SECTION 01 10 00.00XX
TASK ORDER STATEMENT OF WORK

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1.0 PROJECT OBJECTIVES

1.0.1 The project objective is to design and construct facilities for the military that are consistent with the design and construction practices used for civilian sector projects that perform similar functions to the military projects. For example, a Company Operations Facility has the similar function as an office/warehouse in the civilian sector; therefore the design and construction practices for a company operations facility should be consistent with the design and construction of an office/warehouse building.

Comparison of Military Facilities to Civilian Facilities

Military Facility	Civilian Facility
Unaccompanied Enlisted Personnel Housing (UEPH)	Apartment

1.0.3 1.0.2 It is the Army's objective that these buildings will have a 25-year useful design life before a possible re-use/re-purpose or renovation requirement, to include normal sustainment, restoration, modernization activities and a 50-year building replacement life. Therefore, the design and construction should provide an appropriate level of quality to ensure the continued use of the facility over that time period with the application of reasonable preventive maintenance and repairs that would be industry-acceptable to a major civilian sector project OWNER. The site infrastructure will have at least a 50-year life expectancy with industry-accepted maintenance and repair cycles.The project site should be developed for efficiency and to convey a sense of unity or connectivity with the adjacent buildings and with the Installation as a whole.

1.0.4 Requirements stated in this contract are minimums. Innovative, creative, and life cycle cost effective solutions, which meet or exceed these requirements are encouraged. Further, the OFFEROR is encouraged to seek solutions that will expedite construction (panelization, pre-engineered, etc.) and shorten the schedule. **The intent of the Government is to emphasize the placement of funds into functional/operational requirements. Materials and methods should reflect this by choosing the most economical Type of Construction allowed by code for this occupancy/project allowing the funding to be reflected in the quality of interior/exterior finishes and systems selected.**

1.1. SECTION ORGANIZATION

This Section is organized under 6 major “paragraphs”.

(1) Paragraph 1 is intended to define the project objectives and to provide a comparison between the military facility(ies) and comparable “civilian” type buildings.

(2) Paragraph 2 describes the scope of the project.

(3) Paragraph 3 provides the functional, operational and facility specific design criteria for the specific facility type(s) included in this contract or task order.

(4) Paragraph 4 lists applicable industry and government design criteria, generally applicable to all facility types, unless otherwise indicated in the Section. It is not intended to be all-inclusive. Other industry and government standards may also be used, where necessary to produce professional designs, unless they conflict with those listed.

(5) Paragraph 5 contains Army Standard Design Criteria, generally applicable to all facility types, unless otherwise indicated in the Section.

(6) Paragraph 6 contains installation and project specific criteria supplementing the other 5 paragraphs.

2.0 SCOPE

2.1. UNACCOMPANIED ENLISTED PERSONNEL HOUSING (UEPH)

Provide Unaccompanied Enlisted Personnel Housing (UEPH) facilities. This project type is to house single soldiers and is intended to be similar both functionally and technically to similar housing in the private sector community surrounding the Installation.

Number of single personnel to be housed is 270

Maximum gross area 98,820 square feet.

2.2. SITE:

Provide all site improvements necessary to support the new building facilities. Refer to Paragraph 6.

Approximate area available 8.40 acres

2.3. GOVERNMENT-FURNISHED GOVERNMENT-INSTALLED EQUIPMENT (GFGI)

Coordinate with Government on GFGI item requirements and provide suitable structural support, brackets for projectors/VCRs/TVs, all utility connections and space with required clearances for all GFGI items. Fire extinguishers are GF/GI personal property, while fire extinguisher brackets and cabinets are Contractor furnished and installed CF/CI. All Computers and related hardware, copiers, faxes, printers, video projectors, VCRs and TVs are GFGI.

The following are also GFGI items: Ice makers, Vending machines, Washers, Dryers.

2.4. FURNITURE REQUIREMENTS

A Furniture, Fixtures & Equip design and package is NOT required for this project. However, Structural Interior Design (SID) is required for all facility types regardless of the requirements for the FF&E design and package. The basic space planning for the anticipated FF&E requirements in conjunction with the functional layout of the building and design issues such as life safety, privacy, acoustics, lighting, ventilation, and accessibility is still required as part of the SID submittal.

2.5. NOT USED

3.0 UNACCOMPANIED ENLISTED PERSONNEL HOUSING (UEPH)

3.1. GENERAL REQUIREMENTS

The Army requires an apartment complex of two-bedroom, one-bath dwelling units with kitchen (1+1E module) similar in features, standards and layout to apartment complexes in the surrounding community. Maximize the space inside the individual dwelling units versus providing additional spaces not listed in the functional requirements in this section. Building circulation is required to be through the use of interior corridors/breezeways or garden style apartments, where circulation is minimized. Exterior egress balconies are prohibited; this does not preclude apartments designed with exterior entry landings. Choice of breezeways and exterior entry landings shall be predicated upon the weather criteria of the specific geographic area. Breezeways and exterior entry landings shall be designed to preclude snow and ice infiltration/accumulation. Building spaces and areas are as indicated in the text below. Coordinate the site design with the building described in this Section. Specific site requirements that affect the design and construction of the site appear in 01 10 00-6.0.

3.2. FUNCTIONAL AND AREA REQUIREMENTS

The overall building gross area is based on allocating each occupant 366 gross square feet for buildings up to three stories or 388 gross square feet for buildings over three stories. For Installations in Alaska the overall building gross area is based on allocating each occupant 388 gross square feet for all barracks building, irrespective of building height. The gross square feet per occupant includes the total area of all functional areas required in the building, including all dwelling units, common areas, canopies, and support areas, e.g. stairways, elevators, foyers, corridors, public toilets, janitor’s closets, utility room spaces.

(a) Elevators: Provide elevators for buildings that exceed three stories only. Provide elevator system that complies with ASME A17.1 and ASME A17.2.1 in their entirety, and additional requirements specified herein. The first elevator shall be centrally located and shall have a minimum rated load-capacity of 3500 lb (1588 kg), with center opening doors and interior dimensions sized to accommodate a fully extended Emergency Medical Services (EMS) gurney and four average size adults. Gurney size shall be based on the “STRYKER Power-PRO XT" gurney. An additional elevator as specified above shall be provided for every additional one hundred (100) persons or fraction thereof, over the first two hundred (200) persons the building is designed to accommodate, unless a traffic analysis determines otherwise. Such traffic analysis shall be included in the Design Analysis. Elevator interior walls, ceiling, doors and fixtures shall have a satin No. 4 stainless steel finish. Floor finish shall be vinyl composition tile as specified in Paragraph 3.4.5.2. (b). All elevators shall be furnished with removable hanging protective pads and fixed hooks to facilitate conversion to use for moving freight.

Elevator Inspector: The Elevator Inspector shall be certified in accordance with the requirements of ASME A17.1 and ASME QEI-1 and licensed in elevator inspection by the State where project is located. The Certified Elevator Inspector shall inspect the installation of the elevator(s) to assure that the installation conforms with all contract requirements. The Elevator Inspector shall be directly employed by the Prime Contractor and shall be independent of the Elevator System Manufacturer and the Elevator System Installer. The Elevator Inspector shall witness the acceptance inspections and tests, approve all results and sign and certify the successful results. The Elevator Inspector, after completion of the acceptance inspections and tests, shall certify in writing that the installation is in accordance with the contract requirements. The Elevator Inspector shall bring any discrepancy, including any safety related deficiencies, to the attention of the Contracting Officer in writing, no later than three working days after the discrepancy is discovered.

(b) Gross building area definition: Gross building area is measured to the outside face of exterior enclosure walls. Gross area includes floor areas, penthouses, mezzanines, and other spaces as follows:

(1) Areas calculated as half space. Gross building area shall be calculated in accordance with Appendix Q, with the following exceptions in accordance with TI 800-01 Design Criteria – Appendix B, UEPH:

i. All stairs and elevator shafts count as half space for each floor they serve.

ii. Interior public corridors/breezeways will be calculated as half space.

(2) Excluded space: The following spaces are excluded from gross area calculations: Attic areas where average clear height does not exceed 7 feet; crawl spaces; exterior uncovered loading platforms; open courtyards; normal roof overhangs and soffits for weather protection; uncovered ramps and steps; utility tunnels; raceways; mechanical equipment platforms and catwalks.

(3) Gross area limitations: Maximum authorized gross building areas for each facility is included in this paragraph. Proposals that exceed authorized gross area limitations may be considered non-conforming.

(c) Net area definition: Net area is measured to the inside face of the room or finish walls.

(d) Net Area Requirements: Net area requirements for programmed spaces are included in this chapter. If net area requirements are not specified, the space shall be sized to accommodate the required function and to comply with code requirements, overall gross area limitations, and any other requirement of this RFP (for example, area requirements for corridors, stairs, and mechanical rooms will typically be left to the discretion of the offeror).

3.2.1. ACCESSIBILITY REQUIREMENTS

Able-bodied soldiers occupy and manage UEPH facilities. The Architectural Barriers Act (ABA) requirements do not apply to UEPH facilities, except as follows:

3.2.1.1. Site Plan Design and Construction:

(a) Provide ABA compliant access from the parking lot to the building.

(b) Provide two (2) ABA compliant vehicle parking stalls for each barracks building for visitor parking.

(c) Provide handicapped vehicle parking signage and pavement markings.

3.2.1.2. Facility Design and Construction:

(a) The main building entrance on the ground level and at least one emergency egress, designed per applicable code, shall be handicapped accessible. Electronic exterior door openers with push button control are required for handicapped accessibility.

(b) Provide ABA clearances and door accesses in the building main entry/vestibule being used by visitors.

(c) If a lobby is required by the RFP, provide a handicapped accessible drinking fountain in the lobby.

(d) If a lobby is required by the RFP, provide handicapped accessible public toilet(s), which may be unisex, in the lobby area.

3.2.2. Dwelling Units:

3.2.2.1. Bedrooms: Each dwelling unit shall have two bedrooms, each with a minimum net area of 140 square feet and a maximum net area of 183 square feet. Bedrooms shall be equal in size and similar in configuration. Each bedroom shall have a walk-in closet directly adjacent. Each walk-in closet shall have a net area of 32 square feet, and shall be furnished with hanger rods and shelves. Closet shelf shall be capable of supporting a minimum of 30 pounds per linear foot. Closet shelf shall be 15 inches deep and top of shelf shall be set at 70 inches above closet finish floor. Closet rod and bracket system shall be capable of supporting a minimum of 30 pounds per linear foot. Provide a minimum of 78 linear inches of rod and shelf with no rod and shelf being less than 48 inches long. Each closet door shall have a Function (F75), Grade 1 closet latch, and be equipped with padlock eyes so the occupant can provide his/her own padlock. One padlock eye shall be mortised into and screw attached flush with door edge on the latch side of the door and the second padlock eye shall be mortised and welded flush into the inside face of the door frame jamb. Padlock eye shall be fabricated to accommodate padlock shackle up to 1/4" diameter. Padlock eye color shall match door frame color. Locate padlock eye at between 4'-6"' and 5'-6" AFF. Location of padlock eyes shall be at the same height in all modules. Each closet door shall have a Type 304 satin finished, stainless steel, robe hook mounted on the closet side of the door. Each closet door shall have a 16 inches wide by 70 inches high by ¼ inch thick, select float glass, full length mirror, in a one piece ½ inch by ½ inch by ½ inch Type 304 satin finished, stainless steel frame, with mitered corners, mounted on the bedroom side of the door. Bottom of mirror shall be located at 6 inches above finish floor. Bedroom shall be able to accommodate the following furniture with adequate circulation for one occupant:

- One twin bed with headboard and footboard 40" wide x 85 long".
- One entertainment center 36" wide x 25" deep x 76" high.
- One chest of drawers 36" wide x 20" deep.

- One nightstand 26” wide x 20” deep.
- One desk 60” wide x 26” deep with retractable keyboard tray and overhead study carrel.
- One desk chair 19 ½” wide by 18” deep.

3.2.2.2. Kitchen: Each dwelling unit shall have a full kitchen with adequate space and circulation to accommodate a GFGI full size refrigerator 28 inches wide, a CFCI built-in two-burner electric cooktop with a CFCI built-in combination vent hood and convection/microwave oven, with standard height base cabinet system, wall cabinet system and countertops for food storage and preparation. Provide a minimum of two 18 inches wide drawer units in the kitchen base cabinet system. Provide utility connections and casework to accommodate appliances listed above. Provide area for recyclables receptacle and kitchen waste receptacle. Furnish and install a single bowl stainless steel kitchen sink. Provide utility connections and casework to accommodate future installation of a dishwasher. Future dishwasher space shall be furnished with a removable built-in full width shelf dividing it into two equal spaces, and a pair of removable swing doors matching the rest of the kitchen cabinetry. Provided a minimum of twelve (12) linear feet of base cabinet systems with twelve (12) linear feet of standard height counter and twelve (12) linear feet of wall cabinet systems. Twelve (12) linear feet of standard height counter includes required sink. In addition to the twelve (12) linear feet of standard height counter, kitchen layout shall accommodate a minimum of 36 linear inches of counter style seating and dining for two people, or provide space for a 36 inch diameter dining table with two chairs outside of the kitchen area.

3.2.2.3. Bathroom: Each dwelling unit shall have one full bath, with an elongated floor mounted flush tank type vitreous china water closet, porcelain enameled cast-iron or enameled steel tub/shower, fixed shower head, lavatory/vanity with storage cabinets below, two minimum 16-inches wide by 24 inches high recessed mirrored medicine cabinet, with adjustable shelves, mounted on the backwall of the vanity. Medicine cabinet construction shall be heavy gauge steel, all welded, with a powder-coated finish. Mirror shall be ¼ inch thick select float glass in a one piece ½ inch by ½ inch by ½ inch Type 304 satin finished, stainless steel frame, with mitered corners. Provide one combination tumbler holder/tooth brush holder and one soap dish at each medicine cabinet. Install each set of tooth brush/tumbler holder and soap dish in a stack, with bottom of tooth brush/tumbler holder 6-inches above top of soap dish. Provide a minimum of two towel bars. Spray end of shower head shall be set at 78 inches above finish height of tub drain. Fiberglass or acrylic tub-surround units are required. Lavatory/vanity shall be separated from the tub/shower-water closet enclosure.

3.2.2.4. Not Used

3.2.3. Common Areas:

3.2.3.1. Lobby: Lobby shall meet the accessibility requirements stated in 01 10 00-3.2.1 above.

3.2.3.2. Public Toilet(s): Public toilets, which may be a single, unisex toilet, shall be located adjacent to the Lobby area and shall comply with the ABA accessibility requirements. If either a CQ station or a lobby is provided, a public toilet shall be included.

3.2.3.3. CQ Station: CQ station shall be located within the Lobby. CQ Station shall have a net area of 70 square feet and shall consist of a built-in reception ABA compliant counter for visitors with space for a chair. Provide a dual 8-pin modular jack outlet for voice and data connectivity. Provide two (2) 125 volt, duplex receptacles for CQ workstation. Receptacles shall be on a dedicated circuit Provide additional lighting over CQ station to obtain a 30-footcandle illuminance level on desk top.

3.2.3.4. Centralized Laundry: Locate a minimum of one laundry room in a centralized location, on each floor of each barracks building. Interior of laundry rooms shall be visible from the corridor through glazed picture windows. Picture window glazing shall be laminated glass. Design-Build Contractor may propose an alternate solution that will provide visual monitoring of the laundry room in-lieu of using picture windows. Laundry room entry shall provide a clear opening 36 inches wide minimum. Size self-serve laundry facilities to accommodate a combined total of no fewer than one commercial washer per 12 residents on each floor and one commercial dryer per 8 residents on each floor. Washers and dryers are GFGI. Fixed heavy gauge stainless steel clothes folding/hanging tables, stainless steel utility sinks and laundry supplies vending area are required features of centralized laundry facilities. Each fixed heavy gauge stainless steel clothes folding/hanging table shall be 2'-0" deep by 5'-0" wide. Provide one fixed heavy gauge stainless steel clothes folding/hanging table per 48 residents on each floor. Provide power receptacles for washers, dryers and laundry supplies vending machines. Provide a minimum of one convenience duplex power receptacle on each wall. Provide water and drain connections for all washers. Provide individual vent connections for all dryers. Locate laundry rooms on exterior wall so that dryer exhaust can be vented directly to the exterior.

3.2.3.5. Vending Area: Provide a minimum of one vending area centrally located on the ground floor of each barracks building. For barracks buildings higher than three stories, provide a minimum of one vending area centrally located on the ground floor of each barracks building, and a minimum of one vending area centrally located on every other floor above the ground floor of each barracks building. Provide additional ventilation/exhaust to maintain vending areas temperature at levels specified for corridors. Each Vending Area shall be sized to accommodate one ice cube machine-dispenser designed for hotel type ice bucket filling, capable of producing minimum 250 pounds of regular ice cubes in 24 hours, with 180 pound storage capacity, and one full-size vending machine per 80 – 100 residents, or space for a minimum of three full-size vending machines, whichever is greater. Provide power receptacles for vending machines and ice cube machine-dispensers. Provide water and drain connections for ice cube machine-dispensers. Provide floor drain for ice cube machine-dispensers. Locate vending areas in central locations that are easily monitored. Vending Machines and ice cube machine-dispenser shall be GFGI.

3.2.3.6. Recyclables Storage: Provide one Recyclables Storage per building. Locate the Recyclables Storage on the first floor with access to the complex trash/recyclables dumpster area. Recyclables Storage shall be fully enclosed and ventilated. Recyclables Storage shall be sized to accommodate a minimum of six (6) fifty-gallon barrel sized recyclable containers, with adequate circulation space to allow access to move each container in and out of the Recyclable Storage with a dolly, without having to move the other containers.

3.2.3.7. Janitor’s Closet: Provide a minimum of one Janitor’s Closet per floor. Each Janitor’s Closet shall have a minimum area of 30 square feet. Each Janitor closet shall have a mop sink, mop rack, and space for buckets, vacuum and storage for janitorial supplies. Provide a minimum of six linear feet of 18 inch deep, heavy duty, stainless steel shelving for storage of janitorial supplies.

3.2.3.8. Mechanical, Electrical, and Telecommunications Rooms: Mechanical rooms shall accommodate space for equipment maintenance/repair access without having to remove other equipment. Mechanical, electrical and telecommunications rooms shall be keyed separately for access by Installation maintenance personnel. Filter changes and preventative maintenance shall be performed without requiring access to the dwelling units. First floor exterior access is required for centralized mechanical and electrical rooms. Telecommunications rooms shall comply with the requirements of ANSI/TIA/EIA-569-B. Refer to Mechanical and Electrical Sections for additional information.

3.2.3.9. Mail Access Area: A mail access area shall be designed and constructed as a part of this project. Mail access area shall include one USPS-approved combination lock type mailbox per resident, and a minimum of one USPS-approved two-key parcel locker per 40 residents. The numbering sequence shall be coordinated with the user. Mail access area shall be a mail kiosk separated from the main building with box access on outside, and rear (or front) loading. Location of mail kiosk shall conform to the requirements of ATFP UFC 4-010-01. Mail kiosk shall be protected from the elements and shall be architecturally compatible with the associated barracks building.

3.2.3.10. Mudroom:

Provide an enclosed centralized location close to main building entry, with direct exterior access for soldiers to rinse mud off field gear, boots and clothing before laundering. Provide one rinsing station per 30 persons. Each rinsing station shall be furnished with a utility sink and a hosed hot and cold water faucet.

3.2.3.11. Activity Room: Provide an Activity Room on each floor. Activity rooms shall be sized to provide space for a 55 inch projection television, lounge seating for 25 persons and one standard size pool table with required clearances. Provide electrical and cable connections for the projection television.

3.2.3.12. Vestibule: Provide an enclosed transition space between the exterior and the lobby or building interior. Provide a minimum of 7 feet clearance between interior and exterior doors.

3.3. SITE REQUIREMENTS

3.3.1. Walks: Construct pedestrian walks within the designated construction area and connect to existing sidewalks, where applicable.

(a) Sidewalks shall be a minimum of 6 feet wide. Sidewalks designed to support emergency vehicle traffic shall be a minimum of 20 feet wide per NFPA requirements. Sidewalks designed to support service vehicle traffic shall be a minimum of 10 feet wide. Construct walks paralleling buildings beyond the eave drip line and at least 5 feet from the foundation. Restrict vehicular access to the sidewalks, as required by UFC 4-010-01.

(b) Construct non-vehicular pedestrian sidewalks of Portland Cement Concrete having a minimum nominal thickness of 4 inches. Design joint patterns uniformly, symmetrical, and in accordance with the American Association of State Highway and Transportation Officials (AASHTO) standards. For joints, do not exceed the length to width ratio of 1.25 for non-reinforced pavements.

(c) Sidewalks designed to support emergency and service vehicle traffic will be considered roadway pavements and shall be designed to meet the AASHTO standards. Construct vehicular supported walks of Portland Cement Concrete having a minimum nominal thickness of 7 inches. Design joints uniformly, symmetrical, and in accordance with AASHTO standards. Do not exceed the length to width ratio of 1.25 for non-reinforced pavements.

3.3.2. Site Structures and Amenities

Dumpster Area: The Contractor shall locate, design, and construct the dumpster enclosure area(s) and screening. Dumpster screening shall be aesthetically and architecturally compatible with the building it serves and shall be designed in accordance with the Installation’s guidelines. Locate the dumpster areas in accordance with UFC 4-010-01 “DoD Minimum Antiterrorism Standards for Buildings”. Position the GFGI dumpsters outside of restricted areas to allow for servicing activities.

3.3.3. Site Functional Requirements

(a) Privately Owned Vehicle (POV) Parking: The Contractor shall design and construct the POV parking, within the designated construction area. Base the location and design of the POV parking area(s) on the Installation's site constraints. The Contractor shall ensure that the location of parking complies with UFC 4-010-01. See paragraph 5.2.3, “VEHICLE PAVEMENTS”, for additional information. Provide POV parking spaces for 70 percent of the personnel.

(b) Service Drives: The Contractor shall provide service drives to each building. Locate the drives in accordance with UFC 4-010-01. Restrict access to the drives, where applicable, as required by UFC 4-010-01. Design the pavements as required by paragraph 5.2.3, “VEHICLE PAVEMENTS”. The minimum service drive width shall be 10 feet. The Contractor shall design and construct drives with curb and gutter when necessary for drainage purposes.

(c) Fire Access Lanes: The Contractor shall provide fire access lanes. Access must be provided to three sides, minimum. Access must be within 33 feet of a building’s entrance. Design the fire access lanes in accordance with NFPA 1, UFC-3-600-01, and the installation’s requirements.

3.4. ARCHITECTURAL REQUIREMENTS

3.4.1. Hardware

3.4.1.1. Non-Destructive Emergency Access System: Furnish and install a Knox-Vault 4400 Series (Single Lock Model) mounted at each building exterior adjacent to the main entry.

3.4.1.2. Finish Hardware: All hardware shall be consistent and shall conform to ANSI/BMHA standards for Grade 1. All requirements for hardware keying shall be coordinated with the Contracting Officer. Extension of the existing Installation keying system shall be provided, the Installation keying system is Best/Omni 29. Cores shall have not less than seven pins; cylinders shall have key-removable type cores. Disassembly of knob or lockset shall not be required to remove core from lockset. Locksets for mechanical, electrical and communications rooms only shall be keyed to the existing Installation Master Keying System. HVAC terminal units that are accessed from a central corridor shall have a deadbolt to minimize protrusion into corridor. Plastic cores are unacceptable. Provide closers for all exterior doors, all doors opening to corridors and as required by codes. Exit devices shall be installed on all building egress doors.

3.4.1.3. Auxiliary Hardware: Provide wall or floor stops for all exterior doors that do not have overhead holder/stops. Provide other hardware as necessary for a complete installation.

3.4.1.4. Hardware For Fire Doors: Hardware for fire doors shall be installed in accordance with the requirements of applicable codes. Exit devices installed on fire doors shall have a visible label bearing the marking "Fire Exit Hardware". Other hardware installed on fire doors, such as locksets, closers, and hinges shall have a visible label or stamp indicating that the hardware items have been approved by an approved testing agency for installation on fire-rated doors. Hardware for smoke-control door assemblies shall be installed in accordance with applicable codes.

3.4.1.5. Key Card Access System: A Programmable Electronic Key Card Access System shall be provided on all exterior entry/egress doors, dwelling unit doors, bedroom doors and centralized laundry doors (if centralized laundries are required by RFP). Extension of the existing Installation key card access system shall be provided, the existing Installation key card access system is B.A.S.I.S G by Best Access. The minimum operability requirement is a key card access system that provides a single key card for the individual soldier, programmable to open all exterior entry/egress doors, the laundry room (if a centralized laundry is provided), the soldier's dwelling unit door, and the soldier's bedroom door. A Programmable Electronic Key Card Access System Manufacturer's Representative shall install all hardware and software necessary for the operation of the Electronic Key Card Access System and program all locksets. Provide six (6) blank key cards for each personnel each building is designed to accommodate. All blank key cards shall be serially numbered and each key card shall have its number permanently inscribed on it. The Design-Build Contractor shall furnish in three-ring binders, one full set of the system manufacturer's system training manual, system maintenance manual, and one training video (in format provided by the system manufacturer), with each system installed. The Programmable Electronic Key Card Access System Manufacturer's Representative shall provide two (2) separate 4-hour classes of training for the user on software use, programming locks, encoding cards and printing reports. Each building shall be furnished with a complete stand-alone key card system package. System shall be capable of being compartmentalized so that each building has only the capability to produce key cards for that building. Provide a two (2) year warranty on the system and all components and locksets. All special tools, software, connecting cables and proprietary equipment necessary for the maintenance, testing, and reprogramming of the system shall be furnished to the Contracting Officer Representative.

3.4.1.6. Key Card Access System Accessories: None

3.4.2. Special Acoustical Requirements

3.4.2.1. Exterior walls and roof/floor/ceiling assemblies, doors, windows and interior partitions shall be designed to provide for attenuation of external noise sources such as airfields in accordance with applicable criteria, but no less than the following:

(a) Interior partitions – STC 49

(b) Exterior walls – STC 49

(c) Floors separating sleeping spaces – STC 50 / IIC 55

(d) Module entry, bedroom and bathroom doors – STC 25

3.4.2.2. Sound conditions (and levels) for interior spaces, due to the operation of mechanical and electrical systems and devices, shall not exceed levels as recommended by ASHRAE handbook criteria. Provide acoustical treatment for drain lines and other utilities to prevent noise transmission into the interior of dwelling units

3.4.3. Exterior Design Objectives

Provide durable and easily maintainable materials. Do not use exterior materials that require periodic repainting or similar refinishing processes. Material exposed to weather shall be factory pre-finished, integrally colored or provided with intrinsic weathering finish.

3.4.3.1. Exterior Walls: Where Exterior Insulation and Finish Systems (EIFS), or any other material except CMU or other Masonry material is used as exterior finish material, it shall be in conjunction with a Masonry wainscot. EIFS shall be "high-impact" type and shall be "drainable" type. Masonry units shall be tested for efflorescence.

Efflorescence testing shall conform to the provisions of ASTM C 67. CMU construction shall comply with the provisions of ASTM C 1400.

3.4.3.2. Roof System: Minimum roof slope for membrane roof systems shall be 1/4 inch per foot. Minimum roof slope for pitched roof systems shall be 3 inches per foot. Membrane roof systems shall be fully adhered. Structural standing seam metal roofs shall comply with the requirements of ASTM E 1592. Roof system shall be Underwriters Laboratory (UL 580 Class 90) rated or Factory Mutual Global (FM) I-90 rated. Roof system shall comply with applicable criteria for fire rating.

(a) Roof Mounted Equipment: For roof mounted equipment, provide permanent access walkways and platforms to protect roof. Roof mounted equipment on pitched roof systems is unacceptable. Roof mounted equipment on membrane roof systems shall be completely screened by the roof parapet.

(b) Roof access from building exterior is prohibited.

3.4.3.3. Trim and Flashing: Gutters, downspouts, and fascias shall be factory pre-finished metal and shall comply with SMACNA Architectural Sheet Metal Manual.

3.4.3.4. Bird Habitat Mitigation: The Contractor shall provide details in the design necessary to eliminate the congregating and nesting of birds at, on, and in the facility.

3.4.3.5. Exterior Doors and Frames:

(a) Main Entrance Doors: Provide aluminum storefront doors and frames with Architectural Class 1 anodized finish, fully glazed, with medium or wide stile for entry into lobbies or corridors. Provide doors complete with frames, framing members, subframes, transoms, sidelights, trim, applied muntins, and accessories. Framing systems shall have thermal-break design. Storefront systems shall be capable of withstanding area wind loads, thermal and structural movement required by location and project requirements, and shall comply with applicable codes and criteria

(b) Other Exterior Doors: Provide insulated hollow metal exterior doors for entry to all spaces other than corridors, lobbies, or reception/waiting rooms. Doors and frames shall comply with applicable codes and criteria. Doors shall be minimum Level 3, physical performance Level A, Model 2. Frames shall be minimum 12-gauge, with continuously welded mitered corners and seamless face joints. Doors and frames shall be A60 galvannealed, shall comply with ASTM A653 and shall be factory primed. Fire-rated openings shall comply with applicable codes, and the requirements of the labeling authority. Door and frame installation shall comply with applicable codes and criteria.

3.4.3.6. Exterior Windows: Provide insulated, high efficiency window systems, with thermally broken frames complying with applicable codes and criteria. Each bedroom shall have at least one exterior window. Window shall meet egress requirements of NFPA 101 and International Building Code. All bedroom windows shall be operable windows. Operable windows shall be furnished with locks, and fiberglass or aluminum insect screens removable from the inside. Windows shall not open to corridor, balcony or landing. Curtain wall systems shall be capable of withstanding area wind loads, thermal and structural movement required by location and project requirements, and shall comply with applicable codes and criteria. Window sills shall be designed to discourage bird nesting.

3.4.3.7. Exterior Glass and Glazing: Material and installation shall comply with applicable codes and criteria.

3.4.3.8. Thermal Insulation: Provide exterior wall, floor, and roof/ceiling assemblies with thermal transmittance (U-values) required to comply with the proposed energy calculations for the facilities. Insulation shall not be installed directly on top of suspended acoustical panel ceiling systems.

3.4.3.9. Exterior Louvers: Exterior louvers shall have bird screens and shall be designed to exclude wind-driven rain. Exterior louvers shall be made to withstand wind loads in accordance with the applicable codes. Wall louvers shall bear the Air Movement & Control Association (AMCA) International certified ratings program seal for air performance and water penetration in accordance with AMCA 500-D and AMCA 511. Louver finish shall be factory applied.

3.4.4. Interior Design Objectives

General: Provide sustainable materials and furnishings that are easily maintained and replaced. Maximize use of daylighting. Provide interior surfaces that are easy to clean and light in color. Design barracks interior with a residential ambience.

3.4.4.1. Signage: Room signage shall conform to the Housing Automated Management System, (HOMES4). At each dwelling unit, provide two (one on each side of entry door) dwelling unit/room number and changeable two-line message strip signage. Dwelling units shall be sequentially numbered. For example, the first unit on the first floor shall be “101”, first unit on the second floor shall be “201”. Rooms shall be designated using the letters “A and B”. The room designation is determined by standing in the corridor facing the entry door of the dwelling unit, the bedroom on the left is “A” and the one on the right is “B”. The complete dwelling unit/room numbering shall be as in this example, first unit on the second floor “201A and 201B”. Changeable message strip signs shall be of same construction as standard room signs to include a clear sleeve that will accept a paper or plastic insert with identifying changeable text. The insert shall be prepared typeset message photographically enlarged to size and mounted on paper card stock.

3.4.4.2. Bulletin Boards: Provide one bulletin board centrally located on all floors. Bulletin board shall be 4’-0” high and 6’-0” wide. Bulletin boards shall have a header panel and shall have lockable, glazed doors. Glazing shall be laminated glass.

3.4.4.3. Corner Guards: Provide surface mounted, high impact resistant, integral color, snap-on type resilient corner guards, extending from floor to ceiling for wall/column outside corners in high traffic areas. Factory fabricated end closure caps shall be furnished for top and bottom of surface mounted corner guards.

3.4.4.4. Chair Rail: Chair rails shall be installed in areas prone to hi-impact use, such as corridors and lobby.

3.4.4.5. Casework: Provide cabinets complying with AWI Quality Standards. Countertops shall have waterfall front edge. Bathroom, kitchen and public toilet countertops shall have integral coved backsplash. Bathroom and public toilet (if required by RFP) vanity countertop shall be minimum ½ inch thick cast 100 percent acrylic polymer solid surfacing material with waterfall front edge and integral coved backsplash.

3.4.4.6. Fire Extinguisher Cabinets and Fire Extinguisher Mounting Brackets: Furnish and install fire extinguisher cabinets and fire extinguisher mounting brackets as required by applicable codes and criteria. Furnish a list of installed fire extinguisher cabinets and mounting brackets (including location, size and type) to the Contracting Office Representative.

3.4.4.7. Interior Doors and Frames:

(a) Wood Doors: Provide flush solid core wood doors with Grade A hardwood face veneer for transparent finish. Stile edges shall be non-finger jointed hardwood compatible with face veneer. Provide flush solid core wood doors at doors within dwelling unit. Provide flush solid core wood doors at all dwelling unit entry.

(b) Insulated Metal Doors: Comply with applicable codes and criteria. Doors shall be minimum Level 3, physical performance Level A, Model 2; factory primed. Provide insulated metal doors at utility rooms, janitor closets, module entry (if solid core insulated hollow metal door is required), and stairwell doors.

(c) Hollow Metal Frames: Comply with ANSI A250.8/SDI 100. Frames shall be minimum Level 3, 16 gauge, and shall be continuously welded, with mitered corners and seamless face joints; factory primed.

- Contractor’s Option – Contractors have the option to furnish knockdown frames for closet and bathroom doors in the dwelling units. Continuously welded frames with mitered corners and seamless face joints at closets and bathroom doors in the dwelling units shall be considered betterments.

(d) Fire-rated and Smoke Control Doors and Frames: Comply with applicable codes, criteria and requirements of labeling authority.

(e) STC ratings shall be of the sound classification required and shall include the entire door and frame assembly.

(f) Each dwelling unit entry door shall be furnished with a brass peep hole door viewer with a viewing angle of 200 degrees minimum.

3.4.4.8. Window Treatment: Provide horizontal mini blinds at all exterior windows. Uniformity of window covering color and material shall be maintained to the maximum extent possible throughout each building. Blinds in barracks bedrooms shall be room darkening mini blinds. Window stools shall be minimum ½ inch thick cast 100 percent acrylic polymer solid surfacing material.

3.4.4.9. Mold and Mildew Mitigation: The Designer of Record shall provide details in the design analysis and design showing steps taken to mitigate the potential growth of mold and mildew in the facility.

3.4.4.10. Toilet Accessories: Furnish and install the items listed below and all other toilet accessories necessary for a complete and usable facility. All toilet accessories except soap dishes at tub/shower shall be Type 304 stainless steel with satin finish.

(a) Public Toilets (IF REQUIRED BY THE RFP): Toilet accessories shall conform to the requirements of the ABA and shall include, but are not limited to the following:

(1) Glass mirrors on stainless steel frame and shelf – at each lavatory

(2) Liquid soap dispenser – at each lavatory

(3) Combination recessed mounted paper-towel dispenser/waste receptacle

(4) Sanitary napkin disposal at each female\unisex toilet

(5) Recessed mounted lockable double toilet paper holder – at each water closet.

(6) Sanitary toilet seat cover dispenser – a minimum of one per toilet room

(7) Grab bars – as required by ABA

(b) Dwelling unit bathroom accessories shall at a minimum include:

(1) Two heavy duty towel bars – minimum 24 inches wide each

(2) Two recessed mounted mirrored medicine cabinets – at each lavatory. (See Section 01 10 00 Paragraph 3.2.2.3.)

(3) Two soap dish - at tub/shower. Soap dishes shall be molded into fiberglass or acrylic tub surround.

(4) One wall mounted retractable clothesline – across tub/shower

(5) Two combination tumbler holder/toothbrush holder – one at each medicine cabinet

(6) Double robe hook - on inside face of bathroom door

(7) Toilet paper holder – at each water closet.

(8) Curved shower curtain rod - extra heavy duty.

(9) Shower curtain – white anti-bacterial nylon/vinyl fabric shower curtain.

(10) Two soap dish – one at each medicine cabinet.

3.4.5. Finishes

Designers are not limited to the minimum finishes listed in this paragraph and are encouraged to offer higher quality finishes.

3.4.5.1. Minimum Paint Finish Requirements

(a) All paints used shall be listed on the "Approved product list" of the Master Painters Institute, (MPI). Application criteria shall be as recommended by Master Painters Institute (MPI) guide specifications for the substrate to be painted and the environmental conditions existing at the project site.

(b) Exterior surfaces, except factory pre-finished material or exterior surfaces receiving other finishes shall be painted a minimum of one prime coat and two finish coats. Paints having a lead content over 0.06 percent by weight of nonvolatile content are unacceptable. Paints containing zinc-chromate, strontium-chromate, mercury or mercury compounds, confirmed or suspected human carcinogens shall not be used on this project. Exterior paints and coating products shall be classified as containing low volatile organic compounds (VOCs) in accordance with

MPI criteria. Application criteria shall be as recommended by MPI guide specifications. Provide an MPI Gloss Level 5 Finish (Semi-gloss), unless otherwise specified.

(c) Interior surfaces, except factory pre-finished material or interior surfaces receiving other finishes shall be painted a minimum of one prime coat and two finish coats. Paints having a lead content over 0.06 percent by weight of nonvolatile content are unacceptable. Paints containing zinc-chromate, strontium-chromate, mercury or mercury compounds, confirmed or suspected human carcinogens shall not be used on this project. Interior paints and coating products shall contain a maximum level of 150 g/l (grams per liter) of volatile organic compounds (VOCs) for non-flat coatings and 50 g/l of VOCs for flat coatings. Provide an MPI Gloss Level 5 Finish (Semi-gloss) in wet areas and a flat finish in all other areas.

3.4.5.2. Minimum Interior Finish Requirements

(a) Wall, ceiling and floor finishes shall conform to the requirements of the IBC, NFPA and UFC 3-600-01. Where code requirements conflict, the most stringent code requirement shall apply.

(b) Carpet shall not be used as a floor finish on this project. Vinyl composition tile (VCT) shall be a minimum 1/8 inch thick, conforming to ASTM F 1066, Class 2, through-pattern tile, Composition 1, asbestos free, with color and pattern uniformly distributed throughout the thickness of the tile.

(c) Walls: All wall finish shall be minimum 5/8" painted gypsum board, except where stated otherwise. All gypsum board shall achieve a score of 10, the highest level of performance for mold resistance under the ASTM D 3273 test method. All gypsum board shall be transported, handled, stored and installed in accordance with the GYPSUM ASSOCIATION – Guidelines For Prevention Of Mold Growth On Gypsum Board (GA-238-03). Use impact resistant gypsum board in corridors, storage rooms, stairwells and activity rooms and centralized laundries (if centralized laundries are required by RFP).

(d) All ceiling finishes shall be minimum 5/8" painted gypsum board, except where stated otherwise. All gypsum board shall achieve a score of 10, the highest level of performance for mold resistance under the ASTM D 3273 test method. All gypsum board shall be transported, handled, stored and installed in accordance with the GYPSUM ASSOCIATION – Guidelines For Prevention Of Mold Growth On Gypsum Board (GA-238-03).

MINIMUM INTERIOR FINISHES														
	FLOORS					BASE			WALLS		CEILING			REMARKS
	RESILIENT FLOORING	PORCELAIN OR QUARRY TILE	CERAMIC TILE	RECESSED ENTRY MAT	SEALED CONCRETE	RESILIENT BASE	SANITARY COVE CERAMIC BASE	PORCELAIN OR QUARRY TILE	GYPSUM BOARD PAINT	CERAMIC	GYPSUM BOARD PAINT	ACOUSTICAL CEILING TILE	MINIMUM HEIGHT	
COMMON AREAS														
LOBBY (IF REQUIRED BY RFP)		●						●	●		●	●	9'-0"	SEE NOTE 6
PUBLIC TOILET			●				●		●	●	●		8'-0"	SEE NOTES 2, 3 AND 5
VESTIBULES		●		●				●	●		●		9'-0"	
MUDROOM (IF REQUIRED BY RFP)			●				●		●	●	●		8'-0"	SEE NOTES 2 AND 5
BOOT WASH (IF REQUIRED BY RFP)					●								-	
ACTIVITY ROOM (IF REQUIRED BY RFP)		●						●	●		●	●	9'-0"	SEE NOTE 6

MAIL ACCESS AREA		●						●	●		●		8’-0”	IF LOCATED WITHIN BUILDING
STAIRS	●				●	●			●		●		8’-0”	SEE NOTE 4
CORRIDORS	●					●			●		●	●	9'-0"	SEE NOTE 6
VENDING											●		8’-0”	SEE NOTE 1
RECYCLABLES STORAGE	●					●			●		●		8’-0”	SEE NOTE 1
JANITOR CLOSETS			●				●		●	●	●		8’-0”	SEE NOTE 2
MECHANICAL					●	●			●		●		-	SEE NOTES 5 AND 7
ELECTRICAL					●	●			●		●		-“	
TELECOMMUNICATIONS					●	●			●		●			SEE NOTE 8
CENTRALIZED LAUNDRY (IF REQUIRED BY RFP)		●						●	●		●		8’-0”	SEE NOTE 5
DWELLING UNITS														
KITCHEN	●					●			●		●		8’-0”	SEE NOTE 3
BATHROOM			●				●		●	●	●		8'-0"	SEE NOTES 2 AND 3
BEDROOM	●					●			●		●		9'-0"	SEE NOTE 9
CLOSET	●					●			●		●		8’-0”	
1. FINISHES IN VENDING OR RECYCLABLES STORAGE AREA SHALL MATCH FINISHES IN ADJACENT SPACE.														
2. ALL WET WALLS SHALL HAVE A 4'-0" HIGH CERAMIC TILE WAINSCOT. BATHTUB SURROUND SHALL BE AS SPECIFIED IN PARAGRAPH 3.2.2.3.														
3. ALL KITCHEN AND BATHROOM COUNTERS SHALL HAVE A MINIMUM OF 4" HIGH BACKSPLASH.														
4. STAIR LANDING SHALL BE RESILIENT FLOORING OR SEALED CONCRETE. TREADS SHALL BE RESILIENT FLOORING OR SEALED CONCRETE, PROVIDE SLIP RESISTANT NOSING. RISERS SHALL BE PAINTED STEEL OR RESILIENT FINISH AS REQUIRED FOR STAIR CONSTRUCTION TYPE.														
5. PROVIDE FLOOR DRAIN IN CENTER OF ROOM. SLOPE FLOOR TO DRAIN IN ALL ROOMS WITH FLOOR DRAIN														
6. UP TO 50% OF CEILING AREA MAY BE ACOUSTICAL CEILING TILE. ALL ACOUSTICAL CEILING TILE SHALL BE INSTALLED WITH HOLD DOWN CLIPS TO PREVENT UPWARD MOVEMENT.														
7. PROVIDE FLOOR DRAIN IN CENTER OF ROOM. DOES NOT APPLY TO DWELLING UNIT MECHANICAL CLOSETS.														
8. COMPLY WITH THE REQUIREMENTS OF ANSI/TIA/EIA-569-B														
9. WHERE MASONRY WALLS ARE PROPOSED AS THE BEDROOM WALL FINISH SYSTEM, THE LONGEST WALL IN EACH BEDROOM SHALL BE FINISHED WITH A TACKABLE MATERIAL. TACKABLE MATERIAL SHALL BE GYPSUM BOARD AND SHALL COMPLY WITH THE REQUIREMENTS OF PARAGRAPH 3.4.5.2.(c)														

3.5. STRUCTURAL REQUIREMENTS

Design and construct as a complete system in accordance with APPLICABLE CRITERIA.

3.5.1. Design live loads shall be per the IBC but not lower than the following minimums.

(Note that the minimum live loads indicated do not include partition loads. Partition live loads of 15 pounds per square foot (psf) shall be added to all areas with a live load of 80 psf or less)

(a)	Elevated floors	60 pounds per square foot (psf) minimum
(b)	Slab on grade	150 psf minimum
(c)	Centralized laundry area (if required by RFP)	150 psf, (but not less than actual equipment loads)

3.5.2. Wood frame construction is prohibited from use in all facilities 5-stories or greater

3.6. ENERGY CONSERVATION

3.6.1. Energy Compliance

The building, including the building envelope, HVAC systems, service water heating, power, and lighting systems shall be designed to achieve a non-plug load energy consumption that is at least 40% below the consumption of a baseline building meeting the minimum requirements of ANSI/ASHRAE/IESNA Standard 90.1-2007 (see paragraph 5.9 Energy Conservation). (Note: Plug loads shall be included in building energy modeling but are subtracted in the final calculation of Energy Performance. See section "Design After Award" for additional guidance.)

3.6.2. Required Energy Conservation Features

All items listed in the required energy conservation features table shall be provided as a minimum. Additional energy conservation features may be required to meet the above energy performance. The contractor is responsible for determining and providing additional energy conservation features to meet the energy performance requirement.

3.6.3. Compliance Documentation

The required energy conservation features shown in the following tables contribute to the achievement of the above energy performance and are life cycle cost effective for a UEPH facility. Use of the required energy conservation features does not eliminate the requirement for energy analysis calculations documenting compliance. The D-B contractor must document compliance with the above energy performance utilizing the methodology described in ASHRAE 90.1, Appendix G as discussed in section 01 33 16 Design After Award.

Climate Zone 3A, Energy Conservation Features Table

Item	Component	Minimum Requirements
Roof	Attic	R-40
	Surface reflectance	0.27
Walls	Light Weight Construction	R-20
Exposed Floors	Mass	R-10 c.i.
Slabs	Unheated	NR (2)
Doors	Swinging	U-0.70
	Non-Swinging	U-1.45
Infiltration		0.25 cfm/ft^2 @ 75 Pa (3)
Vertical Glazing	Window to Wall Ratio (WWR)	10% - 20%
	Thermal transmittance	U-0.45
	Solar heat gain coefficient (SHGC)	0.31
Interior Lighting	Lighting Power Density (LPD)	0.9 W/ft^2
	Ballast	Electronic ballast
HVAC	Air Conditioner	Energy Efficient Heating and Cooling System with Associated Heating and Reheat Coil DOAS with 14 SEER DX coil (3.52 COP), Hot Gas Reheat and Auxiliary Heat/ Reheat Coil

	Gas Furnace	none
	ERV	70% - 75% sensible effectiveness
Economizer		no
Ventilation	Outdoor Air Damper	Motorized control
	Demand Control	NR
	Laundry Room	Decoupled (5)
Ducts	Friction Rate	0.08 in. w.c./100 feet
	Sealing	Seal class B
	Location	Interior only
	Insulation level	R-6 (6)
Service Water Heating	Gas storage	90% E_t

Notes for Energy Conservation Features Table:

(1) NOT USED

(2) NR means there is no requirement or recommendation for a component in this climate.

(3) Increased Building Air tightness. Building air leakage (measured in cfm/ft2) is the average volume of air(measured in cubic feet per minute) that passes through a unit area of the building envelope (measured in square feet) when the building is maintained at a specified internal pressure (measured in Pascals). Testing requirements are specified in Chapter 5..

(4) Dedicated Outdoor Air System. A central dedicated outdoor air system (DOAS) providing the following:

(a) Outside air for building indoor air quality and humidity control

(b) Make-up air for bathroom and kitchen exhausts

(c) Building pressurization to prevent infiltration which allows for reduction of heating/cooling and moisture loads on the system.

NOTE: The Central DOAS does not provide sensible heating or cooling. Sensible loads are provided by a complementing heating and cooling system

(5) **Decoupling exhaust and supply systems for laundry rooms**. To reduce unneeded energy use for heating and cooling of the make-up air and for air transportation of supply and exhausted air from the dryers, laundry exhaust and supply systems are separated in the efficient building model from the rest of the building exhaust and supply systems. Laundry exhaust system and corresponding make-up systems operate only when dryers are operating.

(6) The duct and pipe insulation values are from the ASHRAE Advanced Energy Design Guide for Small Offices.

All design features not described above will be in accordance with the minimum requirements of ANSI/ASHRAE/IESNA Standard 90.1-2007. including conformance with paragraph 5.9.2, which requires purchase of Energy Star and FEMP designated products.

3.6.4. Schedules

The following facility schedules must be used in all facility energy simulations for purposes of documenting compliance with energy performance requirement.

UEPH Common Area Internal Load Schedules

Hr	Occupancy			Lighting			Washer/Dryer Use			Washer SHW		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1-6	0.00	0.00	0.00	0.30	0.30	0.30	0.00	0.00	0.00	0.00	0.00	0.00
7-10	0.20	0.20	0.20	0.30	0.30	0.30	0.00	0.00	0.00	0.00	0.00	0.00
11-18	0.00	0.00	0.00	0.30	0.30	0.30	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.80	0.80	0.80	0.00	0.00	0.00	0.00	0.00	0.00
20-21	0.20	0.20	0.20	0.80	0.80	0.80	0.50	0.50	0.50	0.50	0.50	0.50
22-23	0.40	0.40	0.40	0.80	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.00
24	0.20	0.20	0.20	0.80	0.80	0.80	0.50	0.50	0.50	0.50	0.50	0.50
Peak	5 occ/floor			1.0 W/ft^2 (10.8 W/m^2)			8.4 kW/floor			53.3 gal/hr/flr (202 L/hr/flr)		

UEPH Apartment Unit Internal Load Schedules

Hr	Occupancy			Lighting			Plug Loads			Service Hot Water		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1-5	0.80	0.75	0.75	0.20	0.20	0.20	0.20	0.20	0.20	0.00	0.00	0.00
6	0.70	0.65	0.75	0.40	0.30	0.20	0.20	0.20	0.20	0.10	0.10	0.10
7	0.60	0.60	0.70	0.70	0.50	0.30	0.40	0.35	0.20	0.40	0.40	0.40
8	0.50	0.50	1.00	0.50	0.50	0.50	0.40	0.40	0.40	0.20	0.20	0.20
9	0.25	0.25	0.00	0.20	0.20	0.20	0.30	0.40	0.40	0.00	0.00	0.00
10-17	0.20	0.20	0.20	0.20	0.20	0.20	0.30	0.30	0.30	0.00	0.00	0.00
18	0.30	0.30	0.30	0.50	0.50	0.50	0.50	0.50	0.50	0.10	0.10	0.10
19	0.50	0.30	0.30	0.70	0.70	0.70	0.50	0.50	0.50	0.10	0.10	0.10
20	0.50	0.50	0.50	0.70	0.70	0.70	0.60	0.50	0.50	0.10	0.10	0.10
21	0.70	0.50	0.50	0.70	0.70	0.70	0.60	0.50	0.50	0.00	0.00	0.00
22	0.70	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.00	0.00	0.00
23	0.80	0.75	0.75	0.40	0.40	0.40	0.40	0.50	0.50	0.00	0.00	0.00
24	0.80	0.75	0.75	0.20	0.20	0.20	0.20	0.20	0.20	0.00	0.00	0.00
Peak	2 occ/unit			1.1 W/ft^2 (10.8 W/m^2)			1.7 W/ft^2 (18 W/m^2)			40 gal/hr (114 L/hr)		

UEPH Apartment Unit Internal Load Schedules

Hr	Refrigerator			Range and Oven		
	Wk	Sat	Sun	Wk	Sat	Sun
1-6	1.00	1.00	1.00	0.01	0. 01	0. 01
7-16	1.00	1.00	1.00	0.04	0.04	0.04
17-18	1.00	1.00	1.00	0.05	0.05	0.05
19-20	1.00	1.00	1.00	0.11	0.11	0.11
21-23	1.00	1.00	1.00	0.10	0.10	0.10
24	1.00	1.00	1.00	0.03	0.03	0.03
Peak	76.36 W/unit			68.95 W/unit		

UEPH Apartment Unit Thermostat Set-Point Schedules

Hr	Heating (°F)			Heating (°C)			Cooling (°F)			Cooling (°C)		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun

Hr	Heating (°F)			Heating (°C)			Cooling (°F)			Cooling (°C)		
1-24	68	68	68	20	20	20	75	75	75	24	24	24

UEPH Unoccupied Zones (ie stairwells, mechanical rooms) Thermostat Set-Point Schedules

Hr	Heating (°F)			Heating (°C)		
	Wk	Sat	Sun	Wk	Sat	Sun
1-24	55	55	55	12.8	12.8	12.8

3.7. MECHANICAL REQUIREMENTS

3.7.1. Plumbing

3.7.1.1. Water Heating: Domestic water heating system shall be sized based on 20 gallons of 110 deg. F hot water consumption per occupant during morning peak period. Peak period duration shall be 30 minutes (10 minute duration for shower and lavatory use per occupant per dwelling unit plus a 10 minute transition period). Hot water storage capacity shall be based on 75% usable storage and a storage temperature of 140 deg F. For domestic hot water pipe sizing, peak hot water flow rate shall be based on all showers flowing simultaneously at a rate of 2.0 gpm per shower. Waste stacks, building waste drains, and lift stations (if required) shall be sized with consideration of increased flow rates as well. Domestic hot water distribution shall be at 120 deg F from a central system mixing valve. Domestic hot water distribution piping shall be designed to handle up to 180 deg F water temperatures.

Maximum plumbing fixture flow rates shall be as follows:

Water closets: 1.28 gallons per flush (or dual flush type with an equivalent average flush volume)
Showers: 1.5 gpm
Bathroom sinks: 0.5 gpm
Kitchen sinks: 1.5 gpm
Janitor sinks: 1.5 gpm

3.7.1.2. Mudroom: Provide sand interceptors in drains from Mudroom areas.

3.7.1.3. Laundry: Centralized Laundry facilities shall be considered commercial laundries with respect to the IPC and shall be provided with solids interceptor in accordance with the IPC. IF DRYER VENTS ARE MANIFOLDED TO A COMMON EXHAUST, PROVIDE AN EASILY ACCESSIBLE MEANS OF CLEANOUT. Dryer exhaust vent exterior terminations shall be located no closer than 15 feet from dwelling unit bedroom windows.

3.7.2. Heating, Ventilating and Air-Conditioning

3.7.2.1. All room/dwelling unit HVAC units shall be located in equipment closets accessible only through a corridor access door with keyed deadbolt. Corridor HVAC access doors shall be sized for ease of service and maintenance of HVAC units. Access for maintenance shall not require entry into the dwelling unit. Air filters shall be located in the equipment closet.

3.7.2.2. Each dwelling unit shall be positively ventilated using dedicated outdoor air units. Dedicated outdoor air units (DOAUs) shall continuously supply dehumidified, tempered air ducted directly to each bedroom from DOAU. DOAU supply air ductwork shall not connect to dwelling unit heating/cooling unit. Supply air conditions from DOAU shall be between 68 and 75 degree F dry bulb and no greater than 48 degree F dew point. Supply quantity shall be 30 cfm per bedroom for a total of 60 cfm per dwelling unit. Dwelling unit exhaust shall be 45 cfm continuous through a bathroom exhaust. (Note: This exceeds ASHRAE 62.1 but provides compliance with IMC chapter 4 and maintains slight building positive pressurization with respect to dwelling unit exhaust rate of 45 cfm). DOAU unit shall be direct expansion (DX) type and cooling/dehumidification shall be available 24/7/365. Refer to chapter 6 for site specific constraints. The number of exhaust fans and DOAUs shall be the same, and exhaust fans and DOAUs shall be arranged for and shall include exhaust air energy recovery. Exhaust and DOAU systems shall be provided with variable frequency drives (VFDs) and shall be provided with a control logic that provides reduced ventilation rates during periods of low interior humidity and still meet minimum ASHRAE 62.1 requirements.

3.7.2.3. Corridors shall be ventilated per ASHRAE 62.1 by supply from the dedicated outdoor air unit.

3.7.2.4. Dwelling unit room temperature control shall be through the direct digital control (DDC) system. Each dwelling unit shall have a heating/cooling unit with thermostat/temperature control sensor located in common area. Occupant control will include fan selection (on/off) and an occupant temperature setpoint adjustment mechanism that allows +/- 2 deg F of adjustment from the DDC programmed set points (70 deg F heating, 75 deg F cooling). Additionally, the DDC controls shall monitor each dwelling unit for sub-cooling. The DDC system shall record an alarm event if the space temperature drops below 71 degree F (adjustable) when the outside air is greater than 85 degree F (adjustable). Occupant control shall also include ability to select heating or cooling mode. HVAC system shall be able to provide for year round heating or cooling in individual dwelling units as selected by the occupants.

3.7.2.5. Kitchen range hoods shall be the U.L. listed ductless type.

3.8. ELECTRICAL REQUIREMENTS

Select electrical characteristics of the power system to provide a safe, efficient, and economical distribution of power based upon the size and types of loads to be served. Use distribution and utilization voltages of the highest level that is practical for the load to be served. The effect of nonlinear loads such as computers, other electronic equipment and electronic ballasts shall be considered and accommodated as necessary. Voltage drop shall not exceed the maximum allowed per ASHRAE 90.1. Transient voltage surge protection shall be provided on service equipment. Bedrooms shall be considered to be living and sleeping rooms, therefore they are to be considered to be part of a dwelling unit per NFPA 70.

3.8.1. Interior Lighting

Interior lighting controls shall be provided in accordance with ASHRAE 90.1. Compact fluorescent lamps of 12 watts or less shall not be used. Electronic ballasts for linear florescent lamps shall be the high efficiency programmed start type. Provided lighting levels shall be within +/- 10% of required lighting levels.

3.8.1.1. Lighting level in bedrooms shall be 15 foot-candles. Lighting shall utilize compact fluorescent fixtures with manual on/off switching.

3.8.1.2. Lighting level in laundry room(s) shall be 30 foot-candles. Lighting shall have automatic occupancy sensor detection switching.

3.8.1.3. Lighting level in lobbies (if required by the RFP) shall be 10 foot-candles. Lighting in common areas such as corridors and lobbies shall have automatic occupancy sensor detection switching. Sensors in corridors shall be wired such that only the lighting fixtures within the activation range of a particular sensor shall turn on

3.8.1.4. Lighting level in kitchen areas shall be 30 foot-candles with automatic occupancy sensor detection switching. Switching shall be manual-ON/Automatic OFF. Counter top task lighting shall be installed under cabinets utilizing fixtures with 2 foot linear T8 fluorescent lamps with manual on/off switching. Task lighting switching shall be separate from general lighting switching.

3.8.1.5. Lighting level in mechanical and electrical rooms shall be 30 foot-candles. Lighting shall utilize fixtures with T8 fluorescent lamps with manual on/off switching.

3.8.1.6. Provide an illuminance level of 20-footcandles and automatic occupancy sensor detection switching to control fixture(s) in the mudroom (if mudroom is provided).

3.8.1.7. If mail is distributed from an exterior kiosk or through an exterior wall provide a minimum illuminance level of 5-footcandles.

3.8.1.8. Provide compact fluorescent light fixture with automatic occupancy sensor detection switching in each walk-in closet. Switching shall be manual-ON/Automatic OFF.

3.8.2. Interior Power

Power shall be provided for all installed equipment requiring power to include convenience receptacles and government furnished government installed equipment. Panelboards located in accessible areas, shall be lockable and keyed to one master key.

3.8.2.1. In addition to the requirements of NFPA 70 for dwelling units, a duplex receptacle shall be mounted adjacent to the CATV outlet.

3.8.2.2. Provide a minimum of one 125 volt duplex receptacle on each wall within the lobby (if lobby is provided) for housekeeping purposes.

3.8.2.3. Provide a minimum of one 125 volt duplex receptacle per corridor for housekeeping. No point along a corridor wall at 18” above finished floor shall be more than 25 feet from a receptacle.

3.8.2.4. Provide a minimum of two 125 volt duplex receptacles in mechanical rooms in addition to those required by NFPA 70. This requirement does not apply to the small mechanical rooms used for individual dwelling units. In addition, provide a minimum of one 125 volt duplex receptacle in each electrical room.

3.9. TELECOMMUNICATIONS REQUIREMENTS

Telecommunications outlets shall be provided per the applicable criteria based on functional purpose of the space within the building.

3.10. CABLE TV (CATV) REQUIREMENTS

All CATV outlet boxes, connectors, cabling, and cabinets shall conform to applicable criteria unless noted otherwise. All horizontal cabling shall be homerun from the CATV outlet to the nearest telecommunications room unless indicated otherwise. See paragraph 6 for possible additional requirements.

3.11. FIRE ALARM REQUIREMENTS

3.11.1.1. All software, software locks, special tools and any other proprietary equipment required to maintain, add devices to or delete devices from the system, or test the Fire Alarm system shall become property of the Government and be furnished to the Contracting Officer’s Representative prior to final inspection of the system.

3.11.1.2. The fire alarm system installation shall be supervised by a National Institute for Certification of Engineering Technologies (NICET) Level 3 (minimum) technician.

3.11.1.3. Smoke detectors shall be provided in all bedrooms. Smoke detectors in bedrooms shall be monitored. Tampering with a smoke detector shall send a trouble signal. Trouble signals shall be transmitted to the fire department.

4.0 APPLICABLE CRITERIA

Unless a specific document version or date is indicated, use criteria from the most current references, including any applicable addenda, unless otherwise stated in the contract or task order, as of the date of the Contractor's latest accepted proposal or date of issue of the contract or task order solicitation, whichever is later. In the event of conflict between References and/or Applicable Military Criteria, apply the most stringent requirement, unless otherwise specifically noted in the contract or task order.

4.1. INDUSTRY CRITERIA

Applicable design and construction criteria references are listed in Table 1 below. This list is not intended to include all criteria that may apply or to restrict design and construction to only those references listed. See also Paragraph 3 for additional facility-specific applicable criteria.

Table 1: Industry Criteria

Air Conditioning and Refrigeration Institute (ARI)	
ARI 310/380	Packaged Terminal Air-Conditioners and Heat Pumps
ARI 440	Room Fan-Coil and Unit Ventilator
ANSI/ARI 430-99	Central Station Air Handling Units
ARI 445	Room Air-Induction Units
ARI 880	Air Terminals
Air Movement and Control Association (AMCA)	
AMCA 210	Laboratory Methods of Testing Fans for Rating
American Architectural Manufacturers Association (AAMA)	
AAMA 605	Voluntary Specification Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels
AAMA 607.1	Voluntary Guide Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum
AAMA 1503	Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections
American Association of State Highway and Transportation Officials (AASHTO)	
	Roadside Design Guide [guardrails, roadside safety devices]

	Standard Specifications for Transportation Materials and Methods of Sampling and Testing [Road Construction Materials]
	Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals
	Guide for Design of Pavement Structures, Volumes 1 and 2 [pavement design guide]
	A Policy of Geometric Design of Highways and Streets
American Bearing Manufacturers Association (AFBMA)	
AFBMA Std. 9	Load Ratings and Fatigue Life for Ball Bearings
AFBMA Std. 11	Load Ratings and Fatigue Life for Roller Bearings
American Boiler Manufacturers Association (ABMA)	
ABMA ISEI	Industry Standards and Engineering Information
American Concrete Institute	
ACI 302.2R	Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials
ACI 318	Building Code Requirements for Structural Concrete
ACI SP-66	ACI Detailing Manual
ACI 530	Building Code Requirements for Masonry Structures
ADA Standards for Accessible Design	
See US Access Board	ADA and ABA Accessibility Guidelines for Buildings and Facilities, Chapters 3-10.
American Institute of Steel Construction (AISC)	
	Manual of Steel Construction – 13th Edition (or latest version)
American Iron and Steel Institute	
AISI S100	North American Specification for the Design of Cold-Formed Steel Structural Members

American National Standards Institute 11 (ANSI)	
ANSI Z21.10.1	Gas Water Heaters Vol. 1, Storage water Heaters with Input Ratings of 75,000 Btu per Hour or less
ANSI Z124.3	American National Standard for Plastic Lavatories
ANSI Z124.6	Plastic Sinks
ANSI Z21.45	Flexible Connectors of Other Than All-Metal Construction for Gas Appliances
ANSI/IEEE C2-2007	National Electrical Safety Code
ANSI/AF&PA NDS-2001	National Design Specification for Wood Construction
American Society of Civil Engineers (ASCE)	
ASCE 7	Minimum Design Loads for Buildings and Other Structures
ASCE 37	Design and Construction of Sanitary and Storm Sewers, Manuals and Reports on Engineering Practice [sanitary sewer and storm drain design criteria]
ASCE/SEI 31-03	Seismic Evaluation of Existing Buildings [Existing Building Alteration/Renovation]
ASCE/SEI 41-06	Seismic Rehabilitation of Existing Buildings [Existing Building Alteration/Renovation]
American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)	
ASHRAE 90.1	ANSI/ASHRAE/IESNA 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings
ASHRAE Guideline 0	The Commissioning Process
ASHRAE Guideline 1.1	The HVAC Commissioning Process
ASHRAE Handbooks	Fundamentals, HVAC Applications, Systems and Equipment, Refrigeration (Applicable, except as otherwise specified)
ASHRAE Standard 15	Safety Standard for Refrigeration Systems
ASHRAE Standard 62.1	Ventilation for Acceptable Indoor Air Quality

ASHRAE Standard 55	Thermal Environmental Conditions for Human Occupancy (Design portion is applicable, except where precluded by other project requirements.)
American Society of Mechanical Engineers International (ASME)	
ASME BPVC SEC VII	Boiler and Pressure Vessel Code: Section VII Recommended Guidelines for the Care of Power Boilers
ASME A17.1	Safety Code for Elevators and Escalators
ASME B 31 (Series)	Piping Codes
American Water Works Association (AWWA)	
	Standards [standards for water line materials and construction]
American Welding Society	
	Welding Handbook
	Welding Codes and Specifications (as applicable to application, see International Building Code for example)
Architectural Woodwork Institute (AWI)	
Latest Version	AWI Quality Standards
Associated Air Balance Council (AABC)	
AABC MN-1	National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems
	AABC Associated Air Balance Council Testing and Balance Procedures
ASTM International	
ASTM C1060-90(1997)	Standard Practice for Thermographic Inspection of Insulation Installations in Envelope Cavities of Frame Buildings
ASTM E 779 (2003)	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
ASTM E1827-96(2002)	Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door

Builders Hardware Manufacturers Association (BHMA)	
ANSI/BHMA	The Various BHMA American National Standards
Building Industry Consulting Service International	
	Telecommunications Distribution Methods Manual (TDMM)
	Customer-Owned Outside Plant Design Manual (CO-OSP)
Code of Federal Regulations (CFR)	
49 CFR 192	Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards
10 CFR 430	Energy Conservation Program for Consumer Products
Consumer Electronics Association	
CEA 709.1B	Control Network Protocol Specification
CEA 709.3	Free-Topology Twisted-Pair Channel Specification
CEA 852	Tunneling Component Network Protocols Over Internet Protocol Channels
Electronic Industries Association (EIA)	
ANSI/EIA/TIA 568	Structured Cabling Series
ANSI/EIA/TIA 569	Commercial Building Standard for Telecommunications Pathways and Spaces (includes ADDENDA)
ANSI/TIA/EIA-606	Administrative Standard for the Telecommunications Infrastructure of Commercial Buildings
J-STD EIA/TIA 607	Commercial Building Grounding and Bonding Requirements for Telecommunications
Federal Highway Administration (FHWA)	
	Manual on Uniform Traffic Control Devices for Streets and Highways [signage and pavement markings for streets and highways]
FHWA-NHI-01-021	Hydraulic Engineering Circular No. 22, Second Edition, URBAN DRAINAGE DESIGN MANUAL

Illuminating Engineering Society of North America (IESNA)	
IESNA RP-1	Office Lighting
IESNA RP-8	Roadway Lighting
IESNA Lighting Handbook	Reference and Application
Institute of Electrical and Electronics Engineers Inc. (IEEE)	
	Standard for Use of the International System of Units (SI): the Modern Metric System
Standard 1100	Recommended Practice for Powering and Grounding Sensitive Electronic Equipment
International Code Council (ICC)	
IBC	International Building Code Note: All references in the International Building Code to the International Electrical Code shall be considered to be references to NFPA 70. All references in the International Building Code to the International Fuel Gas Code shall be considered to be references to NFPA 54 and NFPA 58. All references in the International Building Code to the International Fire Code and Chapter 9 shall be considered to be references to Unified Facilities Criteria (UFC) 3-600-01.
IMC	International Mechanical Code – Note: For all references to “HEATING AND COOLING LOAD CALCULATIONS”, follow ASHRAE 90.1 Note: For all references to “VENTILATION”, follow ASHRAE 62.1
IRC	International Residential Code
IPC	International Plumbing Code
IEC	Energy Conservation Code (IEC) –Applicable only to the extent specifically referenced herein. Refer to Paragraph 5, ENERGY CONSERVATION requirements.
IGC	International Gas Code - not applicable. Follow NFPA 54, National Fuel Gas Code and NFPA 58, Liquified Petroleum Gas Code.

International Organization for Standardization (ISO)	
ISO 6781:1983	Qualitative detection of thermal irregularities in building envelopes – infrared method
LonMark International (LonMark)	
LonMark Interoperability Guidelines	(available at www.lonmark.org), including: Application Layer Guidelines, Layer 1-6 Guidelines, and External Interface File (XIF) Reference Guide
LonMark Resource Files	(available at www.lonmark.org), including Standard Network Variable Type (SNVT) definitions
Metal Building Manufacturers Association (MBMA)	
	Metal Building Systems Manual
Midwest Insulation Contractors Association (MICA)	
	National Commercial and Industrial Insulation Standards Manual
National Association of Corrosion Engineers International (NACE)	
NACE RP0169	Control of External Corrosion on Underground or Submerged Metallic Piping Systems
NACE RP0185	Extruded, Polyolefin Resin Coating Systems with Adhesives for Underground or Submerged Pipe
NACE RP0285	Corrosion Control of Underground Storage Tank Systems by Cathodic Protection
NACE RP0286	Electrical Isolation of Cathodically Protected Pipelines
National Electrical Manufacturers Association (NEMA)	
National Environmental Balancing Bureau (NEBB)	
	Procedural Standards Procedural Standards for Testing Adjusting Balancing of Environmental Systems
National Fire Protection Association (NFPA)	
NFPA 10	Standard for Portable Fire Extinguishers
NFPA 13	Installation of Sprinkler Systems

NFPA 13R	Residential Occupancies up to and Including Four Stories in Height Sprinkler Systems
NFPA 14	Standard for the Installation of Standpipes and Hose Systems
NFPA 20	Installation of Centrifugal Fire Pumps
NFPA 24 NFPA 25	Standard for the Installation of Private Fire Service Mains and Their Appurtenances [underground fire protection system design] Inspection, Testing And Maintenance Of Water-Based Fire Protection Systems
NFPA 30	Flammable and Combustible Liquids Code
NFPA 30A	Motor Fuel Dispensing Facilities and Repair Garages
NFPA 31	Installation of Oil Burning Equipment
NFPA 54	National Fuel Gas Code
NFPA 58	Liquefied Petroleum Gas Code
NFPA 70	National Electrical Code
NFPA 72	National Fire Alarm Code
NFPA 76	Fire Protection of Telecommunications Facilities
NFPA 80	Standard for Fire Doors and Fire Windows
NFPA 90a	Installation of Air Conditioning and Ventilating Systems
NFPA 96	Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations
NFPA 101	Life Safety Code
NFPA 780	Standard for the Installation of Lightning Protection Systems
National Roofing Contractor’s Association (NRCA)	
	Roofing and Waterproofing Manual
National Sanitation Foundation, International	

NSF/ANSI Std. 2, 3, 4, 5, 6, 7, 8, 12, 13, 18, 20, 21, 25, 29, 35, 36, 37, 51, 52, 59, 169	Food Equipment Standards
ANSI/UL Std. 73, 197, 471, 621, 763	Food Equipment Standards
CSA Std. C22.2 No. 109, 120, 195	Food Equipment Standards
Occupational Safety and Health Administration (OSHA)	
Title 29, Part 1926	OSHA Construction Industry Standards, Title 29, Code of Federal Regulations, Part 1926, Safety and Health Regulations for Construction
Plumbing and Drainage Institute (PDI)	
PDI G 101	Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data
PDI WH201	Water Hammer Arrestors
Precast Concrete Institute	
PCI Design Handbook	Precast and Prestressed Concrete
Sheet Metal and Air Conditioning Contractor’s National Association (SMACNA)	
SMACNA HVAC Duct Construction Standards	HVAC Duct Construction Standards - Metal and Flexible
SMACNA Architectural Manual	Architectural Sheet Metal Manual
SMACNA HVAC TAB	HVAC Systems - Testing, Adjusting and Balancing
State/Local Regulations	
	State Department of Transportation Standard Specifications for Highway and Bridge Construction
	Sedimentation and Erosion Control Design Requirements
	Environmental Control Requirements
	Storm Water Management Requirements

Steel Door Institute (SDI)	
ANSI A250.8/SDI 100	Standard Steel Doors and Frames
Steel Deck Institute	
	SDI Diaphragm Design Manual
Steel Joist Institute	
	Catalog of Standard Specifications and Load Tables for Steel Joists and Joist Girders
Underwriters Laboratories (UL)	
UL 96A	Installation Requirements for Lightning Protection Systems
UL 300	Standard for Safety for Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas
UNITED STATES ACCESS BOARD: U.S. ARCHITECTURAL AND TRANSPORTATION BARRIERS COMPLIANCE BOARD	
ADA and ABA Accessibility Guidelines for Buildings and Facilities	ABA Accessibility Standard for DoD Facilities Derived from the ADA and ABA Accessibility Guidelines: Specifically includes: ABA Chapters 1 and 2 and Chapters 3 through 10. Use this reference in lieu of IBC Chapter 11. Excluded are: (a) Facilities, or portions of facilities, on a military installation that are designed and constructed for use exclusively by able-bodied military personnel (See Paragraph 3 for any reference to this exclusion). (b) Reserve and National Guard facilities, or portions of such facilities, owned by or under the control of the Department of Defense, that are designed and constructed for use exclusively by able-bodied military personnel. (See paragraph 3 for any reference to this exclusion).
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES	
	FDA National Food Code
U.S. GREEN BUILDING COUNCIL (USGBC)	
LEED-NC	Green Building Rating System for New Construction & Major Renovations
	Application Guide for Multiple Buildings and On-Campus Building

	Projects

4.2. MILITARY CRITERIA

The project shall conform to the following criteria. Certain design impacts and features due to these criteria are noted for the benefit of the offeror. However, all requirements of the referenced criteria will be applicable, whether noted or not, unless otherwise specified herein.

4.2.1. Energy Policy Act of 2005 (Public Law 109-58) (applies only to the extent specifically implemented in the contract, which may or may not directly cite or reference EPACT)

4.2.2. Executive Order 12770: Metric Usage In Federal Government

(a) Metric design and construction is required except when it increases construction cost. Offeror to determine most cost efficient system of measurement to be used for the project.

4.2.3. TB MED 530: Occupational and Environmental Health Food Sanitation

4.2.4. Unified Facilities Criteria (UFC) 3-410-01FA: Heating, Ventilating, and Air Conditioning - applicable only to the extent specified in paragraph 5, herein.

4.2.5. Deleted.

4.2.6. UFC 3-600-01 Design: Fire Protection Engineering for Facilities. Use the latest edition of the IBC in coordination with this UFC. Use Chapters 3, 6, 7, 33 and UFC 3-600-01. If any conflict occurs between these Chapters and UFC 3-600-01, the requirements of UFC 3-600-01 take precedence. Use UFC 3-600-01 in lieu of IBC Chapters 4, 8,9,10.

4.2.7. UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings

4.2.8. UFC 4-023-03 Design of Buildings to Resist Progressive Collapse (Use most recent version, regardless of references thereto in other publications)

(a) Note the option to use tie force method or alternate path design for Occupancy Category II.

4.2.9. UFC 4-021-01 Design and O&M: Mass Notification Systems

4.2.10. Technical Criteria for Installation Information Infrastructure Architecture (I3A)

(a) Email: DetrickISECI3Aguide@conus.army.mil

4.2.11. U.S. Army Information Systems Engineering Command (USAISEC) TG for the Integration of SECRET Internet Protocol (IP) Router Network (SIPRNET). See Paragraph 3 for applicability to specific facility type. May not apply to every facility. This is mandatory criteria for those facilities with SIPRNET.

4.2.11.1. Draft Guide Specification for Section 27 05 28 PROTECTIVE DISTRIBUTION SYSTEM (PDS) FOR SIPRNET COMMUNICATIONS SYSTEMS, found at https://rfpwizard.cecer.army.mil/HTML/docs/Refs/SECTION_270528-v3.pdf

5.0 GENERAL TECHNICAL REQUIREMENTS

This paragraph contains technical requirements with general applicability to Army facilities. See also Paragraph 3 for facility type-specific operational, functional and technical requirements. Residential or similar grade finishes and materials are not acceptable for inclusion in these buildings, unless otherwise specifically allowed.

5.1. SITE PLANNING AND DESIGN

5.1.1. STANDARDS AND CODES: The site planning and design shall conform to APPLICABLE CRITERIA and to paragraph 6, PROJECT SPECIFIC REQUIREMENTS.

5.1.2. SITE PLANNING OBJECTIVES: Group buildings in configurations that create a sense of community and promote pedestrian use. See paragraph 3 for additional site planning requirements relating to building functions.

5.1.2.1. Provide enclosures and or visual screening devices for Outdoor Utility such as dumpsters, emergency generators, transformers, heating, ventilation, and air conditioning units from streetscape and courtyard views to limit visual impact. Enclosures shall be compatible with the building they serve and accessible by vehicle. The location of dumpsters can have a significant visual impact and should be addressed as part of an overall building design and incorporated in site planning.

5.1.2.2. Where included in the project, dumpster pads shall be concrete (minimum of 8 inches thick on 4 inch base course, unless site conditions dictate more conservative requirements) and directly accessible by way of a paved service drive or parking lot with adequate overhead clearance for collection vehicles. Provide space at dumpster areas for recycling receptacles. Coordinate with Installation on recycling receptacle types, sizes and access requirements and provide space at dumpster areas to accommodate them.

5.1.2.3. Vehicular Circulation. Apply design vehicle templates provided by the American Association of State Highway and Transportation Officials (AASHTO) to the site design. The passenger car class includes passenger cars and light trucks, such as vans and pick-ups. The passenger car template is equivalent to the non-organizational – privately owned vehicle (POV). The truck class template includes single-unit trucks, recreation vehicles, buses, truck tractor-semi-trailer combinations, and trucks or truck tractors with semi-trailers in combination with full trailers. Provide vehicle clearances required to meet traffic safety for emergency vehicles, service vehicles, and moving vans. Provide required traffic control signage Site entrances and site drive aisles shall maximize spacing between drives, incorporate right-angle turns, and limit points of conflict between traffic. Design Services Drives to restrict access to unauthorized vehicles by removable bollards, gates, or other barriers to meet Anti-Terrorism/Force Protection (ATFP) requirements. Orient service drives to building entrances other than the primary pedestrian entry at the front of the building.

5.1.2.4. Provide Emergency Vehicle Access around the facility and shall be in accordance with AT/FP requirements. Maintain a 33-foot clear zone buffer for emergency vehicles, designed to prevent other vehicles from entering the AT/FP standoff to the building.

5.1.2.5. Clear and grub all trees and vegetation necessary for construction; but, save as many trees as possible. Protect trees to be saved during the construction process from equipment.

5.1.2.6. Stormwater Management. Employ design and construction strategies (Best Management Practices) that reduce stormwater runoff, reduce discharges of polluted water offsite and maintain or restore predevelopment hydrology with respect to temperature, rate, volume and duration of flow to the maximum extent practicable. See paragraph 6, PROJECT SPECIFIC requirements for additional information.

5.1.3. EXTERIOR SIGNAGE: Provide exterior signage in accordance with Appendix H, Exterior Signage. Provide exterior NO SMOKING signage that conveys building and grounds smoking policy.

5.1.4. EXISTING UTILITIES: Base utilities maps and capacities for this site are included as part of this RFP. See paragraph 6 for more detailed information.

5.2. SITE ENGINEERING

5.2.1. STANDARDS AND CODES: The site engineering shall conform to APPLICABLE CRITERIA.

5.2.2. SOILS:

5.2.2.1. A report has been prepared to characterize the subsurface conditions at the project site and is **appended to these specifications.** The report provides a general overview of the soil and geologic conditions with detailed descriptions at discrete boring locations. The Contractor's team shall include a licensed geotechnical engineer to interpret the report and develop earthwork and foundation recommendations and design parameters in which to base the contractor's design. If any additional subsurface investigation or laboratory analysis is required to better characterize the site or develop the final design, the Contractor shall perform it under the direction of a licensed geotechnical engineer. There will be no separate payment for the cost of additional tests. If differences between the Contractor's additional subsurface investigation and the government provided soils report or the reasonably expected conditions require material revisions in the design, an equitable adjustment may be made, in accordance with the provisions of the Differing Site Conditions clause. The basis for the adjustment would be the design and construction appropriate for the conditions described in the Government furnished report or the reasonably expected conditions, in comparison with any changes required by material differences in the actual conditions encountered, in accordance with the terms of contract clause Differing Site Conditions.

5.2.2.2. The contractor's licensed geotechnical engineer shall prepare a final geotechnical evaluation report, to be submitted along with the first foundation design submittal, as described in Section 01 33 16, *Design After Award*.

5.2.3. VEHICLE PAVEMENTS: (as applicable to the project)

5.2.3.1. Design procedures and materials shall conform to one of the following: 1) the USACE Pavement Transportation Computer Assisted Structural Engineering (PCASE) program, 2) American Association of State Highway and Transportation Officials (AASHTO) or, 3) the applicable state Department of Transportation standards in which the project is located. See paragraph 5.2.2.2 and Section 01 33 16 for required information for the Contractor's geotechnical evaluation report. The minimum flexible pavement section shall consist of 2 inches of asphalt and 6 inches of base or as required by the pavement design, whichever is greater, unless specifically identified by the Government to be a gravel road. Design roads and parking areas for a life expectance of 25 years with normal maintenance. Parking area for tactical vehicles (as applicable to the project) shall be Portland Cement Concrete (PCC) rigid pavement design. For concrete pavements, submit joint layout plan for review and concurrence. Design pavements for military tracked vehicles (as applicable to the project) IAW USACE PCASE. Traffic estimates for each roadway area will be as shown on the drawings or listed in Section 01 10 00 Paragraph 6.4.4. Pavement markings and traffic signage shall comply with the Installation requirements and with the Manual on Uniform Traffic Control Devices.

5.2.3.2. Parking Requirements.

(a) All handicap POV parking lots (where applicable in the facility specific requirements) shall meet the ADA and ABA Accessibility Guidelines for accessible parking spaces.

(b) Design POV parking spaces for the type of vehicles anticipated, but shall be a minimum of 9 ft by 18 ft for POVs, except for two wheel vehicles.

5.2.3.3. Sidewalks. Design the network of walks throughout the complex (where applicable) to facilitate pedestrian traffic among facilities, and minimize the need to use vehicles. Incorporate sidewalks to enhance the appearance of the site development, while creating a sense of entry at the primary patron entrances to the buildings. Minimum sidewalk requirements are in Paragraph 3, where applicable and/or paragraph 6 and/or site plans, where applicable..

5.2.4. CATHODIC PROTECTION: Provide cathodic protection systems for all underground metallic systems and metallic fittings/portions of non-metallic, underground systems, both inside and outside the building 5 foot line that are subject to corrosion. Coordinate final solutions with the installation to insure an approach that is consistent with installation cathodic protection programs.

5.2.5. UTILITIES: See paragraph 6.4.6 for specific information on ownership of utilities and utility requirements. Meter all utilities (gas, water, and electric, as applicable) to each facility. For Government owned utilities, install meters that are wireless data transmission capable as well as have a continuous manual reading option. All meters will be capable of at least hourly data logging and transmission and provide consumption data for gas, water, and electricity. Gas and electric meters will also provide demand readings based on consumption over a maximum of any 15 minute period. Configure all meters to transmit at least daily even if no receiver for the data is currently available at the time of project acceptance. For privatized utilities, coordinate with the privatization utility(ies) for the proper meter base and meter installation.

5.2.6. PERMITS: The CONTRACTOR shall be responsible for obtaining all permits (local, state and federal) required for design and construction of all site features and utilities.

5.2.7. IRRIGATION. Landscape irrigation systems, if provided, shall comply with the following:

5.2.7.1. Irrigation Potable Water Use Reduction. Reduce irrigation potable water use by 100 percent using LEED credit WE1.1 baseline (no potable water used for irrigation), except where precluded by other project requirements.

5.2.8. EPA WATERSENSE PRODUCTS AND CONTRACTORS. Except where precluded by other project requirements, use EPA WaterSense labeled products and irrigation contractors that are certified through a WaterSense labeled program where available.

5.3. ARCHITECTURE AND INTERIOR DESIGN:

This element will be evaluated per APPLICABLE CRITERIA under the quality focus.

5.3.1. STANDARDS AND CODES: The architecture and interior design shall conform to APPLICABLE CRITERIA.

5.3.2. GENERAL: Overall architectural goal is to provide a functional, quality, visually appealing facility that is a source of pride for the installation and delivered within the available budget and schedule.

5.3.3. COMPUTATION OF AREAS: See APPENDIX Q for how to compute gross and net areas of the facility(ies).

5.3.4. BUILDING EXTERIOR: Design buildings to enhance or compliment the visual environment of the Installation. Where appropriate, reflect a human scale to the facility. Building entrance should be architecturally defined and easily seen. When practical, exterior materials, roof forms, and detailing shall be compatible with the surrounding development and adjacent buildings on the Installation and follow locally established architectural themes. Use durable materials that are easy to maintain. Exterior colors shall conform to the Installation requirements. See paragraph 6.

5.3.4.1. Building Numbers: Permanently attach exterior signage on two faces of each building indicating the assigned building number or address. Building number signage details and locations shall conform to Appendix H, Exterior Signage.

5.3.5. BUILDING INTERIOR

5.3.5.1. Space Configuration: Arrange spaces in an efficient and functional manner in accordance with area adjacency matrices.

5.3.5.2. Surfaces: Appearance retention is the top priority for building and furniture related finishes. Provide low maintenance, easily cleaned room finishes that are commercially standard for the facility occupancy specified, unless noted otherwise.

5.3.5.3. Color: The color, texture and pattern selections for the finishes of the building shall provide an aesthetically pleasing, comfortable, easily maintainable and functional environment for the occupants. Coordinate the building colors and finishes for a cohesive design. Select colors appropriate for the building type. Use color, texture and pattern to path or way find through the building. Trendy colors that will become dated shall be limited to non-permanent finishes such as carpet and paint. Select finisheswith regards to aesthetics, maintenance, durability, life safety and image. Limit the number of similar colors for each material. Use medium range colors for ceramic and porcelain tile groutto help hide soiling. Plastic laminate and solid surface materials shall have patterns that are mottled, flecked or speckled. Coordinate finish colors of fire extinguisher cabinets, receptacle bodies and plates, fire alarms / warning lights, emergency lighting, and other miscellaneous items with the building interior. Match color of equipment items on ceilings (speakers, smoke detectors, grills, etc.) the ceiling color.

5.3.5.4. Circulation: Circulation schemes must support easy way finding within the building.

5.3.5.5. Signage: Provide interior signage for overall way finding and life safety requirements. A comprehensive interior plan shall be from one manufacturer. Include the following sign types: (1) Lobby Directory, (2) Directional Signs; (3) Room Identification Signs; (4) Building Service Signs; (5) Regulatory Signs; (6) Official and Unofficial Signs (7) Visual Communication Boards (8) NO SMOKING signage that conveys building smoking policy. Use of emblems or logos may also be incorporated into the signage plan.

5.3.5.6. Window Treatment: Provide interior window treatments with adjustable control in all exterior window locations for control of day light coming in windows or privacy at night. Maintain uniformity of treatment color and material to the maximum extent possible within a building.

5.3.5.7. Casework: Unless, otherwise specified, all casework for Cabinetry and cases shall be “custom grade”, as described in the AWI Quality Standards.

5.3.6. COMPREHENSIVE INTERIOR DESIGN

5.3.6.1. Comprehensive Interior Design includes the integration of a Structural Interior Design (SID) and a Furniture, Fixtures and Equipment (FF&E) design and package. SID requires the design, selection and coordination of interior finish materials that are integral to or attached to the building structure. Completion of a SID involves the selection and specification of applied finishes for the building’s interior features including, but not limited to, walls, floors, ceilings, trims, doors, windows, window treatments, built-in furnishings and installed equipment, lighting, and signage. The SID package includes finish schedules, finish samples and any supporting interior elevations, details or plans necessary to communicate the building finish design and build out. The SID also provides basic space planning for the anticipated FF&E requirements in conjunction with the functional layout of the building and design issues such as life safety, privacy, acoustics, lighting, ventilation, and accessibility. See Section 01 33 16 for SID design procedures.

5.3.6.2. The FF&E design and package includes the design, selection, color coordination and of the required furnishing items necessary to meet the functional, operational, sustainability, and aesthetic needs of the facility coordinated with the interior finish materials in the SID. The FF&E package includes the specification, procurement documentation, placement plans, ordering and finish information on all freestanding furnishings and accessories, and a cost estimate. Coordinate the selection of furniture style, function and configuration with the defined requirements. Examples of FF&E items include, but are not limited to workstations, seating, files, tables, beds, wardrobes, draperies and accessories as well as marker boards, tack boards, and presentation screens. Criteria for furniture selection include function and ergonomics, maintenance, durability, sustainability, comfort and cost.

5.4. STRUCTURAL DESIGN

5.4.1. STANDARDS AND CODES: The structural design shall conform to APPLICABLE CRITERIA.

5.4.2. GENERAL: The structural system must be compatible with the intended functions and components that allows for future flexibility and reconfigurations of the interior space. Do not locate columns, for instance, in rooms requiring visibility, circulation or open space, including, but not limited to entries, hallways, common areas, classrooms, etc. Select an economical structural system based upon facility size, projected load requirements and local availability of materials and labor. Base the structural design on accurate, site specific geotechnical information and anticipated loads for the building types and geographical location. Consider climate conditions, high humidity, industrial atmosphere, saltwater exposure, or other adverse conditions when selecting the type of cement and admixtures used in concrete, the concrete cover on reinforcing steel, the coatings on structural members, expansion joints, the level of corrosion protection, and the structural systems. Analyze, design and detail each building as a complete structural system. Design structural elements to preclude damage to finishes, partitions and other frangible, non-structural elements to prevent impaired operability of moveable components; and to prevent cladding leakage and roof ponding. Limit deflections of structural members to the allowable of the applicable material standard, e.g., ACI, AISC, Brick Industry Association, etc. When modular units or other pre-fabricated construction is used or combined with stick-built construction, fully coordinate and integrate the overall structural design between the two different or interfacing construction types. If the state that the project is located in requires separate, specific licensing for structural engineers (for instance, such as in Florida, California and others), then the structural engineer designer of record must be registered in that state.

5.4.3. LOADS: See paragraph 3 for facility specific (if applicable) and paragraph 6 for site and project specific structural loading criteria. Unless otherwise specified in paragraph 6, use Exposure Category C for wind. If not specified, use Category C unless the Designer of Record can satisfactorily justify another Exposure Category in its design analysis based on the facility Master Plan. Submit such exceptions for approval as early as possible and prior to the Interim Design Submittal in Section “Design After Award”. Design the ancillary building items, e.g. doors, window jambs and connections, overhead architectural features, systems and equipment bracing, ducting, piping, etc. for gravity, seismic, lateral loads and for the requirements of UFC 4-010-01, DOD Minimum Antiterrorism Standards for Buildings. Ensure and document that the design of glazed items includes, but is not limited to, the following items under the design loads prescribed in UFC 4-010-01:

(a) Supporting members of glazed elements, e.g. window jamb, sill, header

(b) Connections of glazed element to supporting members, e.g. window to header

(c) Connections of supporting members to each other, e.g. header to jamb

(d) Connections of supporting members to structural system, e.g. jamb to foundation.

5.4.4. TERMITE TREATMENT: (Except Alaska) Provide termite prevention treatment in accordance with Installation and local building code requirements, using licensed chemicals and licensed applicator firm.

5.5. THERMAL PERFORMANCE

5.5.1. STANDARDS AND CODES: Building construction and thermal insulation for mechanical systems shall conform to APPLICABLE CRITERIA.

5.5.2. BUILDING ENVELOPE SEALING PERFORMANCE REQUIREMENT. Design and construct the building envelope for office buildings, office portions of mixed office and open space (e.g., company operations facilities), dining, barracks and instructional/training facilities with a continuous air barrier to control air leakage into, or out of, the conditioned space. Clearly identify all air barrier components of each envelope assembly on construction documents and detail the joints, interconnections and penetrations of the air barrier components. Clearly identify the boundary limits of the building air barriers, and of the zone or zones to be tested for building air tightness on the drawings. Pending the publication of the 2010 version of ASHRAE 90.1, the use of painted interior walls is not an acceptable air barrier method.

5.5.2.1. Trace a continuous plane of air-tightness throughout the building envelope and make flexible and seal all moving joints.

5.5.2.2. The air barrier material(s) must have an air permeance not to exceed 0.004 cfm / sf at 0.3” wg (0.02 L/s.m2 @ 75 Pa) when tested in accordance with ASTM E 2178

5.5.2.3. Join and seal the air barrier material of each assembly in a flexible manner to the air barrier material of adjacent assemblies, allowing for the relative movement of these assemblies and components.

5.5.2.4. Support the air barrier so as to withstand the maximum positive and negative air pressure to be placed on the building without displacement, or damage, and transfer the load to the structure.

5.5.2.5. Seal all penetrations of the air barrier. If any unavoidable penetrations of the air barrier by electrical boxes, plumbing fixture boxes, and other assemblies are not airtight, make them airtight by sealing the assembly and the interface between the assembly and the air barrier or by extending the air barrier over the assembly.

5.5.2.6. The air barrier must be durable to last the anticipated service life of the assembly.

5.5.2.7. Do not install lighting fixtures with ventilation holes through the air barrier

5.5.2.8. Provide a motorized damper in the closed position and connected to the fire alarm system to open on call and fail in the open position for any fixed open louvers such as at elevator shafts.

5.5.2.9. Damper and control to close all ventilation or make-up air intakes and exhausts, atrium smoke exhausts and intakes, etc when leakage can occur during inactive periods.

5.5.2.10. Compartmentalize garages under buildings by providing air-tight vestibules at building access points.

5.5.2.11. Compartmentalize spaces under negative pressure such as boiler rooms and provide make-up air for combustion.

5.5.2.12. Performance Criteria and Substantiation: Submit the qualifications and experience of the testing entity for approval. Demonstrate performance of the continuous air barrier for the opaque building envelope by the following tests:

(a) Develop an Air Barrier Quality Assurance plan to assure that a competent air barrier inspector/specialist inspects the critical components prior to them being concealed. At a minimum, three onsite inspections are required during construction to assure the completeness of the construction and design.

(b) Test the completed building and demonstrate that the air leakage rate of the building envelope does not exceed 0.25cfm/ft2 at a pressure differential of 0.3" w.g.(75 Pa) in accordance with ASTM's E 779 (2003) or E-1827-96 (2002). Accomplish tests using either pressurization or depressurization or both. Divide the volume of air leakage in cfm @ 0.3" w.g. (L/s @ 75 Pa) by the area of the pressure boundary of the building, including roof or ceiling, walls and floor to produce the air leakage rate in cfm/ft2 @ 0.3" w.g. (L/s.m2 @ 75 Pa). Do not test the building until verifying that the continuous air barrier is in place and installed without failures in accordance with installation instructions so that repairs to the continuous air barrier, if needed to comply with the required air leakage rate, can be done in a timely manner.

(c) Test the completed building using Infrared Thermography testing. Use infrared cameras with a resolution of 0.1deg C or better. Perform testing on the building envelope in accordance with ISO 6781:1983 and ASTM C1060-90(1997). Determine air leakage pathways using ASTM E 1186-03 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems, and perform corrective work as necessary to achieve the whole building air leakage rate specified in (a) above.

(d) Notify the Government at least three working days prior to the tests to provide the Government the opportunity to witness the tests. Provide the Government written test results confirming the results of all tests.

5.6. PLUMBING

5.6.1. STANDARDS AND CODES: The plumbing system shall conform to APPLICABLE CRITERIA.

5.6.2. PRECAUTIONS FOR EXPANSIVE SOILS: Where expansive soils are present, include design features for underslab piping systems and underground piping serving chillers, cooling towers, etc, to control forces resulting from soil heave. Some possible solutions include, but are not necessarily limited to, features such as flexible expansion joints, slip joints, horizontal offsets with ball joints, or multiple bell and spigot gasketed fittings. For structurally supported slabs, suspend piping from the structure with adequate space provided below the pipe for the anticipated soil movement.

5.6.3. HOT WATER SYSTEMS: For Hot Water heating and supply, provide a minimum temp of 140 Deg F in the storage tank and a maximum of 110 Deg F at the fixture, unless specific appliances or equipment specifically require higher temperature water supply.

5.6.4. SIZING HOT WATER SYSTEMS: Unless otherwise specified or directed in paragraph 3, design in accordance with ASHRAE Handbook Series (appropriate Chapters), ASHRAE Standard 90.1, and the energy conservation requirements of the contract. Size and place equipment so that it is easily accessible and removable for repair or replacement.

5.6.5. JANITOR CLOSETS: In janitor spaces/room/closets, provide at minimum, a service sink with heavy duty shelf and wall hung mop and broom rack(s).

5.6.6. FLOOR DRAINS: As a minimum, provide floor drains in mechanical rooms and areas, janitor spaces/rooms/closets and any other area that requires drainage from fixtures or equipment, drain downs, condensate, as necessary.

5.6.7. URINALS: Not Used.

5.6.8. BUILDING WATER USE REDUCTION. Reduce building potable water use in each building 30 percent using IPC fixture performance requirements baseline.

5.6.9. Do not use engineered vent or Sovent® type drainage systems.

5.6.10. Where the seasonal design temperature of the cold water entering a building is below the seasonal design dew point of the indoor ambient air, and where condensate drip will cause damage or create a hazard, insulate plumbing piping with a vapor barrier type of insulation to prevent condensation. Do not locate water or drainage piping over electrical wiring or equipment unless adequate protection against water (including condensation) damage is provided. Insulation alone is not adequate protection against condensation. Follow ASHRAE Fundamentals Chapter 23, Insulation for Mechanical Systems, IMC paragraph 1107 and International Energy Conservation Code for pipe insulation requirements.

5.6.11. Cover all drain, waste and vent piping to prevent mortar or other debris from being flushed down and blocking pipes during such construction activities.

5.7. ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

5.7.1. STANDARDS AND CODES: The electrical systems for all facilities shall conform to APPLICABLE CRITERIA.

5.7.2. MATERIALS AND EQUIPMENT: Materials, equipment and devices shall, as a minimum, meet the requirements of Underwriters Laboratories (UL) where UL standards are established for those items. Wiring for branch circuits shall be copper. Motors larger than one-half horsepower shall be three phase. All electrical systems shall be pre-wired and fully operational unless otherwise indicated. Wall mounted electrical devices (power receptacles, communication outlets and CATV outlets) shall have matching colors, mounting heights and faceplates.

5.7.3. POWER SERVICE: Primary service from the base electrical distribution system to the pad-mounted transformer and secondary service from the transformer to the building service electrical equipment room shall be underground. See paragraph 6 for additional site electrical requirements.

5.7.3.1. Spare Capacity: Provide 10% space for future circuit breakers in all panelboards serving residential areas of buildings and 15% spaces in all other panelboards.

5.7.4. TELECOMMUNICATION SERVICE: Connect the project's facilities to the Installation telecommunications (voice and data) system through the outside plant (OSP) telecommunications underground infrastructure cabling system per the I3A Criteria. Connect to the OSP cabling system from each facility main cross connect located in the telecommunications room.

5.7.5. LIGHTING: Comply with the recommendations of the Illumination Engineering Society of North America (IESNA), the National Energy Policy Act and Energy Star requirements for lighting products..

5.7.5.1. Interior Lighting:

(a) Reflective Surfaces: Coordinate interior architectural space surfaces and colors with the lighting systems to provide the most energy-efficient workable combinations.

(b) High Efficiency Fluorescent Lighting: Utilize NEMA premium electronic ballasts and energy efficient fluorescent lamps with a Correlated Color Temperature (CCT) of 4100K. Linear fluorescent and compact fluorescent fixtures shall have a Color Rendering Index of (CRI) of 87 or higher. Fluorescent lamps shall be the low mercury type qualifying as non-hazardous waste upon disposal. Do not use surface mounted fixtures on acoustical tile ceilings. Provide an un-switched fixture with emergency ballast shall be provided at each entrance to the building.

(c) Solid State Lighting: Fixtures shall provide lighting with a minimum Correlated Color Temperature (CCT) of 4100K and shall have a Color Rendering Index of (CRI) of 75 or higher. Verify performance of the light producing solid state components by a test report in compliance with the requirements of IESNA LM 80. Verify performance of the solid state light fixtures by a test report in compliance with the requirements of IESNA LM 79. Provide lab results by a NVLAP certified laboratory. The light producing solid state components and drivers shall have a life expectancy of 50,000 operating hours while maintaining at least 70% of original illumination level. Provide a complete five year warranty for fixtures.

(d) Metal Halide Lighting (where applicable): Metal Halide lamp fixtures in the range of 150-500 Watts shall be pulse start type and have a minimum efficiency rating of 88%.

(e) Lighting Controls: ANSI/ASHRAE/IESNA 90.1 has specific lighting controls requirements. Provide a high level of lighting system control by individual occupants or by specific groups in multi-occupant spaces (classrooms, conference rooms) to promote the productivity, comfort and well being of the building occupants. In office spaces, the preferred lighting should be a 30 FC ambient lighting level with occupancy sensor controlled task lighting in the work spaces to provide a composite lighting level of 50 FC on the working surfaces. Consider incorporating daylighting techniques for the benefit of reducing lighting energy requirements while improving the quality of the indoor spaces. If daylight strategies are used, additional coordination is required with the architect and mechanical engineer. Additionally, incorporate electric lighting controls to take advantage of the potential energy savings.

(f) Exterior Lighting: See paragraph 6.9 for site specific information, if any, on exterior lighting systems. Minimize light pollution and light trespass by not over lighting and use cut-off type exterior luminaries.

5.7.6. TELECOMMUNICATION SYSTEM: Building telecommunications cabling systems (BCS) and OSP telecommunications cabling system shall conform to APPLICABLE CRITERIA, including but not limited to I3A Technical Criteria. An acceptable BCS encompasses, but is not limited to, copper and fiber optic (FO) entrance cable, termination equipment, copper and fiber backbone cable, copper and fiber horizontal distribution cable, workstation outlets, racks, cable management, patch panels, cable tray, cable ladder, conduits, grounding, and labeling.. Items included under OSP infrastructure encompass, but are not limited to, manhole and duct infrastructure, copper cable, fiber optic cable, cross connects, terminations, cable vaults, and copper and FO entrance cable.

5.7.6.1. Design, install, label and test all telecommunications systems in accordance with the I3A Criteria and ANSI/TIA/EIA 568, 569, and 606 standards. A Building Industry Consulting Services International (BICSI) Registered Communications Distribution Designer (RCDD) with at least 2 yrs related experience shall develop and stamp telecommunications design, and prepare the test plan. See paragraph 5.8.2.5 for design of environmental systems for Telecommunications Rooms.

5.7.6.2. The installers assigned to the installation of the telecommunications system or any of its components shall be regularly and professionally engaged in the business of the application, installation and testing of the specified telecommunications systems and equipment. Key personnel; i.e., supervisors and lead installers assigned to the installation of this system or any of its components shall be BICSI Registered Cabling Installers, Technician Level. Submit documentation of current BICSI certification for each of the key personnel. In lieu of BICSI certification, supervisors and installers shall have a minimum of 5 years experience in the installation of the specified copper and fiber optic cable and components. They shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products.

5.7.6.3. Perform a comprehensive end to end test of all circuits to include all copper and fiber optic cables upon completion of the BCS and prior to acceptance of the facility. Provide adequate advanced notification to the COR to allow COR and Installation personnel attendance The BCS circuits include but are not limited to all copper and fiber optic(FO) entrance cables, termination equipment, copper and fiber backbone cable, copper and fiber horizontal distribution cable, and workstation outlets. Test in accordance with ANSI/EIA/TIA 568 standards. Use test instrumentation that meets or exceeds the standard. Submit the official test report to include test procedures, parameters tested, values, discrepancies and corrective actions in electronic format. Test and accomplish all necessary corrective actions to ensure that the government receives a fully operational, standards based, code compliant telecommunications system.

5.7.7. LIGHTNING PROTECTION SYSTEM: Provide a lightning protection system where recommended by the Lightning Risk Assessment of NFPA 780, Annex L.

5.8. HEATING, VENTILATING, AND AIR CONDITIONING

5.8.1. STANDARDS AND CODES: The HVAC system shall conform to APPLICABLE CRITERIA.

5.8.2. DESIGN CONDITIONS.

5.8.2.1. Outdoor and indoor design conditions shall be in accordance with UFC 3-410-01FA. Outdoor air and exhaust ventilation requirements for indoor air quality shall be in accordance with ASHRAE 62.1. All Buildings with minimum LEED Silver requirement (or better) will earn LEED Credit EQ 7.1, Thermal Comfort-Design., except where precluded by other project requirements. Where the contract specifies indoor design temperature , airflow, humidity conditions, etc., use those parameters.

5.8.2.2. High Humidity Areas: Design HVAC systems in geographical areas meeting the definition for high humidity in UFC 3-410-01FA to comply with the special criteria therein for humid areas.

