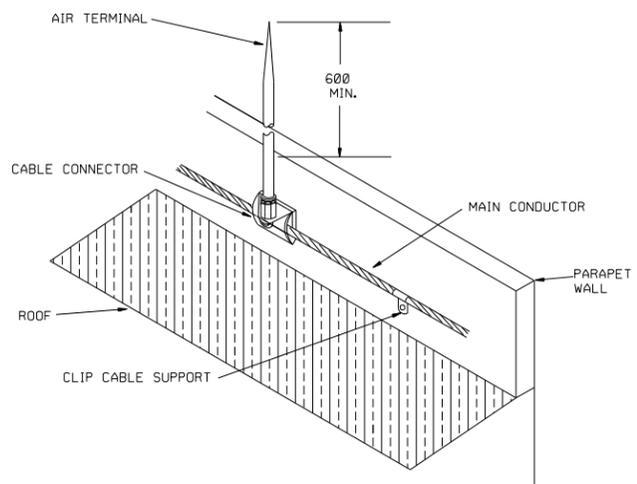
A B C D E F G H

6
 5
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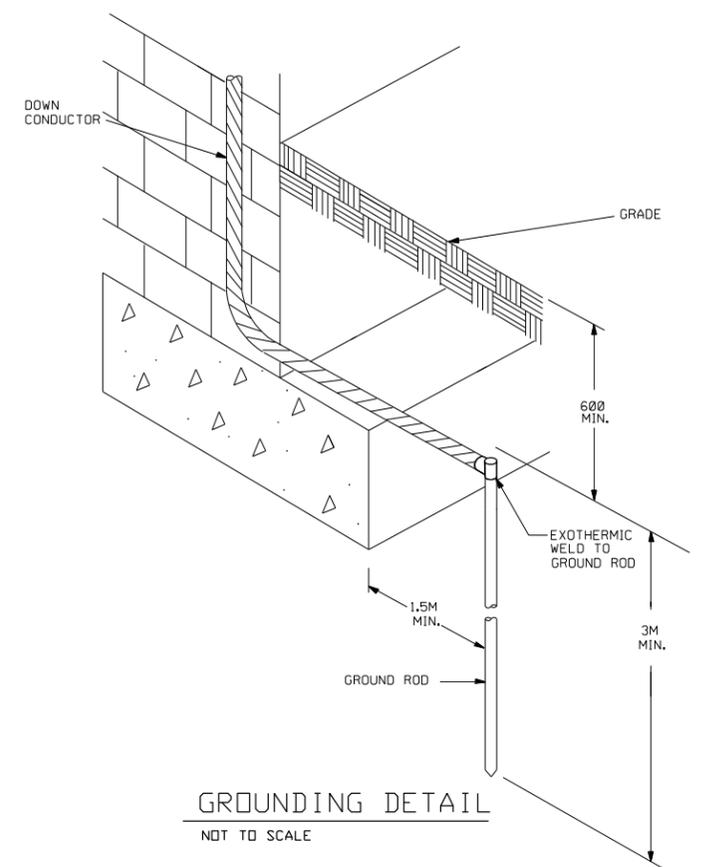