5.8.2.3. Cooling equipment may be oversized by up to 15 percent to account for recovery from night setforward. Heating equipment may be oversized by up to 30 percent to account for recovery from night setback. Design single zone systems and multi-zone systems to maintain an indoor design condition of 50% relative humidity for cooling only. For heating only where the indoor relative humidity is expected to fall below 20% for extended periods, add humidification to increase the indoor relative humidity to 30%. Provide ventilation air from a separate dedicated air handling unit (DOAU) for facilities using multiple single zone fan-coil type HVAC systems. Do not condition outside air through fan coil units. Avoid the use of direct expansion cooling coils in air handling units with constant running fans that handle outside air.

5.8.2.4. Locate all equipment so that service, adjustment and replacement of controls or internal components are readily accessible for easy maintenance.

5.8.2.5. Environmental Requirements for Telecommunications Rooms,(including SIPRNET ROOMS, where applicable for specific facility type). Comply with ANSI/EIA/TIA 569 and the I3A.

5.8.2.6. Fire dampers: dynamic type with a dynamic rating suitable for the maximum air velocity and pressure differential to which the damper is subjected. Test each fire damper with the air handling and distribution system running.

5.8.3. BUILDING AUTOMATION SYSTEM. Provide a Building Automation System consisting of a building control network , and integrate the building control network into the UMCS as specified.

The building control network shall be a single complete non-proprietary Direct Digital Control (DDC) system for control of the heating, ventilating and air conditioning (HVAC) systems as specified herein. The building control network shall be an Open implementation of LONWORKS® technology using ANSI/EIA 709.1B as the only communications protocol and use only LonMark Standard Network Variable Types (SNVTs), as defined in the LonMark® Resource Files, for communication between DDC Hardware devices to allow multi-vendor interoperability.

5.8.3.1. The building automation system shall be open in that it is designed and installed such that the Government or its agents are able to perform repair, replacement, upgrades, and expansions of the system without further dependence on the original Contractor. This includes, but is not limited to the following:

(a) Install hardware such that individual control equipment can be replaced by similar control equipment from other equipment manufacturers with no loss of system functionality.

(b) Necessary documentation (including rights to documentation and data), configuration information, configuration tools, programs, drivers, and other software shall be licensed to and otherwise remain with the Government such that the Government or its agents are able to perform repair, replacement, upgrades, and expansions of the system without subsequent or future dependence on the Contractor.

5.8.3.2. All DDC Hardware shall:

(a) Be connected to a TP/FT-10 ANSI/EIA 709.3 control network.

(b) Communicate over the control network via ANSI/EIA 709.1B exclusively.

(c) Communicate with other DDC hardware using only SNVTs

(d) Conform to the LonMark® Interoperability Guidelines.

(e) Be locally powered; link power (over the control network) is not acceptable.

(f) Be fully configurable via standard or user-defined configuration parameter types (SCPT or UCPT), standard network variable type (SNVT) network configuration inputs (*nci*), or hardware settings on the controller itself to support the application. All settings and parameters used by the application shall be configurable via standard or user-defined configuration parameter types (SCPT or UCPT), standard network variable type (SNVT) network configuration inputs (*nci*), or hardware settings on the controller itself

(g) Provide input and output SNVTs required to support monitoring and control (including but not limited to scheduling, alarming, trending and overrides) of the application. Required SNVTs include but are not limited to: SNVT outputs for all hardware I/O, SNVT outputs for all setpoints and SNVT inputs for override of setpoints.

(h) To the greatest extent practical, not rely on the control network to perform the application..

5.8.3.3. Controllers shall be Application Specific Controllers whenever an ASC suitable for the application exists. When an ASC suitable for the application does not exist use programmable controllers or multiple application specific controllers.

5.8.3.4. Application Specific Controllers shall be LonMark Certified whenever a LonMark Certified ASC suitable for the application exists. For example, VAV controllers must be LonMark certified.

5.8.3.5. Application Specific Controllers (ASCs) shall be configurable via an LNS plug-in whenever t an ASC with an LNS plug-in suitable for the application exists.

5.8.3.6. Each scheduled system shall accept a network variable of type SNVT_occupancy and shall use this network variable to determine the occupancy mode. If the system has not received a value to this network variable for more than 60 minutes it shall default to a configured occupancy schedule.

5.8.3.7. Gateways may be used provided that each gateway communicates with and performs protocol translation for control hardware controlling one and only one package unit.

5.8.3.8. Not Used

5.8.3.9. Perform all necessary actions needed to fully integrate the building control system. These actions include but are not limited to:

- Configure M&C Software functionality including: graphical pages for System Graphic Displays including overrides, alarm handling, scheduling, trends for critical values needing long-term or permanent monitoring via trends, and demand limiting.
- Install IP routers or ANSI/CEA-852 routers as needed to connect the building control network to the UMCS IP network. Routers shall be capable of configuration via DHCP and use of an ANSI/CEA-852 configuration server but shall not rely on these services for configuration. All communication between the UMCS and building networks shall be via the ANSI/CEA-709.1B protocol over the IP network in accordance with ANSI/CEA-852.

5.8.3.10. Provide the following to the Government for review prior to acceptance of the system:

- The latest version of all software and user manuals required to program, configure and operate the system.
- Points Schedule drawing that shows every DDC Hardware device. The Points Schedule shall contain the following information as a minimum:
  - Device address and NodeID.
  - Input and Output SNVTs including SNVT Name, Type and Description.
  - Hardware I/O, including Type (AI, AO, BI, BO) and Description.
  - Alarm information including alarm limits and SNVT information.
  - Supervisory control information including SNVTs for trending and overrides.
  - Configuration parameters (for devices without LNS plug-ins) Example Points Schedules are available at https://eko.usace.army.mil/fa/besc/
- Riser diagram of the network showing all network cabling and hardware. Label hardware with ANSI.CEA-709.1 addresses, IP addresses, and network names.
- Control System Schematic diagram and Sequence of Operation for each HVAC system.
- Operation and Maintenance Instructions including procedures for system start-up, operation and shut-down, a routine maintenance checklist, and a qualified service organization list.
- LONWORKS® Network Services (LNS®) database for the completed system.
- Quality Control (QC) checklist (below) completed by the Contractor's Chief Quality Control (QC)

Representative

Table 5-1: QC Checklist

Instructions: Initial each item, sign and date verifying that the requirements have been met.		
#	Description	Initials
1	All DDC Hardware is installed on a TP/FT-10 local control bus.	
2	Communication between DDC Hardware is only via EIA 709.1B using SNVTs. Other protocols and network variables other than SNVTs have not been used.	
3	All sequences are performed using DDC Hardware.	
4	LNS Database is up-to-date and accurately represents the final installed system	
5	All software has been licensed to the Government	
6	M&C software monitoring displays have been created for all building systems, including all override and display points indicated on Points Schedule drawings.	
7	Final As-built Drawings accurately represent the final installed system.	
8	O&M Instructions have been completed and submitted.	
9	Connections between the UMCS IP network and ANSI/CEA-709.1B building networks are through ANSI/CEA-852 Routers.	
By signing below I verify that all requirements of the contract, including but not limited to the above, been met.		
Signature:____________________________ Date:______________		

5.8.3.11. Perform a Performance Verification Test (PVT) under Government supervision prior to system acceptance. During the PVT demonstrate that the system performs as specified, including but not limited to demonstrating that the system is Open and correctly performs the Sequences of Operation.

5.8.3.12. Provide a 1 year unconditional warranty on the installed system and on all service call work. The warranty shall include labor and material necessary to restore the equipment involved in the initial service call to a fully operable condition.

5.8.3.13. Provide training at the project site on the installed building system Upon completion of this training each student, using appropriate documentation, should be able to start the system, operate the system, recover the system after a failure, perform routine maintenance and describe the specific hardware, architecture and operation of the system.

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5.8.4. TESTING, ADJUSTING AND BALANCING. Test and balance air and hydronic systems, using a firm certified for testing and balancing by the Associated Air Balance Council (AABC), National Environmental Balancing Bureau (NEBB), or the Testing Adjusting, and Balancing Bureau (TABB). The prime contractor shall hire the TAB firm directly, not through a subcontractor. Perform TAB in accordance with the requirements of the standard under which the TAB Firm's qualifications are approved, i.e., AABC MN-1, NEBB TABES, or SMACNA HVACTAB unless otherwise specified herein. All recommendations and suggested practices contained in the TAB Standard shall be considered mandatory. Use the provisions of the TAB Standard, including checklists, report forms, etc., as nearly as practicable to satisfy the Contract requirements. Use the TAB Standard for all aspects of TAB, including qualifications for the TAB Firm and Specialist and calibration of TAB instruments. Where the instrument manufacturer calibration recommendations are more stringent than those listed in the TAB Standard, adhere to the manufacturer's recommendations. All quality assurance provisions of the TAB Standard such as performance guarantees shall be part of this contract. For systems or system components not covered in the TAB Standard, the TAB Specialist shall develop TAB procedures. Where new procedures, requirements, etc., applicable to the Contract requirements have been published or adopted by the body responsible for the TAB Standard used (AABC, NEBB, or TABB), the requirements and recommendations contained in these procedures and requirements are mandatory.

5.8.5. COMMISSIONING: Commission all HVAC systems and equipment, including controls, and all systems requiring commissioning for LEED Enhanced commissioning, in accordance with ASHRAE Guideline 1.1, ASHRAE

Guideline 0 and LEED. Do not use the sampling techniques discussed in ASHRAE Guideline 1.1 and in ASHRAE Guideline 0. Commission 100% of the HVAC controls and equipment. Hire the Commissioning Authority (CA), certified as a CA by AABC, NEBB, or TABB, as described in Guideline 1.1. The CA will be an independent subcontractor and not an employee of the Contractor nor an employee or subcontractor of any other subcontractor on this project, including the design professionals (i.e., the DOR or their firm(s)). The CA will communicate and report directly to the Government in execution of commissioning activities. The Contracting Officer's Representative will act as the Owner's representative in performance of duties spelled out under OWNER in Annex F of ASHRAE Guideline 0. All buildings with Minimum LEED Silver (or better) requirement will earn LEED Credit EA3 Enhanced Commissioning.

5.9. ENERGY CONSERVATION

5.9.1. The building including the building envelope, HVAC systems, service water heating, power, and lighting systems shall meet the Mandatory Provisions and the Prescriptive Path requirements of ASHRAE 90.1. Substantiation requirements are defined in Section 01 33 16, Design After Award.

5.9.2. Design all building systems and elements to meet the minimum requirements of ANSI/ASHRAE/IESNA 90.1. Design the buildings, including the building envelope, HVAC systems, service water heating, power, and lighting systems to achieve an energy consumption that is at least 40% below the consumption of a baseline building meeting the minimum requirements of ANSI/ASHRAE/IESNA Standard 90.1. Energy calculation methodologies and substantiation requirements are defined in Section 01 33 16, Design After Award.

5.9.3. Purchase Energy Star products, except use FEMP designated products where FEMP is applicable to the type product. The term "Energy Star product" means a product that is rated for energy efficiency under an Energy Star program. The term "FEMP designated product" means a product that is designated under the Federal Energy Management Program of the Department of Energy as being among the highest 25 percent of equivalent products for energy efficiency. When selecting integral sized electric motors, choose NEMA PREMIUM type motors that conform to NEMA MG 1, minimum Class F insulation system. Motors with efficiencies lower than the NEMA PREMIUM standard may only be used in unique applications that require a high constant torque speed ratio (e.g., inverter duty or vector duty type motors that conform to NEMA MG 1, Part 30 or Part 31).

5.9.4. Solar Hot Water Heating. Provide at least 30% of the domestic hot water requirements through solar heating methodologies, unless the results of a Life Cycle Cost Analysis (LCCA) developed utilizing the Building Life Cycle Cost Program (BLCC) which demonstrates that the solar hot water system is not life cycle cost effective in comparison with other hot water heating systems. The type of system will be established during the contract or task order competition and award phase, including submission of an LCCA for government evaluation to justify non-selection of solar hot water heating. The LCCA uses a study period of 25 years and the Appendix K utility cost information. The LCCA shall include life cycle cost comparisons to a baseline system to provide domestic hot water without solar components, analyzing at least two different methodologies for providing solar hot water to compare against the baseline system.

5.9.5. Process Water Conservation. When potable water is used to improve a building's energy efficiency, employ lifecycle cost effective water conservation measures, except where precluded by other project requirements.

5.9.6. Renewable Energy Features. The Government's goal is to implement on-site renewable energy generation for Government use when lifecycle cost effective. See Paragraph 6, PROJECT SPECIFIC REQUIREMENTS for renewable energy requirements for this project.

5.10. FIRE PROTECTION

5.10.1. STANDARDS AND CODES Provide the fire protection system conforming to APPLICABLE CRITERIA.

5.10.2. Inspect and test all fire suppression equipment and systems, fire pumps, fire alarm and detection systems and mass notification systems in accordance with the applicable NFPA standards. The fire protection engineer of record shall witness final tests. The fire protection engineer of record shall certify that the equipment and systems are fully operational and meet the contract requirements. Two weeks prior to each final test, the contractor shall notify, in writing, the installation fire department and the installation public work representative of the test and invite them to witness the test.

5.10.3. Fire Extinguisher Cabinets: Provide fire extinguisher cabinets and locations for hanging portable fire extinguishers in accordance with NFPA 10 Standard for Portable Fire Extinguishers. The Government will furnish and install portable fire extinguishers, which are personal property, not real property installed equipment.

5.10.4. Fire alarm and detection system: Required fire alarm and detection systems shall be the addressable type. Fire alarm initiating devices, such as smoke detectors, heat detectors and manual pull stations shall be addressable. When the system is in alarm condition, the system shall annunciate the type and location of each alarm initiating device. Sprinkler water flow alarms shall be zoned by building and by floor. Supervisory alarm initiating devices, such as valve supervisory switches, fire pump running alarm, low-air pressure on dry sprinkler system, etc. shall be zoned by type and by room location.

5.10.5. Roof Access: Paragraph 2-9 of UFC 3-600-01 Fire Protection for Facilities will be modified in the next update to that UFC. Pending revision, comply with roof access and stairway requirements in accordance with the International Building Code. Where roof access is required by the IBC or other criteria, comply with UFC 4-010-01, Anti-Terrorist Force Protection, Standard 14. "Roof Access".

5.10.6. Fire Protection Engineer Qualifications: In accordance with UFC 3-600-01, FIRE PROTECTION ENGINEERING FOR FACILITIES, the fire protection engineer of record shall be a registered professional engineer (P.E.) who has passed the fire protection engineering written examination administered by the National Council of Examiners for Engineering and Surveys (NCEES), or a registered P.E. in a related engineering discipline with a minimum of 5 years experience, dedicated to fire protection engineering that can be verified with documentation.

5.11. SUSTAINABLE DESIGN

5.11.1. STANDARDS AND CODES: Sustainable design shall conform to APPLICABLE CRITERIA. See paragraph 6, PROJECT-SPECIFIC REQUIREMENTS for which version of LEED applies to this project. The LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects (AGMBC) applies to all projects. Averaging may be used for LEED compliance as permitted by the AGMBC but is restricted to only those buildings included in this project. Each building must individually comply with the requirements of paragraphs ENERGY CONSERVATION and BUILDING WATER USE REDUCTION.

5.11.2. LEED RATING, REGISTRATION, VALIDATION AND CERTIFICATION: See Paragraph PROJECT-SPECIFIC REQUIREMENTS for project minimum LEED rating/achievement level, for facilities that are exempt from the minimum LEED rating, for LEED registration and LEED certification requirements and for other project-specific information and requirements.

5.11.2.1. Innovation and Design Credits. LEED Innovation and Design (ID) credits are acceptable only if they are supported by formal written approval by GBCI (either published in USGBC Innovation and Design Credit Catalog or accompanied by a formal ruling from GBCI). LEED ID credits that require any Owner actions or commitments are acceptable only when Owner commitment is indicated in paragraph PROJECT-SPECIFIC REQUIREMENTS or Appendix LEED Project Credit Guidance

5.11.3. OPTIMIZE ENERGY PERFORMANCE. : Project must earn, as a minimum, the points associated with compliance with paragraph ENERGY CONSERVATION. LEED documentation differs from documentation requirements for paragraph ENERGY CONSERVATION and both must be provided. For LEED-NC v2.2 projects you may substitute ASHRAE 90.1 2007 Appendix G in its entirety for ASHRAE 90.1 2004 in accordance with USGBC Credit Interpretation Ruling dated 4/23/2008.

5.11.4. COMMISSIONING. See paragraph 5.8.5 COMMISSIONING for commissioning requirements. USACE templates for the required Basis of Design document and Commissioning Plan documents are available at http://en.sas.usace.army.mil (click on Engineering Criteria) and may be used at Contractor's option.

5.11.5. DAYLIGHTING. Except where precluded by other project requirements, do the following in at least 75 percent of all spaces occupied for critical visual tasks: achieve a 2 percent glazing factor (calculated in accordance with LEED credit EQ8.1) OR earn LEED Daylighting credit, provide appropriate glare control and provide either automatic dimming controls or occupant-accessible manual lighting controls.

5.11.6. LOW-EMITTING MATERIALS. Except where precluded by other project requirements, use materials with low pollutant emissions, including but not limited to composite wood products, adhesives, sealants, interior paints and finishes, carpet systems and furnishings,

5.11.7. CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT. Except where precluded by other project requirements, earn LEED credit EQ 3.1 Construction IAQ Management Plan, During Construction and credit EQ 3.2 Construction IAQ Management Plan, Before Occupancy.

5.11.8. RECYCLED CONTENT. In addition to complying with section RECYCLED/RECOVERED MATERIALS, earn LEED credit MR4.1, Recycled Content, 10 percent except where precluded by other project requirements.

5.11.9. BIOBASED AND ENVIRONMENTALLY PREFERABLE PRODUCTS. Except where precluded by other project requirements, use materials with biobased content, materials with rapidly renewable content, FSC certified wood products and products that have a lesser or reduced effect on human health and the environment over their lifecycle to the maximum extent practicable.

5.11.10. FEDERAL BIOBASED PRODUCTS PREFERRED PROCUREMENT PROGRAM (FB4P). The Farm Security and Rural Investment Act (FSRIA) of 2002 required the U.S. Department of Agriculture (USDA) to create procurement preferences for biobased products that are applicable to all federal procurement (to designate products for biobased content). For all designated products that are used in this project, meet USDA biobased content rules for them except use of a designated product with USDA biobased content is not required if the biobased product (a) is not available within a reasonable time, (b) fails to meet performance standard or (c) is available only at an unreasonable price. For biobased content product designations, see http://www.biopreferred.gov/ProposedAndFinalItemDesignations.aspx.

5.12. CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT: Achievement of 50% diversion, by weight, of all non-hazardous C&D waste debris is required. Reuse of excess soils, recycling of vegetation, alternative daily cover, and wood to energy are not considered diversion in this context, however the Contractor must tracked and report it. A waste management plan and waste diversion reports are required, as detailed in Section 01 57 20.00 10, ENVIRONMENTAL PROTECTION.

5.13. SECURITY (ANTI-TERRORISM STANDARDS): Unless otherwise specified in Project Specific Requirements, only the minimum protective measures as specified by the current Department of Defense Minimum Antiterrorism Standards for Buildings, UFC 4-010-01, are required for this project. The element of those standards that has the most significant impact on project planning is providing protection against explosives effects. That protection can either be achieved using conventional construction (including specific window requirements) in conjunction with establishing relatively large standoff distances to parking, roadways, and installation perimeters or through building hardening, which will allow lesser standoff distances. Even with the latter, the minimum standoff distances cannot be encroached upon. These setbacks will establish the maximum buildable area. All standards in Appendix B of UFC 4-010-01 must be followed and as many of the recommendations in Appendix C that can reasonably be accommodated should be included. The facility requirements listed in these specifications assume that the minimum standoff distances can be met, permitting conventional construction. Lesser standoff distances (with specific minimums) are not desired, however can be provided, but will require structural hardening for the building. See Project Specific Requirements for project specific siting constraints. The following list highlights the major points but the detailed requirements as presented in Appendix B of UFC 4-010-01 must be followed.

(a) Standoff distance from roads, parking and installation perimeter; and/or structural blast mitigation

(b) Blast resistant windows and skylights, including glazing, frames, anchors, and supports

(c) Progressive collapse resistance for all facilities 3 stories or higher. Unless determined otherwise by the Installation and noted in paragraphs 3 or 6, the building shall be considered to have areas of uncontrolled public access when designing for progressive collapse.

(d) Mass notification system (shall also conform to UFC 4-021-01, Mass Notification Systems)

(e) For facilities with mailrooms (see paragraph 3 for applicability) – mailrooms have separate HVAC systems and are sealed from rest of building

6.0 PROJECT SPECIFIC REQUIREMENTS

6.1. GENERAL

The requirements of this paragraph augment the requirements indicated in Paragraphs 3 through 5.

6.2. APPROVED DEVIATIONS

The following are approved deviations from the requirements stated in Paragraphs 3 through 5 that only apply to this project.

6.3. SITE PLANNING AND DESIGN

6.3.1. General:

See Appendix J, DRAWINGS for the project location and the location of haul routes and Contractor's staging area. Construction limits shall be confined to the construction site boundaries as shown on the Site Development Plan (SDP) within the Appendices. Reference Specification 01 35 12 for special project conditions for Fort Polk. A construction and demolition waste diversion rate of 50% minimum is required unless there is a valid reason for deviation. Items that can be used to help decrease diversion rates include salvaged items (may be reused as part of the contract by others), scrap metal, masonry products, gravel, asphalt, concrete, rock, and topsoil (earth fill is specifically excluded).

a. Risk and threat analysis have been performed for this project in accordance with DA PAM 190-51 and UFC 4-010-01FA, and a low threat level has been assessed. This facility is considered a Billeting facility, therefore; the applicable levels of protection as specified in UFC 4-010-01 are required to be incorporated into the site design.

6.3.1.1. Existing Conditions: The site is generally located north of 23rd Street, south of 22nd Street, east of Mississippi Avenue, and west of Alabama Avenue. Current site conditions include: Buildings 2434 and 2446, gravel parking, sidewalks, benches, utilities, and physical fitness equipment. There are existing water, sewer, gas, and electric lines that run through the site that will require relocation. Refer to paragraph 6.3.1.5. "Demolition". Building 2446 was demolished in 2007. Utilities and the associated foundation for Building 2446 remains and shall be demolished by the Contractor. The Contractor shall demolish and remove Building 2434. The Contractor shall refer to Appendix E for the Environmental Assessment of Building 2434.

Refer to the aerial mapping and topographic survey provided in the Appendices for existing conditions. The aerial was performed in 2007, some changes may exist. The Contractor shall make a visit to the site prior to bids. The Contractor shall bring any discrepancies between the survey and the existing site conditions to the attention of the Contracting Officer's Representative (COR).

6.3.1.2. Site Development Plan (SDP). The SDP provided by the government is included within the Appendices. Any discrepancies which are found in the furnished plans shall be brought to the attention of the COR. Borings, a boring location map, data on the subsurface conditions, and the geotechnical report are furnished as part of the RFP, see Appendix A (report) and Appendix J (drawings).

a. The Contractor shall accept the site as is and be solely responsible for any geotechnical investigations required to accommodate the Contractor's proposed foundation and other site features (as required by the Contractor's final geotechnical report). The Contractor's pad preparation operations shall be confined to the work area defined by the SDP. Excess soil may not be wasted within the SDP work area without the written approval of the Contracting Officer's Representative (COR).

b. The Contractor will be allotted an area as shown on the SDP for the placement of a construction trailer complex and storage for the Contractor and respective Subcontractors. Permanent Trailers will not be permitted within the building envelope work areas. Trailers within the work area may be required to be relocated, at no additional cost to the Government, to accommodate site activities. The Contractor shall construct a temporary six-foot (6) high chain link fence around the construction trailer complex and storage area. The fence shall include plastic strip inserts, colored brown to obstruct visibility through the fence. The Contractor shall be responsible for the site preparation, fencing, access drives, and maintenance of the compound at all times. Upon completion of the project and after removal of trailers, materials, and equipment from within the fenced area, the fence shall be removed and will become the property of the Contractor. Areas used by the Contractor for the storage of equipment or material, or other use, shall be restored to the original or better condition. Gravel used to traverse grassed areas shall be removed and the area restored to its original condition, including top soil and seeding as necessary.

c. For proposal purposes, the Contractor should assume he will be responsible for providing temporary utilities (water, sewer, and electricity, etc.) at the project site. The Contractor shall coordinate connection point of temporary utilities with DPW and American Water through the COR. The Contractor shall supplement the temporary water connection point with a PRV backflow preventer and the connection must be metered.

d. The SDP is a conceptual layout provided as a guide to the Contractor. The Contractor shall adhere to the requirements stated within this RFP and on the SDP drawings, but the Contractor’s final design shall provide the greatest value to the Government. The Contractor’s site design shall not interfere with the future construction of the Company Operations building. Construction limits are provided on the SDP drawings.

6.3.1.3. Future Development: This complex also includes a Company Operations building, to be constructed under a separate contract. Refer to Appendix J for the location of the Company Ops.

6.3.1.4. Grading Requirements:

a. Finished Floor Elevations: A building's finished floor elevation shall be a minimum of 12 inches above the highest point of the adjacent outside finished grade, unless there is an overriding technical reason to deviate. The finished grade shall be sloped a minimum of 5% for the first 10 feet away from the building.

b. Turfed Areas Adjacent to Buildings: Outside finished grade shall slope away from the building at a 5% grade for the first 10 feet. The 5% grade shall be extended to 20 to 30 feet in areas with expansive soils. When site conditions require the use of steep slopes near buildings, the grade shall slope away from the building at a 5% grade for a minimum of 6 feet before transitioning to a steeper slope. The maximum slope shall be 25%, refer to paragraph c below. These requirements shall be indicated on the grading plan with critical spot elevations.

c. Lawn Areas: Lawn areas beyond the 5% finished grade stated above shall have a 1% minimum slope and a maximum slope of 25%. The Contractor shall provide slope protection based on the soil type, slope length, aesthetic, environmental, and economic considerations.

d. Ditches and Swales: A minimum longitudinal ditch or swale gradient of 0.5% with an absolute minimum of 0.3% shall be used. Side slopes on ditches or swales shall be no steeper than 1 vertical on 4 horizontal. Steeper slopes shall be paved. Turf Reinforcement Matting (TRM) shall be used in ditches that are subject to high velocity storm runoff. Erosion control matting shall also be utilized as necessary to control erosion on steeper slopes.

e. Roads, Streets, and Access Drives: Gradients for roads, streets and access drives shall be as outlined in AASHTO, *A Policy of Geometric Design of Highways and Streets*. Grade changes in excess of 1% shall be accomplished by means of vertical curves. The length of vertical curves will be determined in accordance with the aforementioned AASHTO criteria. Profiles are mandatory for vertical control of centerline gradients. Roads, streets and highways shall be shown using of half-plan/half-profile type drawings.

f. Parking Areas: Pavement grades shall provide positive surface drainage with a 1 percent minimum slope in the direction of drainage. Provide a maximum slope within a 90-degree parking space of 1-½ percent from front to rear end and 5 percent from side to side. Provide a maximum slope within a 45-degree or 60-degree parking space of 1 percent from front to rear end and 5 percent from side to side. Slope grade perpendicular to direction of parking 5 percent maximum for bituminous or concrete surfaces and 3 percent for other surfaces.

g. Culverts: The recommended gradient of culverts shall be 0.5% with an absolute minimum of 0.3%. Concrete headwalls or end sections shall be provided for all culverts. Headwalls and end sections shall be designed to reduce velocities to levels that are non-erosive for the soil types encountered.

h. Finish Grade Contours and Spot Elevations: Provide finish grade contours at 1-foot intervals and spot elevations to construct all site development features. Spot elevations on the drawings shall be sufficient so that interpolation between contours is not required for structures, grading or paved areas. Spot elevations shall be provided where grade changes a minimum of 1 percent and shall be used at point of tangency for curbs on end islands and at corners of parking lots.

6.3.1.5. Demolition: The Contractor shall demolish all utilities located under proposed pavement and building. Building 2446 will be removed prior to construction. Demolition of building 2434 is a bid option in this RFP. The Contractor shall demolish any pavements or utilities associated with these two buildings. The Contractor shall relocate the physical fitness equipment to the area shown on Sheet C102, Appendix J. For further possible demolition, refer to Appendix J, existing site conditions. The demolition of all utilities shall be in accordance with DPW and AW requirements.

a. Existing water service lines shall be physically separated from, and capped or plugged at the water supply main at the first threaded connection closest to the main. Where the supply from the main feeds more than one building, and those remaining buildings will have continued water service, the contractor shall physically separate, and cap or plug the water supply for the demolished building at the tee branch. Where demolished buildings have separate fire lines (typically 4" thru 8" line sizes) for fire protection, the contractor shall physically separate the fire line from the source main between the operating valve and the main, and cap or plug the service lead as close as possible to the main. In all cases, if the materials of previous construction consist of leaded joint tees as the point of connection from the water main to the lines to be abandoned, the contractor shall physically remove the main line tee and replace that portion of the main line which was affected. All valves and valve boxes associated with the utility lines to be abandoned shall be removed from the site and shall not be buried in place, unless there is/are other buildings that are affected by that same service line tap.

b. Existing lateral sewer lines shall be physically separated from the sewer collection system at the closest point to the receiving manhole, or branch wye if the lateral receives effluent from additional buildings that are to remain in service. The contractor shall permanently cap or install a concrete plug or other Contracting Officer's Representative (COR) approved device permanently affixed to the remaining portion of active sewer line that will prevent groundwater influence. All cleanouts and similar above ground fittings associated with sewer lines to be abandoned shall be physically separated from the lateral line at the fitting (sanitary wye) below grade and removed from the site.

c. Existing natural gas service lines shall be capped as near as possible to the source of supply, typically either Polyethylene (PE) or steel. The contractor shall heat fuse a PE cap in accordance with the pipe manufacturers recommendations or install a threaded plug or cap of approved material for steel lines as close to the tee as possible. The building riser shall be physically separated below grade at the depth of the service line and removed from site. The abandoned service line shall be filled with water and each end shall be permanently capped or plugged, if the abandoned service line is not physically removed in it's entirety from the original service line ditch. All associated service valves and valve boxes shall be physically removed from the site.

6.3.1.6. Design Submittal: The Contractor's site design shall include separate drawings to include, but not limited to Demolition, Site Layout, Grading, including storm drainage structures, Site Utilities, Erosion and Sediment Control, SWPPP, and Turfing and Landscaping. Complete design calculations shall be included in a design analysis for site development items such as storm drainage, storm drainage structures, and all outside utilities. Horizontal and vertical control shall be provided for all new facilities. Innovative site design is encouraged within the site boundaries. The Contractor shall provide electronic design files (CADD/GIS) for the site as part of their design and construction responsibilities. The electronic files shall follow the coordinate system utilized in the SDP, and must be included as an as-built condition. See Section 01 35 12 for CADD/GIS requirements.

6.3.1.7. Environmental Compliance Officer: The Contractor must have two Fort Polk certified Environmental Compliance Officer's onsite. The training is forty (40) hours and is offered twice a month at Building 2522. Coordinate the dates of training with your COR.

6.3.2. Site Structures and Amenities

a. Building(s)

(1) Building Setback and Force Protection: The site shall be laid out based on the facility threat security level to protect against exterior attack by providing standoff distance between an aggressor or bomb, barriers, and to facilitate visual monitoring of the site. Reference is made to the force protection requirements in UFC 4-010-01.

(2) Building Spacing: Fire clearance separations shall be in accordance with UFC 3-600-01 and the International Building Code. Verify that fire clearances and access for equipment is acceptable to the Installation's Fire Chief. Separation for buildings shall conform to force protection requirements per UFC 4-010-01.

(3) The Contractor shall locate the building east of the parking lot. Refer to the drawings, Appendix J.

b. Parking Areas: The Contractor shall provide a total of 189 parking spaces, in accordance with Chapter 3 Section 01 10 00. The number of handicap accessible spaces provided shall be in accordance with ADA Standards for Accessible Design.

(1) The Contractor shall provide perimeter concrete curbs and gutters for all parking areas and access drives.

(2) The Contractor shall provide a landscaped island every 16 spaces minimum.

c. Walks: Walks paralleling buildings shall be located beyond the eave drip line and at least 5 feet from the foundation. Walks paralleling parking areas shall be at least 6 feet wide and shall abut the back of the curb. All other walks shall be a minimum 5 feet wide. The Contractor shall construct aluminum handrails along stairs with more than one step. The Contractor shall proved ramps on all sidewalks intersecting streets and parking lots.

d. Dumpsters: The Contractor shall coordinate location of the dumpsters with the Installation and in accordance with UFC 4-010-01. Concrete loading aprons shall be provided for the first 15 feet in front of the dumpster pads to accommodate loading and to avoid rutting of the pavement in front of the dumpsters. Dumpster screening shall be compatible with the building it serves and shall be sized to accommodate front loading dumpsters. The Contractor shall provide one trash dumpsters per 150 soldiers.

e. Retaining Walls: **(Am#2)** ~~The Contractor shall construct aluminum handrails on all retaining walls over four feet in height.~~ The Contractor shall design the wall in accordancewith soil parameters given in the Geotechnical Report. The design shall be stamped and sealed by a structural engineer. The Contractor shall construct aluminum handrails on all retaining walls over four feet in height.

f. Mechanical/Electrical Yard: The Contractor shall concrete pave the entire area within a screened/fenced in mechanical or electrical area. All Mechanical/Electrical Yards shall be located a minimum of 33-ft from the building.

g. Bootwash. Provide one bootwash station, (3 feet by 3 feet) with hose bib, per 30 apartments. **(Am#2)** The Contractor shall connect the bootwash stations to the sanitary sewer. The Contractor shall either provide raised bootwashes or a curb around the bootwashes to prevent the entrance of runoff. The Contractor shall place two-way clean outs every 80-ft to and at sanitary sewer connection.

6.3.3. Site Functional Requirements:

6.3.3.1. Stormwater Management (SWM) Systems.

The Contractor shall comply with the requirements of general permit number LAR100000.

6.3.3.1.1. Storm Drain System: Existing Storm Drainage Systems are shown within the SDP. The Contractor shall tie into these systems as appropriate for his areas of design responsibility. Design and construction of the storm drainage system shall be in accordance with Federal Aviation Administration Advisory Circular FAA AC 150-5320-5C, *Surface Drainage Design*; Federal Highway Administration Publication No. FHWA-NHI-01-021, Hydraulic Engineering Circular No. 22, Second Edition, *URBAN DRAINAGE DESIGN MANUAL*; and U.S. Weather Bureau Technical Paper No. 40, dated May 1961, *Rainfall Frequency Atlas of the United States for Durations from 30 minutes to 24 hours, and return periods from 1 to 100 years*. Design of drainage structures shall be based on a 10-year storm frequency. Design of the storm drainage system shall incorporate the principles of Low Impact Development (LID), as detailed in UFC 3-210-10 DESIGN: *LOW IMPACT DEVELOPMENT MANUAL. The contractor's design shall maintain or restore, to the maximum extent possible, the predevelopment hydrology of the site with regard to the temperature, rate, volume, and duration of flow in accordance with the Energy Independence and Security Act of 2007 (Section 438, EISA 2007).* Manholes, surface inlets, and curb inlets shall be constructed of reinforced concrete or pre-cast reinforced concrete. Structures in pavement shall be designed to handle H-20 loading. Structures in turfed areas can be constructed for lighter weight loading. The Contractor is responsible for designing the storm drainage system to be as economical as possible, while taking into account the topography, drainage area, and outfall locations, as well as coordination with existing drainage systems, and existing and future underground utilities. Profiles are required for underground storm drainage systems and sections are required for culverts.

a. Underground Systems: Whenever possible, pipe crowns shall be matched in elevations. Profiles of pipes shall show all existing and new underground utilities and pertinent surface features. The minimum pipe gradient shall be designed to provide a minimum velocity (full flow) of 3.0 fps. The new outfall and receiving channel must be designed to withstand the shear stress acting on the channel from the runoff to prevent erosion. New underground storm drainage pipes shall be sized by computation of backwater surface profiles. The minimum pipe size shall be 12 inches, unless the pipe is a part of the roof drain system, in which case the minimum size of laterals and collector pipes is 4 inches.

b. Street Drainage: Street drainage shall be accomplished by the use of curb and gutter and curb inlets. Curb gaps can be considered in areas where roadside ditches are used. The center one-third of the street shall not convey runoff during the passing of the design storm. Inverted crown sections for the streets shall not be used without prior approval. Curb inlets shall not be located in the radius of street intersections, at curb returns, or where pedestrian traffic is most likely to occur.

c. POV Parking and Hardstands: Do not concentrate the flow of storm runoff on asphalt pavement. Convey storm runoff within POV parking areas to perimeter curbs by sheetflow. However, if it is necessary to concentrate flow within a parking area, provide concrete paving at the swale flowline. Concentrated flow will not be permitted to flow from POV parking or hardstand areas onto adjacent gravel areas or turfed slopes. Sheetflow from parking areas and hardstands onto adjacent gravel or turfed areas must be examined for possible erosive effects.

d. The Contractor shall connect the roof drain system to an underground storm drain system unless otherwise approved by DPW.

e. There is an existing detention area located west of the Barracks site, refer to Appendix E. The Contractor may utilize this area to help meet Section 438, EISA 2007.

6.3.3.2. Erosion and Sediment Control

During the construction of the facilities, the Contractor shall be responsible for the Storm Water Pollution Prevention Plans (SWPPP) for the limits of the entire construction site. The use of silt fences, mulch straw/hay bales around inlets, and sediment traps to control erosion during construction shall be included in the design.

6.3.3.3. Vehicular Circulation.

a. Geometric Features: Geometric design of all roads, streets, access drives, and parking areas shall conform to the requirements presented in AASHTO, *A Policy of Geometric Design of Highways and Streets*. Verify with the local installation that access for fire equipment is adequate. Radii, to back of curb, for intersections are standardized as follows:

Primary and Secondary Intersection - 30 feet

Tertiary intersections - 20 feet

Access drives at end parking space - 5 feet

b. Main Access Road: The Contractor shall avoid offsetting the entrances to the parking lot from other parking lot entrances if possible. If this design is not possible the centerline offset shall be at least 200-feet from existing local streets and driveways.

6.4. SITE ENGINEERING

6.4.1. Existing Topographical Conditions

The government furnished survey Horizontal and Vertical control complies with EM 1110-1-8005, Table 2-1, *Military Construction, Building or Structure Design*. Horizontal control is based on Louisiana State Plane Coordinate

System, North Zone, NAD-83. Vertical control is based on NAVD-88. The government furnished survey was performed using English units in survey feet and using the level names of AEC 3.0 CADD standards with the Southwestern Division, Fort Worth District file naming convention.

6.4.2. Existing Geotechnical conditions: See Appendix A for a preliminary geotechnical report.

Reference paragraph 5.2.2 and Appendix A.

6.4.3. Fire Flow Tests See Appendix D for results of fire flow tests to use for basis of design for fire flow and domestic water supply requirements.

6.4.4. Pavement Engineering and Traffic Estimates:

6.4.4.1. Pavements: Geometric design of roads and streets shall follow the guidance provided in AASHTO - *A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS and GUIDELINES FOR GEOMETRIC DESIGN OF VERY LOW-VOLUME LOCAL ROADS (ADT≤400)*. Pavement structures shall be designed in accordance with criteria contained in AASHTO - *GUIDE FOR DESIGN OF PAVEMENT STRUCTURES*. Vehicle types expected to occupy the pavements and their frequency of use are as follows: personal vehicles, such as cars and small trucks, garbage trucks, and fire/emergency medical vehicles. Paved access is required to mechanical rooms/yards. The design shall be based on an Equivalent Single Axle Load (ESAL) of 4726. New curb and gutter shall be concrete paved. Pavement markings and striping shall be in accordance with state DOT standards and the Manual of Uniform Traffic Control Devices (MUTCD). Channelization and pavement markings shall be as required by the FHWA MUTCD and FHWA Standard Highway Signs.

6.4.4.2. Emergency Vehicle Access: Access drives shall be provided to allow access for fire trucks and emergency vehicles in accordance with NFPA and UFC 3-600-1. Access drive(s) shall be constructed of concrete pavement. The emergency access drives shall have minimum turning radii of 35 feet to accommodate fire vehicles. The Company Operation facility to the east of the Barracks site will construct a road that may be utilized as an emergency access drive for the Barracks, refer to Appendix J for location. The distance from the Barracks to this road must meet the requirements of UFC 3-600-1 if utilized as an emergency access drive for the Barracks. The Company Operations site is currently under design by the Corps of Engineers (Fort Worth District). The Contractor shall coordinate the grading around the emergency access drive with the CORPS.

6.4.4.3. Concrete Hardstands for Vehicle Parking and Storage Areas: A joint pattern plan shall be developed showing locations of each type of joint to be used. Spot elevations are required at the intersection of each joint to facilitate placement of forms during construction.

6.4.5. Traffic Signage and Pavement Markings

Permanent and construction roadway signs shall be as required by the FHWA MUTCD and FHWA Standard Highway Signs.

6.4.6. Base Utility Information

a. Underground utility lines such as sanitary sewer, water, and gas shall not be placed under existing or proposed pavements, but the utility shall be placed between the back slope of a road ditch and building, or back of curb. Deviations to the aforementioned requirements shall be coordinated with the COR. Do not locate above ground utility features in front of, or in such a manner as to detract from the facility, make landscaping more difficult, or restrict or negate close-in recreational areas. High pressure gas lines shall not be closer than 100 feet from an occupied building without special protective provisions and COR approval. Open cut excavation will not be allowed for crossing existing streets. The Contractor shall bore unless otherwise approved by DPW through the COR.

b. Utility information shall be coordinated and planned with the Installation’s DPW through the COR. The SDP provides existing utility routing and general orientation for points of connection. Specific connection locations not shown are noted hereinafter.

c. Included in Appendix J is the Topographic Survey of the site, which includes the following information: site features, utilities, and drainage patterns. Electronic CADD files of the aforementioned are provided as part of the RFP.

d. The Contractor is responsible for connection of all utilities from the Barracks building to the service lines. The Contractor shall be responsible for coordination between the SDP and utility providers. The Contractor shall coordinate all utility outages with the installation, the Contracting Officer, and American Water Enterprise Military Services Group (American Water).

e. The Water and Sanitary Sewer Services on this installation are privatized by American Water Enterprise Military Services Group (American Water). The Contractor shall adhere to the AMERICAN WATER MILITARY SERVICE GROUP DESIGN GUIDE FOR WATER AND WASTEWATER FACILITIES included in Appendix AA. The Contractor is required to submit a Permit Application for Water and Sewer Taps and Line Installations to American Water for approval. All water and sanitary sewer construction shall be inspected by American Water. All submittals, correspondence, and inspections shall be submitted to American Water through the COR. The Contractor's Water and Sanitary Sewer design will also have to be approved by the State of Louisiana, refer to American Water's Design Guide for further information.

f. The Contractor shall adhere to Louisiana's Title 51 Public Health - Sanitary Code Part XII. Water Supplies, Part XIII. Sewage Disposal, and Part XIV. Plumbing. State and Federal Law, and the Louisiana Sanitary Code, requires that – prior to the start of construction – approval by the Louisiana Department of Health and Hospitals (DHH) must be obtained for plans and specifications of all public water systems and wastewater systems. All extensions or modifications to the installations water or wastewater (W3) systems require submittal of plans and specifications to the DHH for approval. Construction may not start until the State review and approval process is completed. The Contractor shall submit a design summary package to the LDHH for review and approval:

DHH/OPH Central Region 6 Office
5604 B Coliseum Boulevard
Alexandria, Louisiana 71303

The design summary package shall consist of a cover letter briefly describing the project, the applicable filled out LDHH design summary forms, and the Contractor's design drawings and specs. Refer to Appendix BB for the LDHH deisgn summary forms or to HYPERLINK "http://www.dhh.louisiana.gov/offices/publications.asp?ID=204&Detail=1092"http://www.dhh.louisiana.gov/offices/publications.asp?ID=204&Detail=1092.

6.4.6.1. Site Electrical: Refer to Paragraph 6.9.

6.4.6.2. Water Distribution System: The water distribution system is shown on the SDP. The Contractor shall coordinate points of connection through the COR with American Water. Design and construction of the potable water service between the main line and the Barracks shall be the responsibility of the Contractor. The design and construction of the water distribution system for domestic water shall be in accordance with American Water's Design Guide and Specifications. A meter will be provided by the Contractor, and the Contractor will be responsible for connection to the meter and all service piping beyond the meter outlet. Design and installation of the water system and meter shall be in accordance with American Water's Design Guide. Coordination with American Water shall be through the COR. Valves will be installed on the water service lines near the connection point and on each service line to the building. For water mains, provide 2 valves at tees and 3 valves at crosses. Velocities in water lines shall be less than 7 feet per second (fps) to prevent possible water hammer effects.

a. Potable Water Disinfection - Verification of water line disinfection shall be performed per AWWA C651-05. The samples shall be analyzed by an analytical lab that holds a current state license and certification. Repeating disinfection protocols per AWWA C651-05 is required until satisfactory results are obtained (two consecutive sets of acceptable samples taken 24 hours apart). Water samples shall be collected in proper sterilized containers, and a bacterial examination shall be performed in accordance with state approved methods. As a minimum, one water sample from each 1000 linear feet segment of disinfected water line shall be collected. The water supply system disinfection is not approved for usage until each test result is negative for bacteriological examination. The water sample analytical results shall be provided to the DPW's Environmental Office for record keeping. The commercial laboratory shall be certified by the state's approving authority for examination of potable water.

b. The Contractor shall provide one separate fire sprinkler service connection. The Contractor shall provide a double detector check valve assembly and all piping between the detector check and the building. The Contractor shall provide and locate fire hydrants in accordance with UFC 3-600-01 and American Water's Design Guide. The Contractor shall provide shutoff valves for each fire hydrant. The Contractor shall provide bollards around fire hydrants, Fire Department Connections (FDC), and Post Indicator Valves (PIV) that are subject to vehicular damage. The bollards shall be spaced to allow access by fire department personnel. The Contractor shall provide tamper switches with each PIV and shall connect the PIV to the building's fire alarm panel. Fire Department Connections shall be placed in front of the building and the PIV shall be placed a minimum of 40 feet away from all buildings. Any deviation from these locations must be approved in writing by the Fort Polk Fire Marshall and American Water.

6.4.6.3. Sanitary Sewer System: The sanitary sewer system is shown on the SDP. The Contractor shall coordinate points of connection through the COR with American Water. Design and construction of the sanitary sewer system shall be in accordance American Water's Design Guide and Specifications. The design and construction shall also be in accordance with American Society of Civil Engineers (ASCE) and the Water Environment Federation (WEF), Gravity Sanitary Sewer Design and Construction, Second Edition (ASCE Manuals and Reports on Engineering Practice No. 60 / WEF Manual of Practice No. FD-5). Sanitary Sewer service shall be provided to the Barracks. The Contractor is responsible for the installation of two-way cleanouts and all structures required by criteria, as well as, all piping between the designated point of connection and the building. Manholes shall be provided at every change of direction and every 400 feet. Provide drop manholes if pipe elevations differ more than 18 inches. The minimum sewer main size shall be 8-inch. Provide 6-inch minimum sewer connections to buildings. Provide two-way cleanouts every 100 feet along a sewer branch connection from a building, and provide two-way cleanouts at the building connection. Manhole inlets shall be constructed of reinforced concrete or pre-cast reinforced concrete. Structures in pavement shall be designed to handle H-20 loading. Structures in turfed areas can be constructed for lighter weight loading. The Contractor shall refer to American Water's Design Guide and Specifications to determine type of pipe material. The Contractor shall provide profiles for the underground sanitary sewer systems.

6.4.6.4. Natural Gas Distribution: Natural Gas distribution lines are shown on the SDP. The Contractor shall coordinate points of connection to the facility with the Fort Polk DPW through the COR. The Contractor shall install the site gas distribution piping. The Contractor shall provide and install the gas meter and connect the meter to the building stub out. Fort Polk uses a Sonix 880 meter or equivalent. The Contractor shall be required to stub the gas feed out of the building. Design and construction of the natural gas service lines shall be in accordance with ANSI B31.8, Gas Transmission Distribution and Piping Systems. Natural gas shall be provided to the building. A meter/regulator assembly shall be provided for the facility by the Contractor and shall have a valved bypass. The Construction of the Natural Gas line will proceed beyond the Construction Limits shown. All construction of the gas line beyond the construction limits shall be coordinated with the adjacent contractor.

6.4.6.5. Site Cable TV: Refer to Paragraph 6.9.

6.4.7. Cut and Fill

6.4.8. Borrow Material

Borrow areas are located off the installation.

6.4.9. Haul Routes and Staging Areas

See Appendix J, Drawings for the project location and the location of haul routes and Contractor's staging area.

6.4.10. Clearing and Grubbing:

The Contractor shall provide a tree demolition drawing, through the COR, to be approved by Fort Polk DPW. After approval of the tree demolition drawing, the Contractor shall mark all trees to be demolished, and allow a minimum of two weeks for DPW and Forestry to remove the merchantable timber. All remaining trees shall be cleared and grubbed by the Contractor as needed for construction.

6.4.11. Landscaping:

a. Native or well adapted species of plants shall be provided in the landscaping plan. All trees, shrubs, and ground covers shall be chosen from the preferred plant list included in Appendix **I**. Shade trees shall be provided. Flowering vegetation shall be used at focal points to provide visual interest. All landscaping within 33 feet of the facility shall adhere to force protection clear zone requirements as specified in UFC 4-010-01.

b. The landscaping integrated design shall emphasize the goal to achieve energy efficiency and water conservation. The vegetation shall be selected based on hardiness, availability, and local climate, to aid in the conservation of water, as well as, maintenance resources. The trees shall be located to optimize shading opportunities, which aids in energy efficiency of the buildings by cooling during the summer.

c. Landscape Irrigation. No permanent landscape irrigation shall be included in the project.

d. The Contractor shall construct and maintain protection around all trees to be saved. The Contractor shall prohibit vehicle parking, vehicle traffic and other construction activity within the drip lines for these trees. The Contractor shall provide a landscaping plan showing which trees are to remain and details showing how to protect them.

6.4.12. Turf:

Turfing shall be required on all graded, unpaved and disturbed areas resulting from the Contractor's operations. Sod shall be used in areas with steep slopes (≥ 3:1) or ditch linings to assist in establishing turf and to aid in erosion protection. Turf Reinforcement Matting (TRM) should be used in ditches that are subject to high velocity storm runoff. Erosion control matting shall also be utilized as necessary to control erosion on steeper slopes.

6.5. ARCHITECTURE

6.5.1. General: To the maximum extent possible within the contract cost limitation, the buildings shall conform to the look and feel of the architectural style and shall use the same colors as adjacent facilities as expressed herein . The Government will evaluate the extent to which the proposal is compatible with the architectural theme expressed in the RFP during the contract or task order competition. The first priority in order of importance is that the design provides comparable building mass, size, height, and configuration compared to the architectural theme expressed herein. The second priority is that design is providing compatible exterior skin appearance based upon façade, architectural character (period or style), exterior detailing, matching nearby and installation material/color pallets, as described herein.

6.5.2. **Design**

6.5.2.1. Appendix F is provided "For Information Only", to establish the desired site and architectural themes for the area. Appendix F identifies the desired project look and feel based on Fort Polk**'s I**nstallation Architectural Theme from existing and proposed adjacent building forms; i.e. building exterior skin, roof lines, delineation of entrances, proportions of fenestration in relation to elevations, shade and shadow effects, materials, textures, exterior color schemes, and organizational layout.

6.5.2.2. The design should address Fort Polk's identified preferences. Implement these preferences considering the following:

(a) Achievable within the Construction Contract Cost Limitation (CCL)

(b) Meets Milestones within Maximum Performance Duration.

(c) Achieves Full Scope indentified in this Solicitation

(d) Best Life-Cycle Cost Design

(e) Meets the Specified Sustainable Design and LEED requirements

(f) Complies with Energy Conservation Requirements Specified in this RFP.

6.5.2.3. Priority #1. Visual Compatibility: Facility Massing (Size, Height, Spacing, Architectural Theme, etc.) Exterior Aesthetic Considerations: The buildings massing, exterior functional aesthetics, and character shall create a comprehensive and harmonious blend of design features that are sympathetic to the style and context of the Installation. The Installation's intent for this area is:

shown in Appendix F.

6.5.2.4. Priority #2. Architectural Compatibility: Exterior Design Elements (Materials, Style, Construction Details, etc.) Roofs, Exterior Skin, and Windows & Door Fenestrations should promote a visually appealing compatibility with the desired character while not sacrificing the integrity and technical competency of building systems.

6.5.2.5. See Appendix F for exterior colors that apply to Architectural character at Fort Polk. The manufacturers and materials referenced are intended to establish color only, and are not intended to limit manufacturers and material selections.

6.5.2.6. Additional architectural requirements:

(a) Install fall protection anchor points on all roofs with a slope greater than 2:12

(b) Ferrous metals shall not be used in exposed to weather locations, or in other areas where corrosion would be anticipated.

6.5.3. Not Used

6.5.4. INTERIOR DESIGN

6.5.4.1. Install kickplates on doors in heavy use areas.

6.5.4.2. Install door stops at all interior and exterior locations.

6.5.4.3 Casework. In addition to 01 10 00, para 3.4.4.5, CQ Station and Kitchen vanity countertop shall also be minimum 1/2 inch thick cast 100 percent acrylic polymer solid surfacing material with waterfall front edge and integral cived backsplash.

Interior building signage requirements:

Nothing additional.

6.6. STRUCTURAL DESIGN

6.6.1 General:

Consider mission effectiveness, the most economical system in the locality, life-cycle economics, and space adaptability in choosing the structural systems. Space adaptability includes future reorganization or reallocation of space.

Analyze, design, and detail each building as a complete structural system. Design structural elements to preclude damage to finishes, partitions, and other frangible, nonstructural elements; to prevent impaired operability of moveable components; and to prevent cladding leakage and roof ponding. Limit deflections of structural members to the allowable of the applicable material standard, e.g. ACI, AISC, Brick Industry Association (BIA).

Consider climate conditions, high humidity, industrial atmosphere, saltwater exposure, or other adverse conditions when selecting the type of cement and admixtures used in concrete, the concrete cover on reinforcing steel, the coatings on structural members, expansion joints, the level of corrosion protection, and the structural systems. All concrete shall be a minimum of 3,000 psi and shall be steel reinforced. Place floor mounted mechanical and electrical equipment on a 4” minimum concrete pad.

In addition to gravity, seismic, and lateral loads, design ancillary building items, e.g. doors, window jambs and connections, overhead architectural features, equipment bracing, for the requirements of UFC 4-010-01, DOD Minimum Antiterrorism Standards for Buildings. Ensure and document that the design of glazed items includes, but is not limited to, the following items under the design loads prescribed in UFC 4-010-01:

(a) Supporting members of glazed elements, e.g. window jamb, sill, header

(b) Connections of glazed element to supporting members, e.g. window to header

(c) Connections of supporting members to each other, e.g. header to jamb

(d) Connections of supporting members to structural system, e.g. jamb to foundation.

FOR THE DESIGN OF THIS PROJECT, THE FACILITY WILL BE CONSIDERED AS NOT HAVING CONTROLLED PUBLIC ACCESS.

6.6.2 Applicable Standards, Codes, and Criteria:

The structural design shall fully comply with the following listed criteria in addition to the provisions provided in Section 01 10 00 paragraph 4.0 Applicable Criteria. Use the latest edition of the International Building Code (IBC) for design guidance, and coordinate design with UFC 4-010-01. For buildings three stories and taller, design for progressive collapse in accordance with UFC 4-023-03, Design of Buildings to Resist Progressive Collapse.

6.6.3 Project Specific Design Loads:

6.6.3.1. Ground Snow: 5 psf.

6.6.3.2. Wind Speed: 95 mph.

6.6.3.3. Frost Penetration: 0 inches.

6.6.3.4. Seismic Design Data: The mapped maximum considered earthquake (MCE) spectral response accelerations for site class B are:

Ss (at short periods) = 12 % g.

S1 (at 1-second period) = 5 % g.

The acceleration values identified are for the general location of the facility. Verify and use site specific criteria based on the final site location of the facility. Adjust site class per IBC to match specific site information in geotechnical report.

6.6.3.5 Antiterrorism/Force Protection loads and minimum requirements are per UFC 4-010-01. For design of structural components subjected to dynamic loads, the U.S. Army Corps of Engineers Protective Design Center (PDC) developed SBEDS, Single-Degree-of-Freedom Blast Effects Design Spreadsheets (SBEDS). SBEDS is available at the software tab of the PDC website, HYPERLINK "https://pdc.usace.army.mil/"https://pdc.usace.army.mil/.

6.6.4 Foundation

The foundation is site specific and must be designed upon known geotechnical considerations by an engineer knowledgeable of the local conditions, e.g. highly expansive soils, groundwater levels. Coordinate the need for a vapor barrier with the architectural floor finishes and requirements of the geotechnical report. All slab-on-grade to receive a coating (e.g. epoxy) or to receive an overlaying finish (e.g. carpet or tile), shall be underlain by a vapor barrier system with a minimum 10-mil polyethylene membrane. If the reinforced concrete ribbed mat option in the Government Geotechnical Report in Appendix A is chosen, the following change is required to the “CESWD-ED-TS/G Criteria Letter, dated 29 January 1988 – Design Criteria for Ribbed Mat Foundations, SWDED-G Criteria Letter, dated 16 April 1987 – Criteria for Developing Geotechnical Design Parameters for SWD Ribbed Mat Design Methodology”. Part I - General Requirements for Ribbed Mats, paragraph 4.2 Slab states a slab reinforcement minimum of 0.2%. Change this minimum slab reinforcement to 0.5 percent.

6.6.5 Site Features – Retaining Walls/Bridges/etc.

Design site features, e.g. retaining walls, culverts, bridges, in accordance with the appropriate American Association of State Highway and Transportation Officials (AASHTO) criteria including AASHTO LRFD Bridge Design Specifications, AASHTO Standard Specifications for Highway Bridges, and AASHTO Guide Specifications for Design of Pedestrian Bridges. Consider operation and maintenance requirements, e.g. painting, mowing, inspecting, routine maintenance. Design site features to drain properly in order to meet loading assumptions.

6.7. THERMAL PERFORMANCE

No additional requirements.

6.8. PLUMBING

6.8.1 Domestic Hot Water

Piping shall be connected such that vertical risers are part of the recirculation piping resulting in continuous hot water in the risers.

6.8.2 Domestic Water Piping Material

All domestic water piping within the facility shall be of the same material to help alleviate corrosion at connection points.

6.8.3 Domestic Water Valves

a. Isolation Valves: In addition to valves required by code provide accessible isolation valves for each dwelling unit to allow water to be shut off to the entire unit without affecting the water supply to other units.

b. Shower Valves: Provide integral stop valves with the shower valve assembly.

6.8.4 Shower Heads

Shower heads shall be low flow type.

6.8.5 Stop valves shall be installed on all sinks, toilets, water heaters, and/or any water tie-in connections (hot and cold).

6.8.6 Shower rooms shall have curved curtain rods with white anti-bacterial nylon/vinyl fabric shower curtain.

6.9. SITE ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

6.9.1 Primary Power

6.9.1.1 Demolition

An existing power line traverses through the center of the site between Alabama Ave. and Mississippi St. as shown on the drawings in Appendix J. This line shall be demolished in accordance with the drawings.

6.9.1.2 Service

6.9.1.2.1 Aerial service shall be reestablished to existing pole mounted transformers for buildings 2429 and 2430 as shown on the drawings in Appendix J.

6.9.1.2.2 Underground service shall consist of a 2-way 4 inch concrete encased duct system between aerial to underground transition pole and pad mounted transformer. One duct shall contain primary conductors and one shall be spare. Manholes shall be installed as required. Duct system shall traverse parallel to main roads and shall not be placed futher than 20' from 22nd or 23rd Streets when traversing in the east-west direction. Traversing under streets shall be done be jack and boring. Saw cutting is not allowed.

6.9.1.3 Service Connection Point

Service connection point shall be either the existing aerial primary located on the west side of Mississippi Ave. or the east side of Alabama Ave. Lines are shown on the drawings in Appendix J.

6.9.1.4 Voltage

Existing voltage is 13800/7960.

6.9.2 Lighting

Lighting shall be provided for all parking lots, entry roads into parking lots (if longer than 60 feet) and sidewalks that provide a direct route from the parking lot(s) to the building. Emergeny service drives are not required to be illuminated. Round metal poles shall be utilized. Lighted bollards may be utilized for sidewalks. Power shall be supplied from within the UEPH.

6.9.2.1 Lighting Levels

For parking lot lighting follow the Recommended Maintained Illuminance Values for Parking Lots outlined in IESNA RP-20-98. For roads follow the guidelines set forth in IESNA RP-8-00. Sidewalks shall be illuminated to an average foot-candle level of 0.5.

6.9.2.2 Lighting Controls

Exterior lighting controls shall utilize a single photocell and lighting contactor (contactor shall be placed inside the electrical room). Photocell shall be accessible without the use of a bucket truck.

6.9.3 Telecommunications

6.9.3.1 Copper and Fiber Requirements

Connectivity point for copper cabling is shown on drawing U401 in Appendix J. Provide a 25 pair copper cable from manhole MH T-13A and a 12 strand single mode fiber optic cable from Bldg. 2391 to the UEPH main telecommunications room. Building 2391 is located north of the site west of Alabama Ave. Length of fiber optic cable required is 2500'. Provide a 2-4" concrete encased duct bank (one duct with 4-1" inner ducts) between last manhole (which may be MH T-13A depending on design) and the main telecommunications room to provide a pathway for the cabling into the facility. The 4" duct without the inner ducts will be used for the copper cabling and one of the inner ducts will be used for the fiber optic cabling. If manholes are required per I3A, provide a 4-4" concrete encased duct bank (one duct with 4-1" inner ducts) between manholes.

6.9.3.2 CATV

There are two CATV providers on Ft. Polk. One is the Army Warrior Network which provides service to individual dwelling units and the other is Sudden Link which provides service to admininstration offices.

6.9.3.2.1 Army Warrior Network Requirements

Provide a 0.625" coaxial, jacketed, flooded cable between manhole T-12 shown on sheet U401 in Appendix J and the main telecommunications room. An existing pedestal is located adjacent to the manhole which the Army Warrior Network will connect the coaxial cable to. Sufficient cable slack shall be provided in the manhole to allow for this connection. Point of Contact is Mr. Donnie Stephens at 337-208-2025. Cable shall enter the building through one of the inner ducts described in paragraph 6.9.3.1.

6.9.3.2.2 Sudden Link Requirements

Provide a 1-500 P-3 flooded underground cable from the main telecommunications room to an existing riser pole shown on sheet U401 in Appendix J. Cable shall not be spliced. Provide 25' of coiled slack in telecommunications room. Cable shall enter the building through one of the inner ducts described in paragraph 6.9.3.1.

See sheet U401 for additional information. Point of Contact is Mr. Terry Glass at 337-424-0272.

6.10. FACILITY ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

6.10.1 Mass Notification System shall be capable of accepting controls to announce all pre-recorded messages as well as live messages from a remote site by way of dry contacts and 600 ohm audio inputs.

6.10.2 Fire Alarm System

6.10.2.1 Fire alarm panel shall be located in the mechanical room.

6.10.2.2 Activation of smoke detectors in apartment units shall not result in a trouble signal being sent to the fire department.

6.10.2.3 Alarm signals transmitted shall be zoned per floor.

6.10.2.4 Antenna shall be omnidirectional type.

6.10.2.5 Provide Class A fire alarm circuits. Common speakers shall be used for fire alarm (FA) and mass notification (MN) messages. Smoke detectors shall transmit supervisory, trouble, and alarm signals to the fire alarm control panel (FACP) per the Installation's DPW.

6.10.2.6 All IDC, SLC, and NAC circuits shall be class A style D, class A style 6 and class A style Z respectively.

6.10.2.7 FA signals and MN messages shall be transmitted via a Monaco BT-FX transceiver (or approved equal) to the Monaco D-21 proprietary supervising station receiving equipment.

6.10.2.8 Provide an 80-character display annunciator, with message buffer, at both the FACP and the fire department building entry. Also, provide a graphic display annunciator at the building entry. The graphic display should be an architectural display of the building set. The graphic display shall have LED lights that flash, representing signals sent by the transmitter.

6.10.3 Electrical Meters

Electrical meters shall meet the following requirements and shall have the same salient features as the Shark200.

6.10.3.1 Electrical meters and instrument transformers shall meet or exceed the following minimum requirements:

6.10.3.1.1 Measure quantities. Electrical meter quantities measured are Power (kiloWatt), average demand over 15 minute intervals and Energy (kiloWatt-hours).

6.10.3.1.2 System Accuracy. System accuracy for the meter product devices including instrument transformers shall not exceed plus or minus 1.2% as calculated using the Root Sum Square (RSS) method and assuming normal distribution.

6.10.3.1.3 Meter Accuracy:

6.10.3.1.3.1 For facilities with connected loads equal to or greater than one (1) mega volt-ampere (MVA), meter certification shall be NEMA/ANSI C12.20, Accuracy class 0.2%.

6.10.3.1.3.2 For facilities with loads less than 1 MVA, meter certification shall be IEEE/ANSI C12.20, Accuracy class 0.5%.

6.10.3.1.4 Communication Protocol. Meters shall communicate via either Modbus RTU or ANSI/CEA-709.1b (LonTalk) protocols or as otherwise specified.

6.10.3.1.5 Auxiliary data ports. Unless otherwise specified, electrical meters shall have a minimum of two pulse inputs for incorporation of other external meter data.

6.10.3.1.6 Surge Protection. Meters shall comply with IEEE/ANSI C37.90.1, Standard surge withstand capability (SWC) tests for relays and relay systems associated with electric power apparatus and IEEE C62.41.

6.10.3.1.7 Current transformers (CTs) sized properly so that the meter secondary of the transformer shall output current to ensure at least a plus or minus 0.6% accuracy of current when measured between 10% and 90% of full amperage range.

6.10.3.1.7.1 CTs shall not exceed 5 amps on the secondary side.

6.10.3.1.7.2 Burden on CTs shall not exceed rated burden for the accuracy class.

6.10.3.1.7.3 CTs shall be provided in solid or split core configurations.

6.10.3.1.7.4 CTs shall be provided in the appropriate ranges to meet the service entrance amperage requirements.

6.10.3.1.7.5 For facilities with a connected load equal to or greater than 1MVA, CT certification shall be IEC 185 or ANSI/IEEE C57.13 for 0.3% accuracy class or better.

6.10.3.1.7.6 For facilities with a connected load less than 1MVA, CTs shall revenue grade and certified per IEEE/ANSI C57.13 or IEC 185.

6.10.3.1.8 Current sensors shall be sized properly for the application and provide a voltage (normally 0-2 volts) to the meter that results in at least a plus or minus 0.6% accuracy of current when measured between 10% and 90% of full amperage range.

6.10.3.1.9 Voltage or Potential Transformers (PTs) sized properly so that the meter secondary of the transformer shall output voltage to ensure at least a plus or minus 0.6% accuracy of voltage when measured from zero to the IEEE/ANSI C57.13 or IEC 185 specified standard burden, at the specified standard burden power factor, and at any value from 90% to 110% of rated voltage.

6.10.3.1.9.1 For facilities with a connected load equal to or greater than 1MVA, PT certification shall be IEC 185 or IEEE/ANSI C57.13 for 0.3% accuracy class or better.

6.10.3.1.9.2 For facilities with a connected load less than 1MVA, PTs shall be revenue grade and certified per IEEE/ANSI C57.13 or IEC 185.

6.10.3.1.9.3 Burden on PTs shall not exceed rated burden for accuracy class.

6.10.3.1.10 Data Storage. Unless otherwise specified, the meter must be capable of providing and storing required interval data for a minimum of 30 days.

6.10.3.1.11 Environmental Tolerances of Metering Devices.

6.10.3.1.11.1 Outdoor/exterior devices shall be rated for operation and storage from -20º to 70º C or better and 5 to 100% relative humidity (non-condensing). Exterior meters shall be provided with or installed within a NEMA 4 enclosure. Enclosures shall be NEMA 4X for coastal and corrosive environments.

6.10.3.1.11.2 Indoor/interior devices shall be rated for operation and storage from 0Ã‚Âº - 50Ã‚Âº C or better and 5 to 90% relative humidity (non-condensing). Interior meters shall be provided with or installed within a NEMA 12 enclosure.

6.10.3.1.12 Reimbursable. Metering devices exceeding the above requirements that are requested by Reimbursable facilities/customers shall be installed per written request as provided in pre-proposal documentation.

6.10.4 Telecommunications

6.10.4.1 Provide gas rather than solid state protector modules.

6.10.4.2 Provide fiber optic patch panel in building 2391 for termination of 12-strand single mode fiber optic outside plant cable. Coordinate mounting location within building with Ft. Polk NEC through the COR.

6.10.5. CATV

All CATV cabling shall be homerun back to the nearest telecommunications room. Provide 10' of slack within telecommunications room for termination by CATV provider.

6.11. HEATING, VENTILATING, AND AIR CONDITIONING

6.11.1 UMCS: Fort Polk currently does not have a base-wide UMCS system. Provide a 1" conduit with pull wire between the DDC cabinet and the main telecommunications room for future connection to a UMCS system.

6.11.2 Water cooled chillers are acceptable if an ionic streamed water treatment is provided in lieu of chemicals.

6.11.3 HVAC design shall control humidity levels and moisture to prevent condensation and mold formation on interior surfaces:

6.11.3.1 Deep dehumidification shall be provided using dedicated outdoor air unit (DOAU). Unit shall supply air temperature neutral air with a dew point of not greater than 43 deg F and shall not rely on chilled water from a central plant for dehumidification. Air shall be supplied direct to bedroom or living unit, not through a fan coil.

6.11.3.2 Building shall be pressurized.

6.11.3.3 DOAUs shall be accessible for maintenance. Do not install in attic.

6.11.3.4 1% dry bulb, 0.4% wet bulb design conditions shall be used. Moisture load analysis shall be performed by determining moisture load (grains/hour) to the DOAU system based on internal latent load as well as infiltration and moisture transfer through wall permeability.

Integrate the control system to the installation’s existing UMCS. The existing UMCS is N/A

6.12. ENERGY CONSERVATION

6.12.1. General

No additional requirements.

6.12.2. Inclusion of Renewable Energy Features. The following renewable energy features have been determined lifecycle cost effective, are included in the project budget and shall be provided:

No additional requirements.

6.13. FIRE PROTECTION

Automatic sprinkler system riser must be located in a room with exterior door access to room.

6.14. SUSTAINABLE DESIGN

6.14.1. LEED Rating Tool Version. This project shall be executed using LEED-NC Version 2.2.

6.14.2. The minimum requirement for this project is to achieve LEED Silver level. Each non-exempt facility (building plus sitework) must achieve this level. In addition to any facilities indicated as exempt in paragraph 3, the following facilities are exempt from the minimum LEED achievement requirement: None..

6.14.3. Credit Validation: LEED registration, compiling of documentation at LEED OnLine and use of the LEED Letter Templates is required. Registration and payment of registration fees will be by the Government. Administration/team management of the online project will be by the Contractor. Validation of credits will be accomplished by the Government. LEED certification of the project by the Contractor is required. The Contractor will obtain LEED certification prior to project closeout. Application, payment of certification of fees and all coordination with USGBC during the certification process will be by the Contractor. GBCI interim review of design phase data is not required by the Government but is recommended. Government validation during project execution does not relieve or modify in any way the Contractor’s responsibility to satisfy all requirements for certification as defined by LEED and GBCI. Contractor is not responsible for design phase LEED documentation of any unaltered portion of the design that is accomplished by others. If the project includes unaltered complete design by others, during the certification process Contractor will coordinate all GBCI comments on LEED credits that fall outside Contractor’s scope of responsibility with the Government for coordination with the Designer of Record, and Contractor will not be penalized if project fails to achieve certification at the minimum required level due to loss of credits that are the responsibility of others.

6.14.4. Commissioning: See Appendix M for Owner’s Project Requirements document(s).

6.14.5. LEED Credits Coordination. The following information is provided relative to Sustainable Sites and other credits.

SS Credit 1 Site Selection:

Project site IS NOT considered prime farmland.

Delineation of 100-year flood elevation is shown on site drawings provided in this CONTRACT.

Delineation of threatened or endangered species habitat is shown on site drawings provided in this CONTRACT.

Delineation of water, wetlands and areas of special concern is shown on site drawings provided in this CONTRACT.

Project site WAS NOT previously used as public parkland.

SS Credit 2 Development Density & Community Connectivity.

Project site DOES NOT meets the criteria for this credit.

SS Credit 3 Brownfield Redevelopment.

Project site DOES NOT meets the criteria for this credit.

SS Credit 4.1 Public Transportation Access.

Project site DOES NOT meets the criteria for this credit.

EA Credit 6 Green Power.

35% of the project's electricity WILL NOT be provided through an Installation renewable energy contract. Do not purchase Renewable Energy Credits (REC's) to earn this credit.

MR Credit 2 Construction Waste Management.

The Installation does not have an on-post recycling facility available for Contractor's use.

6.14.6. LEED Credit Preferences, Guidance and Resources. See Appendix L LEED Project Credit Guidance for supplemental information relating to individual credits.

6.14.7. Not Used

6.14.8. Additional Information

[Not Supplied - PS_SustDesign_Additional : MR2]

6.15. ENVIRONMENTAL

See Appendix E.

6.16. PERMITS

6.17. DEMOLITION

Demolition and abatement of Building 2434 is a bid option. Building 2434 is a WWII building of wood construction. The Record of Environmental Consideration (REC) for Building 2434 is the second REC included in Appendix EE. The REC includes asbestos and lead based paint surveys.

6.18. ADDITIONAL FACILITIES

None.

End of Section 01 10 00.00XX

SECTION 01 33 00.00XX
SUBMITTAL PROCEDURES
(DESIGN-BUILD TASK ORDERS)

1.0 GENERAL

1.13. GOVERNMENT APPROVED OR CONCURRED WITH SUBMITTALS

1.14. INFORMATION ONLY SUBMITTALS

1.0 GENERAL

1.1.1. This section contains requirements specifically applicable to this task order. The requirements of Base ID/IQ contract Section 01 33 30 apply to this task order, except as otherwise specified herein.

1.13. GOVERNMENT APPROVED OR CONCURRED WITH SUBMITTALS

Upon completion of review of submittals requiring Government approval or concurrence, the Government will stamp and date the submittals as approved or concurred. The Government will retain zero(0) copies of the submittal and return zero(0) copy(ies) of the submittal.

1.14. INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe. The Government will retain zero(0) copies of information only submittals.

End of Section 01 33 00.00XX

SECTION 01 33 16
DESIGN AFTER AWARD

ATTACHMENT G DESIGN SUBMITTAL DIRECTORY AND SUBDIRECTORY FILE ARRANGEMENT

1.0 GENERAL INFORMATION

1.1. INTRODUCTION

1.1.1. The information contained in this section applies to the design required after award. After award, the Contractor will develop the accepted proposal into the completed design, as described herein.

1.1.2. The Contractor may elect to fast track the design and construction that is, proceed with construction of parts of the sitework and facilities prior to completion of the overall design. To facilitate fast tracking, the Contractor may elect to divide the design into no more than six (6) design packages per major facility type and no more than three (3) design packages for site and associated work. Designate how it will package the design, consistent with its overall plan for permitting (where applicable) and construction of the project. See Sections 01 33 00 SUBMITTAL PROCEDURES and 01 32 01.00 10 PROJECT SCHEDULE for requirements for identifying and scheduling the design packaging plan in the submittal register and project schedule. See also Sections 01 10 00 STATEMENT OF WORK and 01 57 20.00 10 ENVIRONMENTAL PROTECTION for any specified permit requirements. If early procurement of long-lead item construction materials or installed equipment, prior to completion of the associated design package, is necessary to facilitate the project schedule, also identify those long-lead items and how it will assure design integrity of the associated design package to meet the contract requirements (The Contract consists of the Solicitation requirements and the accepted proposal). Once the Government is satisfied that the long-lead items meet the contract requirements, the Contracting Officer will allow the Contractor to procure the items at its own risk.

1.1.3. The Contractor may proceed with the construction work included in a separate design package after the Government has reviewed the final (100%) design submission for that package, review comments have been addressed and resolved to the Government's satisfaction and the Contracting Officer (or the Administrative Contracting Officer) has agreed that the design package may be released for construction.

1.1.4. INTEGRATED DESIGN. To the maximum extent permitted for this project, use a collaborative, integrated design process for all stages of project delivery with comprehensive performance goals for siting, energy, water, materials and indoor environmental quality and ensures incorporation of these goals. Consider all stages of the building lifecycle, including deconstruction.

1.2. DESIGNER OF RECORD

Identify, for approval, the Designer of Record (“DOR”) that will be responsible for each area of design. One DOR may be responsible for more than one area. Listed, Professional Registered, DOR(s) shall account for all areas of design disciplines shall be accounted for by a listed. The DOR’s shall stamp, sign, and date each design drawing and other design deliverables under their responsible discipline at each design submittal stage (see contract clause Registration of Designers). If the deliverables are not ready for release for construction, identify them as "preliminary" or "not for release for construction" or by using some other appropriate designation. The DOR(s) shall also be responsible for maintaining the integrity of the design and for compliance with the contract requirements through construction and documentation of the as-built condition by coordination, review and approval of extensions of design, material, equipment and other construction submittals, review and approval or disapproval of requested deviations to the accepted design or to the contract, coordination with the Government of the above activities, and by performing other typical professional designer responsibilities.

2.0 PRODUCTS (Not Applicable)

3.0 EXECUTION

3.1. PRE-WORK ACTIVITIES & CONFERENCES

3.1.1. Design Quality Control Plan

Submit for Government acceptance, a Design Quality Control Plan in accordance with Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL before design may proceed.

3.1.2. Post Award Conference

3.1.2.1. The government will conduct a post award contract administration conference at the project site, as soon as possible after contract award. This will be coordinated with issuance of the contract notice to proceed (NTP). The Contractor and major sub-contractor representatives shall participate. All designers need not attend this first meeting. Government representatives will include COE project delivery team members, facility users, facility command representatives, and installation representatives. The Government will provide an agenda, meeting goals, meeting place, and meeting time to participants prior to the meeting.

3.1.2.2. The post award conference shall include determination and introduction of contact persons, their authorities, contract administration requirements, discussion of expected project progress processes, and coordination of subsequent meetings for quality control (see Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL), Partnering (see below and SCR: Partnering), and the initial design conference (see below).

3.1.2.3. The government will introduce COE project delivery team members, facility users, facility command representatives, and installation representatives. The DB Contractor shall introduce major subcontractors, and other needed staff. Expectations and duties of each person shall be defined for all participants. A meeting roster shall be developed and distributed by the government with complete contact information including name, office, project role, phone, mailing and physical address, and email address.

3.1.3. Partnering & Project Progress Processes

3.1.3.1. The initial Partnering conference may be scheduled and conducted at any time with or following the post award conference. The Government proposes to form a partnership with the DB Contractor to develop a cohesive building team. This partnership will involve the COE project delivery team members, facility users, facility command representatives, installation representatives, Designers of Record, major subcontractors, contractor quality control staff, and contractor construction management staff. This partnership will strive to develop a cooperative management team drawing on the strengths of each team member in an effort to achieve a quality project within budget and on schedule. This partnership will be bilateral in membership and participation will be totally voluntary. All costs, excluding labor and travel expenses, shall be shared equally between the Government and the Contractor. The Contractor and Government shall be responsible for their own labor and travel costs. Normally, partnering meetings will be held at or in the vicinity of the project installation.

3.1.3.2. As part of the partnering process, the Government and Contractor shall develop, establish, and agree to comprehensive design development processes including conduct of conferences, expectations of design development at conferences, fast-tracking, design acceptance, Structural Interior Design (SID)/ Furniture, Fixtures & Equipment (FF&E) design approval, project closeout, etc. The government will explain contract requirements and the DB Contractor shall review their proposed project schedule and suggest ways to streamline processes.

3.1.4. Initial Design Conference

The initial design conference may be scheduled and conducted at the project installation any time after the post award conference, although it is recommended that the partnering process be initiated with or before the initial design conference. Any design work conducted after award and prior to this conference should be limited to site and is discouraged for other items. All Designers of Record shall participate in the conference. The purpose of the meeting is to introduce everyone and to make sure any needs the contractor has are assigned and due dates established as well as who will get the information. See also Attachment F, BUILDING INFORMATION MODELING REQUIREMENTS for discussion concerning the BIM Implementation Plan demonstration at this meeting. The DB Contractor shall conduct the initial design conference.

3.1.5. Pre-Construction Conference

Before starting construction activities, the Contractor and Government will jointly conduct a pre-construction administrative conference to discuss any outstanding requirements and to review local installation requirements for start of construction. It is possible there will be multiple Pre-Construction Conferences based on the content of the design packages selected by the Contractor. The Government will provide minutes of this meeting to all participants.

3.2. STAGES OF DESIGN SUBMITTALS AND OVER THE SHOULDER PROGRESS REVIEWS

The stages of design submittals described below define Government expectations with respect to process and content. The Contractor shall determine how to best plan and execute the design and review process for this project, within the parameters listed below. As a minimum, the Government expects to see at least one interim design submittal, at least one final design submittal before construction of a design package may proceed and at least one Design Complete submittal that documents the accepted design. The Contractor may sub-divide the design into separate packages for each stage of design and may proceed with construction of a package after the Government accepts the final design for that package. See discussion on waivers to submission of one or more intermediate design packages where the parties partner during the design process. See also Attachment F, BUILDING INFORMATION MODELING REQUIREMENTS for discussion concerning BIM and the various stages of design submittals and over-the-shoulder progress reviews**.**

3.2.1. Site/Utilities

To facilitate fast-track design-construction activities the contractor may submit a final (100%) site and utility design as the first design submittal or it may elect to submit interim and final site and utility design submittals as explained below. Following review, resolution, and incorporation of all Government comments, and submittal of a satisfactory set of site/utility design documents, after completing all other pre-construction requirements in this contract and after the pre-construction meeting, the Government will allow the Contractor to proceed with site development activities, including demolition where applicable, within the parameters set forth in the accepted design submittal. For the first site and utility design submission, whether an interim or final, the submittal review, comment, and resolution times from this specification apply, except that the Contractor shall allow the Government a 14 calendar day review period, exclusive of mailing time. No on-site construction activities shall begin prior to written Government clearance to proceed.

3.2.2. Interim Design Submittals

The Contractor may submit either a single interim design for review, representing a complete package with all design disciplines, or split the interim design into smaller, individual design packages as it deems necessary for fast-track construction purposes. As required in Section 01 32 01.00 10 PROJECT SCHEDULE, the Contractor shall schedule its design and construction packaging plan to meet the contract completion period. This submission is the Government's primary opportunity to review the design for conformance to the solicitation and to the accepted contract proposal and to the Building Codes at a point where required revisions may be still made, while minimizing lost design effort to keep the design on track with the contract requirements. The requirements for the interim design review submittals and review conferences are described hereinafter. This is not necessarily a hold point for the design process; the Contractor may designate the interim design submittal(s) as a snapshot and proceed with design development at its own risk. See below for a waiver, where the parties establish an effective over-the-shoulder progress review procedure through the partnering process that would eliminate the need for or expedite a formal intermediate design review on one or more individual design packages.

3.2.3. Over-the-Shoulder Progress Reviews

To facilitate a streamlined design-build process, the Government and the Contractor may agree to one-on-one reviewer or small group reviews, electronically, on-line (if available within the Contractor's standard design practices) or at the Contractor's design offices or other agreed location, when practicable to the parties. The Government and Contractor will coordinate such reviews to minimize or eliminate disruptions to the design process. Any data required for these reviews shall normally be provided in electronic format, rather than in hard copy. If the Government and Contractor establish and implement an effective, mutually agreeable partnering procedure for regular (e.g., weekly) over-the shoulder review procedures that allow the Government reviewers the opportunity to keep fully informed of the progress, contents, design intent, design documentation, etc. of the design package, the Government will agree to waive or to expedite the formal intermediate design review period for that package. The Contractor shall still be required to submit the required intermediate design documentation, however the parties may agree to how that material will be provided, in lieu of a formal consolidated submission of the package. It should be noted that Government funding is extremely limited for non-local travel by design reviewers, so the maximum use of virtual teaming methods must be used. Some possible examples include electronic file sharing, interactive software with on-line or telephonic conferencing, televideo conferencing, etc. The Government must still perform its Code and Contract conformance reviews, so the Contractor is encouraged to partner with the reviewers to find ways to facilitate this process and to facilitate meeting or bettering the design-build schedule. The Contractor shall maintain a fully functional configuration management system as described herein to track design revisions, regardless of whether or not there is a need for a formal intermediate design review. The formal intermediate review procedures shall form the contractual basis for the official schedule, in the event that the partnering process determines that the formal intermediate review process to be best suited for efficient project execution. However, the Government pledges to support and promote the partnering process to work with the Contractor to find ways to better the design schedule.

3.2.4. Final Design Submissions

This submittal is required for each design package prior to Government acceptance of that design package for construction. The requirements for the final design submittal review conferences and the Government's acceptance for start of construction are described herein after.

3.2.5. Design Complete Submittals

After the final design submission and review conference for a design package, revise the design package to incorporate the comments generated and resolved in the final review conferences, perform and document a back-check review and submit the final, design complete documents, which shall represent released for construction documents. The requirements for the design complete submittals are described hereinafter.

3.2.6. Holiday Periods for Government Review or Actions

Do not schedule meetings, Government reviews or responses during the last two weeks of December or other designated Government Holidays (including Friday after Thanksgiving). Exclude such dates and periods from any durations specified herein for Government actions.

3.2.7. Late Submittals and Reviews

If the Contractor cannot meet its scheduled submittal date for a design package, it must revise the proposed submittal date and notify the government in writing, at least one (1) week prior to the submittal, in order to accommodate the Government reviewers' other scheduled activities. If a design submittal is over one (1) day late in accordance with the latest revised design schedule, or if notification of a proposed design schedule change is less than seven (7) days from the anticipated design submission receipt date, the Government review period may be extended up to seven (7) days due to reviewers' schedule conflicts. If the Government is late in meeting its review commitment and the delay increases the Contractor's cost or delays completion of the project, the Suspension of Work and Defaults clauses provide the respective remedy or relief for the delay.

3.3. DESIGN CONFIGURATION MANAGEMENT

3.3.1. Procedures

Develop and maintain effective, acceptable design configuration management (DCM) procedures to control and track all revisions to the design documents after the Interim Design Submission through submission of the As-Built documents. During the design process, this will facilitate and help streamline the design and review schedule. After the final design is accepted, this process provides control of and documents revisions to the accepted design (See Special Contract Requirement: Deviating From the Accepted Design). The system shall include appropriate authorities and concurrences to authorize revisions, including documentation as to why the revision must be made. The DCM data shall be available to the Government reviewers at all times. The Contractor may use its own internal system with interactive Government concurrences, where necessary or may use the Government's "DrChecks Design Review and Checking System" (see below and Attachment C).

3.3.2. Tracking Design Review Comments

Although the Contractor may use its own internal system for overall design configuration management, the Government and the Contractor shall use the DrChecks Design Review and Checking System to initiate, respond to, resolve and track Government design compliance review comments. This system may be useful for other data which needs to be interactive or otherwise available for shared use and retrieval. See Attachment C for details on how to establish an account and set-up the DrChecks system for use on the project.

3.3.3. Design and Code Checklists

Develop and complete various discipline-specific checklists to be used during the design and quality control of each submittal. Submit these completed checklists with each design submittal, as applicable, as part of the project documentation. See Section 01 45 04.00 10 Contractor Quality Control, Attachment D for a Sample Fire Protection and Life Safety Code review checklist and Attachment E for LEED SUBMITTALS.

3.4. INTERIM DESIGN REVIEWS AND CONFERENCES

3.4.1. General

At least one interim design submittal, review and review conference is required for each design package (except that, per paragraph 3.2.1, the Contractor may skip the interim design submission and proceed directly to final design on the sitework and utilities package). The DB Contractor may include additional interim design conferences or over-the-shoulder reviews, as needed, to assure continued government concurrence with the design work. Include the interim submittal review periods and conferences in the project schedule and indicate what part of the design work is at what percentage of completion. The required interim design conferences shall be held when interim design requirements are reached as described below. See also Paragraph: **Over-the-Shoulder Progress Reviews** for a waiver to the formal interim design review.

3.4.2. Procedures

After receipt of an Interim Design submission, allow the Government fourteen (14) calendar days after receipt of the submission to review and comment on the interim design submittal. For smaller design packages, especially those that involve only one or a few separate design disciplines, the parties may agree on a shorter review period or alternative review methods (e.g., over-the–shoulder or electronic file sharing), through the partnering process. For each interim design review submittal, the COR will furnish, to the Contractor, a single consolidated, validated listing of all comments from the various design sections and from other concerned agencies involved in the review process using the DrChecks Design Review and Checking System. The review will be for conformance with the technical requirements of the solicitation and the Contractor's RFP proposal. If the Contractor disagrees technically with any comment or comments and does not intend to comply with the comment, he/she must clearly outline, with ample justification, the reasons for noncompliance within five (5) days after receipt of these comments in order that the comment can be resolved. Furnish disposition of all comments, in writing, through DrChecks. The Contractor is cautioned that if it believes the action required by any comment exceeds the requirements of this contract, that it should take no action and notify the COR in writing immediately. The Interim Review conference will be held for each design submittal at the installation. Bring the personnel that developed the design submittal to the review conference. The conference will take place the week after the receipt of the comments by the Contractor. For smaller fast-track packages that involve only a few reviewers, the parties may agree to alternative conferencing methods, such as teleconferencing, or televideo, where available, as determined through Partnering.

3.4.3. Conference Documentation

3.4.3.1. In order to facilitate and accelerate the Government code and contract conformance reviews, identify, track resolution of and maintain all comments and action items generated during the design process and make this available to the designers and reviewers prior to the Interim and subsequent design reviews.

3.4.3.2. The DB Contractor shall prepare meeting minutes and enter final resolution of all comments into DrChecks. Copies of comments, annotated with comment action agreed on, will be made available to all parties before the conference adjourns. Unresolved problems will be resolved by immediate follow-on action at the end of conferences. Incorporate valid comments. The Government reserves the right to reject design document submittals if comments are significant. Participants shall determine if any comments are critical enough to require further design development prior to government concurrence. Participants shall also determine how to proceed in order to obtain government concurrence with the design work presented.

3.5. INTERIM DESIGN REQUIREMENTS

Interim design deliverables shall include drawings, specifications, and design analysis for the part of design that the Contractor considers ready for review.

3.5.1. Drawings

Include comments from any previous design conferences incorporated into the documents to provide an interim design for the “part” submitted.

3.5.2. Design Analyses

3.5.2.1. The designers of record shall prepare and present design analyses with calculations necessary to substantiate and support all design documents submitted. Address design substantiation required by the applicable codes and references and pay particular attention to the following listed items:

3.5.2.2. For parts including sitework, include site specific civil calculations.

3.5.2.3. For parts including structural work, include structural calculations.

(a) Identify all loads to be used for design.

(b) Describe the method of providing lateral stability for the structural system to meet seismic and wind load requirements. Include sufficient calculations to verify the adequacy of the method.

(c) Provide calculations for all principal roof, floor, and foundation members and bracing and secondary members.

(d) Provide complete seismic analyses for all building structural, mechanical, electrical, architectural, and building features as dictated by the seismic zone for which the facility is being constructed.

(e) Computer generated calculations must identify the program name, source, and version. Provide input data, including loads, loading diagrams, node diagrams, and adequate documentation to illustrate the design. The schematic models used for input must show, as a minimum, nodes/joints, element/members, materials/properties, and all loadings, induced settlements/deflections, etc., and a list of load combinations. Include an output listing for maximum/minimum stresses/forces and deflections for each element and the reactions for each loading case and combination.

(f) See also the Security (Anti-Terrorism) requirements below for members subject to Anti-Terrorist Force Protection (ATFP) and Progressive Collapse requirements.

(g) Fully coordinate and integrate the overall structural design between two different or interfacing construction types, such as modular and stick-built or multistory, stacked modular construction. Provide substantiation of structural, consolidation/settlement analysis, etc., as applicable, through the interfaces.

3.5.2.4. For Security (Anti-Terrorism): Provide a design narrative and calculations where applicable, demonstrating compliance with each of the 22 standards in UFC 4-010-01, which includes Design of Buildings to Resist Progressive Collapse (use the most recent version of UFC 4-023-03, regardless of references to any specific version in UFC 4-010-01). Where sufficient standoff distance is not being provided, show calculations for blast resistance of the structural system and building envelope. Show complete calculations for members subjected to ATFP loads, e.g., support members of glazed items (jambs, headers, sills) connections of windows to support members and connections of support members to the rest of the structure. For 3 story and higher buildings, provide calculations to demonstrate compliance with progressive collapse requirements.

3.5.2.5. For parts including architectural work, include building floor area analysis.

3.5.2.6. For parts including mechanical work, include HVAC analysis and calculations. Include complete design calculations for mechanical systems. Include computations for sizing equipment, compressed air systems, air duct design, and U-factors for ceilings, roofs and exterior walls and floors. Contractor shall employ commercially available energy analysis techniques to determine the energy performance of all passive systems and features. Use of hourly energy load computer simulation is required (see paragraph 3.5.5.2 for list of acceptable software). Based on the results of calculations, provide a complete list of the materials and equipment proposed with the manufacturer's published cataloged product installation specifications and roughing-in data.

3.5.2.7. For parts including life safety, include building code analysis and sprinkler and other suppression systems. Notwithstanding the requirements of the Codes, address the following:

(a) A registered fire protection engineer (FPE) must perform all fire protection analyses. Provide the fire protection engineer’s qualifications. See Section 01 10 00, paragraph 5 for qualifications.

(b) Provide all references used in the design including Government design documents and industry standards used to generate the fire protection analysis.

(c) Provide classification of each building in accordance with fire zone, building floor areas and height and number of stories.

(d) Provide discussion and description of required fire protection requirements including extinguishing equipment, detection equipment, alarm equipment and water supply. Alarm and detection equipment shall interface to requirements of Electronic Systems.

(e) Provide hydraulic calculations based on water flow test for each sprinkler system to insure that flow and pressure requirements can be met with current water supply. Include copies of Contractor's water flow testing done to certify the available water source.

3.5.2.8. For parts including plumbing systems:

(a) List all references used in the design.

(b) Provide justification and brief description of the types of plumbing fixtures, piping materials and equipment proposed for use.

(c) Detail calculations for systems such as sizing of domestic hot water heater and piping; natural gas piping; LP gas piping and tanks, fuel oil piping and tanks, etc., as applicable.

(d) When the geotechnical report indicates expansive soils are present, indicate in the first piping design submittal how piping systems will be protected against damage or backfall/backflow due to soil heave (from penetration of slab to the 5 foot building line).

3.5.2.9. For elevator systems:

(a) List all criteria codes, documents and design conditions used.

(b) List any required permits and registrations for construction of items of special mechanical systems and equipment.

3.5.2.10. For parts including electrical work, include lighting calculations to determine maintained foot-candle levels, electrical load analysis and calculations, electrical short circuit and protective device coordination analysis and calculations and arc fault calculations.

3.5.2.11. For parts including telecommunications voice/data (including SIPRNET, where applicable), include analysis for determining the number and placement of outlets

3.5.2.12. For Cathodic Protection Systems, provide the following stamped report by the licensed corrosion engineer or NACE specialist with the first design submission. The designer must be qualified to engage in the practice of corrosion control of buried or submerged metallic surfaces. He/she must be accredited or certified by the National Association of Corrosion Engineers (NACE) as a NACE Accredited Corrosion Specialist or a NACE certified Cathodic Protection Specialist, or must be a registered professional engineer with a minimum of five years experience in corrosion control and cathodic protection, Clearly describe structures, systems or components in soil or water to be protected. Describe methods proposed for protection of each.

3.5.2.13. Air Barrier System: Provide a narrative of the design and installation requirements for the Air Barrier system. As part of the design quality control process an air barrier consultant shall review drawing details to assure that details of critical Air Barrier components are properly detailed and incorporated during the design drawings and process (i.e. window flashing details, penetration in air barrier details, door flashing details, roofing/ceiling barrier interface details and etc.). Furnish the Government written review details and results.

3.5.3. Geotechnical Investigations and Reports:

3.5.3.1. The contractor’s licensed geotechnical engineer shall prepare a final geotechnical evaluation report, to be submitted along with the first foundation design submittal. Make this information available as early as possible during the over-the-shoulder progress review process. Summarize the subsurface conditions and provide recommendations for the design of appropriate utilities, foundations, floor slabs, retaining walls, embankments, and pavements. Include compaction requirements for fill and backfill under buildings, sidewalks, other structures and open areas. Recommend foundation systems to be used, allowable bearing pressures for footings, lateral load resistance capacities for foundation systems, elevations for footings, grade beams, slabs, etc. Provide an assessment of post-construction settlement potential including total and differential. Provide recommendations regarding lateral earth pressures (active, at-rest, passive) to be used in the design of retaining walls. Include the recommended spectral accelerations and Site Class for seismic design along with an evaluation of any seismic hazards and recommendations for mitigation, if required. Include calculations to support the recommendations for bearing capacity, settlement, and pavement sections. Include supporting documentation for all recommended design parameters such as Site Class, shear strength, earth pressure coefficients, friction factors, subgrade modulus, California Bearing Ratio (CBR), etc. Provide earthwork recommendations, expected frost penetration, expected groundwater levels, recommendations for dewatering and groundwater control and the possible presence of any surface or subsurface features that may affect the construction of the project such as sinkholes, boulders, shallow rock, old fill, old structures, soft areas, or unusual soil conditions. Include pH tests, salinity tests, resistivity measurements, etc., required to design corrosion control and grounding systems. Include the raw field data. Arrange a meeting with the Government subsequent to completion and evaluation of the site specific geotechnical exploration to outline any differences encountered that are inconsistent with the Government provided preliminary soils information. Clearly outline differences which require changes in the foundation type, or pavement and earthwork requirements from that possible and contemplated using the Government furnished preliminary soils investigation, which result in a change to the design or construction. Any equitable adjustment is subject to the provisions of the contract’s Differing Site Conditions Clause.

3.5.3.2. Vehicle Pavements: The Contractor’s geotechnical report shall contain flexible and rigid pavement designs, as applicable for the project, including design CBR and modulus of subgrade reaction and the required compaction effort for subgrades and pavement layers. Provide Information on the types of base course materials available in the area and design strengths.

3.5.3.3. The Contractor and the professional geotechnical engineer consultant shall certify in writing that the design of the project has been developed consistent with the Contractor’s final geotechnical report. The certification shall be stamped by the consulting professional geotechnical engineer and shall be submitted with the first design submission. If revisions are made to the initial design submission, a new certification shall be provided with the final design submission.

3.5.4. LEED Documentation:

Assign a LEED Accredited Professional, responsible to track LEED planning, performance and documentation for each LEED credit through construction closeout. Incorporate LEED credits in the plans, specifications and design analyses. Develop LEED supporting documentation as a separable portion of the Design Analysis and provide with each required design submittal. Include the LEED Project checklist for each non-exempt facility (one checklist may be provided for multiple facilities in accordance with the LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects and the LEED SUBMITTALS (Attachment E, herein) with each submittal. Final design submittal for each portion of the work must include all required design documentation relating to that portion of work (example - all site credit design documents with final site design). Submittal requirements are as indicated in Attachment E, LEED SUBMITTALS. Submit all documentation indicated on Attachment E as due at final design at final design submittal (for fast-track projects with multiple final design submittals, this shall be at the last scheduled final design submittal). All project documentation related to LEED shall conform to USGBC requirements for both content and format, including audit requirements and be separate from other design analyses. Maintain and update the LEED documentation throughout project progress to construction closeout and shall compile product data, receipts, calculations and other data necessary to substantiate and support all credits claimed. The Government may audit any or all individual credits. Audit documentation is not required to be submitted unless requested. These requirements apply to all projects. If the project requires the Contractor to obtain USGBC certification, the Contractor shall also be responsible for obtaining USGBC certification and shall provide written evidence of certification with the construction closeout LEED documentation submittal. Install the USGBC building plaque at the location indicated by the Government upon receipt. If Contractor obtains USGBC interim design review, submit the USGBC review to the Government within 30 days of receipt for information only.

3.5.4.1. LEED Documentation for Technology Solution Set. If the Solicitation provides a Prescriptive Technology Solution Set, use of the Technology Solution set has no effect on LEED documentation requirements. Provide all required LEED documentation, including energy analysis, in accordance with LEED requirements when using the Technology Solution Set.

3.5.5. Energy Conservation:

3.5.5.1. Refer to Section 01 10 00, Paragraph 5. Interim and Final Design submittals shall demonstrate that each building including the building envelope, HVAC systems, service water heating, power, and lighting systems meet the Mandatory Provisions and the Prescriptive Path requirements of ASHRAE 90.1. Use Compliance Documentation forms available from ASHRAE and included in the ASHRAE 90.1 User's Manual for this purpose. The Architectural Section of the Design Analysis shall include completed forms titled "Building Envelope Compliance Documentation Parts I and II". The Heating Ventilating and Air Conditioning (HVAC) Section of the Design Analysis shall include a completed form titled "HVAC Simplified Approach Option - Part I" if this approach is allowed by the Standard. Otherwise, the HVAC Section of the Design Analysis shall include completed forms titled "HVAC Mandatory Provisions - Part II" and "HVAC Prescriptive Requirements - Part III". The Plumbing Section of the Design Analysis shall include a completed form titled "Service Water Heating Compliance Documentation". The Electrical Section of the Design Analysis shall include an explanatory statement on how the requirements of ASHRAE 90.1-2004 Chapter 8 Power were met. The Electrical Section of the Design Analysis shall also include a completed form titled "Lighting Compliance Documentation".

3.5.5.2. Interim and Final Design submittals which address energy consuming systems, (heating, cooling, service hot water, lighting, power, etc.) must also include calculations in a separate Energy Conservation Section of the Design Analysis which demonstrate and document (a) the baseline energy consumption for the facility or facilities under contract, that would meet the requirements of ANSI/ASHRAE/IESNA Standard 90.1 and (b) the energy consumption of the facility or facilities under contract utilizing the materials and methods required by this construction contract. Use the USGBC Energy and Atmosphere (EA) Credit 1 compliance template / form or an equivalently detailed form for documenting compliance with the energy reduction requirements. This template / form is titled PERFORMANCE RATING METHOD and is available when the project is registered for LEED. The calculation methodology used for this documentation and analysis shall follow the guidelines set forth in Appendix G of ASHRAE 90.1, with two exceptions: a) receptacle and process loads may be omitted from the calculation; and b) the definition of the terms in the formula for Percentage Improvement found in paragraph G1.2 are modified as follows: Baseline Building Performance shall mean the annual energy consumption calculated for a building design intended for use as a baseline for rating above standard design meeting the minimum requirements of the energy standard, and Proposed Building Performance shall mean annual energy consumption calculated for the proposed building design intended for construction. This calculation shall address all energy consuming systems in a single integrated methodology. Include laboratory fume hoods and kitchen ventilation loads in the energy calculation. They are not considered process loads. Individual calculations for heating, cooling, power, lighting, power, etc. systems will not be acceptable. The following building simulation software is acceptable for use in calculating building energy consumption: Hourly Analysis Program (HAP) by Carrier Corp., TRACE 700 by Trane Corp., DOE-2 by US Department of Energy, EnergyPlus by DOD/DOE.

3.5.6. Specifications

Specifications may be any one of the major, well known master guide specification sources (use only one source) such as MASTERSPEC from the American Institute of Architects, SPECTEXT from Construction Specification Institute or Unified Facility Guide Specifications (UFGS using MASTERFORMAT 2004 numbering system), etc. (including specifications from these sources). Manufacturers' product specifications, utilizing CSI's Manu-Spec, three part format may be used in conjunction with the selected specifications. The designers of record shall edit and expand the appropriate Specifications to insure that all project design requirements, current code requirements, and regulatory requirements are met. Specifications shall clearly identify, where appropriate, specific products chosen to meet the contract requirements (i.e., manufacturers' brand names and model numbers or similar product information).

3.5.7. Building Rendering

Present and provide a draft color computer, artist, or hand drawn rendering with the conceptual design submittal of the building exterior. Perspective renderings shall include a slightly overhead view of the entire building to encompass elevations and the roof configuration of the building. After Government review and acceptance, provide a final rendering, including the following:

Three (3) 18" x 24" color prints, framed and matted behind glass with project title underneath the print.

One (1) Image file (high resolution) in JPG format on CD for those in the submittal distribution list.

3.5.8. Interim Building Design Contents

The following list represents what the Government considers should be included in the overall completed design for a facility or project. It is not intended to limit the contractor from providing different or additional information as needed to support the design presented, including the require design analyses discussed above. As the Contractor develops individual design packages and submits them for Interim review, include as much of the applicable information for an individual design package as is developed at the Interim design level for review purposes. These pieces shall be developed as the design progresses toward the design complete stage.

3.5.8.1. Lawn and Landscaping Irrigation System

3.5.8.2. Landscape, Planting and Turfing

3.5.8.3. Architectural

(a) Design Narrative

(b) Architectural Floor Plans, Typical Wall and Roof Sections, Elevations

(c) Finish schedule

(d) All required equipment

(e) Special graphics requirements

(f) Door and Window Schedules

(g) Hardware sets using BHMA designations

(h) Composite floor plan showing all pre-wired workstations

(i) Structural Interior Design (SID) package: See ATTACHMENT A for specific requirements

(j) Furniture, Fixtures & Equipment (FF&E) design package: See ATTACHMENT B for specific requirements

(k) Air Barrier Design: Details of all Air Barrier components, (i.e. window flashing details, penetrations in air barrier details, door flashing details, roofing/ceiling barrier interface details and etc.)

3.5.8.4. Structural Systems. Include:

(a) Drawings showing principal members for roof and floor framing plans as applicable

(b) Foundation plan showing main foundation elements where applicable

(c) Typical sections for roof, floor, and foundation conditions

3.5.8.5. Plumbing Systems

(a) Show locations and general arrangement of plumbing fixtures and major equipment

(b) Plan and isometric riser diagrams of all areas including hot water, cold water, waste and vent piping. Include natural gas (and meter as required), (natural gas and meter as required), (LP gas), (fuel oil) and other specialty systems as applicable.

(c) Include equipment and fixture connection schedules with descriptions, capacities, locations, connection sizes and other information as required

3.5.8.6. HVAC Systems

(a) Mechanical Floor Plans: The floor plans shall show all principle architectural features of the building which will affect the mechanical design. The floor plans shall also show the following:

(1) Room designations.

(2) Mechanical legend and applicable notes.

(3) Location and size of all ductwork and piping.

(4) Location and capacity of all terminal units (i.e., registers, diffusers, grilles, hydronic baseboards).

(5) Pre-Fabricated Paint Spray Booth (where applicable to project scope)

(6) Paint Preparation Area (where applicable to project scope)

(7) Exhaust fans and specialized exhaust systems.

(8) Thermostat location.

(9) Location of heating/cooling plant (i.e., boiler, chiller, cooling tower, etc).

(10) Location of all air handling equipment.

(11) Air balancing information.

(12) Flue size and location.

(13) Piping diagram for forced hot water system (if used).

(b) Equipment Schedule: Provide complete equipment schedules. Include:

(1) Capacity

(2) Electrical characteristics

(3) Efficiency (if applicable)

(4) Manufacturer's name

(5) Optional features to be provided

(6) Physical size

(7) Minimum maintenance clearances

(a) Details: Provide construction details, sections, elevations, etc., only where required for clarification of methods and materials of design.

(b) HVAC Controls: Submit complete HVAC controls equipment schedules, sequences of operation, wiring and logic diagrams, Input/Output Tables, equipment schedules, and all associated information. See the Statement of Work for additional specific requirements.

3.5.8.7. Fire Protection and Life Safety.

(a) Provide plan for each floor of each building that presents a compendium of the total fire protection features being incorporated into the design. Include the following types of information:

(1) The location and rating of any fire-resistive construction such as occupancy separations, area separations, exterior walls, shaft enclosures, corridors, stair enclosures, exit passageways, etc.

(2) The location and coverage of any fire detection systems

(3) The location and coverage of any fire suppression systems (sprinkler risers, standpipes, etc.)

(4) The location of any other major fire protection equipment

(5) Indicate any hazardous areas and their classification

(6) Schedule describing the internal systems with the following information: fire hazard and occupancy classifications, building construction type, GPM/square foot sprinkler density, area of operation and other as required

(b) Working plans and all other materials submitted shall meet NFPA 13 requirements, with respect to required minimum level of detail.

3.5.8.8. Elevators. Provide:

(a) Description of the proposed control system

(b) Description, approximate capacity and location of any special mechanical equipment for elevators.

3.5.8.9. Electrical Systems.

(a) Electrical Floor Plan(s): Show all principle architectural features of the building which will affect the electrical design. Show the following:

(1) Room designations.

(2) Electrical legend and applicable notes.

(3) Lighting fixtures, properly identified.

(4) Switches for control of lighting.

(5) Receptacles.

(6) Location and designation of panelboards. Clearly indicate type of mounting required (flush or surface) and reflect accordingly in specifications.

(7) Service entrance (conduit and main disconnect).

(8) Location, designation and rating of motors and/or equipment which requires electrical service. Show method of termination and/or connection to motors and/or equipment. Show necessary junction boxes, disconnects, controllers (approximate only), conduit stubs, and receptacles required to serve the motor and/or equipment.

(b) Building Riser Diagram(s) (from pad-mounted transformer to unit load center panelboard): Indicate the types and sizes of electrical equipment and wiring. Include grounding and metering requirements.

(c) Load Center Panelboard Schedule(s): Indicate the following information:

(1) Panelboard Characteristics (Panel Designation, Voltage, Phase, Wires, Main Breaker Rating and Mounting.

(2) Branch Circuit Designations.

(3) Load Designations.

(4) Circuit Breaker Characteristics. (Number of Poles, Trip Rating, AIC Rating)

(5) Branch Circuit Connected Loads (AMPS).

(6) Special Features

(d) Lighting Fixture Schedule(s): Indicate the following information:

(1) Fixture Designation.

(2) General Fixture Description.

(3) Number and Type of Lamp(s).

(4) Type of Mounting.

(5) Special Features.

(e) Details: Provide construction details, sections, elevations, etc. only where required for clarification of methods and materials of design.

3.5.8.10. Electronic Systems including the following responsibilities:

(a) Fire Detection and Alarm System. Design shall include layout drawings for all devices and a riser diagram showing the control panel, annunciator panel, all zones, radio transmitter and interfaces to other systems (HVAC, sprinkler, etc.)

(b) Fire Suppression System Control. Specify all components of the Fire Suppression (FS) System in the FS section of the specifications. Clearly describe how the system will operate and interact with other systems such as the fire alarm system. Include a riser diagram on the drawings showing principal components and interconnections with other systems. Include FS system components on drawing legend. Designate all components shown on floor plans “FS system components” (as opposed to “Fire Alarm components”). Show location of FS control panels, HVAC control devices, sensors, and 120V power panel connections on floor plans. Indicate zoning of areas by numbers (1, 2, 3) and detectors sub-zoned for cross zoning by letter designations (A and B). Differentiate between ceiling mounted and under floor detectors with distinct symbols and indicate sub-zone of each.

(c) Public Address System

(d) Special Grounding Systems. Completely reflect all design requirements in the specifications and drawings. Specifications shall require field tests (in the construction phase), witnessed by the Government, to determine the effectiveness of the grounding system. Include drawings showing existing construction, if any.

(e) Cathodic Protection.

(f) Intrusion Detection, Card Access System

(g) Central Control and Monitoring System

(h) Mass Notification System

(i) Electrical Power Distribution Systems

3.5.8.11. Separate detailed Telecommunications drawings for Information Systems including the following responsibilities:

(a) Telecommunications Cabling

(b) Supporting Infrastructure

(c) Outside Plant (OSP) Cabling - Campus or Site Plans - Exterior Pathways and Inter-Building Backbones

(d) Include a layout of the voice/data outlets (including voice only wall & pay phones) on telecommunication floor plan drawing, location of SIPRNET data outlets (where applicable), and a legend and symbol definition to indicate height above finished floor. Show size of conduit and cable type and size on Riser Diagram. Do not show conduit runs between backboard and outlets on the floor plans. Show underground distribution conduit and cable with sizing from point of presence to entrance facility of building.

(e) Layout of complete building per floor - Serving Zone Boundaries, Backbone Systems, and Horizontal Pathways including Serving Zones Drawings - Drop Locations and Cable ID's

(f) Communication Equipment Rooms - Plan Views - Tech and AMEP/Elevations - Racks and Walls. Elevations with a detailed look at all telecomm rooms. Indicate technology layout (racks, ladder-racks, etc.), mechanical/electrical layout, rack elevation and backboard elevation. They may also be an enlargement of a congested area of T1 or T2 series drawing.

3.6. FINAL DESIGN REVIEWS AND CONFERENCES

A final design review and review conference will be held upon completion of final design at the project installation, or – where equipment is available - by video teleconference or a combination thereof, for any design package to receive Government acceptance to allow release of the design package for construction. For smaller separate design packages, the parties may agree on alternative reviews and conferences (e.g., conference calls and electronic file sharing, etc.) through the Partnering process. Include the final design conference in the project schedule and shall indicate what part of the design work is at 100% completion. The final design conference will be held after the Government has had seven (7) calendar days after receipt of the submission to review the final design package and supporting data. For smaller packages, especially those involving only one or a few design disciplines the parties may agree on a shorter period.

3.7. FINAL DESIGN REQUIREMENTS

Final design deliverables for a design package shall consist of 100% complete drawings, specifications, submittal register and design analyses for Government review and acceptance. The 100% design submission shall consist of drawings, specifications, updated design analyses and any permits required by the contract for each package submitted. In order to expedite the final design review, prior to the conference, ensure that the design configuration management data and all review comment resolutions are up-to-date. Include the 100% SID and 100% FF&E binders for government approval. The Contractor shall have performed independent technical reviews (ITR's) and back-checks of previous comment resolutions, as required by Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL, including providing documentation thereof. Use DrChecks or other acceptable comment tracking system during the ITR and submit the results with each final design package

3.7.1. Drawings

3.7.1.1. Submit drawings complete with all contract requirements incorporated into the documents to provide a 100% design for each package submitted.

3.7.1.2. Prepare all drawings with the Computer-Aided Design and Drafting (CADD)/Computer-Aided Design (CAD) system, organized and easily referenced electronically, presenting complete construction information.

3.7.1.3. Drawings shall be complete. The Contractor is encouraged to utilize graphics, views, notes, and details which make the drawings easier to review or to construct but is also encouraged to keep such materials to those that are necessary.

3.7.1.4. Provide detail drawings that illustrate conformance with the contract. Include room finish schedules, corresponding color/finish/special items schedules, and exterior finish schedules that agree with the submitted SID binders.

3.7.1.5. The design documents shall be in compliance with the latest version of the A/E/C CAD Standard, available at https://cadbim.usace.army.mil/CAD. Use the approved vertical Corps of Engineers title blocks and borders on all drawings with the appropriate firm name included within the title block area.

3.7.1.6. CAD System and Building Information Modeling (BIM) (NOTE: If this is a Single Award or Multiple Award, Indefinite Delivery/Indefinite Quantity Contract, this information will be provided for each task order.)

All CAD files shall be fully compatible with MicroStation V8 or higher. Save all design CAD files as MicroStation V8 or higher files. All submitted BIM Models and associated Facility Data shall be fully compatible with Bentley BIM file format and the USACE Bentley BIM v8 Workspace.

(a) CAD Data Final File Format: During the design development capture geo-referenced coordinates of all changes made to the existing site (facility footprint, utility line installations and alterations, roads, parking areas, etc) as a result of this contract. There is no mandatory methodology for how the geo-referenced coordinates will be captured, however, Engineering and Construction Bulletin No. 2006-15, Subject: Standardizing Computer Aided Design (CAD) and Geographic Information Systems (GIS) Deliverables for all Military Design and Construction Projects identifies the format for final as-built drawings and data sets to be delivered to the government. Close-out requirements at the as-built stage; require final geo-referenced GIS Database of the new facility along with all exterior modifications. The Government will incorporate this data set into the Installation's GIS Masterplan or Enterprise GIS System. See also, Section 01 78 02.00 10 Closeout Submittals.

(b) Electronic Drawing Files: In addition to the native CAD design files, provide separate electronic drawing files (in editable CAD format and Adobe Acrobat PDF version 7.0 or higher) for each project drawing.

(c) Each file (both CAD and PDF) shall represent one complete drawing from the drawing set, including the date, submittal phase, and border. Each drawing file shall be completely independent of any data in any other file, including fonts and shapes not included with the basic CAD software program utilized. Fonts that are not included as part of the default CAD software package installation or recognized as an allowable font by the A/E/C CAD Standard are not acceptable in delivered CAD files. All displayed graphic elements on all levels of the drawing files shall be part of the project drawing image. The drawing files shall not contain any graphic element that is not part of the drawing image.

(d) Deliver BIM Model and associated Facility Data files in their native format. At a minimum, BIM files shall address major architecture design elements, major structural components, mechanical systems and electrical/communication distribution and elements as defined in Attachment F. See Attachment F for additional BIM requirements.

(e) Drawing Index: Provide an index of drawings sheet in CAD as part of the drawing set, and an electronic list in Microsoft Excel of all drawings on the CD. Include the electronic file name, the sheet reference number, the sheet number, and the sheet title, containing the data for each drawing.

(f) Hard Copies: Plot submitted hard copy drawings directly from the "electronic drawing files" and copy for quantities and sizes indicated in the distribution list at the end of this specification section. The Designers of Record shall stamp, sign and date original hard copy sheets as Released For Construction, and provide copies for distribution from this set.

3.7.2. Design Analyses

3.7.2.1. The designers of record shall update, finalize and present design analyses with calculations necessary to substantiate and support all design documents submitted.

3.7.2.2. The responsible DOR shall stamp, sign and date the design analysis. Identify the software used where, applicable (name, version, vendor). Generally, provide design analyses, individually, in an original (file copy) and one copy for the assigned government reviewer.

3.7.2.3. All disciplines review the LEED design analysis in conjunction with their discipline-specific design analysis; include a copy of the separable LEED design analysis in all design analysis submittals.

3.7.2.4. Do not combine multi-disciplined volumes of design-analysis, unless multiple copies are provided to facilitate multiple reviewers (one copy per each separate design analysis included in a volume).

3.7.3. Specifications

Specifications shall be 100% complete and in final form.

3.7.4. Submittal Register

Prepare and update the Submittal Register and submit it with the 100% design specifications (see Specification Section 01 33 00, SUBMITTAL PROCEDURES) with each design package. Include the required submittals for each specification section in a design package in the submittal register.

3.7.5. Preparation of DD Form 1354 (Transfer of Real Property)

This form itemizes the types, quantities and costs of various equipment and systems that comprise the project, for the purpose of transferring the new construction project from the Corps Construction Division to the Installation's inventory of real property. The Government will furnish the DB Contractor's design manager a DD Form 1354 checklist to use to produce a draft Form 1354. Submit the completed checklist and prepared draft Form DD 1354 with the 100% design in the Design Analysis. The Corps will use these documents to complete the final DD 1354 upon completion of construction.

3.7.6. Acceptance and Release for Construction

3.7.6.1. At the conclusion of the Final Design Review (after resolutions to the comments have been agreed upon between DOR and Government reviewers), the Contracting Officer or the ACO will accept the Final Design Submission for the design package in writing and allow construction to start for that design package. The Government may withhold acceptance until all major corrections have been made or if the final design submission requires so many corrections, even though minor, that it isn't considered acceptably complete.

3.7.6.2. Government review and acceptance of design submittals is for contract conformance only and shall not relieve the Contractor from responsibility to fully adhere to the requirements of the contract, including the Contractor’s accepted contract proposal, or limit the Contractor’s responsibility of design as prescribed under Special Contract Requirement: “Responsibility of the Contractor for Design” or limit the Government’s rights under the terms of the contract. The Government reserves the right to rescind inadvertent acceptance of design submittals containing contract deviations not separately and expressly identified in the submittal for Government consideration and approval.

3.8. DESIGN COMPLETE CONSTRUCTION DOCUMENT REQUIREMENTS

After the Final Design Submission and Review Conference and after Government acceptance of the Final Design submission, revise the design documents for the design package to incorporate the comments generated and resolved in the final review conference, perform and document a back-check review and submit the final, design complete documents. Label the final design complete documents “FOR CONSTRUCTION” or use similar language. In addition to the final drawings and specifications, the following deliverables are required for distribution and field use. The deliverable includes all documentation and supporting design analysis in final form, as well as the final review comments, disposition and the back-check. As part of the quality assurance process, the Government may perform a back-check of the released for construction documentation. Promptly correct any errors or omissions found during the Government back-check. The Government may withhold retainage from progress payments for work or materials associated with a final design package until this submittal has been received and the Government determines that it is complete.

3.9. SUBMITTAL DISTRIBUTION, MEDIA AND QUANTITIES

3.9.1. Submittal Distribution and Quantities

General: The documents which the Contractor shall submit to the Government for each submittal are listed and generally described in preceding paragraphs in this Section. Provide copies of each design submittal and design substantiation as follows (NOTE: If this is a Single Award or Multiple Award, Indefinite Delivery/Indefinite Quantity Contract, this information will be provided for each task order):

Activity and Address	Drawing Size (Full Size) **Full** Full Sets/ *Partial Sets	Design Analyses & Specs Full Sets/ *Partial Sets	Drawing Size (Half Size) **half** Full Sets/ *Partial Sets	Non-BIM Data CD-ROM or DVD as Necessary (PDF& **.dgn**)	Furniture Submittal (Per Attachment B)	Structural Interior Design Submittal	BIM Data DVD (Per Attach F)
Commander, U.S.Army Engineer District **Fort Worth**	1/0	7/0	7/0	7	1	1	1
Commander, U.S.Army Engineer District, Center of Standardization **Fort Worth**	1/0	1/0	1/0	6	N/A	1	1
Installation	1/0	11/0	11/0	11	2	2	1
U.S.Army Corps of Engineers Construction Area Office	4/4	4/0	4/0	4	1	1	1
Information Systems Engineering Command (ISEC)	0/0	0/0	0/0	1	N/A	N/A	1
Other Offices	0/0	0/0	0/0	1	N/A	0	0

***NOTE: For partial sets of drawings, specifications and design analyses, see paragraph 3.9.3.3, below.**

****NOTE: When specified below in 3.9.2, furnish Installation copies of Drawings as paper copies, in lieu of the option to provide secure web-based submittals.**

3.9.2. Web based Design Submittals

Except for full or half-sized drawings for Installation personnel, as designated in the Table above, Web based design submittals will be acceptable as an alternative to the paper copies listed in the Table above, provided a single hard-copy PDF based record set is provided to the Contracting Officer for record purposes. Where the contract requires the Contractor to submit documents to permitting authorities, still provide those authorities paper copies (or in an alternate format where required by the authority). Web based design submittal information shall be provided with adequate security and availability to allow unlimited access those specifically authorized to Government reviewers while preventing unauthorized access or modification. File sizes must be of manageable size for reviewers to quickly download or open on their computers. As a minimum, drawings shall be full scale on American National Standards Institute (ANSI) D sheets (34" x 22"). In addition to the optional website, provide the

BIM data submission on DVD to each activity and address noted above in paragraph 3.9.1 for each BIM submission required in Attachment F.

3.9.3. Mailing of Design Submittals

3.9.3.1. Mail all design submittals to the Government during design and construction, using an overnight mailing service. The Government will furnish the Contractor addresses where each copy shall be mailed to after award of the contract (or individual task order if this is an indefinite delivery/indefinite quantity, task order contract). Mail the submittals to six (6) different addresses. Assemble drawing sheets, specs, design analyses, etc. into individual sets; do not combine duplicate pages from individual sets so that the government has to assemble a set.

3.9.3.2. Each design submittal shall have a transmittal letter accompanying it indicating the date, design percentage, type of submittal, list of items submitted, transmittal number and point of contact with telephone number.

3.9.3.3. Provide partial sets of drawings, specifications, design analyses, etc., as designated in the Table in paragraph 3.9.1, to those reviewers who only need to review their applicable portions of the design, such as the various utilities. The details of which office receives what portion of the design documentation will be worked out after award.

3.10. AS-BUILT DOCUMENTS

Provide as-built drawings and specifications in accordance with Section 01 78 02.00 10, CLOSEOUT SUBMITTALS. Update LEED design phase documentation during construction as needed to reflect construction changes and advancing project completion status (example - Commissioning Plan updates during construction phase) and include updated LEED documentation in construction closeout submittal.

ATTACHMENT A
STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS

1.0 GENERAL INFORMATION

Structural Interior Design includes all building related elements and components generally part of the building itself, such as wall finishes, ceilings finishes, floor coverings, marker/bulletin boards, blinds, signage and built in casework. Develop the SID in conjunction with the furniture footprint.

2.0 STRUCURAL INTERIOR DESIGN (SID) REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS

2.1. FORMAT AND SCHEDULE

Prepare and submit for approval an interior and exterior building finishes scheme for an interim design submittal. The DOR shall meet with and discuss the finish schemes with the appropriate Government officials prior to preparation of the schemes to be presented. Present original sets of the schemes to reviewers at an interim design conference.

At the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers, the Contractor may proceed to final design with the interior finishes scheme presented.

The SID information and samples are to be submitted in 8 ½” x 11” format using three ring binders with pockets on the inside of the cover. When there are numerous pages with thick samples, use more than one binder. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Fold out items must have a maximum spread of 25 ½”. Provide cover and spine inserts sheets identifying the document as “Structural Interior Design” package. Include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.

Design submittal requirements include, but are not limited to:

2.1.1. Narrative of the Structural Interior Design Objectives

The SID shall include a narrative that discusses the building related finishes. Include topics that relate to base standards, life safety, sustainable design issues, aesthetics, durability and maintainability, discuss the development and features as they relate to the occupants requirements and the building design.

2.1.2. Interior Color Boards

Identify and key each item item on the color boards to the contract documents to provide a clear indication of how and where each item will be used. Arrange finish samples to the maximum extent possible by room type in order to illustrate room color coordination. Label all samples on the color boards with the manufacturer’s name, patterns and colors name and number. Key or code samples to match key code system used on contract drawings.

Material and finish samples shall indicate true pattern, color and texture. Provide photographs or colored photocopies of materials or fabrics to show large overall patterns in conjunction with actual samples to show the actual colors. Finish samples must be large enough to show a complete pattern or design where practical.

Color boards shall include but not be limited to original color samples of the following:

All walls finishes and ceiling finishes, including corner guards, acrylic wainscoting and wall guards/chair rail finishes

All tile information, including tile grout color and tile patterns.

- All flooring finishes, including patterns.
- All door, door frame finishes and door hardware finishes
- All signage, wall base, toilet partitions, locker finishes and operable/folding partitions and trim

- All millwork materials and finishes (cabinets, counter tops, etc.)
- All window frame finishes and window treatments (sills, blinds, etc.)

Color board samples shall reflect all actual finish textures, patterns and colors required as specified. Patterned samples shall be of sufficient size to adequately show pattern and its repeat if a repeat occurs.

2.1.3. Exterior Color Boards

Prepare exterior finishes color boards in similar format as the interior finishes color boards, for presentation to the reviewers during an interim design conference. Provide original color samples of all exterior finishes including but not limited to the following:

- All Roof Finishes
- All Brick and Cast Stone Samples
- All Exterior Insulation and Finish Samples
- All Glass Color Samples
- All Exterior Metals Finishes
- All Window & Door Frame Finishes
- All Specialty Item Finishes, including trim

Identify each item on the exterior finishes color boards and key to the building elevations to provide a clear indication of how and where each item will be used.

2.2. STRUCTURAL INTERIOR DESIGN DOCUMENTS

2.2.1. General

Structural interior design related drawings must indicate the placement of extents of SID material, finishes and colors and must be sufficiently detailed to define all interior work. The following is a list of minimum requirements:

2.2.2. Finish Color Schedule

Provide finish color schedule(s) in the contract documents. Provide a finish code, material type, manufacturer, series, and color designations. Key the finish code to the color board samples and drawings.

2.2.3. Interior Finish Plans

Indicate wall and floor patterns and color placement, material transitions and extents of interior finishes.

2.2.4. Furniture Footprint Plans

Provide furniture footprint plans showing the outline of all freestanding and systems furniture for coordination of all other disciplines.

2.2.5. Interior Signage

Include interior signage plans or schedules showing location and quantities of all interior signage. Key each interior sign to a quantitative list indicating size, quantity of each type and signage text.

2.2.6. Interior Elevations, Sections and Details

Indicate material, color and finish placement.

ATTACHMENT B
FURNITURE, FIXTURES & EQUIPMENT (FF&E) REQUIREMENTS

1.0 FF&E REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS

1.1. NOT USED

1.2. NOT USED

1.3. FURNITURE SELECTION

1.3.1. Select furniture from the GSA Schedules. Specify furniture available open market when an item is not available on the GSA Schedules. Provide justification fort items not available on the GSA Schedules.

1.3.2. To the greatest extent possible when specifying furniture work within a manufacturer's family of furniture for selections, example: Steelcase, Turnstone, Brayton International, Metro, and Vecta are all Steelcase companies. Each alternate should also be specified from a manufacturer's family of furniture, example: first set of alternates would be specified from Knoll's family of furniture and the second from Herman Miller family of furniture. It may be necessary to make some selections from other than a manufacturer's family of furniture if costs are not reasonable for particular items, some items are not available or appropriate for the facility or the items are not on GSA Schedule. If this occurs, consider specifying product from an open line that is accessible by numerous dealerships. Select office furniture including case goods, tables, storage, seating, etc. that is compatible in style, finish and color. Select furniture that complies with ANSI/BIFMA and from manufacturer's standard product line as shown in the most recent published price list and/or amendment and not custom product.

1.4. CONSTRUCTION

1.4.1. Provide knee space at workstations and tables that is not obstructed by panels/legs that interfere with knee space of seated person and specificy modesty panels at walls to be of a height or be hinged to allow access to building wall electrical outlets and communication jacks. Provide desks, storage and tables with leveling devices to compensate for uneven floors.

1.4.2. Specify workstations and storage of steel construction. Provide worksurface tops constructed to prevent warpage. Provide user friendly features such as radius edges. Do not use sharp edges and exposed connections and ensure the underside of desks, tables and worksurfaces are completely and smoothly finished. Provide abutting worksurfaces that mate closely and are of equal heights when used in side-by-side configurations in order to provide a continuous and level worksurface.

1.4.3. Drawers shall stay securely closed when in the closed position and protect wires from damage during drawer operation. Include a safety catch to prevent accidental removal when fully open

1.4.4. Unless otherwise noted, provide lockable desks and workstations, filing cabinets and storage. Key all locks within a one person office the same; key all one person offices within a building differently. If an office or open office area has more than one workstation, key all the workstations differently, but key all locks within an individual workstation the same. Use tempered glass glazing when glazing is required. Use light-emitting diode (LED)/solid state lighting where task lighting is required in furniture.

1.5. FINISHES AND UPHOLSTERY

1.5.1. Specify neutral colors for casegoods, furniture systems, storage and tables. Specify desk worksurfaces and table tops that are not too light or too dark in color and have a pattern to help hide soiling. Accent colors are allowed in break and lounge areas. Keep placement of furniture systems panel fabric accent colors to a minimum. All finishes shall be cleanable with ordinary household cleaning solutions.

1.5.2. Use manufacturer's standard fabrics; including textile manufacturers fabrics that have been graded into the furniture manufactures fabric grades and are available through their GSA Schedule. Customers Own Material (COM) can be used in headquarter buildings in command suites with executive furniture. Coordinate specific locations with Corps of Engineers Interior Designer.

1.5.3. Specify seating upholstery that meets Wyzenbeek Abrasion Test, 55,000 minimum rubs. Specify a soil retardant finish for woven fabrics if Crypton or vinyl upholstery is not provided for seating in dining areas. Use manufacturer's standard fabrics. This includes textile manufacturers fabrics that have been graded into the furniture manufactures fabric grades and are available through their GSA Schedule. Specify upholstery and finish colors and patterns that help hide soiling. Specify finishes that can be cleaned with ordinary household cleaning solutions.

1.6. ACCESSORIES

1.6.1. Specify all accessories required for completely finished furniture installation. Provide filing cabinets and storage for office supplies. Provide tack surfaces at workstations with overhead storage. Provide tackable surfaces at workstations with overhead storage.

1.6.2. Not Used.

1.6.3. Workstations are to be equipped with stable keyboard trays that have height adjustability, tilting capability, including negative tilt, have a mouse pad at same height as the keyboard tray that can accommodate both left and right handed users, and retractable under worksurface.

1.7. MISSION UNIQUE EQUIPMENT

Funding for FF&E furniture items and mission unique equipment (MUE) items are from two different sources. Separate the designs and procurement documentation for FFE items and MUE. MUE includes, but is not limited to, items such as industrial shelving, workbenches, appliances, fitness equipment, IT equipment and supporting carts. The User will purchase and install mission unique equipment items, unless otherwise noted. Identify locations of known MUE items such as industrial shelving, workbenches, appliances, etc. for space planning purposes.

1.8. SUSTAINABILITY

1.8.1. For all designs provided regardless of facility type, make every effort to implement all aspects of sustainability to the greatest extent possible for all the selections made in the FF&E package. This includes but is not limited to the selection of products that consider: **Material Chemistry and Safety of Inputs** (What chemicals are used in the construction of the selections?); **Recyclability** (Do the selections contain recycled content?); **Disassembly** (Can the selections be disassembled at the end of their useful life to recycle their materials?).

1.8.2. Make selections to the greatest extent possible of products that possess current McDonough Braungart Design Chemistry (MBDC) certification or other "third-party" certified Cradle to Cradle program, Forest Stewardship Council (FSC) certification, GREENGAURD certification or similar "third-party" certified products consisting of low-emitting materials.

1.9. FURNITURE SYSTEMS

1.9.1. General.

Where appropriate, design furniture systems in open office areas. Coordinate style and color of furniture systems with other storage, seating, etc. in open office areas. Minimize the number of workstation typicals and the parts and pieces required for the design to assist in future reconfiguration and inventorying.

1.9.2. Connector Systems.

Specify a connector system that allows removal of a single panel or spine wall within a typical workstation configuration without requiring disassembly of the workstation or removal of adjacent panels. Specify connector system with tight connections and continuous visual seals. When Acoustical panels are used, provide connector system with continuous acoustical seals. Specify concealed clips, screws, and other construction elements, where possible.

1.9.3. Panels and Spine Walls

Specify panels and spine walls with hinged or removable covers that permit easy access to the raceway when required but are securely mounted and cannot be accidentally dislodged under normal conditions. Panels shall be capable of structurally supporting more than 1 fully loaded component per panel per side. Raceways are to be an integral part of the panel and must be able to support lay-in cabling and have a large capacity for electrical and IT. Do not thread cables through the frame.

1.9.4. Electrical And Information/Technology (IT)

Design furniture with electrical systems that meets requirements of UL 1286 when powered panels are required and UL approved task lights that meet requirements of NFPA 70. Dependent on user requirements and Section 01 10 00, paragraph 3 requirements, it is recommended that workstation electrical and IT wiring entry come from the building walls to eliminate the use of power poles and access at the floor. Design electrical and IT systems that are easily accessed in the spine wall and panels without having to move return panels and components. Electrical and IT management will be easily accessible by removable wall covers which can be removed while workstation components are still attached. Specify connector system that has continuation of electrical and IT wiring within workstations and workstation to workstation.

1.9.5. Pedestals

Specify pedestals that are interchangeable from left to right, and right to left, and retain pedestal locking system capability.

1.10. EXECUTIVE FURNITURE

1.10.1. Design for executive furniture in command areas, coordinate specific locations with Corps of Engineers Interior Designer. Use upgraded furniture, upholsteries and finishes in command suites. This includes but is not limited to wood casegoods, seating and tables. Select executive furniture casegoods from a single manufacturer and style line, to include workstations, credenzas, filing, and storage, etc.

1.10.2. Specify furniture with wood veneer finish (except worksurfaces) with mitered solid wood edge of same wood type. Provide worksurface plastic laminate that closely matches adjacent wood veneer. Other executive office furniture such as seating, tables, executive conference room furniture, etc. shall be compatible in style, finish and color with executive furniture casegoods.

1.11. SEATING

1.11.1. General

Specify appropriate chair casters and glides for the floor finish where the seating is located. Universal casters that are appropriate for both hard surface flooring and carpet are preferred. All seating shall support up to a minimum of 250 lbs.

1.11.2. Desk and Guest Seating

Select ergonomic desk chairs with casters, non-upholstered adjustable arms, waterfall front, swivel, tilt, variable back lock, adjustable back height or adjustable lumbar support, pneumatic seat height adjustment, and padded, contoured upholstered seat and back. Desk and guest chair backs may be other than upholstered such as mesh fabric if it is ergonomically designed, forms to back and is comfortable. Depending on scale of desk chair provide seat pan forward and back adjustment to increase or decrease depth of seat pan. All desk chairs shall have an adjustable seat height range of 4 1/2", range to include 16 1/2-20". Select guest chairs that are compatible in style, finish and color with the desk chairs.

1.11.3. Conference Room Seating

At tables, select ergonomic conference seating with casters, non-upholstered arms, waterfall front, swivel, tilt, pneumatic seat height adjustment, and padded, contoured seat and back, unless otherwise noted. Select arm height and/or design that allows seating to be moved up closely to the table top. Conference chair backs may be other than upholstered such as mesh fabric if it is ergonomically designed, forms to back and is comfortable. Perimeter conference chairs shall be compatible in style, finish and color with conference seating at the tables.

1.11.4. Lounge, Waiting and Reception Area Seating

Select seating with arms and cushioned, upholstered seat and back. In heavy use areas, arms shall be easily cleaned such as non-upholstered arms or upholstered arms with wood arm caps unless otherwise noted.

1.11.5. Break Room Seating

Select stackable seating that is easily cleaned. Seating shall be appropriate for table and counter heights as applicable with non-upholstered arms if arms are required. Chairs shall have metal legs and composite materials for seats.

1.11.6. Lounge, Waiting and Reception Furniture.

Design for end and coffee tables with plastic laminate tops that are compatible in style finish and color with the seating.

1.12. FILING AND STORAGE.

Select storage and shelving units that meet customer’s functional load requirements for stored items. Specify counterweights for filing cabinets when required by the manufacturer for stability. File drawers shall allow only one drawer to be opened at a time. Provide heavy duty storage and shelving if information is not available.

1.13. TRAINING TABLES.

Don’t use plastic laminate self edge. Training tables shall be reconfigurable, moveable and storable; lighter weight folding with dollies or castered as necessary. Specify dollies if required.

1.14. FURNITURE WARRANTIES.

Specify manufacturer's performance guarantees or warranties that include parts, labor and transportation as follows:

Furniture System, unless otherwise noted – 10 year minimum
Furniture System Task Lights – 2 year minimum, excluding bulbs
Furniture System Fabric – 3 year minimum
Desks - 10 year minimum
Seating, unless otherwise noted - 10 year minimum
Seating Mechanisms and Pneumatic Cylinders - 10 years
Fabric - 3 years minimum
Filing and Storage - 10 year minimum
Tables, unless otherwise noted - 10 year minimum
Table Mechanisms – 5 year
Table Ganging Device - 1 year
Items not listed above - 1 year minimum

ATTACHMENT C
TRACKING COMMENTS IN DRCHECKS

1.0 General

The Government and DB Contractor shall set up the project in Dr Checks. Throughout the design process, the parties shall enter, track, and back-check comments using the DrChecks system. Government reviewers enter design review comments into DrChecks. Designers of Record shall annotate comments timely and specifically to indicate exactly what action will be taken or why the action is not required. Comments considered critical by the conference participants shall be flagged as such.

2.0 DrChecks Review Comments

The Contractor and the Government shall monitor DrChecks to assure all comments are annotated and agreed to by the designers and reviewers prior to the next submittal. The DrChecks comments and responses shall be printed and included in the design analysis for record.

2.1. Conference participants (reviewers) will expect coordination between Design Analysis calculations and the submitted design. Reviewers will also focus on the design submittal's satisfaction of the contract requirements.

2.2. The Designers of Record shall answer each comment in DrChecks with a formal response prior to the next submittal, clearly indicating what action will be taken and what drawing/spec will change. Designers of Record are encouraged to directly contact reviewers to discuss and agree to the formal comment responses rather than relying only on DrChecks and review meetings to discuss comments. With the next design conference, reviewers will back-check answers to the comments against the submittal, in addition to reviewing additional design work.

2.3. Comments that, in the DB Contractor's opinion, require effort outside the scope of the contract shall be clearly indicated as such in DrChecks. The DB Contractor shall not proceed with work outside the contract until a modification to the contract is properly executed, if one is necessary.

3.0 DrChecks Initial Account Set-Up

To initialize an office's use of DrChecks, choose a contact person within the office to call the DrChecks Help Desk at 800-428-HELP, M-F, 8AM-5PM, Central time. This POC will be given an office password to distribute to others in the office. Individuals can then go to the hyperlink at http://www.projnet.org and register as a first time user. Upon registration, each user will be given a personal password to the DrChecks system.

3.1. Once the office and individuals are registered, the COE's project manager or lead reviewer will assign the individuals and/or offices to the specific project for review. At this point, persons assigned can make comments, annotate comments, and close comments, depending on their particular assignment.

4.0 DrChecks Reviewer Role

The Contractor is the technical reviewer and the Government is the compliance reviewer of the DB designers design documents. Each reviewer enters their own comments into the Dr Checks system. To enter comments:

4.1. Log into DrChecks.

4.2. Click on the appropriate project.

4.3. Click on the appropriate review conference. An Add comment screen will appear.

4.4. Select or fill out the appropriate sections (particularly comment discipline and type of document for sorting) of the comment form and enter the comment in the space provided.

4.5. Click the Add Comment button. The comment will be added to the database and a fresh screen will appear for the next comment you have.

4.6. Once comments are all entered, exit DrChecks by choosing “My Account” and then Logout.

5.0 DrChecks Comment Evaluation

The role of the designers of record is to evaluate and respond to the comments entered by the Government reviewers and by the DB Contractor. To respond to comments:

5.1. Log into DrChecks.

5.2. Click on the appropriate project.

5.3. Under “Evaluate” click on the number under “Pending”.

5.4. Locate the comments that require your evaluation. (Note: If you know the comment number you can use the Quick Pick window on your home page in DrChecks; enter the number and click on go.)

5.5. Select the appropriate evaluation (concur, non-concur, for information only, or check and resolve) and add the response.

5.6. Click on the Add button. The evaluation will be added to the database and a fresh screen will appear with the next comment.

5.7. Once evaluations are all entered, exit DrChecks by choosing “My Account” and then Logout.

6.0 DrChecks Back-check

At the following design conference, participants will back-check comment annotations against newly presented documents to verify that the designers' responses are acceptable and completed. The Contractor and Government reviewers shall either enter additional back-check comments, as necessary or close those that are resolved as a result of the design conferences:

6.1. Log into DrChecks.

6.2. Click on the appropriate project.

6.3. Under “My Backcheck” click on the number under “Pending”.

6.4. If you agree with the designer’s response select “Close Comment” and add a closing response if desired.

6.5. If you do not agree with the designer’s response or the submittal does not reflect the response given, select “Issue Open”, enter additional information.

6.6. Click on the Add button. The back-check will be added to the database and a fresh screen will appear with the next comment.

6.7. Once back-checks are all entered, exit DrChecks by choosing “My Account” and then Logout. The design is completed and final when there are no pending comments to be evaluated and there are no pending or open comments under back-check.

ATTACHMENT D
SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW

Instructions: Use the information outlined in this document to provide the minimum requirement for development of Fire Protection and Life Safety Code submittals for all building projects. Additional and supplemental information may be used to further develop the code review. Insert N/A after criteria, which may be “not applicable”.

1.0 SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW

1.1. Project Name (insert name and location)

1.2. Applicable Codes and Standards

1.2.1. Unified Facilities Criteria (UFC): 3-600-01, Design: Fire Protection Engineering For Facilities

1.2.2. International Building Code (IBC) for fire resistance requirements, allowable floor area, building height limitations and building separation distance requirements, except as modified by UFC 3-600-01.

1.2.3. National Fire Protection Association (NFPA) 101 Life Safety Code (latest edition), for building egress and life safety and applicable criteria in UFC 3-600-01.

1.2.4. ADA and ABA Accessibllity Guidelines. For Buildings and Facilities See Section 01 10 00, Paragraph 3 for facility specific criteria.

1.3. Occupancy Classification
IBC chapters 3 and 4

1.4. Construction Type
IBC chapter 6

1.5. Area Limitations
IBC chapter 5, table 503

1.6. Allowable Floor Areas
IBC section 503, 505

1.7. Allowable area increases
IBC section 506, 507

1.8. Maximum Height of Buildings
IBC section 504

1.9. Fire-resistive substitution

1.10. Occupancy Separations
IBC table 302.3.2

1.11. Fire Resistive Requirements

1.11.1. Exterior Walls - [_____] hour rating, IBC table 601, 602

1.11.2. Interior Bearing walls - [_____] hour rating

1.11.3. Structural frame - [_____] hour rating

1.11.4. Permanent partitions - [_____] hour rating

1.11.5. Shaft enclosures - [_____] hour rating

1.11.6. Floors & Floor-Ceilings - [_____] hour rating

1.11.7. Roofs and Roof Ceilings - [_____] hour rating

1.12. Automatic Sprinklers and others used to determine the need for automatic Extinguishing Equipment, Extinguishing Systems, Foam Systems, Standpipe

1.12.1. UFC 3-600-01, chapters 4 and 6 systems, wet chemical systems, etc. State which systems are required and to what criteria they will be designed.

1.12.2. UFC 3-600-01, Appendix B Occupancy Classification. Note the classification for each room. This may be accomplished by classifying the entire building and noting exceptions for rooms that differ (E.g. The entire building is Light Hazard except boiler room and storage rooms which are [_____], etc.)

1.12.3. UFC 3-600-01, Chapter 3 Sprinkler Design Density, Sprinkler Design Area, Water Demand for Hose Streams (supply pressure and source requirements).

1.12.4. UFC 3-600-01, Chapter 4 Coverage per sprinkler head. Extended coverage sprinkler heads are not permitted.

1.12.5. Available Water Supply. Provide the results of the water flow tests showing the available water supply static pressure and residual pressure at flow. Based on this data and the estimated flow and pressure required for the sprinkler system, determine the need for a fire pump.

1.12.6. NFPA 13, Para. 8.16.4.6.1. Provide backflow preventer valves as required by the local municipality, authority, or water purveyor. Provide a test valve located downstream of the backflow preventer for flow testing the backflow preventer at full system demand flow. Route the discharge to an appropriate location outside the building.

1.13. Kitchen Cooking Exhaust Equipment

Describe when kitchen cooking exhaust equipment is provided for the project. Type of extinguishing systems for the equipment should be provided. per NFPA 96. Show all interlocks with manual release switches, fuel shutoff valves, electrical shunt trips, exhaust fans, and building alarms.

1.14. Portable Fire Extinguishers, fire classification and travel distance. per NFPA 10

1.15. Enclosure Protection and Penetration Requirements. - Opening Protectives and Through Penetrations

1.15.1. IBC Section712, 715 and Table 715.3. Mechanical rooms, exit stairways, storage rooms, janitor [_____] hour rating. IBC Table 302.1.1

1.15.2. Fire Blocks, Draft Stops, Through Penetrations and Opening Protectives

1.16. Fire Dampers. Describe where fire dampers and smoke dampers are to be used (IBC Section 716 and NFPA 90A}. State whether isolation smoke dampers are required at the air handler.

1.17. Detection Alarm and Communication. UFC 3-600-01, (Chapter 5); NFPA 101 para. 3.4 (chapters 12-42); NFPA 72

1.18. Mass Notification. Describe building/facility mass notification system (UFC 4-021-01) type and type of base-wide mass notification/communication system. State whether the visible notification appliances will be combined with the fire alarm system or kept separate. (Note: Navy has taken position to combine visible notification appliances with fire alarm).

1.19. Interior Finishes (classification). NFPA 101.10.2.3 and NFPA 101.7.1.4

1.20. Means of Egress

1.20.1. Separation of Means of Egress, NFPA 101 chapters 7 and 12-42; NFPA101.7.1.3

1.20.2. Occupant Load, NFPA101.7.3.1 and chapters 12-42.

1.20.3. Egress Capacity (stairs, corridors, ramps and doors) NFPA101.7.3.3

1.20.4. Number of Means of Egress, NFPA101.7.4 and chapters 12-42.

1.20.5. Dead end limits and Common Path of Travel, NFPA 101.7.5.1.6 and chapters 12-42.

1.20.6. Accessible Means of Egress (for accessible buildings), NFPA101.7.5.4

1.20.7. Measurement of Travel Distance to Exits, NFPA101.7.6 and chapters 12-42.

1.20.8. Discharge from Exits, NFPA101.7.7.2

1.20.9. Illumination of Means of Egress, NFPA101.7.8

1.20.10. Emergency Lighting, NFPA101.7.9

1.20.11. Marking of Means of Egress, NFPA101.7.10

1.21. Elevators, UFC 3-600-01, Chapter 6; IBC and ASME A17.1 - 2000,(Safety Code for Elevators and Escalators)

1.22. Accessibility Requirements, ADA and ABA Accessibility Guidelines for Buildings and Facilities

1.23. Certification of Fire Protection and Life Safety Code Requirements. (Note: Edit the Fire team membership if necessary). Preparers of this document certify the accuracy and completeness of the Fire Protection and Life Safety features for this project in accordance with the attached completed form(s).

1.24. Designer of Record. Certification of Fire protection and Life Safety Code Requirements. (Note: Edit the Fire team members if necessary). Preparers of this document certify the accuracy and completeness of the Fire Protection and Life Safety features of this project.

Fire Protection Engineer of Record:

____

Signature and Stamp

Date

OR

Architect of Record:

____

Signature and Stamp

Date

Mechanical Engineer of Record:

____

Signature and Stamp

Date

Electrical Engineer of Record:

Signature/Date

ATTACHMENT E
LEED SUBMITTALS

LEED-NC v2.2 Submittals (OCT09REV)

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v2.2 Submittals (OCT09REV)		Provide for Credit Audit Only		Date Submitted (to be filled in by Contractor)	Government Reviewer's Use (OCT09REV)
PAR		FEATURE	DUE AT		REQUIRED DOCUMENTATION	DATE	REV
GENERAL							
	GENERAL - All calculations shall be in accordance with LEED 2.2 Reference Guide.						
	GENERAL: Obtain excel version of this spreadsheet at http://en.sas.usace.army.mil/enWeb, "Engineering Criteria". OCT09REV						
	GENERAL - For all credits, narrative/comments may be added to describe special circumstances or considerations regarding the project's credit approach.						
	GENERAL - Include all required LEED drawings indicated below in contract drawings with applicable discipline drawings, labeled For Reference Only.						
	NOTE: Each submittal indicated with "**" differs from LEED certified project submittals by either having a different due date or being an added submittal not required by GBCI. OCT09REV						
	OCT09REV GENERAL - Audit documentation may include but is not limited to what is indicated in this table.						
			Closeout		List of all Final Design submittals revised after final design to reflect actual closeout conditions. Revised Final Design submittals. - OR - Statement confirming that no changes have been made since final design that effect final design submittal documents.		Proj Engr (PE)
CATEGORY 1 - SUSTAINABLE SITES							
SSPR1		Construction Activity Pollution Prevention (PREREQUISITE)	**Final Design		List of drawings and specifications that address the erosion control, particulate/dust control and sedimentation control measures to be implemented.		CIV
OCT09REV			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			**Final Design		Narrative that indicates which compliance path was used (NPDES or Local standards) and describes the measures to be implemented on the project. If a local standard was followed, provide specific information to demonstrate that the local standard is equal to or more stringent than the NPDES program.		CIV
SS1		Site Selection	Final Design		Statement confirming that project does not meet any of the prohibited criteria.		CIV
OCT09REV			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	X	LEED Site plan drawing that shows all proposed development, line depicting boundary of all bodies of water and/or wetlands within 100 feet of project boundary and a line depicting 5' elevation above 100 year flood line that falls within project boundary. Not required if neither condition applies.		CIV
SS2		Development Density & Community Connectivity	Final Design		Option 1: LEED Site vicinity plan showing project site and surrounding development. Show density boundary or note drawing scale.		CIV
OCT09REV			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design		Option 1: Table indicating, for project site and all surrounding sites within density radius (keyed to site vicinity plan), site area and building area. Project development density calculation. Density radius calculation. Development density calculation within density radius.		CIV
			Final Design		Option 2: LEED Site vicinity plan showing project site, the 1/2 mile community radius, pedestrian walkways and the locations of the residential development(s) and Basic Services surrounding the project site.		CIV
			Final Design		Option 2: List (including business name and type) of all Basic Services facilities within the 1/2 mile radius, keyed to site vicinity plan.		CIV
SS3		Brownfield Redevelopment	Final Design		Narrative describing contamination and the remediation activities included in project. Include statement indicating how site was determined to be a brownfield.		CIV
OCT09REV			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS4.1		Alternative Transportation: Public Transportation Access	Final Design		Statement indicating which option for compliance applies. State whether public transportation is existing or proposed and, if proposed, cite source of this information.		CIV
OCT09REV			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design		Option 1: LEED Site vicinity plan showing project site, mass transit stops and pedestrian path to them with path distance noted.		CIV
			Final Design		Option 2: LEED Site vicinity plan showing project site, bus stops and pedestrian path to them with path distance noted.		CIV
SS4.2		Alternative Transportation: Bicycle Storage & Changing Rooms	Final Design		FTE calculation. Bicycle storage spaces calculation. Shower/changing facilities calculation.		CIV
			Final Design		List of drawings that show the location(s) of bicycle storage areas. Statement indicating distance from building entrance.		CIV
			Final Design		List of drawings that show the location(s) of shower/changing facilities and, if located outside the buiding, statement indicating distance from building entrance.		ARC
SS4.3		Alternative Transportation: Low Emitting & Fuel Efficient Vehicles	Final Design		Statement indicating which option for compliance applies. FTE calculation. Statement indicating total parking capacity of site.		CIV
OCT09REV			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design		Option 1: Low-emission & fuel-efficient vehicle calculation.		CIV

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PAR		FEATURE	DUE AT		REQUIRED DOCUMENTATION	DATE	REV
			Final Design		Option 1: List of drawings and specification references that show location and number of preferred parking spaces for low-emission & fuel-efficient vehicles and signage.		CIV
			Final Design		Option 1: Statement indicating quantity, make, model and manufacturer of low-emission & fuel-efficient vehicles to be provided. Statement confirming vehicles are zero-emission or indicating ACEEE vehicle scores.		CIV
			Final Design		Option 2: Low-emission & fuel-efficient vehicle parking calculation.		CIV
			Final Design		Option 2: List of drawings and specification references that show location and number of preferred parking spaces and signage.		CIV
			Final Design		Option 3: Low-emission & fuel-efficient vehicle refueling station calculation.		CIV
			Final Design		Option 3: List of drawings and specifications indicating location and number of refueling stations, fuel type and fueling capacity for each station for an 8-hour period.		CIV
			Closeout	X	Option 3: Construction product submittals indicating what was provided and confirming compliance with respect to fuel type and fueling capacity for each station for an 8-hour period.		CIV
SS4.4		Alternative Transportation: Parking Capacity	Final Design		Statement indicating which option for compliance applies.		CIV
OCT09REV			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design		Option 1: Preferred parking calculation including number of spaces required, total provided, preferred spaces provided and percentage.		CIV
			Final Design		Option 2: FTE calculation. Preferred parking calculation including number of spaces provided, preferred spaces provided and percentage.		CIV
			Final Design		Options 1 and 2: List of drawings and specification references that show location and number of preferred parking spaces and signage.		CIV
			Final Design		Option 3: Narrative indicating number of spaces required and provided and describing infrastructure and support programs with description of project features to support them.		CIV
SS5.1		Site Development: Protect or Restore Habitat	**Final Design		Option 1: List of drawing and specification references that convey site disturbance limits.		CIV
OCT09REV			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			**Final Design		Option 2: LEED site plan drawing that delineates boundaries of each preserved and restored habitat area with area (sf) noted for each.		CIV
			**Final Design		Option 2: Percentage calculation of restored/preserved habitat to total site area. List of drawings and specification references that convey restoration planting requirements.		CIV
SS5.2		Site Development: Maximize Open Space	Final Design		Option 2: LEED site plan drawing delineating boundary of vegetated open space adjacent to building with areas of building footprint and designated open space noted.		CIV
OCT09REV			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS6.1		Stormwater Design: Quantity Control	Final Design		Statement indicating which option for compliance applies.		CIV
OCT09REV			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design		Option 1: Indicate pre-development and post-development runoff rate(cfs) and runoff quantity (cf) -OR - Narrative describing site conditions, measures and controls to be implemented to prevent excessive stream velocities and erosion.		CIV
			Final Design		Option 2: Indicate pre-development and post-development runoff rate(cfs) and runoff quantity (cf). Indicate percent reduction in each.		CIV
SS6.2		Stormwater Design: Quality Control	Final Design		For non-structural controls, list all BMPs used and, for each, describe the function of the BMP and indicate the percent annual rainfall treated. List all structural controls and, for each, describe the pollutant removal and indicate the percent annual rainfall treated.		CIV
OCT09REV			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS7.1		Heat Island Effect: Non-Roof	**Final Design		LEED site plan drawing indicating locations and quantities of each paving type, including areas of shaded pavement. Percentage calculation indicating percentage of reflective/shaded/open grid area.		CIV
OCT09REV			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS7.2		Heat Island Effect: Roof	Final Design		Option 1: Percentage calculation indicating percentage of SRI compliant roof area. List of drawings and specification references that convey SRI requirements and roof slopes.		ARC

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			Final Design OCT09REV		Option 1: List of specified roof materials indicating, for each, product type, manufacturer, product name and identification if known, SRI value and roof slope. OCT09REV		ARC
			**Closeout OCT09REV		Option 1: List of installed roof materials indicating, for each, manufacturer, product name and identification, SRI value and roof slope.		PE
			Closeout	X	Option 1: Manufacturer published product data or certification confirming SRI		PE
			Final Design		Option 2: Percentage calculation indicating percentage of vegetated roof area.		ARC
			Final Design		Option 3: Combined reflective and green roof calculation.		ARC
			Final Design OCT09REV		Option 3: List of specified roof materials indicating, for each, product type, manufacturer, product name and identification if known, SRI value and roof slope. OCT09REV		
			**Closeout OCT09REV		Option 3: List of installed roof materials indicating, for each, manufacturer, product name and identification, SRI value and roof slope.		PE
			Closeout	X	Option 3: Manufacturer published product data or certification confirming SRI		PE
SS8		Light Pollution Reduction	Final Design		Interior Lighting: List of drawings and specification references that convey interior lighting requirements (location and type of all installed interior lighting, location of non-opaque exterior envelope surfaces, allowing confirmation that maximum candela value from interiorfixtures does not intersect non-opaque building envelope surfaces). - OR - List of drawings and specification references that show automatic lighting controls that turn off non-essential lighting during non-business hours.		ELEC
OCT09REV			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		ELEC
			Final Design		Exterior Lighting: List of drawings and specification references that convey exterior lighting requirements (location and type of all site lighting and building façade/landscape lighting).		ELEC
			Final Design		Exterior Site Lighting Power Density (LPD): Tabulation for exterior site lighting indicating, for each location identification or description, units of measure, area or distance of the location, actual LPD using units consistent with ASHRAE 90.1, and the ASHRAE allowable LPD for that type of location. Percentage calculation of actual versus allowable LPD for all site lighting.		ELEC
			Final Design		Exterior Building Facade/Landscape Lighting Power Density (LPD): Tabulation for exterior building facade/landscape lighting indicating, for each location identification or description, units of measure, area or distance of the location, actual LPD using units consistent with ASHRAE 90.1, and the ASHRAE allowable LPD for that type of location. Percentage calculation of actual versus allowable LPD for all building facade/landscape lighting.		ELEC
			Final Design		Exterior Lighting IESNA Zone: Indicate which IESNA zone is applicable to the project.		ELEC
			Final Design		Exterior Lighting Site Lumen table indicating, for each fixture type, quantity installed, initial lamp lumens per luminaire, initial lamp lumens above 90 degrees from Nadir, total lamp lumens and total lamp lumens above 90 degrees. Percentage of site lamp lumens above 90 degrees from nadir to total lamp lumens.		ELEC
			Final Design		Exterior Lighting Narrative describing analysis used for addressing requirements for light trespass at site boundary and beyond.		ELEC
CATEGORY 2 – WATER EFFICIENCY							
WE1.1		Water Efficient Landscaping: Reduce by 50%	Final Design		Statement indicating which option for compliance applies.		CIV
OCT09REV			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design		Calculation indicating, for baseline and design case, total water applied, total potable water applied, total non-potable water applied. Design case percent potable water reduction. If nonpotable water is used, indicate source of nonpotable water.		CIV
			Final Design		List of landscape plan drawings.		CIV
			Final Design		Narrative describing landscaping and irrigation design strategies, including water use calculation methodology used to determine savings and, if non-potable water is used, specific information about source and available quantity.		CIV
WE1.2		Water Efficient Landscaping: No Potable Water Use or No Irrigation	Same as WE1.1		Same as WE1.1		CIV
WE2		Innovative Wastewater Technologies	Final Design		Statement confirming which option for compliance applies.		MEC

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			Final Design		Statement confirming which occupancy breakdown applies (default or special). For special occupancy breakdown, indicate source and explanation for ratio.		MEC
			Final Design		Occupancy calculation including male/female numbers for FTEs, visitors, students, customers, residential and other type occupants/users		MEC
			Final Design		Statement indicating percent of male restrooms with urinals. Statement indicating annual days of operation.		MEC
			Final Design		Baseline flush fixture calculation spreadsheet indicating, for each fixture type, gender, flush rate, daily uses per person for each occupant type identified in occupancy calculation and annual baseline flush fixture water usage.		MEC
			Final Design		Design case flush fixture calculation spreadsheet indicating, for each fixture type, gender, fixture manufacturer, fixture model number, flush rate, percent of occupants using this fixture type, daily uses per person for each occupant type identified in occupancy calculation and annual design case flush fixture water usage.		MEC
			Final Design		Option 1: If onsite non-potable water is used, identify source(s), indicate annual quantity from each source and indicate total annual quantity from all onsite non-potable water sources.		MEC
			Final Design		Option 1: Summary calculation indicating baseline annual water consumption, design case annual water consumption, non-potable annual water consumption and total percentage annual water savings.		MEC
			Final Design		Option 2: Statement confirming on-site treatment of all generated wastewater to tertiary standards and all treated wastewater is either infiltrated or used on-site.		MEC
			Final Design		Option 2: List of drawing and specification references that convey design of on-site wastewater treatment features.		CIV
			Final Design		Option 2: On-site water treatment quantity calculation indicating all on-site wastewater source(s), annual quantity treated, annual quantity infiltrated and annual quantity re-used on site from each source and totals for annual quantity treated, annual quantity infiltrated and annual quantity re-used on site from all sources.		CIV
			Final Design		Option 2: Wastewater summary calculation indicating design case annual flush fixture water usage, annual on-site water treatment and percentage sewage convyance reduction.		MEC
			Final Design		Narrative describing project strategy for reduction of potable water use for sewage conveyance, including specific information on reclaimed water usage and treated wastewater usage.		MEC
WE3.1		Water Use Reduction: 20% Reduction	Final Design		Statement confirming which occupancy breakdown applies (default or special). For special occupancy breakdown, indicate source and explanation for ratio.		MEC
			Final Design		Occupancy calculation including male/female numbers for FTEs, visitors, students, customers, residential and other type occupants/users		MEC
			Final Design		Statement indicating percent of male restrooms with urinals. Statement indicating annual days of operation.		MEC
			Final Design		Baseline flush fixture calculation spreadsheet indicating, for each fixture type, gender, flush rate, daily uses per person for each occupant type identified in occupancy calculation and annual baseline flush fixture water usage.		MEC
			Final Design		Design case flush fixture calculation spreadsheet indicating, for each fixture type, gender, fixture manufacturer, fixture model number, flush rate, percent of occupants using this fixture type, daily uses per person for each occupant type identified in occupancy calculation and annual design case flush fixture water usage.		MEC
			Closeout	X	Manufacturer published product data or certification confirming fixture water usage.		PE
WE3.2		Water Use Reduction: 30% Reduction	Same as WE3.1		Same as WE3.1		MEC
CATEGORY 3 – ENERGY AND ATMOSPHERE							
EAPR1		Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	**Final Design		**Owner's Project Requirements document		ALL
			**Final Design		**Basis of Design document for commissioned systems		MEC, ELEC
			**Final Design		**Commissioning Plan		MEC, ELEC

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			Closeout		Statement confirming all commissioning requirements have been incorporated into construction documents.		PE
			Closeout		Commissioning Report		PE
EAPR2		Minimum Energy Performance (PREREQUISITE)	Final Design		Statement listing the mandatory provisions of ASHRAE 90.1 that project meets relative to compliance with this prerequisite and indicating which compliance path was used.		MEC ELEC ARC
EAPR3		Fundamental Refrigerant Management (PREREQUISITE)	Final Design		Statement indicating which option for compliance applies.		MEC
			Final Design		Option 2: Narrative describing phase out plan, including specific information on phase out dates and refrigerant quantities.		MEC
EA1		Optimize Energy Performance	Final Design		Statement indicating which compliance path option applies.		MEC
			Final Design		Option 1: Statement confirming simulation software capabilities and confirming assumptions and methodology.		MEC
			Final Design		Option 1: General information including simulation program, principal heating source, percent new construction and renovation, weather file, climate zone and Energy Star Target Finder score.		MEC
			Final Design		Option 1: Space summary listing, for each building use, the conditioned area, unconditioned area and total area and include total area for each category		MEC
			Final Design		Option 1: List of all simulation output advisory message data and show difference between baseline and proposed design		MEC
			Final Design		Option 1: Comparison summary for energy model inputs including description of baseline and design case energy model inputs, showing both by element type		MEC
			Final Design		Option 1: Energy type summary lising, for each energy type, utility rate description, units of energy and units of demand		MEC
			Final Design		Option 1: Statement indicating whether project uses on-site renewable energy. If yes, list all sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost		MEC
			Final Design		Option 1: If analysis includes exceptional calculation methods, statement describing how exceptional calculation measure cost savings is determined		MEC
			Final Design		Option 1: If analysis includes exceptional calculation methods, for each exceptional calculation method indicate energy types and, for each energy type, annual energy savings, annual cost savings, and brief descriptive narrative		MEC
			Final Design		Option 1: Baseline performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand for all four orientations. For each orientation indicate total annual energy use for each orientation and total annual process energy use.		MEC
			Final Design		Option 1: Baseline energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design		Option 1: Proposed Design performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand, baseline annual and peak energy demand and percent savings. Indicate total annual energy use and total annual process energy use for both proposed design and baseline and percent savings.		MEC
			Final Design		Option 1: Proposed Design energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design		Option 1: Energy cost and consumption by energy type report indicating, for each energy type, proposed design and baseline annual use and annual cost, percent savings annual use and annual cost. Indicate for renewable energy annual energy generated and annual cost. Indicate exceptional calculations annual energy savings and annual cost savings. Indicate building total annual energy use, annual energy cost for proposed design and baseline and indicate percent savings annual energy use and annual energy cost.		MEC

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			Final Design		Option 1: Compliance summaries from energy simulation software. If software does not produce compliance summaries provide output summaries and example input summaries for baseline and proposed design supporting data in the tables. Output summaries must include simulated energy consumption by end use and total energy use and cost by energy type. Example input summaries should represent most common systems and must include occupancy, use pattern, assumed envelope component sizes and descriptive features and assumed mechanical equipment types and descriptive features		MEC
			Final Design		Option 1: Energy rate tariff from project energy providers (only if not using LEED Reference Guide default rates)		MEC
EA2.1		On-Site Renewable Energy	Final Design		Statement indicating which compliance path option applies.		ELEC
			Final Design		List all on-site renewable energy sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost. Indicate total annual energy use (all sources), total annual energy cost (all sources) and percent renewable energy cost.		ELEC MEC
			Final Design		Option 1: Indicate, for renewable energy,proposed design total annual energy generated and annual cost.		ELEC MEC
			Final Design		Option 2: Indicate CBECS building type and building gross area. Provide the following CBECS data: median annual electrical intensity, median annual non-electrical fuel intensity, average electric energy cost, average non-electric fuel cost, annual electric energy use and cost, annual non-electric fuel use and cost.		ELEC MEC
			Final Design		Option 2: Narrative describing renewable systems and explaining calculation method used to estimate annual energy generated, including factors influencing performance.		ELEC MEC
EA2.2		On-Site Renewable Energy	Same as EA2.1		Same as EA2.1		ELEC MEC
EA2.3		On-Site Renewable Energy	Same as EA2.1		Same as EA2.1		ELEC MEC
EA3		Enhanced Commissioning	**Final Design		**Owner's Project Requirements document (OPR)		ALL
			**Final Design		**Basis of Design document for commissioned systems (BOD)		ELEC MEC
			**Final Design		**Commissioning Plan		ELEC MEC
			Closeout		Statement confirming all commissioning requirements have been incorporated into construction documents.		PE
			Closeout		**Commissioning Report		PE
			**Final Design		Statement by CxA confirming Commissioning Design Review		
			Closeout		Statement by CxA confirming review of Contractor submittals for compliance with OPR and BOD		PE
			Closeout		**Systems Manual		PE
			Closeout		Statement by CxA confirming completion of O&M staff and occupant training		PE
			Closeout		**Scope of work for post-occupancy review of building operation, including plan for resolution of outstanding issues		PE
			**Predesign		Statement confirming CxA qualifications and contractual relationships relative to work on this project, demonstrating that CxA is an independent third party.		MEC
EA4		Enhanced Refrigerant Management	Final Design		Refrigerant impact calculation table with all building data and calculation values as shown in LEED 2.2 Reference Guide Example Calculations		MEC
			Final Design		Narrative describing any special circumstances or explanatory remarks OCT09REV		
			Closeout	X	Cut sheets highlighting refrigerant data for all HVAC components.		PE
EA5		Measurement & Verification	Closeout		Statement indicating which compliance path option applies.		PE
			Closeout		Measurement and Verification Plan		PE
			Closeout		**Scope of work for post-occupancy implementation of M&V plan		PE
EA6		Green Power	Closeout		Statement indicating which compliance path option applies.		PE
			Closeout		Option 1: Indicate proposed design total annual electric energy usage		PE
			Closeout		Option 2: Indicate actual total annual electric energy usage		PE
			Closeout		Option 3: Calculation indicating building type, total gross area, median electrical intensity and annual electric energy use		PE

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			Closeout		Green power provider summary table indicating, for each purchase type, provider name, annual quantity green power purchased and contract term. Indicate total annual green power use and indicate percent green power		PE
			Closeout		Narrative describing how Green Power or Green Tags are purchased		PE
CATEGORY 4 – MATERIALS AND RESOURCES							
MRPR1		Storage & Collection of Recyclables (PREREQUISITE)	Final Design		Statement confirming that recycling area will accommodate recycling of plastic, metal, paper, cardboard and glass. Narrative indicating any other materials addressed and coordination with pickup.		ARC
MR1.1		Building Reuse: Maintain 75% of Existing Walls, Floors & Roof	**Final Design		If project includes a building addition, confirm that area of building addition does not exceed 2x the area of the existing building.		ARC
			**Final Design		Spreadsheet listing, for each building structural/envelope element, the existing area and reused area. Total percent reused.		ARC
MR1.2		Building Reuse: Maintain 95% of Existing Walls, Floors & Roof	Same as MR1.1		Same as MR1.1		ARC
MR1.3		Building Reuse: Maintain 50% of Interior Non-Structural Elements	**Final Design		If project includes a building addition, confirm that area of building addition does not exceed 2x the area of the existing building.		ARC
			**Final Design		Spreadsheet listing, for each building interior non-structural element, the existing area and reused area. Total percent reused.		ARC
MR2.1		Construction Waste Management: Divert 50% From Disposal	**Preconstruction		Waste Management Plan		PE
			**Construction Quarterly and Closeout		Spreadsheet calculations indicating material description, disposal/diversion location (or recycling hauler), weight, total waste generated, total waste diverted, diversion percentage		PE
					OCT09REV		
			**Construction Quarterly and Closeout		Receipts/tickets for all items on spreadsheet		PE
MR2.2		Construction Waste Management: Divert 75% From Disposal	Same as MR2.1		Same as MR2.1		PE
MR3.1		Materials Reuse: 5%	Closeout		Statement indicating total materials value and whether default or actual.		PE
			Closeout		Spreadsheet calculations indicating, for each reused/salvaged material, material description, source or vendor, cost. Total reused/salvaged materials percentage.		PE
MR3.2		Materials Reuse: 10%	Same as MR3.1		Same as MR3.1		PE
MR4.1		Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	Closeout		Statement indicating total materials value and whether default or actual.		PE
			Closeout		Spreadsheet calculations indicating, for each recycled content material, material name/description, manufacturer, cost, post-consumer recycled content percent, pre-consumer recycled content percent, source of recycled content data. Total post-consumer content materials cost, total pre-consumer content materials cost, total combined recycled content materials cost, recycled content materials percentage.		PE
			Final Design or NLT Preconstruction		**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal. OCT09REV		PE
			Closeout	X	Manufacturer published product data or certification, confirming recycled content percentages in spreadsheet		PE
MR4.2		Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	Same as MR4.1		Same as MR4.1		PE
MR5.1		Regional Materials:10% Extracted, Processed & Manufactured Regionally	Closeout		Statement indicating total materials value and whether default or actual.		PE
			Closeout		Spreadsheet calculations indicating, for each regional material, material name/description, manufacturer, cost, percent compliant, harvest distance, manufacture distance, source of manufacture and harvest location data. Total regional materials cost, regional materials percentage.		PE
			Preconstruction OCT09REV		**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal. OCT09REV		PE
			Closeout	X	Manufacturer published product data or certification confirming regional material percentages in spreadsheet		PE

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MR5.2		Regional Materials:20% Extracted, Processed & Manufactured Regionally	Same as MR5.1		Same as MR5.1		PE
MR6		Rapidly Renewable Materials	Closeout		Statement indicating total materials value and whether default or actual.		PE
			Closeout		Spreadsheet calculations indicating, for each rapidly renewable material, material name/description, manufacturer, cost, rapidly renewable content percent, rapidly renewable product value. Total rapidly renewable product value, rapidly renewable materials percentage.		PE
			Final Design OCT09REV		**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal. OCT09REV		ARC
			Closeout	X	Manufacturer published product data or certification confirming rapidly renewable material percentages in spreadsheet		PE
MR7		Certified Wood	Closeout		Statement indicating total materials value and whether default or actual.		PE
			Closeout		Spreadsheet calculations indicating, for each certified wood material, material name/description, vendor, cost, wood component percent, certified wood percent of wood component, FSC chain of custody certificate number. Total certified wood product value, certified wood materials percentage.		PE
			Final Design or NLT Preconstruction		**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal. OCT09REV		PE
			Closeout	X	Vendor invoices, FSC chain of custody certificates and anufacturer published product data or certification confirming all certified wood materials percentages in spreadsheet.		PE
CATEGORY 5 – INDOOR ENVIRONMENTAL QUALITY							
EQPR1		Minimum IAQ Performance (PREREQUISITE)	Final Design		Statement indicating which option for compliance applies, stating applicable criteria/requirement, and confirming that project has been designed to meet the applicable requirements.		MEC
			Final Design		Narrative describing the project's ventilation design, including specifics about fresh air intake volumes and special considerations.		MEC
EQPR2		Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	Final Design		Statement indicating which option for compliance applies, stating applicable criteria/requirement, and confirming that project has been designed to meet the applicable requirements.		ARC
			Final Design		List of drawing and specification references that convey conformance to applicable requirements (signage, exhaust system, room separation details, etc).		ARC
EQ1		Outdoor Air Delivery Monitoring	Final Design		Statement indicating which option for compliance applies and confirming that project has been designed to meet the applicable requirements.		MEC
			Final Design		List of drawing and specification references that convey conformance to applicable requirements.		MEC
			Final Design		Narrative describing the project's ventilation design and CO2 monitoring system, including specifics about monitors, operational parameters and setpoints.		MEC
			Closeout	X	Cut sheets for CO2 monitoring system.		PE
EQ2		Increased Ventilation	Final Design		Statement indicating which option for compliance applies and confirming that project has been designed to meet the applicable requirements.		MEC
			Final Design		Narrative describing the project's ventilation design, including specifics about zone fresh air intake volumes and demonstrating compliance.		MEC
			Final Design		Option 2: Narrative describing design method used for determining natural ventilation design, including calculation methodology/model results and demonstrating compliance.		MEC
			Final Design		List of drawing and specification references that convey conformance to applicable requirements.		MEC
EQ3.1		Construction IAQ Management Plan: During Construction	**Preconstruction		Construction IAQ Management Plan		PE
			Closeout		Statement confirming whether air handling units were operated during construction		PE
			Closeout		Dated jobsite photos showing examples of IAQ management plan practices being implemented. Label photos to indicate which practice they demonstrate. Minimum one photo of each practice at each building.		PE
			Closeout		Spreadsheet indicating, for each filter installed during construction, the manufacturer, model number, MERV rating, location installed, and if it was replaced immediately prior to occupancy.		PE
EQ3.2		Construction IAQ Management Plan: Before Occupancy	**Preconstruction		Construction IAQ Management Plan		PE

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	**LEED-NC v2.2 Submittals (OCT09REV)**		Provide for Credit Audit Only		Date Submitted (to be filled in by Contractor)	Government Reviewer's Use (OCT09REV)
PAR		**FEATURE**	**DUE AT**		**REQUIRED DOCUMENTATION**	**DATE**	**REV**
			Closeout		Statement indicating which option for compliance applies and confirming that required activities have occurred that meet the applicable requirements.		PE
			Closeout		Option 1a: Narrative describing the project's flushout process, including specifics about temperature, airflow and duration, special considerations (if any) and demonstrating compliance.		PE
			Closeout		Option 1b: Narrative describing the project's pre-occupancy and post-occupancy flushout processes, including specifics about temperature, airflow and duration, special considerations (if any) and demonstrating compliance.		PE
			Closeout		Option 2: Narrative describing the project's IAQ testing process, including specifics about contaminants tested for, locations, remaining work at time of test, retest parameters and special considerations (if any).		PE
			Closeout		Option 2: IAQ testing report demonstrating compliance.		PE
EQ4.1		Low Emitting Materials: Adhesives & Sealants	Closeout		Spreadsheet indicating, for each applicable indoor adhesive, sealant and sealant primer used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data.		PE
			Closeout		Spreadsheet indicating, for each applicable indoor aerosol adhesive, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data - OR - Statement confirming no indoor aerosol adhesives were used for the project.		PE
			Closeout	X	Manufacturer published product data or certification confirming material VOCs in spreadsheet		PE
EQ4.2		Low Emitting Materials: Paints & Coatings	Closeout		Spreadsheet indicating, for each applicable indoor paint and coating used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data.		PE
			Closeout		Spreadsheet indicating, for each applicable indoor anti-corrosive/anti-rust paint and coating used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data - OR - Statement confirming no indoor anti-corrosive/anti-rust paints were used for the project .		PE
			Closeout	X	Manufacturer published product data or certification confirming material VOCs in spreadsheet		PE
EQ4.3		Low Emitting Materials: Carpet Systems	Closeout		Spreadsheet indicating, for each indoor carpet used, the manufacturer, product name/model number, if it meets LEED requirement (yes/no) and source of LEED compliance data.		PE
			Closeout		Spreadsheet indicating, for each indoor carpet cushion used, the manufacturer, product name/model number, if it meets LEED requirement (yes/no) and source of LEED compliance data - OR - Statement confirming no indoor carpet cushion was used for the project.		PE
			Closeout	X	Manufacturer published product data or certification confirming material CRI label in spreadsheet		PE
EQ4.4		Low Emitting Materials: Composite Wood & Agrifiber Products	Closeout		Spreadsheet indicating, for each indoor composite wood and agrifiber product used, the manufacturer, product name/model number, if it contains added urea formaldehyde (yes/no) and source of LEED compliance data.		PE
			Closeout	X	Manufacturer published product data or certification confirming material urea formaldehyde in spreadsheet		PE
EQ5		Indoor Chemical & Pollutant Source Control	Closeout OCT09REV		Spreadsheet indicating, for each permanent entryway system used, the manufacturer, product name/model number and description of system. Roll-up and carpet systems requiring weekly cleaning to earn this credit are not a permitted option for Army projects.		PE
			Final Design		List of drawing and specification references that convey locations and installation methods for entryway systems.		ARC
			Final Design		Spreadsheet indicating, for each chemical use area, the room number, room name, description of room separation features (walls, floor/ceilings, openings) and pressure differential from surrounding spaces with doors closed - OR - Statement confirming that project includes no chemical use areas and that no hazardous cleaning materials are needed for building maintenance.		ARC MEC
			Final Design		If project includes chemical use areas: List of drawing and specification references that convey locations of chemical use areas, room separation features and exhaust system.		ARC MEC
			Closeout OCT09REV		If project includes chemical use areas: Spreadsheet indicating, for AHUs/mechanical ventilation equipment serving occupied areas, the manufacturer, model number, MERV rating, location installed, and if it was replaced immediately prior to occupancy (yes/no) - OR - Statement confirming that project does not use mechanical equipment for ventilation of occupied areas.		PE

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	LEED-NC v2.2 Submittals (OCT09REV)		Provide for Credit Audit Only		Date Submitted (to be filled in by Contractor)	Government Reviewer's Use (OCT09REV)
PAR		FEATURE	DUE AT		REQUIRED DOCUMENTATION	DATE	REV
EQ6.1		Controllability of Systems: Lighting	Final Design		Calculation indicating total number of individual workstations, number of workstations with individual lighting controls and the percentage of workstations with individual lighting controls.		ELEC
			Final Design		For each shared multi-occupant space, provide a brief description of lighting controls.		ELEC
			Final Design		Narrative describing lighting control strategy, including type and location of individual controls and type and location of controls in shared multi-occupant spaces.		ELEC
EQ6.2		Controllability of Systems: Thermal Comfort	Final Design		Calculation indicating total number of individual workstations, number of workstations with individual thermal comfort controls and the percentage of workstations with individual thermal comfort controls.		MEC
			Final Design		For each shared multi-occupant space, provide a brief description of thermal comfort controls.		MEC
			Final Design		Narrative describing thermal comfort control strategy, including type and location of individual and shared multi-occupant controls.		MEC
EQ7.1		Thermal Comfort: Design	Final Design		Design criteria spreadsheet indicating, for spring, summer, fall and winter, maximum indoor space design temperature, minimum indoor space design temperature and maximum indoor space design humidity.		MEC
			Final Design		Narrative describing method used to establish thermal comfort control conditions and how systems design addresses the design criteria, including compliance with the referenced standard.		MEC
EQ7.2		Thermal Comfort: Verification	Final Design		Narrative describing the scope of work for the thermal comfort survey, including corrective action plan development		MEC
EQ8.1		Daylight & Views: Daylight 75% of Spaces	Final Design		Option 1: Table indicating all regularly occupied spaces with space area and space area with 2% daylighting factor. Sum of regularly occupied areas and regularly occupied areas with 2% daylighting factor. Percentage calculation of areas with 2% daylighting factor to total regularly occupied areas.		ARC
			Final Design		Option 1: Glazing factor calculation table		ARC
			Final Design		Option 2: Simulation model method, software and output data		ARC
			Final Design		Option 2: Table indicating all regularly occupied spaces with space area, space area with minimum 25 footcandles daylighting illumination, and method of providing glare control. Sum of regularly occupied areas and regularly occupied areas with 25 fc daylighting. Percentage calculation of areas with 25 fc daylighting to total regularly occupied areas.		ARC
			Final Design		For all occupied spaces excluded from the calculation, provide narrative indicating reasons for excluding the space.		ARC
			Final Design		List of drawing and specification references that convey exterior glazed opening head and sill heights and glazing performance properties.		ARC
			Closeout	X	Manufacturer published product data or certification confirming glazing Tvis in spreadsheet		PE
EQ8.2		Daylight & Views: Views for 90% of Spaces	Final Design		Table indicating all regularly occupied spaces with space area and space area with access to views. Sum of regularly occupied areas and regularly occupied areas with access to views. Percentage calculation of areas with views to total regularly occupied areas.		ARC
			Final Design		For all occupied spaces excluded from the calculation, provide narrative indicating reasons for excluding the space.		ARC
			Final Design		LEED Floor plan drawings showing line of sight diagramming of views areas in each regularly occupied space. List of drawing/specification references that convey exterior glazed opening head and sill heights.		ARC
CATEGORY 6 – FACILITY DELIVERY PROCESS							
IDc1.1		Innovation in Design	Final Design OCT09REV		Narrative decribing intent, requirement for credit, project approach to the credit. List of drawings and specification references that convey implementation of credit. All other documentation that validates claimed credit.		
IDc1.2		Innovation in Design	Final Design OCT09REV				
IDc1.3		Innovation in Design	Final Design OCT09REV				
IDc1.4		Innovation in Design	Final Design OCT09REV				
IDc2		LEED Accredited Professional	Final Design		Narrative indicating name of LEED AP, company name of LEED AP, description of LEED AP's role and responsiblilities in the project.		ARC

ATTACHMENT F
Version 07-07-2010

BUILDING INFORMATION MODELING REQUIREMENTS

1.0 Section 1 - Submittal Format

1.1. Design Deliverables. Develop all designs using Building Information Modeling (BIM) and Computer Aided Design (CAD) software. Design submittal drawings shall be Full size, suitable for half-size scaled reproduction.

2.0 Section 2 – Design Requirements

2.1. BIM Model and Facility Data. Contractor shall use BIM application(s) and software(s) to develop project designs. “Facility Data” is defined as associated intelligent attribute data. The “Model” is defined as 3D graphics that includes Facility Data and output as described in the paragraph ‘Output’ below. Contractors will use the Model to produce accurate Construction Documents. For each Center of Standardization (CoS) facility type included in this project, all BIM Models and associated Facility Data shall be submitted in Bentley Systems BIM [Not Supplied - SubmittalReqCADDSystem : BENTLEY_VERSION] with associated USACE Bentley BIM Workspace (which includes specific standard BIM libraries and definitions). This Workspace can be downloaded from the CAD/BIM Technology Center. [Where available, the workspace will be specific to this CoS Facility Standard Design. The Contractor will be provided a baseline multi-discipline BIM Project Model for the CoS Facility Standard Design type, where such a model exists (for the purposes of site adaptation).] The USACE Bentley BIM Workspace is dependent on specific versions of the Bentley BIM suite of products and only the versions of the software that are listed in the Contractor instructions included with the USACE BIM Workspace are permitted to be used.

2.1.1. Reference. Refer to ERDC TR-06-10, “U.S. Army Corps of Engineers Building Information Modeling Road Map” from the CAD/BIM Technology Center website for more information on the USACE BIM implementation goals.

2.2. Drawings. Deliver CAD files used for the creation of the Construction Documents Drawings per requirements in Section 01 33 16, the criteria of the USACE Fort Worth District, and as noted herein. Specification of a CAD file format for these Drawings does not limit which BIM application(s) or software(s) may be used for project development and execution.

2.2.1. IFC Support. The Contractor’s selected BIM application(s) and software(s) must support the IFC (Industry Foundation Class - see www.iai-tech.org). Submit any deviations from or additions to the IFC property sets for any new spaces, systems, and equipment for Government approval.

2.2.2. Submittal Requirements. BIM submittals shall be fully interoperable, compatible, and editable with the Bentley BIM tools. Use the specified version of the USACE Bentley BIM Workspace and conform to the requirements of **Sections 3 and 4 below**.

2.2.3. BIM Project Execution Plan.

2.2.3.1. Develop a BIM Project Execution Plan (“Plan” or “PxP”) documenting the BIM and analysis technologies selected for the Project Model (integrated with the AEC CAD Standard) from concept development through As-Builts as a design, production, coordination, construction, and documentation tool and the collaborative process by which it shall be executed. See Section 7 for additional guidance on developing the Plan.

2.2.4. BIM Requirements..

2.2.4.1. Facility Data. Develop the Facility Data consisting of a set of intelligent elements for the Model (e.g., doors, air handlers, electrical panels). This Facility Data shall include all material definitions and attributes that are necessary for the Project facility design and construction. Additional data in support of Section 6 Contractor Electives is encouraged.

2.2.4.2. Model Content. The Model and Facility Data shall include, at a minimum, the requirements of Section 4 below.

2.2.4.3. Model Granularity. Models may vary in level of detail for individual elements within a model, but at a minimum must include all features that would be included on a quarter inch (1/4" = 1'0") scaled drawing (e.g. at least 1/16th, 1/8th and 1/4th), or appropriately scaled civil drawings.

2.2.4.4. Output. Submitted CAD drawings (e.g., plans, elevations, sections, schedules, details, etc.) shall be derived (commonly known as extractions, views or sheets) and maintained from the submitted Model and Facility Data.

2.3. Quality Control. Implement quality control (QC) parameters for the Model, including:

2.3.1. Model Standards Checks. QC validation used to ensure that the Project Facility Data set has no undefined, incorrectly defined or duplicated elements. Report non-compliant elements and corrective action plan to correct non-compliant elements. Provide the government with detailed justification and request government approval for any non-compliant element which the contractor proposes to be allowed to remain in the Model.

2.3.2. CAD Standards Checks. QC checking performed to ensure that the fonts, dimensions, line styles, levels and other construction document formatting issues are followed per the A/E/C CADD Standard.

2.3.3. Other Parameters. Develop such other QC parameters as Contractor deems appropriate for the Project and provide to the Government for concurrence.

2.4. Design and Construction Reviews. Perform design and construction reviews at each submittal stage under Section 3 to test the Model, including:

2.4.1. Visual Checks. Checking to ensure the design intent has been followed and that there are no unintended elements in the Model.

2.4.2. Interference Management Checks. Locate conflicting spatial data in the Model where two elements are occupying the same space. Log hard interferences (e.g., mechanical vs. structural or mechanical vs. mechanical overlaps in the same location) and soft interferences, (e.g., conflicts regarding equipment clearance, service access, fireproofing, insulation) in a written report and resolve.

2.4.3. IFC Coordination View. Provide an IFC Coordination View in IFC Express format for all deliverables. Provide exported property set data for all IFC supported named building elements.

2.4.4. Other Parameters. Develop such other Review parameters as the Contractor deems appropriate for the Project and provide to the Government for concurrence..

3.0 Section 3 – Design Stage Submittal Requirements

3.1. General Submittal Requirements.

3.1.1. Provide submittals in compliance with BIM Project Execution Plan deliverables at stages as described hereinafter.

3.1.2. At each Stage in Paragraphs 3.3 through 3.6, provide a Contractor-certified written report confirming that consistency checks as identified in Paragraphs 2.3 and 2.4 have been completed. This report shall be discussed as part of the review process and shall address cross-discipline interferences, if any.

3.1.3. At each Stage in Paragraphs 3.3 through 3.6, provide the Government with:

- The Model, Facility Data, Workspace and CAD Data files in native Bentley BIM/CAD.

- A 3-D interactive review format of the Model in Bentley Navigator, Autodesk Navisworks, Adobe 3D PDF 7.0 (or later), Google Earth KMZ or other format per Plan requirements. The file format for reviews can change between submittals.

- A list of all submitted files. The list should include a description, directory, and file name for each file submitted. For all CAD sheets, include the sheet title and sheet number. Identify files that have been produced from the submitted Model and Facility Data.

3.1.4. The Government will confirm acceptability of all submittals identified in Section 3 in coordination with the USACE Fort Worth BIM Manager

3.2. Initial Design Conference Submittal.

3.2.1. Submit a digital copy of the Plan where, in addition to Paragraph 3.1.4, the USACE Geographic District BIM Manager will coordinate with the USACE CoS BIM Manager to confirm acceptability of the Plan or advise as to additional processes or activities necessary to be incorporated.

3.2.2. Within thirty (30) days after the approval of the Plan, conduct a demonstration to review the Plan for clarification, and to verify the functionality of Model technology workflow and processes. If modifications are required, the Contractor shall complete the modifications and resubmit the Plan and perform subsequent demonstration for Government acceptance. There will be no payment for design or construction until the Plan is acceptable to the Government. The Government may also withhold payment for design and construction for unacceptable performance in executing the approved Plan.

3.3. Interim Design Submittals.

3.3.1. BIM and CAD Data. The Model shall include the requirements identified in Paragraph 2.2.4 as applicable to the Interim Design package(s).

3.4. Final Design Submissions and Design Complete Submittals.

3.4.1. BIM and CAD Data. The Model shall include the requirements identified in Paragraph 2.2.4. Acceptance according to Paragraph 3.1.4 is required before commencement of construction, as described in Paragraph 3.7.6 of Section 01 33 16.

3.5. Construction Submittals – Over-The-Shoulder Progress Reviews. Periodic quality control meetings or construction progress review meetings shall include quality control reviews on the implementation and use of the Model, including interference management and design change tracking information.

3.6. Final As-Builts BIM and CAD Data Submittal. Submit the final Model, Facility Data, and CAD files reflecting as-built conditions for Government Approval, as specified in Section 01 78 02.00 10, PROJECT CLOSEOUT.

4.0 Section 4 – BIM Model Minimum Requirements and Output

4.1. General Provisions. The deliverable Model shall be developed to include the systems described below as they would be built and the processes of installing them, and to reflect final as-built conditions. The deliverable model at the interim design stage and at the final design stage (“released for construction”) shall be developed to include as many of the systems described below as are necessary and appropriate at that design stage.

4.2. Architectural/Interior Design. The Architectural systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4”=1’0”) scaled drawing. Additional minimum Model requirements include:

4.2.1. Spaces. The Model shall include spaces defining accurate net square footage and net volume, and holding data for the room finish schedule for including room names and numbers. Include Programmatic Information provided by the Government or validated program to verify design space against programmed space, using this information to validate area quantities.

4.2.2. Walls and Curtain Walls. Each wall shall be depicted to the exact height, length, width and ratings (thermal, acoustic, fire) to properly reflect wall types. The Model shall include all walls, both interior and exterior, and the necessary intelligence to produce accurate plans, sections and elevations depicting these design elements.

4.2.3. Doors, Windows and Louvers. Doors, windows and louvers shall be depicted to represent their actual size, type and location. Doors and windows shall be modeled with the necessary intelligence to produce accurate window and door schedules.

4.2.4. Roof. The Model shall include the roof configuration, drainage system, penetrations, specialties, and the necessary intelligence to produce accurate plans, building sections and generic wall sections where roof design elements are depicted.

4.2.5. Floors. The floor slab shall be developed in the structural Model and then referenced by the architectural Model for each floor of the Project building.

4.2.6. Ceilings. All heights and other dimensions of ceilings, including soffits, ceiling materials, or other special conditions shall be depicted in the Model with the necessary intelligence to produce accurate plans, building sections and generic wall sections where ceiling design elements are depicted.

4.2.7. Vertical Circulation. All continuous vertical components (i.e., non-structural shafts, architectural stairs, handrails and guardrails) shall be accurately depicted and shall include the necessary intelligence to produce accurate plans, elevations and sections in which such design elements are referenced.

4.2.8. Architectural Specialties and Woodwork. All architectural specialties (i.e., toilet room accessories, toilet partitions, grab bars, lockers, and display cases) and woodwork (i.e., cabinetry and counters) shall be accurately depicted with the necessary intelligence to produce accurate plans, elevations and sections in which such design elements are referenced.

4.2.9. Signage. The Model shall include all signage and the necessary intelligence to produce accurate plans and schedules.

4.2.10. Schedules. Provide door, window, hardware sets using BHMA designations, flooring, wall finish, and signage schedules from the Model, indicating the type, materials and finishes used in the design.

4.3. Furniture. The furniture systems Model may vary in level of detail for individual elements within a Model, but at a minimum must include all features that would be included on a quarter inch (1/4”=1’0”) scaled drawing, and have necessary intelligence to produce accurate plans. Representation of furniture elements is to be 2D. Contractor may provide a minimal number of 3D representations as examples. Examples of furniture include, but are not limited to, desks, furniture systems, seating, tables, and office storage.

4.3.1. Furniture Coordination. Furniture that makes use of electrical, data or other features shall include the necessary intelligence to produce coordinated documents and data.

4.4. Equipment. The Model may vary in level of detail for individual elements within a Model. Equipment shall be depicted to meet layout requirements with the necessary intelligence to produce accurate plans and minimum schedules depicting their configuration. Examples of equipment include but are not limited to copiers, printers, refrigerators, ice machines and microwaves.

4.4.1. Schedules. Provide furniture and equipment schedules from the model indicating the materials, finishes, mechanical, and electrical requirements.

4.5. Structural. The structural systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4”=1’0”) scaled drawing. Additional minimum Model requirements include:

4.5.1. Foundations. All necessary foundation and/or footing elements, with necessary intelligence to produce accurate plans and elevations

4.5.2. Floor Slabs. Structural floor slabs shall be depicted, including all necessary recesses, curbs, pads, closure pours, and major penetrations accurately depicted.

4.5.3. Structural Steel. All steel columns, primary and secondary framing members, and steel bracing for the roof and floor systems (including decks), including all necessary intelligence to produce accurate structural steel framing plans and related building/wall sections.

4.5.4. Cast-in-Place Concrete. All walls, columns, and beams, including necessary intelligence to produce accurate plans and building/wall sections depicting cast-in-place concrete elements.

4.5.5. Expansion/Contraction Joints. Joints shall be accurately depicted.

4.5.6. Stairs. The structural Model shall include all necessary openings and framing members for stair systems, including necessary intelligence to produce accurate plans and building/wall sections depicting stair design elements.

4.5.7. Shafts and Pits. The structural Model shall include all necessary shafts, pits, and openings, including necessary intelligence to produce accurate plans and building/wall sections depicting these design elements.

4.6. Mechanical. The mechanical systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Small diameter (less than 1-1/2" NPS) field-routed piping is not required in the model. Additional minimum Model requirements include:

4.6.1. HVAC. All necessary heating, ventilating, air-conditioning and specialty equipment, including air distribution ducts for supply, return, and ventilation and exhaust ducts, including control system, registers, diffusers, grills and hydronic baseboards with necessary intelligence to produce accurate plans, elevations, building/wall sections and schedules.

4.6.1.1. Mechanical Piping. All necessary piping and fixture layouts, and related equipment, including necessary intelligence to produce accurate plans, elevations, building/wall sections, and schedules.

4.6.2. Plumbing. All necessary plumbing piping and fixture layouts, floor and area drains, and related equipment, including necessary intelligence to produce accurate plans, elevations, building/wall sections, riser diagrams, and schedules.

4.6.3. Equipment Clearances. All HVAC and Plumbing equipment clearances shall be modeled for use in interference management and maintenance access requirements.

4.6.4. Elevator Equipment. The Model shall include the necessary equipment and control system, including necessary intelligence to produce accurate plans, sections and elevations depicting these design elements.

4.7. Electrical/Telecommunications. The electrical systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4"=1'0") scaled drawing. Small diameter (less than 1-1/2"Ø) field-routed conduit is not required in the model. Additional minimum Model requirements include:

4.7.1. Interior Electrical Power and Lighting. All necessary interior electrical components (i.e., lighting, receptacles, special and general purpose power receptacles, lighting fixtures, panelboards, cable trays and control systems), including necessary intelligence to produce accurate plans, details and schedules. Lighting and power built into furniture/equipment shall be modeled.

4.7.2. Special Electrical Systems. All necessary special electrical components (i.e., security, Mass Notification, Public Address, nurse call and other special occupancies, and control systems), including necessary intelligence to produce accurate plans, details and schedules.

4.7.3. Grounding Systems. Grounding Systems. All necessary grounding components (i.e., lightning protection systems, static grounding systems, communications grounding systems, bonding), including necessary intelligence to produce accurate plans, details and schedules.

4.7.4. Communications. All existing and new communications service controls and connections, both above ground and underground with necessary intelligence to produce accurate plans, details and schedules. Cable tray routing shall be modeled without detail of cable contents.

4.7.5. Exterior Building Lighting. All necessary exterior lighting with necessary intelligence to produce accurate plans, elevations and schedules. The exterior building lighting Model shall include all necessary lighting, relevant existing and proposed support utility lines and equipment required with necessary intelligence to produce accurate plans, details and schedules.

4.7.6. Equipment Clearances. The model shall incorporate and define all electrical and communications working spaces, clearances, and required access

4.8. Fire Protection. The fire protection system Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4”=1’0”) scaled drawing. Additional minimum Model requirements include:

4.8.1. Fire Protection System. All relevant fire protection components (i.e., branch piping, sprinkler heads, fittings, drains, pumps, tanks, sensors, control panels) with necessary intelligence to produce accurate plans, elevations, building/wall sections, riser diagrams, and schedules. All fire protection piping shall be modeled.

4.8.2. Fire Alarms. Fire alarm/mass notification devices and detection system shall be indicated with necessary intelligence to produce accurate plans depicting them.

4.9. Civil. The civil Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a one inch (1”=100’) scaled drawing. Additional minimum Model requirements include:

4.9.1. Terrain (DTM). All relevant site conditions and proposed grading, including necessary intelligence to produce accurate Project site topographical plans and cross sections.

4.9.2. Drainage. All existing and new drainage piping, including upgrades thereto, including necessary intelligence to produce accurate plans and profiles for the Project site.

4.9.3. Storm Water and Sanitary Sewers. All existing and new sewer structures and piping, including upgrades thereto, on the Project site with necessary connections to mains or other distribution points as appropriate, including necessary intelligence to produce accurate plans and profiles for the Project site.

4.9.4. Utilities. All necessary new utilities connections from the Project building(s) to the existing or newly-created utilities, and all existing above ground and underground utility conduits, including necessary intelligence to produce accurate plans and site-sections.

4.9.5. Roads and Parking. All necessary roadways and parking lots or parking structures, including necessary intelligence to produce accurate plans, profiles and cross-sections.

5.0 Section 5 - Ownership and Rights in Data

5.1. Ownership. The Government has ownership of and rights at the date of Closeout Submittal to all CAD files, BIM Model, and Facility Data developed for the Project in accordance with FAR Part 27, clauses incorporated in Section 00 72 00, Contract Clauses and Special Contract Requirement 1.14 GOVERNMENT RE-USE OF DESIGN (Section 00 73 00). The Government may make use of this data following any deliverable.

6.0 Section 6 – Contractor Electives

6.1. Applicable Criteria. If the Contractor elected to include one or more of the following features as an elective in its accepted contract proposal for additional credit during the source selection, as described in the proposal submission requirements and evaluation criteria, the following criteria are requirements, as applicable to those elective feature(s).

6.2. COBIE Compliance. The Model and Facility Data for the Project shall fulfill Construction Operations Building Information Exchange (COBIE) requirements as defined by the Whole Building Design Guide organization, including all requirements for the indexing and submission of Portable Document Format (PDF) and other appropriate file formats that would otherwise be printed and submitted in compliance with Project operations and maintenance handover requirements.

6.3. Project Scheduling using the Model. In the BIM Execution Plan and during the Preliminary BIM Execution Plan Review, provide an overview of the use of BIM in the development and support of the project construction schedule.

6.3.1. Submittal Requirements. During the Submittal stages, the Contractor shall deliver the construction schedule with information derived from the Model.

6.3.1.1. Construction Submittals – Over-The-Shoulder Progress Reviews. Periodic quality control meetings or construction progress review meetings shall include quality control reviews on the implementation and use of the Model for project scheduling.

6.4. Cost Estimating. In the BIM Execution Plan and during the Preliminary BIM Execution Plan Review, provide an overview of the use of BIM in the development and support of cost estimating requirements, or other applications such as cost analysis and estimate validation.

6.4.1. Submittal Requirements. During the Submittal stages, the Contractor shall deliver cost estimating information derived from the Model.

6.4.2. Project completion. At project completion, the Contractor shall provide an MII (Micro Computer Aided Cost Estimating System Generation II) Cost Estimate which follows the USACE Cost Engineering Military Work Breakdown System (WBS), a modified Uniformat, to at least the sub-systems level and uses quantity information supplied directly from BIM output to the maximum extent possible, though other "Gap" quantity information will be included as necessary for a complete and accurate cost estimate.

6.4.2.1. Sub system level extracted quantities from the BIM for use within the estimate shall be provided according to how detailed line items or tasks should be installed/built so that accurate costs can be developed and/or reflected. Therefore, when developing a BIM, the designer shall be cognizant of what tasks need to be separated appropriately at the beginning stages of model development, such as tasks done on the first floor versus the same task on higher floors that will be more labor intensive and therefore need to have a separate quantity and be priced differently. Tasks and their extracted quantities from the BIM shall be broken done by their location (proximity in the structure) as well as the complexity of its installation.

6.4.2.2. At all design stages it shall be understood that BIM output as described in this document will not generate all quantities that are necessary in order to develop a complete and accurate cost estimate of the project based on the design. An example of this would be plumbing that is less than 1.5" diameter and therefore not expected to be modeled due to granularity; this information is commonly referred to as The Gap. Quantities from The Gap and their associated costs shall be included in the final project actual cost estimates as well.

6.5. Other Analyses and Reports. Structural, energy and efficiency, EPACT 2005 & EISA 2007, lighting design, daylighting, electrical power, psychrometric processing, shading, programming, LEED, fire protection, code compliance, Life Cycle Cost, acoustic, plumbing.

7.0 Section 7 – BIM Project Execution Plan Template

7.1. Contractors will utilize the latest version of the USACE BIM PROJECT EXECUTION PLAN (USACE PxP) Template to develop an acceptable Plan. The template can be downloaded from the CAD/BIM Technology Center website.

ATTACHMENT G

DESIGN SUBMITTAL DIRECTORY AND SUBDIRECTORY FILE ARRANGEMENT

Organize electronic design submittal files in a subdirectory/file structure in accordance with the following table. The Contractor may suggest a slightly different structure, subject to the discretion of the government.

Design Submittal Directory and Subdirectory File Arrangement.

Directory	Sub-Directory	Sub-Directory or Files	Files
Submittal/Package Name	Narratives	PDF file or files with updated design narrative for each applicable design discipline	
	Drawings	PDF (subdirectory)	Single PDF file with all applicable drawing sheets - bookmarked by sheet number and name
		BIM (subdirectory) See Attachment F.	BIM project folder (with files) per the USACE Workspace. Include an Excel drawing index file with each drawing sheet listed by sheet #, name and corresponding dgn file name (Final Design & Design Complete only)
	Design Analysis & Calculations	Individual PDF files containing design analysis and calculations for each discipline applicable to the submittal	
		PDF file with Fire Protection and Life Safety Code Review checklist	
	LEED	PDF file with updated Leed Check List	
		PDF file or files with LEED Templates for each point with applicable documentation included in each file.	
		LEED SUBMITTALS	
	Energy Analysis	PDF with baseline energy consumption analysis	
		PDF with actual building energy consumption analysis	
	Specifications	Single PDF file with table of contents and all applicable specifications sections.	
		Submittal Register (Final Design & Design Complete submittal only)	
	Design Quality Control	PDF file or files with DQC checklist(s) and/or statements	
	Building Rendering(s)	PDF file of rendering for each building type included in contract (Final Design & Design Complete).	

SECTION 01 45 04.00 10
CONTRACTOR QUALITY CONTROL

1.0 GENERAL

1.1. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Refer to the latest edition, as of the date of the contract solicitation.

- ASTM INTERNATIONAL (ASTM)
- ASTM D 3740 Minimum Requirements for Agencies

  Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
- ASTM E 329 Agencies Engaged in the Testing

  and/or Inspection of Materials Used in Construction
- U.S. ARMY CORPS OF ENGINEERS (USACE)

  ER 1110-1-12 Quality Management

1.2. PAYMENT

There will be no separate payment for providing and maintaining an effective Quality Control program. Include all costs associated therewith in the applicable unit prices or lump-sum prices contained in the Contract Line Item Schedule.

2.0 PRODUCTS (Not Applicable)

3.0 EXECUTION

3.1. GENERAL REQUIREMENTS

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

3.2. QUALITY CONTROL PLAN

Furnish for Government review, not later than 30 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 30 days of operation. Design and construction may begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. The Government will not permit work outside of the features of work included in an accepted interim plan to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started. Where the applicable Code issued by the International Code Council calls for an inspection by the Building Official, the Contractor shall include the inspections in the Quality Control Plan and shall perform the inspections. The Designer of Record shall develop a program for any special inspections required by the applicable International Codes and the Contractor shall perform these inspections, using qualified inspectors. Include the special inspection plan in the QC Plan.

3.2.1. Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all design and construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents subcontractors, designers of record, consultants, architect/engineers (AE), fabricators, suppliers, and purchasing agents:

3.2.1.1. A description of the quality control organization. Include a chart showing lines of authority and an acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. A CQC System Manager shall report to the project superintendent or someone higher in the contractor's organization.

3.2.1.2. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function. Also include those responsible for performing and documenting the inspections required by the International Codes and the special inspection program developed by the designer of record.

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

3.2.1.4. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents subcontractors, designers of record, consultants, architect engineers (AE), offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

3.2.1.5. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. Use only Government approved Laboratory facilities.

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

3.2.1.7. Procedures for tracking design and construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

3.2.1.8. Reporting procedures, including proposed reporting formats.

3.2.1.9. A list of the definable features of work. A definable feature of work is a task, which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting.

3.2.1.10. A list of all inspections required by the International Codes and the special inspection program required by the code and this contract.

3.2.2. Additional Requirements for Design Quality Control (DQC) Plan

The following additional requirements apply to the Design Quality Control (DQC) plan:

3.2.2.1. The Contractor's QCP Plan shall provide and maintain a Design Quality Control (DQC) Plan as an effective quality control program which will assure that all services required by this design-build contract are performed and provided in a manner that meets professional architectural and engineering quality standards. As a minimum, competent, independent reviewers identified in the DQC Plan shall review all documents. Use personnel who were not involved in the design effort to produce the design to perform the independent technical review (ITR). The ITR is intended as a quality control check of the design. Include, at least, but not necessarily limited to, a review of the contract requirements (the accepted contract or task order proposal and amended RFP), the basis of design, design calculations, the design configuration management documentation and check the design documents for errors, omissions, and for coordination and design integration. The ITR team is not required to examine, compare or comment concerning alternate design solutions but should concentrate on ensuring that the design meets the contract requirements. Correct errors and deficiencies in the design documents prior to submitting them to the Government.

3.2.2.2. Include in the DQC Plan the discipline-specific checklists to be used during the design and quality control of each submittal. Submit these completed checklists at each design phase as part of the project documentation.

3.2.2.3. A Design Quality Control Manager, who has the responsibility of being cognizant of and assuring that all documents on the project have been coordinated, shall implement the DQC Plan This individual shall be a person who has verifiable engineering or architectural design experience and is a registered professional engineer or architect. Notify the Government, in writing, of the name of the individual, and the name of an alternate person assigned to the position.

3.2.3. Acceptance of Plan

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

3.2.4. Notification of Changes

After acceptance of the CQC Plan, notify the Government in writing of any proposed change. Proposed changes are subject to Government acceptance.