GROUNDING CONDUCTOR CONNECTION DETAILS
 NOT TO SCALE

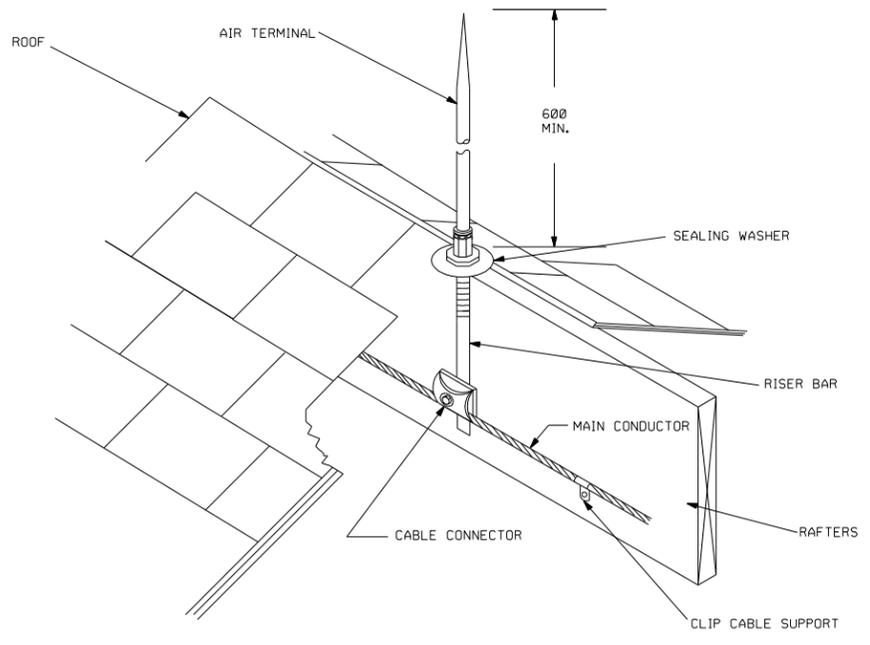
DETAIL 5



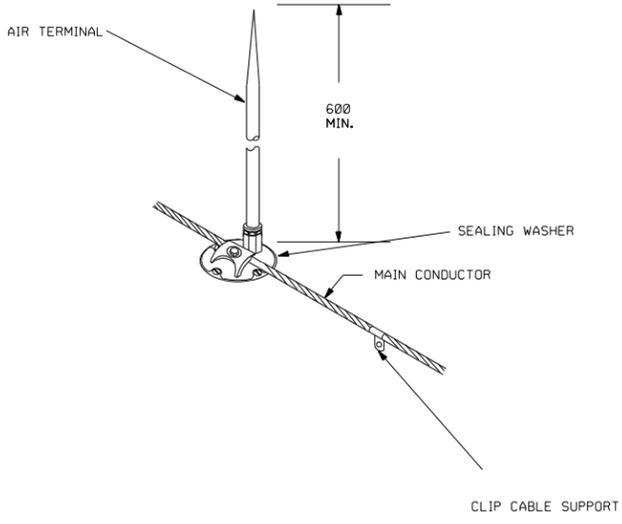
AIR TERMINAL DETAIL
 NOT TO SCALE



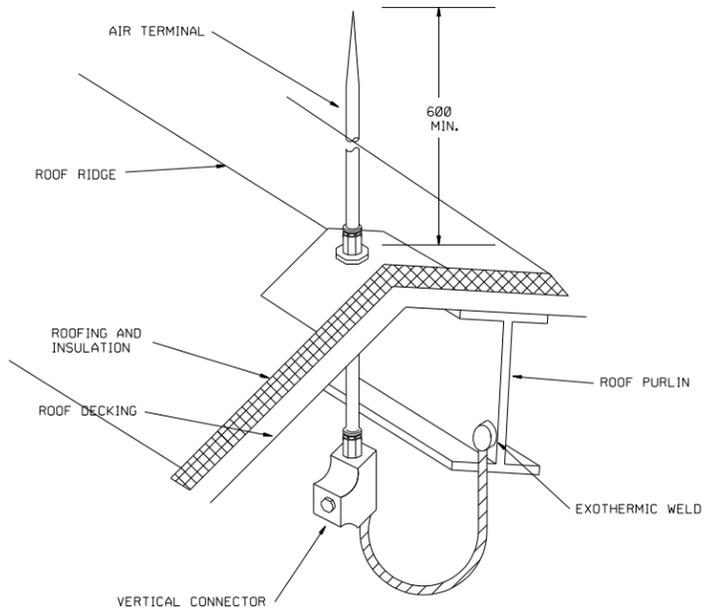
GROUNDING DETAIL
 NOT TO SCALE



AIR TERMINAL DETAIL
 NOT TO SCALE



AIR TERMINAL DETAIL
 NOT TO SCALE



AIR TERMINAL DETAIL
 NOT TO SCALE

UNLESS OTHERWISE NOTED, LINEAR DIMENSIONS SHOWN ARE IN MILLIMETERS.

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SYMBOL	DESCRIPTION	DATE	APP

DESIGNED BY: MM	DATE: 02-05-07
DWN BY: MM	SUBMITTED BY: SVED ENAYATULLA
CHK BY: SE	CHEF, PDI BLDG SYSTEMS
	FILE NO: AF0701 \$-EL0701

US Army Corps of Engineers
 Transatlantic Programs Center

AFGHAN NATIONAL POLICE HEADQUARTERS (2 STORY) COMPOUND
 AFGHANISTAN
STANDARD DETAILS
 LIGHTNING PROTECTION DETAILS

SHEET REFERENCE NUMBER:
SE-7