3.3. COORDINATION MEETING

After the Postaward Conference, before start of design or construction, and prior to acceptance by the Government of the CQC Plan, the Contractor and the Government shall meet and discuss the Contractor's quality control system. Submit the CQC Plan for review a minimum of 7 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, design activities, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. The Government will prepare minutes of the meeting for signature by both parties. . The minutes shall become a part of the contract file. There may be occasions when either party will call for subsequent conferences to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4. QUALITY CONTROL ORGANIZATION

3.4.1. Personnel Requirements

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

3.4.2. CQC System Manager

Identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System

Manager shall be a graduate engineer, graduate architect, or a BA/BS graduate of an ACCE accredited construction management college program. The CQC system Manager may alternately be an engineering technician with at least 2 years of college and an ICC certification as a Commercial Building Inspector (Residential Building Inspector certification will be required for Military Family Housing projects). In addition, the CQC system manager shall have a minimum of 5 years construction experience on construction similar to this contract. The CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. Assign the CQC System Manager no other duties (except may also serve as Safety and Health Officer, if qualified and if allowed by Section 00 73 00). Identify an alternate for the CQC System Manager in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager but the alternate may have other duties in addition to serving in a temporary capacity as the acting QC manager.

3.4.3. CQC Personnel

3.4.3.1. In addition to CQC personnel specified elsewhere in the contract provide specialized CQC personnel to assist the CQC System Manager in accordance with paragraph titled Area Qualifications.

3.4.3.2. These individuals may be employees of the prime or subcontractor; be responsible to the CQC System Manager; **are not intended to be full time, but must be physically present at the construction site during work on their areas of responsibility**; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan. **One person may cover more than one area, provided that they are qualified to perform QC activities for the designated areas below and provided that they have adequate time to perform their duties:**

3.4.4. Experience Matrix

3.4.4.1. Area Qualifications

3.4.4.1.1. Civil - Graduate Civil Engineer or (BA/BS) graduate in construction management with 4 years experience in the type of work being performed on this project or engineering technician with 5 yrs related experience.

3.4.4.1.2. Mechanical - Graduate Mechanical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or engineering technician with an ICC certification as a Commercial Mechanical Inspector with 5 yrs related experience.

3.4.4.1.3. Electrical - Graduate Electrical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or engineering technician with an ICC certification as a Commercial Electrical Inspector with 5 yrs related experience.

3.4.4.1.4. Structural - Graduate Structural Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or person with an ICC certification as a Reinforced Concrete Special Inspector and Structural Steel and Bolting Special Inspector (as applicable to the type of construction involved) with 5 yrs related experience.

3.4.4.1.5. Plumbing - Graduate Mechanical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience, or person with an ICC certification as a Commercial Plumbing Inspector with 5 yrs related experience.

3.4.4.1.6. Concrete, Pavements and Soils Materials Technician (present while performing tests) with 2 yrs experience for the appropriate area

3.4.4.1.7. Testing, Adjusting and Balancing Specialist must be a member (TAB) Personnel of AABC or an experienced technician of the firm certified by the NEBB (present while testing, adjusting, balancing).

3.4.4.1.8. Design Quality Control Manager Registered Architect or Professional Engineer (not required on the construction site)

3.4.4.1.9. Registered Fire Protection Engineer with 4 years related experience or engineering technician with 5 yrs related experience (but see requirements for Fire Protection Engineer of Record to witness final testing in Section 01 10 00, paragraph 5.10, Fire Protection).

3.4.4.1.10. QC personnel assigned to the installation of the telecommunication system or any of its components shall be Building Industry Consulting Services International (BICSI) Registered Cabling Installers, Technician Level. Submit documentation of current BICSI certification. In lieu of BICSI certification, QC personnel shall have a minimum of 5 years experience in the installation of the specified copper and fiber optic cable and components. They shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products. QC personnel shall witness and certify the testing of telecommunications cabling and equipment.

3.4.5. Additional Requirement

In addition to the above experience and/or education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management for Contractors". This course is periodically offered at N/A. Inquire of the District or Division sponsoring the course for fees and other expenses involved, if any, for attendance at this course.

3.4.6. Organizational Changes

When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5. SUBMITTALS AND DELIVERABLES

Make submittals as specified in Section 01 33 00 ***SUBMITTAL PROCEDURES***. The CQC organization shall certify that all submittals and deliverables are in compliance with the contract requirements.

3.6. CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. The CQC organization shall conduct at least three phases of control for each definable feature of the construction work as follows:

3.6.1. Preparatory Phase

Perform this phase prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

3.6.1.1. A review of each paragraph of applicable specifications, reference codes, and standards. Make a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field at the preparatory inspection. Maintain these copies in the field, available for use by Government personnel until final acceptance of the work.

3.6.1.2. A review of the contract drawings.

3.6.1.3. A check to assure that all materials and/or equipment have been tested, submitted, and approved.

3.6.1.4. Review of provisions that have been made to provide required control inspection and testing.

3.6.1.5. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

3.6.1.6. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

3.6.1.7. A review of the appropriate activity hazard analysis to assure safety requirements are met.

3.6.1.8. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

3.6.1.9. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

3.6.1.10. Discussion of the initial control phase.

3.6.1.11. Notify the Government at least 24 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. Document the results of the preparatory phase actions by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2. Initial Phase

Accomplish this phase at the beginning of a definable feature of work. Include the following actions:

3.6.2.1. Check work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

3.6.2.2. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.

3.6.2.3. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

3.6.2.4. Resolve all differences.

3.6.2.5. Check safety to include compliance with and upgrading of the Accident Prevention plan and activity hazard analysis. Review the activity analysis with each worker.

3.6.2.6. Notify the Government at least 24 hours in advance of beginning the initial phase. The CQC System Manager shall prepare and attach to the daily CQC report separate minutes of this phase. Indicate exact location of initial phase for future reference and comparison with follow-up phases.

3.6.2.7. Repeat the initial phase any time acceptable specified quality standards are not being met.

3.6.3. Follow-up Phase

Perform daily checks to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Conduct final follow-up checks and correct deficiencies prior to the start of additional features of work which may be affected by the deficient work. Do not build upon nor conceal non-conforming work.

3.6.4. Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.7. TESTS

3.7.1. Testing Procedure

Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements and project design documents. Upon request, furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory, or establish an approved testing laboratory at the project site. The Contractor may elect to use a laboratory certified and accredited by the Concrete and cement Reference Laboratory (CCRL) or by AASHTO Materials Reference Laboratory (AMRL) for testing procedures that those organizations certify. The Contractor shall perform the following activities and record and provide the following data:

3.7.1.1. Verify that testing procedures comply with contract requirements and project design documents.

3.7.1.2. Verify that facilities and testing equipment are available and comply with testing standards.

3.7.1.3. Check test instrument calibration data against certified standards.

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

3.7.1.5. Include results of all tests taken, both passing and failing tests, recorded on the CQC report for the date taken. Include specification paragraph reference, location where tests were taken, and the sequential control number identifying the test. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. Provide an information copy of tests performed by an offsite or commercial test facility directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2. Testing Laboratories

3.7.2.1. Capability Check

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

3.7.2.2. Capability Recheck

If the selected laboratory fails the capability check, the Government will assess the Contractor a charge of $1,375 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3. Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4. Furnishing or Transportation of Samples for Government Quality Assurance Testing

The Contractor is responsible for costs incidental to the transportation of samples or materials. Deliver samples of materials for test verification and acceptance testing by the Government to the Corps of Engineers Laboratory, f.o.b., at the following address:

- For delivery by mail:

  N/A

  N/A

  N/A

  N/A
- For other deliveries:

  N/A

N/A

N/A

N/A

The area or resident office will coordinate, exact delivery location, and dates for each specific test.

3.8. COMPLETION INSPECTION

3.8.1. Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the SPECIAL CONTRACT REQUIREMENTS Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. Prepare a punch list of items which do not conform to the approved drawings and specifications and include in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2. Pre-Final Inspection

As soon as practicable after the notification above, the Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Correct any items noted on the Pre-Final inspection in a timely manner. Accomplish these inspections and any deficiency corrections required by this paragraph within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3. Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall attend the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups and major commands may also attend. The Government will formally schedule the final acceptance inspection based upon results of the Pre-Final inspection. Provide notice to the Government at least 14 days prior to the final acceptance inspection and include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9. DOCUMENTATION

3.9.1. Maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers using government-provided software, QCS (see Section 01 45 01.10). The report includes, as a minimum, the following information:

3.9.1.1. Contractor/subcontractor and their area of responsibility.

3.9.1.2. Operating plant/equipment with hours worked, idle, or down for repair.

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

3.9.1.4. Test and/or control activities performed with results and references to specifications/drawings requirements. Identify the applicable control phase (Preparatory, Initial, Follow-up). List deficiencies noted, along with corrective action.

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

3.9.1.6. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.

3.9.1.7. Offsite surveillance activities, including actions taken.

3.9.1.8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

3.9.1.9. Instructions given/received and conflicts in plans and/or specifications.

3.9.1.10. Provide documentation of design quality control activities. For independent design reviews, provide, as a minimum, identity of the ITR team, the ITR review comments, responses and the record of resolution of the comments.

3.9.2. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. Furnish the original and one copy of these records in report form to the Government daily within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, submit one report for every 7 days of no work and on the last day of a no work period. Account for all calendar days throughout the life of the contract. The first report following a day of no work shall be for that day only. The CQC System Manager shall sign and date reports. The report shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel. The Contractor may submit these forms electronically, in lieu of hard copy.

3.10. NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

End of Section 01 45 04.00 10

SECTION 01 50 02.00XX
TEMPORARY CONSTRUCTION FACILITIES

1.0 OVERVIEW

1.1. GENERAL REQUIREMENTS

1.3. BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.0 OVERVIEW

1.1. GENERAL REQUIREMENTS

1.1.1. This section contains requirements specifically applicable to this task order. The requirements of Base ID/IQ contract Section 01 50 02 apply to this task order, except as otherwise specified herein.

1.3. BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.3.1. Bulletin Board (As Specified in Base contract)

1.3.2. Project and Safety Signs (Added to Stress standardization of signs, in the event that the Base ID/IQ Section 01 50 02 does not contain this information)

Erect a project sign and a site safety sign with informational details as provided by the Government at the Post award conference, within 15 days prior to any work activity on project site. Update the safety sign data daily, with light colored metallic or non-metallic numerals. Remove the signs from the site upon completion of the project. Engineer Pamphlet EP 310-1-6a contains the standardized layout and construction details for the signs. It can be found through a GOOGLE Search or try http://www.usace.army.mil/publications/eng-pamphlets/ep310-1-6a/s-16.pdf.

End of Section 01 50 02.00XX

Appendix A

Geotechnical Report

FORT POLK, LOUISIANA

ENLISTED UNACCOMPANIED PERSONNEL HOUSING

GOVERNMENT GEOTECHNICAL REPORT

FOR DESIGN-BUILD PROJECT RFP

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS

FORT WORTH DISTRICT

ENGINEERING AND CONSTRUCTION DIVISION
ENGINEERING SERVICES BRANCH

GEOTECHNICAL SECTION

CESWF-EC-DG

MARCH 2009

FORT POLK, LOUISIANA
ENLISTED UNACCOMPANIED PERSONNEL HOUSING

GOVERNMENT GEOTECHNICAL REPORT

1. <u>General.</u> The purpose of this report is to provide subsurface information, and foundation and pavement design considerations, guidance, and requirements for a new Enlisted Unaccompanied Personnel Housing facility at Fort Polk, Louisiana. Design and construction of the new facility will be accomplished under a design-build contract. It should be noted that the details of the new construction described herein are based on the most current project design information available at the time of this report, specifically, the Project Definition Report prepared by the Fort Worth District, dated 13 February 2009. Based on this information, the proposed Enlisted Unaccompanied Personnel Housing is intended to accommodate approximately 228 Junior Enlisted personnel and 52 Sergeants, with a maximum barracks utilization of 328 soldiers. The programmed size of the new facility is approximately 120,048 GSF. Based on available project information, the Enlisted Unaccompanied Personnel Housing will be either a two- or three-story (maximum) facility. The new facility is anticipated to include sleeping modules (consisting of a living area, kitchen area, restroom, and sleeping area), as well as multipurpose rooms, storage areas, and communication/mechanical/electrical rooms. Specific details of the structural framing and roofing systems, exterior and interior finishing systems, and other construction details were not known at the time of this report. However, it is anticipated that the new building construction will match existing building architectural styles of the surrounding area. New pavement structures required for the project include a privately-owned vehicle (POV) parking area (to accommodate approximately 237 vehicles), fire/emergency medical vehicle access lane(s), and service drive(s). At the time of this report, these pavement structures may be either rigid or flexible pavement, therefore, alternative minimum pavement sections for each type are provided herein. Pavement structures required for the project also include concrete aprons in front of trash dumpster pads. Support features for the project are anticipated to include sidewalks, utilities, and landscaping.

The proposed Enlisted Unaccompanied Personnel Housing site is located in the southern part of the Fort Polk main cantonment area. Specifically, the project site is bounded to the north by 22^{nd} Street, to the east by Alabama Avenue, to the south by 23^{rd} Street, and to the west by Mississippi Avenue. The Enlisted Unaccompanied Personnel Housing project site slopes downgradient to the west at approximately a 2 to 7 percent gradient (although it should be noted that some areas within the Enlisted Unaccompanied Personnel Housing project site have 10 percent or steeper gradients). Existing grades across the entire project site range from approximate elevation 263.5 feet National Geodetic Vertical Datum (NGVD) to 304.5 feet (NGVD). Existing grades within the anticipated area of new building construction range from approximate elevation 287.5 feet (NGVD) to 302.5 feet (NGVD). A finish floor elevation for the new facility was not known at the time of this report.

2. Subsurface Investigation. Sixteen (16) test holes, 8A2S-BK8-1 through 10A2S-BK8-16, were drilled at the Enlisted Unaccompanied Personnel Housing site in August and September 2008 by Geotechnical Testing Laboratory, Inc. under a contract geotechnical field investigation scope of work prepared by the U.S. Army Corps of Engineers, Fort Worth District, through Merrick and Company and their geotechnical subcontractor GeoConsultants, LLC. Geotechnical Testing Laboratory accomplished the geotechnical field investigation with a Diedrich D-50 drill rig using a 6-inch flight auger, a nominal 3-inch diameter shelby tube sampler, a nominal 2-inch diameter split spoon sampler, and a 6-inch rotary bit. The borings were advanced to total depths ranging from 10.0 feet to 60.0 feet below existing grade. Representative soil samples recovered from the borings were placed in containers and delivered to the laboratory of TEAM Consultants, Incorporated (Arlington, Texas) for testing. Results of the field investigation are presented on Sheet B101, Boring Locations, and Sheets B201 through B204, Logs of Borings (Appendix A).

a. Groundwater Conditions. Groundwater conditions were monitored during and upon completion of drilling operations, and after observation periods ranging from 24 hours to 12 days. Static water levels were measured in eight of the sixteen borings drilled at the Enlisted

Unaccompanied Personnel Housing project site, with depths ranging from 8.5 feet to 14.0 feet below existing grade. Tabulated below are the static levels measured at the time of the field investigation. It should be noted that groundwater conditions are relative to the time of drilling, annual precipitation, and drainage conditions at the site.

Boring	Static Level, feet
8A2S-BK8-1	12.0
8A2S-BK8-2	11.0
8A2S-BK8-3	14.0
8A2S-BK8-4	11.0
8A2S-BK8-5	11.0
8A2S-BK8-6	11.0
10A2S-BK8-12	8.5
10A2S-BK8-14	8.5

b. Dynamic Cone Penetrometer Testing. Dynamic Cone Penetrometer (DCP) testing for pavement design considerations was performed in borings 10A2S-BK8-7, 10A2S-BK8-10, 10A2S-BK8-12, 10A2S-BK8-13, and 10A2S-BK8-16. DCP test results are discussed later in this report, and will be presented as Appendix D of the final report.

c. Soil Resistivity Testing. A soil resistivity test was performed near the location of boring 8A2S-BK8-4. The resistivity value of 8,330 ohm-cm was measured in the field at this location. The testing was performed with a diode spacing of 2.5 feet. Soil resistivity test results are provided in the 'Remarks' column of the aforementioned log of boring (Appendix A).

3. Subsurface Conditions.

a. General Geology. Fort Polk lies within the West Gulf Coastal Plain section of the Coastal Plain physiographic province. The coastal plain of Louisiana is characterized by a broad rolling landform extending from the foot of the Ouachita Mountains on the north to the Gulf of Mexico on the south. It has developed upon a sequence of sedimentary rock units which dip gently southward, resulting in successively younger formations cropping out towards the Gulf. Most of Fort Polk lies within the outcrop area of the Fleming Formation, a complex sequence of sands and clays of Miocene age. Fisk (1940) divided the Fleming Formation into six members, distinguished from each other as being predominantly clayey zones or sandy zones. Although not accepted for use by the U.S. Geological Survey, the members are correlatable throughout several parishes on electric logs and show up as sandy intervals separated by clayey intervals. From oldest to youngest the members are: Lena, Carnahan Bayou, Dough Hills, Williamson Creek, Castor Creek, and Blounts Creek. The predominantly sandy members contain the aquifers that supply groundwater to Fort Polk.

Deposits of Pleistocene age continuously overlie the Fleming Formation within the extreme southeastern portion of Fort Polk. Elsewhere on the military reservation, these deposits form terraces that parallel the major streams and occur as isolated remnants mantling interstream highs. These deposits are fluviatile in nature and are generally coarser grained than the underlying Miocene deposits.

Sediments of recent age are confined to alluvial deposits in the larger stream valleys and as a thin veneer of residual soils developed upon primary materials.

South Fort Polk is situated upon the outcrop area of the Blounts Creek member. This member is a complex sequence of sands and clays. Sand beds make up 35 to 45 percent of the member (Rogers and Calandro, 1965). Numerous remnants of Pleistocene age occur upon the outcrop of the Blounts Creek. Residual soils developed upon the outcrop of the member are as complex and variable as the parent material from which it was derived.

b. <u>Site Conditions.</u> Based on information available at the time of this report, the Enlisted Unaccompanied Personnel Housing project site is situated on a semi-developed parcel. Several trees are present across the site, particularly in the southeastern part of the proposed POV parking area. There are also several small existing buildings within the project limits (specifically, Buildings 2429, 2430, 2434, and 2446), as well as a small existing POV parking area south of Building 2446 (within the area of the proposed Enlisted Unaccompanied Personnel Housing building construction). The project site is otherwise clear and grass-covered. The Enlisted Unaccompanied Personnel Housing project site slopes downgradient to the west at approximately a 2 to 7 percent gradient (although it should be noted that some areas within the Enlisted Unaccompanied Personnel Housing project site have 10 percent or steeper gradients). Existing grades across the entire project site range from approximate elevation 263.5 feet National Geodetic Vertical Datum (NGVD) to 304.5 feet (NGVD). Existing grades within the anticipated area of new building construction range from approximate elevation 287.5 feet (NGVD) to 302.5 feet (NGVD).

Stratigraphically, the site is characterized by interbedded deposits of low to high plasticity clay (CL to CH, respectively), clayey sand (SC), silty sand (SM), sand with silt (SP-SM), and sandy silt (ML). The clays are most commonly high plasticity, and are described as firm to hard, moist to wet, with varying amounts of silt and sand. The sandy soils are composed predominantly of fine sand size particles (with typically a very small fraction of coarse and medium size sand particles). Based on standard penetration testing, the sandy soils are generally loose to medium dense (but vary from very loose to dense), although standard penetration test blow counts (N-values) measured in the field were most commonly between 5 and 15 blows per foot to the total depth investigated (60.0 feet), showing no appreciable correlation for an increase in strength with depth. The sandy soils are moist to wet, and have varying amounts of clay and silt. Soils classifying as SP-SM, SM, and ML were consistently non-plastic. Both the clayey soils and sandy soils range in color from yellow brown to light brown to gray to red brown. Atterberg limits test results for the clayey soils and for plastic specimens of the sandy soils indicate these materials have liquid limits ranging from 22 to 96 percent, plastic limits varying from 13 to 31 percent (with plasticity indices ranging from 8 to 72 percent). In situ soil moisture contents of the plastic soils vary from approximately 14 to 41 percent.

Subsurface conditions representative of the project site are shown on the boring logs, Sheet B201 through B204 (Appendix A). The legend on the individual boring logs shows overburden materials as classified in the laboratory using procedures presented in ASTM D 2488. It should be noted that the actual interface between material types may be far more gradual or abrupt than represented; therefore, actual subsurface conditions in areas not sampled may differ from those predicted. The nature and extent of variations across the site may not become evident until construction commences, and the actual construction process may alter subsurface conditions as well. If variations become evident at the time of construction, CESWF-EC-DG should be contacted to determine if the recommendations and requirements presented in this report need to be reevaluated.

4. Testing.

a. Laboratory Testing. Representative soil samples recovered from the borings were subjected to laboratory testing for identification, moisture content, grain-size distribution, Atterberg limits, density, strength, and controlled expansion-consolidation. The accumulative test results are presented in Appendix C. Results of identification testing are shown on the individual boring logs, Sheet B201 through B204 (Appendix A). The visual descriptions and Unified Soil Classifications presented on the logs are based on test methods presented in ASTM D 2488. Descriptions of overburden materials were changed to correspond with the laboratory classification.

The laboratory test results are also presented graphically in Appendix B as follows: Plasticity characteristics are shown on Plate 1, Plasticity Chart. Moisture content values are shown with respect to depth on Plate 2. Atterberg limits test results are shown with respect to depth on Plate 3. Dry density values of representative undisturbed samples and their corresponding moisture contents are shown with respect to depth on Plate 4. Ultimate compressive strengths of the clayey soils are shown with respect to depth on Plate 5.

(1) Shear Strength Testing. Shear strength characteristics of the cohesive soils were analyzed in the laboratory using one-point unconsolidated-undrained triaxial compression

testing, confining the specimens to overburden pressure and then loading to failure. The ultimate compressive strengths recorded are presented below and in Appendix C at the end of this report.

Boring	Depth, ft	γ_d, pcf	Q_u, tsf	Material Type
8A2S-BK8-2	59.0	80.1	2.717	CH Clay Overburden
8A2S-BK8-4	5.0	107.2	2.131	SC Clayey Sand Overburden
8A2S-BK8-4	9.0	103.5	1.566	CH Clay Overburden
8A2S-BK8-4	14.0	110.8	2.330	SC Clayey Sand Overburden
8A2S-BK8-4	19.0	113.3	3.931	CL Clay Overburden
8A2S-BK8-4	24.0	94.2	2.135	CH Clay Overburden
8A2S-BK8-4	29.0	100.2	1.744	CH Clay Overburden
8A2S-BK8-4	34.0	106.6	2.898	CH Clay Overburden
8A2S-BK8-4	39.0	84.7	1.458	CH Clay Overburden
8A2S-BK8-4	43.5	83.0	1.537	CH Clay Overburden
8A2S-BK8-6	51.0	103.7	2.456	SP-SM Silty Sand Overburden

(2) Controlled Expansion-Consolidation Testing. Controlled expansion-consolidation (CEC) testing was performed on three specimens of high plasticity (CH) overburden clay to determine the shrink-swell potential of this material. A high plasticity clay specimen collected at a depth of 4.0 feet within boring 8A2S-BK8-2 was subjected to CEC testing. This CH clay specimen has a liquid limit of 58 percent, a plastic limit of 18 percent (PI = 40 percent), and a natural moisture content of approximately 16 percent. An expansion pressure (p_{exp}) of approximately 1.5 tsf was recorded during CEC testing on this high plasticity clay specimen. Based on CEC test results, the high plasticity clay specimen collected at a depth of 4.0 feet within boring 8A2S-BK8-2 has a moderate to high expansion potential ($C_s = 0.033$; $p_{exp}/p_0 = 5.8$) and a moderate potential for consolidation ($C_c = 0.136$). Controlled expansion-consolidation testing also was performed on a specimen of high plasticity clay collected at a depth of 34.0 feet within boring 8A2S-BK8-2. This CH clay specimen has a liquid limit of 84 percent, a plastic limit of 27 percent (PI = 57 percent), and a natural moisture content of approximately 33 percent. An expansion pressure (p_{exp}) of approximately 0.75 tsf was recorded during CEC testing on this clayey sand specimen. The third specimen of the high plasticity overburden clay selected for CEC testing was collected at a depth of 59.0 feet within boring 8A2S-BK8-2. This CH clay specimen has a liquid

limit of 84 percent, a plastic limit of 30 percent (PI = 54 percent), and a natural moisture content of approximately 41 percent. An expansion pressure (p_{exp}) of approximately 1.0 tsf was recorded during CEC testing on this high plasticity clay specimen. Based on CEC test results, the high plasticity clay specimen collected at a depth of 59.0 feet within boring 8A2S-BK8-2 has a moderate to very high expansion potential (C_s = 0.110; p_{exp}/p_0 = 0.27) and a very high potential for consolidation (C_c = 0.532). CEC test results are summarized below and are included in Appendix C at the end of this report.

Boring	Depth, feet	LL	PI	P_{exp}, tsf	P_{exp}/P_o	C_s	C_c	Material Type
8A2S-BK8-2	4.0	58	40	1.5	5.8	0.033	0.136	CH Clay Overburden
8A2S-BK8-2	34.0	84	57	0.75	0.4	0.080	0.216	CH Clay Overburden
8A2S-BK8-2	59.0	84	54	1.0	0.3	0.110	0.532	CH Clay Overburden

b. Field Testing.

(1) Standard Penetration Testing. Standard penetration testing was performed in all borings at approximately 2.5-foot intervals within the upper 10 feet, and at approximately 5-foot intervals below 10 feet. A standard penetration test consists of driving a standard 1.5-inch (I.D.) diameter split-spoon sampler 18 inches into the soil using a 140-pound free-falling hammer dropped a distance of 30 inches. The number of blows required for each 6 inches of penetration is recorded. Penetration resistance (N) is defined as the sum of blows required to drive the second and third increments, or the final 12 inches. It should be noted that “refusal” is taken as a blow count of 50 or more per 6-inch increment.

Standard penetration testing is performed to evaluate the relative densities of the in situ soils for foundation design considerations. The results are used to calculate the shear strength of the in situ soils and settlements relative to given load conditions. Based on standard penetration testing performed at the Enlisted Unaccompanied Personnel Housing site, the silty and clayey sandy soils range in relative density from loose to dense (with average N-values ranging from 4 to

44). However, N-values recorded during the field investigation were most commonly between 5 and 15 blows per foot (i.e., loose to medium dense). The range of blows per foot (N-values) shows no appreciable increase in strength with depth correlation. Standard penetration test data collected within the cohesive soil layers exhibits a much wider variability, and is not used for design; instead, unconsolidated-undrained compression testing data, as presented above, is considered for the cohesive soils.

(2) Dynamic Cone Penetrometer Testing. Dynamic Cone Penetrometer (DCP) testing was performed in borings 10A2S-BK8-7, 10A2S-BK8-10, 10A2S-BK8-12, 10A2S-BK8-13, and 10A2S-BK8-16 for pavement design considerations. A DCP consists of a steel rod with a steel cone attached to one end and a sliding single-mass hammer. For this project, the DCP test was performed by driving the steel cone into the soil using a 17.6-pound sliding hammer dropped from a height of 22.6 inches (574 millimeters). The number of blows required for each 0.4 inch (10-mm) or greater of penetration was recorded as the "penetration per blow set"; therefore, the more penetration achieved per blow indicates that a "weaker" soil layer was encountered. Typically, penetration measurements are taken to a depth of 39.4 inches (1000 millimeters) or when refusal is achieved. Refusal is defined as the point at which the cone cannot penetrate the soil more than 0.4 inches (10 millimeters). Presented below are the average in situ strength parameters derived from the DCP tests.

Depth, in	CBR, %	k, pci
0 – 6	3 – 31	100 – 302
6 – 12	8 – 59	174 – 416
>12	1 – 32	60 – 312

5. **Discussions.** The following discussions are provided in support of the foundation and pavement design recommendations and requirements made herein for the proposed Enlisted Unaccompanied Personnel Housing project. It should be noted that the discussions presented

herein are based on the results of the Government geotechnical field investigation and laboratory testing program conducted at the site, as described previously in this report, as well as engineering studies, and previous engineering experience with similar structures at Fort Polk. The Design-Build Contractor shall heed the information provided in this report and comply with the requirements and recommendations presented herein when developing his foundation and pavement designs. The bidders for this design-build contract project may use the subsurface boring log and lab testing data presented herein as a basis to formulate their foundation and pavement designs for the purposes of developing a bid for the project Request for Proposal (RFP) solicitation, or, at their option, may supplement these data with their own geotechnical field investigations and laboratory testing programs if determined insufficient for such purposes. This is due to the lensatic nature of the subsurface soils. <u>Laboratory testing performed by the Design-Build Contractor (and/or their associates) is required to meet the following standards (at a minimum)</u>: Tests on disturbed specimens of overburden soils shall include classification (ASTM D 2488), moisture content (ASTM D 2216), grain size analysis (ASTM D 422), and Atterberg limits (ASTM D 4318). Undisturbed (shelby tube) specimens of the overburden soils shall also be collected; tests on undisturbed specimens of the overburden soil shall include the tests listed for disturbed specimens, as well as controlled expansion-consolidation testing (ASTM D 2435 and ASTM D 4546 (Method C)), density (Corps of Engineers Engineer Manual (EM) 1110-2-1906, Appendix II, Par. 4, Displacement Method), and strength testing (ASTM D 2850).

Development of the final foundation and pavement designs is the responsibility of the Design-Build Contractor; <u>however, the Design-Build Contractor's final foundation and pavement designs shall be in full compliance with the requirements prescribed herein (including foundation type, foundation design parameters, foundation and earthwork construction requirements, and minimum pavement sections and pavement design parameters)</u>. The Design-Build Contractor shall provide to the Government engineering studies and design calculations that support the foundation and pavement design recommendations they or their associates propose. The Design-Build Contractor's foundation and pavement design recommendations shall be reviewed for technical adequacy and compliance with the criteria established herein and in the Request for Proposal (RFP). Specific requirements for the Design-Build Contractor's foundation and pavement design analysis are provided in section 6.c.

a. Soil Activity Considerations. The Enlisted Unaccompanied Personnel Housing site is characterized by interbedded deposits of low to high plasticity clay (CL to CH, respectively), clayey sand (SC), silty sand (SM), sand with silt (SP-SM), and sandy silt (ML); the sitly soils (i.e., SM, SP-SM, and ML) are typically non-plastic. Of these, the most prevalent soils at the site are high plasticity clays. Atterberg limits test results for the clayey soils and for plastic specimens of the sandy soils indicate these materials have liquid limits ranging from 22 to 96 percent, plastic limits varying from 13 to 31 percent (with plasticity indices ranging from 8 to 72 percent). In situ soil moisture contents of the plastic soils vary from approximately 14 to 41 percent.

Based on the results of Atterberg limits, in situ moisture content testing, controlled expansion and consolidation testing, and engineering judgment and experience at Fort Polk, an active zone of at least 15.0 feet shall be used for expansive soils analyses. The results of Atterberg limits testing and CEC testing indicate that the clayey, sandy soils are potentially susceptible to both heave and consolidation. Furthermore, controlled expansion-consolidation testing indicates the heave and consolidation potential of the soils increases with depth. Once built upon, these materials can experience significant volumetric changes when their in situ moisture environment is altered. These volumetric change capacities necessitate special requirements with regard to the foundation design and earthwork activities for the new project construction, as are provided herein, to ensure adequate foundation performance.

b. Foundation Design Considerations. A variety of foundation systems have been utilized with success at Fort Polk, depending on site-specific subsurface conditions. Shallow foundation systems include spot and continuous spread footings, and reinforced concrete ribbed and flat mat slabs. Deep foundation systems include pre-cast reinforced concrete driven piles and reinforced concrete drilled and underreamed piers. Considerations associated with deep and shallow foundation systems are discussed in the following paragraphs.

Based on the new facility being limited to either a two- or three-story structure, a deep foundation system will not be necessary to support the anticipated building loads. Furthermore, the in situ soils exhibit no significant increase in strength with depth; hence there is no bearing capacity advantage of a deep foundation system of either driven piles or underreamed piers. The high groundwater levels and relatively loose sandy soils would also increase the difficulty in constructing a drilled and underreamed pier foundation system. Also, heave forces acting upon pier or pile foundations from the very high plasticity clays present at the site, and potentially large settlements that could be induced within the clayey and sandy soils by deep foundations could create significant structural distress within the facility. Lastly, it is anticipated that a shallow foundation system could be constructed more economically than a deep foundation system. Therefore, **a deep foundation system shall not be used for this facility.**

In light of the comparatively low relative density of the in situ clayey and sandy overburden soils identified during the geotechnical field investigation, these soils can be expected to be susceptible to both total and differential settlements from shallow foundation loads. Thus a shallow foundation will need to act monolithically to ensure differential movements do not exceed tolerable limits. The best foundation performance for this facility can be achieved by a reinforced concrete ribbed mat slab or flat mat slab. A properly designed and constructed ribbed mat or flat mat slab will act monolithically, would be anticipated to be constructed above the groundwater level, and also would be assigned an allowable bearing capacity that would minimize the potential for excessive total or differential settlements to occur. **Therefore, the Design-Build Contractor shall limit consideration for foundation systems to either a reinforced concrete ribbed mat**

slab or a reinforced concrete flat mat slab; if the facility is designed as a three-story structure, only a flat mat foundation system shall be used (a ribbed mat may only be used if the facility is designed as a two-story structure). The structural designer shall select the foundation system between these two types based on suitability for the structure, and, secondarily, on which foundation system would be able to provide the best performance for the greatest construction economy. A shallow spot and/or continuous spread footing foundation system **shall not** be allowed for this facility.

c. Pavement Design Considerations. The pavement designs presented in this report are based on criteria contained in *UFC 3-250-01FA*, *UFC 3-250-18FA*, and engineering judgment.

(1) Traffic Types and Conditions. Four (4) pavement structures were analyzed and for this project, with minimum designs presented herein. Specifically, new pavement structures required for the project include fire/emergency medical vehicle access lane(s), service drive(s), a privately-owned vehicle (POV) parking area, and aprons in front of trash dumpster pads. Aprons in front of trash dumpster pads shall be rigid pavement, while the other three pavement structures may be either rigid or flexible pavement. Fire/emergency medical vehicles and trash trucks making infrequent passes (ranging from weekly to monthly) are anticipated to occupy the fire/emergency medical vehicle access lanes and service drives. The types of vehicles that will occupy the POV parking area are anticipated to be limited to passenger cars and trucks (with the pavement anticipated to experience a maximum of more than 250 vehicular passes per hour). Based on criteria contained in the aforementioned Technical Manuals, the following traffic conditions were assigned for the pavement structures:

Pavement Structure	Traffic Category	Street Class	Design Index
Emergency Access Lanes/ Service Drives	IVA	F	4
Apron (Trash)	IVA	F	4
POV Parking Areas	II	D	2

(2) Pavement Design Parameters. California Bearing Ratio (CBR) and plate bearing tests were not conducted for this project. Instead, dynamic cone penetrometer (DCP) testing was conducted to evaluate the raw subgrade for pavement design considerations. The penetration resistance obtained from the DCP test is a measure of the soil's relative density, which in turn is used to derive "in situ" CBR and modulus of subgrade reaction values.

The average in situ CBR values measured within the upper 12 inches of soils tested at the Enlisted Unaccompanied Personnel Housing site range from approximately 3 to 56 percent, and below this depth, CBR values range from 1 to 32 percent. Modulus of subgrade reaction values measured within the upper 12 inches of soils tested range from 100 to 416 pci, and below this depth, modulus of subgrade reaction values range from 60 to 312 pci. Laboratory CBR tests previously have been performed on similar subgrade materials collected at Fort Polk. The results indicate that CBR values between 3 and 4 can be expected for the sandy and clayey subgrade when compacted to 90 percent of maximum laboratory density. Previously conducted plate-bearing tests indicate the modulus of subgrade reaction for this material to range from 100 pci to 150 pci. Based on an analysis of the results of the in situ DCP testing and a comparison with the historical data, design CBR and modulus of subgrade reaction values of 4 percent and 100 pci, respectively, were assigned to the raw subgrade when compacted to 90 percent of laboratory maximum density (ASTM D 1557). To ensure that these design CBR and modulus of subgrade reaction values are achieved, the upper 6 inches of raw subgrade materials directly underlying the base course layer(s), as specified herein, shall consist of satisfactory materials, *excluding* materials that classify as CH materials. If the upper 6 inches of raw subgrade directly underlying the base course layer(s) are CH materials, the upper 6 inches of these materials shall be removed and replaced with satisfactory materials (excluding CH materials), and compacted to the density specified for raw subgrade underlying pavements. The CBR value considered for the sand clay gravel base material is 50.

6. Recommendations and Requirements. The following foundation and pavement design recommendations and requirements are based on the results of the field investigation, laboratory testing, engineering studies, and the criteria cited herein.

a. Foundation Design Recommendations and Requirements.

(1) Foundation System. Only the following foundation systems shall be allowed for the Enlisted Unaccompanied Personnel Housing (barracks): 1) a reinforced concrete ribbed mat slab, or 2) a reinforced concrete flat mat slab, designed in accordance with the criteria and requirements specified herein. **No other foundation systems shall be allowed.** ***The following foundation systems are specifically prohibited: spot and/or continuous spread footings, drilled piers (both straight-shaft and underreamed), driven or cast-in-place piles, and auger cast piles. In addition, if the facility is designed with more than two stories, only a flat mat foundation system shall be used.*** Criteria for Site Class D shall be utilized for foundation seismic design purposes, as presented in ***UFC 3-310-04 – Seismic Design for Buildings***. The Design-Build Contractor is responsible for developing the final foundation designs and earthwork requirements. The Design-Build Contractor shall use the subsurface conditions and laboratory and in situ testing data provided in this report, as well as any supplemental subsurface investigations and testing performed by them or their associates to develop the final foundation designs and earthwork requirements. The Design-Build Contractor also shall use the design criteria cited herein to develop the final foundation designs and earthwork requirements. However, **it is required that the Design-Build Contractor's final foundation designs and earthwork requirements meet (or exceed) the minimum foundation design and earthwork requirements specified herein.**

(a) Reinforced Concrete Ribbed Mat or Flat Mat Slab. The proposed Enlisted Unaccompanied Personnel Housing (barracks) shall be supported on either a reinforced concrete ribbed mat slab or a flat mat slab foundation system. If the facility is designed with more than two stories, only a flat mat foundation system shall be used. ***The mat slabs shall be***

conventionally reinforced – POST-TENSIONED SLABS ARE NOT ALLOWED. A ribbed mat slab consists of a grid of stiffening ribs cast monolithically with the floor slab. The monolithic nature of this system allows the foundation to span or cantilever areas where a loss of support may occur; thus potential differential settlements are spread over a large horizontal area by the ribs through soil-structure interaction. The mat slabs shall be analyzed and designed for 1.0 inch of long-term differential movement. For this reason, interior ribs shall be spaced no further than 15 feet center-to-center, and diagonal stiffener ribs should be placed at each corner of the mat slab. Additional stiffness shall be provided for areas of significant stress concentrations where deflections reflect detrimentally through the superstructure and facade. Design of the ribbed mat slab shall meet the minimum requirements as presented in ***CESWD-ED-TS/G Criteria Letter, dated 29 January 1988 – Design Criteria for Ribbed Mat Foundations, SWDED-G Criteria Letter, dated 16 April 1987 – Criteria for Developing Geotechnical Design Parameters for SWD Ribbed Mat Design Methodology***, and the recommendations and requirements provided herein.

Interior and exterior beams shall bottom a minimum of 24 inches below outside finished grade. An allowable bearing capacity of 2.0 ksf (net) shall be used to size the beams. For this phase of design, it should be noted that (1) the structural load is supported solely on the beam and the beam intersections, (2) load transfer occurs over the effective beam width, and (3) the beam and soil remain in contact. Beam intersections should be widened at column locations to accommodate the above allowable bearing value for the anticipated load condition. The load used to size the beams shall consist of full dead load plus that portion of the live load that acts more or less continuously, usually 50 percent.

The ribbed mat slab foundation shall incorporate adequate stiffness such that the deformations do not exceed the structural tolerance of any elements in the foundation or superstructure. Analyses should consider a vertical separation of the foundation slab and beams from the subgrade of 1.0 inch at the outside of all perimeter beams, with loss of support beneath the foundation over a horizontal distance of not less than 4.5 feet. This loss of support condition corresponds to the **center lift mode**. Additionally, **edge lift analyses** should consider an edge moisture variation distance equal to 5.25 feet, and an edge lift heave of 1.0 inch should be used in the design of the ribbed mat slab. This edge lift heave corresponds to an applied structural pressure of 100 psf. For edge lift considerations, two additional combinations of pressure and swell are required. For an allowable bearing capacity of 2.0 ksf, an edge lift heave of 0.75-inch can be expected to occur. At an ultimate bearing capacity of 6.0 ksf, 0.5-inch of heave should be anticipated. It should be noted that these anticipated heave amounts are based on a minimum of 3.0 feet of compacted nonexpansive fill, as recommended in this report.

A modulus of subgrade reaction equal to 200 psi/inch should be used when analyzing the ribbed mat slabs to determine in-service deformations. This value, however, should be factored to account for width effects such that $k_{design}=k_1(B_{eff})$, where B_{eff} is the effective beam width in feet. Design of the ribbed mat slabs may use the *SWD-AEIM* sections as a minimum stiffness "first approximation".

A reinforced concrete flat mat foundation should have a uniform thickness of not less than 2.0 feet. The mat should be tapered as required to ensure the perimeter of the slab extends to a constant elevation and is at least 24 inches below outside finish grade. An allowable bearing pressure of 2.0 ksf (net) shall be used to design the flat mat slabs. The load used to size flat mat slabs should consist of the full dead load plus that portion of the live load that reacts continuously, usually 50 percent. Flat mat slabs also should incorporate adequate stiffness such that the deformations do not exceed the structural tolerances of any element of the foundations or superstructures. Flat mat slabs should be analyzed for stiffness using the same edge and center lift mode analysis parameters as provided in this report for ribbed mat slab foundations.

The mat slabs will, by design, be supported on-grade. A polyethylene vapor barrier (10-mil minimum thickness) and a minimum 6-inch capillary water barrier should be placed beneath the mat slab.

(b) Small Support-type Structures. Small support-type structures (<500 GSF), if used, can be supported on reinforced concrete slabs-on-grade with turned-down edge beams. The turned-down edge beam should extend a minimum of 12 inches below outside finished grade and can be sized for a safe bearing pressure of 2,000 psf (net). Subgrade preparation shall be in accordance with the requirements specified below for ribbed and flat mat slabs.

(2) Subgrade Preparation Requirements. For ribbed mat and flat mat slab foundations, the upper 5.0 feet (minimum) of existing soils within the proposed Enlisted Unaccompanied Personnel Housing building footprint shall be removed and replaced with compacted nonexpansive backfill, which should limit the magnitude of predicted movement to approximately 1 inch or less. Furthermore, subgrade preparation for the mat slabs (both ribbed mat and flat mat) shall ensure that a minimum of 2.0 feet of existing soil below the base of these features shall be removed and replaced with compacted nonexpansive fill, regardless of the amount of cut or fill required for site grading. Any additional fill required to reach the final subgrade elevation below the base of the mat ribs or mat slab should be nonexpansive material as well. These measures should limit the magnitude of predicted floor slab movement to approximately 1 inch or less. Nonexpansive fill should be placed in controlled lifts not exceeding 8 inches in loose thickness and compacted to not less than 95 percent of maximum laboratory density as determined in accordance with ASTM D 1557. The upper 6 inches of existing subgrade exposed after excavation operations, or cleared prior to fill placement should be scarified, moistened, manipulated, and recompacted to the same density required for nonexpansive fill materials. Vibration compaction should not be allowed. Groundwater levels should be controlled in cut sections of the site by appropriate ditch construction and pumping to achieve required compaction levels of in place soils and fills.

(3) Below-Grade Structures. The following information is provided for the design

of all below-grade structures, if applicable. An at-rest lateral earth pressure coefficient (k_o) of 0.7, an angle of internal friction (ϕ) of 28°, and a cohesion value (c) of 100 psf shall be used. The backfill material should be assumed to have a moist unit weight of 125 pcf and all backfill should be nonexpansive or select material. An active earth pressure coefficient (k_a) and a passive earth pressure coefficient (k_p) of 0.36 and 2.77, respectively, can be used for excavations for below-grade structures.

(4) Drainage. Proper drainage is an important design consideration to ensure satisfactory long-term foundation performance. Exterior grading adjacent to the completed buildings should be sloped away from the structures a minimum of 5 percent for the first 10 feet. Runoff from the roofs should be adequately discharged a sufficient distance away from foundation edges. In no case shall water be allowed to pond adjacent to or beneath the buildings, both during and after construction.

(5) Care of Water. Drainage of ground and surface water from the project site continually throughout the construction contract is essential. The contractor will be required to protect the excavation and all constructed work throughout the life of the contract by means of ditches, berms, sumps with pumps, and any other means required to continually and effectively remove water from the site at all times. Ponding of water in the excavation is unacceptable at any time. These requirements shall be reflected in the specifications and structural notes.

(6) Mechanical Connections. All exterior mechanical connections shall be of the flexible type. Flexible connections should be capable of resisting a minimum of 1 inch of both vertical and horizontal movement. The contractor may require greater flexibilities, if needed. All condensate lines should drain away from foundation edges.

(7) Backfill Adjacent to Exterior Grade Beam Excavation. Use select clay backfill adjacent to exterior grade beam excavation to minimize water penetration to expansive subsoils.

(8) Material Testing Requirements. Testing shall be the responsibility of the

contractor to ensure that the subgrade, fill, and backfill materials are properly compacted. To this end, the following frequencies of testing shall be included in the contract as a minimum:

- In-place density of the subgrade, fills, and backfills shall be performed for every 2000 square feet per lift in accordance with ASTM D 1556 or ASTM D 2922.
- Optimum Moisture and Laboratory Maximum Density of nonexpansive fill and backfill shall be performed for every 500 cubic yards or when any change in material occurs.

(9) Foundation Material Definitions.

(a) Satisfactory Materials. Satisfactory materials include materials classified in ASTM D 2487 as GW, GM, GC, GP, SW, SP, SM, SC, CL, and CH and shall be free of trash, debris, roots or other organic matter, or stones larger than 3 inches in any dimension.

(b) Unsatisfactory Materials. Unsatisfactory materials include materials classified in ASTM D 2487 as Pt, OH, OL, ML, MH and any other materials not defined as satisfactory.

(c) Nonexpansive Soils. Nonexpansive soils for nonexpansive fill shall meet the requirements of the Louisiana Department of Transportation and Development Standard Specifications for Roads and Bridges for "Sand Clay Gravel", Part X, Section 1003.03(a). Satisfactory soils with a plasticity index of not less than 4 nor greater than 12 percent may be used as Nonexpansive soils.

(d) Select Soils. Select soils shall include all Satisfactory soils except CH materials. Select soils shall have a maximum liquid limit of 35 percent and a plasticity index of not less than 12 nor greater than 20 percent.

(e) Select Clay Backfill. Select clay backfill shall be a satisfactory material having a liquid limit of 35 percent or less, and a plasticity index of not less than 8 nor greater than 20 when tested in accordance with ASTM D 4318, and classifying as a CL in accordance with ASTM D 2487.

(f) Capillary Water Barrier. Capillary Water Barrier shall consist of clean, crushed, nonporous rock, crushed gravel, or uncrushed gravel. The maximum particle size shall be 1.5 inches and no more than 2 percent by weight shall pass the No. 4 sieve.

(g) Cohesionless and Cohesive Materials. Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic.

(h) Degree of Compaction. Degree of compaction is a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557.

The above material definitions and subgrade preparation requirements should be presented in ***UFGS-31 00 00 EARTHWORK***.

b. Pavement Design Recommendations and Requirements. The minimum pavement sections presented below are based on criteria contained in *UFC 3-250-01FA, UFC 3-250-18FA*, and engineering judgment. The Design-Build Contractor is responsible for developing the final pavement designs. The Design-Build Contractor shall use the subsurface conditions and laboratory and in situ testing data provided in this report, as well as any supplemental subsurface investigations and testing performed by them or their associates, and any supplemental information regarding traffic loading conditions and requirements (beyond that provided herein) to develop the final pavement designs. The Design-Build Contractor shall use the United Facilities Criteria (UFCs) cited herein as well as Pavement-Transportation Computer Assisted Structural Engineering (PCASE) software (available at ***https://transportation.wes.army.mil/triservice/pcase/*** as a free download) to develop the final pavement designs. However, **it is required that the Design-Build Contractor's final pavement sections meet (or exceed) the minimum pavement sections specified herein.** As previously stated, based on information available at the time of this report, the fire/emergency medical vehicle access lanes, service drives, and the POV parking area may be either rigid or flexible pavement structures, and alternative minimum sections for each pavement type are provided below.

(1) Rigid Pavement. The following minimum rigid pavement sections are recommended for fire/emergency medical vehicle access lanes, service drives, and for aprons for a minimum distance of 15 feet in front of trash dumpster pads. The rigid pavement design considers a modulus of subgrade reaction of 100 pci for the raw subgrade when compacted to 90 percent of laboratory maximum density and a concrete flexural strength of 600 psi at 28 days.

(a) Fire/Emergency Medical Vehicle Access Lanes and Service Drives. The pavement section is based on Category IVA Traffic and a Class F Street (Design Index = 4).

7.5” Portland Cement Concrete (nonreinforced)

6” Base Course (CBR=50) compacted to at least 95 percent of maximum laboratory density (ASTM D 1557)

6” Raw Subgrade compacted to at least 90 percent of maximum laboratory density (ASTM D 1557)

(b) POV Parking Area. The pavement section is based on Category II Traffic and a Class D Street (Design Index = 2).

6” Portland Cement Concrete (nonreinforced)

6” Base Course (CBR=50) compacted to at least 95 percent of maximum laboratory density (ASTM D 1557)

6” Raw Subgrade compacted to at least 90 percent of maximum laboratory density (ASTM D 1557)

(c) Aprons in Front of Trash Dumpster Pads. The design is based on Category IVA Traffic and a Class F Street (Design Index = 4). This pavement section can also serve as a reinforced concrete minimum pavement section for Fire/Emergency Medical Vehicle Access Lanes.

6” Portland Cement Concrete reinforced with No. 4 bars spaced 16 inches o.c.e.w.

6” Base Course (CBR=50) compacted to at least 95 percent of maximum laboratory density (ASTM D 1557)

6” Raw Subgrade compacted to at least 90 percent of maximum laboratory density (ASTM D 1557)

Reinforcement for odd-shaped slabs, joint design, joint spacing, and other details should be in accordance with the latest edition of the *SWD-AEIM* and *UFC 3-250-01FA*, where applicable. The reinforcement bars should be placed a minimum of 1.5 inches clear distance from the surface of the pavement.

(2) Flexible Pavement. The following minimum flexible pavement sections are recommended for fire/emergency medical vehicle access lanes, service drives, and the privately-owned vehicle (POV) parking area. The flexible pavement designs consider a CBR value of 4 percent for the raw subgrade when compacted to 90 percent of laboratory maximum density.

(a) Fire/Emergency Medical Vehicle Access Lanes and Service Drives. The design is based on Category IVA Traffic and a Class F Street (Design Index = 4).

3” Hot-Mix Surface Course

6” Base Course (CBR=50) compacted to at least 100 percent of maximum laboratory density (ASTM D 1557)

6” Base Course (CBR=50) compacted to at least 100 percent of maximum laboratory density (ASTM D 1557)

6” Base Course (CBR=50) compacted to at least 95 percent of maximum laboratory density (ASTM D 1557)

6” Raw Subgrade compacted to at least 90 percent of maximum laboratory density (ASTM D 1557)

(b) POV Parking Area. The design is based on Category II Traffic and a

Class D Street (Design Index = 2).

2.5” Hot-Mix Surface Course

6” Base Course (CBR=50) compacted to at least 100 percent of maximum laboratory density (ASTM D 1557)

6” Base Course (CBR=50) compacted to at least 95 percent of maximum laboratory density (ASTM D 1557)

6” Raw Subgrade compacted to at least 90 percent of maximum laboratory density (ASTM D 1557)

The following note should be incorporated as part of the pavement details shown on the contract drawings.

1. "The moisture content shall be at least 1 percent above optimum during compaction of the raw subgrade."

2. “The upper 6 inches of raw subgrade materials directly underlying the base course layer(s) shall consist of satisfactory materials, excluding materials that classify as CH materials. If the upper 6 inches of raw subgrade directly underlying the base course layer(s) are CH materials, the upper 6 inches of these materials shall be removed and replaced with satisfactory materials (excluding CH materials), and compacted to the density specified for raw subgrade underlying pavements.”

(3) Pavement Material Definitions.

(a) High Stability Hot-Mix Surface Course. Aggregates and asphaltic materials shall conform to the requirements of the Louisiana Department of Transportation and Development Standard Specifications for Roads and Bridges for "Asphaltic Concrete Mixtures", Part V. Asphaltic material for the paving mixture should be asphaltic cement, viscosity grade AC-30 or PG-64-22. Edit guide specification ***UFGS-32 12 16 HOT-MIX ASPHALT (HMA) FOR ROADS*** to the above requirements.

(b) Prime Coat and Tack Coat. Asphaltic material for the prime coat shall be cut-back asphalt, grade MC-30, conforming to the requirements of Louisiana Department of

Transportation and Development Standard Specifications for Roads and Bridges for "Asphaltic Materials", Part X, Section 1002. Prime coat should be applied to the surface of the base course. Asphaltic material for the tack coat shall be cut-back asphalt, grade RC-250, or emulsified asphalt, grade SS-1, conforming to the requirements of Louisiana Department of Transportation and Development Standard Specifications for Roads and Bridges for "Asphaltic Materials", Part X, Section 1002. Tack coat should be applied to all surfaces that contact new asphalt pavement. Edit guide specification ***UFGS-32 12 10 BITUMINOUS TACK AND PRIME COATS*** to the above requirements.

(c) Portland Cement Concrete. The material shall conform to the requirements of ***UFGS-32 13 14 CONCRETE PAVEMENTS FOR SMALL PROJECTS***. The maximum nominal size coarse aggregate shall be 1.5 inches, and the mixture shall be designed to attain a flexural strength of 600 psi at 28 days.

(d) Base Course. Aggregates shall conform to the requirements of ***UFGS-32 11 23 AGGREGATE BASE COURSE***, and shall have a CBR value of 50 percent. The gradation for the material should conform to the requirements of the Louisiana Department of Transportation and Development Standard Specifications for Roads and Bridges for “Sand Clay Gravel:, Part X, Section 1003.03(a).

(e) Raw Subgrade. The material shall conform to the requirements of ***UFGS-31 00 00 EARTHWORK***.

(4) Vehicular Pavement Material Testing Requirements. Testing shall be the responsibility of the contractor to ensure that the subgrade, base course, hot-mix surface course, and Portland cement concrete are properly constructed. To this end, the following testing requirements shall be included in the contract specifications as a minimum:

- In-place density testing of the subgrade and base course shall be performed, at a minimum, every 600 square yards per lift in accordance with ASTM D 1556 and

ASTM D 2922. ASTM D 1556 shall be used as a check at least once per lift for each 3,000 square yards of completed subgrade and base course.

- Before starting work, at least one sample of base course material shall be tested in accordance with ASTM C 136. After the initial test, a minimum of one sieve analysis (ASTM C 136 and ASTM D 422) shall be performed for each 1,000 tons of base course placed, with a minimum of one analysis performed for each day's run until the course is completed. One liquid limit and plasticity index shall be performed for each sieve analysis per ASTM D 4318

- Wear tests shall be performed in accordance with ASTM C 131. A minimum of one test per base course material source shall be run.

- Thickness of the base course shall be measured for each 600 square yards of material placed. Compacted thickness of the base course shall be as presented in this report and the completed section shall be within 3/8-inch of the thickness presented.

- Hot Bin gradations for the asphalt wearing course shall be tested in accordance with ASTM C 136 and ASTM C 117. A minimum of one test shall be conducted. Marshall specimens shall be taken in accordance with methods described in AI MS-2. At least two sets of specimens shall be taken. Asphalt extractions shall be performed in accordance with ASTM D 2172, Method A or B. At least one asphalt extraction shall be conducted. Field density tests shall be conducted in accordance with ASTM D 2950. One test shall be conducted for each 300 square yards of pavement placed. The mat density shall be 97.5 to 100.5 percent and the joint density shall be 95.5 to 100.5 percent of the density obtained from laboratory-compacted specimens. Thickness measurements shall be taken at a minimum of one measurement for each 1,000 square yards of pavement placed.

- The Job Mix Formula for the bituminous mixture shall be furnished to the Contraction Officer for approval. The formula will indicate the percentage of each stockpile and mineral filler, the percentage of each size aggregate, the percentage of bitumen, and the temperature of the completed mixture when discharged from the mixer. The Contractor shall file with the Contracting Officer certified delivery tickets for all aggregates and bituminous materials actually used in construction. The finished mixture shall be designed using procedures contained in AI MS-2 and the criteria shown below.

Test Property	50 Blows
Stability (minimum), lbs	500
Flow (maximum), 1/100-inch	8-18
Air Voids, percent	3% to 5%
Percent Voids in mineral aggregate	14
TSR, minimum percent	75

- The contractor shall be responsible for the development of the mixture proportion study for cementitious materials and chemical admixtures. The concrete mix design shall include a statement giving the maximum nominal coarse aggregate size and the proportions of all ingredients that will be used in the manufacture of concrete at least 60 days prior to commencing concrete operations. Trial design batches, mixture proportioning studies, and testing requirements shall be the responsibility of the Contractor. Strength requirements shall be based on flexural strength. Trial mixtures having proportions, slumps, and air content suitable for the work shall be based on methodology described in ACI 211.1, modified as necessary to accommodate flexural strength. The maximum water-cementitious material ratio is 0.45. Coarse and fine aggregates shall have a satisfactory service record of at least 5 years successful service in three paving projects, or if a new source is used, shall meet the requirements when tested for resistance to freezing and thawing. Coarse and fine aggregates not having a satisfactory demonstrable service record shall have a durability factor of 50 when subjected to freezing and thawing in concrete in accordance with COE CRD-C 114 (Test Method for Soundness of Aggregates by Freezing and Thawing of Concrete Specimens).

- Smoothness measurements shall be taken in successive positions parallel to the pavement (flexible and rigid) centerline with a 12-foot straightedge. Measurements shall be taken perpendicular to the pavement (flexible and rigid) centerline at 15-foot intervals. Surface smoothness shall not exceed 3/8-inch.

c. **Requirements for the Design-Build Contractor's Foundation and Pavement Design Analysis.** The successful proposer shall provide a Foundation and Pavement Design Analysis after contract award. ***The geotechnical firm responsible for the geotechnical design shall have demonstrated successful performance in design of at least five (5) projects of similar type and scope in expansive soil environments in Louisiana.*** The Foundation and Pavement Design Analysis (Report) shall include a description of the project, including a discussion of any unusual features of the project, a discussion for each structure that requires a foundation system, and a discussion of each pavement type. All calculations in support of bearing, settlement, heave, and structural deflections shall be included in or attached to the report.

(1) **Foundation System.** ***A shallow foundation system consisting of either a reinforced concrete ribbed mat slab or a reinforced concrete flat mat slab shall be utilized for the Enlisted Unaccompanied Personnel Housing (barracks). However, if the building is designed with more than two stories, only a monolithic flat mat foundation system shall be used.***

The Design-Build Contractor shall design the shallow foundation system in accordance with the requirements, recommendations, and design parameters provided in this report.

(2) **Subgrade Preparation and Fill Requirements.** ***The Design-Build Contractor shall comply with the subgrade preparation and fill (earthwork) requirements specified in this report. Compaction requirements for the raw subgrade, fill, and backfill materials, and foundation and pavement material definitions shall be as specified herein.***

(3) **Pavement Sections.** The Design-Build Contractor shall provide separate subparagraphs for each rigid and flexible pavement structure included in the project, ***using the pavement sections provided in this report as minimum sections***. The Design-Build Contractor shall use the UFCs cited herein and PCASE pavement design software to develop the final pavement designs, and shall present PCASE design output data tables in their report documentation for review by the Government. Each pavement design shall include as a minimum the following items: traffic types, road classifications and design indexes; subgrade strength values (CBR and modulus of subgrade reaction values for the specified compactive effort); pavement material thicknesses and compaction requirements; and concrete flexural strength for designated time frame.

(4) Exhibits to be Included in the Design-Build Contractor's Foundation and Pavement Design Analysis. The following exhibits shall be included in the Design-Build contractor's Foundation and Pavement Design Analysis. The Design-Build contractor may use the information provided in this report to partially satisfy these requirements, but shall supplement the information provided herein with additional subsurface drilling and testing, as described in the first paragraph of Section 5 of this report. Required exhibits to be included with the Design-Build contractor's Foundation and Pavement Design Analysis include:

- Site Plan with Boring Locations and Legend;
- Boring Logs;
- Plasticity Chart;
- Standard Penetration Tests versus Depth of Boring (if applicable);
- Moisture Content versus Depth (Chart);
- Moisture Content-Liquid Limit-Plastic Limit versus Depth (Chart);
- Strength Tests Results versus Depth (Chart);
- Tabulation of Laboratory Test Results (to include Boring Number, Sample Number, Depth, Laboratory Classification, Visual Descriptions, Grain Size Analysis (%Gravel, %Sand, %Fines), LL, PL, PI, MC, Unit Weight, and Strength Test Data;
- Consolidation-Expansion Tests/Swell Pressure Tests (if applicable).

FORT POLK, LOUISIANA
ENLISTED UNACCOMPANIED PERSONNEL HOUSING

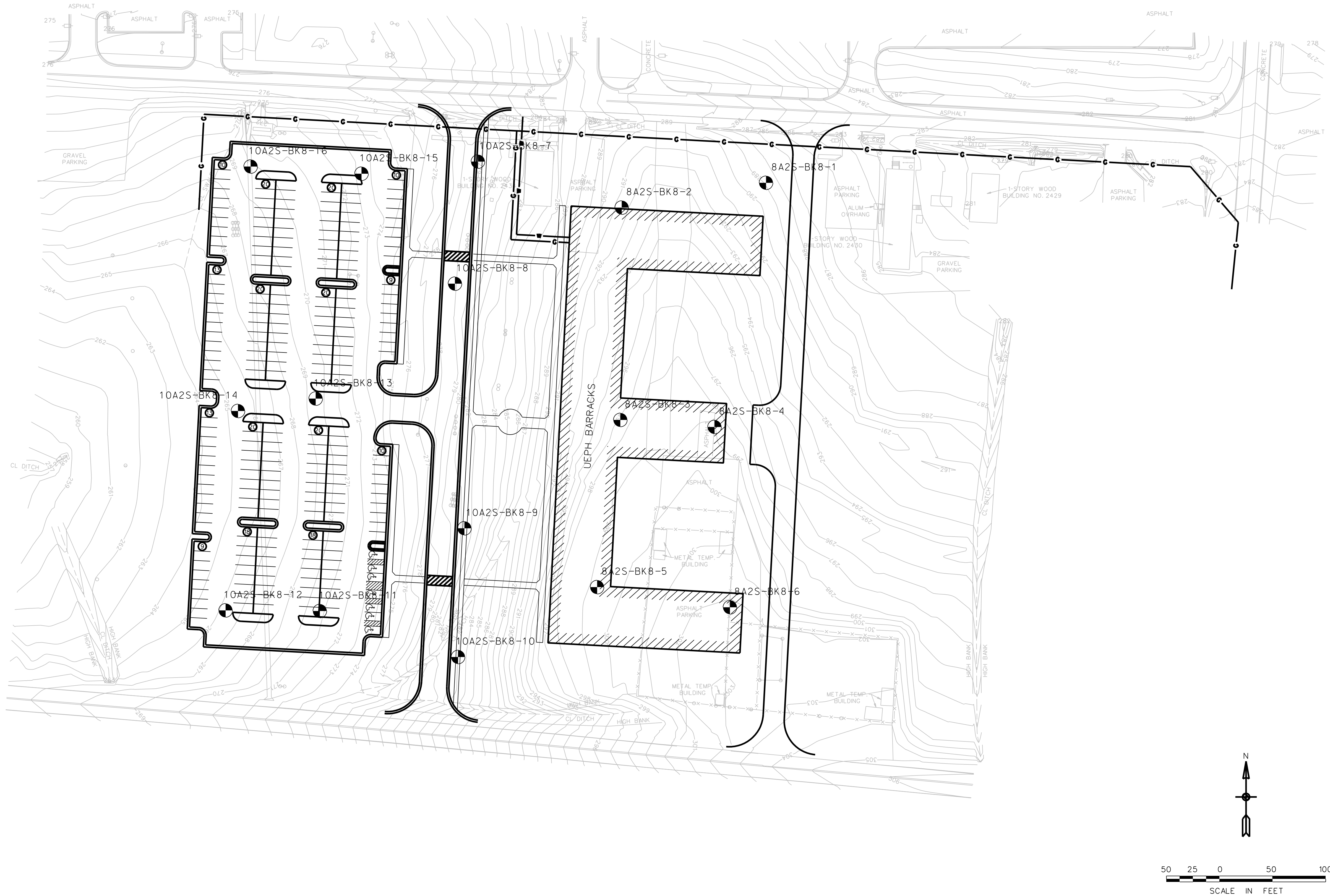
References:

- TEAM Consultants, Incorporated Report No. 082074
- UFC 3-220-03FA – Soils and Geology Procedures for Foundation Design of Buildings and Other Structures (Except Hydraulic Structures)
- UFC 3-220-07 – Foundations in Expansive Soils
- CESWD-ED-TS/G Criteria Letter, dated 29 January 1988 – Design Criteria for Ribbed Mat Foundations
- SWDED-G Criteria Letter, dated 16 April 1987 – Criteria for Developing Geotechnical Design Parameters for SWD Ribbed Mat Design Methodology
- UFC 3-250-01FA – Pavement Design for Roads, Streets, Walks, and Open Storage Areas
- UFC 3-250-18FA – General Provisions and Geometric Design For Roads, Streets, Walks, and Open Storage Areas
- Louisiana Department of Transportation and Development Standard Specifications for Roads and Bridges
- SWD-AEIM Architectural-Engineering Manual
- UFGS Guide Specifications For Construction

FORT WORTH DISTRICT
MARCH 2009

APPENDIX A

BORING LOCATIONS & LOGS OF BORINGS



NOTE: THIS SHEET USED FOR BORING LOCATIONS ONLY.

US Army Corps of Engineers
Fort Worth District

Symbol	Description	Date	Approval

Designed by: J. PICKERING	Date:
Dwn by: J. PICKERING	Sol No.
Reviewed by: K. McCLESKEY	Contr No.
Submitted by: LESLIE L. PERRIN, P.E. CHIEF, GEOTECHNICAL SECTION	File name: Plot date: $$date$$ Plot scale:

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS
FORT WORTH, TEXAS

ENGINEERING/
CONSTRUCTION DIVISION
ENG. SERVICES BRANCH

FORT POLK, LOUISIANA
ENLISTED UNACCOMPANIED PERSONNEL HOUSING
PN: 060130

BORING LOCATION MAP

Sheet reference number:
B-101

$$time$$
$$date$$
$$user$$
$$cadd file name$$
DESIGN FILE: $$cadd file name$$
Contr No.

US Army Corps of Engineers
Fort Worth District

DRILLING LOG — Hole No. 8A25-BK8-1

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-1
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	60'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 13 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	12' AFTER 24 HR CAVED @ 15'
16. DATE HOLE	STARTED 09/10/08 / COMPLETED 09/10/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT (a): 11.2, 17.2, 32.0, 25.0, 29.7, 33.9, 35.0, 38.8, 32.7, 29.9, 24.9, 24.8, 30.2

DEPTH IN METERS (b): 10, 20, 30, 40, 42, 46, 50, 60

LEGEND (c)

CLASSIFICATION OF MATERIALS (Description) (d):

0'-2' - SAND
SILTY, W/ GRAVEL, LOOSE, MOIST, REDDISH BROWN

2.0'-53.0' - CLAY

2'-13' -
HIGH PLASTICITY, STIFF, MOIST, LIGHT GRAY

13'-18' -
LOW PLASTICITY, STIFF, MOIST, W/SAND, LIGHT GRAY AND TAN

18'-23' -
HIGH PLASTICITY, W/SILTY SAND LAYERS, STIFF, MOIST, LIGHT GRAY AND TAN

23'-28' -
LOW PLASTICITY, SILTY, STIFF, MOIST, TAN AND GRAY

28'-46' -
HIGH PLASTICITY, STIFF, MOIST, LIGHT BROWN, TAN AND GRAY

46'-53' -
LOW PLASTICITY, SANDY, FIRM, WET, REDDISH BROWN, AND GRAY

53'-58' - SAND
SILTY, M. DENSE, WET, REDDISH BROWN, AND GRAY

58'-60' - SILT
SANDY, M. DENSE, WET, LIGHT BROWN, TAN, AND GRAY

% CORE RECOVERY (e) | BOX OR SAMPLE NO. (f)

REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g):

GPS - 31^ 01.947" N
093^ 12.593" W

BEGAN ROTARY WASH @ 1.5'

PENETRATION TESTS

DEPTH	BLOW COUNT
0-1.5	3-3-3
3-4.5	3-5-8
8-9.5	4-5-7
13-14.5	9-6-8
18-19.5	5-6-7
23-24.5	5-4-6
28-29.5	3-4-6
33-34.5	3-4-5
38-39.5	6-5-7
43-44.5	3-4-4
48-49.5	4-3-2
53-59.5	6-9-9
58.5-60	3-6-5

DISTURBED SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-2

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-2
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	60'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 4 / UNDISTURBED 9
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	10' AFTER 12 DAYS CAVED @ 11'
16. DATE HOLE	STARTED 08/29/08 / COMPLETED 08/29/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT (a): 16.2, 16.2, 14.3, 21.9, 17.2, 22.0, 21.5, 32.7, 27.3

DEPTH IN METERS (b): 10, 20, 30, 40, 50, 60

LEGEND (c)

CLASSIFICATION OF MATERIALS (Description) (d):

0'-19' - CLAY
HIGH PLASTICITY, SANDY, STIFF TO HARD, MOIST, REDDISH BROWN TO TAN AND GRAY, WITH IRON STAINS

19'-21' - SAND
CLAYEY, WET, GRAY, AND TAN

21'-43' - CLAY

21'-33' -
LOW PLASTICITY, SANDY, V. STIFF TO HARD, DAMP, GRAY AND TAN

33'-43' -
HIGH PLASTICITY, V. STIFF TO HARD, DAMP, GRAY TO LIGHT BROWN, WITH IRON STAINS

43'-53' - SAND
SILTY TO WITH SILT, DENSE, WET, LIGHT BROWN TO TAN AND GRAY

53'-60' - CLAY
LOW TO HIGH PLASTICITY, STIFF TO V. STIFF, WET

% CORE RECOVERY (e) | BOX OR SAMPLE NO. (f)

REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g):

GPS - 31^ 01.943" N
093^ 12.619" W

AUGERED TO 6", 3', 8', 13', & 18' TO OBTAIN SAMPLES, BEGAN ROTARY WASH @ 20'.

SHELBY TUBES

DEPTH	PENETROMETER READING
3-5	3.25
8-10	4.50+
13-15	3.75
18-20	3.25
23-25	3.75
28-30	4.50
33-35	4.50
43-45	2.50
58-60	2.25

PENETRATION TESTS

DEPTH	BLOW COUNT
0.5-2	4-6-8
38-39.5	7-9-6
47.5-49	8-14-21
52.5-54	4-5-7

UNDISTURBED SAMPLES SEALED IN TUBES. DISTURBED SAMPLES SEALED IN JARS. ALL SAMPLES LABELED BY BORING NO. AND DEPTH OF SAMPLE.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-3

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-3
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	60'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 14 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	14' AFTER 24 HRS CAVED @ 15'
16. DATE HOLE	STARTED 09/10/08 / COMPLETED 09/10/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT (a)

DEPTH IN METERS (b): 10, 20, 30, 40, 50, 60

LEGEND (c): VISUAL

CLASSIFICATION OF MATERIALS (Description) (d):

0'-1' - SAND
SILTY, M. DENSE, DAMP, LIGHT BROWN

1'-47' - CLAY
HIGH PLASTICITY, STIFF TO V. STIFF, MOIST LIGHT GRAY AND TAN, WITH LAYERS OF LOW PLASTICITY CLAY

47'-55' - SAND
SILTY, M. DENSE, WET, GRAY AND REDDISH BROWN

55'-60' - CLAY
HIGH PLASTICITY, SANDY, STIFF, MOIST, GRAY, WITH SAND LAYERS

% CORE RECOVERY (e) | BOX OR SAMPLE NO. (f)

REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g):

GPS - 31^ 01.910 N
093^ 12.619 W

BEGAN ROTARY WASH @ 1.5'

PENETRATION TESTS

DEPTH	BLOW COUNT
0-1.5	4-4-7
3-4.5	5-4-5
8-9.5	5-5-9
13-14.5	6-6-9
18-19.5	9-10-12
23-24.5	4-6-8
28-29.5	5-5-8
33-34.5	4-6-7
38-39.5	4-5-8
43-44.5	7-8-11
48-49.5	3-2-3
52-53.5	6-9-12
56-57.5	4-4-6
58.5-60	7-7-7

DISTURBED SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

NOTES:

1. USE THIS SHEET FOR BORING LOGS ONLY.
2. MOISTURE CONTENT, WHERE SHOWN, IS EXPRESSED AS PERCENT DRY WEIGHT AT TIME OF LABORATORY CLASSIFICATION.
3. LEGEND SHOWS OVERBURDEN MATERIALS CLASSIFIED ACCORDING TO ASTM D 2487 AND ASTM D 2488.
4. DESCRIPTION OF OVERBURDEN MATERIALS CHANGED TO CORRESPOND WITH LABORATORY CLASSIFICATION AS NECESSARY.
5. ORIGINAL DRILLING LOGS AVAILABLE AT CORPS OF ENGINEERS OFFICES.

Symbol | Description

Designed by: J. PICKERING | Date: | Rev.
Dwn by: J. PICKERING | Sol No.
Reviewed by: K. McCLESKEY | Contr No.
Submitted by: LESLIE L. PERRIN, P.E. CHIEF, GEOTECHNICAL SECTION | File name: | Plot date: $$date$$ | Plot scale:

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION ENG. SERVICES BRANCH

FORT POLK, LOUISIANA
ENLISTED UNACCOMPANIED PERSONNEL HOUSING
PN: 060130
LOGS OF BORINGS - 1 OF 4

Sheet reference number: B201

Contr No.

DESIGN FILE: $$cadd file name$$

$$time$$ $$date$$ $$user$$ $$cadd file name$$

$$REFERENCEFILE10$$ $$REFERENCEFILE11$$ $$REFERENCEFILE12$$ $$REFERENCEFILE13$$ $$REFERENCEFILE14$$

$$REFERENCEFILE5$$ $$REFERENCEFILE6$$ $$REFERENCEFILE7$$ $$REFERENCEFILE8$$ $$REFERENCEFILE9$$

REFERENCE FILES: $$REFERENCEFILE1$$ $$REFERENCEFILE2$$ $$REFERENCEFILE3$$ $$REFERENCEFILE4$$

DRILLING LOG — Hole No. 8A25-BK8-4

DRILLING LOG	DIVISION: SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-4
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	60'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 5 / UNDISTURBED 9
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	11' AFTER 24 HR CAVED @ 16'
16. DATE HOLE	STARTED 09/9/08 / COMPLETED 09/9/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

Columns: % MOISTURE CONTENT (a) | DEPTH IN METERS (b) | LEGEND (c) | CLASSIFICATION OF MATERIALS (Description) (d) | % CORE RECOVERY (e) | BOX OR SAMPLE NO. (f) | REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)

% Moisture content (top to bottom): 10.4, 17.3, 21.8, 18.1, 17.1, 30.9, 27.1, 19.2, 36.6, 31.9, 21.2, 22.0, 27.7, 23.1

Depth: 10, 20, 30, 40, 50, 60

Classification of materials:

0'-3.5' - SAND

0'-1.5' -
SILTY, LOOSE, MOIST, LIGHT BROWN & TAN

1.5'-6' -
CLAYEY, LOOSE, MOIST, REDDISH BROWN AND GRAY

3.5'-13' - CLAY
HIGH PLASTICITY, SANDY, V. STIFF, MOIST, REDDISH BROWN & TAN

13'-17' - SAND
CLAYEY, MOIST, REDDISH BROWN & TAN

17'-23' - CLAY
LOW PLASTICITY, MOIST, HARD, GRAY & TAN

23'-46' - CLAY
HIGH PLASTICITY, V. STIFF TO HARD, MOIST, GRAY & TAN

46'-56' - SAND
SILTY TO POORLY GRADED, M. DENSE TO LOOSE, WET, REDDISH TAN TO TAN & GRAY

56'-60' - CLAY
LOW PLASTICITY, SANDY, FIRM, WET, REDDISH TAN & REDDISH BROWN

Remarks:

GPS - 31^ 01.909" N
093^ 12.602" W

BEGAN ROTARY WASH @ 1.5'

PENETRATION TESTS

DEPTH	BLOW COUNT
0-1.5	2-3-3
48-49.5	7-7-5
52-53.5	6-3-4
56-57.5	3-3-2
58.5-60	3-3-3

SHELBY TUBES

DEPTH	PENETROMETER READING
4-6	3.75
8-10	4.25
13-15	4.50+
18-20	4.50+
23-25	4.50+
28-30	3.00
33-35	3.75
38-40	3.50
43-45	2.00

UNDISTURBED SAMPLES SEALED IN TUBES. DISTURBED SAMPLES SEALED IN JARS. ALL SAMPLES LABELED BY BORING NO. AND DEPTH OF SAMPLE.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-5

DRILLING LOG	DIVISION: SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-5
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	60'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 6 / UNDISTURBED 7
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	11' AFTER 24 HRS CAVED @ 13'
16. DATE HOLE	STARTED 9/9/08 / COMPLETED 9/9/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

Columns: % MOISTURE CONTENT (a) | DEPTH IN METERS (b) | LEGEND (c) | CLASSIFICATION OF MATERIALS (Description) (d) | % CORE RECOVERY (e) | BOX OR SAMPLE NO. (f) | REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)

Depth: 10, 20, 30, 40, 50, 60

Legend: VISUAL

Classification of materials:

0'-0.5' - SAND
LOAM, DRY, GRAY, W/ ROOTS

0.5'-4' - SAND
CLAYEY, LOOSE, MOIST YELLOWISH BROWN

4'-6' - CLAY
LOW PLASTICITY, SANDY, MOIST, YELLOWISH BROWN& GRAY

6'-13' - SAND
CLAYEY, LOOSE, DAMP, YELLOWISH BROWN

13'-32' - CLAY
HIGH PLASTICITY, STIFF TO V. STIFF, MOIST, LIGHT GRAY & TAN, W/ LAYERS OF LOW PLASTICITY CLAY

32'-53' - CLAY
LOW PLASTICITY, SANDY, STIFF, MOIST, GRAY & REDDISH BROWN

53'-60' - SAND
SILTY, DENSE, WET, GRAY & REDDISH BROWNS, W/ HIGH PLASTICITY CLAY LAYERS

Remarks:

GPS - 31^ 01.884" N
093^ 12.623" W

BEGAN ROTARY WASH @ 1.5'

PENETRATION TESTS

DEPTH	BLOW COUNT
0-1.5	2-2-3
13.5-15	3-3-5
33-34.5	6-5-4
37-38.5	3-5-7
53-54.5	9-16-20
58.5-60	11-19-25

SHELBY TUBES

DEPTH	PENETROMETER READING
4-6	4.5
9-11	0.5
18-20	3.75
23-25	NO REC.
28-30	2.75
43-45	1.75
48-50	1.50

UNDISTURBED SAMPLES SEALED IN TUBES. DISTURBED SAMPLES SEALED IN JARS. ALL SAMPLES LABELED BY BORING NO. AND DEPTH OF SAMPLE.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-6

DRILLING LOG	DIVISION: SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-6
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	60'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 7 / UNDISTURBED 7
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	11' AFTER 24 HRS CAVED @ 17'
16. DATE HOLE	STARTED 9/9/08 / COMPLETED 9/9/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

Columns: % MOISTURE CONTENT (a) | DEPTH IN METERS (b) | LEGEND (c) | CLASSIFICATION OF MATERIALS (Description) (d) | % CORE RECOVERY (e) | BOX OR SAMPLE NO. (f) | REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)

% Moisture content: 23.1

Depth: 10, 20, 30, 40, 50, 60

Legend: VISUAL; SM; VISUAL

Classification of materials:

0'-0.67' -
2.5" ASPHALTIC CONCRETE OVER 6" SOIL - CEMENT

0.67'-14' - SAND
CLAYEY, DENSE TO M. DENSE, DAMP, REDDISH BROWN AND TAN, WITH OCCASIONAL SILT LAYERS

14'-19' - CLAY
HIGH PLASTICITY, WITH SAND, STIFF TO V. STIFF, MOIST, LIGHT GRAY AND TAN, WITH LEAN CLAY LAYERS

19'-21' - SAND
SILTY, DAMP, GRAY AND TAN

21'-34' - CLAY
HIGH PLASTICITY, WITH SAND, V. STIFF, MOIST, LIGHT GRAY AND TAN, WITH LEAN CLAY LAYERS

34'-44' - SAND
MEDIUM DENSE, DAMP, GRAY AND REDDISH BROWN

44'-60' - CLAY
LOW PLASTICITY, SANDY, STIFF TO V. STIFF, MOIST, GRAY AND REDDISH BROWN, WITH SILTY SAND LAYERS

Remarks:

GPS - 31^ 01.881" N
093^ 12.599" W

BEGAN ROTARY WASH @ 1.5'

PENETRATION TESTS

DEPTH	BLOW COUNT
4-5.5	8-13-18
9-10.5	8-8-9
13-14.5	4-5-8
37-38.5	9-12-17
41-42.5	9-9-12
55-56.5	10-13-15
58.5-60	7-9-9

SHELBY TUBES

DEPTH	PENETROMETER READING
1-3	4.50
18-20	3.50
23-25	2.00
28-30	2.50
33-35	0.50
45-47	3.50
50-52	1.25

UNDISTURBED SAMPLES SEALED IN TUBES. DISTURBED SAMPLES SEALED IN JARS. ALL SAMPLES LABELED BY BORING NO. AND DEPTH OF SAMPLE.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

NOTES:

1. USE THIS SHEET FOR BORING LOGS ONLY.
2. MOISTURE CONTENT, WHERE SHOWN, IS EXPRESSED AS PERCENT DRY WEIGHT AT TIME OF LABORATORY CLASSIFICATION.
3. LEGEND SHOWS OVERBURDEN MATERIALS CLASSIFIED ACCORDING TO ASTM D 2487 AND ASTM D 2488.
4. DESCRIPTION OF OVERBURDEN MATERIALS CHANGED TO CORRESPOND WITH LABORATORY CLASSIFICATION AS NECESSARY.
5. ORIGINAL DRILLING LOGS AVAILABLE AT CORPS OF ENGINEERS OFFICES.

US Army Corps of Engineers
Fort Worth District

Symbol	Description	Date	Approved	Rev.

Designed by: J. PICKERING
Dwn by: J. PICKERING
Reviewed by: K. McCLESKEY
Submitted by: LESLIE L. PERRIN, P.E. CHIEF, GEOTECHNICAL SECTION
Date: Sol No. Contr No. Plot scale:

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION ENG. SERVICES BRANCH

FORT POLK, LOUISIANA
ENLISTED UNACCOMPANIED PERSONNEL HOUSING
PN: 060130

LOGS OF BORINGS - 2 OF 4

Sheet reference number: B202

DRILLING LOG — Hole No. 8A25-BK8-7

DRILLING LOG	DIVISION SOUTHWESTERN	INSTALLATION FT. WORTH DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT: EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station): FORT POLK, LA
3. DRILLING AGENCY: GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number): 8A25-BK8-7
5. NAME OF DRILLER: ROBERT LEGGETT
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: N/A
8. DEPTH DRILLED INTO ROCK: N/A
9. TOTAL DEPTH OF HOLE: 10'
10. SIZE AND TYPE OF BIT: 6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL: DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER: NONE ENCOUNTERED
16. DATE HOLE: STARTED 8/27/08 COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE: NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: N.J. GORSHA

% MOISTURE CONTENT (a)	DEPTH IN METERS (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
13.0			0'-3' - SAND SILTY, LOOSE, DAMP, BROWN, ROOTS IN UPPER 6"			GPS - 31^ 01.950 N 093^ 12.645 W
	2		3'-10' - CLAY HIGH PLASTICITY, FIRM TO STIFF, MOIST, LIGHT GRAY, W/ IRON STAINS			AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS
	4					PENETRATION TESTS DEPTH / BLOW COUNT 0.5-2 / 3-5-4 4.5-6 / 2-2-3 8.5-10 / 4-5-7
30.0	6					ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE
	8					
24.5	10					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-8

DRILLING LOG	DIVISION SOUTHWESTERN	INSTALLATION FT. WORTH DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT: EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station): FORT POLK, LA
3. DRILLING AGENCY: GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number): 8A25-BK8-8
5. NAME OF DRILLER: ROBERT LEGGETT
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: N/A
8. DEPTH DRILLED INTO ROCK: N/A
9. TOTAL DEPTH OF HOLE: 10'
10. SIZE AND TYPE OF BIT: 6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL: DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER: NONE ENCOUNTERED
16. DATE HOLE: STARTED 8/27/08 COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE: NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: N.J. GORSHA

% MOISTURE CONTENT (a)	DEPTH IN METERS (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
10.9			0'-2' - SAND CLAYEY, M. DENSE, DRY, LIGHT BROWN			GPS - 31^ 01.931 N 093^ 12.649 W
	2		2'-10' - CLAY HIGH PLASTICITY, FIRM TO STIFF, MOIST, LIGHT GRAY, W/ IRON STAINS & OCCASIONAL LOW PLASTICITY CLAY LAYERS			AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS
	4					PENETRATION TESTS DEPTH / BLOW COUNT 0.5-2 / 3-4-8 4.5-6 / 2-3-4 8.5-10 / 4-4-6
24.2	6					ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE
	8					
26.3	10					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-9

DRILLING LOG	DIVISION SOUTHWESTERN	INSTALLATION FT. WORTH DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT: EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station): FORT POLK, LA
3. DRILLING AGENCY: GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number): 8A25-BK8-9
5. NAME OF DRILLER: ROBERT LEGGETT
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: N/A
8. DEPTH DRILLED INTO ROCK: N/A
9. TOTAL DEPTH OF HOLE: 10'
10. SIZE AND TYPE OF BIT: 6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL: DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER: NONE ENCOUNTERED
16. DATE HOLE: STARTED 8/27/08 COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE: NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: N.J. GORSHA

% MOISTURE CONTENT (a)	DEPTH IN METERS (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
14.5			0'-1.5' - SAND CLAYEY, M. DENSE, DRY LIGHT BROWN			GPS - 31^ 01.893 N 093^ 12.647 W
	2		1.5'-10' - CLAY HIGH PLASTICITY, FIRM TO STIFF, MOIST, LIGHT GRAY, W/ IRON STAINS & OCCASIONAL LOW PLASTICITY CLAY LAYERS			AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS
	4					PENETRATION TESTS DEPTH / BLOW COUNT 0.5-2 / 3-5-5 4.5-6 / 3-2-4 8.5-10 / 4-6-5
31.0	6					ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE
	8					
28.6	10					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-10

DRILLING LOG	DIVISION SOUTHWESTERN	INSTALLATION FT. WORTH DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT: EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station): FORT POLK, LA
3. DRILLING AGENCY: GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number): 8A25-BK8-10
5. NAME OF DRILLER: ROBERT LEGGETT
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: N/A
8. DEPTH DRILLED INTO ROCK: N/A
9. TOTAL DEPTH OF HOLE: 10'
10. SIZE AND TYPE OF BIT: 6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL: DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER: NONE ENCOUNTERED
16. DATE HOLE: STARTED 8/27/08 COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE: NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: N.J. GORSHA

% MOISTURE CONTENT (a)	DEPTH IN METERS (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
9.2			0'-3' - SAND SILTY, M. DENSE, DRY, GRAYISH, BROWN, W/ROOTS IN TOP 6"			GPS - 31^ 01.873 N 093^ 12.648 W
	2		3'-10' - CLAY HIGH PLASTICITY, STIFF, LIGHT GRAY TO TAN, W/ IRON STAINS & OCCASIONAL LOW PLASTICITY CLAY LAYERS			AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS
	4					PENETRATION TESTS DEPTH / BLOW COUNT 0.5-2 / 4-7-7 4.5-6 / 4-7-6 8.5-10 / 3-5-5
14.7	6					ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE
	8					
31.4	10					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-11

DRILLING LOG	DIVISION SOUTHWESTERN	INSTALLATION FT. WORTH DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT: EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station): FORT POLK, LA
3. DRILLING AGENCY: GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number): 8A25-BK8-11
5. NAME OF DRILLER: ROBERT LEGGETT
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: N/A
8. DEPTH DRILLED INTO ROCK: N/A
9. TOTAL DEPTH OF HOLE: 10'
10. SIZE AND TYPE OF BIT: 6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL: DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER: NONE ENCOUNTERED
16. DATE HOLE: STARTED 8/27/08 COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE: NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: N.J. GORSHA

% MOISTURE CONTENT (a)	DEPTH IN METERS (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
9.2			0'-1' - SAND SILTY, LOOSE, DRY BROWN, W/GRAVEL AND ROOTS IN TOP 6"			GPS - 31^ 01.880 N 093^ 12.673 W
	2		1'-10' - CLAY HIGH PLASTICITY, FIRM, MOIST, LIGHT GRAY, W/ SAND & IRON STAINS AND OCCASIONAL LOW PLASTICITY CLAY LAYERS			AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS
	4					PENETRATION TESTS DEPTH / BLOW COUNT 0.5-2 / 3-4-6 4.5-6 / 1-2-2 8.5-10 / 2-3-5
28.8	6					ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE
	8					
32.0	10					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-12

DRILLING LOG	DIVISION SOUTHWESTERN	INSTALLATION FT. WORTH DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT: EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station): FORT POLK, LA
3. DRILLING AGENCY: GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number): 8A25-BK8-12
5. NAME OF DRILLER: ROBERT LEGGETT
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: N/A
8. DEPTH DRILLED INTO ROCK: N/A
9. TOTAL DEPTH OF HOLE: 10'
10. SIZE AND TYPE OF BIT: 6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL: DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3 UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER: 8.5' AFTER 48 HRS
16. DATE HOLE: STARTED 8/27/08 COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE: NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: N.J. GORSHA

% MOISTURE CONTENT (a)	DEPTH IN METERS (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
13.8			0'-10' - SAND SILTY, LOOSE TO M. DENSE, DAMP, BROWN, LIGHT GRAY AND TAN, W/ ROOTS IN TOP 6"			GPS - 31^ 01.880 N 093^ 12.690 W
	2					AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS
	4					PENETRATION TESTS DEPTH / BLOW COUNT 0.5-2 / 2-4-3 4.5-6 / 3-4-6 8.5-10 / 2-3-5
14.6	6					ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE
	8					
19.2	10					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

NOTES:

1. USE THIS SHEET FOR BORING LOGS ONLY.
2. MOISTURE CONTENT, WHERE SHOWN, IS EXPRESSED AS PERCENT DRY WEIGHT AT TIME OF LABORATORY CLASSIFICATION.
3. LEGEND SHOWS OVERBURDEN MATERIALS CLASSIFIED ACCORDING TO ASTM D 2487 AND ASTM D 2488.
4. DESCRIPTION OF OVERBURDEN MATERIALS CHANGED TO CORRESPOND WITH LABORATORY CLASSIFICATION AS NECESSARY.
5. ORIGINAL DRILLING LOGS AVAILABLE AT CORPS OF ENGINEERS OFFICES.

US Army Corps of Engineers
Fort Worth District

Symbol	Description	Date	Approved

Designed by: J. PICKERING — Dwn by: J. PICKERING — Reviewed by: K. McCLESKEY — Submitted by: LESLIE L. PERRIN, P.E. CHIEF, GEOTECHNICAL SECTION

Date: — Sol No. — Contr No. — Plot date: $$date$$ — Plot scale: — File name: — Rev.

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION ENG. SERVICES BRANCH

FORT POLK, LOUISIANA
ENLISTED UNACCOMPANIED PERSONNEL HOUSING
PN: 060130
LOGS OF BORINGS - 3 OF 4

Sheet reference number: B203

DESIGN FILE: $$cadd file name$$

Contr No.

$$time$$ $$date$$ $$user$$ $$cadd file name$$

REFERENCE FILES: $$REFERENCEFILE1$$ $$REFERENCEFILE2$$ $$REFERENCEFILE3$$ $$REFERENCEFILE4$$ $$REFERENCEFILE5$$ $$REFERENCEFILE6$$ $$REFERENCEFILE7$$ $$REFERENCEFILE8$$ $$REFERENCEFILE9$$ $$REFERENCEFILE10$$ $$REFERENCEFILE11$$ $$REFERENCEFILE12$$ $$REFERENCEFILE13$$ $$REFERENCEFILE14$$

DRILLING LOG — Hole No. 8A25-BK8-13

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-13
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	10'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 3 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	NONE ENCOUNTERED
16. DATE HOLE	STARTED 8/27/08 / COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT (a)	DEPTH IN METERS (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
13.1	2		0'-3.5' - SAND SILTY, LOOSE, DAMP, GRAYISH BROWN 3.5'-10' - CLAY HIGH PLASTICITY, FIRM TO STIFF, MOIST, LIGHT GRAY AND TAN, W/ IRON STAINS, AND OCCASIONAL LOW PLASTICITY CLAY LAYERS			GPS - 31^ 01.913 N 093^ 12.674 W AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS PENETRATION TESTS DEPTH / BLOW COUNT 0.5-2 / 2-4-3 4.5-6 / 2-3-3 8.5-10 / 4-5-7 ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE
23.2	4, 6					
24.7	8, 10					

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71 | PROJECT | HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-14

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-14
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	10'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 3 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	8.5' AFTER 48 HRS
16. DATE HOLE	STARTED 8/27/08 / COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT (a)	DEPTH IN METERS (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
12.6	2		0'-4' - SAND SILTY, LOOSE, DAMP, GRAYISH BROWN 4'-9' - CLAY HIGH PLASTICITY, FIRM, MOIST, LIGHT GRAY, W/ IRON STAINS & OCCASIONAL LOW PLASTICITY CLAY LAYERS 9'-10' - SAND CLAYEY, LOOSE, WET, LIGHT GRAY			GPS - 31^ 01.911 N 093^ 12.688 W AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS PENETRATION TESTS DEPTH / BLOW COUNT 0.5-2 / 3-4-5 4.5-6 / 2-2-4 8.5-10 / 2-2-4 ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE
23.6	4, 6					
22.5	8, 10					

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71 | PROJECT | HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-15

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-15
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	10'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 3 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	NONE ENCOUNTERED
16. DATE HOLE	STARTED 8/27/08 / COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT (a)	DEPTH IN METERS (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
11.7	2		0'-4' - SAND SILTY, LOOSE, DAMP, LIGHT BROWN AND GRAY 4'-10' - CLAY HIGH PLASTICITY, FIRM TO STIFF, MOIST, LIGHT GRAY, W/ IRON STAINS & OCCASIONAL LOW PLASTICITY CLAY LAYERS			GPS - 31^ 01.948 N 093^ 12.666 W AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS PENETRATION TESTS DEPTH / BLOW COUNT 0.5-2 / 3-3-5 4.5-6 / 2-3-2 8.5-10 / 3-5-4 ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE
26.0	4, 6					
21.2	8, 10					

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71 | PROJECT | HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-16

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-16
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	10'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 3 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	NONE ENCOUNTERED
16. DATE HOLE	STARTED 8/27/08 / COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT (a)	DEPTH IN METERS (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
9.5	2		0'-4' - SAND SILTY, LOOSE, DRY, LIGHT BROWN AND GRAY 4'-10' - CLAY HIGH PLASTICITY, FIRM TO STIFF, DAMP, LIGHT GRAY, W/ SAND, IRON STAINS & OCCASIONAL LOW PLASTICITY CLAY LAYERS			GPS - 31^ 01.949 N 093^ 12.686 W AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS PENETRATION TESTS DEPTH / BLOW COUNT 0.5-2 / 3-4-6 4.5-6 / 2-2-3 8.5-10 / 3-6-6 ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE
17.8	4, 6					
19.8	8, 10					

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71 | PROJECT | HOLE NO.

NOTES:

1. USE THIS SHEET FOR BORING LOGS ONLY.
2. MOISTURE CONTENT, WHERE SHOWN, IS EXPRESSED AS PERCENT DRY WEIGHT AT TIME OF LABORATORY CLASSIFICATION.
3. LEGEND SHOWS OVERBURDEN MATERIALS CLASSIFIED ACCORDING TO ASTM D 2487 AND ASTM D 2488.
4. DESCRIPTION OF OVERBURDEN MATERIALS CHANGED TO CORRESPOND WITH LABORATORY CLASSIFICATION AS NECESSARY.
5. ORIGINAL DRILLING LOGS AVAILABLE AT CORPS OF ENGINEERS OFFICES.

US Army Corps of Engineers
Fort Worth District

Symbol	Description	Date	Approved

Rev. | Date: | Designed by: J. PICKERING | Dwn by: J. PICKERING | Sol No. | Reviewed by: K. McCLESKEY | Contr No. | Submitted by: LESLIE L. PERRIN, P.E. CHIEF, GEOTECHNICAL SECTION | File name: | Plot date: $$date$$ | Plot scale:

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION ENG. SERVICES BRANCH

FORT POLK, LOUISIANA
ENLISTED UNACCOMPANIED PERSONNEL HOUSING
PN: 060130
LOGS OF BORINGS - 4 OF 4

Sheet reference number:
B204

DESIGN FILE: $$cadd file name$$

Contr No.

$$time$$ $$date$$ $$user$$ $$cadd file name$$

$$REFERENCEFILE10$$ $$REFERENCEFILE11$$ $$REFERENCEFILE12$$ $$REFERENCEFILE13$$ $$REFERENCEFILE14$$ $$REFERENCEFILE15$$

REFERENCE FILES: $$REFERENCEFILE1$$ $$REFERENCEFILE2$$ $$REFERENCEFILE3$$ $$REFERENCEFILE4$$ $$REFERENCEFILE5$$ $$REFERENCEFILE6$$ $$REFERENCEFILE7$$ $$REFERENCEFILE8$$ $$REFERENCEFILE9$$

APPENDIX B

LABORATORY TESTING DATA PLOTS

ENLISTED UNACCOMPANIED PERSONNEL HOUSING
PLASTICITY CHART

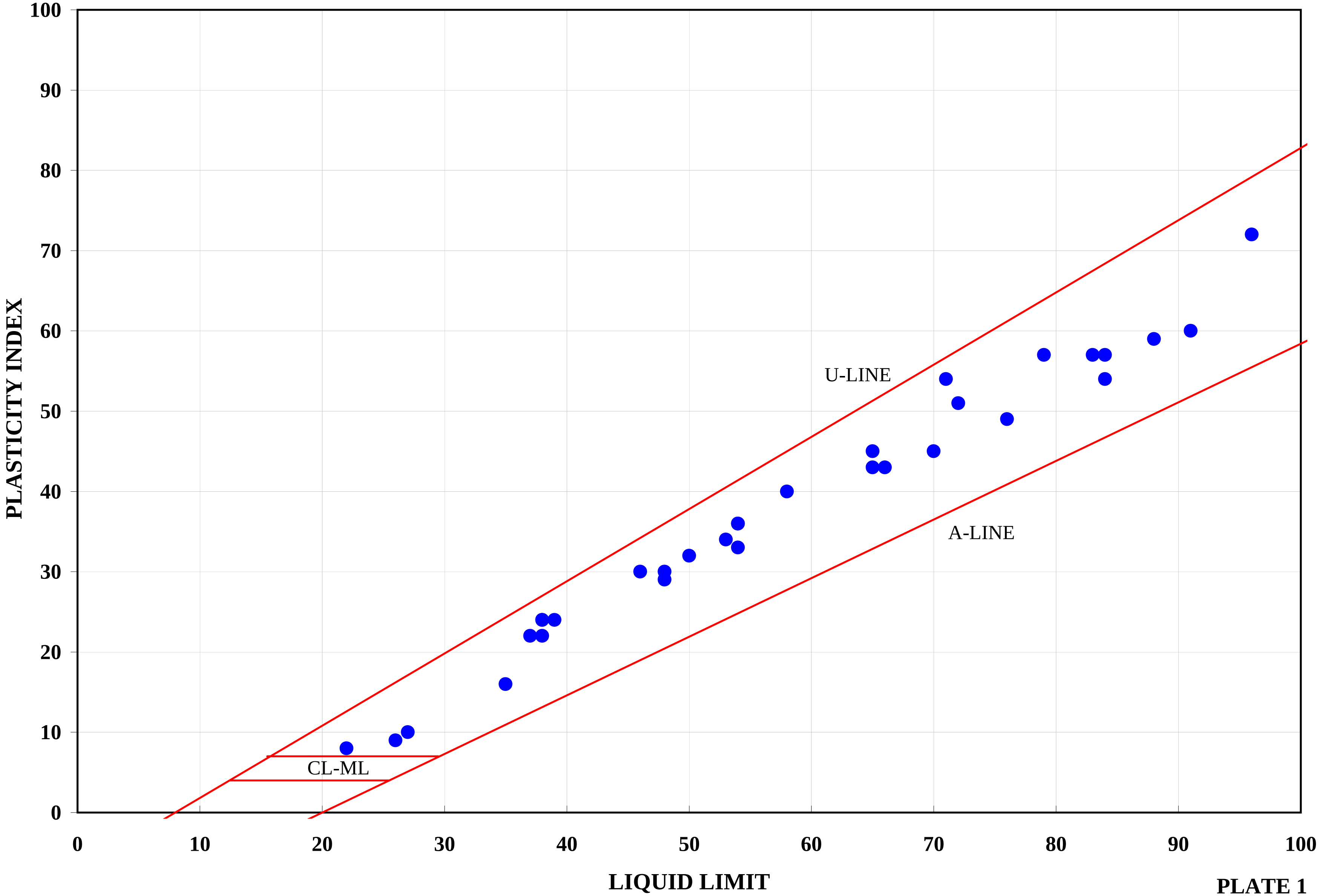


PLATE 1

Se

ENLISTED UNACCOMPANIED PERSONNEL HOUSING
MOISTURE CONTENT VS DEPTH

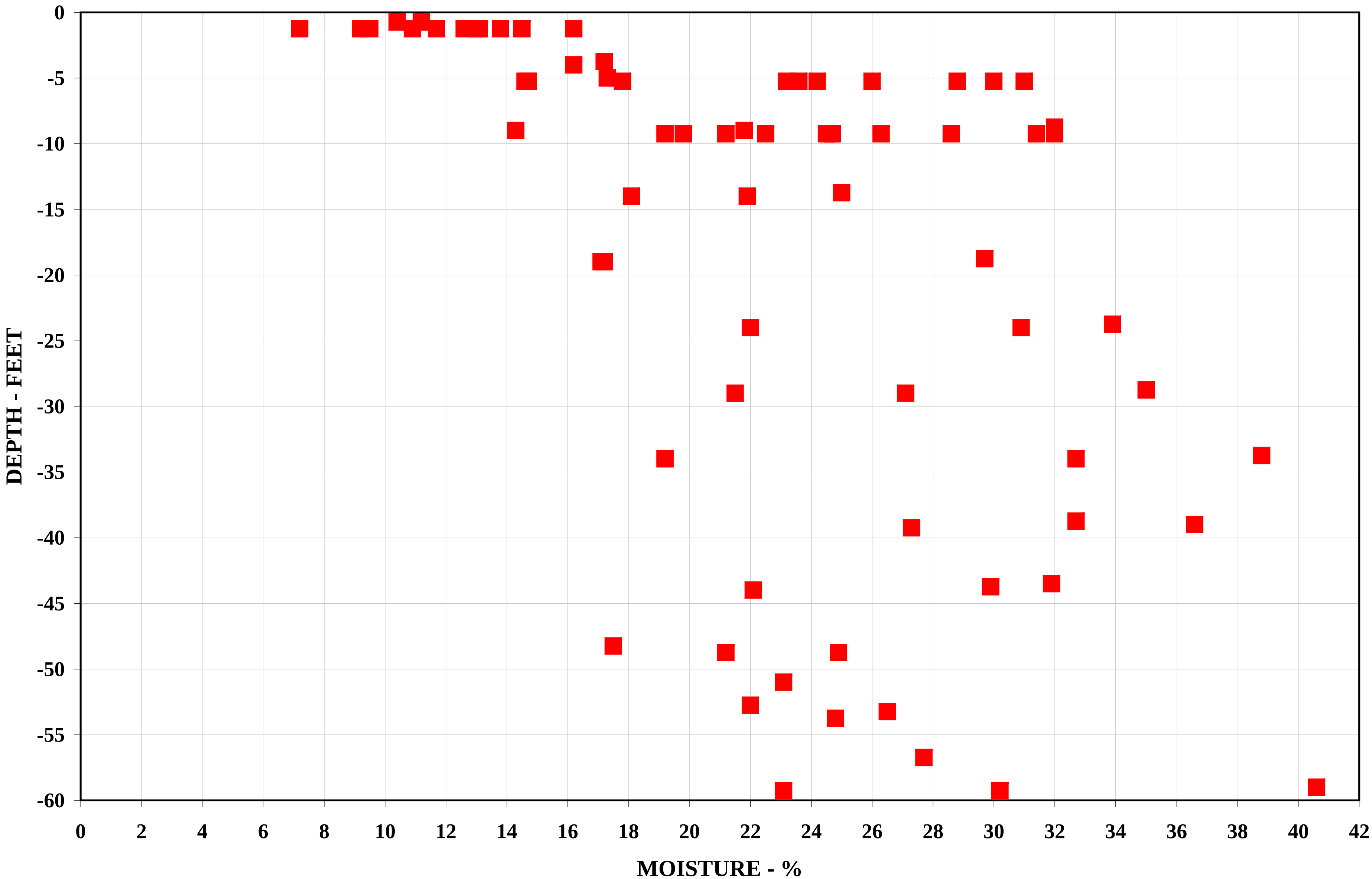


PLATE 2

ENLISTED UNACCOMPANIED PERSONNEL HOUSING
ATTERBERG LIMITS VS DEPTH

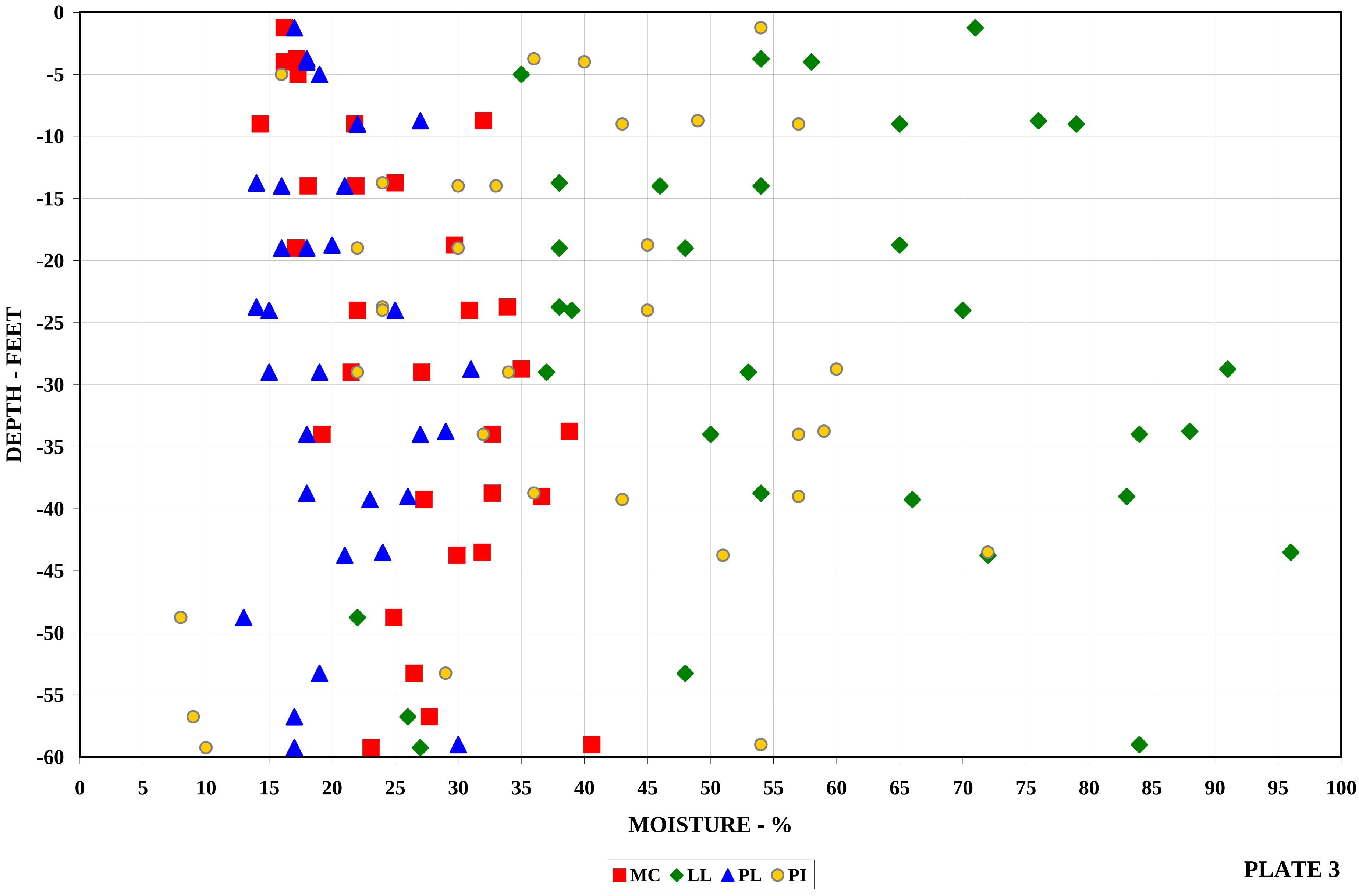


PLATE 3

ENLISTED UNACCOMPANIED PERSONNEL HOUSING
MOISTURE CONTENT - DRY DENSITY VS DEPTH

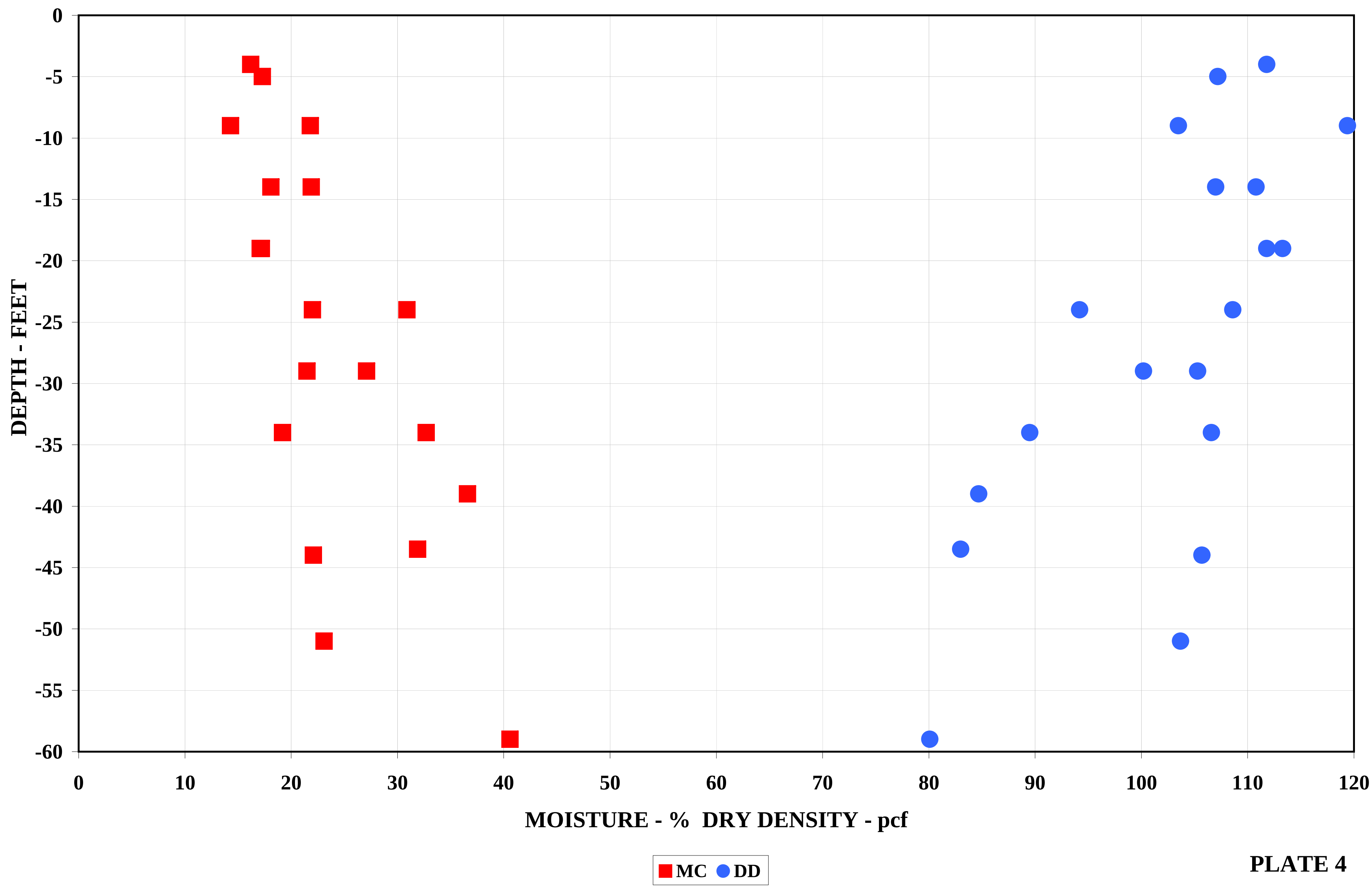


PLATE 4

ENLISTED UNACCOMPANIED PERSONNEL HOUSING
ULTIMATE COMPRESSIVE STRENGTH VS DEPTH

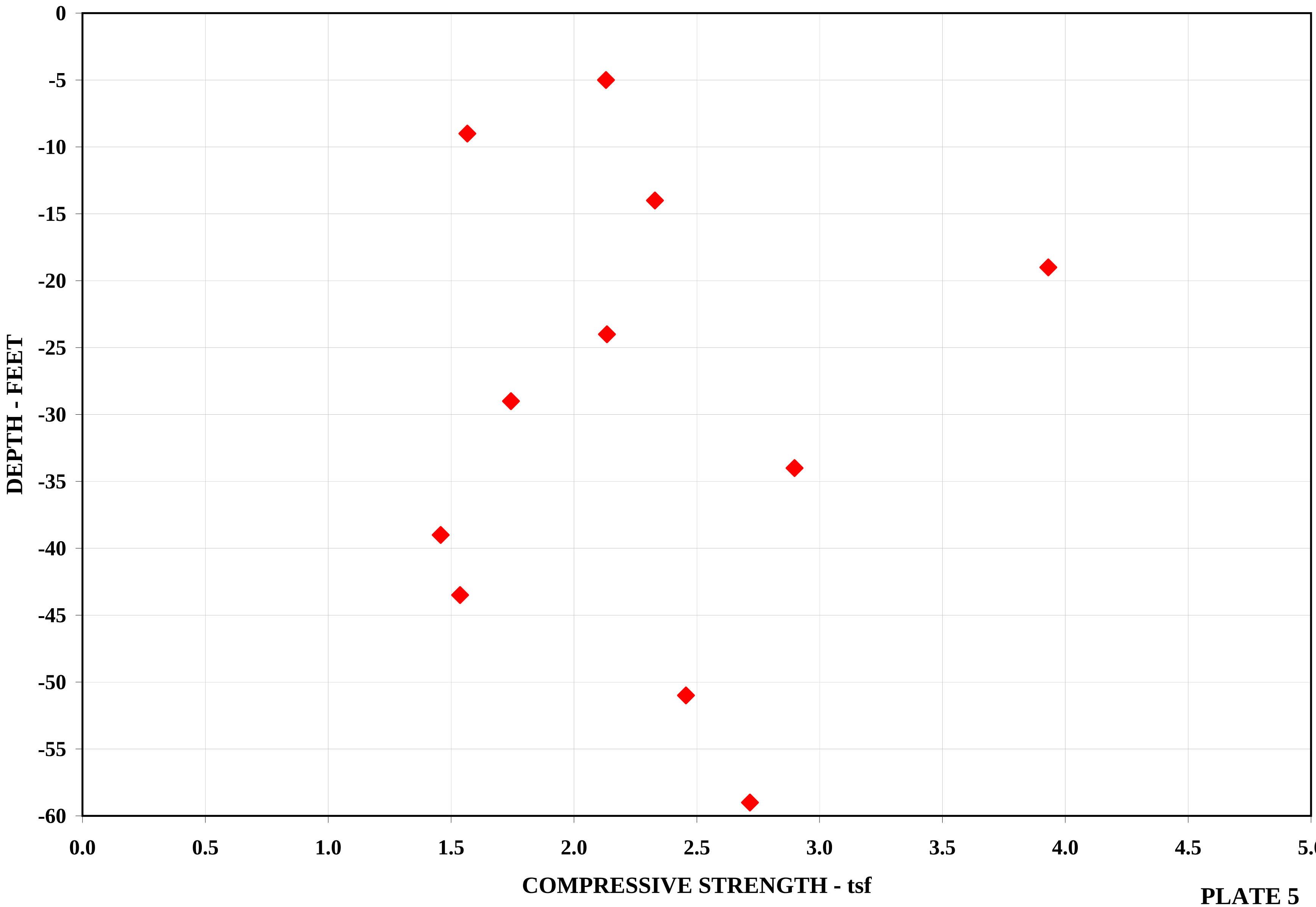


PLATE 5

ENLISTED UNACCOMPANIED PERSONNEL HOUSING
STANDARD PENETRATION TEST BLOW COUNTS VS DEPTH

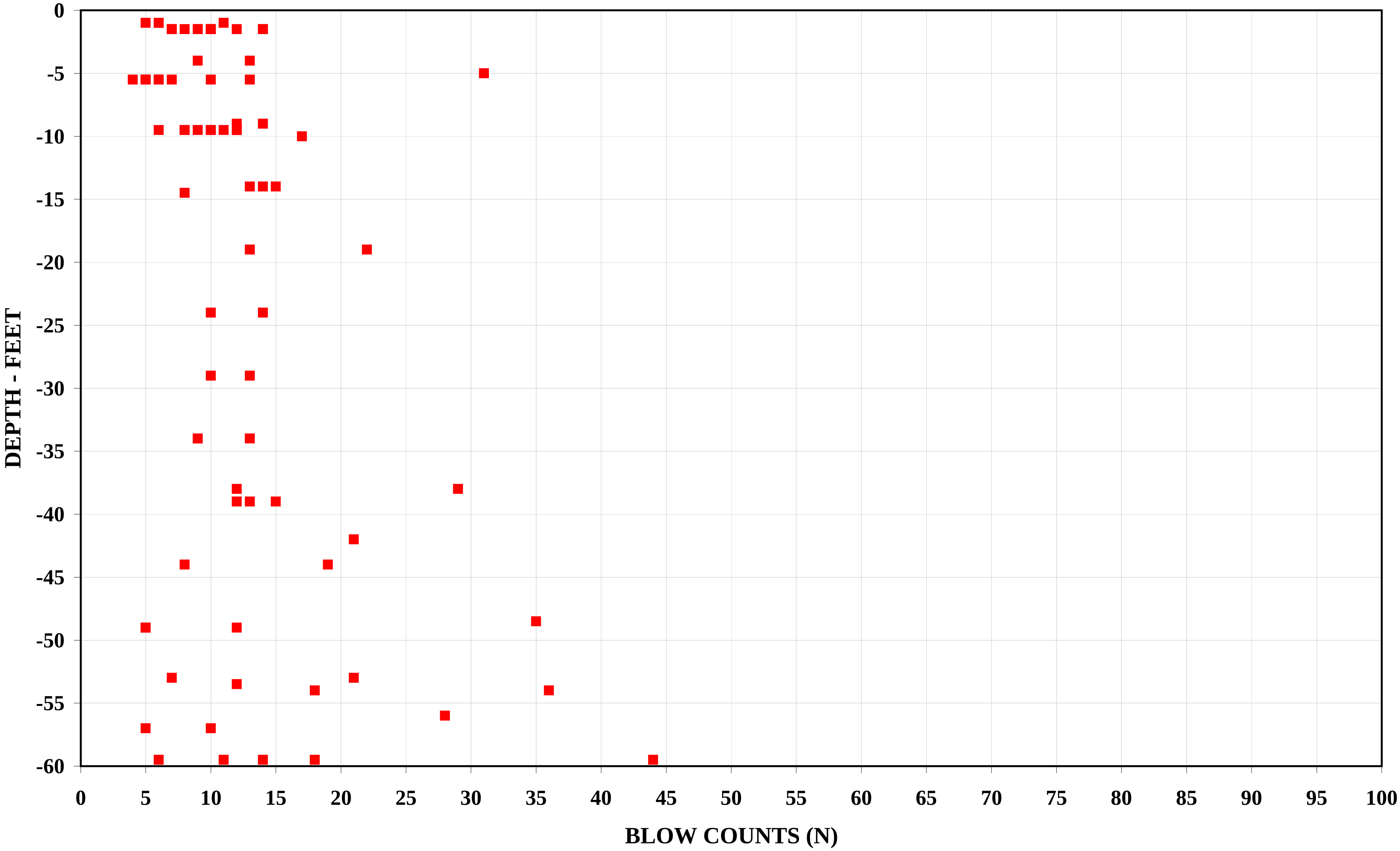


PLATE 6

APPENDIX C

LABORATORY TESTING DATA

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES
ENLISTED UNACCOMPANIED PERSONNEL HOUSING (EUPH) BARRACKS
FORT POLK , LOUISIANA

Boring No.	Sample Type	Sample Depth (ft.)	Visual Description & Unified Soil Classification (ASTM D-2488)		Percent Passing Sieve #4	#10	#20	#40	#60	#80	#100	#200
8A2S-BK8-1	Jar	0-1.5	Reddish brown silty sand with gravel	SM	84.8	81.1	79.2	74.8	66.8	55.2	49.0	29.0
	Jar	3-4.5	Light gray clay with sand	CH	100.0	100.0	99.8	99.7	98.7	95.8	93.9	81.3
	Jar	8-9.5	Light gray clay	CH	100.0	100.0	99.9	99.4	97.6	93.4	91.7	88.2
	Jar	13-14.5	Light gray and tan clay with sand	CL	100.0	100.0	100.0	99.7	97.6	90.1	84.6	71.2
	Jar	18-19.5	Light gray and tan clay	CH	100.0	100.0	100.0	100.0	99.6	99.0	98.4	93.8
	Jar	23-24.5	Tan and gray silty clay	CL	100.0	100.0	100.0	100.0	99.9	99.4	99.0	96.1
	Jar	28-29.5	Light brown, tan and gray clay	CH	100.0	100.0	100.0	100.0	99.9	99.7	99.6	98.0
	Jar	33-34.5	Light brown, tan and gray clay	CH	100.0	100.0	100.0	99.9	99.7	99.4	99.3	97.7
	Jar	38-39.5	Light gray and tan clay with sand	CH	100.0	100.0	100.0	99.8	98.6	92.1	87.4	74.3
	Jar	43-44.5	Light gray and tan clay with sand	CH	100.0	100.0	99.7	99.3	98.2	94.1	90.1	75.4
	Jar	48-49.5	Reddish brown and gray sandy clay	CL	100.0	100.0	100.0	99.8	94.3	79.8	73.6	51.7
	Jar	53-54.5	Reddish brown and gray silty sand	SM	99.6	99.6	99.5	99.0	92.2	77.5	67.3	33.8
	Jar	58.5-60	Light brown, tan and gray sandy silt	ML	100.0	100.0	99.9	99.2	90.5	75.4	68.4	50.2
8A2S-BK8-2	Jar	0.5-2	Reddish brown and gray sandy clay	CH	100.0	99.9	99.8	99.5	97.5	93.1	90.2	75.7
	Tube	3-5	Tan clay with iron stains	CH	100.0	100.0	100.0	100.0	99.6	97.9	96.5	85.3
	Tube	8-10	Reddish brown and gray sandy clay	CH	100.0	100.0	100.0	99.9	98.0	87.8	80.8	57.2
	Tube	13-15	Gray and tan clay with sand	CH	100.0	100.0	99.9	99.9	98.6	91.8	85.8	72.4
	Tube	18-20	Gray and tan clayey sand	SC	100.0	100.0	100.0	99.8	95.4	65.3	51.8	35.6
	Tube	23-25	Gray and tan sandy clay	CL	100.0	100.0	100.0	100.0	99.3	86.9	79.8	65.0
	Tube	28-30	Gray and tan sandy clay	CL	100.0	100.0	100.0	100.0	98.8	90.0	81.4	62.8
	Tube	33-35	Light gray clay with iron stains	CH	100.0	99.8	99.7	99.5	99.3	98.2	97.0	92.5
	Jar	38.5-40	Light brown and gray clay with sand	CH	100.0	100.0	100.0	99.9	99.4	97.2	93.3	76.0
	Tube	43-45	Light brown and tan silty sand	SM	100.0	99.9	99.6	90.1	41.1	31.0	29.4	21.1
	Jar	47.5-49	Tan and gray sand with silt	SP-SM	100.0	99.9	99.6	78.8	37.9	19.9	15.4	8.5
	Jar	52.5-54	Gray clay	CL	100.0	100.0	100.0	99.8	99.5	99.3	99.2	97.8
	Tube	58-60	Light gray and tan clay	CH	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.8

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES
ENLISTED UNACCOMPANIED PERSONNEL HOUSING (EUPH) BARRACKS
FORT POLK , LOUISIANA

Boring No.	Sample Type	Sample Depth (ft.)	Visual Description & Unified Soil Classification (ASTM D-2488)		Percent Passing Sieve #4	#10	#20	#40	#60	#80	#100	#200
8A2S-BK8-4	Jar	0-1.5	Light brown and tan silty sand	SM	98.7	98.5	98.5	97.9	92.7	67.4	53.2	32.0
	Tube	4-6	Tan, reddish brown and gray clayey sand	SC	100.0	100.0	100.0	99.8	98.0	93.2	86.7	34.4
	Tube	8-10	Reddish brown and tan sandy clay	CH	93.8	93.8	93.7	93.3	90.7	79.7	74.4	62.6
	Tube	13-15	Reddish brown and tan clayey sand	SC	100.0	100.0	100.0	99.4	84.4	62.7	56.8	48.0
	Tube	18-20	Gray and tan sandy clay	CL	100.0	100.0	100.0	100.0	99.0	94.1	89.5	63.0
	Tube	23-25	Gray and tan clay	CH	100.0	100.0	100.0	99.8	99.5	98.9	98.4	95.0
	Tube	28-30	Gray and tan clay	CH	100.0	100.0	100.0	100.0	99.6	98.1	96.9	89.5
	Tube	33-35	Gray and tan sandy clay	CH	100.0	100.0	100.0	100.0	96.7	81.3	71.3	50.5
	Tube	38-40	Gray and tan clay	CH	97.3	97.1	96.2	95.5	95.2	95.0	94.9	94.5
	Tube	43-44	Gray and tan clay	CH	100.0	100.0	100.0	99.9	99.9	99.7	99.6	99.0
	Jar	48-49.5	Reddish tan silty sand	SM	100.0	100.0	100.0	99.5	84.3	44.9	32.9	14.1
	Jar	52-53.5	Tan and gray sand with silt	SP-SM	100.0	100.0	100.0	99.3	75.4	34.3	22.4	9.0
	Jar	56-57.5	Reddish tan and gray sandy clay	CL	100.0	100.0	99.9	99.8	98.5	90.1	84.6	60.2
	Jar	58.5-60	Tan, gray and reddish brown sandy clay	CL	100.0	100.0	99.7	99.5	98.3	92.2	85.5	53.5
8A2S-BK8-6	Tube	50-52	Brown and gray sand with silt	SP-SM	100.0	100.0	100.0	99.4	71.1	19.1	11.1	5.4
10A2S-BK8-7	Jar	0.5-2	Brown silty sand	SM	93.6	92.7	91.9	89.3	82.4	69.2	61.7	36.8
	Jar	4.5-6	Tan and gray clay	CL	---	---	---	---	---	---	---	---
	Jar	8.5-10	Gray and light brown clay with sand	CL	---	---	---	---	---	---	---	---
10A2S-BK8-8	Jar	0.5-2	Light brown clayey sand	SC	---	---	---	---	---	---	---	---
	Jar	4.5-6	Light gray clay with iron stains	CH	---	---	---	---	---	---	---	---
	Jar	8.5-10	Light gray clay with iron stains	CH	---	---	---	---	---	---	---	---
10A2S-BK8-9	Jar	0.5-2	Light brown clayey sand	SC	---	---	---	---	---	---	---	---
	Jar	4.5-6	Light gray clay with iron stains	CH	---	---	---	---	---	---	---	---
	Jar	8.5-10	Light gray clay with iron stains	CH	---	---	---	---	---	---	---	---
10A2S-BK8-10	Jar	0.5-2	Grayish brown silty sand	SM	99.4	99.0	98.7	98.1	92.5	69.2	55.9	30.1
	Jar	4.5-6	Light gray clay with iron stains	CH	---	---	---	---	---	---	---	---
	Jar	8.5-10	Light gray and tan clay	CH	---	---	---	---	---	---	---	---
10A2S-BK8-11	Jar	0.5-2	Brown silty sand with gravel	CL	---	---	---	---	---	---	---	---
	Jar	4.5-6	Light gray clay with iron stains	CH	---	---	---	---	---	---	---	---
	Jar	8.5-10	Light gray clay with sand and iron stains	CL	---	---	---	---	---	---	---	---

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SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES
ENLISTED UNACCOMPANIED PERSONNEL HOUSING (EUPH) BARRACKS
FORT POLK , LOUISIANA

Boring No.	Sample Type	Sample Depth (ft.)	Visual Description & Unified Soil Classification (ASTM D-2488)		Percent Passing Sieve #4	#10	#20	#40	#60	#80	#100	#200
10A2S-BK8-12	Jar	0.5-2	Brown and tan silty sand	SM	---	---	---	---	---	---	---	---
	Jar	4.5-6	Light gray silty sand	SM	---	---	---	---	---	---	---	---
	Jar	8.5-10	Gray and brown silty sand	SM	---	---	---	---	---	---	---	---
10A2S-BK8-13	Jar	0.5-2	Grayish brown silty sand	SM	98.7	98.2	97.9	96.4	90.1	69.3	57.7	33.4
	Jar	4.5-6	Light gray clay with iron stains	CH	---	---	---	---	---	---	---	---
	Jar	8.5-10	Light gray and tan clay	CH	---	---	---	---	---	---	---	---
10A2S-BK8-14	Jar	0.5-2	Grayish brown silty sand	SM	---	---	---	---	---	---	---	---
	Jar	4.5-6	Light gray clay with iron stains	CH	---	---	---	---	---	---	---	---
	Jar	8.5-10	Light gray clayey sand	SC	---	---	---	---	---	---	---	---
10A2S-BK8-15	Jar	0.5-2	Light brown and gray silty sand	SM	---	---	---	---	---	---	---	---
	Jar	4.5-6	Light gray clay with iron stains	CH	---	---	---	---	---	---	---	---
	Jar	8.5-10	Light gray clay with iron stains	CH	---	---	---	---	---	---	---	---
10A2S-BK8-16	Jar	0.5-2	Light brown and gray silty sand	SM	100.0	100.0	99.7	98.7	91.5	65.7	52.6	26.4
	Jar	4.5-6	Light gray clay with sand and iron stains	CH	---	---	---	---	---	---	---	---
	Jar	8.5-10	Light gray clay with sand and iron stains	CL	---	---	---	---	---	---	---	---

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES
ENLISTED UNACCOMPANIED PERSONNEL HOUSING (EUPH) BARRACKS
FORT POLK , LOUISIANA

Boring No.	Sample Type	Sample Depth (ft.)	Visual Description & Unified Soil Classification (ASTM D-2488)		Moisture Content (%)	Unit Dry Weight (pcf)	Atterberg Limits LL	PL	PI	Consolidation Test
8A2S-BK8-1	Jar	0-1.5	Reddish brown silty sand with gravel	SM	11.2	---	Non-Plastic			
	Jar	3-4.5	Light gray clay with sand	CH	17.2	---	54	18	36	
	Jar	8-9.5	Light gray clay	CH	32.0	---	76	27	49	
	Jar	13-14.5	Light gray and tan clay with sand	CL	25.0	---	38	14	24	
	Jar	18-19.5	Light gray and tan clay	CH	29.7	---	65	20	45	
	Jar	23-24.5	Tan and gray silty clay	CL	33.9	---	38	14	24	
	Jar	28-29.5	Light brown, tan and gray clay	CH	35.0	---	91	31	60	
	Jar	33-34.5	Light brown, tan and gray clay	CH	38.8	---	88	29	59	
	Jar	38-39.5	Light gray and tan clay with sand	CH	32.7	---	54	18	36	
	Jar	43-44.5	Light gray and tan clay with sand	CH	29.9	---	72	21	51	
	Jar	48-49.5	Reddish brown and gray sandy clay	CL	24.9	---	22	13	8	
	Jar	53-54.5	Reddish brown and gray silty sand	SM	24.8	---	Non-Plastic			
	Jar	58.5-60	Light brown, tan and gray sandy silt	ML	30.2	---	Non-Plastic			
8A2S-BK8-2	Jar	0.5-2	Reddish brown and gray sandy clay	CH	16.2	---	71	17	54	
	Tube	3-5	Tan clay with iron stains	CH	16.2	111.8	58	18	40	*
	Tube	8-10	Reddish brown and gray sandy clay	CH	14.3	119.4	65	22	43	
	Tube	13-15	Gray and tan clay with sand	CH	21.9	107.0	54	21	33	
	Tube	18-20	Gray and tan clayey sand	SC	17.2	111.8	48	18	30	
	Tube	23-25	Gray and tan sandy clay	CL	22.0	108.6	39	15	24	
	Tube	28-30	Gray and tan sandy clay	CL	21.5	105.3	37	15	22	
	Tube	33-35	Light gray clay with iron stains	CH	32.7	89.5	84	27	57	*
	Jar	38.5-40	Light brown and gray clay with sand	CH	27.3	---	66	23	43	
	Tube	43-45	Light brown and tan silty sand	SM	22.1	105.7	Non-Plastic			
	Jar	47.5-49	Tan and gray sand with silt	SP-SM	17.5	---	Non-Plastic			
	Jar	52.5-54	Gray clay	CL	26.5	---	48	19	29	
	Tube	58-60	Light gray and tan clay	CH	40.6	80.1	84	30	54	*

* See attached "Laboratory Test Data Sheets" for Consolidation Test Results

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES
ENLISTED UNACCOMPANIED PERSONNEL HOUSING (EUPH) BARRACKS
FORT POLK , LOUISIANA

Boring No.	Sample Type	Sample Depth (ft.)	Visual Description & Unified Soil Classification (ASTM D-2488)		Moisture Content (%)	Unit Dry Weight (pcf)	Atterberg Limits LL	PL	PI	Consolidation Test
8A2S-BK8-4	Jar	0-1.5	Light brown and tan silty sand	SM	10.4	---		Non-Plastic		
	Tube	4-6	Tan, reddish brown and gray clayey sand	SC	17.3	107.2	35	19	16	
	Tube	8-10	Reddish brown and tan sandy clay	CH	21.8	103.5	79	22	57	
	Tube	13-15	Reddish brown and tan clayey sand	SC	18.1	110.8	46	16	30	
	Tube	18-20	Gray and tan sandy clay	CL	17.1	113.3	38	16	22	
	Tube	23-25	Gray and tan clay	CH	30.9	94.2	70	25	45	
	Tube	28-30	Gray and tan clay	CH	27.1	100.2	53	19	34	
	Tube	33-35	Gray and tan sandy clay	CH	19.2	106.6	50	18	32	
	Tube	38-40	Gray and tan clay	CH	36.6	84.7	83	26	57	
	Tube	43-44	Gray and tan clay	CH	31.9	83.0	96	24	72	
	Jar	48-49.5	Reddish tan silty sand	SM	21.2	---		Non-Plastic		
	Jar	52-53.5	Tan and gray sand with silt	SP-SM	22.0	---		Non-Plastic		
	Jar	56-57.5	Reddish tan and gray sandy clay	CL	27.7	---	26	17	9	
	Jar	58.5-60	Tan, gray and reddish brown sandy clay	CL	23.1	---	27	17	10	
8A2S-BK8-6	Tube	50-52	Brown and gray sand with silt	SP-SM	23.1	103.7		Non-Plastic		
10A2S-BK8-7	Jar	0.5-2	Brown silty sand	SM	13.0	---		Non-Plastic		
	Jar	4.5-6	Tan and gray clay	CL	30.0	---	---	---	---	
	Jar	8.5-10	Gray and light brown clay with sand	CL	24.5	---	---	---	---	
10A2S-BK8-8	Jar	0.5-2	Light brown clayey sand	SC	10.9	---	---	---	---	
	Jar	4.5-6	Light gray clay with iron stains	CH	24.2	---	---	---	---	
	Jar	8.5-10	Light gray clay with iron stains	CH	26.3	---	---	---	---	
10A2S-BK8-9	Jar	0.5-2	Light brown clayey sand	SC	14.5	---	---	---	---	
	Jar	4.5-6	Light gray clay with iron stains	CH	31.0	---	---	---	---	
	Jar	8.5-10	Light gray clay with iron stains	CH	28.6	---	---	---	---	
10A2S-BK8-10	Jar	0.5-2	Grayish brown silty sand	SM	7.2	---		Non-Plastic		
	Jar	4.5-6	Light gray clay with iron stains	CH	14.7	---	---	---	---	
	Jar	8.5-10	Light gray and tan clay	CH	31.4	---	---	---	---	
10A2S-BK8-11	Jar	0.5-2	Brown silty sand with gravel	CL	9.2	---	---	---	---	
	Jar	4.5-6	Light gray clay with iron stains	CH	28.8	---	---	---	---	
	Jar	8.5-10	Light gray clay with sand and iron stains	CL	32.0	---	---	---	---	

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES
ENLISTED UNACCOMPANIED PERSONNEL HOUSING (EUPH) BARRACKS
FORT POLK , LOUISIANA

Boring No.	Sample Type	Sample Depth (ft.)	Visual Description & Unified Soil Classification (ASTM D-2488)		Moisture Content (%)	Unit Dry Weight (pcf)	Atterberg Limits LL	PL	PI	Consolidation Test
10A2S-BK8-12	Jar	0.5-2	Brown and tan silty sand	SM	13.8	---	---	---	---	
	Jar	4.5-6	Light gray silty sand	SM	14.6	---	---	---	---	
	Jar	8.5-10	Gray and brown silty sand	SM	19.2	---	---	---	---	
10A2S-BK8-13	Jar	0.5-2	Grayish brown silty sand	SM	13.1	---		Non-Plastic		
	Jar	4.5-6	Light gray clay with iron stains	CH	23.2	---	---	---	---	
	Jar	8.5-10	Light gray and tan clay	CH	24.7	---	---	---	---	
10A2S-BK8-14	Jar	0.5-2	Grayish brown silty sand	SM	12.6	---	---	---	---	
	Jar	4.5-6	Light gray clay with iron stains	CH	23.6	---	---	---	---	
	Jar	8.5-10	Light gray clayey sand	SC	22.5	---	---	---	---	
10A2S-BK8-15	Jar	0.5-2	Light brown and gray silty sand	SM	11.7	---	---	---	---	
	Jar	4.5-6	Light gray clay with iron stains	CH	26.0	---	---	---	---	
	Jar	8.5-10	Light gray clay with iron stains	CH	21.2	---	---	---	---	
10A2S-BK8-16	Jar	0.5-2	Light brown and gray silty sand	SM	9.5	---		Non-Plastic		
	Jar	4.5-6	Light gray clay with sand and iron stains	CH	17.8	---	---	---	---	
	Jar	8.5-10	Light gray clay with sand and iron stains	CL	19.8	---	---	---	---	

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES
ENLISTED UNACCOMPANIED PERSONNEL HOUSING (EUPH) BARRACKS
FORT POLK , LOUISIANA

Boring No.	Sample Type	Sample Depth (ft.)	Visual Description & Unified Soil Classification (ASTM D-2488)		Moisture Content (%)	Unit Dry Weight (pcf)	Confining Pressure (tsf)	Q (tsf)	Strain @ Failure (%)	Type Failure
8A2S-BK8-1	Jar	0-1.5	Reddish brown silty sand with gravel	SM	11.2	---	---	---	---	
	Jar	3-4.5	Light gray clay with sand	CH	17.2	---	---	---	---	
	Jar	8-9.5	Light gray clay	CH	32.0	---	---	---	---	
	Jar	13-14.5	Light gray and tan clay with sand	CL	25.0	---	---	---	---	
	Jar	18-19.5	Light gray and tan clay	CH	29.7	---	---	---	---	
	Jar	23-24.5	Tan and gray silty clay	CL	33.9	---	---	---	---	
	Jar	28-29.5	Light brown, tan and gray clay	CH	35.0	---	---	---	---	
	Jar	33-34.5	Light brown, tan and gray clay	CH	38.8	---	---	---	---	
	Jar	38-39.5	Light gray and tan clay with sand	CH	32.7	---	---	---	---	
	Jar	43-44.5	Light gray and tan clay with sand	CH	29.9	---	---	---	---	
	Jar	48-49.5	Reddish brown and gray sandy clay	CL	24.9	---	---	---	---	
	Jar	53-54.5	Reddish brown and gray silty sand	SM	24.8	---	---	---	---	
	Jar	58.5-60	Light brown, tan and gray sandy silt	ML	30.2	---	---	---	---	
8A2S-BK8-2	Jar	0.5-2	Reddish brown and gray sandy clay	CH	16.2	---	---	---	---	
	Tube	3-5	Tan clay with iron stains	CH	16.2	111.8	---	---	---	
	Tube	8-10	Reddish brown and gray sandy clay	CH	14.3	119.4	---	---	---	
	Tube	13-15	Gray and tan clay with sand	CH	21.9	107.0	---	---	---	
	Tube	18-20	Gray and tan clayey sand	SC	17.2	111.8	---	---	---	
	Tube	23-25	Gray and tan sandy clay	CL	22.0	108.6	---	---	---	
	Tube	28-30	Gray and tan sandy clay	CL	21.5	105.3	---	---	---	
	Tube	33-35	Light gray clay with iron stains	CH	32.7	89.5	---	---	---	
	Jar	38.5-40	Light brown and gray clay with sand	CH	27.3	---	---	---	---	
	Tube	43-45	Light brown and tan silty sand	SM	22.1	105.7	---	*	*	*
	Jar	47.5-49	Tan and gray sand with silt	SP-SM	17.5	---	---	---	---	
	Jar	52.5-54	Gray clay	CL	26.5	---	---	---	---	
	Tube	58-60	Light gray and tan clay	CH	40.6	80.1	3.688	2.717	9.8	Multi-Angular (40^0-55^0)

* This sample was to fragile and fractured for strength testing.

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES
ENLISTED UNACCOMPANIED PERSONNEL HOUSING (EUPH) BARRACKS
FORT POLK , LOUISIANA

Boring No.	Sample Type	Sample Depth (ft.)	Visual Description & Unified Soil Classification (ASTM D-2488)		Moisture Content (%)	Unit Dry Weight (pcf)	Confining Pressure (tsf)	Q (tsf)	Strain @ Failure (%)	Type Failure
8A2S-BK8-4	Jar	0-1.5	Light brown and tan silty sand	SM	10.4	---	---	---	---	
	Tube	4-6	Tan, reddish brown and gray clayey sand	SC	17.3	107.2	0.312	2.131	12.6	Angular (70^0)
	Tube	8-10	Reddish brown and tan sandy clay	CH	21.8	103.5	0.562	1.566	9.3	Angular (50^0)
	Tube	13-15	Reddish brown and tan clayey sand	SC	18.1	110.8	0.875	2.330	10.1	Internal
	Tube	18-20	Gray and tan sandy clay	CL	17.1	113.3	1.187	3.931	15.1	Internal
	Tube	23-25	Gray and tan clay	CH	30.9	94.2	1.500	2.135	8.9	Internal
	Tube	28-30	Gray and tan clay	CH	27.1	100.2	1.812	1.744	13.1	Angular (45^0)
	Tube	33-35	Gray and tan sandy clay	CH	19.2	106.6	2.125	2.898	6.1	Angular (40^0)
	Tube	38-40	Gray and tan clay	CH	36.6	84.7	2.438	1.458	12.1	Angular (50^0)
	Tube	43-44	Gray and tan clay	CH	31.9	83.0	2.719	1.537	6.5	Angular (45^0)
	Jar	48-49.5	Reddish tan silty sand	SM	21.2	---	---	---	---	
	Jar	52-53.5	Tan and gray sand with silt	SP-SM	22.0	---	---	---	---	
	Jar	56-57.5	Reddish tan and gray sandy clay	CL	27.7	---	---	---	---	
	Jar	58.5-60	Tan, gray and reddish brown sandy clay	CL	23.1	---	---	---	---	
8A2S-BK8-6	Tube	50-52	Brown and gray sand with silt	SP-SM	23.1	103.7	3.188	2.456	15.0	Internal
10A2S-BK8-7	Jar	0.5-2	Brown silty sand	SM	13.0	---	---	---	---	
	Jar	4.5-6	Tan and gray clay	CL	30.0	---	---	---	---	
	Jar	8.5-10	Gray and light brown clay with sand	CL	24.5	---	---	---	---	
10A2S-BK8-8	Jar	0.5-2	Light brown clayey sand	SC	10.9	---	---	---	---	
	Jar	4.5-6	Light gray clay with iron stains	CH	24.2	---	---	---	---	
	Jar	8.5-10	Light gray clay with iron stains	CH	26.3	---	---	---	---	
10A2S-BK8-9	Jar	0.5-2	Light brown clayey sand	SC	14.5	---	---	---	---	
	Jar	4.5-6	Light gray clay with iron stains	CH	31.0	---	---	---	---	
	Jar	8.5-10	Light gray clay with iron stains	CH	28.6	---	---	---	---	
10A2S-BK8-10	Jar	0.5-2	Grayish brown silty sand	SM	7.2	---	---	---	---	
	Jar	4.5-6	Light gray clay with iron stains	CH	14.7	---	---	---	---	
	Jar	8.5-10	Light gray and tan clay	CH	31.4	---	---	---	---	
10A2S-BK8-11	Jar	0.5-2	Brown silty sand with gravel	CL	9.2	---	---	---	---	
	Jar	4.5-6	Light gray clay with iron stains	CH	28.8	---	---	---	---	
	Jar	8.5-10	Light gray clay with sand and iron stains	CL	32.0	---	---	---	---	

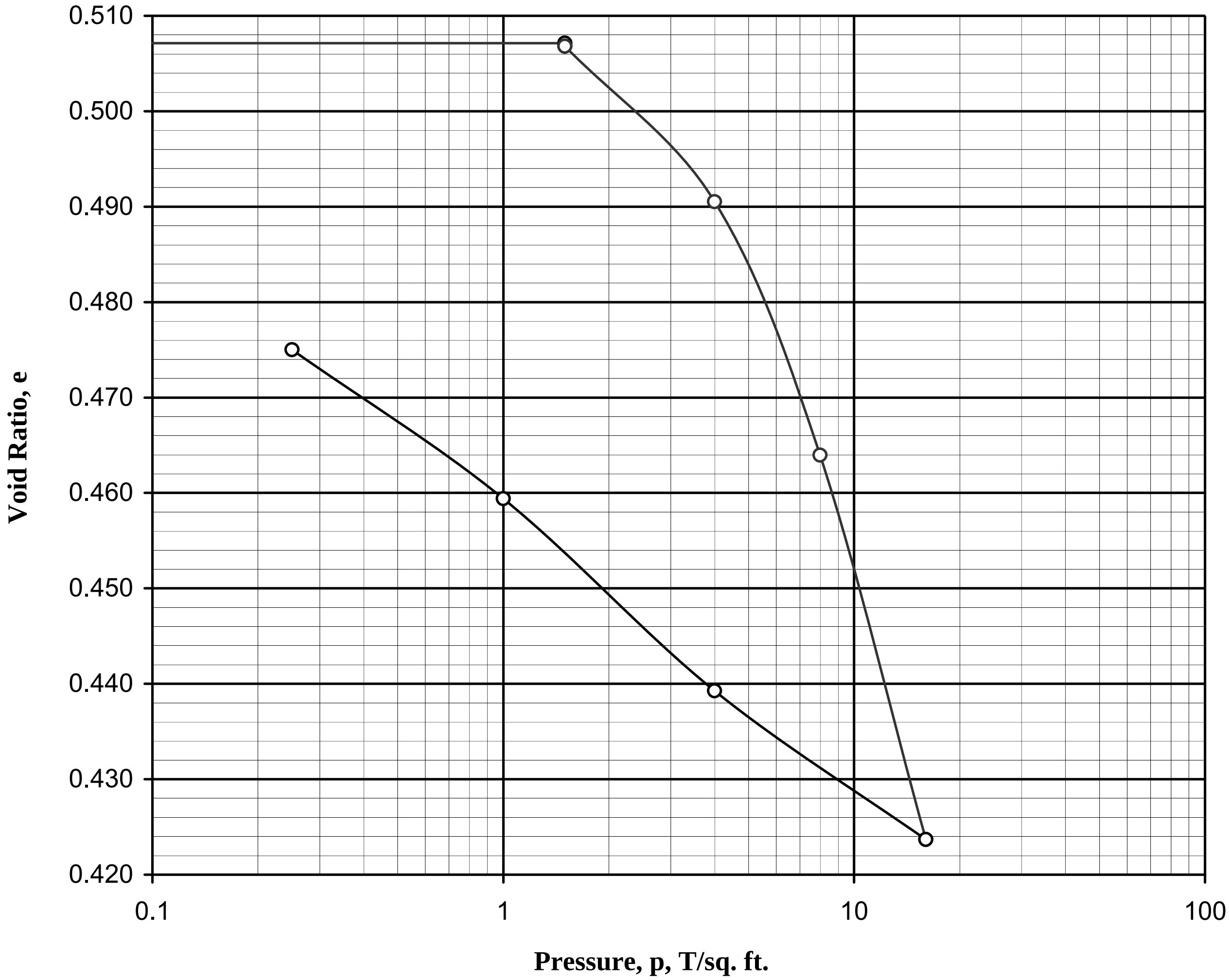
SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES
ENLISTED UNACCOMPANIED PERSONNEL HOUSING (EUPH) BARRACKS
FORT POLK , LOUISIANA

Boring No.	Sample Type	Sample Depth (ft.)	Visual Description & Unified Soil Classification (ASTM D-2488)		Moisture Content (%)	Unit Dry Weight (pcf)	Confining Pressure (tsf)	Q (tsf)	Strain @ Failure (%)	Type Failure
10A2S-BK8-12	Jar	0.5-2	Brown and tan silty sand	SM	13.8	---	---	---	---	
	Jar	4.5-6	Light gray silty sand	SM	14.6	---	---	---	---	
	Jar	8.5-10	Gray and brown silty sand	SM	19.2	---	---	---	---	
10A2S-BK8-13	Jar	0.5-2	Grayish brown silty sand	SM	13.1	---	---	---	---	
	Jar	4.5-6	Light gray clay with iron stains	CH	23.2	---	---	---	---	
	Jar	8.5-10	Light gray and tan clay	CH	24.7	---	---	---	---	
10A2S-BK8-14	Jar	0.5-2	Grayish brown silty sand	SM	12.6	---	---	---	---	
	Jar	4.5-6	Light gray clay with iron stains	CH	23.6	---	---	---	---	
	Jar	8.5-10	Light gray clayey sand	SC	22.5	---	---	---	---	
10A2S-BK8-15	Jar	0.5-2	Light brown and gray silty sand	SM	11.7	---	---	---	---	
	Jar	4.5-6	Light gray clay with iron stains	CH	26.0	---	---	---	---	
	Jar	8.5-10	Light gray clay with iron stains	CH	21.2	---	---	---	---	
10A2S-BK8-16	Jar	0.5-2		SM	9.5	---	---	---	---	
	Jar	4.5-6	Light gray clay with sand and iron stains	CH	17.8	---	---	---	---	
	Jar	8.5-10	Light gray clay with sand and iron stains	CL	19.8	---	---	---	---	

TEAM Consultants, Inc.

Geotechnical, Environmental, Construction Materials Testing



Type of specimen: Undisturbed		Before Test		After Test	
Diam. 2.50 in.	Ht. 0.464 in.	Water Content, w_o	16.20%	W_f	17.56%
Overburden Pressure, P_o T/sq. ft.		Void Ratio, e_o	0.5071	e_f	0.4750
Preconsol. Pressure, P_c T/sq. ft.		Saturation, S_o	86.3%	S_f	99.8%
Compression Index, C_c		Dry Density, γd	111.8 lb/ft^3		
Classification Tan clay with iron stains					
LL 58	G_s 2.700 (assumed)	Project	Fort Polk EUPH		
PL 18					
Remarks			Team Project No.: 082074		
		Boring No:	8A2S-BK8-2	Sample No.:	N/A
		Depth:	3-5	Date:	11/18/08
		CONSOLIDATION TEST REPORT			

Thursday, September 08, 2011

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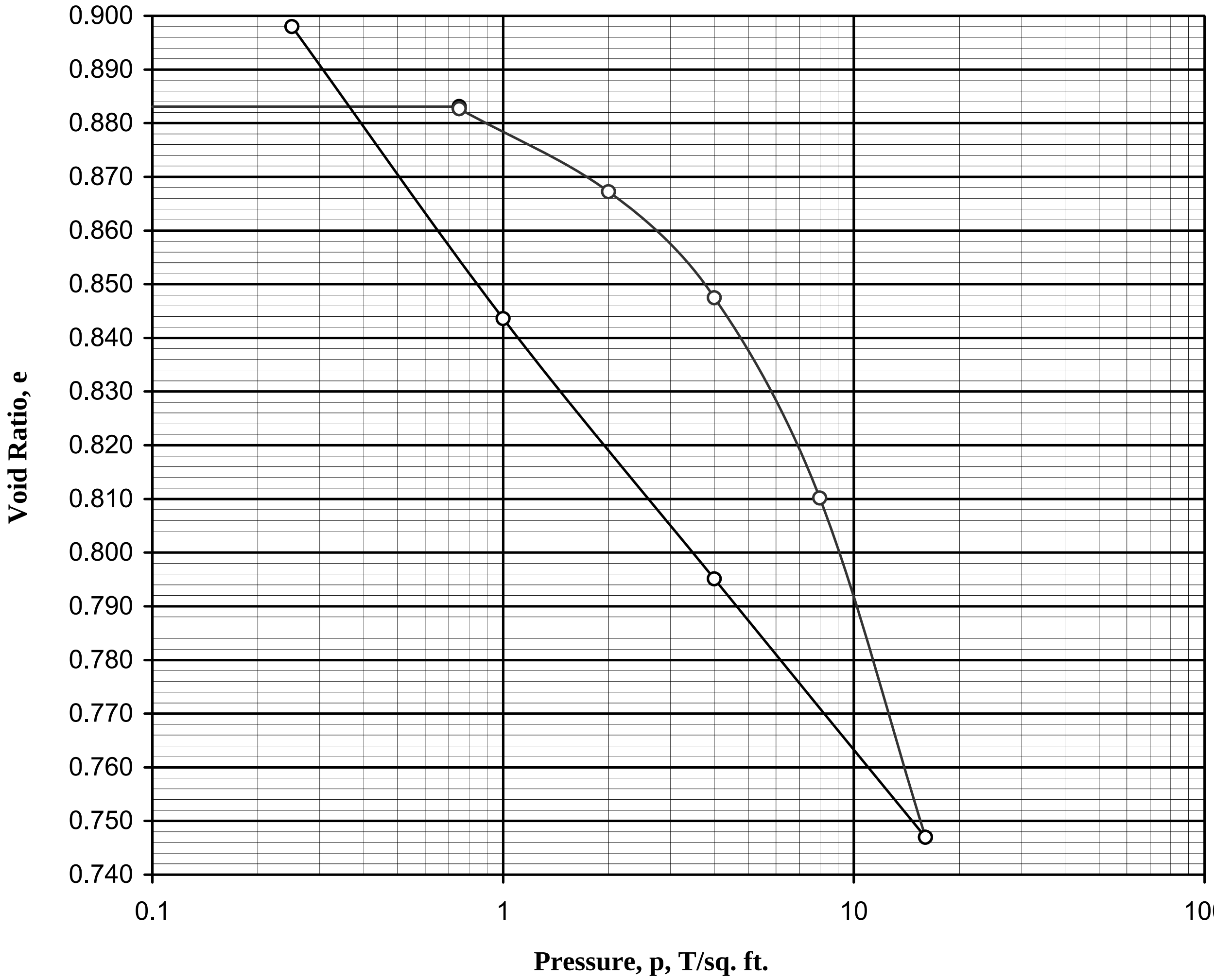

Type of specimen: Undisturbed		Before Test		After Test	
Diam. 2.50 in.	Ht. 0.505 in.	Water Content, w_o	32.71%	W_f	33.32%
Overburden Pressure, P_o T/sq. ft.		Void Ratio, e_o	0.8831	e_f	0.8980
Preconsol. Pressure, P_c T/sq. ft.		Saturation, S_o	100.0%	S_f	100.2%
Compression Index, C_c		Dry Density, γd	89.5 lb/ft^3		
Classification Light gray clay with iron stains					
LL 84	G_s 2.700 (assumed)	Project Fort Polk EUPH			
PL 27		Team Project No.: 082074			
Remarks					
		Boring No:	8A2S-BK8-2	Sample No.:	N/A
		Depth:	33-35	Date:	11/18/08
		CONSOLIDATION TEST REPORT			

Thursday, September 08, 2011

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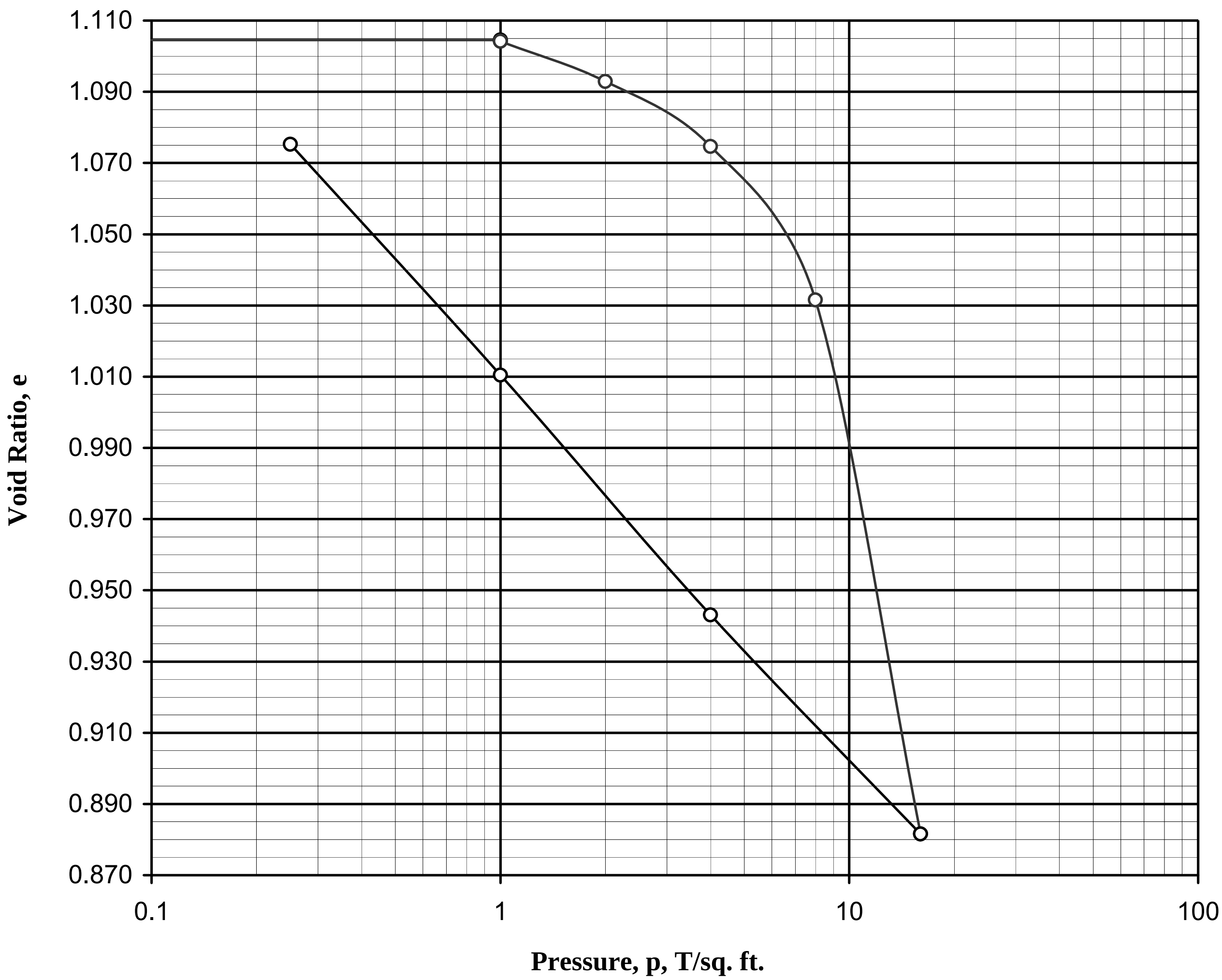


Type of specimen:	Undisturbed		Before Test		After Test	
Diam. 2.50 in.	Ht. 0.503 in.		Water Content, w_o	40.63%	W_f	40.36%
Overburden Pressure, P_o		T/sq. ft.	Void Ratio, e_o	1.1046	e_f	1.0753
Preconsol. Pressure, P_c		T/sq. ft.	Saturation, S_o	99.3%	S_f	101.3%
Compression Index, C_c			Dry Density, γd	80.1 lb/ft^3		
Classification	Light gray and tan clay					
LL 84	G_s 2.700 (assumed)		Project	Fort Polk EUPH		
PL 30				Team Project No.: 082074		
Remarks			Boring No:	8A2S-BK8-2	Sample No.:	N/A
			Depth:	58-60	Date:	11/18/08
			CONSOLIDATION TEST REPORT			

Thursday, September 08, 2011

APPENDIX D

DYNAMIC CONE PENETROMETER (DCP) TESTING DATA PLOTS

DCP TEST DATA

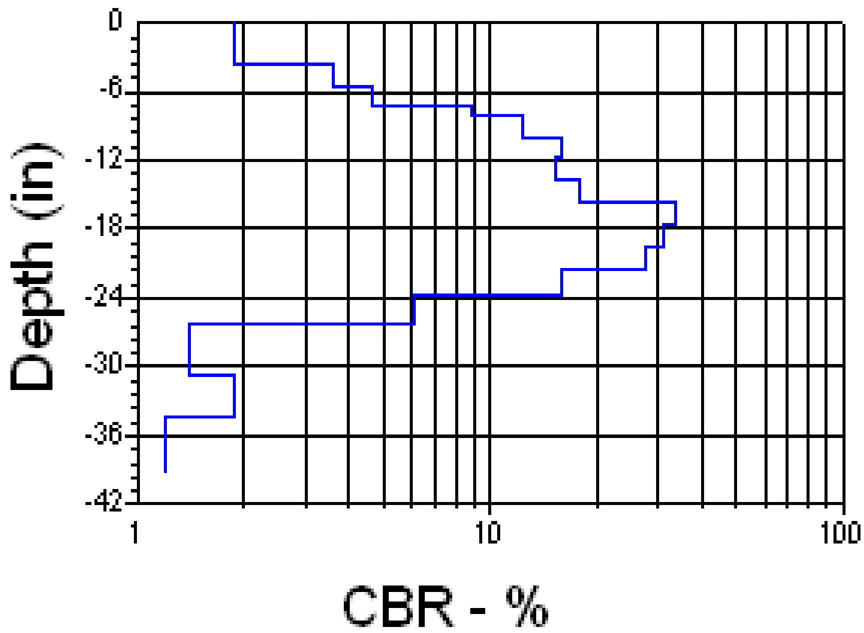
Project: Enlisted Unaccompanied Personnel Housing

Date: 27 August 2008

Feature: 10A2S-BK8-7

Station: 10A2S-BK8-7

CBR VS DEPTH



(MM)	TEST PROFILE	(IN)
0	SUBGRADE 6.00" CBR 3	0
127	UNASSIGNED 6.00" CBR 12	5
254	UNASSIGNED 6.00" CBR 25	10
381	UNASSIGNED 6.00" CBR 21	15
508	UNASSIGNED 6.00" CBR 4	20
635	UNASSIGNED 9.50" CBR 2	25
762		30
889		35
1016		40
1143		45
1270		50

DCP TEST DATA

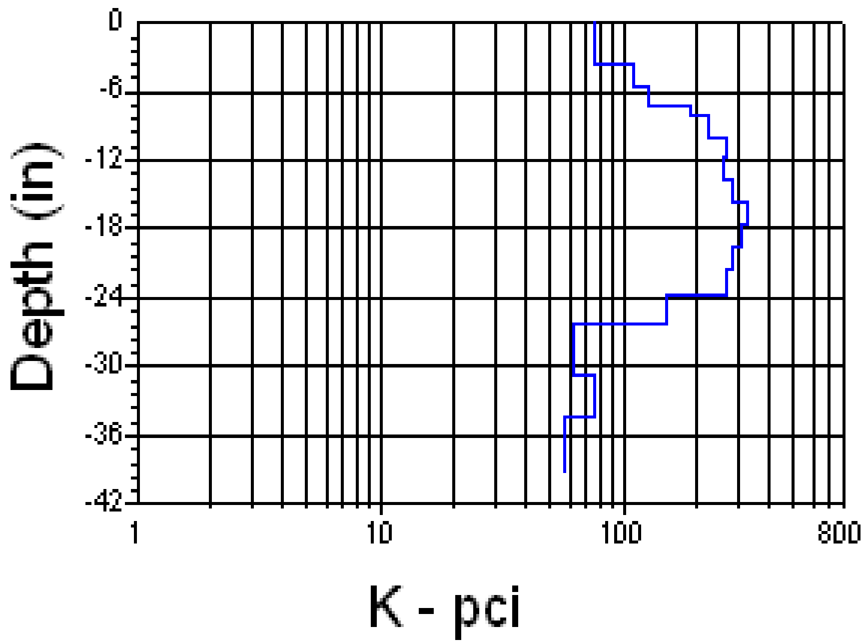
Project: Enlisted Unaccompanied Personnel Housing

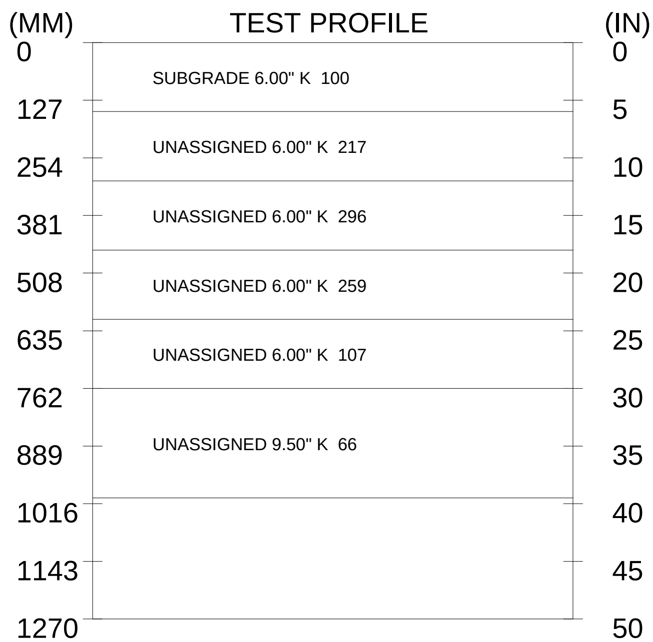
Date: 27 August 2008

Feature: 10A2S-BK8-7

Station: 10A2S-BK8-7

SUBGRADE MODULUS VS DEPTH

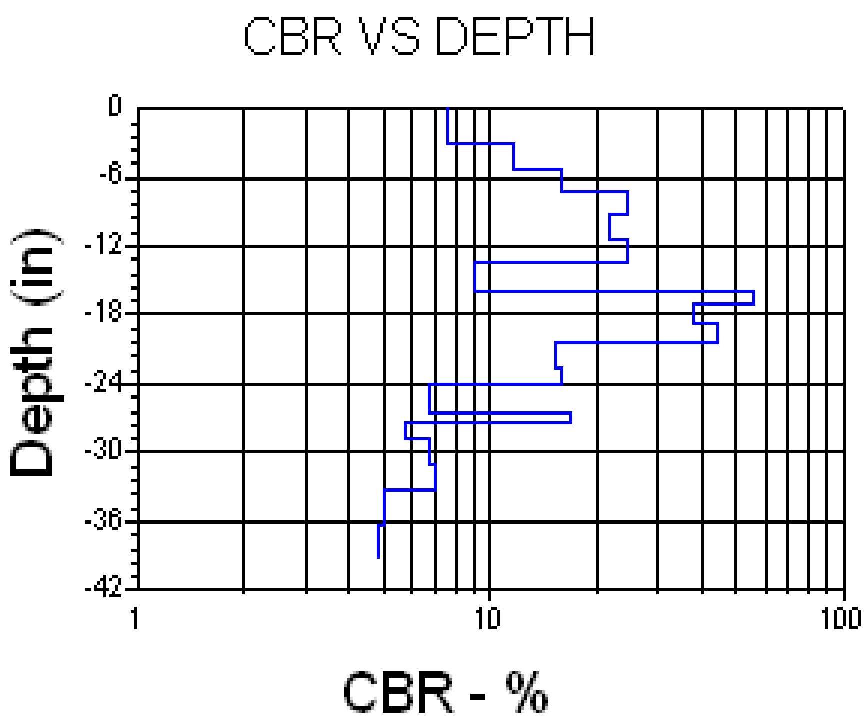




DCP TEST DATA

Project: Enlisted Unaccompanied Personnel Housing | Date: 27 August 2008

Feature: 10A2S-BK8-10 | Station: 10A2S-BK8-10



(MM)	TEST PROFILE	(IN)
0		0
	SUBGRADE 6.00" CBR 11	
127		5
	UNASSIGNED 6.00" CBR 22	
254		10
	UNASSIGNED 6.00" CBR 32	
381		15
	UNASSIGNED 6.00" CBR 29	
508		20
	UNASSIGNED 6.00" CBR 10	
635		25
762		30
	UNASSIGNED 9.50" CBR 6	
889		35
1016		40
1143		45
1270		50

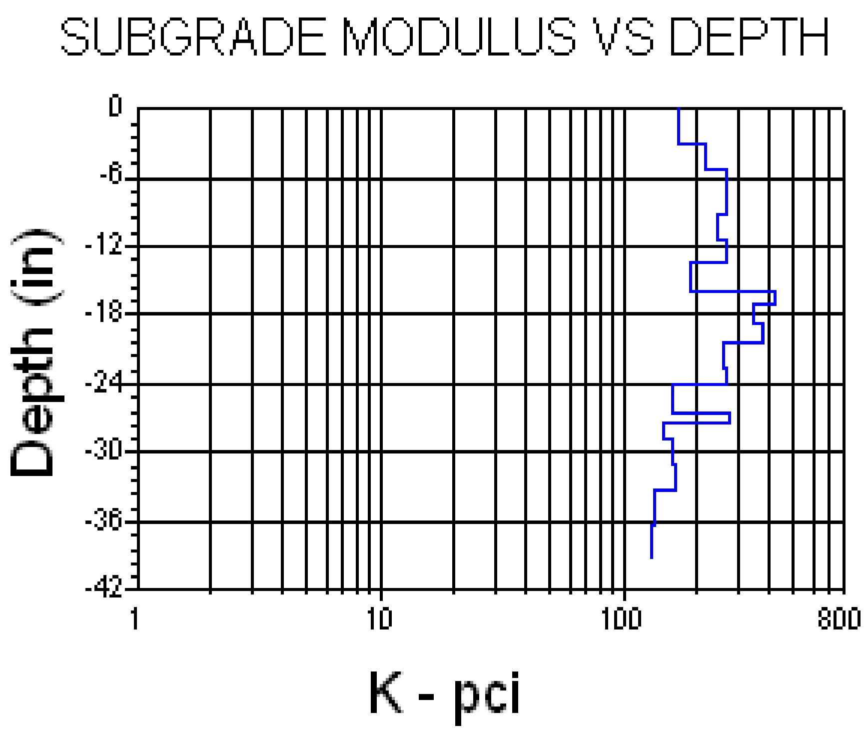
DCP TEST DATA

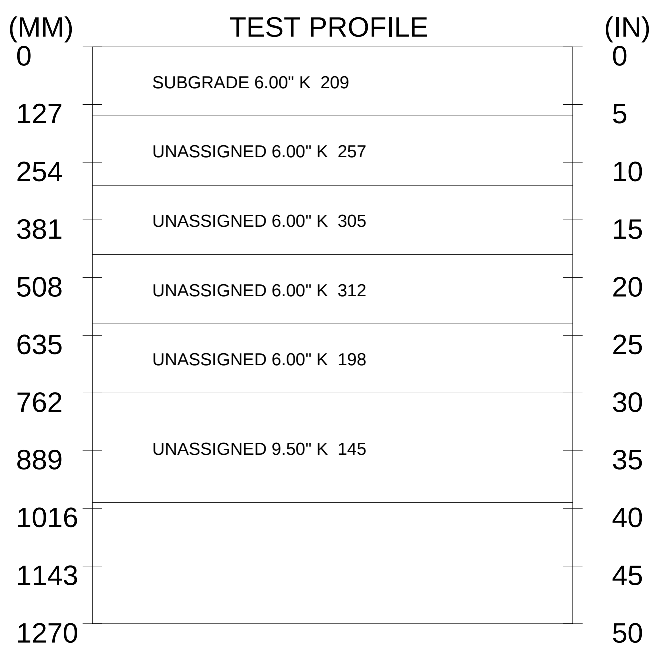
Project: Enlisted Unaccompanied Personnel Housing

Date: 27 August 2008

Feature: 10A2S-BK8-10

Station: 10A2S-BK8-10





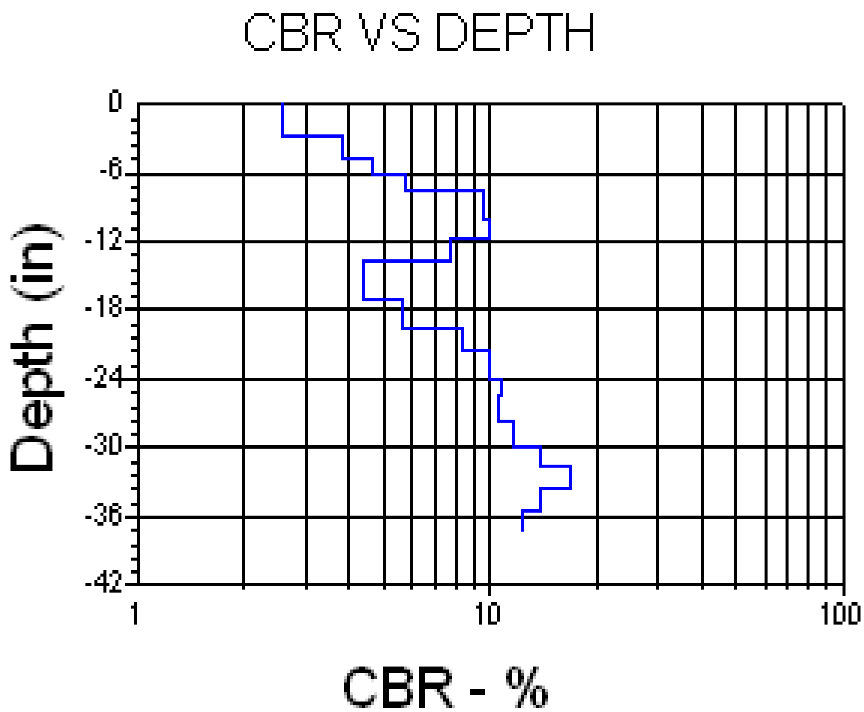
DCP TEST DATA

Project: Enlisted Unaccompanied Personnel Housing

Date: 27 August 2008

Feature: 10A2S-BK8-12

Station: 10A2S-BK8-12



(MM)	TEST PROFILE	(IN)
0	SUBGRADE 6.00" CBR 3	0
127	UNASSIGNED 6.00" CBR 8	5
254	UNASSIGNED 6.00" CBR 6	10
381	UNASSIGNED 6.00" CBR 9	15
508	UNASSIGNED 6.00" CBR 11	20
635	UNASSIGNED 7.25" CBR 15	25
762		30
889		35
1016		40
1143		45
1270		50

DCP TEST DATA

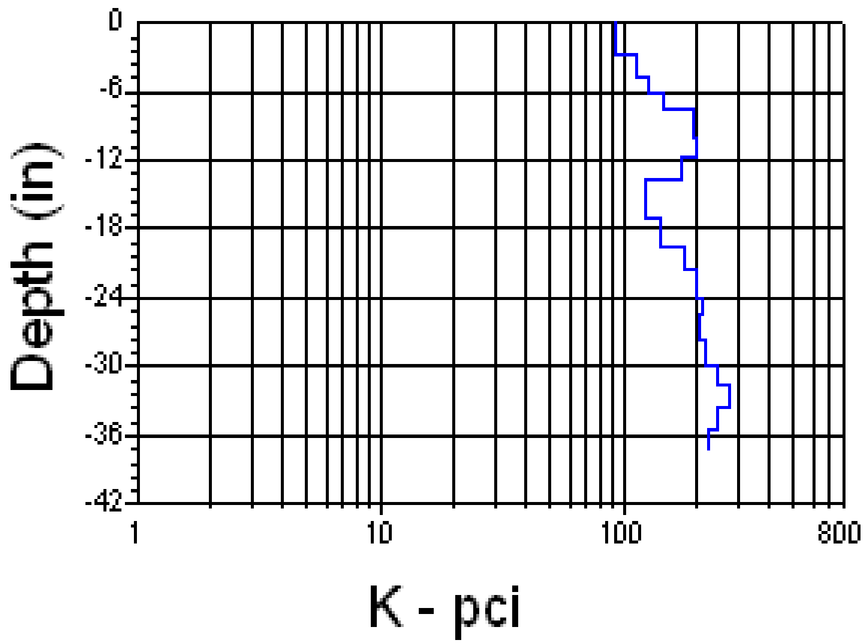
Project: Enlisted Unaccompanied Personnel Housing

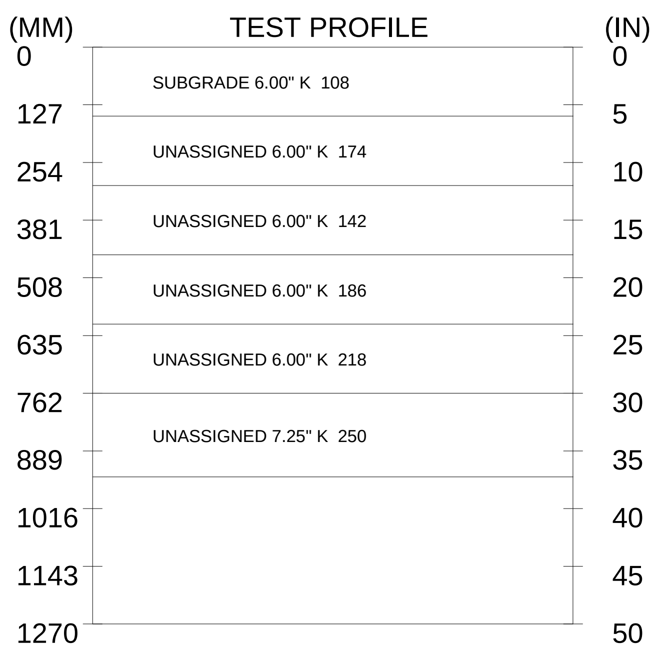
Date: 27 August 2008

Feature: 10A2S-BK8-12

Station: 10A2S-BK8-12

SUBGRADE MODULUS VS DEPTH



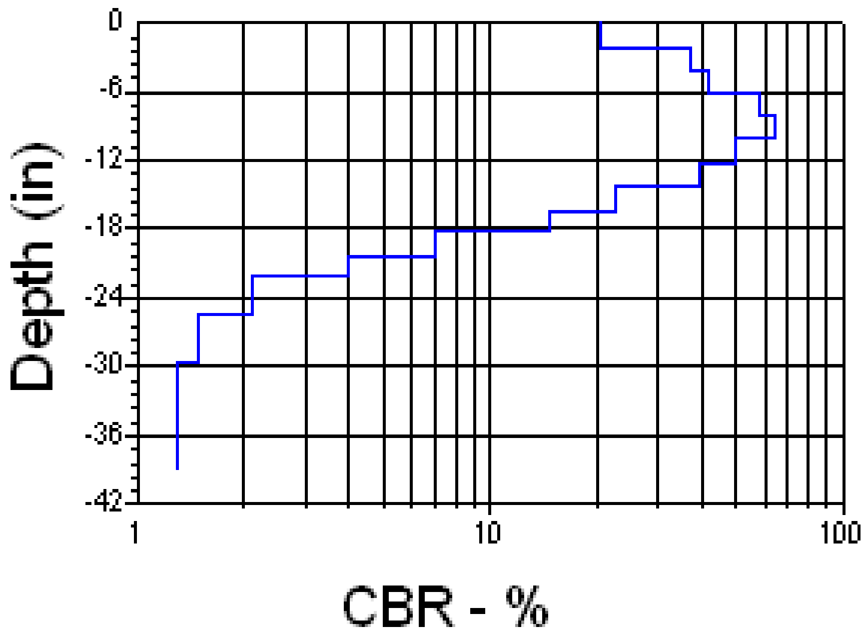


DCP TEST DATA

Project: Enlisted Unaccompanied Personnel Housing   Date: 27 August 2008

Feature: 10A2S-BK8-13   Station: 10A2S-BK8-13

CBR VS DEPTH



(MM)	TEST PROFILE	(IN)
0		0
	SUBGRADE 6.00" CBR 31	
127		5
	UNASSIGNED 6.00" CBR 56	
254		10
	UNASSIGNED 6.00" CBR 31	
381		15
	UNASSIGNED 6.00" CBR 6	
508		20
	UNASSIGNED 6.00" CBR 2	
635		25
762		30
	UNASSIGNED 9.25" CBR 1	
889		35
1016		40
1143		45
1270		50

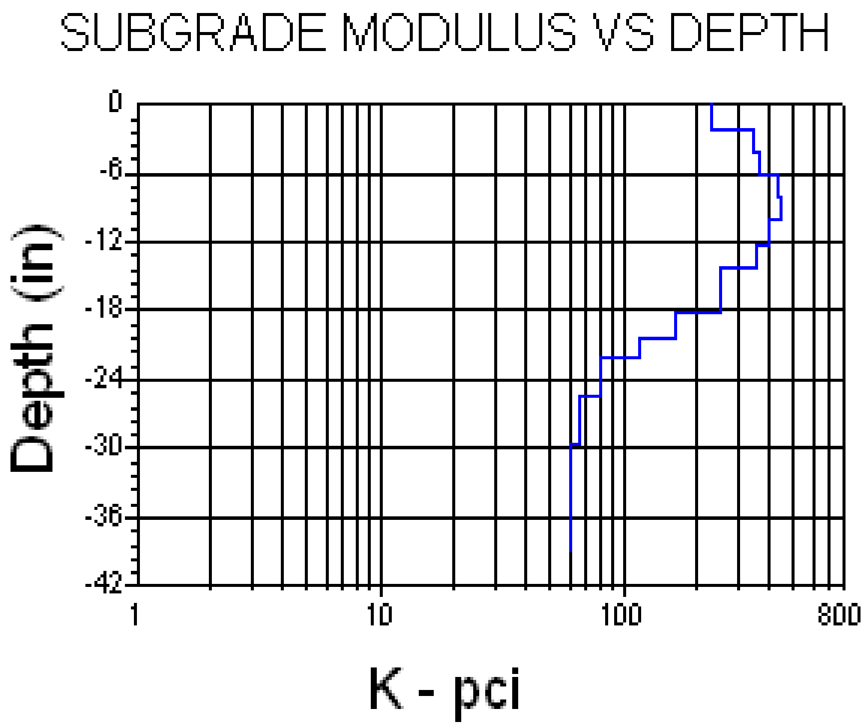
DCP TEST DATA

Project: Enlisted Unaccompanied Personnel Housing

Date: 27 August 2008

Feature: 10A2S-BK8-13

Station: 10A2S-BK8-13



(MM)	TEST PROFILE	(IN)
0		0
	SUBGRADE 6.00" K 302	
127		5
	UNASSIGNED 6.00" K 416	
254		10
	UNASSIGNED 6.00" K 309	
381		15
	UNASSIGNED 6.00" K 149	
508		20
	UNASSIGNED 6.00" K 68	
635		25
762		30
	UNASSIGNED 9.25" K 60	
889		35
1016		40
1143		45
1270		50

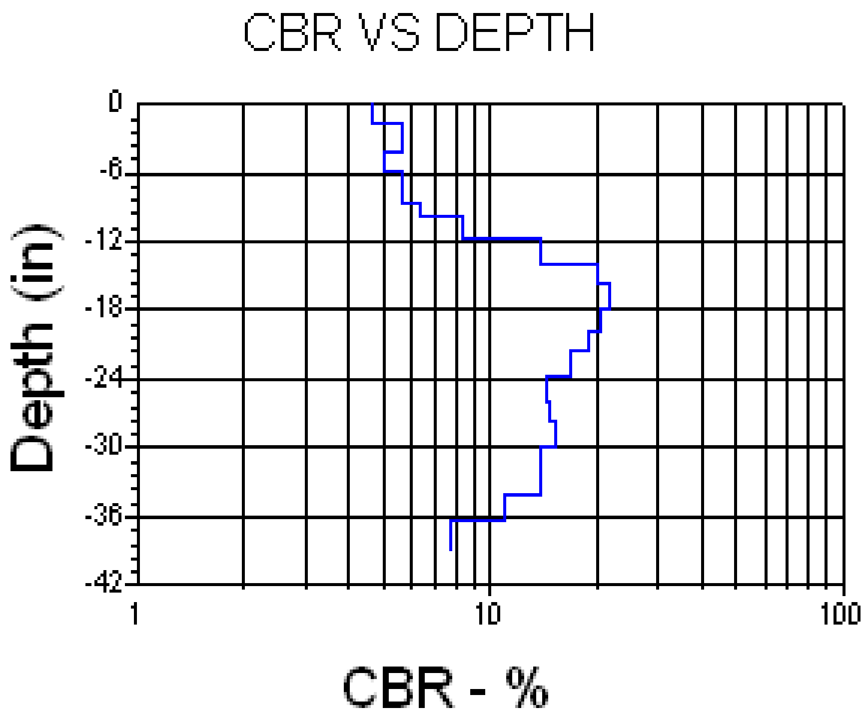
DCP TEST DATA

Project: Enlisted Unaccompanied Personnel Housing

Date: 27 August 2008

Feature: 10A2S-BK8-16

Station: 10A2S-BK8-16



(MM)	TEST PROFILE	(IN)
0	SUBGRADE 6.00" CBR 5	0
127		5
254	UNASSIGNED 6.00" CBR 8	10
381	UNASSIGNED 6.00" CBR 20	15
508	UNASSIGNED 6.00" CBR 18	20
635	UNASSIGNED 6.00" CBR 15	25
762		30
889	UNASSIGNED 9.00" CBR 12	35
1016		40
1143		45
1270		50

DCP TEST DATA

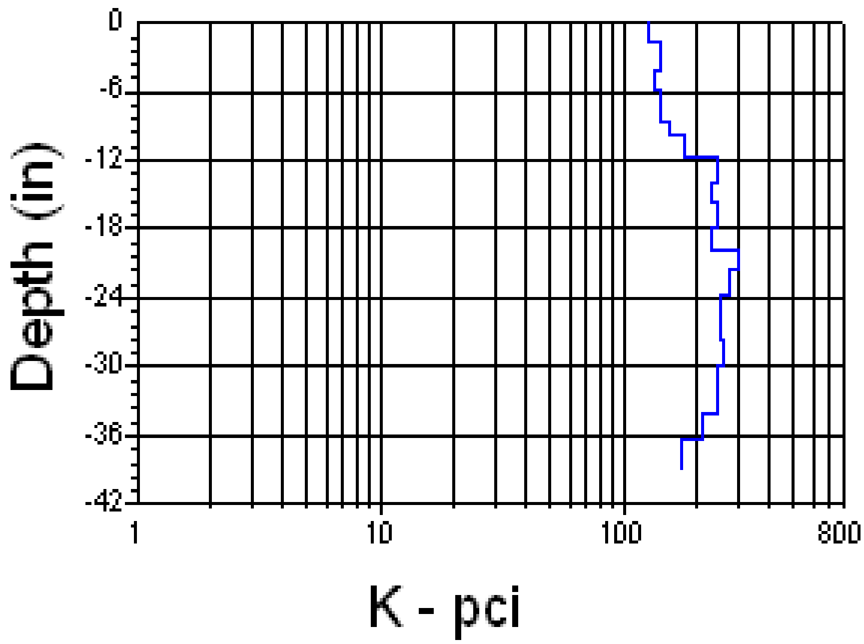
Project: Enlisted Unaccompanied Personnel Housing

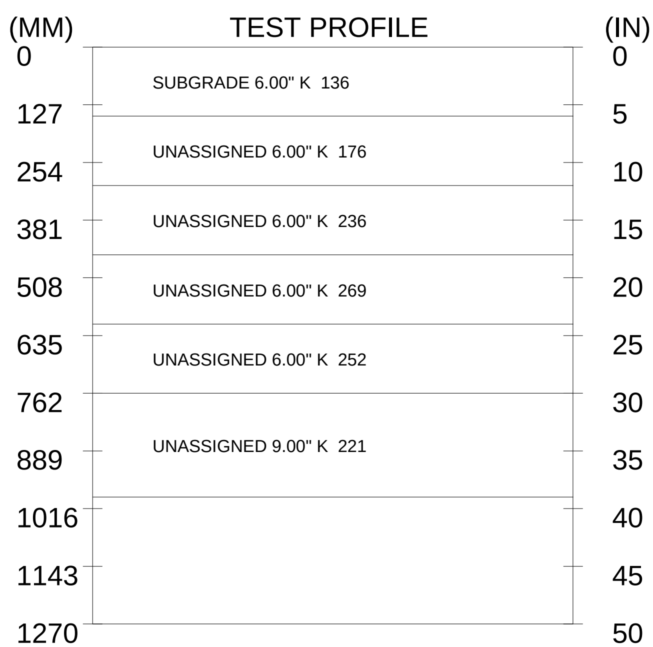
Date: 27 August 2008

Feature: 10A2S-BK8-16

Station: 10A2S-BK8-16

SUBGRADE MODULUS VS DEPTH





APPENDIX E

MAT FOUNDATION DESIGN CRITERIA

WALLACE

DEPARTMENT OF THE ARMY
SOUTHWESTERN DIVISION, CORPS OF ENGINEERS
1114 COMMERCE STREET
DALLAS, TEXAS 75242-0216

REPLY TO
ATTENTION OF

CESWD-ED-TS/G (415a)

29 JAN 1988

MEMORANDUM FOR:

Commander, Albuquerque District, ATTN: CESWA-ED
Commander, Fort Worth District, ATTN: CESWF-ED-DT
Commander, Galveston District, ATTN: CESWG-ED
Commander, Little Rock District, ATTN: CESWL-ED
Commander, Tulsa District, ATTN: CESWT-ED

SUBJECT: Design Criteria for Ribbed Mat Foundations

1. This letter supersedes criteria letter, SWDED-TS/G, 23 Dec 1986, SAB.

2. The enclosed criteria shall be used for design of all ribbed mat foundations. This criteria has been revised to conform with the definition of swell pressure (soil-beam interface pressure) as presented in criteria letter, SWDED-G, 16 Apr 1987, subject: Criteria for Developing Geotechnical Design Parameters for SWD Ribbed Mat Design Methodology. Also, clarification has been provided for application of the PTI design method to family housing.

3. This criteria is furnished to addressees only.

FOR THE COMMANDER:

William Jolin

Encl

ARTHUR D. DENYS, P.E.
Chief, Engineering Division

DESIGN OF RIBBED MAT FOUNDATIONS

BY

JOSEPH P. HARTMAN

AND

B. H. JAMES

U.S. ARMY CORPS OF ENGINEERS

SOUTHWESTERN DIVISION

DALLAS, TEXAS

REVISED

JANUARY 1988

CONTENTS

PART I - GENERAL REQUIREMENTS FOR RIBBED MATS

1. REFERENCES.

1.1 Engineering Instruction Manual, Corps of Engineers, Southwestern Division, (latest edition).

1.2 "Criteria for Selection and Design of Residential Slabs-on-Ground," Building Research Advisory Board (BRAB), Report No. 33 to the Federal Housing Administration, 1968.

1.3 "Design and Construction of Post-Tensioned Slabs-on-Ground," Post Tensioning Institute (PTI), 1980.

1.4 TM 5-818-7, Foundations in Expansive Soils, Corps of Engineers, 1983.

1.5 Letter, SWDED-G, 16 April 1987, Criteria for Developing Geotechnical Design Parameters for Ribbed Mat Design Methodology (Criteria Letter XV 7-12).

2. BACKGROUND. Ribbed mat foundations consist of a thin slab on grade which acts monolithically with a grid of stiffening beams beneath the slab. The beams (ribs) are cast in trenches dug in the foundation soil. Ribbed mats combine the economic advantages of shallow foundations with the performance advantages of monolithic floors. Ribbed mats are especially useful for minimizing differential foundation movements in areas with expansive soils.

3. DESIGN METHODS.

3.1 EXPANSIVE SOILS.

3.1.1 Behavior.

3.1.1.1 Center Lift. In the center lift condition the soil near the edge of the slab drops in relation to the soil near the center. This is due to moisture retention by the interior soils and the drying and shrinking of perimeter soils. As this occurs, the perimeter soil provides less support for the edge of the slab which then acts as a cantilever. This is illustrated in Figure A1 of Appendix A.

3.1.1.2 Edge Lift. In the edge lift condition the soil near the edge of the slab rises in relation to the soil near the center. This is due to the increasing moisture content and subsequent swelling of soil near the edge. The swelling soil raises the edge of the slab, causing some of the slab to lift off the soil. Interior loads cause the slab to sag and recontact the soil at some interior location. The slab thus tends to act as a beam, simply supported by the soil at the edge, and by soil towards the center of the slab. The amount of support at the center depends on numerous parameters such as interior loads, rib bending stiffness, soil swell pressures, and the magnitude of soil swelling. Typical edge lift behavior is illustrated in Figure A3 of Appendix A.

3.1.2 **SWD Method.** All ribbed mats on expansive soils, except for family housing, shall be designed in accordance with the provisions of Part II of this report. Ribbed mats for family housing may be designed in accordance with Part II or paragraphs 3.1.3 or 3.1.4.

3.1.3 **PTI Method.** The PTI method (reference 1.3) may only be used for design of family housing foundations on expansive soils. Specifically, slab width (short dimension) should not exceed 40 feet, rib depths should not exceed 30 inches, loading should consist only of perimeter loads and light interior distributed loads ($DL+LL \leq 100$ psf), soils should be fairly weak in-situ materials with no extensive substitution of non-expansive fill. When using the PTI method, the following provisions shall apply: Rib spacing shall not exceed 15 feet; concrete tensile stress shall not exceed $4\sqrt{f'c}$; the minimum effective prestress shall be 100 psi.

3.1.4 **BRAB Method.** The BRAB report (reference 1.2) may only be used for design of foundations for family housing. However, the PTI method is preferred, since the BRAB method may produce unreasonable results for large foundations.

3.1.5 **Computer Method.** In lieu of paragraph 3.1.2, ribbed mats may be designed using appropriate computer programs. Such programs must be capable of modeling the variable soil swell due to moisture changes, and the non-linear soil-structure interaction near the perimeter of the foundation. One such computer program is CBEAMC, program X0050 in the Corps of Engineers Civil Engineering Library.

3.1.6 Load Factors. When using the above methods to design ribbed mats for center lift and edge lift conditions, load factors may be multiplied by .75 (strength method) or allowable stresses may be increased by one-third (working stress method). This provision does not apply to the allowables given for the PTI method, since those allowables have already been increased from the usual provisions of ACI.

3.2 NON-EXPANSIVE SOILS. Ribbed mat slabs on non-expansive soils need not be designed for bending due to center lift or edge lift conditions. Beam on elastic foundation analyses may be used to determine the effects of concentrated loads on ribs, or ribs may be designed as conventional strip or spot footings.

3.3 SOIL PROPERTIES. Soil properties for design of ribbed mats will be provided in the Foundation Design Analysis by the Corps of Engineers. Criteria for developing these properties is included in reference 1.5. The properties necessary for design in accordance with paragraph 3.1.2 consist of the following, which are defined in Appendix A:

qa - allowable bearing pressure
k - subgrade modulus
Ym - soil heave
Lm - edge moisture variation distance
Psw - pressure of swelling soil acting on perimeter rib

4. MINIMUM REQUIREMENTS.

4.1 SUBGRADE PREPARATION. A vapor barrier, capillary water barrier, and a minimum of 18 inches of non-expansive fill will normally be used beneath ribbed mats. Additional non-expansive fill will often be used to lessen the effects of highly expansive soils. These requirements will be detailed in the Foundation Design Analysis.

4.2 SLAB. For family housing and other small lightly loaded buildings a 4 inch slab may be used. For other buildings the minimum slab thickness will be 5 inches. Minimum slab reinforcing shall be 0.2 percent. Where slabs are subjected to vehicular loading they must be designed for the maximum wheel load, similar to paving. Use 650 psi flexural strength concrete for slabs subject to wheel loads.

4.3 GRID GEOMETRY. Ribs should be located to form a continuous grid. Rib spacing should not exceed 20 feet in expansive soils, or 25 feet in non-expansive soils. Locations of ribs should conform to significant wall and column loads, and may be used to resist thrusts from rigid frame reactions. Ribs should be provided around large openings in the slab. In expansive soils diagonal ribs are required at exterior corners.

Expansion joints should be provided at 250 foot intervals, and should also be used to break irregularly shaped buildings into rectangular segments. Foundations for family housing do not require expansion joints due to irregular shapes.

4.4 RIB SIZE. Minimum rib depth is 20 inches. Rib depths should usually not exceed 3 feet to minimize construction difficulties related to placing reinforcement and maintaining trench walls. If deeper ribs are used, rib width should also be increased. Minimum rib width is 12 inches except for family housing foundations, where 10 inch ribs may be used. Sufficient rib width must also be provided to transfer wall and column loads to the soil as strip footings. The allowable soil bearing capacity may not be exceeded when considering the width of the rib plus an effective slab width on each side of the rib. The effective slab width for bearing is limited to the thickness of the slab. At column locations an alternate is to provide fillets at rib intersections, sufficient to act as spot footings for column loads.

4.5 RIB CAPACITY. Concrete should have a minimum compressive strength of f'c=3000 psi at 28 days. Reinforcing shall be grade 60, except ties may be grade 40. Minimum reinforcing ratio (As/Ag) shall be .0033 top and .0033 bottom, this may be reduced to .005 total in non-expansive soils. Use #3 ties at 24 inches, minimum. These minimums should be sufficient for shrinkage stresses and for unpredictable soil behavior.

4.6 PRESTRESSED MATS. For prestressed ribbed mats, not designed per PTI, all the above minimum requirements apply except that slab and rib top reinforcement may be deleted and replaced by appropriate post-tensioning strands. Mild steel shall still be provided in the bottom of ribs. Minimum effective prestress shall be 100 psi on the gross area of the slab, including effects of subgrade friction as calculated by the PTI method, reference 1.3. Concrete tensile stress shall be limited to $3\sqrt{f'c}$ and shear stress limited to $1.1\sqrt{f'c}$. A one-third overstress may be allowed per paragraph 3.1.6.

4.7 CONSTRUCTION DETAILS.

4.7.1 Conventionally Reinforced. Construction joint spacing should not exceed 50 feet in either direction. A horizontal construction joint may be provided in the ribs at the base of the capillary water barrier when unstable trench walls may cause construction difficulties. However, this joint is discouraged because of increased potential for shrinkage cracks in the slab.

4.7.2 Prestressed. Construction joint spacing shall not exceed 75 feet in either direction. Tendons within each placement shall be stressed to 15 percent of the final prestress not more than 24 hours after the concrete has attained sufficient strength to withstand the partial prestress. Other construction procedures for prestressed ribbed mats shall conform to reference 1.3.

4.7.3 Contractor Designs. Ribbed mat foundations may be designed as prestressed or conventionally reinforced as selected by the engineer. The plans and specifications shall not include the option of changing the ribbed mat from one type to another. The reason for this prohibition is that design parameters (e.g., moments of inertia) may be dependent on the type of ribbed mat being designed and may affect calculated shears and moments. This does not prohibit revisions of the slab type as a result of contractor value engineering proposals. However, such revisions must include a complete design of the ribbed mat foundation using appropriate design parameters in accordance with this report.

PART II - ANALYSIS OF RIBBED MAT FOUNDATIONS ON EXPANSIVE SOILS

1. SCOPE. This part of the report contains the basic rules for design of ribbed mats in expansive soils. This method may be used to predict shears, moments and deflections in ribs subject to soil movement due to changing moisture content. For a commentary on the design method refer to Appendix A; for example design calculations refer to Appendix B. The design method from Part II should be used in conjunction with the "minimum requirements" for ribbed mats, as presented in Part I.

2. GENERAL

2.1 NOTATION.

	C	= Correction factor for equivalent cantilever length
	D	= Beam deflection (IN)
	I	= Moment of inertia per foot, I=Ir/S (IN^4/FT)
	Ir	= Moment of inertia of rib (IN^4)
*	k	= Modulus of subgrade reaction (PCI)
	Lo	= Basic length of cantilever (FT)
	Lc	= Equivalent length of cantilever, center lift (FT)
	Le	= Equivalent length of simple beam, edge lift (FT)
	Li	= Distance from perimeter to location of interior load (FT)
*	Lm	= Edge moisture variation distance (FT)
	Lb	= Width of soil bearing at perimeter, edge lift (FT)
	M	= Bending moment per foot (FT-LB/FT)
* q_a = ALLOWABLE BEARING PRESSURE (PSF)	Mr	= Bending moment per rib, Mr=MxS (FT-LB)
	Pi	= Interior load (PLF)
	Pp	= Perimeter load (PLF)
*	Psw	= Pressure of swelling soil on perimeter rib (PSF)
	R	= End reaction at perimeter for equivalent simple beam (PLF)
	S	= Rib spacing (FT)
	w	= Uniform load (PSF)
	V	= Shear per foot (LB/FT)
	Vr	= Shear per rib, Vr=VxS (LB)
*	Ym	= Soil heave (IN)
	θ	= Rotation of support of equivalent cantilever (RAD)

2.2 UNITS. The equations presented in section 3 are written for units as defined in the above notation. If other units are used the equations must be modified appropriately.

2.3 RIB DEFINITIONS. Ribs are defined as perimeter, transverse or diagonal as shown in Figure 1. Note that transverse refers to ribs parallel to either axis of the building.

* VALUES NEEDED FROM GEOT[illegible]

FIGURE 1 - RIB DEFINITIONS

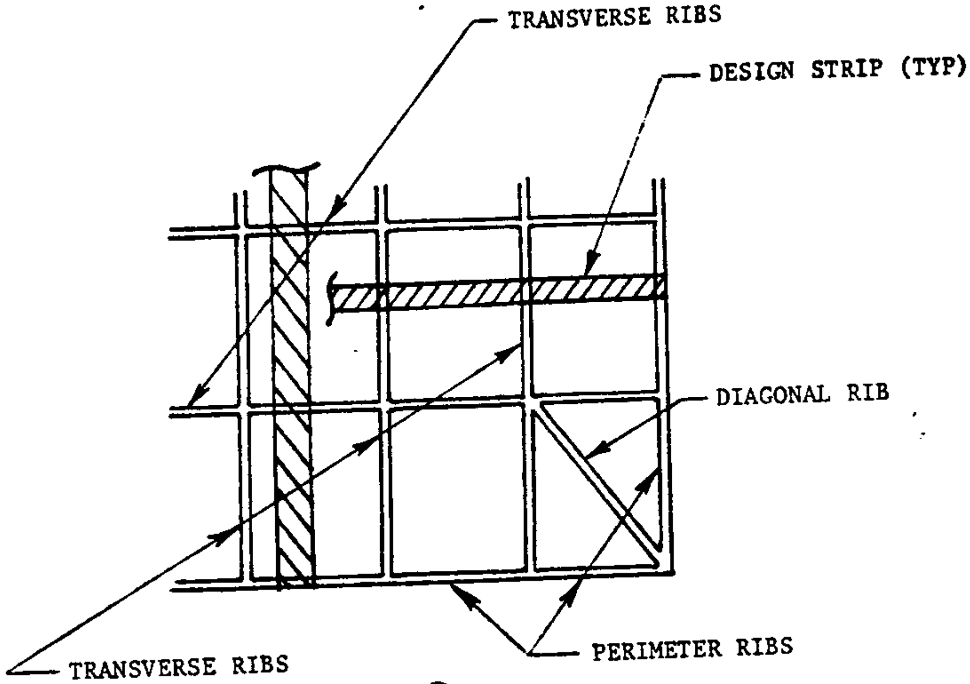
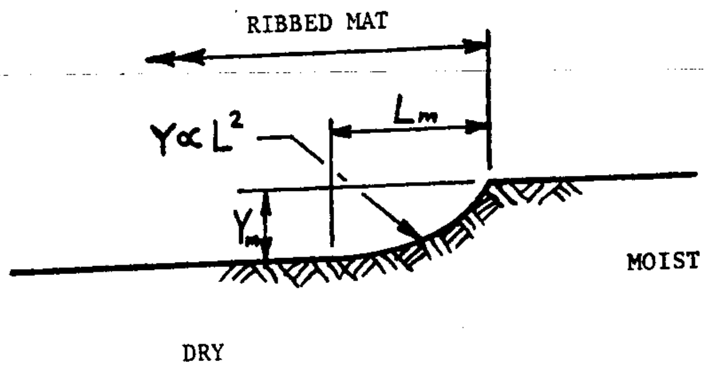


FIGURE 2 - SOIL EDGE PROFILE



2.4 STRIP ANALYSIS. The analysis is based on a strip assumption, ignoring the effects of the grid configuration of the ribs. The formulas and examples presented below are for an equivalent 1-foot strip, using "per foot" values for loads and stiffness.

2.5 SOIL EDGE PROFILE. For edge lift the maximum swell occurs at the perimeter and decreases rapidly toward the interior. The soil profile is assumed to be parabolic (in the unloaded condition) and is illustrated in Figure 2.

3. ANALYSIS METHOD.

3.1 TRANSVERSE RIB - CENTER LIFT.

3.1.1 General. Center lift analysis is based on an equivalent cantilever beam to determine moments, shears and deflections.

3.1.2 Moment. The length of the equivalent cantilever can be calculated as:

$$Lc = C \times Lo$$

where:

$$Lo = 2.3 + .4\ Lm$$

$$C = .8\ Ym^{.12}\ I^{.16} / Pp^{.12}$$

The maximum moment may then be calculated from statics using conventional cantilever formulas such as:

$$M = Pp\ Lc + 1/2\ w\ Lc^2$$

The moment can then be assumed to be constant for a distance Lc/2 and then to decrease linearly to zero at a distance 5Lc from the perimeter. To obtain the design moment for a given rib, multiply the calculated per-foot moment by the appropriate rib spacing (Mr = M x S).

3.1.3 Shear. The maximum shear may be calculated from statics using the same equivalent cantilever as for moment.

$$V = Pp + w\ Lc$$

The shear may then be assumed to decrease linearly from V at the cantilever support, to zero at a distance 5Lc from the perimeter. To obtain the design shear for a given rib, multiply the calculated per-foot shears by the appropriate rib spacing (Vr = V x S).

3.1.4 Deflection. Deflection at the perimeter is the sum of three components: bending deflection of the equivalent cantilever, vertical translation of the cantilever support, and rotation of the cantilever support. Rotation of the support may be calculated as:

$$\theta = M^{1.4} / 9800\ I\ k^{.5}$$

The perimeter deflection is then:

$$D = .11 + 12\ Lc\ \theta$$

where .11 inches is an approximation for the support translation plus the cantilever bending, and (12 Lc) is the length in inches.

Use the deflection calculated above to compare with allowable deflection. The allowable deflection may be determined by using 4Lc as the length between points of zero and maximum deflection.

3.2 TRANSVERSE RIB - EDGE LIFT.

3.2.1 General. Edge lift analysis is based on an equivalent simple beam, supported at the perimeter and at some interior location.

3.2.2 Deflection. The first step in calculating deflection is to determine the length of the equivalent simple beam. The appropriate length depends on many parameters, including the deflection. Therefore, deflection must first be estimated to determine equivalent length, then a deflection is calculated based on that length. The process is repeated until calculated deflection matches the assumed deflection. The equivalent simple beam length may be calculated as:

$$Le = 7.5\ I^{.17}\ Li^{.37}\ D^{.12} / w^{.07}\ Pi^{.11}$$

The perimeter end reaction for this beam may be calculated from statics. For a given case the reaction may be:

$$R = Pp + 1/2\ w\ Le + Pi(Le-Li)/Le$$

The width of soil bearing at the perimeter can be approximated as:

$$Lb = 1.1\ (R/Psw)$$

where Psw is selected from a curve of heave versus bearing pressure, corresponding to the estimated deflection used during this iteration (see reference 1.5).

The edge deflection is found by determining the soil swell at a distance Lb from the perimeter, based on the parabolic swell profile:

$$D = Ym(Lm-Lb)^2/Lm^2$$

When satisfying deflection criteria, use the calculated deflection and equivalent simple beam length.

3.2.3 Moment. Once the simple beam equivalent length has been determined, the bending moments may be calculated based on statics. To obtain rib design moments, multiply per-foot moments by the rib spacing.

3.2.4 Shear. Once the simple beam equivalent length has been determined, the shears may be calculated based on statics. To obtain rib design shears, multiply per-foot shears by the rib spacing. Near the interior support the design shear need not exceed:

$$V = Pi + w(Le-Li)$$

This is due to the effects of the actual distributed soil support, rather than the point support assumed in the simple beam analysis.

3.2.5 Special Cases. If Pi=0 or if Li>Le make the following substitution in the equation for Le:

$$1.4 = Li^{.37} / Pi^{.11}$$

The equation for the simple beam length then becomes:

$$Le = 10.5\ I^{.17}\ D^{.12} / w^{.07}$$

3.3 PERIMETER RIB.

3.3.1 Center Lift. For center lift the perimeter rib will have no support from the soil and must be designed to span between transverse ribs for the perimeter wall loads.

3.3.2 Edge Lift. For edge lift the soil pressure on the perimeter rib will exceed the applied perimeter loads. The perimeter rib must designed to span between transverse ribs for this net upward force.

3.4 DIAGONAL RIB. Diagonal ribs are used to support exterior corners for center lift conditions, if loss of support occurs under both perimeter ribs. Diagonal ribs must be designed to provide the same moment and shear capacity as the larger of the two adjacent transverse ribs.

3.5 INTERIOR RIB. Interior ribs and rib intersections should be located at significant wall and column loads. The ribs can be designed for these loads as strip or spot footings, using beam-on-elastic-foundation methods. Differential soil movement due to moisture change is assumed not to occur except at the perimeter. However, to account for unpredictable interior soil movements, interior ribs must have the minimum size and capacity as required in Part I.

APPENDIX A - COMMENTARY ON PART II

1. SCOPE. Actual behavior of ribbed mats in expansive soils involves complex, non-linear, soil-structure interaction. The best solution for such behavior is provided by computer programs. The hand design method has been developed to approximate such computer results. Hand solutions have been checked by computer analyses; results have been within acceptable limits of error. However, such checks have been made only for a limited range for each design parameter, as shown in Table A1, corresponding to the usual values for military construction within Southwestern Division. If a wider range of parameters is applied to the hand design formulas, the results may be less accurate.

TABLE A1

Parameter	Units	Minimum	Maximum
k	pci	50	200
Ym	in	0.5	3.0
Lm	ft	2	8
I	in^4/ft	750	6000
Pp	lb/ft	1000	5000
Pi	lb/ft	0	5000
Li	ft	6	20
w	psf	100	250
Psw	psf	2000	8000

2. GENERAL.

2.1 NOTATION.

Ir = moment of inertia of rib. For non-prestressed rib mats Ir should be the effective moment of inertia, calculated per ACI 318, Section 9.5.2.3.

k = Modulus of subgrade reaction. This parameter is the ratio of the soil pressure at the base of the concrete and the corresponding settlement. Since modulus values are typically determined by plate-load test at the ground surface, they should be corrected for depth and for footing size (expected high pressure area between concrete and soil). Analyses have indicated that the high bearing pressure area for center lift conditions will occur in an area several feet long parallel to the transverse rib and several feet on each side of the rib. A crude approximation for this area would be 5 feet square. This approximation should be adequate for design, since calcualations are not sensitive to small changes in the modulus of subgrade reaction.

qa = Allowable bearing pressure. This is the safe bearing capacity of the soil at the base of the ribs. A factor of safety of 3.0 is recommended for computing this value.

Lm = Edge moisture variation distance. This represents the distance, inward from the edge of the slab, over which the moisture content of the soil changes. Much judgement is required in determining this value.

Psw = Pressure of swelling soil on perimeter rib. This is the interface pressure between the soil and the base of the exterior rib, due to an increase in soil moisture content. The pressure which can be exerted by the swelling soil is dependent on the amount the surface of the soil is allowed to rise. Therefore Psw is usually presented as a curve of pressure versus heave, as described in reference 1.5 of Part I. The actual upward deflection of the edge of the slab is a complex interaction between swell potential, structural loads, and mat stiffness, all of which combine to determine the interface pressure near the perimeter.

Ym = Soil heave. This is the differential vertical movement of the soil representing either soil heave (edge lift) or soil shrinkage (center lift). The magnitude of Ym is the computed vertical movement of a particle of soil at the ground surface due to a change in moisture content. This value should be based on the accumulation of potential volume changes for the full thickness of the active zone (Za), with no significant loads applied to the foundation. The value of Ym may differ for edge lift and center lift conditions.

Pi, Pp, w = Applied loads. Loads should consist of full dead plus live loads, including dead load of the slab and ribs.

2.2 UNITS.

2.3 RIB DEFINITIONS.

2.4 **STRIP ANALYSIS.** The hand solution formulas have been developed for analysis of an equivalent 1 foot strip. This is convenient for uniform loads and for soil properties, but requires some calculations for appropriate concentrated loads and bending stiffness. Rib stiffness must be divided by rib spacing to get the per-foot stiffness. If column loads exist they must also be divided by the rib or column spacing to provide an equivalent load per foot. If interior wall loads are parallel to the transverse rib, they must be divided by the rib spacing. These calculations are illustrated in Appendix B.

2.5 SOIL EDGE PROFILE. The edge lift condition occurs when increased moisture content swells exterior soils, and this effect extends under the edge of the slab. The center lift condition occurs when soils under the slab are generally moist and seasonal drying occurs on the exterior, again extending under the slab. This causes the soil to shrink away from the edge of the slab.

The analysis method is based on an assumed parabolic swell profile which occurs uniformly along the perimeter. This is a convenient idealization of actual soil behavior, which is certainly more erratic. However, the parabolic profile has better correlation with measured swells than do other possible edge profile assumptions. Note that the soil profile is not used in the hand design formulas for center lift. However, a parabolic profile was used in the computer analyses for center lift, which formed the basis for the hand design forumlas.

3. ANALYSIS METHOD. Many of the formulas for shears, moments and reactions are idealized, assuming Pp and R are exactly at the perimeter and that w extends to the perimeter. These approximations should usually be acceptable, but the formulas may be modified to account for actual load patterns.

3.1 TRANSVERSE RIB - CENTER LIFT

3.1.1 General. Typical behavior of a transverse rib for center lift conditions is shown in Figure A1. This illustrates the soil bearing pressure and the shear, moment and deflection. Note that the effects of the soil movement extend much farther than the moisture variation distance. The moment and shear distribution close to the edge resemble cantilever behavior.

3.1.2 Moment. The extent of significant moments is illustrated in Figure A1. The length of the equivalent cantilever can be taken as a basic length (Lo) which is dependent on the moisture variation distance, times a correction factor (C) which accounts for secondary effects of several parameters. The value of the correction factor will usually be slightly greater or less than unity. The correction factor was developed to permit accurate approximations of computer results. It was developed from the ratios of actual values to usual values for significant parameters. For example, the "usual" values are: Ym = 1 in, $I = 1500\ in^4/ft$, Pp = 3000 lb/ft. Thus:

$$C = (Ym/1.0)^{.12} (I/1500)^{.16} (3000/Pp)^{.12}$$

$$C = .8\ Ym^{.12}\ I^{.16}/\ Pp^{.12}$$

A similar approach was used to develop all the formulas in Part II which have an exponential format.

3.1.3 Shear. Maximum shear occurs near the support of the equivalent cantilever. The extent of significant shears is illustrated in Figure A1.

3.1.4 Deflection. Formulas for deflection include an assumed concrete modulus of elasticity Ec = 3,320,000 psi, for both center lift and edge lift.

Vertical movement at the perimeter is much greater than the bending deflection of the equivalent cantilever. To predict the deflection it is necessary to consider translation and rotation at the support of the equivalent beam. The most significant component is due to rotation at the support. These components of deflection are shown in Figure A2. The sum of the cantilever bending and the support translation are approximated by the value 0.11 inch. The percent error due to this approximation is negligible when total deflections are large. The percent error is greater when total deflections are small, but then the deflections are not significant anyway.

Allowable deflections (see Part I, reference 1.1) are expressed as a ratio of the difference in vertical movement at any two points, compared to the distance between those points. For example: $D \leq L/600$, where D is the differential displacement. In such formulas it is appropriate to use the point of maximum deflection and a point of near-zero deflection as the two measuring points. For center lift behavior the maximum deflection occurs at the perimeter, and deflections tend to die out at approximately 4Lc (four times the equivalent cantilever length) from the perimeter. Therefore, the ratio D/4Lc is appropriate for comparison with allowable deflections.

3.2 TRANSVERSE RIB - EDGE LIFT.

3.2.1 General. Typical behavior of a transverse rib for edge lift conditions is shown in Figure A3. This illustrates the soil bearing pressure and the shear, moment and deflection. Soil swell lifts the edge of the ribbed mat, which actually rises off the soil for some distance from the perimeter. For shear and moment, this portion of the rib acts as a simply supported beam spanning between soil support at the perimeter and at an interior location.

3.2.2 Deflection. Vertical movement at the perimeter is driven by the tendency of the soil to swell, and is resisted by the downward loads applied on the soil. As the soil swells at the perimeter the slab is lifted off the interior soil. This concentrates soil reactions near the edge, causing very high pressures. The pressures rise so high that they limit the capacity of the soil to swell. Thus, the soil cannot swell as much as it would if not loaded. Deflections can be predicted by balancing the upward force of the soil (the swell pressure times the bearing width) with the downward force of applied loads. This downward force can be determined from statics once an equivalent simple beam length is determined. The method for determining the deflection is shown in Figure A4.

Allowable deflections are expressed as ratios, as discussed in the commentary on paragraph 3.1.4. From Figure A3 it can be seen that the appropriate values for this ratio are the edge deflection and the equivalent simple beam length (D/Lc).

Edge lift deflections are mainly a function of soil properties and applied loads, bending stiffness of the ribs has only a secondary effect. Therefore, it may not be possible to control deflections by increasing the rib stiffness. It may be necessary to accommodate calculated deflections by using a less brittle superstructure or by detailing the superstructure to make it less sensitive to deflections. Or it may be necessary to modify soil properties to minimize the edge heave.

3.2.3 Moment. The moments can be calculated by statics, using the equivalent simple beam. The maximum moment will occur at the point of zero shear. Note that the maximum moment is quite sensitive to the beam length, therefore the iterative solution for deflection and appropriate swell pressure must converge accurately before calculating moments.

3.2.4 Shear. Shears can also be calculated by statics from the equivalent simple beam. Note that shears will reduce gradually to near-zero around the interior end of the beam because of the distributed soil support.

3.2.5 Special Cases. If no concentrated interior load exists, or if it is very far from the perimeter, the formula for the simple beam length must be adjusted as shown. This adjusted formula was also developed to duplicate results from computer solutions.

3.3 PERIMETER RIB.

3.4 DIAGONAL RIB.

3.5 INTERIOR RIB. Potential soil heaves in the interior are unpredicatable and are generally due to localized moisture conditions, for example, due to a leaking pipe. Such conditions cannot be accounted for by design forumlas. Adequate strength and stiffness for such unpredictable heaves should be supplied by the minimum requirements listed in Part I of the report. For interior wall or column loads the interior ribs should be designed in accordance with Part I, section 3.2.

FIGURE A1 - CENTER LIFT BEHAVIOR

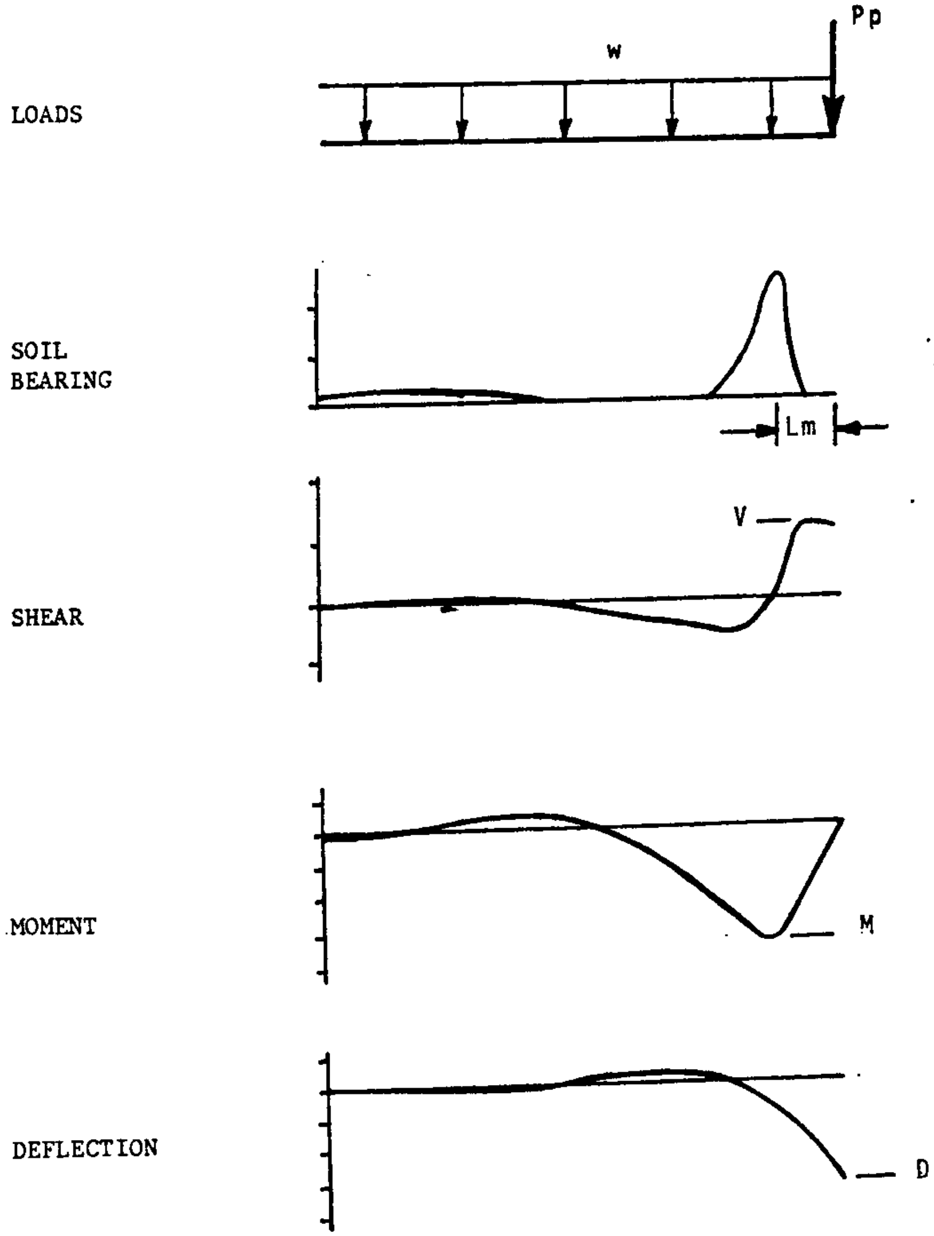
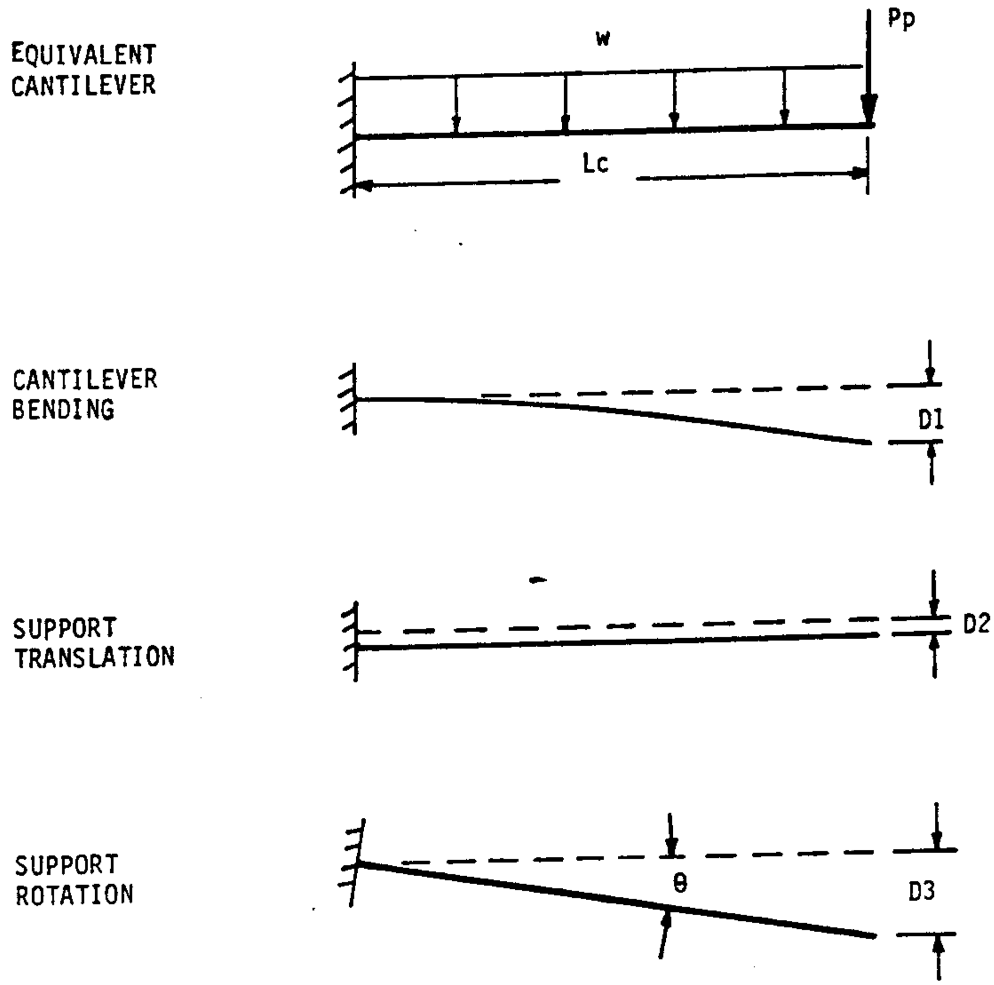


FIGURE A2 - CENTER LIFT DEFLECTION



$$D = D1 + D2 + D3$$

$$D1 + D2 = .11$$

$$D3 = 12\ Lc\ \theta$$

FIGURE A3 - EDGE LIFT BEHAVIOR

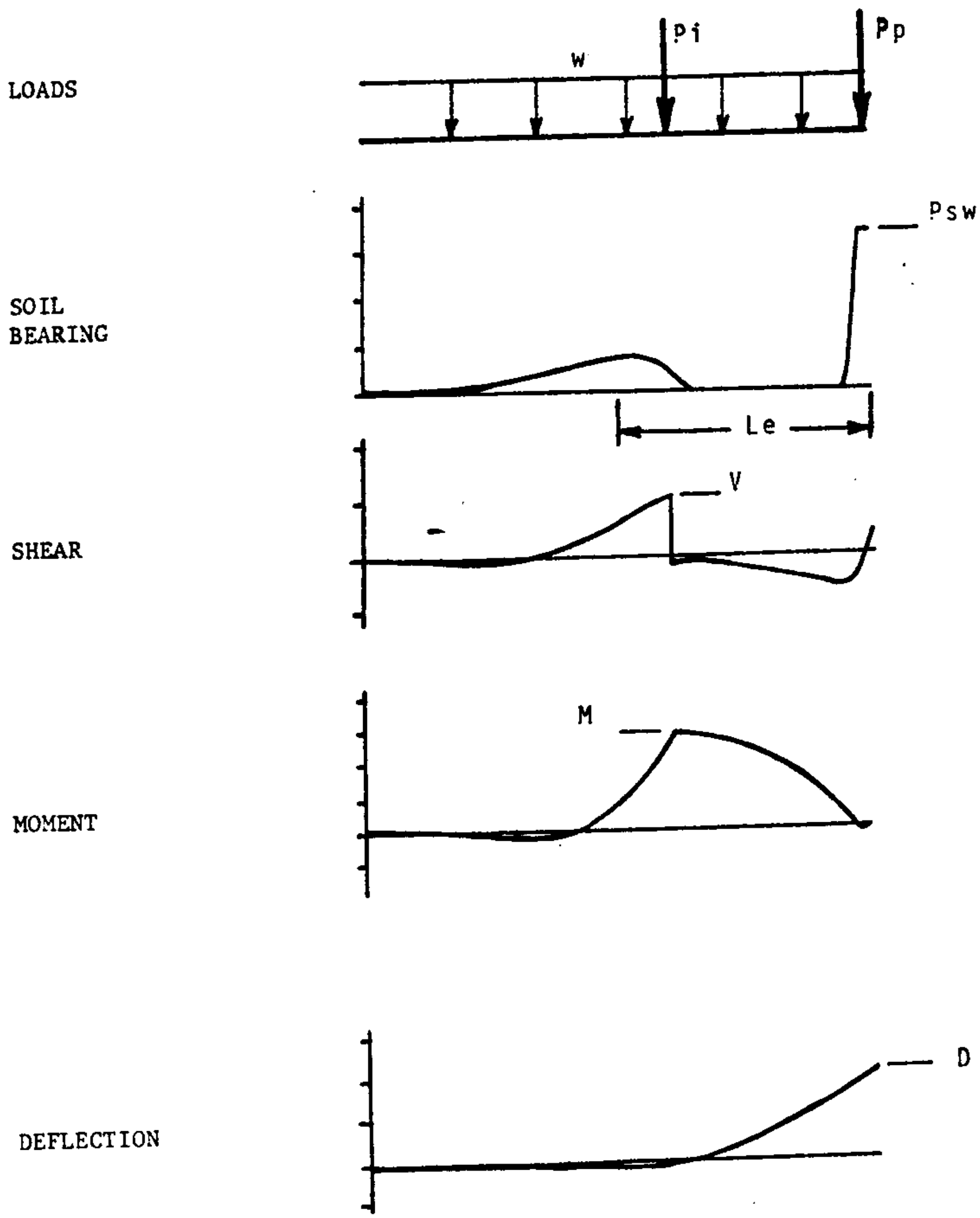
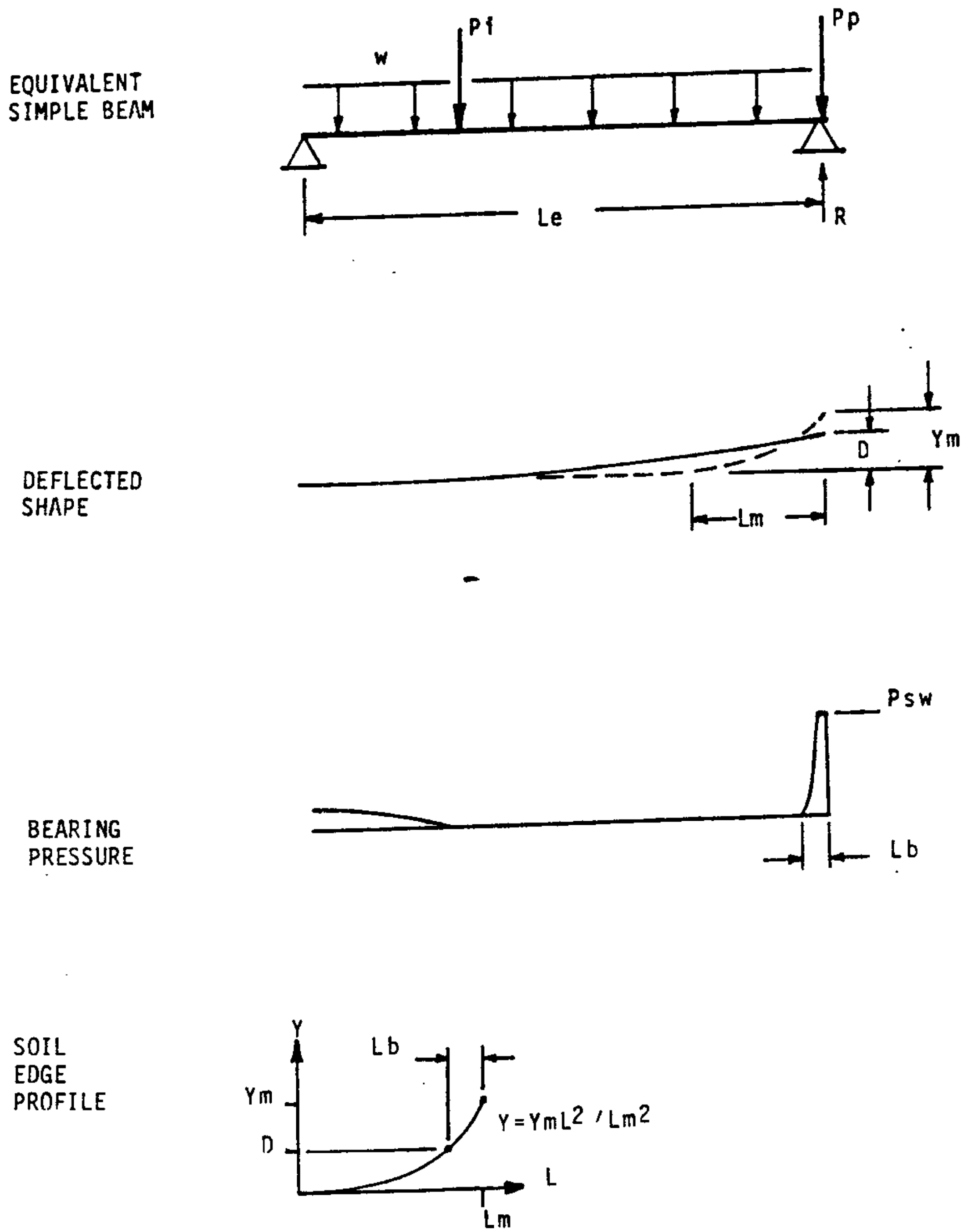


FIGURE A4 - EDGE LIFT DEFLECTION



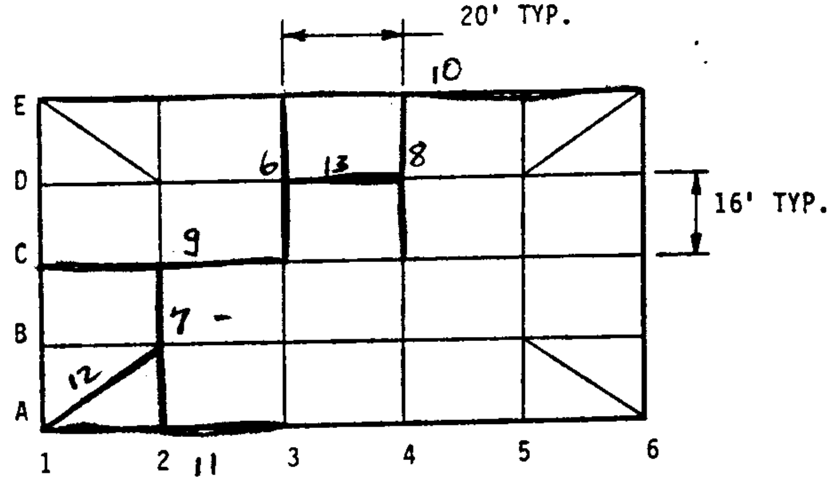
APPENDIX B - DESIGN EXAMPLE

(RIBBED MAT DESIGN IN EXPANSIVE SOIL)

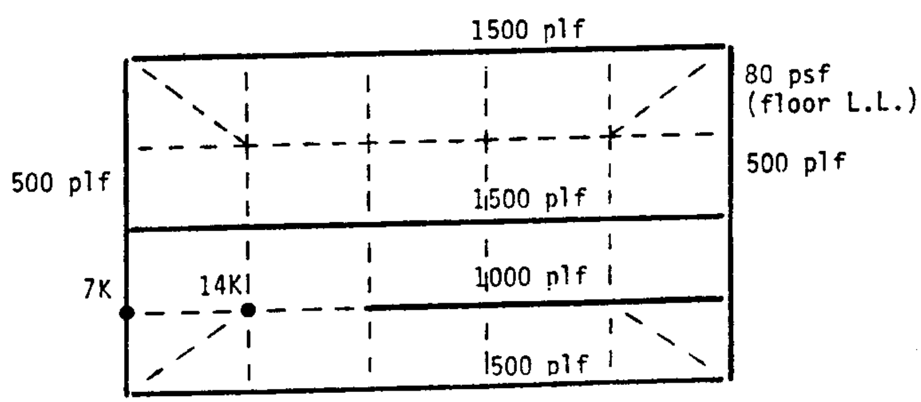
1. SOIL DATA (ref. Part I - 3.3)

qa = 2000 psf
Psw = (see page B9)
k = 100 pci
Lm = 6 ft
Ym = 1.5 in for center lift
Ym = 1.0 in for edge lift

2. FOUNDATION PLAN (ref. Part I - 4.3)



3. LOADS



4. BEARING DESIGN FOR RIBS (ref. Part I - 4.4)

Maximum wall load (P) = 1500 plf

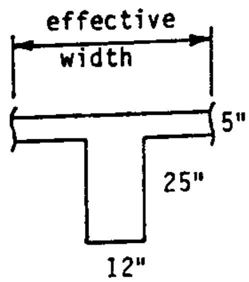
Width $\geq$ P/qa = 1500/2000 = .75 ft

Use 12 inch wide ribs (minimum)

5. INTERIOR RIB PROPERTIES (ref. Appendix A - 2.1)

Ec = 3,320,000 psi

(effective flange width per ACI 318, section 8.10.2 For "span length" use 4Lc for center lift or Le for edge lift)



Let Ir = 36,000 in^4 for center lift
Ir = 24,000 in^4 for edge lift
(ref. ACI 318, section 9.5.2.3, verify Ir after calculating M)

I = Ir/S (in^4/ft):

Rib spacing	16 ft	20 ft
Center lift Edge lift	2250 1500	1800 1200

6. CENTER LIFT DESIGN - RIB E3/C3

6.1 Loads (ref. Appendix A - 2.1)

slab weight = 150 pcf x 5/12 ft = 62 psf

w = DL + LL = 62 + 80 = 142 psf

rib weight = 150 pcf x 2.5 ft x 1.0 ft = 375 plf

Pp = rib + wall = 375 + 1500 = 1875 plf

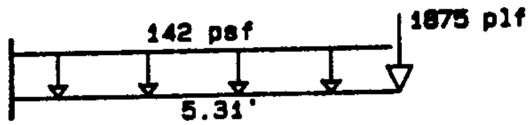
6.2 Equivalent cantilever (ref. Part II - 3.1)

$Lo = 2.3 + .4\ Lm = 2.3 + (.4 \times 6) = 4.7$ ft

$C = .8\ Ym^{.12}\ I^{.16} / Pp^{.12}$

$C = .8 \times 1.5^{.12} \times 1800^{.16} / 1875^{.12} = 1.13$

$Lc = Lo\ C = 4.7 \times 1.13 = 5.31$ ft



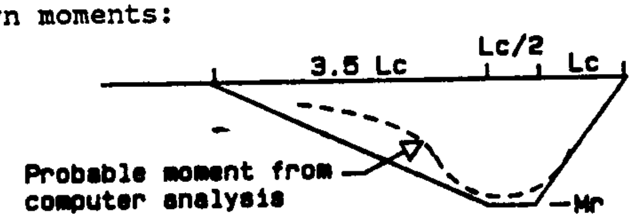
6.3 Moment (ref. Part II - 3.1.2)

$M = Pp\ Lc + 1/2\ w\ Lc^2$

$M = 1875 \times 5.31 + 1/2 \times 142 \times 5.31^2 = 12{,}000$ ft-lb/ft

$Mr = M \times S = 12000 \times 20 = 240{,}000$ ft-lb/rib

Design moments:

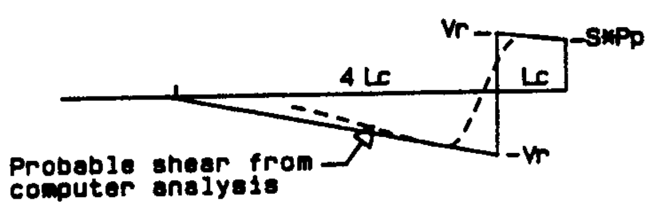


6.4 Shear (ref. Part II - 3.1.3)

$V = Pp + w\ Lc = 1875 + 142 \times 5.31 = 2630$ lb/ft

$Vr = V \times S = 2630 \times 20 = 52{,}600$ lb/rib

Design shears:



6.5 Reinforcing in rib (ref. Part I - 3.1.6 and 4.5)

As = (Mr/ad)/1.33

As = 240 / (1.76 x 28 x 1.33) = 3.66 in^2 (top)

use 3 #10 bars

v = Vr/bd = 52600 / (12 x 28) = 157 psi

vc = $(1.1\sqrt{f'c})1.33$ = 80 psi

Av = (v-vc)b s/(fs 1.33)

Av = (157-80) 12 x 12 / (24000 x 1.33) = .35 in^2/ft

use #4 stirrups @ 12 in

6.6 Deflection (ref. Part II - 3.1.4)

$\theta = M^{1.4} / 9800\ I\ k^{.5}$

.0021

$\theta = 12000^{1.4} / (9800 \times 1800 \times 100^{.5})$ = .0029 radians

D = .11 + 12 Lc θ = .11 + 12 x 5.31 x .0029 = .29 in

.24

D/4Lc = .29 / (4 x 5.31 x 12) = 1/879 O.K.

1/1062

7. EDGE LIFT DESIGN - RIB A2/C2

7.1 Loads

w = 142 psf (same as above)

Pp = rib + wall = 375 + 500 = 875 plf

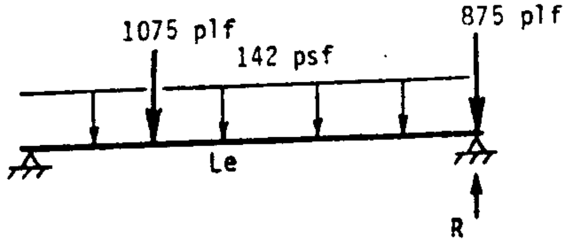
Pi = rib + wall* = 375 + 700 = 1075 plf

* equivalent wall load = column load / rib spacing

14000/20 = 700 plf (ref. Appendix A - 2.4)

Li = 16 ft

7.2 Equivalent simple beam (ref. Appendix A - 3.2.1)



7.3 Deflection (ref. Part II - 3.2.2)

$Le = 7.5\ I^{.17}\ Li^{.37}\ D^{.12} / w^{.07}\ Pi^{.11}$

$Le = 7.5 \times 1200^{.17} \times 16^{.37} \times D^{.12} / 142^{.07} \times 1075^{.11}$

$Le = 22.9\ D^{.12}$

assume D = .50 in (somewhat less than Ym = 1.0 in)

$Le = 22.9 \times .50^{.12} = 21.1$ ft

R = Pp + 1/2 w Le + Pi(Le-Li)/Le

R = 875 + (142x21.1)/2 + 1075(21.1-16.0)/21.1 = 2633 plf

from heave/pressure curve (p B9), for D=.50 find Psw=2000

Lb = 1.1(R/Psw) ≅ 1.1(2633/2000) = 1.45 ft

$D = Ym(Lm-Lb)^2/Lm^2$

$D = 1.0(6.0-1.45)^2/6.0^2 = .575$ in $\neq$ .50 inch assumed!

assume D = .54 in

$Le = 22.9 \times .54^{.12} = 21.3$ ft

R = Pp + 1/2 w Le + Pi(Le-Li)/Le

R = 875 + (142x21.3)/2 + 1075(21.3-16.0)/21.3 = 2655 plf

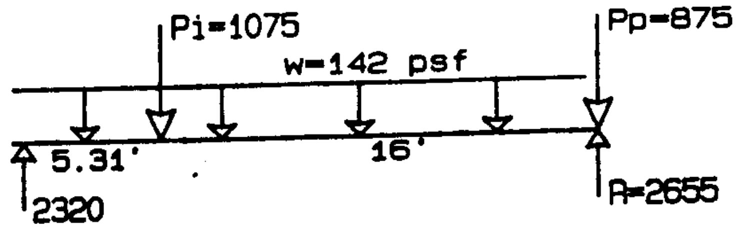
from heave/pressure curve, for D=.54 find Psw=1800 psf

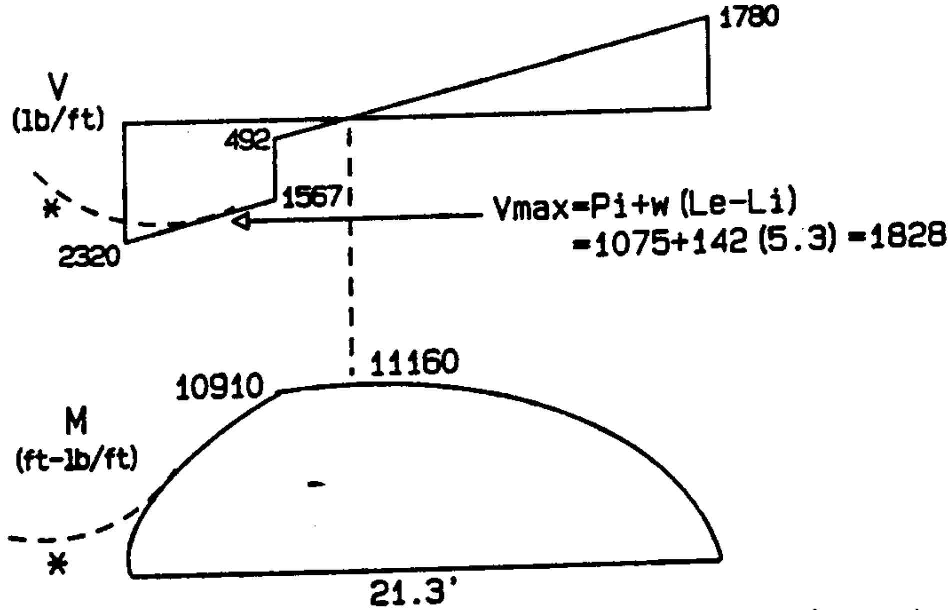
Lb = 1.1(R/Psw) = 1.1(2655/1800) = 1.62 ft

$D = 1.0(6.0-1.62)^2/6.0^2 = .533$ in CONVERGED!

D/Le = .54/(21.3x12) = 1/473 O.K. for non-brittle walls

7.4 Moment and shear (ref. Part II - 3.2.3 and 3.2.4)





* probable shear and moment from computer analysis, note that calculated V=2320 lb will not occur, due to the effects of distributed support from the soil

8. EDGE LIFT DESIGN - RIB E4/C4

8.1 Loads

w = 142 psf (same as above)

Pp = 1875 plf (same as rib E3/C3)

Li = 32 ft (wall along rib C1/C6)

8.2 Deflection

since Li>Le use:

$Le = 10.5\ I^{.17}\ D^{.12}/\ w^{.07}$ (ref. Part II - 3.2.5)

$Le = 10.5 \times 1200^{.17} \times D^{.12}/\ 142^{.07} = 24.77\ D^{.12}$

assume D = .48 in

then $Le = 24.77 \times .48^{.12} = 22.7$ ft

$R = Pp + 1/2\ w\ Le = 1875 + (142 \times 22.7)/2 = 3485$ plf

from heave/pressure curve, for D=.48 find Psw=2100 psf

$Lb = 1.1(R/Psw) = 1.1(3485/2100) = 1.825$ ft

$D = Ym(Lm-Lb)^2/Lm^2$

$D = 1.0(6.0-1.825)^2/6.0^2 = .484$ inch   CONVERGED!

8.3 Find shears and moments by statics, similar to rib A2/C2.

9. CENTER LIFT DESIGN - RIB C1/C3

9.1 Loads

$w = slab + LL + wall^* = 62 + 80 + 94 = 236$ psf

* wall = wall load / rib spacing = 1500/16 = 94 psf
(ref. Appendix A - 2.4)

$Pp = rib + wall = 375 + 500 = 875$ plf

9.2 Equivalent cantilever

$Lo = 2.3 + .4\ Lm = 2.3 + (.4 \times 6) = 4.7$ ft

$C = .8\ Ym^{.12}\ I^{.16}/\ Pp^{.12}$

$C = .8 \times 1.5^{.12} \times 2250^{.16}/\ 875^{.12} = 1.28$

$Lc = Lo\ C = 4.7 \times 1.28 = 6.02$ ft

9.3 Moment

$M = Pp\ Lc + 1/2\ w\ Lc^2$

$M = 875 \times 6.02 + (236 \times 6.02^2)/2 = 9544$ ft-lb/ft

$Mr = M \times S = 9544 \times 16 = 153{,}000$ ft-lb/rib

9.4 Shear

$V = Pp + w\ Lc = 875 + (236 \times 6.02) = 2296$ plf

$Vr = V \times S = 2296 \times 16 = 36{,}700$ lb/rib

9.5 Deflection

$\theta = M^{1.4}/\ 9800\ I\ k^{.5}$

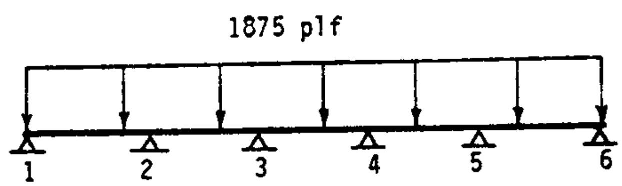
$\theta = 9544^{1.4}/\ 9800 \times 2250 \times 100^{.5} = .0017$ radian

$D = .11 + 12\ Lc\ \theta = .11 + (12 \times 6.02 \times .0017) = .23$ in

10. CENTER LIFT DESIGN - PERIMETER RIB E1/E6 (ref. Part II-3.3.1)

10.1 Span between transverse ribs

Pp = 1875 plf (from calculations for rib E3/C3)

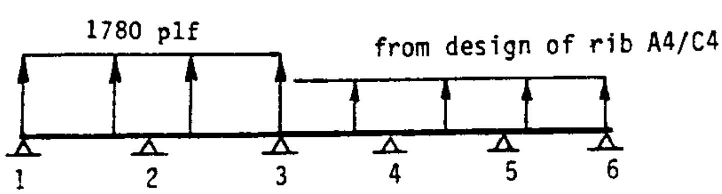


10.2 Analyze by conventional methods

11. EDGE LIFT DESIGN - PERIMETER RIB A1/A3 (ref. Part II - 3.3.2)

11.1 Span between transverse ribs for net upward force (from calculations on rib A2/C2)

R - Pp = 2655 - 875 = 1780 plf (upward)



11.2 Analyze by conventional methods

12. CENTER LIFT DESIGN - DIAGONAL RIB A1/B2 (ref. Part II - 3.4)

12.1 Provide the larger shear and moment capacity of rib B1/B2 or rib A2/B2.

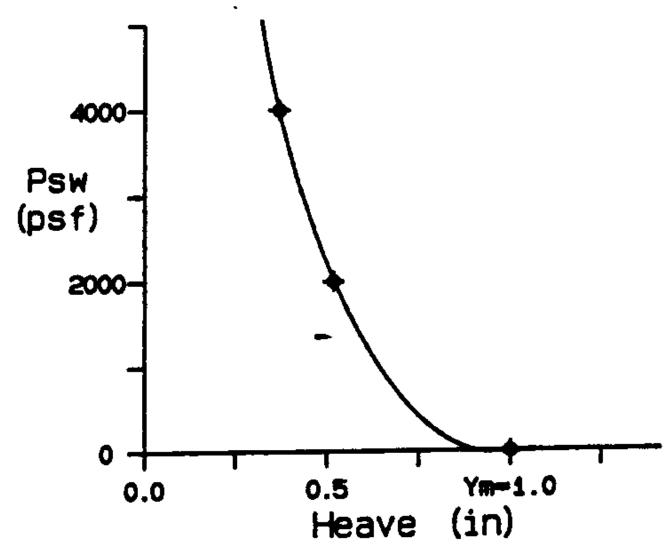
13. RIB D3/D4 (ref. Part I - 4.5)

13.1 Interior rib with no wall or column loads

$A_s \geq .0033\ A_g = .0033 \times 12 \times 30 = 1.20\ in^2$ (top and bot.)

This is the typical minimum reinforcement for the full length of all ribs.

14. HEAVE VERSUS SWELL PRESSURE CURVE (ref. Appendix A - 2.1)



DEPARTMENT OF THE ARMY
SOUTHWESTERN DIVISION, CORPS OF ENGINEERS
1114 COMMERCE STREET
DALLAS, TEXAS 75242-0216

REPLY TO
ATTENTION OF

16 APR 1987

SWDED-G

SUBJECT: Criteria for Developing Geotechnical Design Parameter for SWD Ribbed Mat Design Methodology

Commander, Albuquerque District, ATTN: SWAED-TA
Commander, Fort Worth District, ATTN: SWFED-F
Commander, Galveston District, ATTN: SWGED-G
Commander, Little Rock District, ATTN: SWLED-G
Commander, Tulsa District, ATTN: SWTED-G

1. Reference is made to criteria letter SWDED-TS/G dated 23 December 1986, subject "Design Criteria for Ribbed Mat Foundation".

2. The above reference criteria letter require certain geotechnical parameters be furnished in the Foundation Design Analysis when a ribbed mat slab foundation is recommended in expansive soil areas. Enclosure 1, for addressees only, provides guidance for development of these parameters. These procedures were developed by the Ft. Worth District with review in the Southwestern Division. Questions and/or comments should be directed to either Mr. A.L. Branch, FTS 334-2117 or Mr. Jack Fletcher, FTS 729-6365.

FOR THE COMMANDER:

Encl

William Baker
for ARTHUR D. DENYS, P.E.
Chief, Engineering Division

CONTENTS

DEVELOPMENT OF GEOTECHNICAL DESIGN PARAMETERS FOR RIBBED MAT FOUNDATIONS

1. REFERENCE.

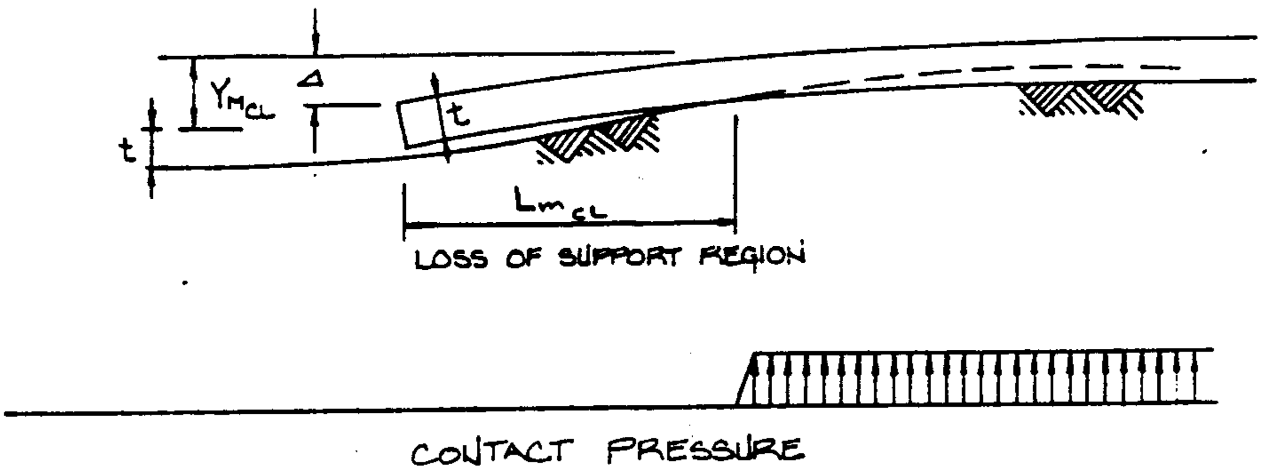
1.1 SWDED-TS/G, Design Criteria for Ribbed Mat Foundations, dated 23 Dec 86.

1.2 TM 5-818-7, Foundations in Expansive Soils, Corps of Engineers, 1983.

2. BACKGROUND. The recently developed structural design methodology (reference 1) models the interaction of a ribbed mat slab on an expansive subgrade for purposes of structural design. This method appears equally suited to stiffened mat systems such as flat mats, modified flat mats and inverted ribbed mats. Utilization of the methodology requires the expansion and refinement of the geotechnical design parameters furnished in the foundation design analysis. The purpose of this report is to (1) identify and (2) provide a rational method of determining these parameters.

3. SOIL-STRUCTURE INTERATION MODES. Two heave induced deformation conditions appropriate for ribbed mat slab structural analysis are (a) center lift and (b) edge lift.

3.1 CENTER LIFT. Center lift considers doming of the foundation in the interior region of a slab on grade differentially to the perimeter region as depicted on figure 1. This may be caused either by drying of the expansive subgrade around the perimeter beam or by wetting of the dry expansive subgrade in the interior region. Perimeter drying results from (1) below average precipitation and/or (2) reduced or no landscape watering and/or

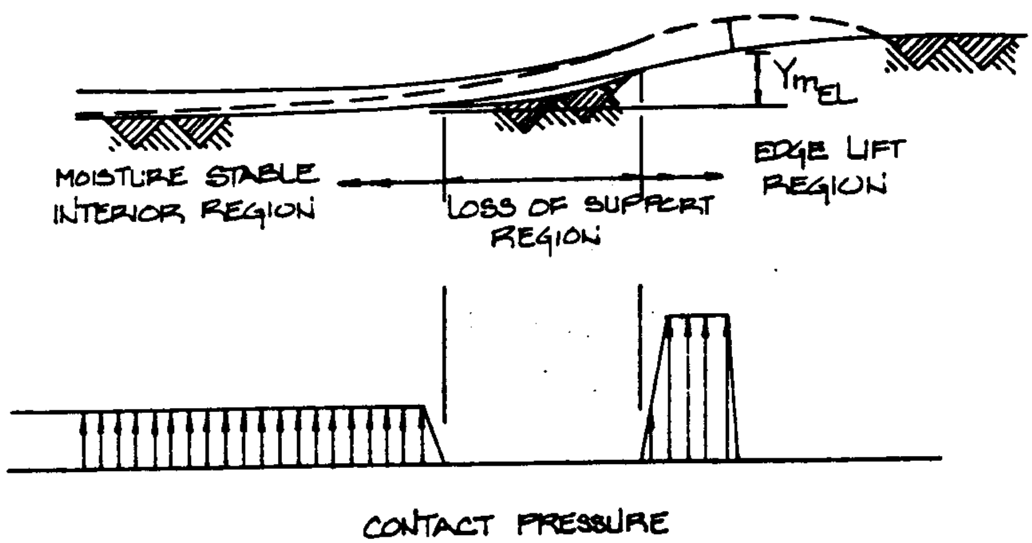


CENTER LIFT

FIGURE 1

(3) removal of old paving or hard stand. Interior wetting results from (1) disruption of the site moisture equilibrium by "capping" the site with the relatively impervious slab or by removal of thick brush or trees from the site (thus eliminating evapo-transportation) and/or (2) leaky inservice or abandoned utilities. Loss of support along perimeter and first interior transverse stiffener beam results if (1) the magnitude of center lift heave is large enough and (2) the beams are sufficiently rigid to cantilever from the supported interior region.

3.2 EDGE LIFT. Edge lift involves more complex soil-structure interactions than does center lift. In edge lift, the structure is supported by heaving subgrade in the perimeter region and in the relatively moisture stable interior region. Loss of support develops when (1) the edge lift heave deformation is large enough and (2) the spanning beam is sufficiently rigid. Edge lift mode is depicted on figure 2.



EDGE LIFT
FIGURE 2

Soil-structure interaction within the interior supported region is reasonably represented as a beam on non-linear subgrade. Soil-structure interaction in the perimeter region is somewhat more complex because the soil deflects under the structural load as a beam on non-linear subgrade, but also the swelling soil either loads and/or deflects the beam upward. To further complicate matters, the amount of edge lift heave and the soil-beam interface pressure are interrelated and unique for each specific site. Background parameter studies for reference 1 indicate that the structural analyses are particularly sensitive to edge lift parameters (edge lift heave magnitude and limiting beam-soil interface pressure). For example, large values for these may cause the solution to either fail to converge or indicate that the beam must be very deep and/or very heavily reinforced. While site conditions may sometimes dictate massive, very rigid stiffener beams, this is not generally the case. Generally, edge lift heave of less than 1.0 to 1.5 inches used in the design method given in reference 1 produce reasonable, constructable beams.

4. DETERMINATION OF CENTER LIFT AND EDGE LIFT PARAMETERS FOR STRUCTURAL DESIGN.

4.1 CENTER LIFT - Center lift parameters to be provided in the foundation design analysis includes (1) modulus of subgrade reaction (K_1), (2) design allowable bearing for beams (q_{all}), (3) magnitude of center lift (Y_{mCL}) and (4) loss of support distance around the perimeter (L_{mCL}).

4.1.1 MODULUS OF SUBGRADE REACTION - The modulus of subgrade reaction should be taken as K_1 = 200 pci for beams up to 12 inches wide bearing on compacted, nonexpansive fill. Higher values may be justified for granular nonexpansive fills consisting of gravel, crushed rock or limestone screenings or for cement stabilized materials if these materials extend significantly ($D \geq 3B$) below the stiffener beam of width B. The foundation design analysis should direct that K_1 values be factored to account for width effects such that $K_{design} = K_1/B$, where B is the effective beam width in feet for soil structure interaction. Note that the resultant effective beam width may include a significant width of the slab and is therefore significantly greater than actual beam width. Studies indicate that significant load distribution occurs over an "effective" width of approximately five. It should be noted that structural design calculations are not sensitive to K value.

4.1.2 <u>DESIGN ALLOWABLE BEARING</u>. A design allowable bearing value (q_{all}) has historically been assigned for sizing of stiffener beams, perimeter beams and enlarged beam intersections beneath columns. Values are typically given considering the beam to be a continuous strip footing or the beam intersection to be a spot footing (carrying either line or concentrated loads, respectively). The allowable bearing value is typically developed based on the average strength of engineered fill at shallow depth with a factor of safety of not less than 3.0. Design loads typically include full dead load plus half live load. The purpose in sizing the beams and beam intersections for this design allowable is to provide uniform contact pressures at the beam-soil interface therefore limiting inservice differential settlement. The assumptions of minimal load sharing between the slab and beams, ample safety factor on the fill strength, and minimum beam widths specified in the SWD EIM combine to limit the mobilized soil strains to low levels. This leads to very small structurally induced deflections given uniform, nominal fill depths. Actual values assigned for design bearing allowables have seldom exceeded q_{all} = 2.0 KSF although values as high as 3.0 KSF have been assigned in limited cases where required and justifiable. Seldom are there structural requirements for larger allowables bearing values since specified minimum beam widths generally govern.

4.1.3 MAGNITUDE OF CENTER LIFT HEAVE POTENTIAL. - The magnitude of center lift heave potential (Y_{mCL}) given in the foundation design analysis should be the residual heave potential at the site. The value of Y_{mCL} should include effects due to subgrade removal and replacement criteria, any surcharge effects due to fill above original subgrade and the weight of the proposed structure. Maximum design value for center lift potential should not exceed 1.5 inches. Where attainable with reasonable removal/replacement depths (≤36 inches), it is desirable to limit Y_{mCL} to not more than 1.0 inch, which is well within the "tolerable" inservice deformation range of most structures. Minimum remove/replace depth should be taken to the bottom elevation of the ribbed mat slab beams.

function of anticipated loads

The heave potential is determined by three soil parameters: the coefficient of swell (C_s), depth of active zone (X_a) and expansion pressure (P_{exp}).

Caution should be used in selecting coefficient of swell (C_s) values for heave analyses since swell pressure test results significantly underestimate C_s values compared to controlled expansion-consolidation-rebound tests. Additionally, both test methods tend to give low C_s values since most rebound time curves are terminated well before primary swell is completed.

★ An appropriate design value of the depth of the active zone (X_a) typically lies between the present depth to the stable relative moisture content (estimated by observing the relationship of moisture content to the plastic limit) and the maximum depth observed, such as the maximum depth of weathering. Typical X_a values for the central and north Texas regions and central Oklahoma region appear to vary from about 10 to 15 feet. These values have been estimated for (1) regression heave analyses for distressed structures and (2) depth of moisture variation versus approximate return/duration interval studies. Values smaller than 14 feet may be applicable in specific cases such as where the active zone is the distance between the structural foundation element or slab on grade and a perched water table; a condition common in these regions.

Center lift heave analyses should consider "saturated" conditions to a depth of X_a. If a nominal remove/replace depth and saturated subgrade assumptions indicate unreasonable residual heave potential, consider increasing the depth of remove/replace and/or recommending a more defensive design to prevent saturation of the subgrade.

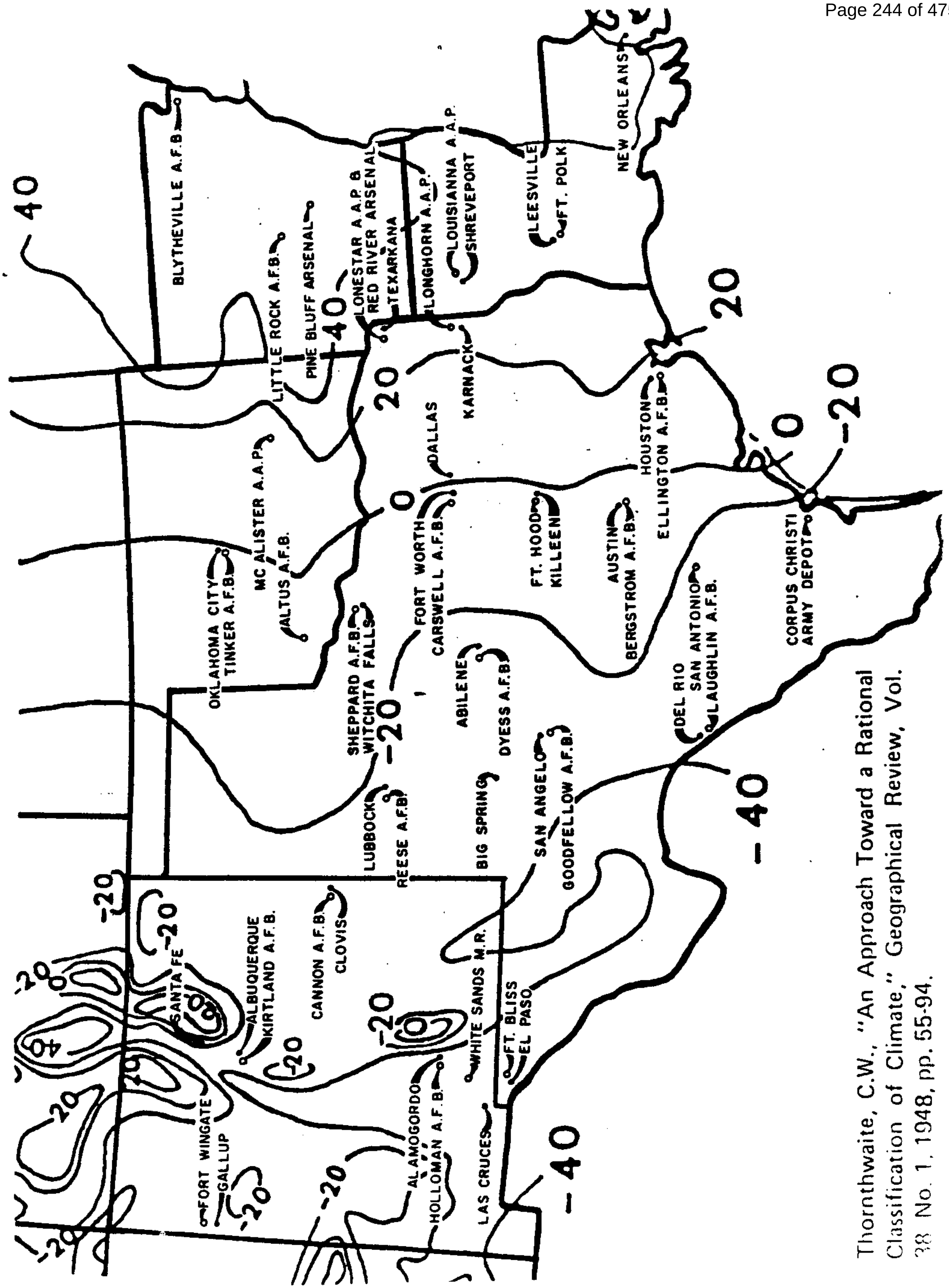
Expansion pressures should be developed versus depth using small depth intervals. These should be developed from laboratory data for the site. Additionally, these may be supplemented using proper correlations with nearby, preferably adjacent sites.

4.1.4 EDGE MOISTURE VARIATION DISTANCE. The edge moisture variation distance (L_{MCL}) may control the design of interior stiffener beams which are adjacent to the perimeter. The maximum moments and shear are induced in the transverse beams when these elements cantilever free of foundation support from the interior supported region to the outside of the perimeter beam. The length of cantilver is largely controlled by the value of L_{MCL}. SWD adopted this concept from Post-Tensioning Institute (PTI) guidelines, originally developed for lightly loaded flexible mats in the late 1970's and early 1980's. Standard practice in the

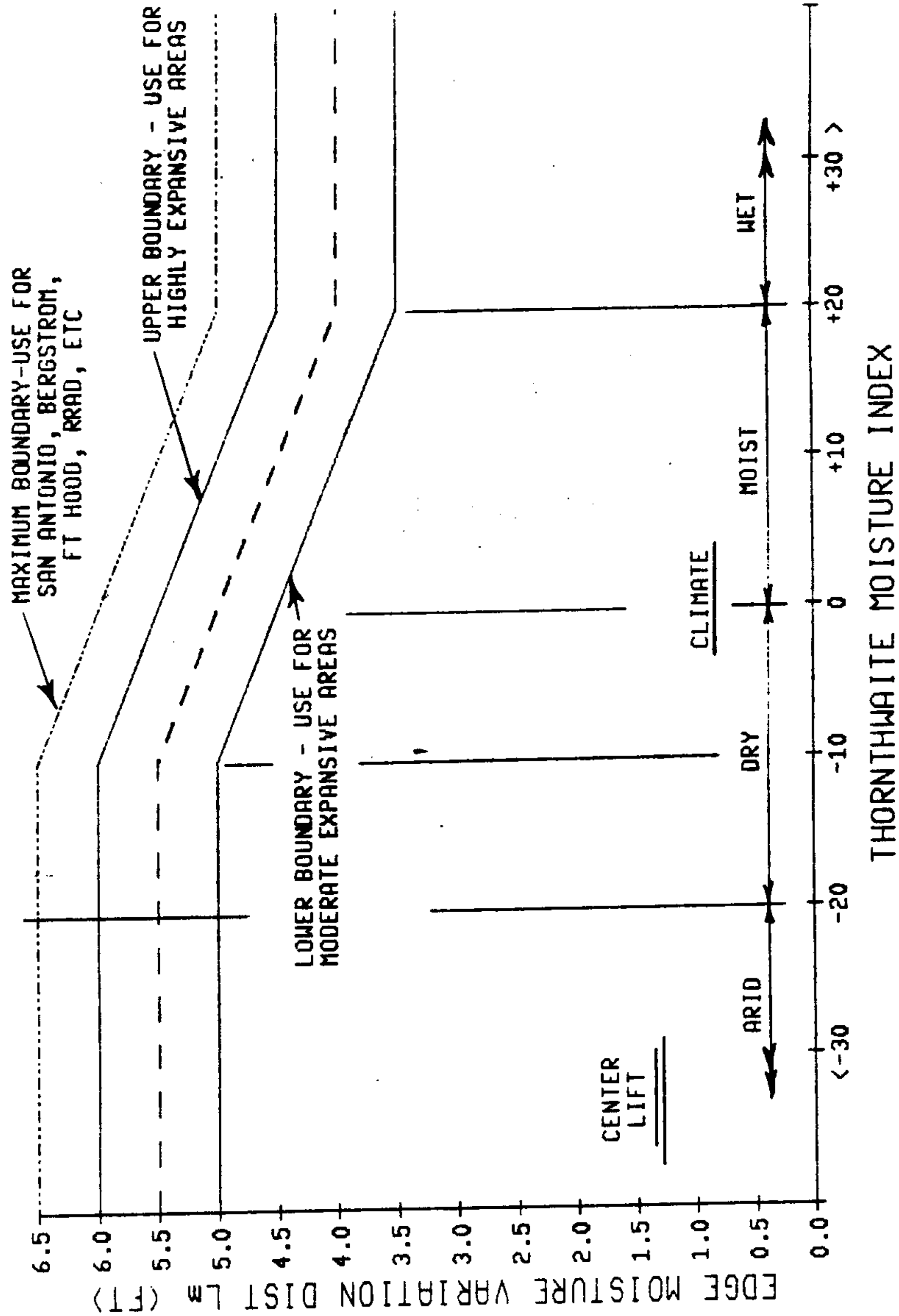
San Antonio area has been to assign upper or near upper bound values from TMI for design L_{mcL} values. At least two aspects of designs probably tend to moderate the actual edge moisture variation distance experienced; these being (1) relatively deep perimeter beams which act as a physical barrier and (2) the non-expansive fill blanket which tends to make changes in moisture content (and therefore any resultant heave or shrinkage) more uniform and provide a surcharge effect as well. Other factors, however, tend to offset these moderating effects. These include very short return interval of edge moisture variation events presented in TMI (reported by some sources to range from 1 to 2 years). Typical project design life of projects exceeds 20 or 30 years and, since we're still using many World War II facilities, it may well exceed 50 years. Estimated edge moisture variation values considering a 100 percent probability of experiencing a 20 to 30-year return interval event may well be twice typical TMI values.

Based on a subjective combination of all factors, it is suggested that L_{mcL} be taken as the edge moisture variation distance determined using figures 3 and 4. These values should be modified, either up or down, based on site secific soils investigations and engineering judgement.

4.2 EDGE LIFT - Edge lift parameters to be provided in the foundation design analysis include (1) modulus of subgrade reaction (K_1), (2) magnitude of edge lift heave (Y_{mEL}), (3) limiting soil-beam interface pressure (P_{SW}) for that portion of the beam being acted on by the heaving subgrade and (4) a value for edge moisture variation distance (L_{mEL}).



Thornthwaite, C.W., "An Approach Toward a Rational Classification of Climate," Geographical Review, Vol. 38 No. 1, 1948, pp. 55-94.



APPROXIMATE RELATIONSHIP BETWEEN THORNWAITE INDEX AND MOISTURE VARIATION DISTANCE

FIGURE 4

4.2.1 MODULUS OF SUBGRADE REACTION. - Values given for center lift are considered appropriate for edge lift also.

$K_1 = 200$ pci

4.2.2 SOIL-BEAM INTERFACE PRESSURE. Discussion of both limiting soil-beam interface pressure and magnitude of edge lift heave parameters (P_{SW} and Y_{mEL}) are best handled concurrently since both are intimately related and the analysis necessary for solution determines both simultaneously.

The area of soil-beam contact in the swelling perimeter region involves a somewhat complex soil-structure interaction situation. As edge lift develops and loss of support occurs between the perimeter and interior regions, the heaving soil may well exert a pressure on the stiffener beams well in excess of typical design interface pressures (q_{all}). As the soil column swells and lifts the overlying beam, the soil-beam contact area increases toward the interior region to accommodate the greater structural reaction.

The soil-structure interaction in the edge lift region can be visualized as a three-component system; (1) a structural element (a beam or mat strip), (2) an element of nonexpansive fill beneath the structural element plus that piece of the expansive subgrade restrained against heave by the weight of the overlying fill and the stresses induced beneath the structural element, and (3) the heaving column of soil to a depth of X_a beneath the bottom of the nonexpansive fill blanket (figure 5).

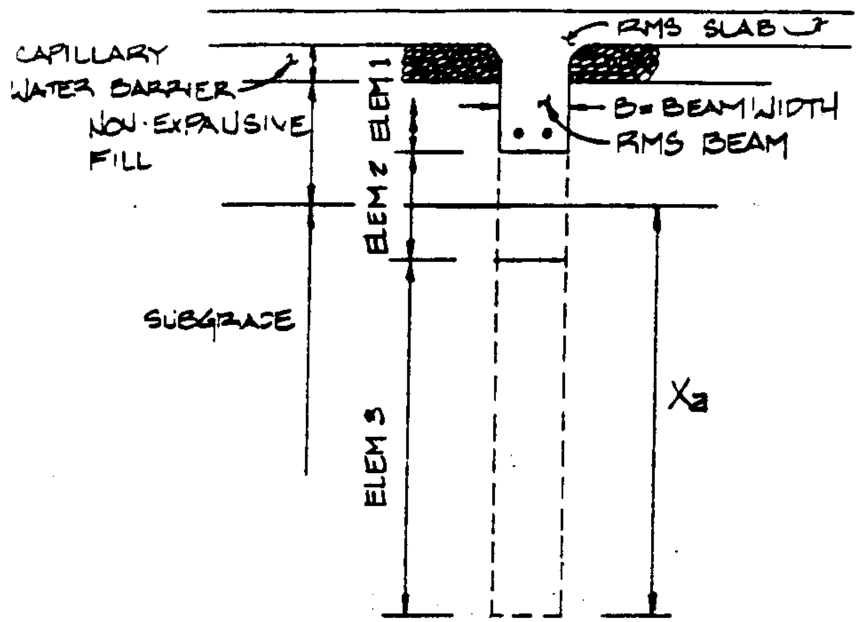


FIGURE 3

The load-deformation relationship of element 1 interacting with element 2 can be represented by a P-Y curve shown in figure 6.

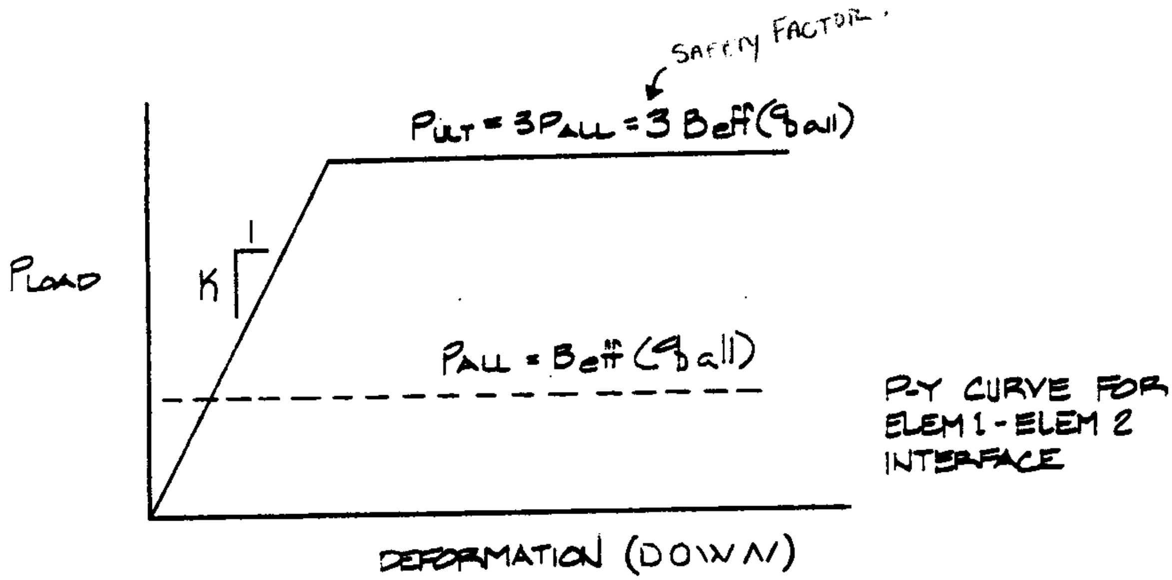


FIGURE 6

The load-deformation relationship of element 3 interacting with elements 1 and 2 in the column immediately below the beam as shown on figure 7. The plot consists of the net heave potential of the swelling soil column versus those forces resisting the tendency to swell, taken at the base of the structural beam.

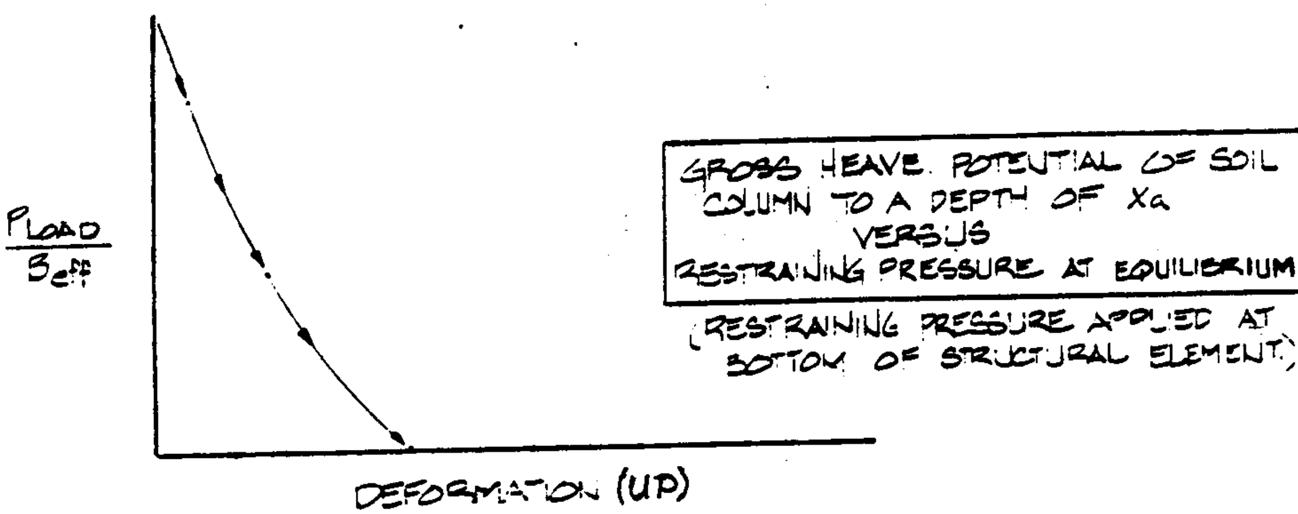
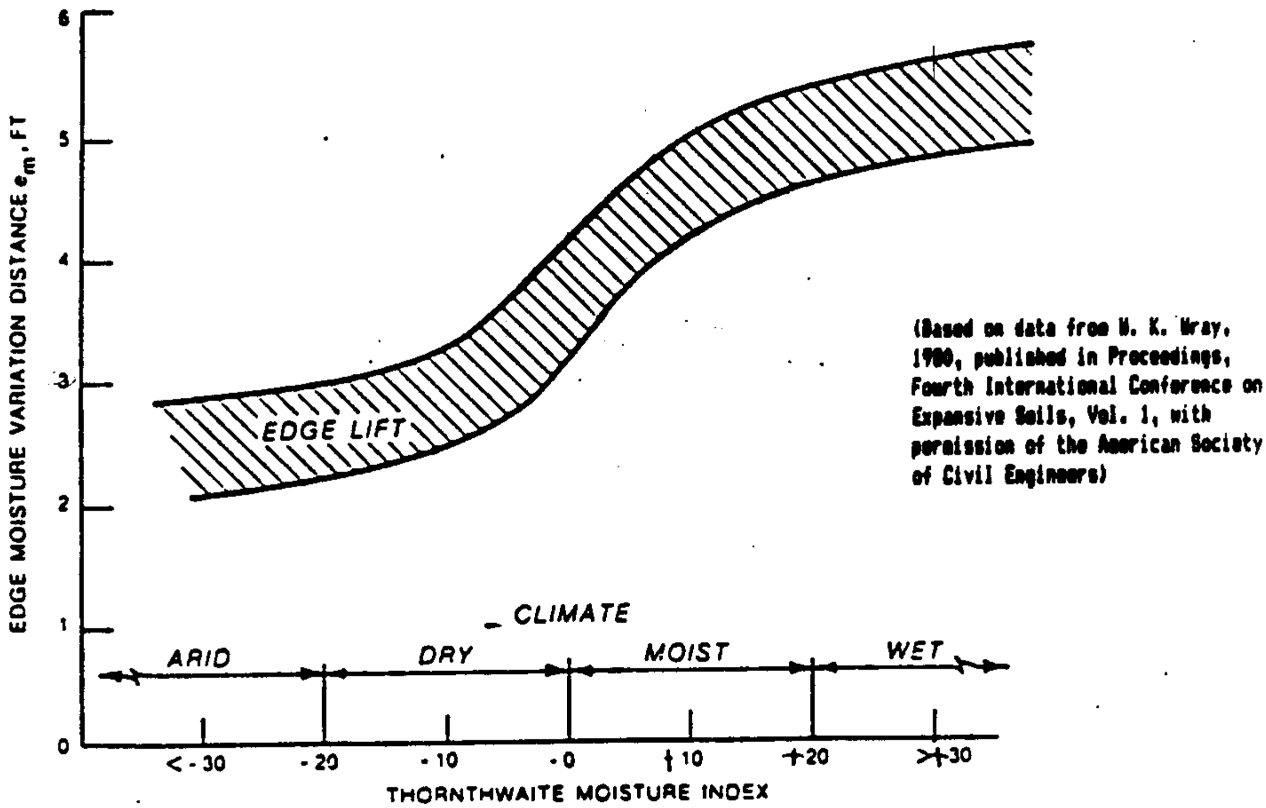


FIGURE 7

These relationships can be added algebracially to produce a composite p-y curve which can be easily utilized by available soil-structure interaction programs for structural analysis. Since such analysis is within the purview of the structural engineer, the geotechnical engineer need only furnish the pressure heave relationship in useable form in the Foundation Design Analysis. It is suggested that this information be provided in a tabulated format giving coordinates for at least three points. These minimum three points should be the P_{SW} and Y_{MBL} coordinates for (1) pressure equal to P_{ult} (P_{ULT} = F.S. x P_{ALLOW}), (2) pressure equal to P_{all} and (3) pressure equal to zero.

4.2.3 <u>EDGE MOISTURE VARIATION DISTANCE</u>. Edge moisture variation distance (L_{mEL}) appropriate for edge lift analysis may be taken from the TMI chart given in figure 8.



Approximate relationship between the Thornthwaite Moisture Index and the edge lift-off distance.

FIGURE 8

The TMI values represent approximate environmentally induced events. As a result, upper bound values should be selected for design. It is recommended, however, that average values be used for all SWD projects. Additionally, recommendations should be made in the foundation design analysis to limit the potential for developing "hot spots" due to long term sources of free water around the building perimeter.

function of the type of bldg, ie, Brick stucco or Not

4.3 Certain structure-site situations may well warrant deleting edge lift analyses as follows:

4.3.1 Where the proposed structure is a pre-engineered metal building without interior masonry walls or heavy interior dead or permanent live loads.

4.3.2 Where defensive design efforts have been incorporated and reasonable confidence exists that these will be constructed and maintained as intended.

4.3.3 Where minor architectural distress (such as cracking of masonry walls, plaster walls, tiled surfaces) is not likely to cause undue user concern or raise inservice maintenance requirements significantly.

5. APPENDIX A

5.1 EXAMPLE PROBLEM. An example problem is provided in Appendix A.

APPENDIX A

EXAMPLE PROBLEM

1. Required. - Develop geotechnical parameters for the structural design of a ribbed mat slab given the following:

a. Proposed Structure. - Office/Administration type structure located in San Antonio, Texas, 60X150 feet in plan. The structure is to consist of double wythe masonry (face brick over CMU) load bearing exterior walls and isolated interior colums at 20 ft. centers.

b. Proposed Site. - One acre, minimal topographic relief, site covered with mesquite trees.

c. Subsurface Conditions. - Drilling program (5 borings) indicates the foundation materials consist of (1) a surface stratum of high plasticity clay grading into medium plasticity clay with depth to a total thickness of 14 feet, (2) a water bearing sand and gravel stratum from 1 to 7 feet thick overlying, (3) an expansive clay shale formation.

d. Summary Laboratory Test Data. -

Stratum	Depth (ft)	USCS	$\bar{W}_o$ (%)	d (pcf)	LL	PI	P_{exp} (tsf) (net)	C_s	C_c	C_u (ts
1	0-4	CH	25	105	65	45	0.8 -1.0	0.06	0.02	0.
2	4-14	CL	14	108	44	30	0.6	0.06	0.18	0.
3	14-20	GC	6	-	25	12	0	-	-	5C B/
4	20 plus	Wea. Clay Shale	22	110	70	52	2.0	0.09	0.22	1.

2. Determine Parameters Required for Center Lift Analysis:

a. Modulus of Subgrade Reaction (K_1). - Mat slab will be founded on nonexpansive fill, therefore it is reasonable to assign a valve of K_1 = 200 PCI. The structural engineer should factor this value based on effective beam width such that $K_{design} = K_1$ (1ft/Beff, ft).

b. Design Bearing Allowable (q_{all}). - Since beams will be supported on nonexpansive fill and the building loads will range from light to moderate, it appears that a design bearing allowable of q_{all} = 2.0 KSF is appropriate.

c. Magnitude of Center Lift Heave Potential (Y_{mcl}). -

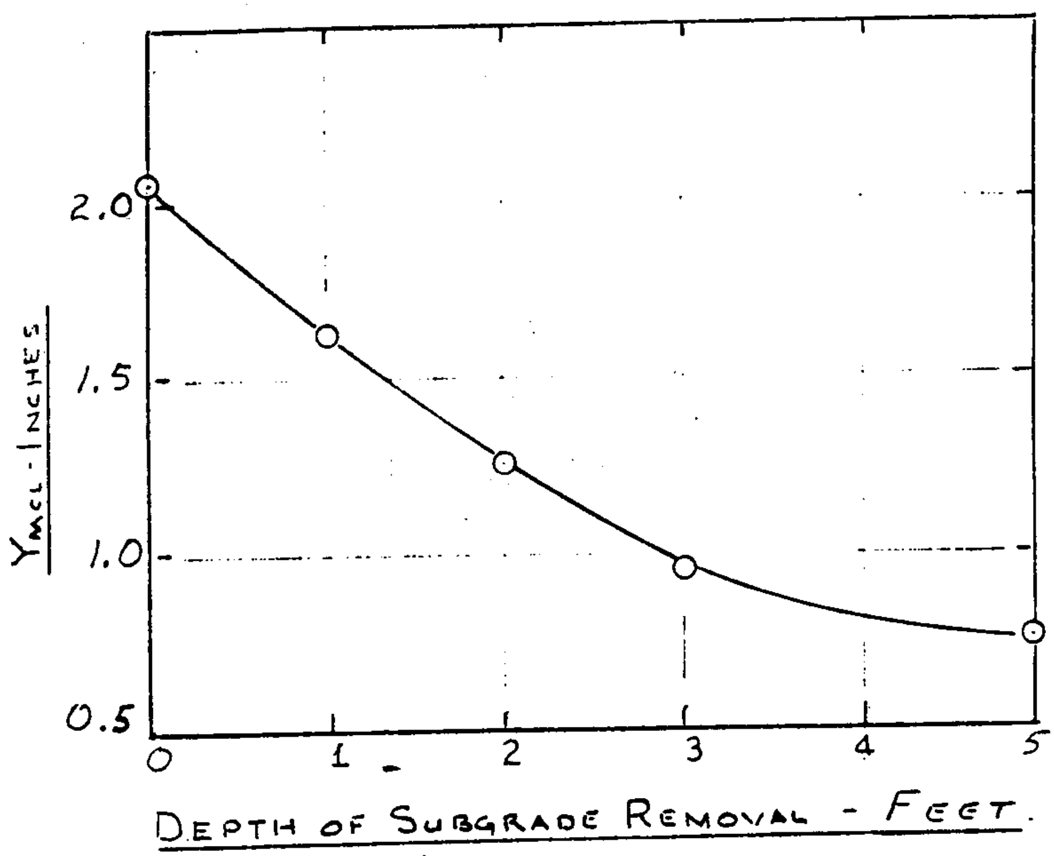
(a) Calculate site heave potential

Given: $C_s = 0.06$, $e_o = 0.60$, P_o = effective overburden pressure, P_{exp} = gross swell pressure, P_f = effective pressure resisting heave beneath mat including P_o, (surcharge due to fill and structural dead load, h_i = heave for soil layer h inches thick, and an X_a = 10 feet.

Cs = .06
eo = .60

z (ft)	z (ft)	Po (tsf)	Pexp (tsf)	Pf (tsf)	h (in)	$h_i = \frac{C_s h}{1+e_o} \log_{10} \frac{P_{exp}}{P_f}$ (inches)	h_i (bottom to top) (inches)
0-1	0.5	0.03	1.0	.07+.03 0.1	12	0.45	2.07
1-2	1.5	0.1	1.0	.07+.1 0.17	12	0.35	1.62
2-3	2.5	0.17	1.1	.07+.17 0.24	12	0.30	1.27
3-4	3.5	0.23	0.8	0.3	12	0.19	0.97
4-6	5	0.33	0.9	0.4	24	0.31	0.78
6-8	7	0.46	1.0	0.53	24	0.25	0.47
8-10	9	0.6	1.2	0.67	24	0.22	0.22
10-12	11	0.73	1.35	0.8	24	0.2	N/A
12-14	13	0.86	0.9	0.93	24	N/A	N/A

Determine required depth of subgrade replacement and residual heave potential after replacement with nonexpansive fill. A plot of replacement depth versus residual heave taken from the above table follows:



Removal and replacement to 3.0 feet will reduce the heave potential to approximately 1.0 inch, thus Y_{mcl} = 1.0 inch. Note that significant additional removal would be required to reduce the residual heave potential any sigificant additional amount.

d. Edge Moisture Variation Distance (L_{mc1}) - taken from figures 3 and 4 as L_{mc1} = 6.5 feet.

3. Determine parameters required for Edge Lift analyses:

a. Modulus of Subgrade Reaction (K_1). - Same as for Center Lift.

b. Design Allowable Bearing (q_{all}). - Same as for Center Lift.

c. Soil - Beam Interface Pressure (P_{sw}) and Magnitude of Edge Lift Heave Potential (Y_{me1}). -

Determine the residual heave potential for the soil column beneath a typical beam for a range of assumed interface pressures.

A summary of calulations and results is presented in tabulated form on page 6. A plot of soil-beam interface pressure versus heave potential is shown on page 7. A reasonable bilinear representation of the results, for use by the structural engineer, can be developed assuming a linear relationship between the following points:

P_{sw}, TSF	Y_{me1}, Inches
0.0	Y_{me1} = 1.25
q_{all} = 1.00	Y_{me1} = 1.0
q_{ult} = 3(q_{all}) = 3.00	Y_{me1} = 0.6

d. Edge Moisture Variation Distance. (L_{me1}). The edge moisture variation distance is taken from figure 8 as L_{me1} = 3.0 feet.

Given: D_f = 2.0ft B = 1.0ft

C_s = 0.06 e_o = 0.60

γ_m = 125pcf

								q_{app}											
								0.5tsf			1.0tsf			2.0tsf			4.0tsf		
Z ft	$\bar{Z}$ ft	h in	$\frac{\bar{Z}-D_f}{B}$	I_s	P_o tsf	P_o+P_s tsf	P_{exp} tsf	ΔP tsf	P_f tsf	Δh_i in	ΔP tsf	P_f tsf	Δh_i in	ΔP tsf	P_f tsf	Δh_i in	ΔP tsf	P_f tsf	Δh_i in
0-3	<----------------COMPACTED NONEXPANSIVE FILL TO A DEPTH OF 3.0 FT.---------------->																		
3-4	3.5	12	1.5B	0.28	0.23	0.30	0.8	0.14	0.37	0.15	0.28	0.51	0.08	0.56	0.79	0	1.12	1.35	0
4-6	5.0	24	3.0B	0.15	0.33	0.40	0.9	0.07	0.40	0.32	0.15	0.48	0.25	0.30	0.63	0.14	0.60	0.93	0
6-8	7.0	24	5.0B	0.09	0.46	0.53	1.0	0.05	0.53	0.25	0.09	0.55	0.23	0.18	0.64	0.17	0.36	0.82	0.09
8-10	9.0	24	7.0B	0.07	0.60	0.67	1.2	0.04	0.67	0.23	0.07	0.67	0.23	0.14	0.74	0.19	0.28	0.88	0.12
10-12	11.0	24	9.0B	0.05	0.73	0.80	1.35	0.03	0.80	0.20	0.05	0.80	0.20	0.1	0.83	0.2	0.20	0.93	0.16
12-14	13.0	24	11.0B	0.04	0.83	0.90	0.9	0.02	0.90	0.0	0.04	0.90	0.0	0.08	0.91	0	0.16	0.99	0
								ΣΔh_i = 1.15			ΣΔh_i = 0.99			ΣΔh_i = 0.7			ΣΔh_i = 0.38		

Where:

Z = depth interval

$\bar{Z}$ = mean depth

B = beam width

D_f = beam depth

τ_z = stress with depth

P_o = overburden pressure

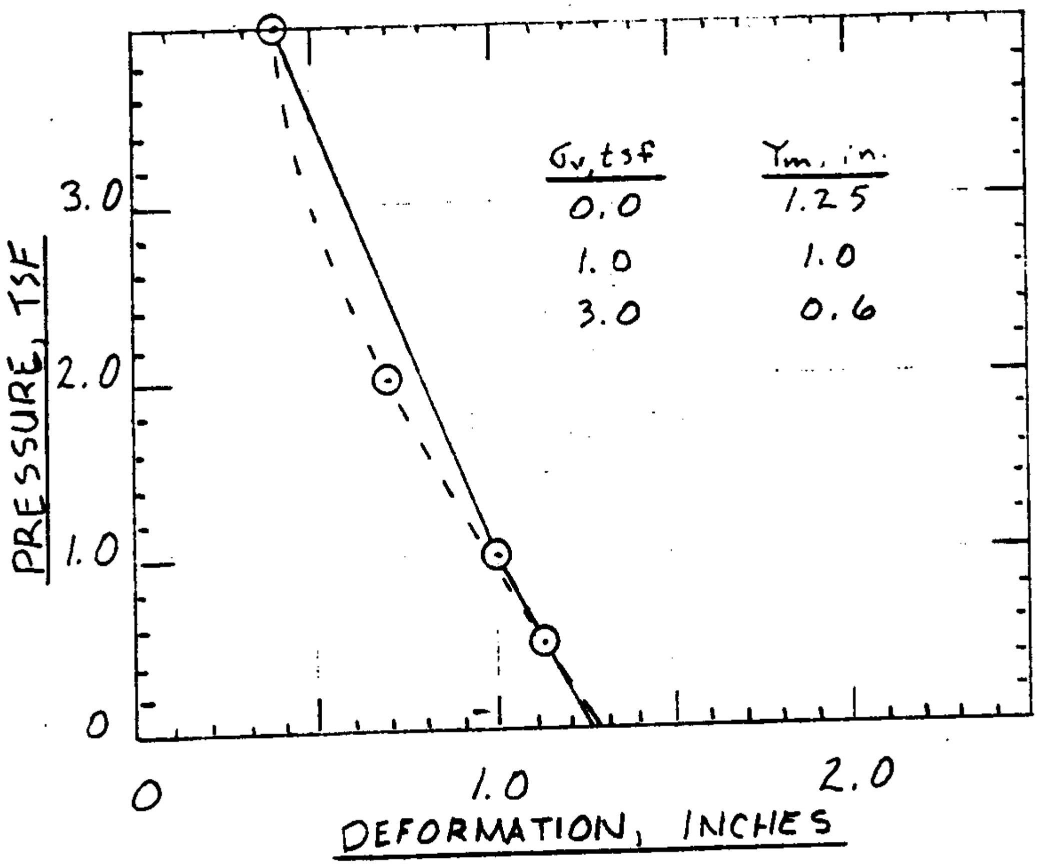
P_s = surcharge pressure next to beam

P_{exp} = expansion pressure

P_f = vertical pressure resisting heave below beam

P = stress @ depth due to to q_{app} $\Delta P = (I_s)(q_{app})$

$P_f = \begin{cases} \Delta P + P_o \\ \text{or} \\ P_o + P_s \end{cases}$ whichever is greater



EDGE LIFT PARAMETER

EXAMPLE PROBLEM

APPENDIX B
List of Drawings

Part I: Site Development Plan

G101: Project Location Map
C001: Existing Site (Aerial)
C002: Existing Site (FY07 Survey)
C101: Conceptual Site Plan
C102: Conceptual Site Plan w/ Future Development
C201: Grading Plan (Existing)
C501: Utility Plan
C901: Swing Gate Detail

Part II: Electrical Plans

U001: Electrical Demolition Plan
U301: Electrical Site Plan
U401: Telecommunications Site Plan

Part III: Geotechnical Drawings

B101: Boring Location Map
B201: Logs of Borings 1 of 4
B202: Logs of Borings 2 of 4
B203: Logs of Borings 3 of 4
B204: Logs of Borings 4 of 4

Appendix C

Utility Connections

Utility connections shall be as shown on the drawings in Appendix J and in accordance with LA Utility Laws and Codes provided in Appendix P.

Appendix D

Results of Fire Flow Tests

Fort Polk

Hydrant Flow Test By Hydrant

Hydrant Number = "024-5 "

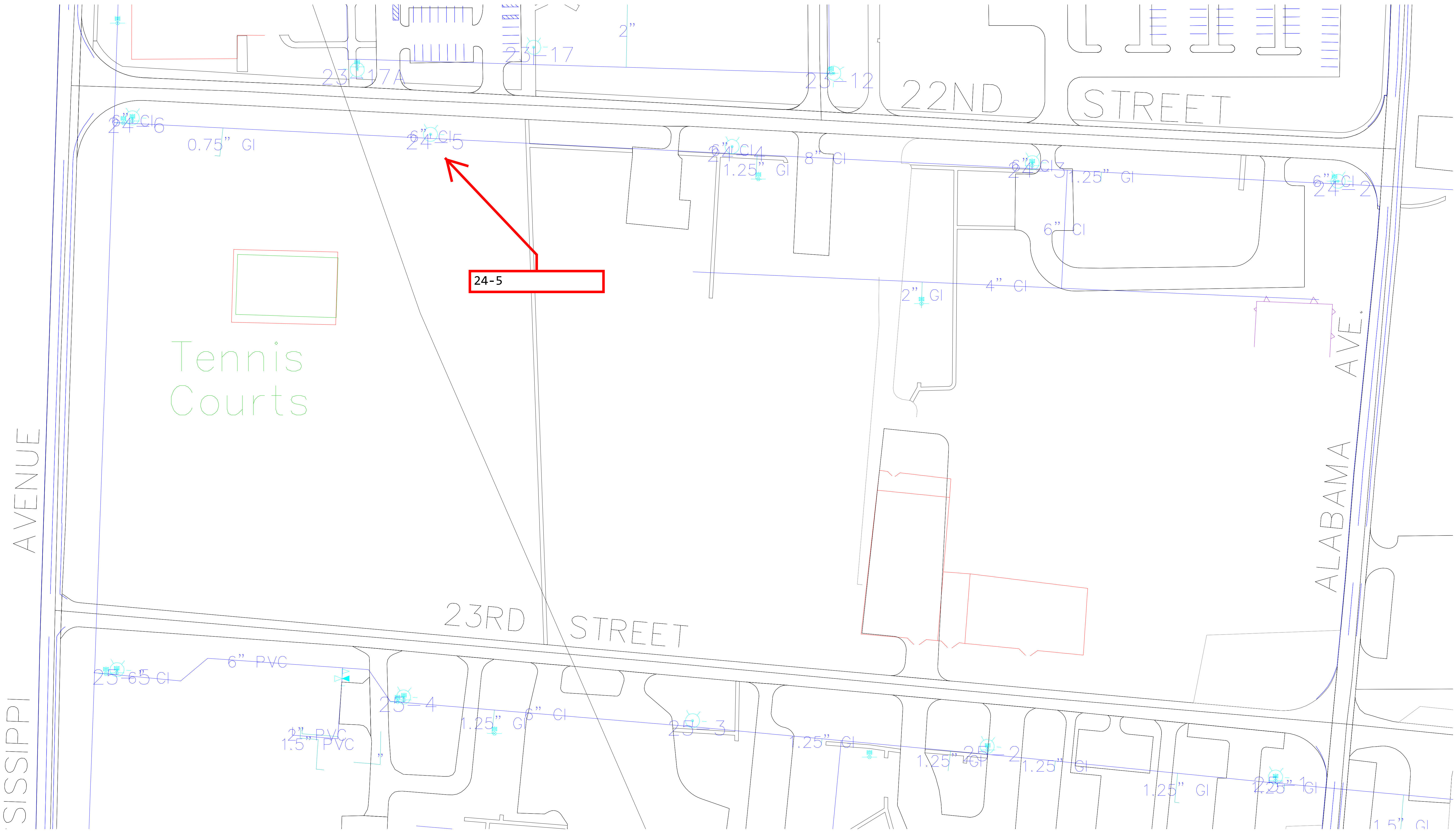
024-5 Southwest Corner of Bldg. /Southwest Corner of STD THREAD

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
01/21/2010	91	68	52.00	59.00	2499	4593	4932	5252
	<No Staff Member Listed>							

Subtotal Flow Tests:	1	Min:	2499	4593	4932	5252
		Max:	2499	4593	4932	5252
		Avg:	2499	4593	4932	5252

Total Flow Tests: 1

* Scheduled Flow Test



22ND STREET
23RD STREET
ALABAMA AVE.
AVENUE
SSISSIPPI
Tennis Courts
24-5
24-6
24-4
24-2
23-17
23-17A
23-12
25-4
25-3
25-2
0.75" GI
6" CI
8" CI
4" CI
2" GI
1.25" GI
6" PVC
2" PVC
1.5" PVC
1.5" GI

CY09093 ENRMD Control Number

AFZX-PW-PS (420-10c) January 30, 2009

MEMORANDUM FOR DPW, ENRMD

SUBJECT: Construction of Enlisted Unaccompanied Personnel Housing for 1MEB, including construction of a retention pond, Fort Polk, LA (PN 60130).

1. Request site-specific environmental surveys for NEPA compliance as applicable for the project described in the attached document.

2. The Record of Environmental Consideration (REC) is enclosed for your review. Please return a copy of the enclosed REC, along with notation of your concurrence or non-concurrence, to this office.

3. Point of contact is Dwight Durrett, DPW Planning Division, 531-6617.

Encl
REC

SCOTTY GOINS
Chief, Planning Division

DEPARTMENT OF THE ARMY
JOINT READINESS TRAINING CENTER AND FORT POLK
FORT POLK, LOUISIANA 71459

RECORD OF ENVIRONMENTAL CONSIDERATION

CY09093 ENRMD Control Number

To: Environmental Officer

From: Dwight Durrett

1. **Project Title**: Construction of Enlisted Unaccompanied Personnel Housing for 1MEB, including construction of a retention pond, Fort Polk, LA (PN60130).

2. **Brief Description of Proposed Action**: Construct a standard design barracks for the 1MEB. Supporting Facilities are to include utilities, electrical service, fire protection and alarm, curbs, and gutters, walks, storm drainage, grading, security fencing, site improvements, and landscaping. Anti-Terrorism/Force Protection measures shall include security fencing and lighting, bollards, minimal access points, and 82 feet setbacks from roadways. Heating and air conditioning will provide a climate controlled environment. Project will include energy efficiency in the form of programmable and occupant sensor setback thermostats. Project will additionally include the construction of a retention pond near the vicinity of the barracks. The retention pond will be designed large enough to support and capture stormwater run-off from the 1MEB barracks facility and the COF facility that is planned to be build nearby the 1MEB barracks.

3. **Project Engineer/ Manager Determination**:

Environmental Parameters	YES	NO
Action will require DHH approval of water system changes.	X	
Action will require DHH approval of wastewater changes.	X	
Project footprint between 1 and 5 acres (storm water permit).		X
Project footprint greater than 5 acres (storm water permit).	X	
Action has the potential to disturb asbestos.		X
Action has the potential to disturb lead based paint.		X

4. **Purpose and Need:** Construct Barracks to meet the 1+1 Standards per DA Standardization Program and to construct a retention pond that will adequately support and capture stormwater run-off from the area to capture diverted stormwater run-off.

5. **Anticipated Date and/or duration of Proposed Action**:

6. **A Map or Map(s) are attached**: see attached map.

7. **Reason for using record of environmental consideration**

   a. Is categorically excluded under the provisions of categorical exclusion (CX) C-1 32 CFR 651, Appendix B [and no extraordinary circumstances exist and there are no adverse affects to sensitive resources, as defined in CFR 651.29(b), 651.29(c)] because: (1) See paragraph 8 below (Effects on the Environment), showing that there are no significant environmental impacts; and (2) this proposed action satisfies the screening conditions in 32 CFR 651.29(a), and meets all screening criteria in 32 CFR 651, Appendix B, Section I.

8. **Effects on the Environment:** The proposed action was evaluated by the proponent and an ENRMD Environmental Subject Matter Expert / Evaluator using the following parameters.

Environmental Parameters	Positive Impact	Negative Impacts	No Significant Impacts	Subject Matter Expert
Air quality			X See Enclosures #1+2	
Water quality			X See Enclosure #3	
Water/Waste Water Systems			X See Enclosure #4	
Cultural Resources			X	AST - 11 Feb. 2009
Does the property qualify as historical property under the National Historic Preservation Act (NHPA)? X no ____ yes (sign name) AST, 11 Feb. 2009				
Natural Resources			X	AST 11 Feb. 2009
Endangered Species			X	
Noise			X	
Sensitive plants or bogs			X	
Wetlands			X	
Asbestos			X See Enclosure #5	
Lead based paint			X See Enclosure #5	
Biodiversity			X	AST - 11 Feb 2009
Solid Waste			X See Enclosure #6	
Hazardous Material \ Waste			X See Enclosure #6	
Toxic Substances			X	AST 11 Feb. 2009
Environmental Justice			X	
Protection of Children			X	

9. **Coordination with other agencies and installation departments**:

Installation Organization or Other Agency	Coordination Date	Coordinating Person
Coordination with EPSD / Master Planner		

10. **NEPA Specialist survey report is attached as Appendix A.**

11. **Conclusion:** This proposed action has been evaluated in accordance with 32 CFR Part 651. It has been determined that this proposed action does not individually or cumulatively have significant effects on the human or natural environment. There will be no environmentally controversial changes to existing environmental conditions. There are no circumstances which would require an Environmental Assessment (EA) or an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA). This proposed action: (1) satisfies all screening conditions in 32 CFR 651.29(a); (2) meets all screening criteria in 32 CFR 651, Appendix B, Section I; (3) does not involve any extraordinary circumstances, as defined in 32 CFR 651.29(b), that would preclude the use of a CX; (4) will not adversely affect environmentally sensitive resources as defined in 32 CFR 651.29(c); (5) qualifies for categorical exclusion (CX) number(s) C-1 in accordance with 32 CFR 651, Appendix B, Section II.

12. **Other Environmental Laws:** This document does not relieve the proponent of applicable federal and state laws and regulations.

Project Proponent

Name DWIGHT DUPRETT
Title PLANNER
Date 2 Feb 09

Installation Environmental Coordinator

Concur / ~~Nonconcur~~

Charles H. Stagg
Chief, Environmental and Natural Resources Management Division
Directorate of Public Works
Date: 12 Feb 2009

CY09093 ENRMD Control Number

DEPARTMENT OF THE ARMY
JOINT READINESS TRAINING CENTER AND FORT POLK
FORT POLK LOUISIANA 71459
ENVIRONMENTAL ANALYSIS/FIELD SURVEY REPORT
Of
Construction of Enlisted Unaccompanied Personnel Housing for 1MEB, including construction of a retention pond, Fort Polk, LA (PN 60130).
CY09093

CY09093 ENRMD Control Number

On 05 February 2009 a field survey was conducted by a NEPA staff member. An inspection of the site location was conducted as a baseline survey to evaluate potential impacts of the proposed action. The proposed action is to construct a standard design barracks for the 1MEB. Supporting facilities for the proposed action are to include utilities, electrical service, fire protection and alarms, curbs, gutters, walks, storm drainage, grading, security fencing, site improvements, and landscaping. The proposed action also includes Anti-Terrorism/Force Protection measures that shall include security fencing and lighting, bollards, minimal access points, and 82 feet setbacks from roadways. Heating and air conditioning will provide a climate controlled environment for the proposed action. The proposed project will include energy efficiency in the form of programmable and occupant sensor setback thermostats. The proposed project will additionally include the construction of a retention pond near the vicinity of the barracks. The retention pond will be designed large enough to support and capture stormwater run-off from the 1MEB barracks facility and the COF facility that is planned to be built nearby the 1MEB barracks. To accomplish the proposed action three alternative site locations were developed and maps are attached. The proposed action is needed to construct barracks to meet the 1+1 Standards per DA Standardization Program and to construct a retention pond that will adequately support and capture stormwater run-off from the area and to capture diverted stormwater run-off. I observed that no environmental impacts would occur during the construction of the enlisted unaccompanied personnel housing for 1MEB, including the construction of a retention pond, as stated above, additionally, the action meets the screening criteria for a Record of Environmental Consideration.

The proposed action is covered under categorical exclusion (CX) number C-1 32 Code of Federal Regulations (CFR) 651. CX C-1 states - "Construction of an addition to an existing structure of new construction on a previously undisturbed site if the area to be disturbed has no more than 5.0 cumulative acres of new surface disturbance. This does not include construction of facilities for the transportation, distribution, use, storage, treatment, and disposal of solid waste, medical waste, and hazardous waste (REC required)." In order for a categorical exclusion to be used as stated in 32 CFR 651, a set of screening criteria must be met. Those screening criteria are listed below.

A CX may be used only when each of the following screening criteria is true:

- The action has NOT been segmented. **TRUE**
- The action does NOT have a reasonable likelihood of causing significant effects on public health, safety or the environment. **TRUE**
- This action does NOT cause an imposition of uncertain or unique environmental risks. **TRUE**
- This action is NOT of greater scope or size than is normal for this category of action. **TRUE**
- This action is NOT expected to produce reportable releases of hazardous or toxic substances as specified in 40 CFR part 302, Designation, Reportable Quantities, and Notification. **TRUE**
- This action is NOT expected to produce releases of petroleum, oils, and lubricants (POL) except from a properly functioning engine or vehicle, application of pesticides and herbicides, where the proposed action results in requirement to develop or amend a Spill Prevention, Control, or Counter Measure Plan. **TRUE**

- There is NO reasonable likelihood of this action violating any federal, state, or local law or requirements imposed for the protection of the environment. **TRUE**

- This action does NOT involve effects on the environment that are highly uncertain, involve unique or unknown risks, or are scientifically controversial. **TRUE**

- This action does NOT establish a precedent for future actions that are reasonably likely to have a future significant effect. **TRUE**

- This action is not expected to potentially degrade an already existing poor environment or effect areas not already significantly modified from their natural condition. **TRUE**

- This action is NOT expected produce unresolved effects on (1) Proposed federally listed, threatened, or endangered species or the r designate critical habitats, (2) Properties listed or eligible for listing on the Natural Register of Historic Places, (3) Areas having special designation or recognition such as prime or unique agriculture lands; coastal zones; designated wilderness or wilderness study areas; wild and scenic rivers; National Historic Landmarks; 100-year flood plains; wetlands; sole source aquifers; National Wildlife Refuges; national Parks; areas of critical environmental concern; or other areas of high environmental sensitivity, or (4) Cultural Resources as defined in AR 200-4. **TRUE**

CY09093 ENRMD Control Number

Conclusion of Findings

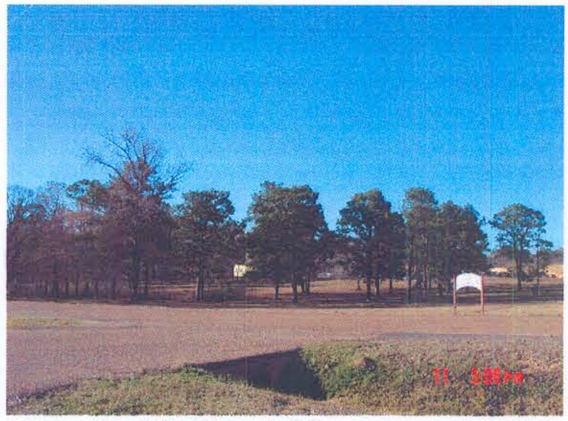
An inspection of the proposed sites for the construction of the enlisted unaccompanied personnel housing for 1MEB, including construction of a retention pond, Fort Polk, LA was conducted as a baseline survey to evaluate the potential environmental impacts of the proposed project. The inspection of the proposed sites included inspection of the preferred site location in addition to two alternative site locations (see attached maps). The proposed project was also reviewed by the appropriate Compliance Management Branch program managers and subject matter experts for significant environmental impacts on air quality, indoor air quality, storm water quality, drinking and waste water quality, lead and asbestos, and solid/hazardous material waste. For additional guidance regarding air and indoor air quality regulations please refer to Enclosure #1 and #2 of this document. For additional guidance regarding storm water/water quality, including drinking and waste water, regulations please refer to Enclosure #3 and #4 of this document. The construction of new facilities requires asbestos free certification upon completion of the project. For additional guidance on regarding lead and asbestos regulations please refer to Enclosure #5 of this document. For additional guidance regarding solid/hazardous material waste please refer to Enclosure #6 of this document. The proposed project was also reviewed by the Conservation Branch for environmental concerns. No significant environmental impacts are expected as a result of this project on any Conservation Branch programs.

Upon completed review of the preferred site location and the alternative site locations it has been determined that this proposed action poses no significant impacts to the environment at any of the three site locations. Therefore, alternative site #1, the preferred site, was selected as the environmentally and mission appropriate site for this proposed action.

If there are no changes in this scope of work or with the location of the proposed action, no other environmental analysis is planned. In conclusion the nature of this action poses no significant environmental impacts to the environment. The proposed action meets the screening criteria for the completion of a Record of Environmental Consideration under categorical exclusion C-1 of the 32 CFR 651.

CY09093 ENRMD Control Number


Alternative Site #1, preferred site-east side


Alternative Site #2-west side


Alternative Site #2


Alternative Site # 3

A. Sara Thames, 11 Feb. 2009

A. Sara Thames, Ecologist
DPW/ENRMD-Conservation Branch
(337) 531-1653

Enclosure #1 (page 1 of 1)

IMSE-POL-PWE

10 February 2009

CY09093 ENRMD Control Number

MEMORANDUM FOR ENRMD, Conservation Branch (Attn: NEPA Staff)

SUBJECT: Construction of Enlisted Unaccompanied Personnel Housing for 1 MEB, Fort Polk, LA CY09093.

1. The REC indicates that a barrack will be built at Fort Polk. The REC does not indicate the size of the proposed comfort heating system. Typically a heating system above 10 MMBtu/hr would require a Title V permit modification and extensive monitoring and regulatory approval to install. The ultimate size of the comfort heating as well as the energy source used to provide it, i.e. natural gas or electrical resistance heating must be communicated to the Air Program Manager.

2. The comfort cooling install in the buildings i.e. the size and type of refrigerant used must be communicated to the Air Program Manager. All refrigerant systems should not contain Ozone Depleting Compounds, rather alternative refrigerants should be used.

3. All work associated with this project must be performed in accordance with 40 CFR 82, Protection of Stratospheric Ozone; Titles V and VI of the Clean Air Act; and Army Regulation (AR) 200- Specifically:

A. All work on equipment containing ODCs must be performed by certified technicians using certified equipment, IAW 40 CFR 82.154.

B. All persons disposing of appliances containing ODCs, must evacuate the refrigerant in the entire unit to a recovery or recycling machine certified pursuant to 40 CFR 82.158.

C. Per 40 CFR 82.154, no person maintaining, servicing, repairing, or disposing of appliances may knowingly vent or otherwise release into the environment any class I or class I1 substance used as refrigerant in such equipment. All releases of ODCs shall be reported to DPW, Environmental and Natural Resources Management Division, Compliance Management Branch as soon as possible.

4. Please notify this office of any changes in the Scope of Work to ensure final product is in compliance with Title V and Title VI of the Clean Air Act.

5. Point of contact is the undersigned at (337) 531-6026, or Harvey.Skinner@us.army.mil.

Harvey Skinner
Installation Air Quality Manager

Enclosure #2 (page 1 of 2)

CY09093 ENRMD Control Number

The following is the review of proposed projects regarding concerns related to Indoor Air Quality. This review applies to the proposal CY09093.

1. New construction can not impact the Indoor Air Quality of a non-existent facility. However, the following information is provided so that measures are taken during construction to supply adequate indoor air quality to the facility.

2. The installation of standing seam metal roofing has the potential to improve the overall indoor air quality present in a facility by limiting standing water on roof tops and subsequent moisture penetration into the structure. However, if the configuration of the HVAC system pulls its outside air supply from the attic space, encapsulating the HVAC system under the standing seam roof can be detrimental to the proper operation of the HVAC system because it requires the system to cool superheated air. This has the potential to negatively impact indoor air quality.

3. To decrease the impact to the efficiency of the HVAC system, exhausted air should be vented out of the attic space. Care should be taken to ensure that the exhaust ductwork is not located in the vicinity of the outside air intake.

4. Insulation attached to the exterior of rigid metal ductwork has the potential to improve the overall indoor air quality present in a facility by limiting the number of places where particulates inside the ductwork can attach to and accumulate, providing a potential food source for mold growth. Minimizing the number of sharp bends in the ductwork will also decrease the amount of particulates accumulating in the ductwork.

5. Providing the appropriate amount of outside air also has the potential to positively impact the overall indoor air quality present in a facility. ASHRAE 62.1 (2007 version) provides guidance on the appropriate level of outside air required per person. It should be noted that this is the minimum recommended outside air (OA) and that significant improvements in indoor air quality are observed when the flow is increased to approximately 20 cfm/person OA.

6. Proper industrial hygiene practices must be observed when modifying the existing HVAC system. An industrial hygienist or equivalent should recommend the appropriate ventilation rates and personal protective equipment necessary during this project, especially if applying solvents or adhesives.

7. Insulating wraps and other building materials utilized in this project should minimize the use of cellulose containing materials as these provide a potential food source for mold. This is especially critical in attic spaces where warm, moist air is already present.

8. Building materials should be utilized which inhibit mold growth through the use chemical treatment or cellulose-free construction. A typical treatment would include gypsum wall board which has been treated with a solution of borax and water on both sides, and allowed to dry.

Enclosure #2 (page 2 of 2)

CY09093 ENRMD Control Number

9. Care must also be taken during construction to prevent direct intrusion of precipitation into the HVAC OA intake.

10. The Heating Ventilation and Air Conditioning (HVAC) system downtime in each facility should be minimized to allow for the reduction of moisture within the facility. A properly operating HVAC system should reduce relative humidity to 40 - 50%.

11. The following guidance should be followed when the HVAC system becomes operational:

a. HVAC systems should be operated on low flow with a medium temperature setting to minimize surpassing the dew point in the rooms under construction.

b. Windows and doors should be closed to minimize outdoor air intrusion.

c. Window blinds should allow for penetration of sunlight to inhibit mold growth during renovation.

d. Ceiling fans should be operational and set on low.

12. Care should be taken during construction to minimize the migration of dust into the HVAC ductwork. All intake and exhaust vents should be sealed while performing activities which may generate large amounts of particulates during construction.

13. Construction materials containing cellulose (wood, sheetrock, etc.) should be stored in a temperature controlled environment until installation to inhibit mold growth.

14. The use of vinyl covered wall board should be minimized due to costs related to mold contamination. Technology is not currently available which would allow for the decontamination of wallboard without the removal and subsequent destruction of the vinyl covering.

15. Contractor should ensure that measures are taken during renovation to minimize the potential exposure of personnel to poor indoor air quality. This should include at a minimum PPE designed to inhibit exposure of personnel to microbial growth. Contractors should obtain recommendations from an industrial hygienist for a determination of the acceptable level of risk associated with the different levels of mold remediation.

Storm Water

POC: Christina Baker
531-2894
Christina.baker2@us.army.mil

Best Management Practices (BMPs) for Construction Activity of Any Size:

- Use silt fences to prevent soil erosion
- Use silt fences to prevent sediment from leaving the site and entering the storm drains
- Vegetate or re-vegetate areas of ground that have been disturbed
- On-site preventative measures should be taken to ensure that potential pollutants are not released into the environment
- During construction and upon completion, the site should be free of excess construction debris and associated litter to prevent contamination of storm water

Small Construction (1 Acre to 4.99999 Acres) Storm Water General Permit (#LAR200000)

- No permit fees will be assessed by the Louisiana Department of Environmental Quality (LDEQ) for coverage under this permit
- Discharge storm water from construction activities will be automatically covered for those that meet the applicability requirements defined in the permit
- Written notification of intent (NOI) under this general permit is not required
- Site/contact information and a Storm Water Pollution Prevention Plan (SWPPP) will be developed, implemented, and kept on site
- A Project Completion Report will be submitted to LDEQ upon completion and stabilization of the construction site in accordance with the permit guidelines

For further information and guidance, please contact LDEQ customer service at 225-219-5337 or go to the link below.
www.deq.louisiana.gov/portal/Portals/0/permits/lpdes/LAR200000.pdf

Storm Water General Permit for Construction Activities of 5 Acres or More (#LAR100000)

- Permit fees will be assessed by LDEQ for coverage under this permit
- An NOI must be submitted to LDEQ before permitees are authorized to discharge storm water
- Site/contact information and a Storm Water Pollution Prevention Plan (SWPPP) will be developed, implemented, and kept on site
- All permitees must submit a Notice of Termination (NOT) within thirty days upon completion and stabilization of the construction site in accordance with the permit guidelines

For further information and guidance, please contact LDEQ customer service at 225-219-5337 or go to the link below.
www.deq.louisiana.gov/portal/Portals/0/permits/lpdes/LAR100000.pdf

If I can be of further assistance, please let me know.

IMWE-POL-PWE 03 January 2009

MEMORANDUM FOR ENRMD, Conservation Branch (ATTN: NEPA Staff)

SUBJECT: CY090093

CY09093 ENRMD Control Number

Please include the statement below in regard to REC CY09093.

For construction projects requiring Waste water and Drinking water Systems connections:

1. The Louisiana Department of Health and Hospitals(LDHH) requires changes to the sanitary sewer system and drinking water systems be approved **prior to start of construction.**

2. A single set of detailed plans and specifications should be submitted at least 60 days prior to the time the approval, comments, or recommendations are desired by the owner. Plans must be signed, stamped, and dated by a registered professional engineer, licensed to practice in the State of Louisiana.

3. A detailed design summary package for all water and sewerage facilities must be submitted. LDHH must approve the project and an approval letter (permit) from LDHH must be received by Fort Polk prior to start of construction.

4. Additionally, Backflow prevention assemblies must be provided for all new construction, as required, to protect the water system from potential contamination.

5. Point of contact is undersigned (337) 531-7547 or aishah.f.jones@us.army.mil.

Aishah F. Jones
Drinking Water Program Manager

Enclosure #5 (page 1 of 1)

IMS W-POL-PWE 3

2 February 2009

CY09093 ENRMD Control Number

MEMORANDUM FOR ENRMD, Conservation Branch (Attn: NEPA Staff)

Construction of Enlisted Unaccompanied Personnel Housing for 1MEB CY09093

1.New Construction of Facilities Require Asbestos Free Certification at the Completion of Project. Paint containing > .06% lead can not be used in the project. For more information contact the appropriate CMB program manager.

2. Point of contact is the undersigned at (337) 531-9128, or Sheilla.guzman@us.army.mil

Sheilla Guzman

IMSW-POL-PWE

03 Feb 2008

CY09093 ENRMD Control Number

MEMORANDUM FOR RECORD

SUBJECT: CY09093 - Construction of Enlisted Unaccompanied Personnel Housing for 1MEB, Including Construction of a Retention Pond, Fort Polk, LA (PN 60130).

1. The request for the Construction of Enlisted Unaccompanied Personnel Housing for 1MEB, Including Construction of a Retention Pond, Fort Polk, LA (PN 60130).
has been evaluated for hazardous and solid waste compliance impacts.

2. All waste should be disposed offsite. **The contractors must ensure proper disposal of any wastes generated. All solid waste must be properly characterized (TESTED) to determine the waste type (hazardous / non-hazardous / universal / PCB), and managed in accordance with LAC 33 Part V and VII.**

a) Any hazardous waste must be properly manifested and packaged prior to leaving the installation. All manifests must be signed by a government representative in DPW-ENRMD.

b) Any non-hazardous solid waste must be disposed in a permitted facility that accepts the types of materials disposed. Also, recycle as much removed material as possible. The quantities of materials that are disposed or recycled must be reported to DPW-ENRMD for tracking purposes.

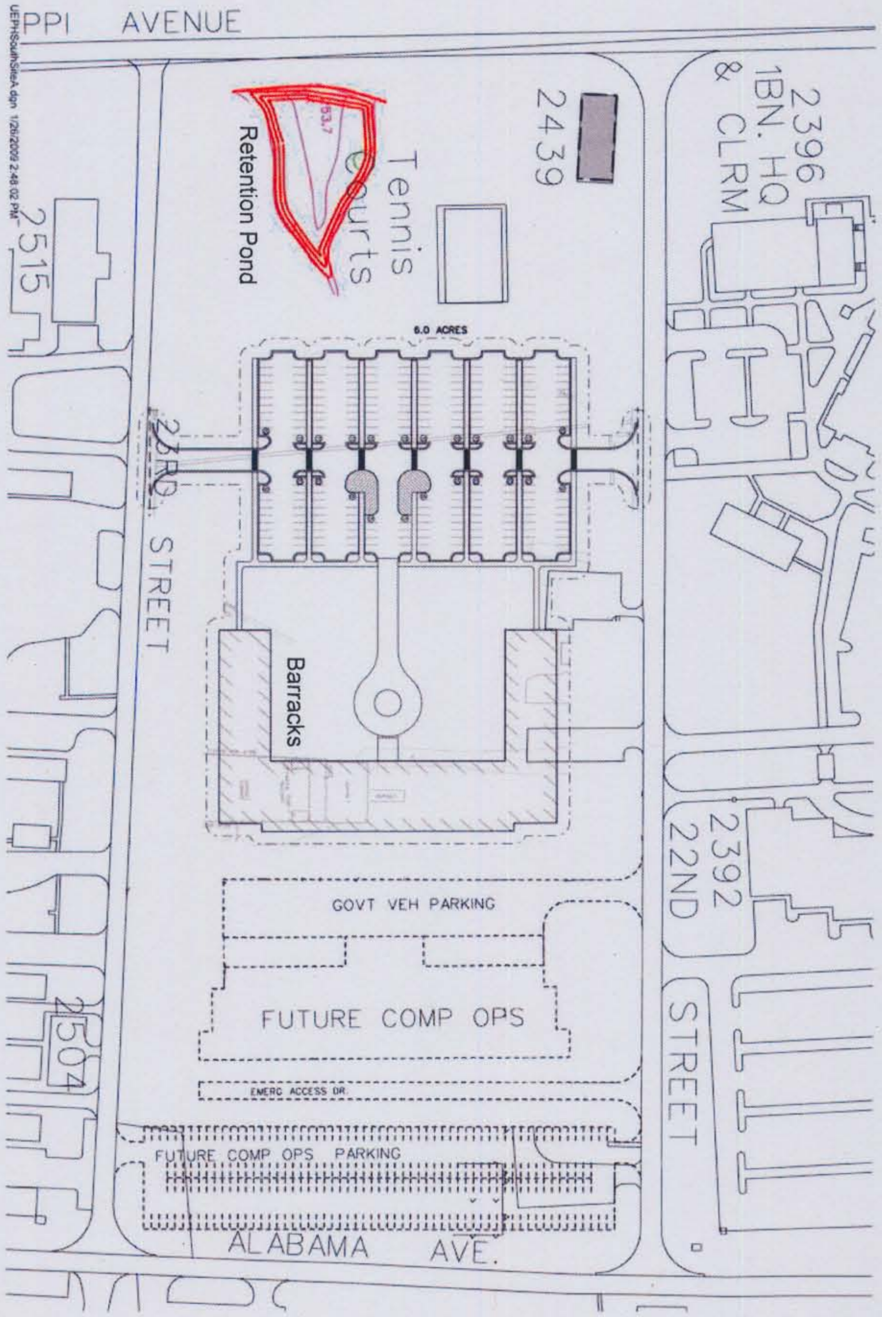
c) Any universal waste must be tracked in some manner when shipped off-site. This tracking may take the form of a log, invoice, bill of lading, or other shipping document. Wastes that fall under universal wastes are batteries, pesticides, mercury thermostats, fluorescent lights, and antifreeze. The quantities of universal waste shipped off-site must be reported to DPW-ENRMD for tracking purposes.

d) Any PCB waste must be properly manifested prior to leaving the Installation. Items that may contain PCB's are ballasts and capacitors found in fluorescent light fixtures.

3. Any products that are used in the project must be assessed to determine whether they are part of the EPA's Comprehensive Procurement Guidelines (40 CFR 247). Specified items are required to meet the Recommended Recovered Materials Content levels unless the materials are not competitively available in a reasonable period of time, are not available at a reasonable price, or do not meet performance standards. The EPA website (http://www.epa.gov/cpg) contains the most recent guidelines for the designated products.

4. The point of contact is the undersigned at 531-6029 or timothy.fitzgerald1@us.army.mil

TIMOTHY B. FITZGERALD
Installation Solid Waste Manager

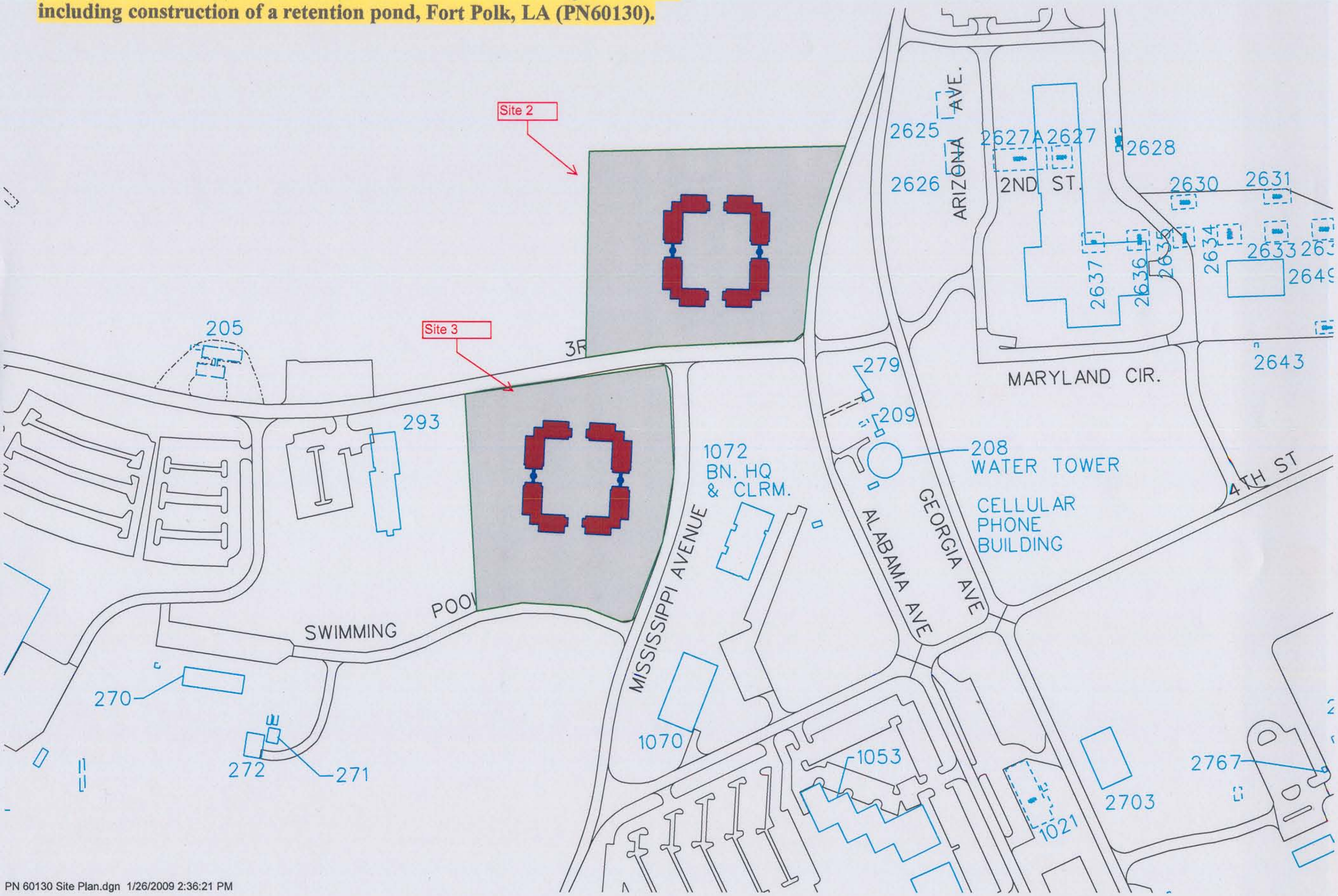


CY09093 ENRMD Control Number

Alternative Site #1 (Preferred Site) for:
Construction of Enlisted Unaccompanied Personnel Housing for 1MEB, including construction of a retention pond, Fort Polk, LA (PN60130).

CY09093 ENRMD Control Number

Alternative Site #2 & #3 for:
Construction of Enlisted Unaccompanied Personnel Housing for 1MEB, including construction of a retention pond, Fort Polk, LA (PN60130).



PN 60130 Site Plan.dgn 1/26/2009 2:36:21 PM

IMSW-POL-PW (405-90a) 30 January 2007

MEMORANDUM FOR DPW, ENRMD

SUBJECT: Disposal of Building T2434, Fort Polk, LA

CY07118 ENRMD Control Number

1. Request site specific environmental evaluations for National Environmental Policy Act
(NEPA) compliance, Clean Air Act Compliance (Title V) evaluation, marketable tree evaluation, asbestos, lead, and etc., as applicable for subject project.

2. Records of Environmental Consideration (REC) are enclosed for your review and concurrence. If your office concurs to the documents enclosed, request copies of REC with concurrence returned to this office as soon as possible.

3. Point of contact is Mr. Bernard W. Harris, DPW, Planning Division, 531-6939.

30 JAN 07

SCOTTY GOINS
Acting Chief, Planning Division

Encl
REC
Site M

*** **Note**: REFER TO Attached (Report of Findings) which discloses presence or absence of Hazardous Materials. If present, Hazardous Material(s) must be removed prior to renovation.

EPSD/TSD Program Manager MUST Comply with attached Health and Safety Memorandums.

CY07118 ENRMD Control Number

DEPARTMENT OF THE ARMY
JOINT READINESS TRAINING CENTER AND FORT POLK
FORT POLK, LOUISIANA 71459

RECORD OF ENVIRONMENTAL CONSIDERATION

To: Ms. Sheilla Guzman, Environmental Officer

From: Bernard W. Harris, Realty Specialist, DPW, Planning Branch

1. **Project Title**: - Demolition of Facility No. T2434,

2. **Brief Description of Proposed Action**: Remove building from site and transport to an offsite landfill.

3. **Purpose and Need:** Facility No. T2434, PVT Org Club, will be disposed in conjunction with the PN 64415 (CSB ME) Operations Facility (1391).

4. **Anticipated Date and/or duration of Proposed Action**: March 2012

5. **A map is attached**.

6. **Reason for using record of environmental consideration**:

   Is adequately covered in the existing Environmental Assessment (EA): Entitled: Programmatic Environmental Assessment for Demolition for World War II and Family Housing Building at Fort Polk, Louisiana and dated January 2001. EA may be reviewed at Building 2543.

7. **Effects on the Environment:** The proposed action was evaluated by the proponent and an ENRMD Environmental Subject Matter Expert / Evaluator using the following parameters.

Environmental Parameters	Positive Impact	Negative Impacts	No Significant Impacts	Subject Matter Expert
Air quality				
Water quality				
Water/Waste Water Systems				
Cultural Resources		Facility	Constructed	in 1941
Does the property qualify as historical property under the National Historic Preservation Act (NHPA)? ____ no ____ yes (sign name) ________________ WWII Bldg See Enclosure #1				
Natural Resources				
Endangered Species			Proposed action covered under EA.	
Noise				
Sensitive plants or bogs				[illegible signature] 06 April 2007
Wetlands				
Asbestos	See Attached	Report of Finding		Enclosure # 2
Lead based paint	See Attached	Report of Finding		Enclosure # 3
Biodiversity				
Solid Waste	See Enclosed	Memorandum		Enclosure # 4
Hazardous Material \ Waste	See Enclosed	Memorandum		Enclosure # 4
Toxic Substances				
Environmental Justice				
Protection of Children				

*** **Note**: REFER TO Attached (Report of Findings) which discloses presence or absence of Hazardous Materials. If present, Hazardous Material(s) must be removed prior to renovation.

EPSD/TSD Program Manager MUST Comply with attached Health and Safety Memorandums.

CY07118 ENRMD Control Number

8. Coordination with other agencies and installation departments:

Installation Organization or Other Agency	Coordination Date	Coordinating Person
Coordination with EPSD / Master Planner		

9. NEPA Specialist survey report is attached as Appendix A.

10. Conclusion: This proposed action has been evaluated in accordance with 32 CFR Part 651. It has been determined that this proposed action does not individually or cumulatively have significant effects on the human or natural environment. There will be no environmentally controversial changes to existing environmental conditions. This proposed action has been adequately covered in the EA, Programmatic EA for Demolition of WWII and Family Housing Buildings at Fort Polk, Louisiana, January 2001. The EA may be reviewed at Building 2543

11. Other Environmental Laws: This document does not relieve the proponent of applicable federal and state laws and regulations.

Project Proponent

30 JAN 07

Scotty Goins
Acting Chief, Planning Division

Installation Environmental Coordinator

Concur / ~~Nonconcur~~

for Wayne Farris

Charles H. Stagg
Chief, Environmental and Natural Resources Management Division
Directorate of Public Works
Date: 16 April 2007

*** **Note**: REFER TO Attached (Report of Findings) which discloses presence or absence of Hazardous Materials. If present, Hazardous Material(s) must be removed prior to renovation.

EPSD/TSD Program Manager MUST Comply with attached Health and Safety Memorandums.

DEPARTMENT OF THE ARMY
JOINT READINESS TRAINING CENTER AND FORT POLK
FORT POLK LOUISIANA 71459

ENVIRONMENTAL ANALYSIS/FIELD SURVEY REPORT
Disposal of Building T2434.
PN 64415
CY07118.

On February 21, 2007 field surveys were conducted by a NEPA staff member. Inspections of the site locations were conducted as a baseline survey to evaluate potential impacts of the proposed action. The proposed action is to remove building from site and transport to an offsite landfill.

The following project has been adequately covered in the EA entitled, "Programmatic Environmental Assessment for Demolition for WWII and Family Housing Buildings at Fort Polk, Louisiana", January 2001 and meets requirements for categorical exclusion (CX) number C-2, 32 Code of Federal Regulations (CFR) 651. CX, C-2 states, "Demolition of non-historic buildings, structures, or other improvements and disposal of debris therefrom, or removal of a part thereof for disposal, in accordance with applicable regulations, including those regulations applying to removal of asbestos, polychlorinated biphenyls (PCBs), lead-based paint, and other special hazard items (REC required)". This action meets the criteria for a categorical exclusion in accordance with (CX) number C-2 of 32 CFR Part 651.29, Appendix B, Section I and the proposed action poses no significant impact to the environment or human health. In order for a categorical exclusion to be used as stated in 32 CFR 651, a set of screening criteria must be met. Those screening criteria are listed below.

A CX may be used only when each of the following screening criteria is true:

- The action has NOT been segmented. **TRUE**
- The action does NOT have a reasonable likelihood of causing significant effects on public health, safety or the environment. **TRUE**
- This action does NOT cause an imposition of uncertain or unique environmental risks. **TRUE**
- This action is NOT of greater scope or size than is normal for this category of action. **TRUE**
- This action is NOT expected to produce reportable releases of hazardous or toxic substances as specified in 40 CFR part 302, Designation, Reportable Quantities, and Notification. **TRUE**
- This action is NOT expected to produce releases of petroleum, oils, and lubricants (POL) except from a properly functioning engine or vehicle, application of pesticides and herbicides, where the proposed action results in requirement to develop or amend a Spill Prevention, Control, or Counter Measure Plan. **TRUE**
- There is NO reasonable likelihood of this action violating any federal, state, or local law or requirements imposed for the protection of the environment. **TRUE**
- This action does NOT involve effects on the environment that are highly uncertain, involve unique or unknown risks, or are scientifically controversial. **TRUE**
- This action does NOT establish a precedent for future actions that are reasonably likely to have a future significant effect. **TRUE**
- This action is not expected to potentially degrade an already existing poor environment or effect areas not already significantly modified from their natural condition. **TRUE**
- This action is NOT expected produce unresolved effects on (1) Proposed federally listed, threatened, or endangered species or the r designate critical habitats, (2) Properties listed or eligible for listing on the Natural Register of Historic Places, (3) Areas having special designation or recognition such as prime or unique agriculture lands; coastal zones; designated wilderness or wilderness study areas; wild and scenic rivers; National Historic Landmarks; 100-year flood plains; wetlands; sole source aquifers; National Wildlife Refuges;

DPW/ENRMD CY 07 118

national Parks; areas of critical environmental concern; or other areas of high environmental sensitivity, or (4) Cultural Resources as defined in AR 200-4. **TRUE**

Conclusion of Findings

T2434 will be disposed of in conjunction with the Construction of the Operations Facility (PN 64115). The following project has been adequately covered in the EA entitled, "Programmatic Environmental Assessment for Demolition for WWII and Family Housing Buildings at Fort Polk, Louisiana", January 2001. The following document may be viewed at Building 2543. The proposed action poses no significant impacts to environment or human health. For specific natural resources of concern such as air quality, water quality, asbestos and lead, a member of the Compliance Branch conducted an evaluation. This report will be attached to the REC as part of the NEPA documentation. If there are no changes in this scope of work or location of the proposed action, no other environmental analysis is planned. In conclusion the nature of this action poses no significant environmental impacts to the environment. The proposed action was covered under the mentioned EA and meets the screening criteria for the completion of a Record of Environmental Consideration under categorical exclusions C-2 of the 32 CFR 651.

Thursday, September 08, 2011

DPW/ENRMD CY 07 118

Allison Cedars (Contractor)
Research Associate II, NEPA
Fort Polk, ENRMD
Colorado State University
337-531-1653
Fax 337-531-2627

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, DC 20310-0111

Encl 1

50

REPLY TO
ATTENTION OF

November 16, 1993

CY07118 ENRMD Control Number

Dr. Robert Bush
Executive Director
Advisory Council on Historic Preservation
The Old Post Office Building, Suite 809
1100 Pennsylvania Avenue, N.W.
Washington, D.C. 20004

Dear Dr. Bush:

Under the terms of the June 7, 1986 Programmatic Memorandum of Agreement (PMOA) for the demolition of World War II Temporary Buildings, as amended on May 5, 1991, the Department of Defense (DoD) was required to undertake various actions to address the effects of the Congressionally mandated demolition of WWII temporary buildings. The enclosed documentation represents the result of work accomplished to meet all PMOA (as amended) stipulations for WWII temporary buildings.

Thursday, September 08, 2011

The Historic American Building Survey/Historic American Engineering Record (HABS/HAER) documentation effort associated with the PMOA requirement was extensive. Of the 27,000 World War II temporary buildings in the DoD inventory, a total of 113 different building types were identified and documented in consultation with the HABS/HAER.

This extensive DoD effort has fulfilled the Army's obligations under the PMOA, and has fully addressed the effects of the Congressional order to demolish all WWII temporary buildings. Therefore, the Army will continue with the demolition effort without further restriction and in full compliance with the National Historic Preservation Act of 1966, as amended.

Sincerely,

Lewis D. Walker

Lewis D. Walker
Deputy Assistant Secretary of the Army
(Environment, Safety and Occupational Health)
OASA (I,L&E)

Enclosure

Enclosure #2

IMSW-POL-PWE

APR - 6 2007

CY07118 ENRMD Control Number

MEMORANDUM FOR ENRMD, CB

SUBJECT: Report of Finding, Asbestos Inspection of Building 2434, Fort Polk, LA

1. An inspection was conducted on Building 2434 on 22 May 2006, for the determination of the presence of asbestos containing building materials (ACBM). Please understand that these results pertain only to that portion of the building for which renovation (work) actions are proposed. The results in this Report of Findings are not necessarily applicable to the remaining spaces in the building. The inspection was performed at the written request of the Environmental and Natural Resources Management Division, Conservation Branch (ENRMD, CB). Inspection results are to be used as part of the Record of Environmental Consideration (REC), ENRMD Control Number CY07118.

2. The inspection was performed by Mr. James Mayes, (Certified Asbestos Inspector No.6I00766) a representative of the Fort Polk ENRMD, Compliance Management Branch. The samples were submitted to the ENRMD Laboratory for analysis.

3. **ASBESTOS-CONTAINING MATERIAL WAS NOT DETECTED.**

4. Descriptions and locations of asbestos containing homogeneous areas are listed at Enclosure 1. Number (3) above describes whether ACBM was identified in areas impacted by the scope contained in (REC) CY07118. Sampling locations are identified at Enclosure 2.

5. For further technical information about interpretation of contamination levels and compliance with environmental regulations, contact Sheilla Guzman with the Compliance Management Branch at phone number 531-9128/6286.

6. For information concerning status on scheduling, contact Mr. Jerry Lewis at 531-7002 or the undersigned at 531-9128.

Sheilla Guzman

Encl
as

SHEILLA GUZMAN
Environmental Officer

BUILDING 2434

Building Name: PRIV/ORG/CLUB
Description/Use: PRIV/ORG/CLUB
Year Constructed: 1941
Square Feet: 1313
Floors: 1
Full Survey: **Yes**
Certified: **No**

Are there areas that are inaccessible? No

Table 1
Asbestos Containing Homogeneous Areas

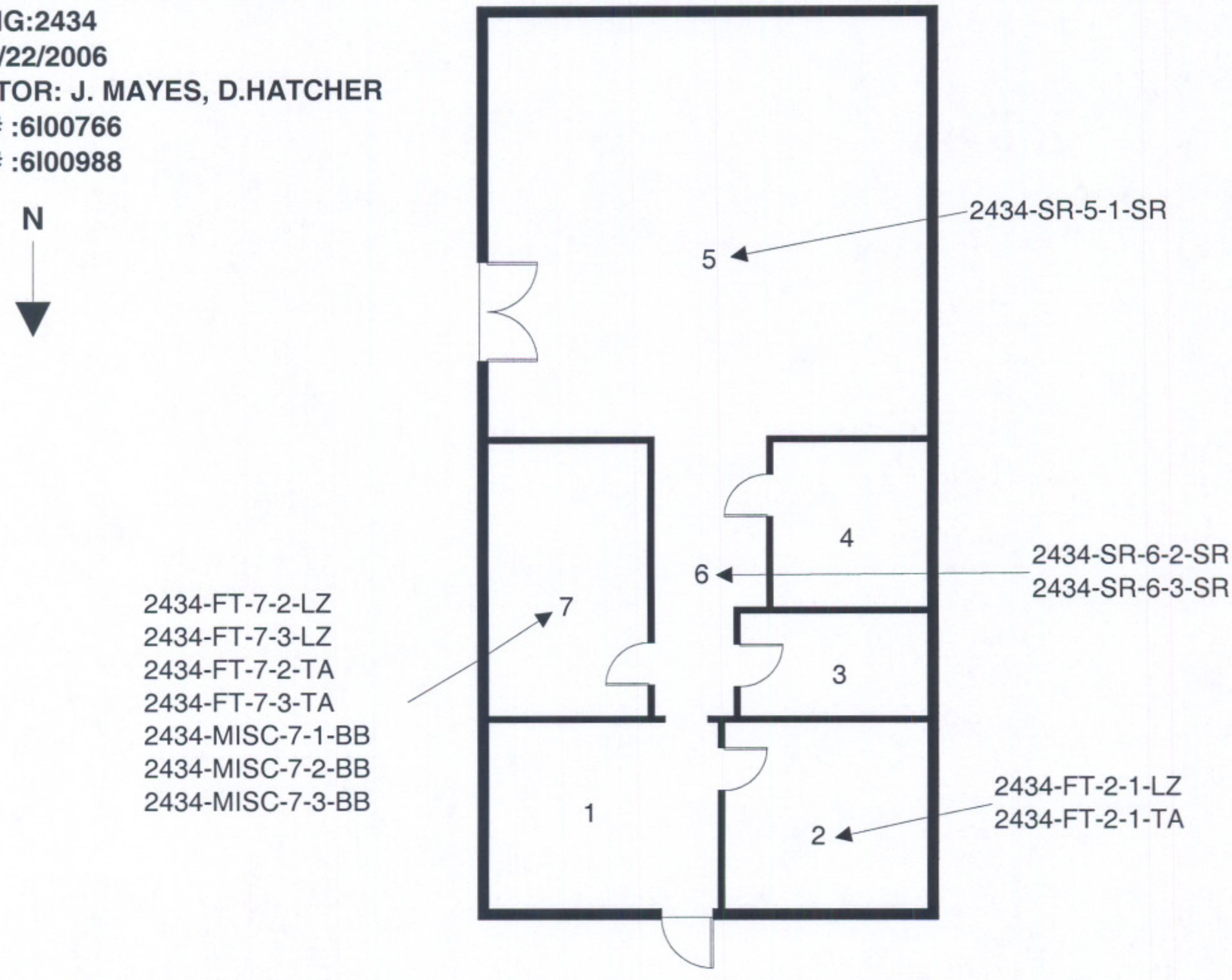
NO HOMOGENEOUS AREAS WITH POSITIVE SAMPLES TO BE SHOWN FOR THIS BUILDING

Se

CY07118 ENRMD Control Number

CY07118 ENRMD Control Number

ASBESTOS SAMPLING POINTS
BUILDING:2434
DATE: 5/22/2006
INSPECTOR: J. MAYES, D.HATCHER
LADEQ# :6I00766
LADEQ# :6I00988



ENC 2

Enclosure#3

IMSW-POL-PWE

APR - 6 2007

MEMORANDUM FOR ENRMD, CB

CY07118 ENRMD Control Number

SUBJECT: Report of Finding, Lead-Based Paint Inspection of Building 2434, Fort Polk, LA

1. An inspection was conducted at Building 2434, on 22 May 2007, for the determination of the presence of any lead-based paint (LBP) hazards. Please understand that these results pertain only to that portion of the building for which renovation (work) actions are proposed. The results in this Report of Findings are not necessarily applicable to the remaining spaces in the building. The inspection was performed at the written request of the Environmental and Natural Resources Management Division, Conservation Branch (ENRMD, CB). Inspection results are to be used as part of the Record of Environmental Consideration (REC), ENRMD Control Number CY07118.

2. The inspection was performed by Mr. Daniel Hatcher, Certified Lead Inspector No. PbO6I00361 a representative of the Fort Polk ENRMD, Compliance Management Branch. Analysis was conducted using the XRF analyzer.

3. **LEAD WAS DETECTED IN THE PAINT.**

4. Descriptions and locations of lead containing homogeneous areas are listed at Enclosure 1. Number (3) above describes whether LBP was identified in areas impacted by the scope contained in (REC) CY07118. Sampling locations are identified at Enclosure 2.

5. For further technical information about interpretation of contamination levels and compliance with environmental regulations, contact Sheilla Guzman with the Compliance Management Branch at 531-9128 or 531-6286.

6. For information concerning status on scheduling, contact Mr. Jerry Lewis at 531-7002 or the undersigned at 531-9128.

Sheilla Guzman

Encl
as

SHEILLA GUZMAN
Environmental Officer

TABLE 2

BLDG #2434 ADDRESS 22 ND AVE. XRF SERIAL NUMBER 1772 Inspector: Daniel Hatcher
Inspection Type: POTENTIAL LEAD BASE PAINTED COATED SURFACES La Cert #:Pb06I00361
Survey Date: 05/22/2006 Unit #

	Sample Identification	RM #	Building Component	Substrate Type	Paint Color	XRF Test Number	XRF Reading mg/cm2	Paint Condition			Hazard Classification (12)			Paint Chip Sample No.	Photo Number
								Intact	Fair	Poor	Immd Haz	Pont. Haz	Non-Haz		
10	CEILING	1	CEILING	FIBERGLASS	WHITE	10	0.3	X				X			
12	WINDOW FRAME	1	W-FRAME	WOOD	STAINED	12	0.1	X				X			
13	WINDOW SILL	1	W-SILL	WOOD	STAINED	13	0.1	X				X			
20	CEILING	3	CEILING	FIBERGLASS	WHITE	20	0.4	X				X			
21	GRID	3	GRID	METAL	BLACK	21	0.2	X				X			
23	WINDOW SILL	3	W-SILL	WOOD	STAINED	23	0.1	X				X			
28	TRIM	4	TRIM	WOOD	STAINED	28	0.4	X					X		
30	BASEBOARD	4	BASEBOARD	WOOD	STAINED	30	0.2	X				X			
36	DOOR FRAME	5	D-FRAME	METAL	TAN	36	0.4	X				X			
39	CEILING ABOVE DROP IN	5	CEILING	WOOD	WHITE	39	0.3	X				X			
41	EAST WALL	EXT	WALL	METAL	TAN	41	0.1	X				X			
43	WEST WALL	EXT	WALL	METAL	TAN	43	0.3	X				X			
44	WINDOW FRAME	EXT	W-FRAME	METAL	BROWN	44	0.4	X				X			
45	CONCRETE FOUNDATION	EXT	FOUND.	CONCRETE	BROWN	45	2.4	X				X			
46	CONCRETE FOUNDATION	EXT	FOUND.	CONCRETE	BROWN	46	1.7	X				X			

1-1st Floor 2-2nd Floor
E - East N-North W-West S-South
Bk - Black Bl-Blue Br-Brown Rd-Red

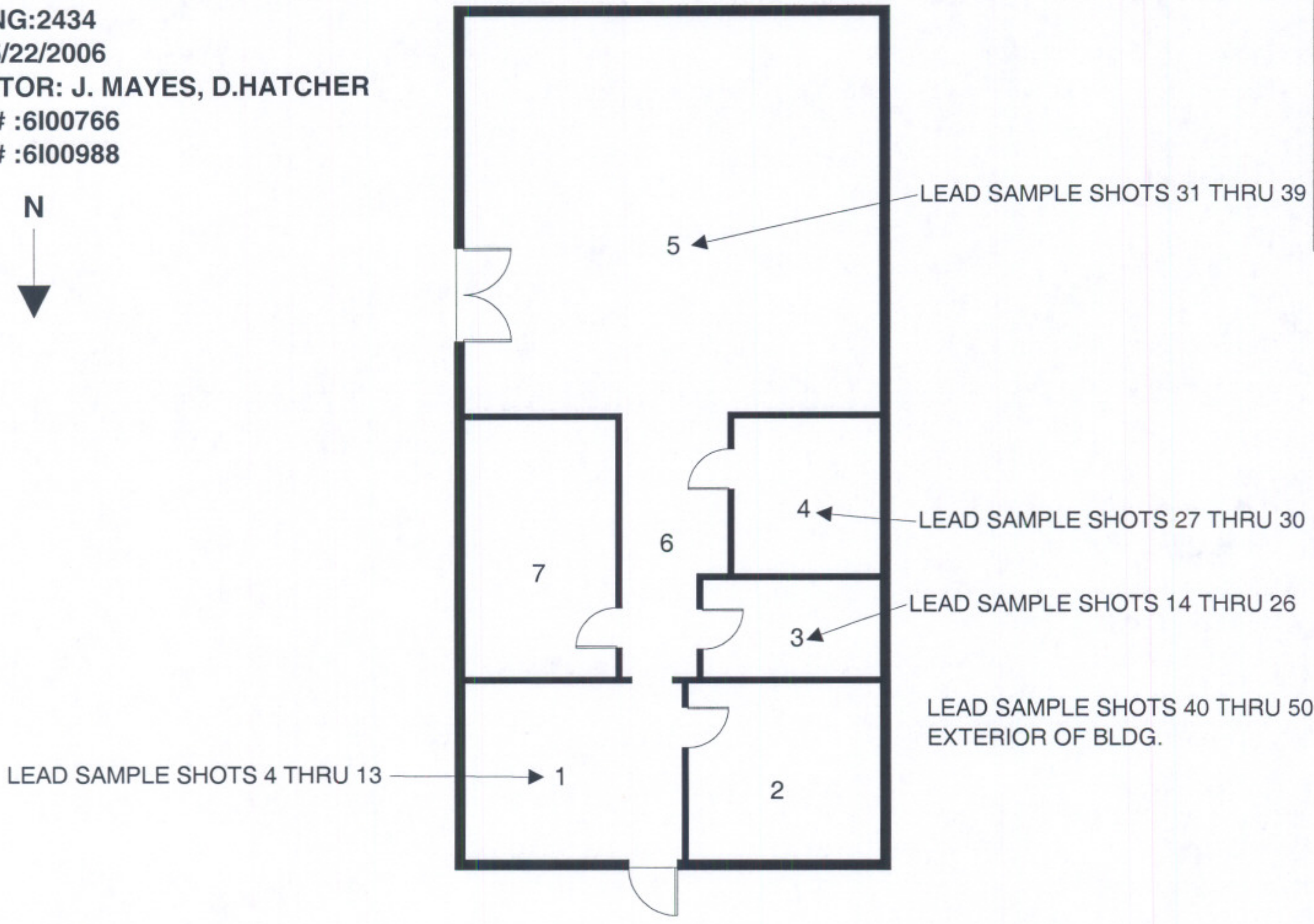
SR-Sheetrock
Yl-Yellow Or-Orange
Wt-White Gy-Grey Gr-Green Bg-Beige

CY07118 ENRMD Control Number

Se

CY07118 ENRMD Control Number

ASBESTOS SAMPLING POINTS
BUILDING:2434
DATE: 5/22/2006
INSPECTOR: J. MAYES, D.HATCHER
LADEQ# :6I00766
LADEQ# :6I00988



ENC 2

TCLP Data Sheet Building # **2434** **Date:** **3/5/2007**

Inspector Name: **DEANDREA MAXIE**

CY07118 ENRMD Control Number

Sample #	Building Component	Total Square Ft	Decimal Equivalent	Sample Size (grams)
1A	INTERIOR DOORS	100	0.0256	2.5641
2B	INTERIOR WALLS	1,000	0.2564	25.6410
3C	RAFTERS & CEILING JOIST	800	0.2051	20.5128
4D	EXTERIOR WALL	1,000	0.2564	25.6410
5E	EXTERIOR FOAM	1,000	0.2564	25.6410
			0.0000	0.0000
			0.0000	0.0000
			0.0000	0.0000
			0.0000	0.0000
			0.0000	0.0000
			0.0000	0.0000
			0.0000	0.0000
			0.0000	0.0000
			0.0000	0.0000
			0.0000	0.0000
			0.0000	0.0000
			0.0000	0.0000
			0.0000	0.0000

N/A
No Samples Submitted

Total: 3,900 SQ.FT.

Total Weight: 100.0000

CY07118 ENRMD Control Number

LABORATORY TEST RESULTS

Job Number: 332710

Date: 04/03/2007

CUSTOMER: Fort Polk Environmental Lab PROJECT: FPL070239 ATTN: Tammy Veillon

Customer Sample ID: FPL070239 VARIOUS BUILDING MATERIAL Bldg 2434
Date Sampled......: 03/05/2007
Time Sampled......: 00:00
Sample Matrix.....: Solid

Laboratory Sample ID: 332710-1
Date Received.......: 03/30/2007
Time Received.......: 09:35

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	FLAGS	REPORTING LIMIT	UNITS	DATE	TECH
SW-846 1311	TCLP Metals Analysis, Solid	Complete				03/30/07	wkc
SW-846 6010B	Lead (Pb), TCLP	1.70		0.100	mg/L	04/02/07	twr
SW-846 3010A	Acid Digestion, TCLP	Complete				04/02/07	map

* In Description = Dry Wgt.

Enclosure#4

IMSW-POL-PWE

8 February 2007

MEMORANDUM FOR RECORD

SUBJECT: CY07118, Demolition of Building T 2434, Ft. Polk, La.

CY07118 ENRMD Control Number

1. The project to demolish building, T 2434, has been evaluated for hazardous and solid waste compliance impacts.

2. All waste should be disposed offsite. The contractors must ensure proper disposal of any wastes generated. All solid waste must be properly characterized to determine the waste type (hazardous / non-hazardous / universal / PCB), and managed in accordance with LAC 33 Part V and VII.

a) Any hazardous waste must be properly manifested and packaged prior to leaving the installation. All manifests must be signed by a government representative in DPW-ENRMD. The painting operations in particular could generate hazardous waste depending on the types of materials used. Ensure minimal generation of wastes by completely using all materials in containers prior to disposal.

b) Any non-hazardous solid waste must be disposed in a permitted facility that accepts the types of materials disposed. Also, recycle as much removed material as possible. The quantities of materials that are disposed or recycled must be reported to DPW-ENRMD for tracking purposes.

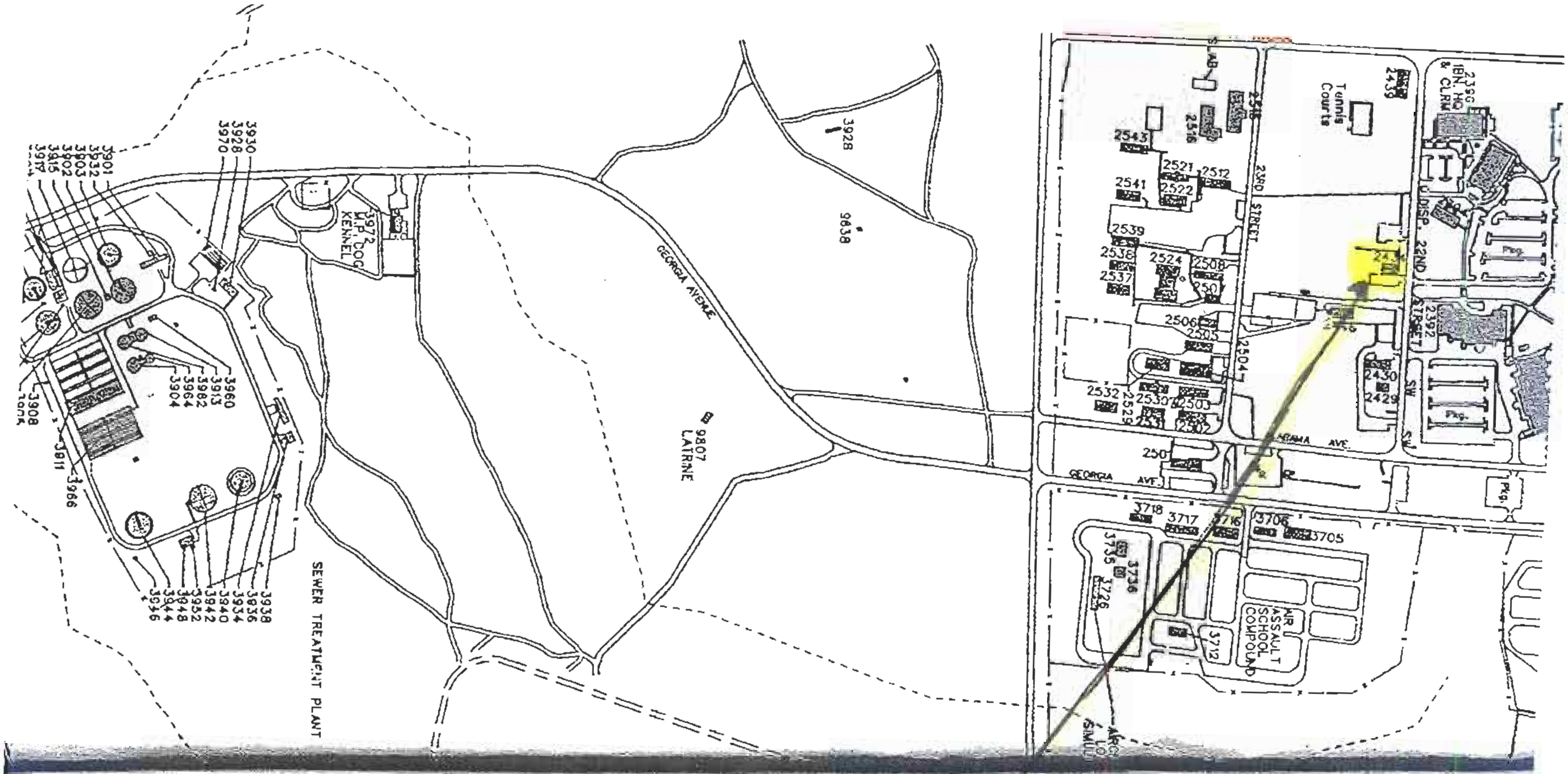
c) Any universal waste must be tracked in some manner when shipped off-site. This tracking may take the form of a log, invoice, bill of lading, or other shipping document. Wastes that fall under universal wastes are batteries, pesticides, mercury thermostats, fluorescent lights, and antifreeze. The quantities of universal waste shipped off-site must be reported to DPW-ENRMD for tracking purposes.

d) Any PCB waste must be properly manifested prior to leaving the Installation. Items that may contain PCB's are ballasts and capacitors found in fluorescent light fixtures.

3. Any products that are used in the project must be assessed to determine whether they are part of the EPA's Comprehensive Procurement Guidelines (40 CFR 247). Specified items are required to meet the Recommended Recovered Materials Content levels unless the materials are not competitively available in a reasonable period of time, are not available at a reasonable price, or do not meet performance standards. The EPA website (http://www.epa.gov/cpg) contains the most recent guidelines for the designated products.

4. The point of contact is the undersigned at 531-6578 or Steven.Gibson@polk.army.mil.

STEVEN S. GIBSON
Installation Solid Waste Manager



Thursday, September 08, 2011

2434

Appendix F

Conceptual Aesthetic Considerations

2 / A-200 SCHEMATIC WEST ELEVATION

SCALE: 1/8" = 1'-0"

0' 4' 8' 16'

1 / A-200 SCHEMATIC NORTH ELEVATION

SCALE: 1/8" = 1'-0"

0' 4' 8' 16'

US Army Corps of Engineers®
Norfolk District

ENGINEERING DESIGN TECHNOLOGIES, INC.
1705 Enterprise Way
Suite 200
Marietta, Georgia 30067
(770) 988-0400

KNIGHT ARCHITECTS
Knight Architects, Inc.
2359 Perimeter Park Drive
Suite 350
Atlanta, Georgia 30341
(770) 452-0101

MARK	DESCRIPTION	DATE	APPR

DESIGNED BY:		DATE: 03/10/2010	
DRAWN BY:	CKD BY:	SOLICITATION NO: W912HN-07-X-9409-CMXX	
SUBMITTED BY:		CONTRACT NO:	
PLOT SCALE:	PLOT DATE:	FILE NUMBER:	
SIZE:	FILE NAME:		

U.S. ARMY CORPS OF ENGINEERS
DISTRICT CORPS OF ENGINEERS
SAVANNAH DISTRICT

I.L. FLEMING, INC.
EDT GROUP, INC.
KNIGHT ARCHITECTS, INC.

BRIGADE/BATTALION HQ
FORT POLK, LOUISIANA

SCHEMATIC FLOOR PLAN
FIRST FLOOR

SHEET IDENTIFICATION:

A-200

SHEET 4 OF ____

2 A-201 SCHEMATIC EAST ELEVATION

SCALE: 1/8" = 1'-0"

0' 4' 8' 16'

1 A-201 SCHEMATIC SOUTH ELEVATION

SCALE: 1/8" = 1'-0"

0' 4' 8' 16'

US Army Corps of Engineers®
Norfolk District

ENGINEERING DESIGN TECHNOLOGIES, INC.
1705 Enterprise Way
Suite 200
Marietta, Georgia 30067
(770) 988-0400

KNIGHT ARCHITECTS
Knight Architects, Inc.
2359 Perimeter Park Drive
Suite 350
Atlanta, Georgia 30341
(770) 452-0101

MARK	DESCRIPTION	DATE	APPR

DESIGNED BY: | DRAWN BY: | CKD BY: | SUBMITTED BY: | PLOT SCALE: | PLOT DATE: | SIZE: | FILE NAME:

DATE: 03/10/2010
SOLICITATION NO: W912HN-07-X-9409-CMXX
CONTRACT NO:
FILE NUMBER:

U.S. ARMY CORPS OF ENGINEERS
DISTRICT CORPS OF ENGINEERS
SAVANNAH DISTRICT

I.L. FLEMING, INC.
EDT GROUP, INC.
KNIGHT ARCHITECTS, INC.

BRIGADE/BATTALION HQ
FORT POLK, LOUISIANA

SCHEMATIC FLOOR PLAN
FIRST FLOOR

SHEET IDENTIFICATION:
A-201
SHEET 5 OF ____

1 A-400 SCHEMATIC PERSPECTIVE

US Army Corps of Engineers®
Norfolk District

ENGINEERING DESIGN TECHNOLOGIES, INC.
1705 Enterprise Way
Suite 200
Marietta, Georgia 30067
(770) 988-0400

KNIGHT ARCHITECTS
Knight Architects, Inc.
2359 Perimeter Park Drive
Suite 350
Atlanta, Georgia 30341
(770) 452-0101

MARK	DESCRIPTION	DATE	APPR.

U.S. ARMY CORPS OF ENGINEERS
DISTRICT CORPS OF ENGINEERS
SAVANNAH DISTRICT

I.L. FLEMING, INC.
EDT GROUP, INC.
KNIGHT ARCHITECTS, INC.

DESIGNED BY:
DRAWN BY:
CKD BY:
SUBMITTED BY:
PLOT SCALE:
PLOT DATE:
SIZE:
FILE NAME:
DATE: 03/10/2010
SOLICITATION NO: W912HN-07-X-9409-CMXX
CONTRACT NO:
FILE NUMBER:

BRIGADE/BATTALION HQ
FORT POLK, LOUISIANA

SCHEMATIC PERSPECTIVE

SHEET IDENTIFICATION:
A-400
SHEET ____ OF ____

1	2	3	4	5

D

C

B

A

1
A-401
SCHEMATIC PERSPECTIVE

US Army Corps of Engineers®
Norfolk District

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MARK	DESCRIPTION	DATE	APPR.

DESIGNED BY:	DATE: 03/10/2010
DRAWN BY:	CKD BY:
SOLICITATION NO: W912HN-07-X-9409-CMXX	
SUBMITTED BY:	CONTRACT NO:
PLOT SCALE:	PLOT DATE:
FILE NUMBER:	
SIZE:	FILE NAME:

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BRIGADE/BATTALION HQ
FORT POLK, LOUISIANA

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Appendix G

GIS Data

Fort Polk CADD GIS Deliverables

Data Standards

Spatial Data Standard for Facilities, Infrastructure and Environment (SDSFIE) current release shall be followed for Geospatial database structure and attributes to allow for data integration. CADD data shall be documented according to the current release of the Architecture, Engineering and Construction (AEC)/CADD standards. All GIS and CADD data will be documented in accordance with the Federal Geographic Data Committee (FGDC) Content Standards for Digital Geospatial Metadata.

Coordinate System Projection and Datum

All GIS data shall use the Universal Transverse Mercator Zone 15 North projection, World Geodetic System of 1984 (WGS84) datum, and the North American Vertical Datum of 1988 (NAVD88) using Metric as the working units to ensure data alignment and accuracy.
CADD data shall be geo-referenced in the State Plane Coordinate System 1983, using the North American 1983 Geodetic Datum with Survey Feet as the working units. The projection, datum and coordinate system must be defined and then documented in the metadata for both CADD and GIS and provided whenever the data is distributed.

CADD & GIS Deliverables

All CADD deliverables of As-built drawings shall be delivered in a MicroStation V8 .DGN compatible format utilizing survey feet for the working units. A seed file can be obtained from the Fort Polk DPW CADD/GIS Center. GIS deliverables shall be delivered in current GeoMedia file format or an ArcView shape file format.

Contact: Fort Polk DPW CADD/GIS Center 337-531-6846

Appendix H

Exterior Signage

surface at least four feet in diameter and set back at least two feet from the pedestrian traffic routes. Steps should be provided for children and the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and Uniform Federal Accessibility Standards (UFAS) standards met (Fig. 11.26). Stepping pads for children shall not interfere with the access for adults.

An alternate utility fountain is to be used in low visibility and remote areas of housing, industrial, and recreational areas where a naturalistic look is desired.

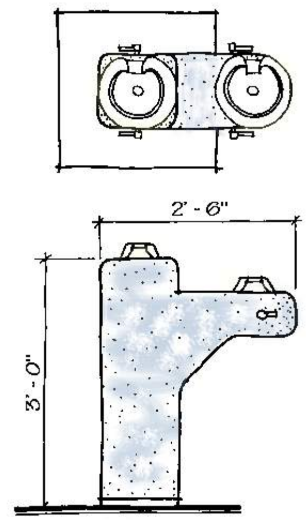


Fig. 11.26 – A handicapped accessible concrete drinking fountain is recommended for high visibility areas.

11.4 SIGNS

11.4.1

Signs are used to visually communicate information. They are highly visible features that should be attractive and compatible with their surroundings. Careful consideration must be given to what a sign says, how it is said, its visual appearance and organization, its location, structural support system, and relation to other signs within the installation. Standardized signage systems facilitate movement, provide a sense of orientation, and reinforce standards of excellence. Signage creates a unifying element throughout the installation that visually ties the installation themes together and builds a reference and continuity that translates into confidence and reassurance when traveling throughout the installation. The standards to apply for signage color, type, and sizing is found in Technical Manual (TM) 5-807-10, *Signage*.

11.4.2

DPW work and site approval is required prior to installing painting, remodeling, relocating, or expanding any sign. No approval is required to perform normal maintenance and repair of a conforming sign or to change a message on an approved sign or marquee specifically designed for this purpose.

11.4.3

Public safety signs not exceeding two square feet do not require site approval. Examples include emergency telephone, restroom, and underground utilities.

11.4.4

Street signs, not located in state rights-of-ways, do not require site approval.

11.4.5
Signs placed for less than 30 days do not require site approval. Those placing these placards shall remove them.

11.4.6
Signs not conforming to this guide will be removed.

11.4.7
No nonconforming sign shall be enlarged, repaired, reconstructed, or changed, except to comply; nor shall the wording or graphics be changed, except to comply.

11.4.8
Signs itemized in this section shall be placed, unless otherwise specified, at the appropriate buildings regardless of its real property categorization.

11.4.9
No signs shall interfere with or confuse traffic or other aspects of safe driving conditions through use of improper wording, graphics, location, size, shape, or color. No sign shall use the words “Stop”, “Go”, “Caution”, Yield”, etc., when such would be confused with traffic signs or devices.

11.4.10 Sign System Characteristics
There are several basic design characteristics that, by serving to convey necessary information clearly and attractively, are an integral part of any successful signage system.

11.4.10.1 Simplicity An effective strategy provides only needed information, avoids redundancy, and eliminates over-signing with resultant clutter and visual confusion. Sign messages must be clear, simple, and easy for motorists to process quickly.

11.4.10.2 Continuity It is essential that the system be applied uniformly and consistently throughout the entire installation. The importance of consistent implementation extends from the larger issues of sign type and size down to accurate color continuity and matching typestyles.

11.4.10.3 Visibility Sign location is a very important ingredient within the system. Signs must be located at significant decision points and oriented to provide clear sight lines for the intended user. Close coordination of locations with respect to landscaping, utilities, adjacent signage, and various other street design elements is important to ensure long-term maximum visibility.

11.4.10.4 Legibility Sign typestyle, line spacing, color, and size all combine to create the crucial design characteristics of legibility. This aspect of sign design should take into consideration users such as motorist, pedestrians, bicyclists, and the relative travel speed at which each type of user will be traveling when viewing the signs.

11.4.11 Vocabulary-Communications

11.4.11.1 A common language has been created for establishing a signing system. The different components that create the sign package have been named and referred to within the total signing system.

11.4.11.2 The creation of a "signing language" helps generate a unified bond within sign types that make up a signing family (Fig. 11.27).

- Reference
  - Information/Message
  - Presentation
  - Architectural Influence
  - Graphic Architecture

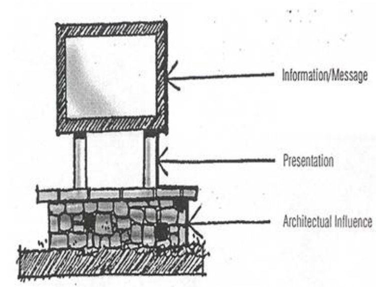


Fig. 11.27 – Signing language helps establish a signing system.

11.4.12 Visual Hierarchy

11.4.12.1 The entire signing system must communicate, through a range of sign and typestyle sizes, the relative importance of the individual activity that the sign identifies. The system should follow a logical progression from a point of origin to the desired destination.

11.4.12.2 A stated ranking method supports the visual standard of hierarchy within the signing system. Signs can be organized within assigned classes with emphasis on the function and image of the installation (Fig. 11.28).

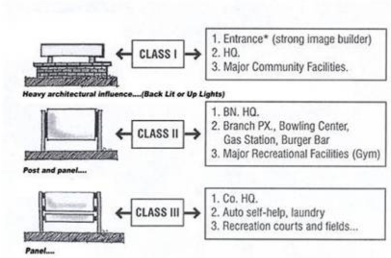


Fig. 11.28 – Signs can be organized into classes within the visual hierarchy.

11.4.12.3 Within each class, the level of architectural influence evokes the importance of the sign to the installation. This is also critical to the idea of progression. The importance of a sign must be presented in its size and level of detail.

11.4.12.4 As individuals move closer to their destination on the installation, the scale of the sign becomes progressively smaller and the level of the message more detailed.

11.4.13 Types of Signs

11.4.13.1 Information / Identification Signs These are signs that identify entrances to the installation, areas within the installation, major tenants, buildings, and organizational or functional components (Fig. 11.29). They identify a location and greet the visitor to that location. They should be compatible in scale and character with the architecture and also blend with the natural surroundings. These signs are designed to include the following:

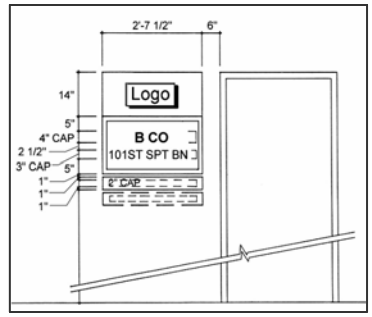


Fig. 11.29 – Building Mounted Information Sign

11.4.13.1.1 Typeface:

- Lettering is self-adhesive backing material.
- Building Title: Helvetica Medium, Upper and Lower Case
- Building Numbers: Helvetica regular
- Building Addresses: Helvetica Medium, Upper and Lower Case

11.4.13.1.2 Color:

- Panel: Dark Brown
- Lettering: White
- Post: Dark Brown
- Exposed Panel Backs and Edges: Dark Brown
- All Paint: Semi-Gloss

11.4.13.1.3 Materials:

- Panel: Double-Face 1/8” Thick Aluminum
- Post: Steel Pipe
- Foundation: Concrete Pier or Direct Burial

11.4.13.1.4 Building Identification

11.4.13.1.4.1 Street Addresses The addressing procedures prescribed in DoD 4525.8-M, DoD Official Mail Manual are mandatory for use by all DoD components. DoD 4525.8-M, Chapter 3 prescribes the following:

Fig. 11.30 – Use street addresses on all building identification signs.

All DoD addresses shall be assigned so they are compatible with the United States Postal Services automated delivery point sequencing (C3.3).

The DoD installation is responsible for assigning city-style, street address on the installation (C3.3.2.2).

Street addresses shall be assigned and used even though a DoD activity may deliver the mail to the addressee (C3.3.2.2.1).

Only geographically locatable civilian-style street address (such as 4102 Cindy Avenue) shall be used (C3.3.2.2.4) (Fig. 11.30).

Installations shall not use one street address for the entire installation and then use secondary unit designators such as "Building 123" to designate the delivery addresses on the installation (C3.3.2.2.5).

Addresses such as "Building 123 Roberts Street" are not a valid address format and shall not be used (C3.3.2.2.6).

11.4.13.1.4.2 Address Placement
Place addresses by the front entrance of the building so they can be seen (C3.3.2.3.1).

Place both the street name and address number on the building if both the building number and street address are visible from the street.

Building identification signs will use street addresses (Fig. 11.29). Buildings without identification signs shall have the address number and street name centered above the main entrance or located to the right side (Fig. 11.31).

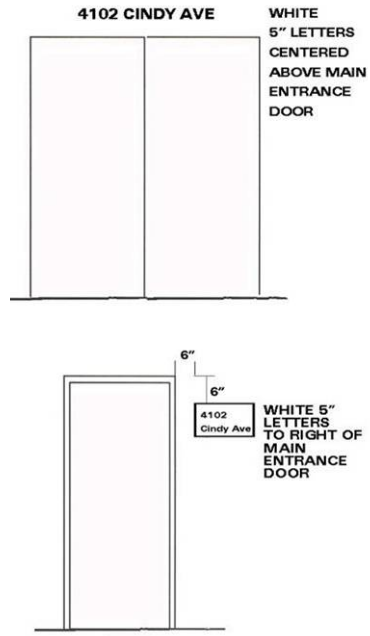


Fig. 11.31 - Street address location at entrance doors.

11.4.13.1.5 Housing Areas
11.4.13.1.5.1 The sign should be complementary to the architectural setting of the housing area and approved by the installation Real Property Planning Board.

11.4.13.1.5.2 Housing numbers should be placed on the curb in front of the respective house and on the house where lighting will effectively light the numbering.

11.4.13.1.6 Installation Identification Signs.
11.4.13.1.6.1 Installation identification signs name the installation and display the official US Army plaque. The designation "United States Army" must appear at the top of the sign in accordance with AR 420-70, para 2-7h. Every installation entrance shall have an installation identification sign displaying only the US Army plaque, with the words "United States Army, Joint Readiness Training Center & Fort Polk", and gate name (Fig. 11.32). The placement of Senior Mission Commander logo, unit crest, and other installation identification signs, monuments, or displays shall be located inside the installation beyond the cleared area of the Access Control Point (ACP) of entry. When used service-wide,

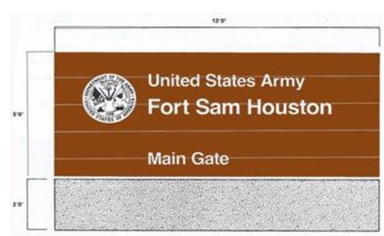


Fig. 11.32 – Installation Entrance Signs

these signs convey a uniform image of strength and stability to the public. Emblems, branch colors, unit mottos, names, and titles of individuals are not to be displayed.

11.4.13.1.6.2 Installation identification signs consist of three types:

- Sign type A1, main entrance sign, identifies the principal visitor entrance.
- Sign type A2, secondary entrance sign, identifies entry points with relatively high volumes of visitor traffic.
- Sign type A3, limited access entry gate signs, identifies entry points with limited public access.

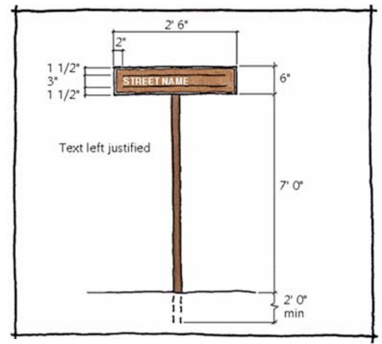


Fig. 11.33 – Typical Street Signs

11.4.13.1.6.3 See Technical Manual (TM) 5-807-10, Signage, paragraph 3-3, for sign specifications and paragraph 3-11 for sign placement guidelines.

11.4.13.1.7 Street Signs Street name identification signs should be designed with the same lettering, color, and materials as other information (Fig. 11.33).

11.4.13.1.8 Wheeled Electrical Signs Wheeled electrical signs will have an attractive presentation. Temporary landscape elements should be used whenever possible. The siting of this type of sign will be approved by the RPPB. No sign of this type will be left in place for longer than six (6) months, after which time the sign will be removed or turned into a permanent sign.

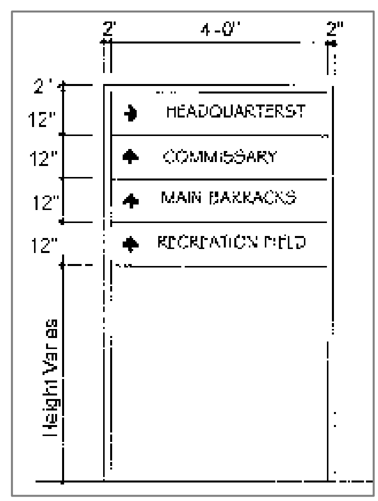


Fig. 11.34 – Direction Sign

11.4.13.2 Directional Signs These signs guide the motorist or pedestrian in, around, and out of the installation (Figs. 11.34 and 11.35). The legibility and placement of these signs, as well as the ordering of information, is critical to their effectiveness. These signs should be placed in central locations and at major decision points along circulation routes. These signs are designed to include the following:

11.4.13.2.1 Typeface:

- Lettering is self-adhesive backing material.
- Helvetica Medium Upper and Lower Case

11.4.13.2.2 Arrow:

- Place at end indicating direction.
- Stroke Width: Helvetica Medium Cap

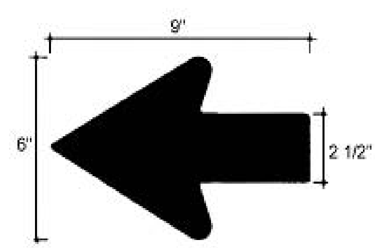


Fig. 11.35 – Use a typical arrow on all destination signs.

11.4.13.2.3 Color:

- Panel: Dark Brown

- Lettering: White
- Post: Dark Brown
- Exposed Panel Backs and Edges: Dark Brown
- All Paint: Semi Gloss

11.4.13.2.4 Materials:

- Panel: Double-face 1/8" Thick Aluminum
- Post: Steel Pipe
- Foundation: Concrete Pier or Direct Burial

11.4.13.3 Regulatory Signs These signs provide the rules for travel and parking on the installation. They include speed signs, turning and lane use signs, warning signs, parking control signs, etc. (Figs. 11.36 and 11.37). Related to these signs are pavement markings and traffic signals. These signs are designed to include the following:

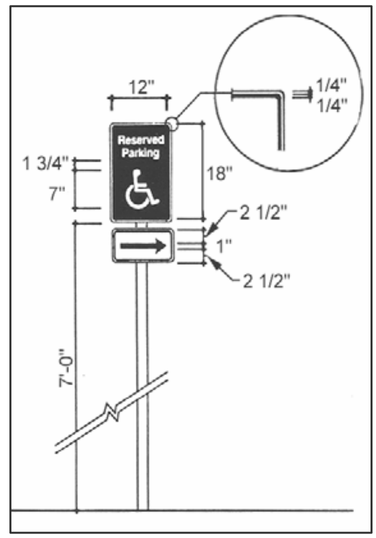


Fig. 11.36 – Regulatory sign.

11.4.13.3.1 Typeface:

- Lettering is self-adhesive backing material.
- Helvetica Medium Upper and Lower Case

11.4.13.3.2 Color:

- Panel: Dark Brown
- Lettering: White
- Post: Dark Brown
- Exposed Panel Backs and Edges: Dark Brown
- All Paint: Semi Gloss

11.4.13.3.3 Materials:

- Panel: Double-face 1/8" thick aluminum
- Post: Steel Pipe
- Foundation: Concrete Pier or Direct Burial

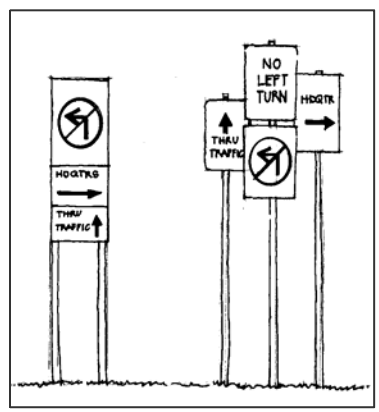


Fig. 11.37 – Sign should be simple, legible, and combined.

11.4.13.3.4 Traffic Control Signs

11.4.13.3.4.1 CONUS Installations National highway standards will be used for signs to regulate vehicular traffic on CONUS installations (AR 420-72, Transportation Infrastructure and Dams, Para 2-15f). These standards are described in the Manual of Uniform Traffic Control Devices (MUTCD). Also see MTMC Pamphlet 55-14, Traffic Engineering for Better Signs and Markings. This pamphlet clarifies existing standards and provides definite guidelines for installation officials to conform to the MUTCD. These standards shall be used installation-wide to include installation Access Control Points.

11.4.13.3.4.2 OCONUS Installations OCONUS installation streets and roads are to be considered extensions of the road system of the host nation and shall use traffic control device standards and criteria of the host nation (AR 420-72, Transportation Infrastructure and Dams, Para 2-15e).

11.4.13.3.5 Prohibitory (Warning) Signs This category of signage is intended to maintain security and safety on the installation perimeter and at other specific secure areas. These signs notify visitors of restrictions as well as other security procedures. The guidelines for design, fabrication, and placement of warning signs are found in Technical Manual (TM) 5-807-10, Signage, para 3-9.

11.4.14 Electronic Exterior Signs

All exterior flashing signs, traveling lights, or signs animated by lights of changing degrees of intensity or color are prohibited.

11.4.15 Sign Placement and Mounting

Placement of signs differs according to the type of sign and the specific site constraints (Fig. 11.38). The following guidelines apply to placement of the majority of signs.

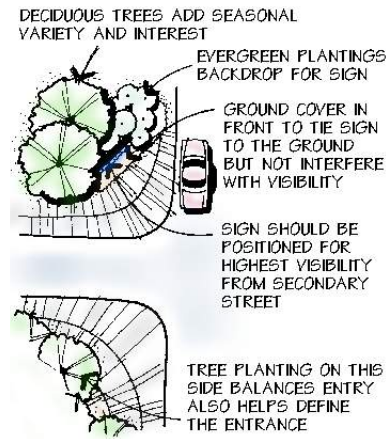


Fig. 11.38 – Consider basic planning and design objectives in sign placement.

Do not place more than one sign at any location. Traffic rules are the exception to this rule.

Place signs in areas free of visual clutter and landscape materials. Place signs in locations that allow enough time for the user to read and react to the message.

Signs should not be placed to block sight lines at intersections. Place signs approximately 1.2 meters (4 feet) above ground level to be within 10 degrees the driver's line of vision (Fig 11.39). Provide proper placement to avoid a hazard to children.

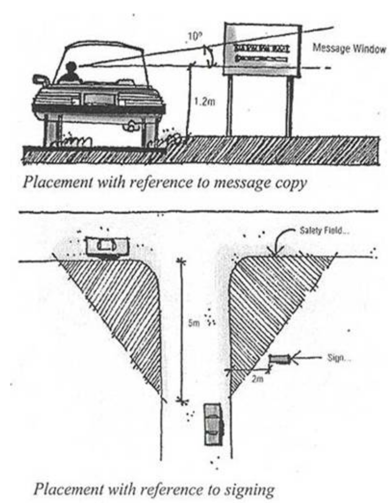


Fig. 11.39 – Placement of signs is critical to ensure easy readability.

Locate identification signs generally at building entrances and/or other parts of the building visible from the main access street. Building signs should be visible from the main circulation paths to the building (vehicular or pedestrian).
Place building and/or facility identification signs within the first 20 percent of the distance closest to the road between the road and the building. These signs shall be placed as not to obscure any other identification, information or vehicular regulatory signs.

Signs unable to be located perpendicular to the direction of traffic may be rotated to a 45-degree angle or parallel to traffic.

The minimum distance between sign and driveway or intersection should normally be 100 feet.

One identification sign for each building is sufficient unless vehicular access occurs on two or more sides of the building.

Provide signs to identify facilities dedicated to or accessible to the handicapped, such as parking spaces, building entrances, and restroom facilities.

Mounting signs on buildings:

- No sign may be mounted on the outside of the door, except small signs (one square foot or less) that indicate required use of an alternate entrance. Signs such as "Escort Required" or changeable signs are not permitted.

- No sign may be attached or mounted to roofs and parapets.

- No sign shall be painted or applied directly onto the surface of a building.

- No permanent signs shall obstruct any window, door, fire escape, ladder, or opening intended for light, air, or egress.

- No temporary sign in windows or glass walls is allowed to cover more than 20 percent of the glass area.

- No signs shall interrupt the vertical and horizontal features of the facade.

- No sign may be tacked, posted, painted, or otherwise affixed to site elements such as sheds, trees, or other structures.

- No sign may be attached to utility poles except for pole identification or warning signs.

- Fasten projecting signs directly to the supporting building wall and integrate the frame into the sign. These signs shall intersect at right angles to the building front and shall not extend above the roofline or the parapet wall. Signs may not project more than five feet from a wall or two-thirds the width of the sidewalk, whichever is less. In no case may signs be closer than 18 inches to the curb line. A clear height of eight feet above the ground is required.

11.4.16 Sign Details

Signage details include the following:

- All signs will either be pre-manufactured or fabricated by DPWE. Low quality and "homemade" type signs are prohibited.
- Any sign that is mechanically animated (i.e., revolves, rotates, or moves in any way) is prohibited.
- Locate signs where they are most visible and the view unobstructed.
- Signs will be brown Federal Specification Color Number 20140 and white (i.e., Park Service colors).
- Universally recognized color schemes such as the state highway and safety signs may follow the Federal Highway Administration's "Standard Alphabets for Highway Signs and Pavement Markings" standards.
- Signs generally are not landscaped; however, if ornamental planting occurs in the vicinity of the sign, locate the sign in the planting bed.
- Temporary signs do not require landscaping; changeable signs are not considered temporary.
- Any exposed lighting tubes, strings of lights, spotlights, or any illumination that causes direct glare upon an unrelated building are prohibited.
- Any flashing signs, traveling lights, or signs animated by lights of changing degrees of intensity or color are prohibited.
- Signs may be lit by remote lamps or backlit where nighttime identification is required such as at clubs, shopping areas, and post entry points.
- Internally lit signs must have an opaque message surface displayed at all times, and at no period will views be allowed to the inside of the sign regardless of whether a message is on the sign or not.

- Kiosks, informational signs, and “You Are Here” maps are to be centrally located in “Activity Nodes” as defined by the District Plate graphics.

- For military building signs, quantities are limited to one of each type allowed.

- Quantities are limited regardless of whether facilities are located on corners, have exposure to multiple roads/drives, or have building entrances visually separated from roads/parking lots.

- All signs use Helvetica font (Fig 11.40).

- Traffic signs will follow guidelines in the Federal Highway Administration’s “Standard Alphabets for Highway Signs and Pavement Markings” standards.

ABCDEFGHIJKLMN
OPQRSTUVWXYZ
a b c d e f g h i j k l m n
o p q r s t u v w x y z

Fig. 11.40 – Use Helvetica type style on signage.

11.4.17 Sign System Typography

11.4.17.1 Military Emblems The Army has a rich tradition of military heraldry. Military emblems are an important part of the soldiers' identity and the emblems have been carefully crafted over the years to express unit pride and unique history and function of the unit. The care and use of organizational emblems in a signage system can add visual interest as well as build pride and a sense of history. However, the overuse of miscellaneous emblems can lead to clutter and a dilution of their importance. Colors for military emblems must be in accordance with the Institute of Heraldry.

11.4.17.2 Department of the Army Plaque The plaque should be displayed on installation identification signage to emphasize the heritage and professionalism of the United States Army. The design of the plaque must be in accordance with Army Regulation (AR) 840-1, Department of the Army Seal, and Department of the Army Emblem and Branch of Service Plaques, and must be reproduced in full color.

11.4.17.3 Insignias The use of branch insignia, shoulder sleeve insignia, coat of arms and/or distinctive insignia on headquarters signs is permitted. All military emblems must appear in full color. Motivational symbols or motifs will not be used.

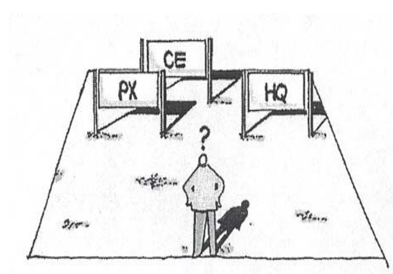


Fig. 11.41 – Visual clutter causes confusion.

11.4.18 Reduce Visual Clutter

11.4.18.1 Over-signing detracts from a uniform sign system and if left uncontrolled will eventually destroy the integrity of the system.

Appendix I

Acceptable Plants List

Prepared by Dr. Charles M. Allen; 531-7535; charles.m.allen1@conus.army.mil
March 30, 2009

Native Shrubs

Arrowwood Viburnum dentatum
Buckeye, Red Aesculus pavia
Buckthorn, Carolina Rhamnus (Frangula) caroliniana
Buttonbush Cephalanthus occidentalis
Cherry-Laurel Prunus caroliniana
Dogwood, Rough-leaf Cornus drummondii
Fringetree Chionanthus virginicus
Hawthorn, Green Crataegus viridis
Hawthorn, Parsley Crataegus marshallii
Holly, Deciduous Ilex decidua
Hoptree Ptelea trifoliata
Huckleberry, Summer (Elliott's Blueberry) Vaccinium elliottii
Mayhaw Crataegus opaca
palmetto Sabal minor
Pawpaw Asimina triloba
Silverbell Halesia diptera
Snowbell, American Styrax americanus
Snowbell, bigleaf Styrax grandifolia
Southern Crabapple Malus angustifolia
Stick, Devil's Walking Aralia spinosa
Sumac, Smooth Rhus glabra
Sumac, winged Rhus copallina
Titi, White Cyrilla Ctrilla racemiflora
Viburnum, Blackhaw Viburnum rufidulum
Viburnum, Possumhaw Viburnum nudum
Virginia Willow Itea virginica
Wax Myrtle (bayberry) Myrica cerifera
Yaupon Ilex vomitoria

Acceptable Shrubs (Not Native)

boxwood Buxus sempervirens
Tree, Chaste Vitex agnus-castus
Myrtle, Crape Lagerstroemia indica
Hawthorn, Indian Raphiolepis indica
Japanese Maple Acer palmatum
Loquat Eriobotrya japonica
Mulberry, Paper Broussonetia papyrifera
Thorn, Jerusalem Parkinsonia aculeata
Gardenias Gardenia
Camellias Camellia
Palms several genera
Junipers Juniperus

Native Trees

Ash, Green Fraxinus pennsylvanica
Ash, White Fraxinus americana
Baldcypress Taxodium distichum
Bay, Red Persea borbonia
Beech, American Fagus grandifolia
Birch, River Betula nigra
Boxelder Acer negundo
Catalpa Catalpa bignonioides
Cherry, Black Prunus serotina
Cottonwood, Eastern Populus deltoides
Dogwood, Flowering Cornus florida
Elm, American Ulmus americana
Elm, Cedar Ulmus crassifolia
Elm, Slippery Ulmus rubra
Elm, Winged Ulmus alata
Gum, Black Nyssa sylvatica
Gum, Sweet Liquidambar styraciflua
Gum, Tupelo Nyssa aquatica
Hackberry Celtis laevigata
Holly, American Holly Ilex opaca
Hophornbeam, Eastern Ostrya virginiana
Huckleberry, Tree (Winter) Vaccinium arboreum
Ironwood Carpinus caroliniana
Locust, Black (Robinia pseudoacacia)
Locust, Honey (Gleditsia triacanthos)
Magnolia, Southern Magnolia grandiflora
Magnolia, Sweetbay Magnolia virginiana
Maple, Drummond Red Acer rubrum var. drummondii
Maple, Red Acer rubrum var. rubrum
Maple, Silver Acer saccharinum
Maple, Sugar Acer saccharum
Mulberry, Red Morus rubra
Oak, Cherrybark Quercus pagoda
Oak, Live Quercus virginiana
Oak, Nuttall Quercus texana
Oak, Shumard Quercus shumardii
Oak, Southern Red Quercus falcata
Oak, Swamp Chestnut (Cow) Quercus michauxii
Oak, Water Quercus nigra
Oak, White Quercus alba
Oak, Willow Quercus phellos
Pecan Carya illinoinensis
Persimmon Diospyros virginiana
Pine, Loblolly Pinus taeda
Pine, Longleaf Pinus palustris
Pine, Shortleaf Pinus echinata
Plum, Mexican Prunus mexicana
Redbud, Eastern Cercis canadensis

Redcedar, Eastern Juniperus virginiana
Sassafras Sassafras albidum
Serviceberry Amelanchier arborea
Sourwood Oxydendrum arboreum
Sycamore Platanus occidentalis
Willow, Black Salix nigra
Yellow-Poplar (tulip poplar) Liriodendron tulipifera

Acceptable Trees (Not Native)

Ash, Arizona Fraxinus velutina
Elm, Chinese Ulmus parvifolia
Elm, Siberian Ulmus pumila
Gingko Gingko biloba
Magnolia, Saucer Magnolia soulangiana
Pine, Slash Pinus elliottii
Pine, Spruce Pinus glabra
Pistachio, Chinese Pistacia chinensis
Tree, Chinese Parasol Firmiana simplex
Tree, Golden Rain Koelreuteria bipinnata
Willow, Weeping Salix babylonoica

The following list is of species that are invasive on Fort Polk or are reported to be invasive in the area. These species should not be considered for planting on Fort Polk.

Invasive Tree Species: Do Not Plant!

Chinaberry Melia azedarach
Mimosa Albizia julibrissin
Oak, Sawtooth Quercus acutissima
Pear, Bradford Pyrus calleryana
Tree of Heaven Ailanthus altissima
Tree, Camphor Cinnamomum camphora
Tree, Chinese Tallow (Chicken Tree) Sapium sebiferum (Triadicia sebifera)
Tree, Golden Rain Koelreuteria paniculata
Tree, Tung Oil Aleurites (Vernicia) fordii

Invasive Shrub species: Do Not Plant

Bamboo, golden Phyllostachys aurea
Cedar, Salt Tamarix spp.
Eye, Hen’s Ardisia crenata
Holly, Burford Ilex cornuta
Lespedeza, shrubby Lespedeza bicolor
Ligustrum, Wax Ligustrum licidum. japonicum, vulgare
Nandina Nandina domestica
olive, thorny/autumn Elaeagnus puungens/umbellata
Privet, Chinese Ligustrum sinense
Rose, Multiflora Rosa multiflora

Invasive Vine Species: Do Not Plant

bigleaf periwinkle Vinca major
catclawvine Macfadyena unguis-cati
Chinese wisteria Wisteria sinensis
English ivy Hedera helix
Japanese climbing fern Lygodium japonicum
Japanese honeysuckle Lonicera japonica
Japanese knotweed Polygonum cuspidatum
kudzu Pueraria montana var. lobata

Invasive Grass/Sedge Species Do Not Plant

cogon grass Imperata cylindrica/brasiliensis
dallisgrass Paspalum dilatatum
fragrant flatsedge Cyperus odoratus
giant reed Arundo donax
glenwoodgrass Sacciolepis indica
Invasive Grass/Sedge Species (Cont.): Do Not Plant
haspan flatsedge Cyperus haspan
itchgrass Rottboellia cochinchinensis
Japanese stiltgrass Microstegium vimineum

Johnsongrass Sorghum halepense
King Ranch Bluestem Bothriochloa ischaemum
nutgrass Cyperus rotundus
Paraguayan windmill grass Chloris canterai
poorland flatsedge Cyperus compressus
redroot flatsedge Cyperus erythrorhizos
ricefield flatsedge Cyperus iria
smut grass Sporobolus indicus
strawcolored flatsedge Cyperus strigosus
tapertip flatsedge Cyperus acuminatus
torpedo grass Panicum repens
Uruguayan pampas grass Cortaderia selloana
variable flatsedge Cyperus difformis
Vasey's grass Paspalum urvillei
weeping lovegrass Eragrostis curvula
yellow nutsedge Cyperus esculentus

Invasive Forb Species: Do Not Plant

air yam Dioscorea bulbifera
bitterweed Helenium amarum
Brazilian vervain Verbena brasiliensis
bull thistle Cirsium vulgare
chamber bitter Phyllanthus urinaria
Chinese lespedeza Lespedeza cuneata
elephant's ear Colocasia esculenta
hairy catsear Hypochaeris radicata
hairy crabweed Fatoua villosa
Japanese clover Kummerowia striata
nodding plumeless thistle Carduus nutans
prickly lettuce Lactuca serriola
rough cocklebur Xanthium strumarium
Spanish needles Bidens bipinnata
sweet clover Melilotus indica
tropical soda apple Solanum viarum
windowbox woodsorrel Oxalis rubra

Invasive Aquatic Species: Do Not Plant

Brazilian waterweed Egeria densa
common water hyacinth Eichhornia crassipes
kariba-weed Salvinia molesta
waterthyme Hydrilla verticillata

APPENDIX J
Drawings

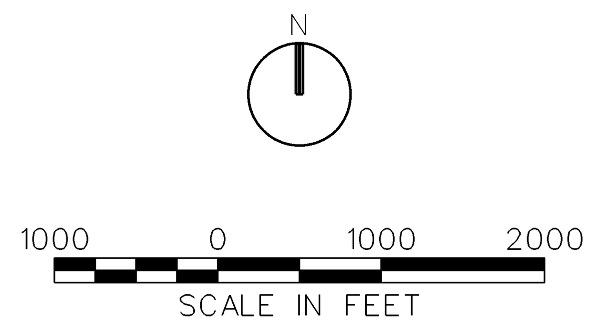
Part I: Site Development Plan

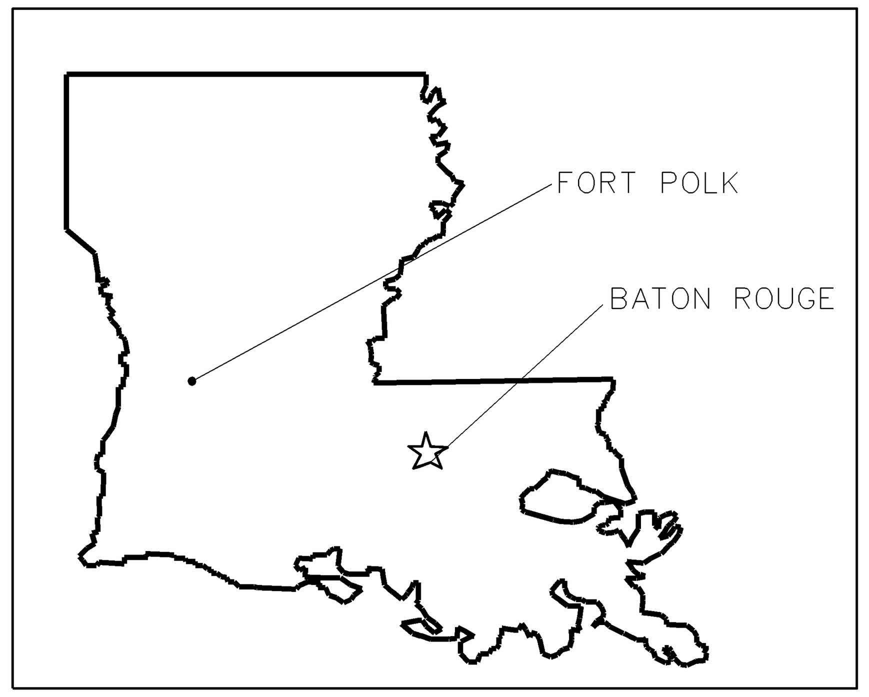
Part II: Electrical Plans

Part III: Geotechnical Drawings

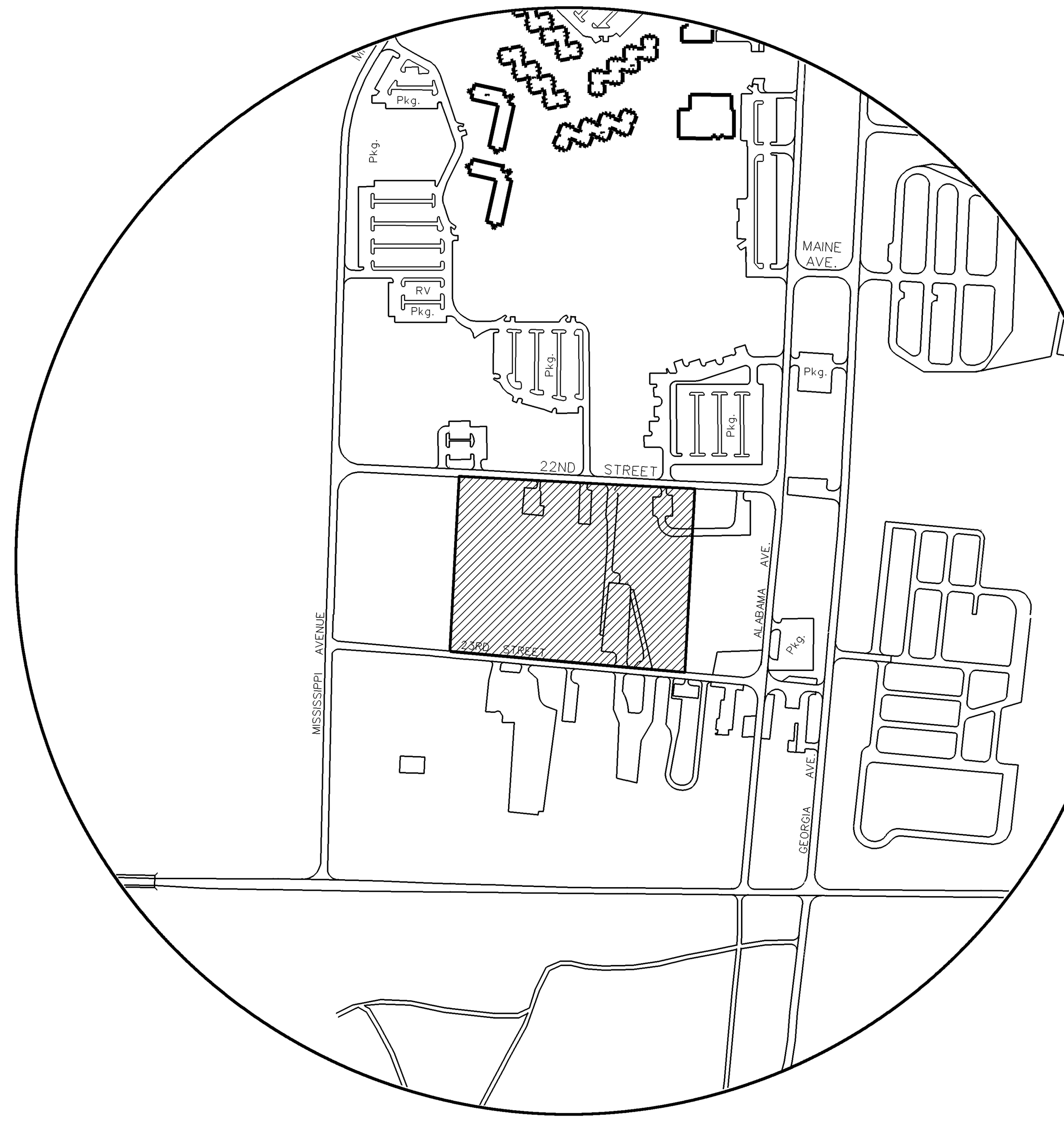
PART I:
Site Development Plan

G101: Project Location Map
C001: Existing Site (Aerial)
C002: Existing Site (FY07 Survey)
C101: Conceptual Site Plan
C102: Conceptual Site Plan w/ Future Development
C201: Grading Plan (Existing)
C501: Utility Plan
C901: Swing Gate Detail





VICINITY MAP



PROJECT LOCATION

NOTES:

1. ALL CONSTRUCTION DEBRIS WITH THE EXCEPTION OF CLEAN EXCESS SPOIL, ASPHALT AND CONCRETE SHALL BE REMOVED AND DISPOSED OF OFF GOVERNEMNT-CONTROLLED PROPERTY AT THE CONTRACTOR'S RESPONSIBILITY AND EXPENSE.

2. THERE ARE NO BORROW SOURCES LOCATED ON FORT POLK. ALL BORROW SHALL BE OBTAINED FROM OFF POST SOURCES AT THE CONTRACTOR'S RESPONSIBILITY AND EXPENSE.

3. THE CONTRACTOR'S LAYDOWN AREA & CONSTRUCTION LIMITS ARE SHOWN ON SHEET G302. (SHEET IS TO BE INCLUDED LATER)

4. CONTRACTOR ACCESS INTO THE INSTALLATION SHALL BE THROUGH THE COMMERICAL TRAFFIC GATES ONLY, UNLESS OTHERWISE DIRECTED. THE COMMERCIAL TRAFFIC ACCESS FROM LOUISIANA HIGHWAY 10 WILL BE THROUGH LOUISIANA AVENUE GATE. COMMERCIAL TRAFFIC ACCESS FROM LOUISIANA HIGHWAY 8 & HIGHWAY 28 VIA LOUISIANA HIGHWAY 469 WILL BE THROUGH THE K AVENUE GATE. TRUCK AND LARGE VEHICLE TRAFFIC IS ONLY ALLOWED TO ENTER AT THE K AVENUE GATE AND LOUISIANA AVENUE GATES.

5. ALL COORDINATES ARE LOUISIANA STATE PLANE VALUES(GRID). COORDINATES ARE BASED ON LOUISIANA STATE PLANE COORDINATE SYSTEM, NAD-83. VERTICAL CONTROL IS BASED ON NGVD 29 DATUM, UNITS ARE IN FEET.

6. ALL SIGNAGE, BARRICADES, AND DELINEATORS REQUIRED FOR TRAFFIC CONTROL IN CONSTRUCTION AREAS SHALL CONFORM TO THE REQUIRMENTS OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), CURRENT EDITION. ALL TRAFFIC CONTROL PLANS SHALL BE SUBMITTED TO THE CONTRACTING OFFICER'S REPRESENTATIVE FOR APPROVAL A MINIMUM OF 60 DAYS IN ADVANCE.

HAUL ROUTE

U.S. Army Corps of Engineers
Fort Worth District

Symbol	Description	Tracking No.	Action	Date

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS	Designed by: R. GUTHMUELLER	Date: NOVEMBER 2009
ENGINEERING/ CONSTRUCTION DIVISION DESIGN BRANCH	Dwn. by: R. GUTHMUELLER	Sol. No.
	Reviewed by: D. DANG	Contr. No.
	Submitted by: MARK L. BLACK, P.E CHIEF, CIVIL SECTION	File name: fp060130-G301.dgn Plot date: 12/29/2010 Plot scale:

Rev.

FORT POLK, LOUISIANA
WARRIORS IN TRANSITION COMPLEX
112 PN BARRACKS
PN070128

PROJECT LOCATION MAP

Sheet reference number:
G301

DESIGN FILE: fp060130-G301.dgn

Contr No.

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Fort Worth District

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Designed by: R. GUTHMUELLER	Date:	Rev.	
Dwn by: R. GUTHMUELLER	Sol No.		
Reviewed by: M. BLACK	Contr No.		
Submitted by: DAVID G. BROWN, P.E. CHIEF, CIVIL SECTION	File name: $$cadd file name$$ Plot date: $$date$$ Plot scale:		

U.S. ARMY ENGINEER DISTRICT,
CORPS OF ENGINEERS
FORT WORTH, TEXAS

ENGINEERING/
CONSTRUCTION DIVISION
ENGINEERING BRANCH

FORT POLK, LOUISIANA
UNACCOMPANIED ENLISTED PERSONNEL HOUSING
PN: 060130

SITE LAYOUT
EXISTING SITE (AERIAL)
(SITE DEVELOPMENT PLAN)

SHEET SEQUENCE NUMBER
C001

Contr No.

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$$date$$
$$user$$
$$cadd file name$$

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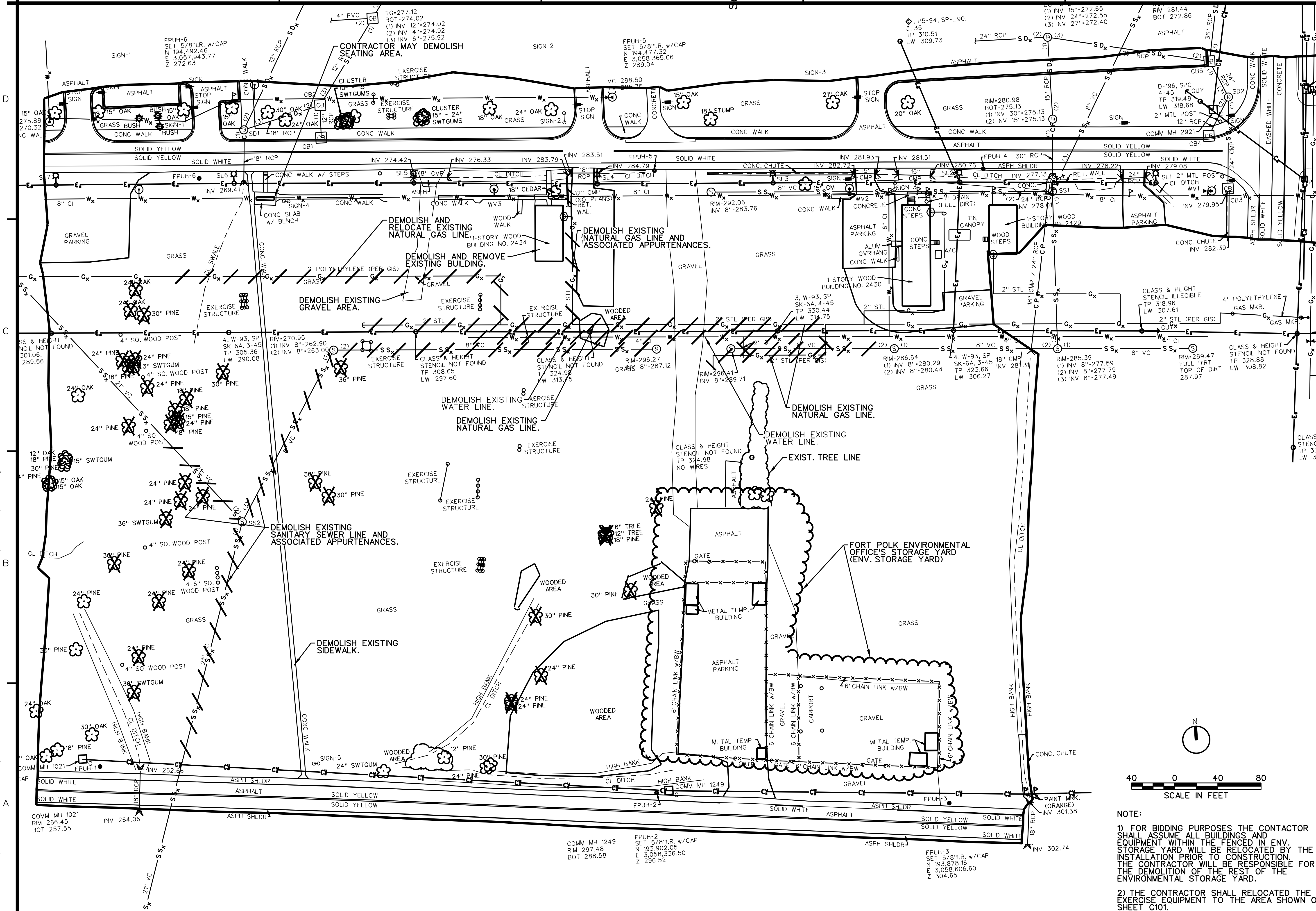

NOTE:

1) FOR BIDDING PURPOSES THE CONTACTOR SHALL ASSUME ALL BUILDINGS AND EQUIPMENT WITHIN THE FENCED IN ENV. STORAGE YARD WILL BE RELOCATED BY THE INSTALLATION PRIOR TO CONSTRUCTION. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE DEMOLITION OF THE REST OF THE ENVIRONMENTAL STORAGE YARD.

2) THE CONTRACTOR SHALL RELOCATED THE EXERCISE EQUIPMENT TO THE AREA SHOWN ON SHEET C101.

US Army Corps of Engineers
Fort Worth District

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/CONSTRUCTION DIVISION ENGINEERING BRANCH

Designed by: R. GUTHMUELLER
Dwn by: R. GUTHMUELLER
Reviewed by: D. DANG
Submitted by: DAVID C. BROWN, P.E. CHIEF, CIVIL SECTION

File name: fp060130-C002.dgn
Plot date: 1/25/2011
Plot scale:

Date: | Sol No. | Contr No.

FORT POLK, LOUISIANA
UNACCOMPANIED ENLISTED PERSONNEL HOUSING
PN: 060130

EXISTING SITE AND DEMOLITION PLAN (FY07 SURVEY) (SITE DEVELOPMENT PLAN)

SHEET SEQUENCE NUMBER
C002

Contr No.

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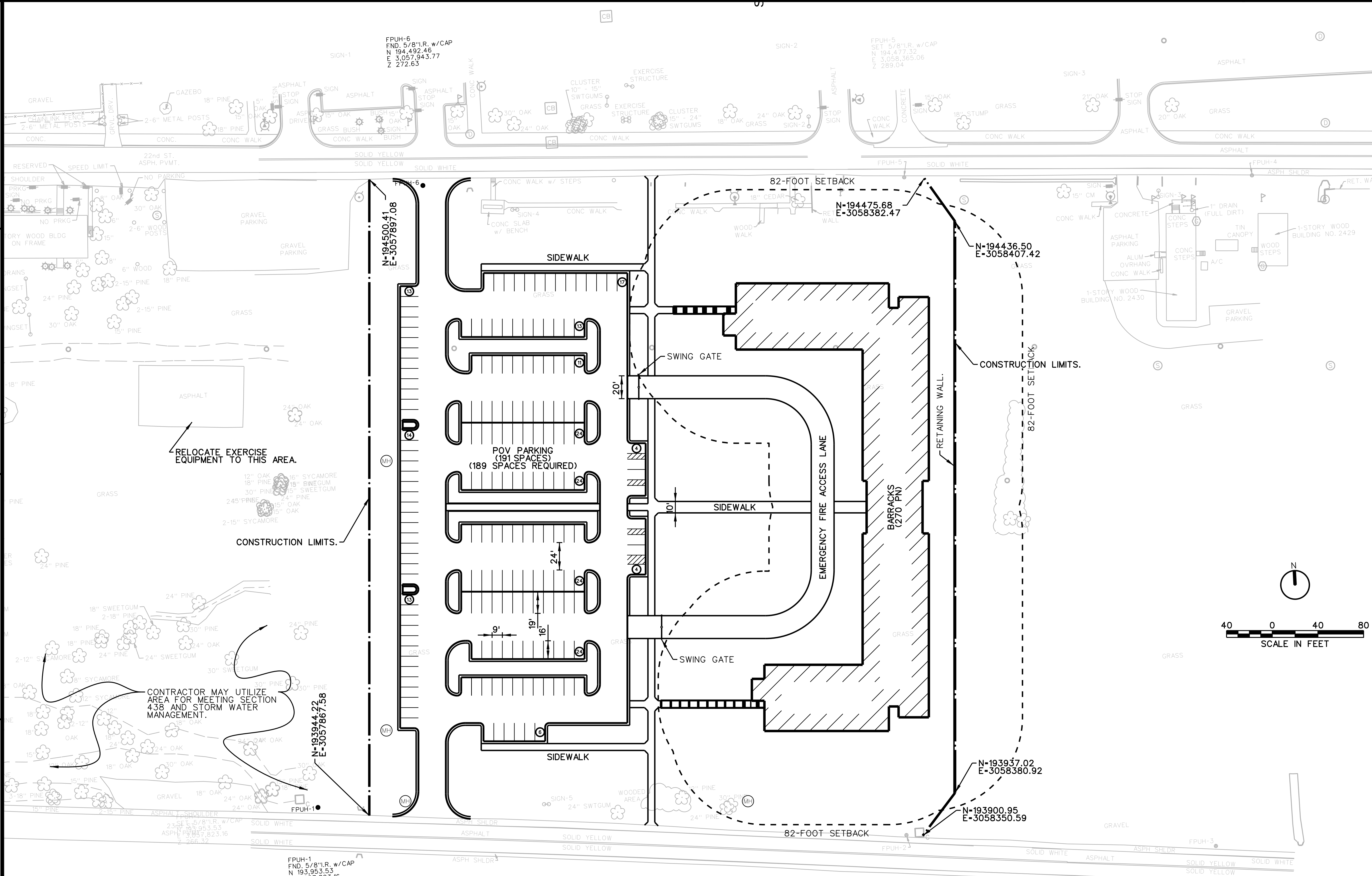

NOTE:

1) CONSTRUCTION SHALL REMAIN WITHIN THE LIMITS SHOWN UNLESS OTHERWISE APPROVED BY DPW THROUGH THE COR. THE USE OF THE LOW LYING AREA AT THE SOUTH WEST CORNER OF THE SITE AND RELOCATION OF THE PHYSICAL FITNESS EQUIPMENT MAY OCCUR OUTSIDE THE CONSTRUCTION LIMITS SHOWN.

US Army Corps of Engineers
Fort Worth District

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS
FORT WORTH, TEXAS

ENGINEERING/CONSTRUCTION DIVISION
ENGINEERING BRANCH

Designed by: R. GUTHMUELLER
Dwn by: R. GUTHMUELLER
Reviewed by: D. DANG
Submitted by: DAVID C. BROWN, P.E. CHIEF, CIVIL SECTION

FORT POLK, LOUISIANA
UNACCOMPANIED ENLISTED PERSONNEL HOUSING
PN: 060130
CONCEPTUAL SITE PLAN
(SITE DEVELOPMENT PLAN)

SHEET SEQUENCE NUMBER
C101

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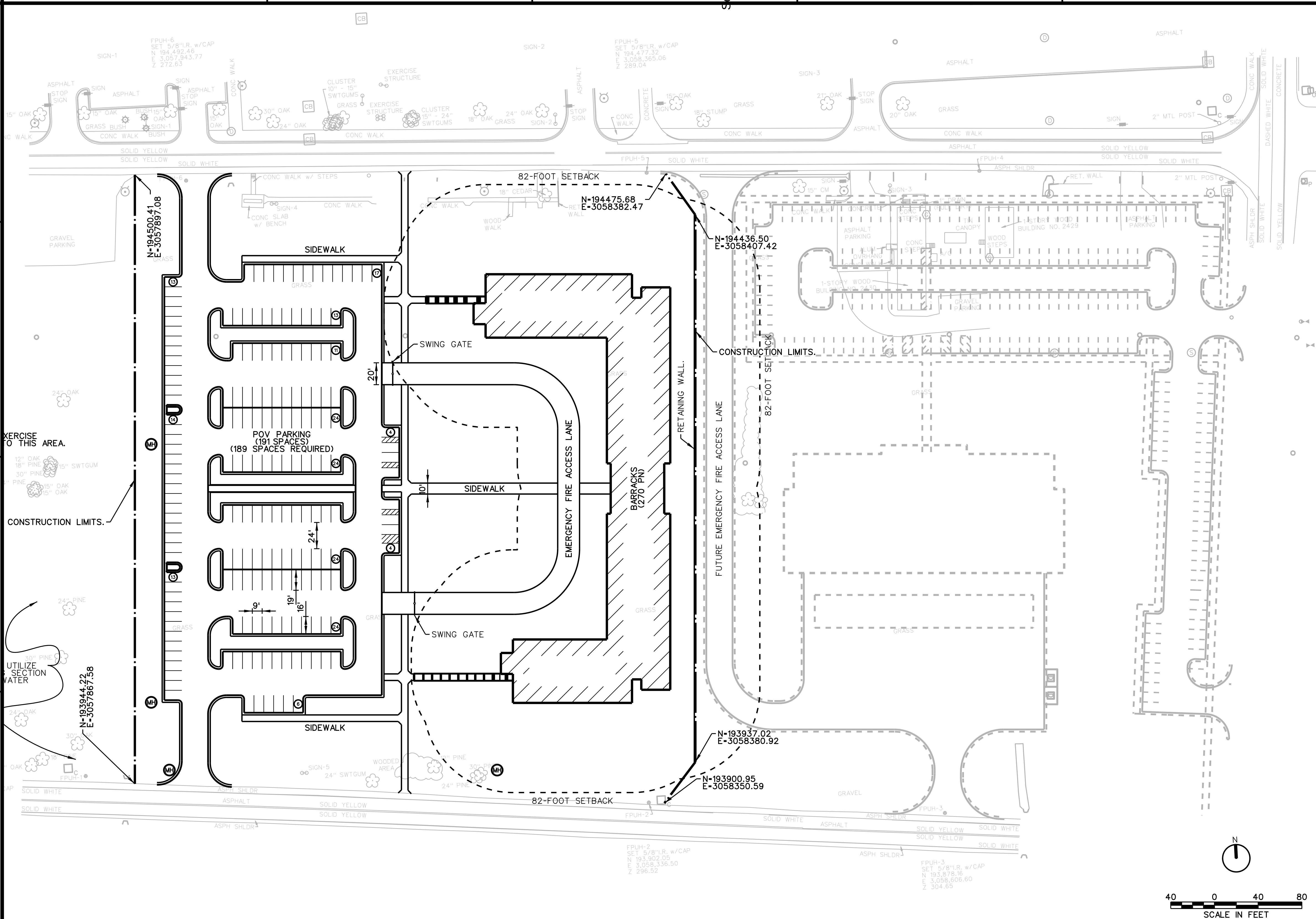
1/25/2011 4:26:48 PM

fp060130-C102.dgn



US Army Corps of Engineers
Fort Worth District

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION ENGINEERING BRANCH

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Dwn by: R. GUTHMUELLER
Reviewed by: D. DANG
Submitted by: DAVID G. BROWN, P.E. CHIEF, CIVIL SECTION

Date: | Rev.
Sol No.
Contr No.

File name: fp060130-C102.dgn
Plot date: 1/25/2011
Plot scale:

FORT POLK, LOUISIANA
UNACCOMPANIED ENLISTED PERSONNEL HOUSING
PN: 060130
SITE LAYOUT
(W/ FUTURE DEVELOPMENT)
(SITE DEVELOPMENT PLAN)

SHEET SEQUENCE NUMBER
C102

Contr No.

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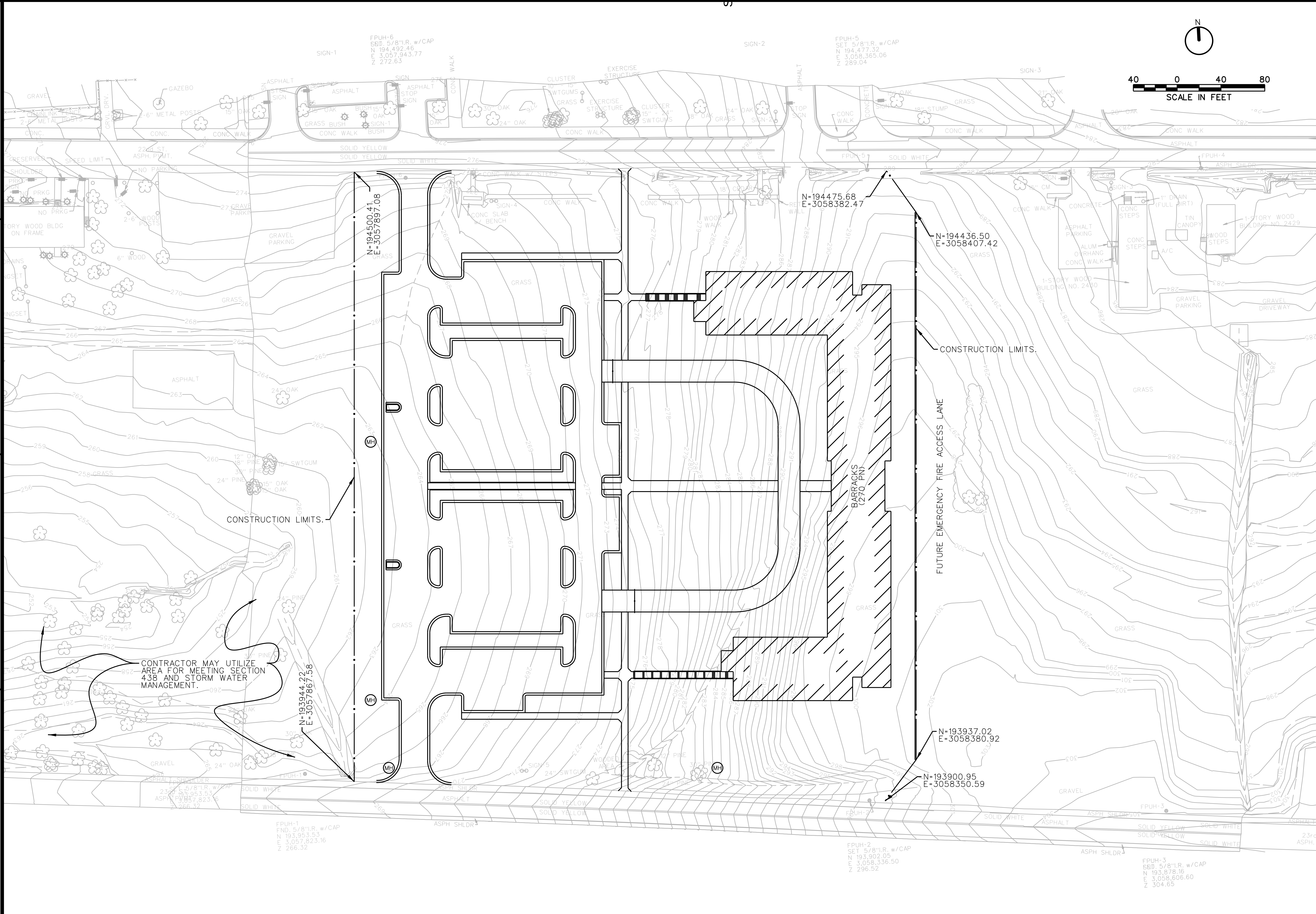

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Reviewed by: D. DANG	Contr No.		
Submitted by: DAVID G. BROWN, P.E. CHIEF, CIVIL SECTION	File name: fp060130-C201.dgn Plot date: 1/25/2011 Plot scale:		

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CORPS OF ENGINEERS
FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION ENGINEERING BRANCH

FORT POLK, LOUISIANA
UNACCOMPANIED ENLISTED PERSONNEL HOUSING
PN: 060130
GRADING PLAN
(EXISTING)
(SITE DEVELOPMENT PLAN)

SHEET SEQUENCE NUMBER
C201

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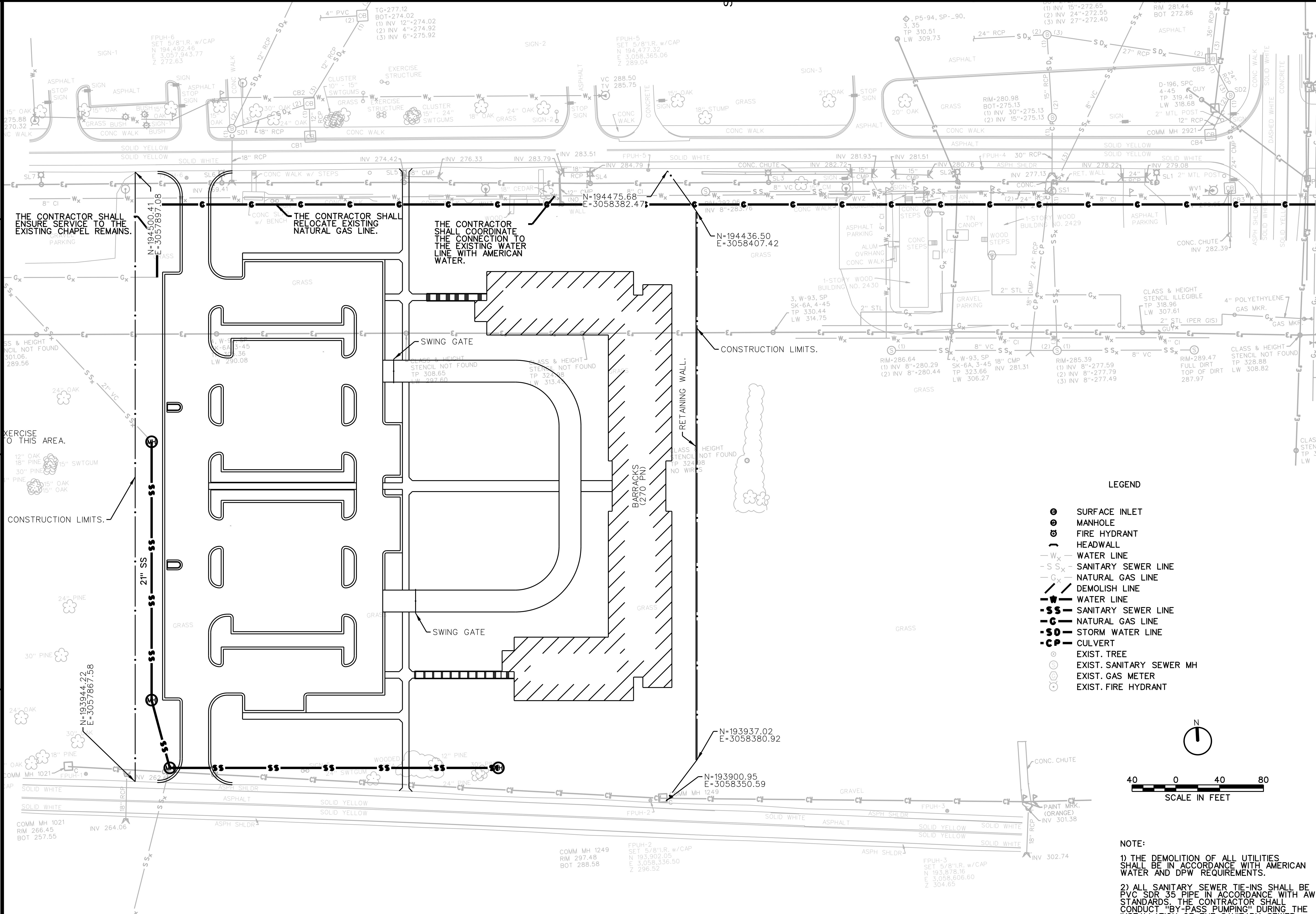

LEGEND

- SURFACE INLET
- MANHOLE
- FIRE HYDRANT
- HEADWALL
- W — WATER LINE
- SS — SANITARY SEWER LINE
- G — NATURAL GAS LINE
- DEMOLISH LINE
- W — WATER LINE
- SS — SANITARY SEWER LINE
- G — NATURAL GAS LINE
- SD — STORM WATER LINE
- CP — CULVERT
- EXIST. TREE
- EXIST. SANITARY SEWER MH
- EXIST. GAS METER
- EXIST. FIRE HYDRANT

NOTE:

1) THE DEMOLITION OF ALL UTILITIES SHALL BE IN ACCORDANCE WITH AMERICAN WATER AND DPW REQUIREMENTS.

2) ALL SANITARY SEWER TIE-INS SHALL BE PVC SDR 35 PIPE IN ACCORDANCE WITH AW STANDARDS. THE CONTRACTOR SHALL CONDUCT "BY-PASS PUMPING" DURING THE INSTALLATION OF THE SANITARY SEWER.

US Army Corps of Engineers
Fort Worth District

Symbol	Description	Tracking No.	Action	Date

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION ENGINEERING BRANCH

Designed by: R. GUTHMUELLER
Dwn by: R. GUTHMUELLER
Reviewed by: D. DANG
Submitted by: DAVID C. BROWN, P.E. CHIEF, CIVIL SECTION

Date: | Sol No. | Contr No. | Rev.

File name: fp060130-C501.dgn
Plot date: 1/25/2011
Plot scale:

FORT POLK, LOUISIANA
UNACCOMPANIED ENLISTED PERSONNEL HOUSING
PN: 060130
UTILITY PLAN
(SITE DEVELOPMENT PLAN)

SHEET SEQUENCE NUMBER
C501

Contr No.

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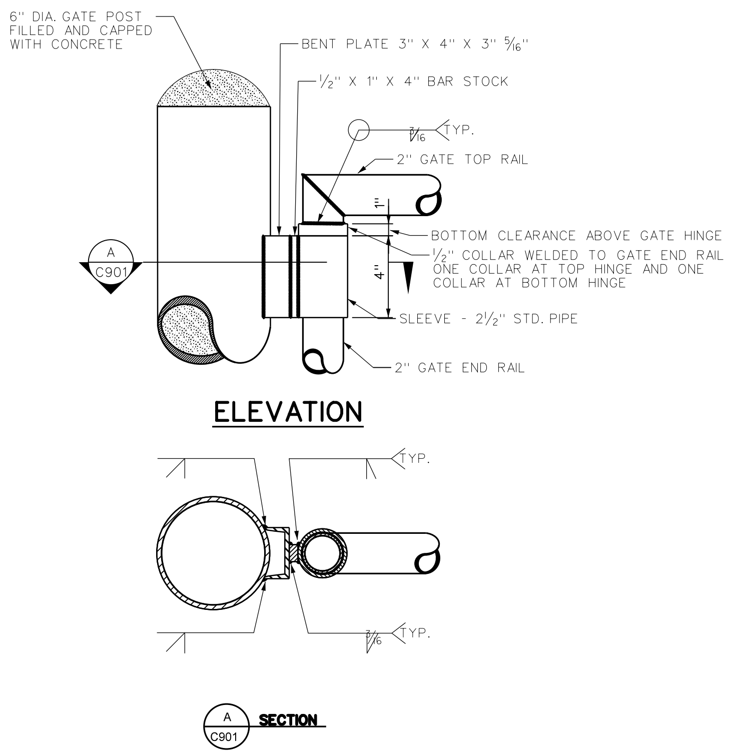
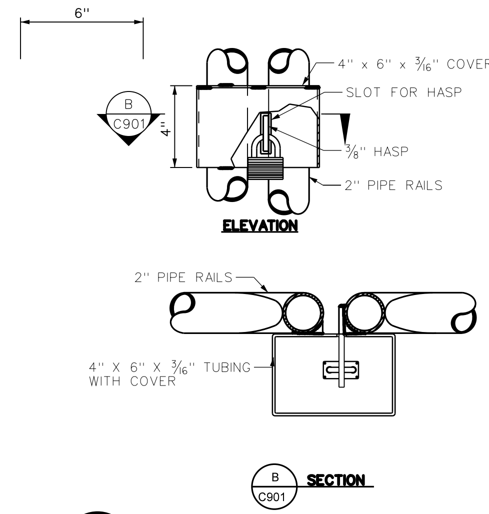
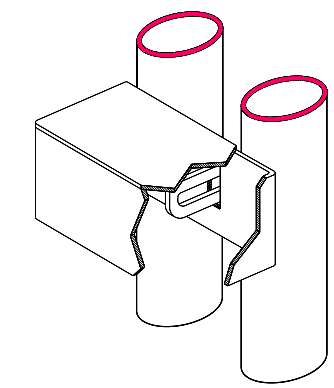


A GATE HINGE DETAILS
NOT TO SCALE

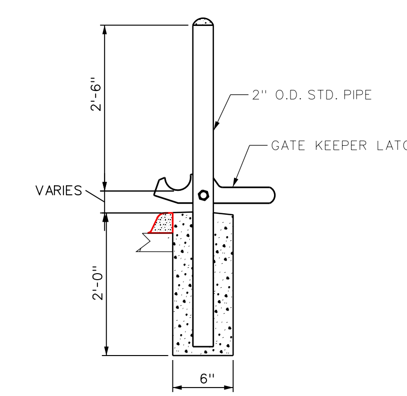


B TAMPER-PROOF LOCK DETAILS
NOT TO SCALE

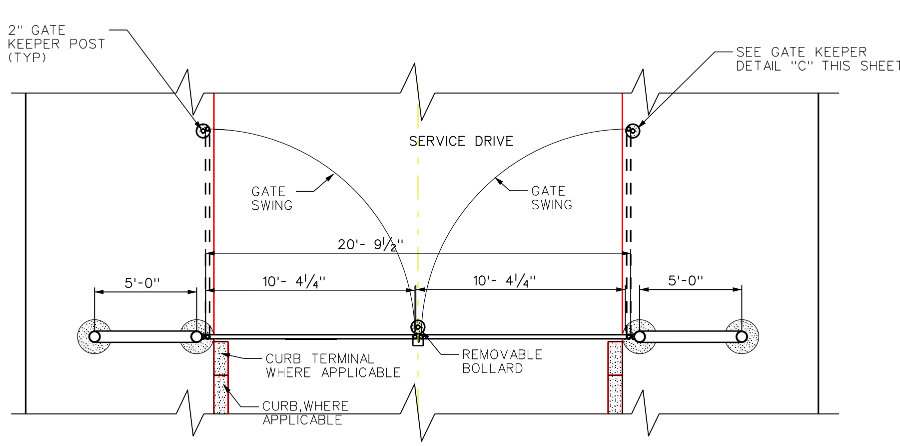


ISOMETRIC VIEW
TAMPER-PROOF LOCK ASSEMBLY
NOT TO SCALE

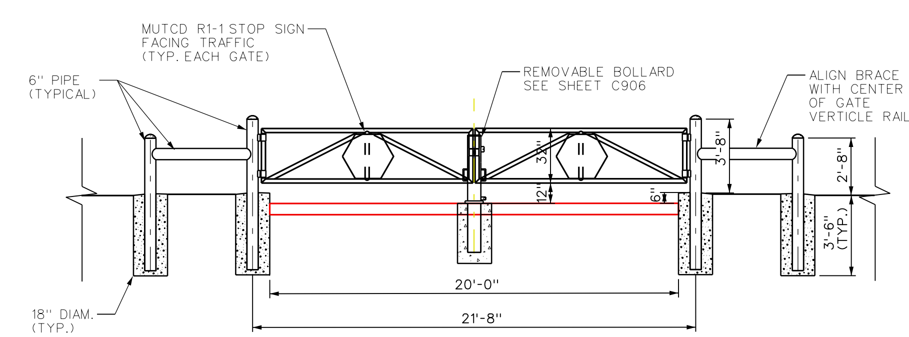
NOTES:
1. ALL PIPES ARE STANDARD WEIGHT PIPES, ASTM A53, GRADE B.
2. OTHER MISCELLANEOUS STEEL SHALL BE ASTM A36.
3. MITER, WELD AND GRIND ALL PIPES JOINTS.
4. GATE, GATE POST AND HARDWARE SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.
5. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF THE GATE ASSEMBLY FOR GOVERNMENT APPROVAL PRIOR TO FABRICATION.
6. WELDING SHALL BE DONE IN ACCORDANCE WITH SPECIFICATION SECTION 05090 - WELDING, STRUCTURAL.



C GATE KEEPER POST DETAIL
NOT TO SCALE



PLAN
20 FOOT TRAFFIC CONTROL GATE DETAILS
NOT TO SCALE



ELEVATION

US Army Corps of Engineers
Fort Worth District

Symbol	Description	Tracking No.	Action	Date

Designed by: | Date: | Rev.
Dwn by: | Sol No.
Reviewed by: | Contr No.
Submitted by: | File name: fp060130-C901.dgn Plot date: 5/13/2010 Plot scale:

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION ENGINEERING BRANCH

FORT POLK, LOUISIANA
UNACCOMPANIED ENLISTED PERSONNEL HOUSING
PN: 060130
SWING GATE DETAIL

Sheet reference number:
C901

Contr No.

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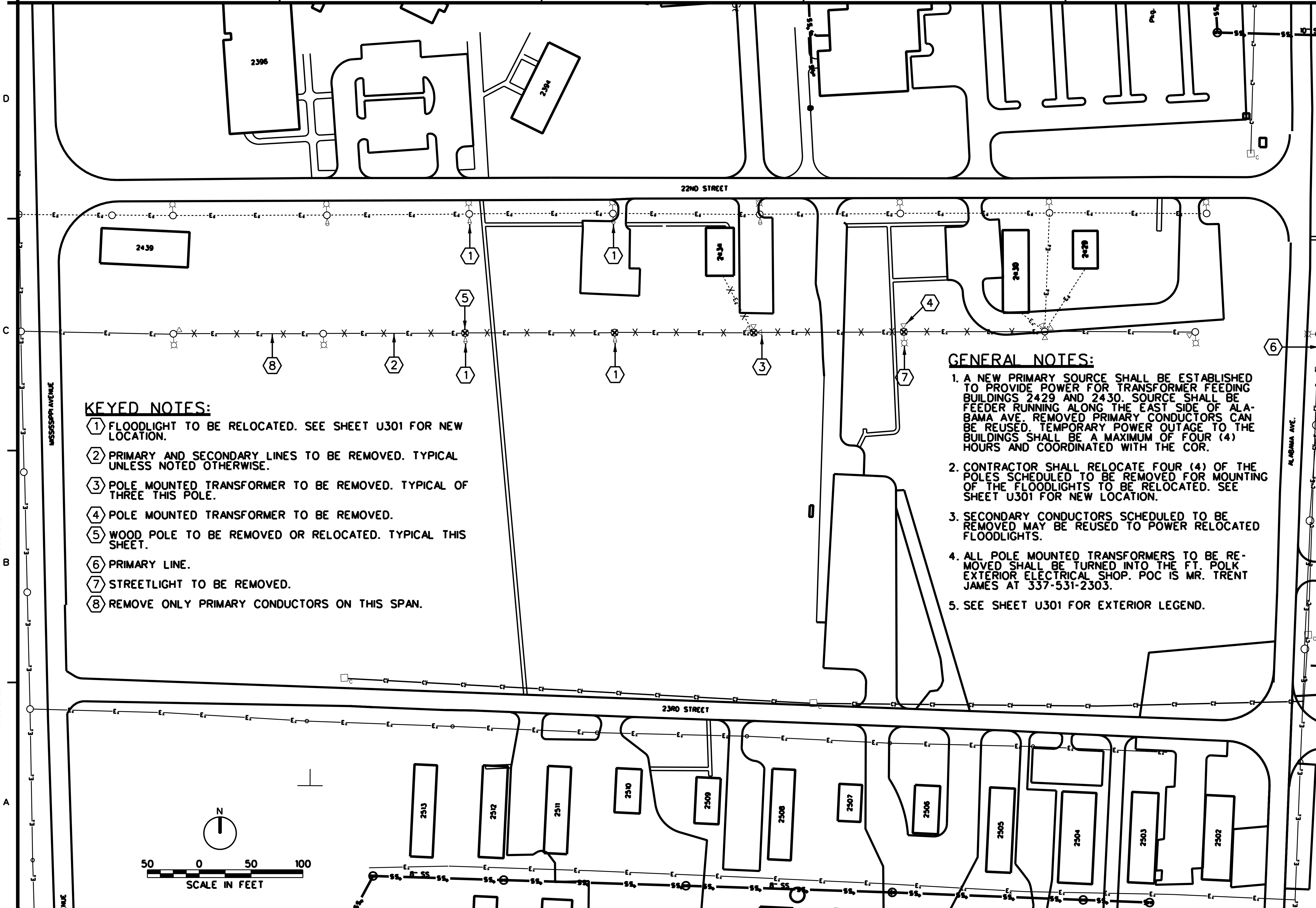
PART II:

Electrical Plans



KEYED NOTES:

1. FLOODLIGHT TO BE RELOCATED. SEE SHEET U301 FOR NEW LOCATION.
2. PRIMARY AND SECONDARY LINES TO BE REMOVED. TYPICAL UNLESS NOTED OTHERWISE.
3. POLE MOUNTED TRANSFORMER TO BE REMOVED. TYPICAL OF THREE THIS POLE.
4. POLE MOUNTED TRANSFORMER TO BE REMOVED.
5. WOOD POLE TO BE REMOVED OR RELOCATED. TYPICAL THIS SHEET.
6. PRIMARY LINE.
7. STREETLIGHT TO BE REMOVED.
8. REMOVE ONLY PRIMARY CONDUCTORS ON THIS SPAN.

GENERAL NOTES:

1. A NEW PRIMARY SOURCE SHALL BE ESTABLISHED TO PROVIDE POWER FOR TRANSFORMER FEEDING BUILDINGS 2429 AND 2430. SOURCE SHALL BE FEEDER RUNNING ALONG THE EAST SIDE OF ALABAMA AVE. REMOVED PRIMARY CONDUCTORS CAN BE REUSED. TEMPORARY POWER OUTAGE TO THE BUILDINGS SHALL BE A MAXIMUM OF FOUR (4) HOURS AND COORDINATED WITH THE COR.
2. CONTRACTOR SHALL RELOCATE FOUR (4) OF THE POLES SCHEDULED TO BE REMOVED FOR MOUNTING OF THE FLOODLIGHTS TO BE RELOCATED. SEE SHEET U301 FOR NEW LOCATION.
3. SECONDARY CONDUCTORS SCHEDULED TO BE REMOVED MAY BE REUSED TO POWER RELOCATED FLOODLIGHTS.
4. ALL POLE MOUNTED TRANSFORMERS TO BE REMOVED SHALL BE TURNED INTO THE FT. POLK EXTERIOR ELECTRICAL SHOP. POC IS MR. TRENT JAMES AT 337-531-2303.
5. SEE SHEET U301 FOR EXTERIOR LEGEND.

US Army Corps of Engineers
Fort Worth District

Designed by: P. GRINDEL, PE
Dwn by: P. GRINDEL, PE
Reviewed by:
Submitted by: JACE D. STORY, CHIEF, ELECTRICAL SECTION

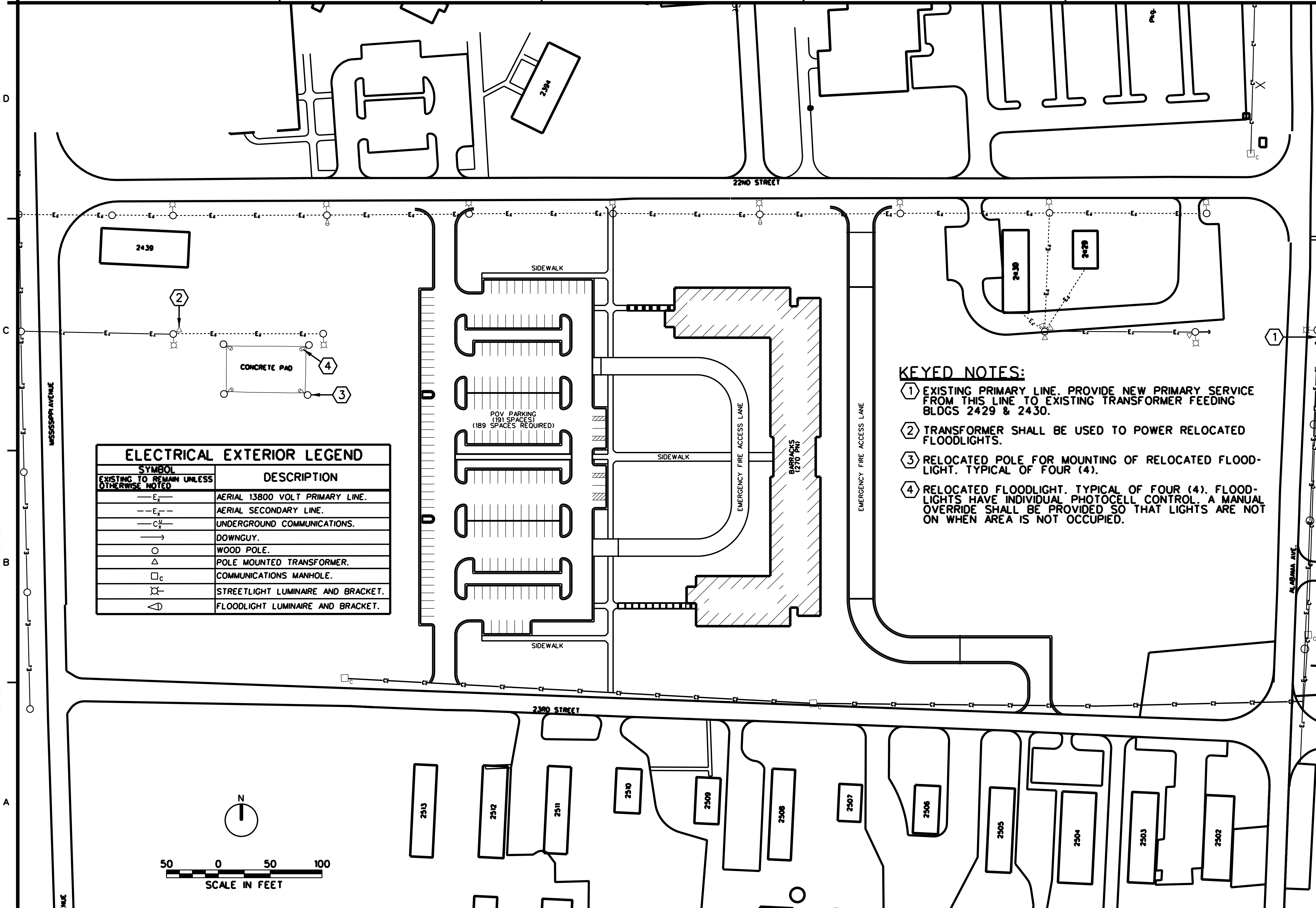
U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS, FORT WORTH, TEXAS

ENGINEERING/CONSTRUCTION DIVISION DESIGN BRANCH

FORT POLK, LOUISIANA
UNACCOMPANIED ENLISTED PERSONNEL HOUSING
PN: 060130

ELECTRICAL DEMOLITION PLAN

Sheet reference number:
U001



ELECTRICAL EXTERIOR LEGEND

SYMBOL EXISTING TO REMAIN UNLESS OTHERWISE NOTED	DESCRIPTION
—E_x—	AERIAL 13800 VOLT PRIMARY LINE.
– –E_x– –	AERIAL SECONDARY LINE.
—C_x^U—	UNDERGROUND COMMUNICATIONS.
⟶	DOWNGUY.
○	WOOD POLE.
△	POLE MOUNTED TRANSFORMER.
□C	COMMUNICATIONS MANHOLE.
☼	STREETLIGHT LUMINAIRE AND BRACKET.
◁	FLOODLIGHT LUMINAIRE AND BRACKET.

KEYED NOTES:

1. EXISTING PRIMARY LINE. PROVIDE NEW PRIMARY SERVICE FROM THIS LINE TO EXISTING TRANSFORMER FEEDING BLDGS 2429 & 2430.
2. TRANSFORMER SHALL BE USED TO POWER RELOCATED FLOODLIGHTS.
3. RELOCATED POLE FOR MOUNTING OF RELOCATED FLOODLIGHT. TYPICAL OF FOUR (4).
4. RELOCATED FLOODLIGHT. TYPICAL OF FOUR (4). FLOODLIGHTS HAVE INDIVIDUAL PHOTOCELL CONTROL. A MANUAL OVERRIDE SHALL BE PROVIDED SO THAT LIGHTS ARE NOT ON WHEN AREA IS NOT OCCUPIED.

US Army Corps of Engineers
Fort Worth District

Designed by: P. GRINDEL, PE
Dwn by: P. GRINDEL, PE
Reviewed by:
Submitted by: GRACE D. STORY CHIEF, ELECTRICAL SECTION

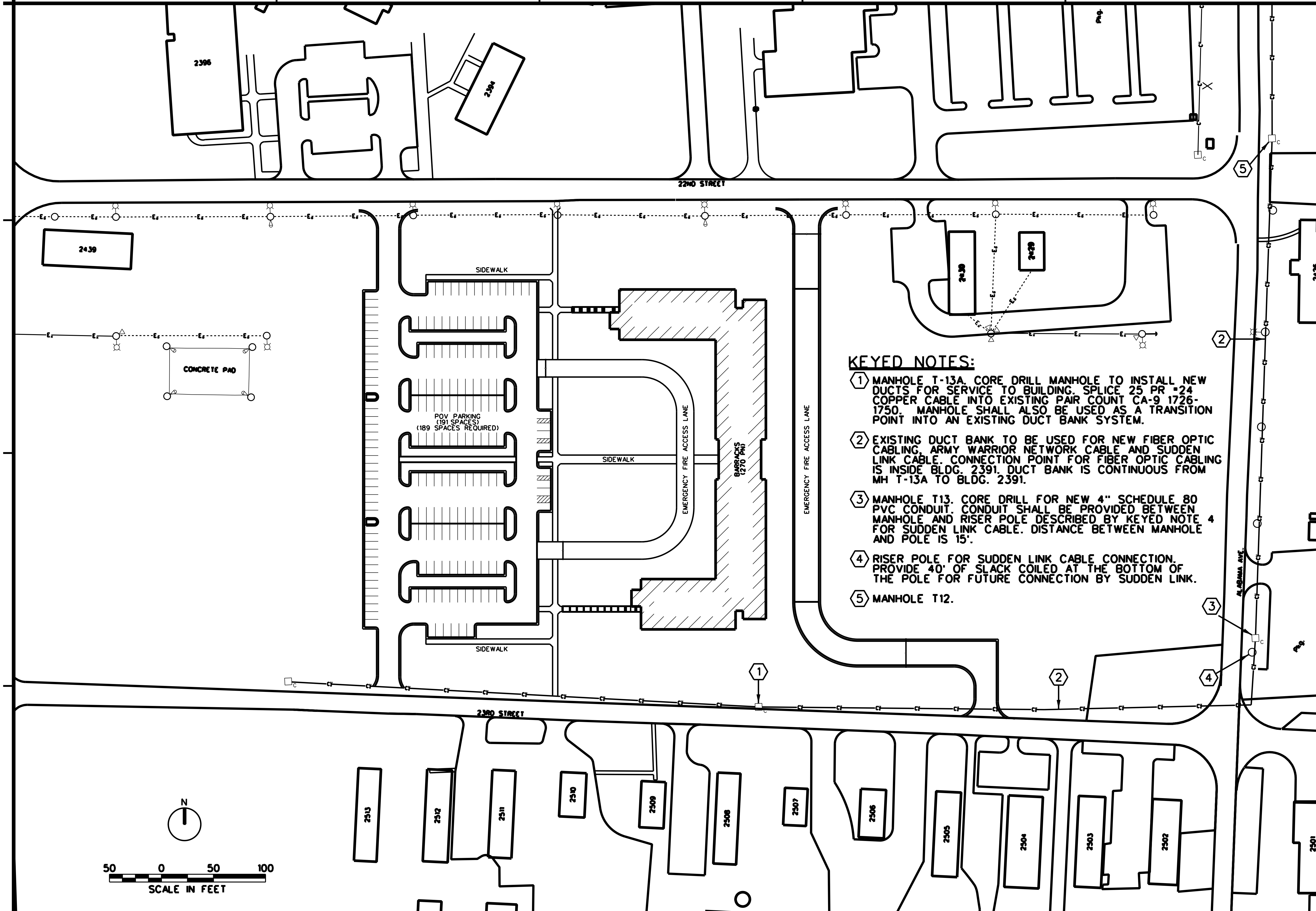
U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION DESIGN BRANCH

FORT POLK, LOUISIANA
UNACCOMPANIED ENLISTED PERSONNEL HOUSING
PN: 060130

ELECTRICAL SITE PLAN

Sheet reference number:
U301



KEYED NOTES:

1. MANHOLE T-13A. CORE DRILL MANHOLE TO INSTALL NEW DUCTS FOR SERVICE TO BUILDING. SPLICE 25 PR #24 COPPER CABLE INTO EXISTING PAIR COUNT CA-9 1726-1750. MANHOLE SHALL ALSO BE USED AS A TRANSITION POINT INTO AN EXISTING DUCT BANK SYSTEM.
2. EXISTING DUCT BANK TO BE USED FOR NEW FIBER OPTIC CABLING, ARMY WARRIOR NETWORK CABLE AND SUDDEN LINK CABLE. CONNECTION POINT FOR FIBER OPTIC CABLING IS INSIDE BLDG. 2391. DUCT BANK IS CONTINUOUS FROM MH T-13A TO BLDG. 2391.
3. MANHOLE T13. CORE DRILL FOR NEW 4" SCHEDULE 80 PVC CONDUIT. CONDUIT SHALL BE PROVIDED BETWEEN MANHOLE AND RISER POLE DESCRIBED BY KEYED NOTE 4 FOR SUDDEN LINK CABLE. DISTANCE BETWEEN MANHOLE AND POLE IS 15'.
4. RISER POLE FOR SUDDEN LINK CABLE CONNECTION. PROVIDE 40' OF SLACK COILED AT THE BOTTOM OF THE POLE FOR FUTURE CONNECTION BY SUDDEN LINK.
5. MANHOLE T12.

US Army Corps of Engineers
Fort Worth District

Symbol

Designed by: P. GRINDEL, PE	Date:	Rev.
Dwn by: P. GRINDEL, PE	Sol No.	
Reviewed by:	Contr No.	
Submitted by: JACK D. STORY, CHIEF, ELECTRICAL SECTION	Plot date: $$date$$ Plot scale:	

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION DESIGN BRANCH

FORT POLK, LOUSIANA
UNACCOMPANIED ENLISTED PERSONNEL HOUSING
PN: 060130

TELECOMMUNICATIONS SITE PLAN

Sheet reference number: U401

Contr No.

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REFERENCE FILES:
$$REFERENCEFILE01$$ … $$REFERENCEFILE14$$

PART III:
Geotechnical Drawings

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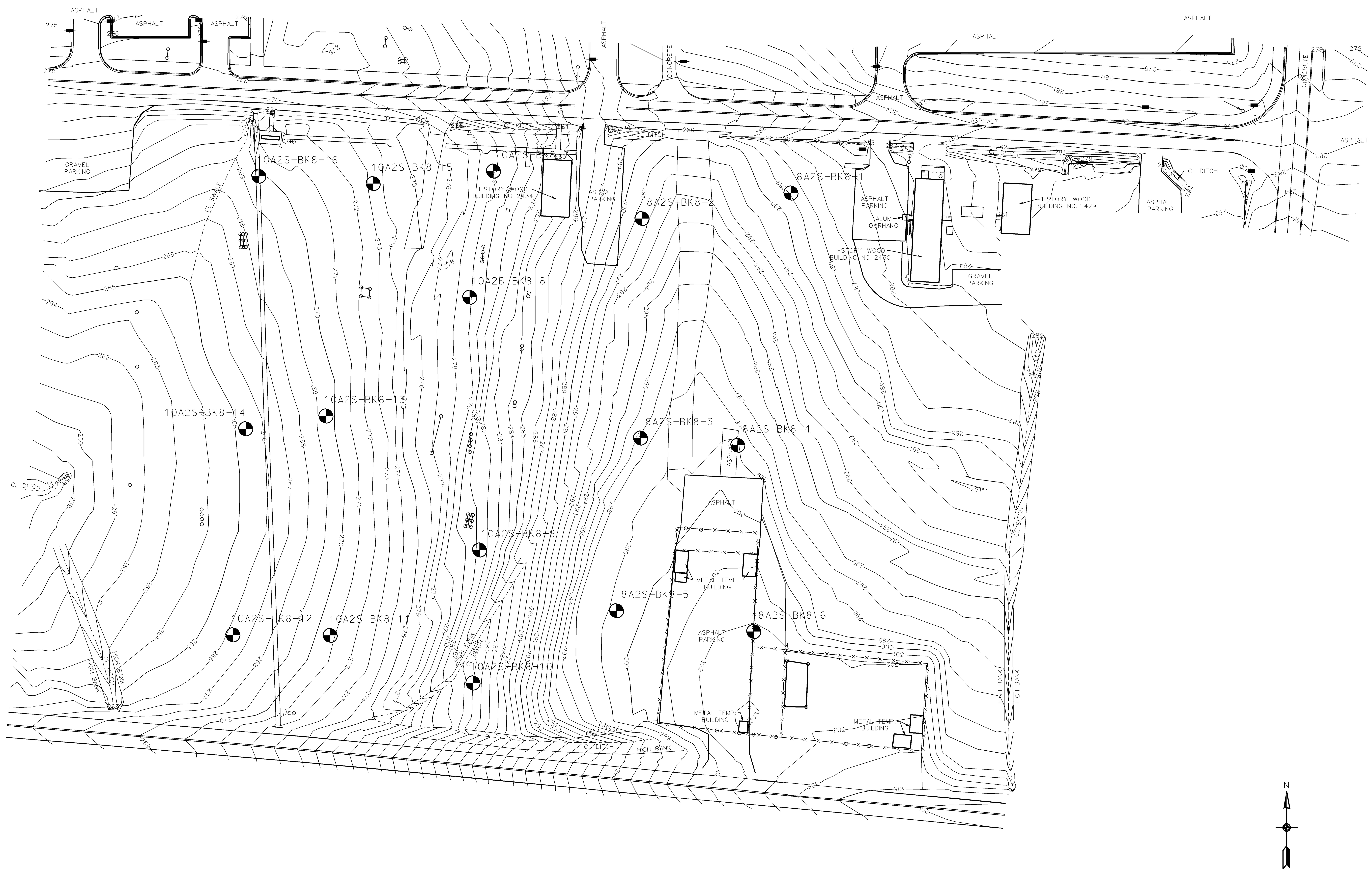

NOTE: THIS SHEET USED FOR BORING LOCATIONS ONLY.

US Army Corps of Engineers
Fort Worth District

Symbol	Description	Date	Approved

Designed by: J. PICKERING
Dwn by: J. PICKERING
Reviewed by: K. McCLESKEY
Submitted by: LESLIE L. PERRIN, P.E. CHIEF, GEOTECHNICAL SECTION
Date:
Sol No.
Contr. No.
File name
Plot date: 3/26/2010
Plot scale:
Rev.

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION ENG. SERVICES BRANCH

FORT POLK, LOUISIANA
ENLISTED UNACCOMPANIED PERSONNEL HOUSING
PN: 060130
BORING LOCATION MAP

Sheet reference number:
B-101

DESIGN FILE: fp-BK8-B101.dgn

Contr No.

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US Army Corps of Engineers
Fort Worth District

DRILLING LOG — Hole No. 8A25-BK8-1

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-1
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	60'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 13 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	12' AFTER 24 HR CAVED @ 15'
16. DATE HOLE	STARTED 09/10/08 / COMPLETED 09/10/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT (a) | DEPTH IN METERS (b) | LEGEND (c) | CLASSIFICATION OF MATERIALS (Description) (d) | % CORE RECOVERY (e) | BOX OR SAMPLE NO. (f) | REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)

% Moisture content (top to bottom): 11.2, 17.2, 32.0, 25.0, 29.7, 33.9, 35.0, 38.8, 32.7, 29.9, 24.9, 24.8, 30.2

Depth scale: 10, 20, 30, 40, 42, 46, 50, 60

Classification of materials:

0'-2' - SAND
SILTY, W/ GRAVEL, LOOSE, MOIST, REDDISH BROWN

2.0'-53.0' - CLAY

2'-13' -
HIGH PLASTICITY, STIFF, MOIST, LIGHT GRAY

13'-18' -
LOW PLASTICITY, STIFF, MOIST, W/SAND, LIGHT GRAY AND TAN

18'-23' -
HIGH PLASTICITY, W/SILTY SAND LAYERS, STIFF, MOIST, LIGHT GRAY AND TAN

23'-28' -
LOW PLASTICITY, SILTY, STIFF, MOIST, TAN AND GRAY

28'-46' -
HIGH PLASTICITY, STIFF, MOIST, LIGHT BROWN, TAN AND GRAY

46'-53' -
LOW PLASTICITY, SANDY, FIRM, WET, REDDISH BROWN, AND GRAY

53'-58' - SAND
SILTY, M. DENSE, WET, REDDISH BROWN, AND GRAY

58'-60' - SILT
SANDY, M. DENSE, WET, LIGHT BROWN, TAN, AND GRAY

Remarks:

GPS - 31^ 01.947" N
093^ 12.593" W

BEGAN ROTARY WASH @ 1.5'

PENETRATION TESTS

DEPTH	BLOW COUNT
0-1.5	3-3-3
3-4.5	3-5-8
8-9.5	4-5-7
13-14.5	9-6-8
18-19.5	5-6-7
23-24.5	5-4-6
28-29.5	3-4-6
33-34.5	3-4-5
38-39.5	6-5-7
43-44.5	3-4-4
48-49.5	4-3-2
53-59.5	6-9-9
58.5-60	3-6-5

DISTURBED SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71 — PROJECT — HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-2

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-2
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	60'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 4 / UNDISTURBED 9
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	10' AFTER 12 DAYS CAVED @ 11'
16. DATE HOLE	STARTED 08/29/08 / COMPLETED 08/29/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% Moisture content (top to bottom): 16.2, 16.2, 14.3, 21.9, 17.2, 22.0, 21.5, 32.7, 27.3

Depth scale: 10, 20, 30, 40, 50, 60

Classification of materials:

0'-19' - CLAY
HIGH PLASTICITY, SANDY, STIFF TO HARD, MOIST, REDDISH BROWN TO TAN AND GRAY, WITH IRON STAINS

19'-21' - SAND
CLAYEY, WET, GRAY, AND TAN

21'-43' - CLAY

21'-33' -
LOW PLASTICITY, SANDY, V. STIFF TO HARD, DAMP, GRAY AND TAN

33'-43' -
HIGH PLASTICITY, V. STIFF TO HARD, DAMP, GRAY TO LIGHT BROWN, WITH IRON STAINS

43'-53' - SAND
SILTY TO WITH SILT, DENSE, WET, LIGHT BROWN TO TAN AND GRAY

53'-60' - CLAY
LOW TO HIGH PLASTICITY, STIFF TO V. STIFF, WET

Remarks:

GPS - 31^ 01.943" N
093^ 12.619" W

AUGERED TO 6", 3', 8', 13', & 18' TO OBTAIN SAMPLES,
BEGAN ROTARY WASH @ 20'.

SHELBY TUBES

DEPTH	PENETROMETER READING
3-5	3.25
8-10	4.50+
13-15	3.75
18-20	3.25
23-25	3.75
28-30	4.50
33-35	4.50
43-45	2.50
58-60	2.25

PENETRATION TESTS

DEPTH	BLOW COUNT
0.5-2	4-6-8
38-39.5	7-9-6
47.5-49	8-14-21
52.5-54	4-5-7

UNDISTURBED SAMPLES SEALED IN TUBES. DISTURBED SAMPLES SEALED IN JARS. ALL SAMPLES LABELED BY BORING NO. AND DEPTH OF SAMPLE.

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71 — PROJECT — HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-3

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-3
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	60'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 14 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	14' AFTER 24 HRS CAVED @ 15'
16. DATE HOLE	STARTED 09/10/08 / COMPLETED 09/10/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

Depth scale: 10, 20, 30, 40, 50, 60

Legend: VISUAL

Classification of materials:

0'-1' - SAND
SILTY, M. DENSE, DAMP, LIGHT BROWN

1'-47' - CLAY
HIGH PLASTICITY, STIFF TO V. STIFF, MOIST LIGHT GRAY AND TAN, WITH LAYERS OF LOW PLASTICITY CLAY

47'-55' - SAND
SILTY, M. DENSE, WET, GRAY AND REDDISH BROWN

55'-60' - CLAY
HIGH PLASTICITY, SANDY, STIFF, MOIST, GRAY, WITH SAND LAYERS

Remarks:

GPS - 31^ 01.910 N
093^ 12.619 W

BEGAN ROTARY WASH @ 1.5'

PENETRATION TESTS

DEPTH	BLOW COUNT
0-1.5	4-4-7
3-4.5	5-4-5
8-9.5	5-5-9
13-14.5	6-6-9
18-19.5	9-10-12
23-24.5	4-6-8
28-29.5	5-5-8
33-34.5	4-6-7
38-39.5	4-5-8
43-44.5	7-8-11
48-49.5	3-2-3
52-53.5	6-9-12
56-57.5	4-4-6
58.5-60	7-7-7

DISTURBED SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71 — PROJECT — HOLE NO.

NOTES:

1. USE THIS SHEET FOR BORING LOGS ONLY.
2. MOISTURE CONTENT, WHERE SHOWN, IS EXPRESSED AS PERCENT DRY WEIGHT AT TIME OF LABORATORY CLASSIFICATION.
3. LEGEND SHOWS OVERBURDEN MATERIALS CLASSIFIED ACCORDING TO ASTM D 2487 AND ASTM D 2488.
4. DESCRIPTION OF OVERBURDEN MATERIALS CHANGED TO CORRESPOND WITH LABORATORY CLASSIFICATION AS NECESSARY.
5. ORIGINAL DRILLING LOGS AVAILABLE AT CORPS OF ENGINEERS OFFICES.

Symbol | Description | Date | Rev.

Designed by: J. PICKERING | Date: | Rev.
Dwn by: J. PICKERING | Sol No.
Reviewed by: K. McCLESKEY | Contr No.
Submitted by: LESLIE L. PERRIN, P.E. CHIEF, GEOTECHNICAL SECTION | File name: | Plot date: 3/26/2010 | Plot scale:

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION ENG. SERVICES BRANCH

FORT POLK, LOUISIANA
ENLISTED UNACCOMPANIED PERSONNEL HOUSING
PN: 060130

LOGS OF BORINGS - 1 OF 4

Sheet reference number: B201

DESIGN FILE: fp-BK8-B201.dgn

Contr No.

REFERENCE FILES: N:\fp\bk8\Civil\Drawings\Geotechnical\fp-BK8-lbmdl.dgn \\SWF-FS\FBGIS\userdirs\GEOTECHNICAL SECTION\McCleskey_K\Military Jobs\FDAs - Backup Copy\F & P DAs\Army\Fort Polk\BK8\CADD\fp-BK8-tb.dgn

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US Army Corps of Engineers
Fort Worth District

Hole No.

DRILLING LOG	DIVISION SOUTHWESTERN	INSTALLATION FT. WORTH DISTRICT	SHEET 1 OF 1 SHEETS
1. PROJECT EUPH BARRACKS (FY11)		10. SIZE AND TYPE OF BIT 6" ROTARY WASH	
2. LOCATION (Coordinates or Station) FORT POLK, LA		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NONE GIVEN	
3. DRILLING AGENCY GEOTECHNICAL TESTING LABORATORY, INC.		12. MANUFACTURER'S DESIGNATION OF DRILL DIETRICH D-50	
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-4	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 5 / UNDISTURBED 9
5. NAME OF DRILLER ROBERT LEGGETT		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER 11' AFTER 24 HR CAVED @ 16'	
		16. DATE HOLE	STARTED 09/9/08 / COMPLETED 09/9/08
7. THICKNESS OF OVERBURDEN N/A		17. ELEVATION TOP OF HOLE NONE AVAILABLE	
8. DEPTH DRILLED INTO ROCK N/A		18. TOTAL CORE RECOVERY FOR BORING N/A %	
9. TOTAL DEPTH OF HOLE 60'		19. SIGNATURE OF INSPECTOR N.J. GORSHA	

% MOISTURE CONTENT (a) | DEPTH IN METERS (b) | LEGEND (c) | CLASSIFICATION OF MATERIALS (Description) (d) | % CORE RECOVERY (e) | BOX OR SAMPLE NO. (f) | REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)

% Moisture content: 10.4, 17.3, 21.8, 18.1, 17.1, 30.9, 27.1, 19.2, 36.6, 31.9, 21.2, 22.0, 27.7, 23.1

Depth in meters: 10, 20, 30, 40, 50, 60

Classification of materials:

0'-3.5' - SAND

0'-1.5' -
SILTY, LOOSE, MOIST, LIGHT BROWN & TAN

1.5'-6' -
CLAYEY, LOOSE, MOIST, REDDISH BROWN AND GRAY

3.5'-13' - CLAY
HIGH PLASTICITY, SANDY, V. STIFF, MOIST, REDDISH BROWN & TAN

13'-17' - SAND
CLAYEY, MOIST, REDDISH BROWN & TAN

17'-23' - CLAY
LOW PLASTICITY, MOIST, HARD, GRAY & TAN

23'-46' - CLAY
HIGH PLASTICITY, V. STIFF TO HARD, MOIST, GRAY & TAN

46'-56' - SAND
SILTY TO POORLY GRADED, M. DENSE TO LOOSE, WET, REDDISH TAN TO TAN & GRAY

56'-60' - CLAY
LOW PLASTICITY, SANDY, FIRM, WET, REDDISH TAN & REDDISH BROWN

Remarks:

GPS - 31^ 01.909" N
093^ 12.602" W

BEGAN ROTARY WASH @ 1.5'

PENETRATION TESTS

DEPTH	BLOW COUNT
0-1.5	2-3-3
48-49.5	7-7-5
52-53.5	6-3-4
56-57.5	3-3-2
58.5-60	3-3-3

SHELBY TUBES

DEPTH	PENETROMETER READING
4-6	3.75
8-10	4.25
13-15	4.50+
18-20	4.50+
23-25	4.50+
28-30	3.00
33-35	3.75
38-40	3.50
43-45	2.00

UNDISTURBED SAMPLES SEALED IN TUBES. DISTURBED SAMPLES SEALED IN JARS. ALL SAMPLES LABELED BY BORING NO. AND DEPTH OF SAMPLE.

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. | PROJECT | HOLE NO.
MAR 71

Hole No.

DRILLING LOG	DIVISION SOUTHWESTERN	INSTALLATION FT. WORTH DISTRICT	SHEET 1 OF 1 SHEETS
1. PROJECT EUPH BARRACKS (FY11)		10. SIZE AND TYPE OF BIT 6" ROTARY WASH	
2. LOCATION (Coordinates or Station) FORT POLK, LA		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NONE GIVEN	
3. DRILLING AGENCY GEOTECHNICAL TESTING LABORATORY, INC.		12. MANUFACTURER'S DESIGNATION OF DRILL DIETRICH D-50	
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-5	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 6 / UNDISTURBED 7
5. NAME OF DRILLER ROBERT LEGGETT		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER 11' AFTER 24 HRS CAVED @ 13'	
		16. DATE HOLE	STARTED 9/9/08 / COMPLETED 9/9/08
7. THICKNESS OF OVERBURDEN N/A		17. ELEVATION TOP OF HOLE NONE AVAILABLE	
8. DEPTH DRILLED INTO ROCK N/A		18. TOTAL CORE RECOVERY FOR BORING N/A %	
9. TOTAL DEPTH OF HOLE 60'		19. SIGNATURE OF INSPECTOR N.J. GORSHA	

% MOISTURE CONTENT (a) | DEPTH IN METERS (b) | LEGEND (c) | CLASSIFICATION OF MATERIALS (Description) (d) | % CORE RECOVERY (e) | BOX OR SAMPLE NO. (f) | REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)

Depth in meters: 10, 20, 30, 40, 50, 60

Legend: VISUAL

Classification of materials:

0'-0.5' - SAND
LOAM, DRY, GRAY, W/ ROOTS

0.5'-4' - SAND
CLAYEY, LOOSE, MOIST YELLOWISH BROWN

4'-6' - CLAY
LOW PLASTICITY, SANDY, MOIST, YELLOWISH BROWN& GRAY

6'-13' - SAND
CLAYEY, LOOSE, DAMP, YELLOWISH BROWN

13'-32' - CLAY
HIGH PLASTICITY, STIFF TO V. STIFF, MOIST, LIGHT GRAY & TAN, W/ LAYERS OF LOW PLASTICITY CLAY

32'-53' - CLAY
LOW PLASTICITY, SANDY, STIFF, MOIST, GRAY & REDDISH BROWN

53'-60' - SAND
SILTY, DENSE, WET, GRAY & REDDISH BROWNS, W/ HIGH PLASTICITY CLAY LAYERS

Remarks:

GPS - 31^ 01.884" N
093^ 12.623" W

BEGAN ROTARY WASH @ 1.5'

PENETRATION TESTS

DEPTH	BLOW COUNT
0-1.5	2-2-3
13.5-15	3-3-5
33-34.5	6-5-4
37-38.5	3-5-7
53-54.5	9-16-20
58.5-60	11-19-25

SHELBY TUBES

DEPTH	PENETROMETER READING
4-6	4.5
9-11	0.5
18-20	3.75
23-25	NO REC.
28-30	2.75
43-45	1.75
48-50	1.50

UNDISTURBED SAMPLES SEALED IN TUBES. DISTURBED SAMPLES SEALED IN JARS. ALL SAMPLES LABELED BY BORING NO. AND DEPTH OF SAMPLE.

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. | PROJECT | HOLE NO.
MAR 71

Hole No.

DRILLING LOG	DIVISION SOUTHWESTERN	INSTALLATION FT. WORTH DISTRICT	SHEET 1 OF 1 SHEETS
1. PROJECT EUPH BARRACKS (FY11)		10. SIZE AND TYPE OF BIT 6" ROTARY WASH	
2. LOCATION (Coordinates or Station) FORT POLK, LA		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NONE GIVEN	
3. DRILLING AGENCY GEOTECHNICAL TESTING LABORATORY, INC.		12. MANUFACTURER'S DESIGNATION OF DRILL DIETRICH D-50	
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-6	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 7 / UNDISTURBED 7
5. NAME OF DRILLER ROBERT LEGGETT		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER 11' AFTER 24 HRS CAVED @ 17'	
		16. DATE HOLE	STARTED 9/9/08 / COMPLETED 9/9/08
7. THICKNESS OF OVERBURDEN N/A		17. ELEVATION TOP OF HOLE NONE AVAILABLE	
8. DEPTH DRILLED INTO ROCK N/A		18. TOTAL CORE RECOVERY FOR BORING N/A %	
9. TOTAL DEPTH OF HOLE 60'		19. SIGNATURE OF INSPECTOR N.J. GORSHA	

% MOISTURE CONTENT (a) | DEPTH IN METERS (b) | LEGEND (c) | CLASSIFICATION OF MATERIALS (Description) (d) | % CORE RECOVERY (e) | BOX OR SAMPLE NO. (f) | REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)

% Moisture content: 23.1

Depth in meters: 10, 20, 30, 40, 50, 60

Legend: VISUAL; SM; VISUAL

Classification of materials:

0'-0.67' -
2.5" ASPHALTIC CONCRETE OVER 6" SOIL - CEMENT

0.67'-14' - SAND
CLAYEY, DENSE TO M. DENSE, DAMP, REDDISH BROWN AND TAN, WITH OCCASIONAL SILT LAYERS

14'-19' - CLAY
HIGH PLASTICITY, WITH SAND, STIFF TO V. STIFF, MOIST, LIGHT GRAY AND TAN, WITH LEAN CLAY LAYERS

19'-21' - SAND
SILTY, DAMP, GRAY AND TAN

21'-34' - CLAY
HIGH PLASTICITY, WITH SAND, V. STIFF, MOIST, LIGHT GRAY AND TAN, WITH LEAN CLAY LAYERS

34'-44' - SAND
MEDIUM DENSE, DAMP, GRAY AND REDDISH BROWN

44'-60' - CLAY
LOW PLASTICITY, SANDY, STIFF TO V. STIFF, MOIST, GRAY AND REDDISH BROWN, WITH SILTY SAND LAYERS

Remarks:

GPS - 31^ 01.881" N
093^ 12.599" W

BEGAN ROTARY WASH @ 1.5'

PENETRATION TESTS

DEPTH	BLOW COUNT
4-5.5	8-13-18
9-10.5	8-8-9
13-14.5	4-5-8
37-38.5	9-12-17
41-42.5	9-9-12
55-56.5	10-13-15
58.5-60	7-9-9

SHELBY TUBES

DEPTH	PENETROMETER READING
1-3	4.50
18-20	3.50
23-25	2.00
28-30	2.50
33-35	0.50
45-47	3.50
50-52	1.25

UNDISTURBED SAMPLES SEALED IN TUBES. DISTURBED SAMPLES SEALED IN JARS. ALL SAMPLES LABELED BY BORING NO. AND DEPTH OF SAMPLE.

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. | PROJECT | HOLE NO.
MAR 71

NOTES:

1. USE THIS SHEET FOR BORING LOGS ONLY.
2. MOISTURE CONTENT, WHERE SHOWN, IS EXPRESSED AS PERCENT DRY WEIGHT AT TIME OF LABORATORY CLASSIFICATION.
3. LEGEND SHOWS OVERBURDEN MATERIALS CLASSIFIED ACCORDING TO ASTM D 2487 AND ASTM D 2488.
4. DESCRIPTION OF OVERBURDEN MATERIALS CHANGED TO CORRESPOND WITH LABORATORY CLASSIFICATION AS NECESSARY.
5. ORIGINAL DRILLING LOGS AVAILABLE AT CORPS OF ENGINEERS OFFICES.

Symbol	Description	Date	Rev.

Designed by: J. PICKERING	Date:	Rev.
Dwn by: J. PICKERING	Sol No.	
Reviewed by: K. McCLESKEY	Contr No.	
Submitted by: LESLIE L. PERRIN, P.E. CHIEF, GEOTECHNICAL SECTION	File name: Plot date: 3/26/2010 Plot scale:	

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION ENG. SERVICES BRANCH

FORT POLK, LOUISIANA
ENLISTED UNACCOMPANIED PERSONNEL HOUSING
PN: 060130

LOGS OF BORINGS - 2 OF 4

Sheet reference number: B202

DESIGN FILE: fp-BK8-B202.dgn

Contr No.

REFERENCE FILES:
N:\fp\bk8\Civil\Drawings\Geotechnical\fp-BK8-Bbndl.dgn
K:\GEOTECHNICAL SECTION\McCleskey_K\Military Jobs\FDAs - Backup Copy\F & P DAs\Army\Fort Polk\BK8\CADD\fp-BK8-tb.dgn

11:00:07 AM 3/26/2010 fp-BK8-B203.dgn

DRILLING LOG — Hole No. 8A25-BK8-7

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-7
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	10'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 3; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	NONE ENCOUNTERED
16. DATE HOLE	STARTED 8/27/08; COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT (a)	DEPTH IN METERS (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
13.0	2		0'-3' – SAND SILTY, LOOSE, DAMP, BROWN, ROOTS IN UPPER 6"			GPS – 31° 01.950 N 093° 12.645 W
30.0	4		3'-10' – CLAY HIGH PLASTICITY, FIRM TO STIFF, MOIST, LIGHT GRAY, W/ IRON STAINS			AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS
24.5	6, 8, 10					PENETRATION TESTS: DEPTH / BLOW COUNT: 0.5-2 3-5-4; 4.5-6 2-2-3; 8.5-10 4-5-7. ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-8

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-8
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	10'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 3; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	NONE ENCOUNTERED
16. DATE HOLE	STARTED 8/27/08; COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT (a)	DEPTH IN METERS (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
10.9	2		0'-2' – SAND CLAYEY, M. DENSE, DRY, LIGHT BROWN			GPS – 31° 01.931 N 093° 12.649 W
24.2	4		2'-10' – CLAY HIGH PLASTICITY, FIRM TO STIFF, MOIST, LIGHT GRAY, W/ IRON STAINS & OCCASIONAL LOW PLASTICITY CLAY LAYERS			AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS
26.3	6, 8, 10					PENETRATION TESTS: DEPTH / BLOW COUNT: 0.5-2 3-4-8; 4.5-6 2-3-4; 8.5-10 4-4-6. ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-9

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-9
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	10'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 3; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	NONE ENCOUNTERED
16. DATE HOLE	STARTED 8/27/08; COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT (a)	DEPTH IN METERS (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
14.5	2		0'-1.5' – SAND CLAYEY, M. DENSE, DRY LIGHT BROWN			GPS – 31° 01.893 N 093° 12.647 W
31.0	4		1.5'-10' – CLAY HIGH PLASTICITY, FIRM TO STIFF, MOIST, LIGHT GRAY, W/ IRON STAINS & OCCASIONAL LOW PLASTICITY CLAY LAYERS			AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS
28.6	6, 8, 10					PENETRATION TESTS: DEPTH / BLOW COUNT: 0.5-2 3-5-5; 4.5-6 3-2-4; 8.5-10 4-6-5. ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-10

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-10
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	10'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 3; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	NONE ENCOUNTERED
16. DATE HOLE	STARTED 8/27/08; COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT (a)	DEPTH IN METERS (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
9.2	2		0'-3' – SAND SILTY, M. DENSE, DRY, GRAYISH, BROWN, W/ROOTS IN TOP 6"			GPS – 31° 01.873 N 093° 12.648 W
14.7	4		3'-10' – CLAY HIGH PLASTICITY, STIFF, LIGHT GRAY TO TAN, W/ IRON STAINS & OCCASIONAL LOW PLASTICITY CLAY LAYERS			AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS
31.4	6, 8, 10					PENETRATION TESTS: DEPTH / BLOW COUNT: 0.5-2 4-7-7; 4.5-6 4-7-6; 8.5-10 3-5-5. ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-11

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-11
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	10'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 3; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	NONE ENCOUNTERED
16. DATE HOLE	STARTED 8/27/08; COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT (a)	DEPTH IN METERS (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
9.2	2		0'-1' – SAND SILTY, LOOSE, DRY BROWN, W/GRAVEL AND ROOTS IN TOP 6"			GPS – 31° 01.880 N 093° 12.673 W
28.8	4		1'-10' – CLAY HIGH PLASTICITY, FIRM, MOIST, LIGHT GRAY, W/ SAND & IRON STAINS AND OCCASIONAL LOW PLASTICITY CLAY LAYERS			AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS
32.0	6, 8, 10					PENETRATION TESTS: DEPTH / BLOW COUNT: 0.5-2 3-4-6; 4.5-6 1-2-2; 8.5-10 2-3-5. ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

DRILLING LOG — Hole No. 8A25-BK8-12

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-12
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	10'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 3; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	8.5' AFTER 48 HRS
16. DATE HOLE	STARTED 8/27/08; COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT (a)	DEPTH IN METERS (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
13.8	2		0'-10' – SAND SILTY, LOOSE TO M. DENSE, DAMP, BROWN, LIGHT GRAY AND TAN, W/ ROOTS IN TOP 6"			GPS – 31° 01.880 N 093° 12.690 W
14.6	4					AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS
19.2	6, 8, 10					PENETRATION TESTS: DEPTH / BLOW COUNT: 0.5-2 2-4-3; 4.5-6 3-4-6; 8.5-10 2-3-5. ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

NOTES:

1. USE THIS SHEET FOR BORING LOGS ONLY.
2. MOISTURE CONTENT, WHERE SHOWN, IS EXPRESSED AS PERCENT DRY WEIGHT AT TIME OF LABORATORY CLASSIFICATION.
3. LEGEND SHOWS OVERBURDEN MATERIALS CLASSIFIED ACCORDING TO ASTM D 2487 AND ASTM D 2488.
4. DESCRIPTION OF OVERBURDEN MATERIALS CHANGED TO CORRESPOND WITH LABORATORY CLASSIFICATION AS NECESSARY.
5. ORIGINAL DRILLING LOGS AVAILABLE AT CORPS OF ENGINEERS OFFICES.

US Army Corps of Engineers
Fort Worth District

Symbol | Description | Date | Approved | Rev.

Designed by: J. PICKERING
Dwn by: J. PICKERING
Reviewed by: K. McCLESKEY
Submitted by: LESLIE L. PERRIN, P.E. CHIEF, GEOTECHNICAL SECTION
Date: | Sol No. | Contr No.
File name | Plot date: 3/26/2010 | Plot scale:

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS
ENGINEERING/ CONSTRUCTION DIVISION ENG. SERVICES BRANCH

FORT POLK, LOUISIANA
ENLISTED UNACCOMPANIED PERSONNEL HOUSING
PN: 060130
LOGS OF BORINGS - 3 OF 4

Sheet reference number: B203

DESIGN FILE: fp-BK8-B203.dgn
Contr No.

REFERENCE FILES:
PW_WORKDIR:dms06609\fp-BK8-tbmdl.dgn
K:\GEOTECHNICAL SECTION\McCleskey_K\Military Jobs\FDAs - Backup Copy\F & P DAs\Army\Fort Polk\BK8\CADD\fp-BK8-tb.dgn

11:12:58 AM 3/26/2010 fp-BK8-B204.dgn

Hole No.

DRILLING LOG

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-13
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	10'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 3 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	NONE ENCOUNTERED
16. DATE HOLE	STARTED 8/27/08 / COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT a	DEPTH IN METERS b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
13.1	2		0'-3.5' - SAND SILTY, LOOSE, DAMP, GRAYISH BROWN 3.5'-10' - CLAY HIGH PLASTICITY, FIRM TO STIFF, MOIST, LIGHT GRAY AND TAN, W/ IRON STAINS, AND OCCASIONAL LOW PLASTICITY CLAY LAYERS			GPS - 31^ 01.913 N 093^ 12.674 W AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS PENETRATION TESTS DEPTH / BLOW COUNT 0.5-2 / 2-4-3 4.5-6 / 2-3-3 8.5-10 / 4-5-7 ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE
	4					
23.2	6					
	8					
24.7	10					

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71 | PROJECT | HOLE NO.

Hole No.

DRILLING LOG

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-14
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	10'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 3 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	8.5' AFTER 48 HRS
16. DATE HOLE	STARTED 8/27/08 / COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT a	DEPTH IN METERS b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
12.6	2		0'-4' - SAND SILTY, LOOSE, DAMP, GRAYISH BROWN 4'-9' - CLAY HIGH PLASTICITY, FIRM, MOIST, LIGHT GRAY, W/ IRON STAINS & OCCASIONAL LOW PLASTICITY CLAY LAYERS 9'-10' - SAND CLAYEY, LOOSE, WET, LIGHT GRAY			GPS - 31^ 01.911 N 093^ 12.688 W AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS PENETRATION TESTS DEPTH / BLOW COUNT 0.5-2 / 3-4-5 4.5-6 / 2-2-4 8.5-10 / 2-2-4 ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE
	4					
23.6	6					
	8					
22.5	10					

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71 | PROJECT | HOLE NO.

Hole No.

DRILLING LOG

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-15
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	10'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 3 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	NONE ENCOUNTERED
16. DATE HOLE	STARTED 8/27/08 / COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT a	DEPTH IN METERS b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
11.7	2		0'-4' - SAND SILTY, LOOSE, DAMP, LIGHT BROWN AND GRAY 4'-10' - CLAY HIGH PLASTICITY, FIRM TO STIFF, MOIST, LIGHT GRAY, W/ IRON STAINS & OCCASIONAL LOW PLASTICITY CLAY LAYERS			GPS - 31^ 01.948 N 093^ 12.666 W AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS PENETRATION TESTS DEPTH / BLOW COUNT 0.5-2 / 3-3-5 4.5-6 / 2-3-2 8.5-10 / 3-5-4 ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE
	4					
26.0	6					
	8					
21.2	10					

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71 | PROJECT | HOLE NO.

Hole No.

DRILLING LOG

DIVISION	SOUTHWESTERN
INSTALLATION	FT. WORTH DISTRICT
SHEET	1 OF 1 SHEETS
1. PROJECT	EUPH BARRACKS (FY11)
2. LOCATION (Coordinates or Station)	FORT POLK, LA
3. DRILLING AGENCY	GEOTECHNICAL TESTING LABORATORY, INC.
4. HOLE NO. (As shown on drawing title and file number)	8A25-BK8-16
5. NAME OF DRILLER	ROBERT LEGGETT
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	N/A
9. TOTAL DEPTH OF HOLE	10'
10. SIZE AND TYPE OF BIT	6" ROTARY WASH
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	NONE GIVEN
12. MANUFACTURER'S DESIGNATION OF DRILL	DIETRICH D-50
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 3 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	NONE ENCOUNTERED
16. DATE HOLE	STARTED 8/27/08 / COMPLETED 8/27/08
17. ELEVATION TOP OF HOLE	NONE AVAILABLE
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	N.J. GORSHA

% MOISTURE CONTENT a	DEPTH IN METERS b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
9.5	2		0'-4' - SAND SILTY, LOOSE, DRY, LIGHT BROWN AND GRAY 4'-10' - CLAY HIGH PLASTICITY, FIRM TO STIFF, DAMP, LIGHT GRAY, W/ SAND, IRON STAINS & OCCASIONAL LOW PLASTICITY CLAY LAYERS			GPS - 31^ 01.949 N 093^ 12.686 W AUGERED TO 6", 4.5', 8.5', & PERFORMED PENETRATION TESTS PENETRATION TESTS DEPTH / BLOW COUNT 0.5-2 / 3-4-6 4.5-6 / 2-2-3 8.5-10 / 3-6-6 ALL SAMPLES SEALED IN JARS AND LABELED BY BORING NO. AND DEPTH OF SAMPLE
	4					
17.8	6					
	8					
19.8	10					

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71 | PROJECT | HOLE NO.

NOTES:

1. USE THIS SHEET FOR BORING LOGS ONLY.
2. MOISTURE CONTENT, WHERE SHOWN, IS EXPRESSED AS PERCENT DRY WEIGHT AT TIME OF LABORATORY CLASSIFICATION.
3. LEGEND SHOWS OVERBURDEN MATERIALS CLASSIFIED ACCORDING TO ASTM D 2487 AND ASTM D 2488.
4. DESCRIPTION OF OVERBURDEN MATERIALS CHANGED TO CORRESPOND WITH LABORATORY CLASSIFICATION AS NECESSARY.
5. ORIGINAL DRILLING LOGS AVAILABLE AT CORPS OF ENGINEERS OFFICES.

REFERENCE FILES:
N:\fp\bk8\Civil\Drawings\Geotechnical\fp-BK8-lbmdl.dgn
K:\GEOTECHNICAL SECTION\McCleskey_K\Military Jobs\FDAs - Backup Copy\F & P DAs\Army\Fort Polk\BK8\CADD\fp-BK8-tb.dgn

US Army Corps of Engineers
Fort Worth District

Symbol	Description	Date	Approved

Designed by: J. PICKERING	Date:	Rev.
Dwn by: J. PICKERING	Sol No.	
Reviewed by: K. McCLESKEY	Contr No.	
Submitted by: LESLIE L. PERRIN, P.E. CHIEF, GEOTECHNICAL SECTION	File name: Plot date: 3/26/2010 Plot scale:	

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION ENG. SERVICES BRANCH

FORT POLK, LOUISIANA
ENLISTED UNACCOMPANIED PERSONNEL HOUSING
PN: 060130

LOGS OF BORINGS - 4 OF 4

Sheet reference number:
B204

DESIGN FILE: fp-BK8-B204.dgn

Contr No.

Appendix K

Fuel Cost Information

Energy Office
Directorate of Public Works
Fort Polk, Louisiana 71459
Phone: 337-531-6877
Fax: 337-531-2712

FORT POLK
ENERGY FACTSHEET
FY-2007

Garrison Data

Average Monthly Utilities Cost: $1,027,017*
(*includes 801 leased housing but not electricity cost for family housing)
Average Monthly Military Population 2007: 9,600
Total Garrison Square Feet : 8,355,720
Total Land Area: 212,000 acres

Electric Usage

Supplier: Entergy
Cost: $0.07253 per kWh
Electric Use: 141,888,654 kWH/year
Average cost per month: $898,034.76
Average cost per square foot per year: $1.23

Water Usage

Supplier: Fort Polk/DPW
Cost: $1.9046 per 1000 gallons (KGal)
Water Production: 795,000 KGal
Average cost per month: $126,148.01
Average cost per square foot per year: $0.1812

Sewer Usage

Supplier: Fort Polk /DPW
Cost: $ 1.7463 per 1000 gallons (KGal)
Sewer Treated: 1,294,080 KGal
Average Cost Per Month: $188,320.99
Average cost per square foot per year: $ 0.2705

Natural Gas Usage

Supplier: Atmos Energy Services
Cost: $7.66 per Decatherm (DTH) (equal to 100,000 Btu's)
Natural Gas Use: 265,526 DTH
Average Cost Per Month: $169,442
Average Cost Per Square Foot Per Year: $0.2433

Prepared by Cyrus P. Stell, 19 June 2008

Appendix L

LEED Project Credit Guidance

APPENDIX L

LEED Project Credit Guidance (MAY 10)

This spreadsheet indicates Army required credits, Army preferred credits, project-specific ranking of individual point preferences, assumptions guidance for individual credits, and references to related language in the RFP for individual credits.

LEED Credit Paragraph	**LEED Project Credit Guidance**	**Army Guidance:** Required - Preferred - Avoid	**Project Preference Ranking**: (1=most preferred, blank=no preference, X=preference not applicable to this credit, Rqd=required)	
PAR	**FEATURE**			**REMARKS**
<u>SUSTAINABLE SITES</u>				
SSPR1	Construction Activity Pollution Prevention (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
SS1	Site Selection		X	See paragraph LEED CREDITS COORDINATION.

SS2	Development Density & Community Connectivity - OPTION 1 DENSITY		X	See paragraph LEED CREDITS COORDINATION.
	Development Density & Community Connectivity - OPTION 2 CONNECTIVITY		X	See paragraph LEED CREDITS COORDINATION.
SS3	Brownfield Redevelopment		X	See paragraph LEED CREDITS COORDINATION.
SS4.1	Alternative Transportation: Public Transportation Access		X	See paragraph LEED CREDITS COORDINATION.
SS4.2	Alternative Transportation: Bicycle Storage & Changing Rooms	Pref		Assume that non-transient building occupants are NOT housed on Post unless indicated otherwise.
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 1			Requires provision of vehicles, which cannot be purchased with construction funds. Assume Government will not provide vehicles unless indicated otherwise. Assume that 50% of GOV fleet is NOT alternative fuel vehicles unless indicated otherwise.
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 2	Pref		
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 3			Requires provision of vehicle refueling stations. Installation must support type of fuel and commit to maintaining/supporting refueling stations.
SS4.4	Alternative Transportation: Parking Capacity	Pref		

SS5.1	Site Development: Protect or Restore Habitat			
SS5.2	Site Development: Maximize Open Space	Pref		Assume AGMBC option for aggregated open space at another location on the installation is not available to the project unless indicated otherwise.
SS6.1	Stormwater Design: Quantity Control	Pref		See paragraph STORMWATER MANAGEMENT.
SS6.2	Stormwater Design: Quality Control	Pref		See paragraph STORMWATER MANAGEMENT.
SS7.1	Heat Island Effect: Non-Roof			
SS7.2	Heat Island Effect: Roof	Pref		Coordinate with nearby airfield requirements, which may preclude this credit.
SS8	Light Pollution Reduction	Pref		
WATER EFFICIENCY				
WEPR1	Water Use Reduction (Version 3 only)	Rqd	Rqd	All LEED prerequisites are required to be met.
WE1.1	Water Efficient Landscaping: Reduce by 50%	Pref		See paragraph IRRIGATION. Project must include landscaping to be eligible for this credit.
WE1.2	Water Efficient Landscaping: No Potable Water Use or No Irrigation	Pref		Project must include landscaping to be eligible for this credit.
WE2	Innovative Wastewater Technologies - OPTION 1			
WE2	Innovative Wastewater Technologies - OPTION 2			
WE3	Water Use Reduction	Pref		See paragraph BUILDING WATER USE REDUCTION.

ENERGY AND ATMOSPHERE				
EAPR1	Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EAPR2	Minimum Energy Performance (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EAPR3	Fundamental Refrigerant Management (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EA1	Optimize Energy Performance	Rqd	1	Earning of LEED EA1 points as indicated in paragraph ENERGY CONSERVATION, as a minimum, is required.
EA2.1	On-Site Renewable Energy	Pref		See paragraph ENERGY CONSERVATION.
EA3	Enhanced Commissioning	Rqd		See paragraph COMMISSIONING. The Commissioning Authority may be provided through the Design-Build Contractor only if in accordance with USGBC Credit Interpretation Ruling (CIR) dated 9/15/06. Commissioning Authority activities begin during design phase and continue well beyond beneficial occupancy. Assume Government will not provide CxA post-occupancy activities unless indicated otherwise.
EA4	Enhanced Refrigerant Management			
EA5	Measurement & Verification			Assume Government will not provide post-occupancy activities unless indicated otherwise.
EA6	Green Power		X	See paragraph LEED CREDITS COORDINATION.

MATERIALS AND RESOURCES				
MRPR1	Storage & Collection of Recyclables (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Coordinate with Installation during design development on collection service and receptacles.
MR1	Building Reuse			
MR2.1	Construction Waste Management: Divert 50% From Disposal	Pref		See paragraph CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT.
MR2.2	Construction Waste Management: Divert 75% From Disposal	Pref		
MR3	Materials Reuse			
MR4.1	Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	Pref		See paragraph RECYCLED CONTENT.
MR4.2	Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	Pref		
MR5.1	Regional Materials:10% Extracted, Processed & Manufactured Regionally			
MR5.2	Regional Materials:20% Extracted, Processed & Manufactured Regionally			

MR6	Rapidly Renewable Materials	Pref		See paragraph BIOBASED AND ENVIRONMENTALLY PREFERABLE MATERIALS and paragraph FEDERAL BIOBASED PRODUCTS PREFERRED PROCUREMENT PROGRAM.
MR7	Certified Wood	Pref		See paragraph BIOBASED AND ENVIRONMENTALLY PREFERABLE MATERIALS.
INDOOR ENVIRONMENTAL QUALITY				
EQPR1	Minimum IAQ Performance (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EQPR2	Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Assume all buildings are smoke free unless indicated otherwise (family housing, barracks and other lodging are facility types where smoking may be permitted in some cases).
EQ1	Outdoor Air Delivery Monitoring			
EQ2	Increased Ventilation			
EQ3.1	Construction IAQ Management Plan: During Construction	Pref		See paragraph CONSTRUCTION IAQ MANAGEMENT.
EQ3.2	Construction IAQ Management Plan: Before Occupancy	Pref		See paragraph CONSTRUCTION IAQ MANAGEMENT.
EQ4.1	Low Emitting Materials: Adhesives & Sealants	Pref		See paragraph LOW-EMITTING MATERIALS.
EQ4.2	Low Emitting Materials: Paints & Coatings	Pref		See paragraph LOW-EMITTING MATERIALS.
EQ4.3	Low Emitting Materials: Carpet/Flooring Systems	Pref		See paragraph LOW-EMITTING MATERIALS.

EQ4.4	Low Emitting Materials: Composite Wood & Agrifiber Products	Pref		See paragraph LOW-EMITTING MATERIALS.
EQ5	Indoor Chemical & Pollutant Source Control	Pref		System requiring weekly cleaning to earn this credit is not a permitted option unless indicated otherwise.
EQ6.1	Controllability of Systems: Lighting			
EQ6.2	Controllability of Systems: Thermal Comfort			
EQ7.1	Thermal Comfort: Design	Rqd		See paragraph HEATING, VENTILATING AND AIR CONDITIONING.
EQ7.2	Thermal Comfort: Verification			Project must earn credit EQ7.1 to be eligible for this credit. Assume Government will not provide post-occupancy activities unless indicated otherwise.
EQ8.1	Daylight & Views: Daylight 75% of Spaces	Pref		See paragraph DAYLIGHTING.
EQ8.2	Daylight & Views: Views for 90% of Spaces	Pref		
INNOVATION & DESIGN PROCESS				
IDc1.1	Innovation in Design			See paragraph INNOVATION AND DESIGN CREDITS. Assume Government will not provide any activities associated with ID credits.
IDc1.2	Innovation in Design			
IDc1.3	Innovation in Design			
IDc1.4	Innovation in Design			
IDc2	LEED Accredited Professional	Rqd	Rqd	LEED AP during design and construction is required.
REGIONAL PRIORITY CREDITS (Version 3 only)				See paragraph LEED CREDITS COORDINATION.

Appendix M

LEED Owner's Project Requirements

Appendix M

Owner's Project Requirements Document for LEED Fundamental Commissioning

Project: UEPH, PN 60130, Ft Polk ________________________

Approved: ____________________ ____________________ __________
Name Owner's Representative Date

____________________ ____________________ __________
Name Design Agent's Representative Date

Overview and Instructions

The purpose of this document is to provide clear and concise documentation of the Owner's goals, expectations and requirements for commissioned systems, and shall be utilized throughout the project delivery and commissioning process to provide an informed baseline and focus for design development and for validating systems' energy and environmental performance.

The Owner's Project Requirements Document is a required document for LEED-NC EA Prerequisite Fundamental Commissioning of the Building Energy Systems. It shall be completed by the Corps District/Design Agent based on coordination with the Installation/User/Proponent and shall be approved by the Installation/User/Proponent representative.

The intent of the Owner's Project Requirements Document is to detail the functional requirements of a project and the expectations of the building's use and operation as it relates to commissioned systems. This template contains the basic recommended components indicated in the LEED Reference Guide. It should be adapted as needed to suit the project, remaining reflective of the LEED intent.

The Owner's Project Requirements Document should ideally be completed before the start of design and furnished to the design team. It must be completed prior to the approval of Contractor submittals of any commissioned equipment or systems to meet LEED requirements.

Updates to the Owner's Project Requirements Document throughout the course of project delivery shall be made by the Corps District/Design Agent based on decisions and agreements coordinated with and agreed to by the Installation/User/Proponent.

The Owner's Project Requirements Document shall be included in the project's LEED documentation file under EA PR1, Fundamental Commissioning of the Building Energy Systems.

Owner's Project Requirements Document for LEED Fundamental Commissioning

Table of Contents

1. *Owner and User Requirements*

What is the primary purpose, program and use of this project? (example: office building with data center)

Describe pertinent project history. (example: standard design development)

Broad Goals

What are the broad goals relative to program needs?

What are the broad goals relative to future expansion?

What are the broad goals relative to flexibility?

What are the broad goals relative to quality of materials?

What are the broad goals relative to construction costs?

What are the broad goals relative to operational costs?

Other broad goals: *(Insert as applicable)*

2. Environmental and Sustainability Goals

What are the project goals relative to sustainability and environmental issues? (example: LEED Silver rating)

What are the project goals relative to energy efficiency? (example: Meet EPACT)

What are the project goals and requirements for building siting that will impact energy use?

What are the project goals and requirements for building facade that will impact energy use?

What are the project goals and requirements for building fenestration that will impact energy use?

What are the project goals and requirements for building envelope that will impact energy use?

What are the project goals and requirements for building roof that will impact energy use?

Other: *(Insert as applicable)*

3. Indoor Environmental Quality Requirements

What is the intended use for all spaces? For all spaces that have an intended use that is not readily apparent from the space name, provide this information in Table 1.

____
____
____

What is the anticipated occupancy schedule (numbers of occupants and time frames) for all occupied spaces? Indicate the default occupancy schedule below and for all spaces that have an occupancy schedule that differs from the default, provide this information in Table 1.

____
____
____

What accommodations for after-hours use are required? (example: access control, lighting controls, HVAC controls) Indicate general accommodations required below and for all spaces that have special requirements, provide this information in Table 1.

____
____
____

What are the lighting, temperature, humidity, air quality, ventilation and filtration requirements for all spaces? Indicate the default requirements below and for all spaces that have a requirement that differs from the default, provide this information in Table 1.

Lighting: ____
Temperature:____

Humidity: ____
Air Quality:____

Ventilation:____

Filtration: ____

What are the acoustical requirements for all spaces? Indicate the default acoustical requirements below and for all spaces that have a requirement that differs from the default, provide this information in Table 1.

____
____
____

What is the desired level of occupant ability to adjust systems controls? Indicate the default desired levels below and for all spaces that have a desired level that differs from the default, provide this information in Table 1.

Lighting: ____

Temperature:____
Humidity: ____
Air Quality:____

Ventilation:____

What, if any, specific types of lighting are desired? (example: fluorescent in 2x2 grid, accent lighting, particular lamps)

____
____
____

4. *Equipment and System Expectations*

(Complete for each category as applicable or indicate "none identified" or "N/A". Add desired features information for other anticipated commissioned systems as applicable)

Indicate desired features for the following commissioned system: Space Heating

Desired Type: ____

Quality: ____

Preferred Manufacturer: ____
Reliability: ____
Automation: ____

Flexibility:____
Maintenance Requirements: ____
Efficiency Target:____

Desired Technologies: ____

Indicate desired features for the following commissioned system: Ventilation

Desired Type: ____

Quality: ____

Preferred Manufacturer: ____
Reliability: ____
Automation: ____

Flexibility:____
Maintenance Requirements: ____
Efficiency Target:____

Desired Technologies: ____

Indicate desired features for the following commissioned system: Air Conditioning

Desired Type: ______________________________

Quality: ______________________________

Preferred Manufacturer: ______________________________
Reliability: ______________________________
Automation: ______________________________

Flexibility: ______________________________
Maintenance Requirements: ______________________________
Efficiency Target: ______________________________

Desired Technologies: ______________________________

Indicate desired features for the following commissioned system: Refrigeration

Desired Type: ______________________________

Quality: ______________________________

Preferred Manufacturer: ______________________________
Reliability: ______________________________
Automation: ______________________________

Flexibility: ______________________________
Maintenance Requirements: ______________________________
Efficiency Target: ______________________________

Desired Technologies:

Indicate desired features for the following commissioned system: HVAC Controls

Desired Type: ______________________________

Quality: ______________________________

Preferred Manufacturer: ______________________________
Reliability: ______________________________
Automation: ______________________________

Flexibility: ______________________________
Maintenance Requirements: ______________________________
Efficiency Target: ______________________________

Desired Technologies: ______________________________

Indicate desired features for the following commissioned system: Domestic Hot Water

Desired Type: ______________________________

Quality: ______________________________

Preferred Manufacturer: ______________________________
Reliability: ______________________________
Automation: ______________________________

Flexibility:______________________________
Maintenance Requirements: ______________________________
Efficiency Target:______________________________

Desired Technologies: ______________________________

Indicate desired features for the following commissioned system: Lighting Controls

Desired Type: ______________________________

Quality: ______________________________

Preferred Manufacturer: ______________________________
Reliability: ______________________________
Automation: ______________________________

Flexibility:______________________________
Maintenance Requirements: ______________________________
Efficiency Target:______________________________

Desired Technologies: ______________________________

Indicate desired features for the following commissioned system: Daylighting Controls

Desired Type: ______________________________

Quality: ______________________________

Preferred Manufacturer: ______________________________
Reliability: ______________________________
Automation: ______________________________

Flexibility:______________________________
Maintenance Requirements: ______________________________
Efficiency Target:______________________________

Desired Technologies: ______________________________

Indicate desired features for the following commissioned system: Emergency Power

Desired Type: ______________________________

Quality: ______________________________

Preferred Manufacturer: ______________________________
Reliability: ______________________________
Automation: ______________________________

Flexibility:____
Maintenance Requirements: ______________________________________
Efficiency Target: ____

Desired Technologies: ____

Indicate desired features for the following commissioned system: Other - ___________________

Desired Type: ____

Quality: ____

Preferred Manufacturer: ____
Reliability: ____
Automation: ____

Flexibility:____
Maintenance Requirements: ______________________________________
Efficiency Target: ____

Desired Technologies: ____

5. Building Occupant and O&M Personnel Requirements

How will the facility be operated? Who will operate the facility?

____
____
____

Will the facility be connected to an EMCS? If so, what are the interface requirements? (example: monitoring points, control points, scheduling)

____
____
____

What is the desired level of training and orientation for building occupants to understand and use the building systems?

____
____
____

What is the desired level of training and orientation for O&M staff to understand and maintain the building systems?

Table 1

Space	Use / Activity	Num of Occs	Special Occupancy Schedule	After Hours Use Reqmt.	Special Cooling Reqmt.	Special Heating Reqmt.	Special Humidity Reqmt.	Special Ventil./Filtration Reqmt.	Special Acoustic Reqmt.	Special Lighting Reqmt.	Special Occup Adjustability Reqmt.

APPENDIX N
LEED Requirements for Multiple Contractor Combined Projects

Not Used

APPENDIX O
LEED Strategy Tables

Not Used

Appendix P

LEED USGB Registration

APPENDIX P

REV 1.0 - 30 NOVEMBER 2008

USGBC Registration of Army Projects

Typical Registration Procedure

1. Complete the online registration form (see guidance below) at the USGBC website http://www.usgbc.org/showfile.aspx?documentid=875 and submit it online.
2. Pay the registration fee via credit card (USACE staff: credit card PR&C is funded by project design or S&A funds).
3. The USGBC will follow up with a final invoice, the LEED-online passwords and template information.
4. If you have any questions, the USGBC contact (as of October 08) is:
Courtney Yan, LEED Program Assistant
U.S. Green Building Council
202/587-7180
cyan@usgbc.org

Completing the Registration Form

BEFORE YOU BEGIN:

Create a personal account with USGBC if you do not have one.
You will need the following information:
Project name as it appears in P2 (obtain from USACE Project Manager)
Building number/physical address of project
Zip code for Installation/project location
Total gross area all buildings in project
Total construction cost for buildings only (see Project Details Section instructions below)

ACCOUNT/LOGIN INFORMATION SECTION

1. The person registering the project **must have an account with USGBC** (login and password) to complete the form. If you have an account, select “I already have a USGBC Web site account” and enter email and password (twice). If you do not have an account, you may select “Create a new USGBC website account” and follow the instructions. It is recommended that you create an account separately on the USGBC website before you start the form. IMPORTANT: USACE team members are members of USGBC and are eligible for Member prices. USACE team members registering projects should be sure to include the USACE Corporate Access ID on the form (if you do not have it contact richard.l.schneider@usace.army.mil or judith.f.milton@usace.army.mil for the number).
2. The Account/Login Information section is filled out by the person registering the project. It may be a Contractor or a USACE staff member.

PROJECT TYPE SECTION

Self-explanatory. As of October 08 USACE projects use LEED for New Construction V2.2. USACE staff members are USGBC members.

GENERAL PROJECT INFORMATION SECTION

Project Title: Match the project name used in P2. Contact the USACE Project Manager for this information.
Is Project Confidential: Indicate NO except if project has security sensitivity (elements that are FOUO or higher security) indicate YES.
Project Address 1 and 2: This is the physical location of the project. Provide building number, street address, block number or whatever is known to best describe the location of the project on the Installation.

Project City: Installation Name
State, Country, Zip Code: Self-explanatory
How Did You Hear About LEED: USACE requirement

PRIMARY CONTACT INFORMATION

The Primary Contact may be a Contractor or a USACE staff member. USGBC considers this individual the primary point of contact for all aspects of the project. It is recommended this person be the Contractor Project Manager or the USACE Project Manager.

PROJECT OWNER INFORMATION

Project Owner First Name, Last Name, email: The Project Owner is the USACE Project Manager.
Organization Name: U.S. Army Corps of Engineers. This field MUST be completed this way because it will be used as a search field by higher HQ to find all USACE registered projects.

PROJECT DETAILS

Owner Type: Military Base
Project Scope: Provide brief description (example: barracks complex)
Site Conditions: Provide brief description (example: wooded with steep grades)
Occupant Type: Provide brief description (example: military and civilian employees)
Owner Occupied: No
Gross Square Footage: Provide total area all buildings in project
Project Budget: Do not include the cost for design, site work, demolition, abatement or other work – do not include Government contingency or supervision costs. For design-build and construction projects registered after award, use the awarded contract cost for construction of buildings only. For projects registered prior to award of design-build or construction contract, use the total Primary Facility cost from DD1391 or updated Primary Facility cost based on design development if available.
Current Project Phase: Identify phase at time of registration (example: design start, construction start)
Project Type: Self-explanatory

PAYMENT INFORMATION

Self-explanatory

APPENDIX Q
REV 2.1 – 30 SEP 2010
AREA COMPUTATIONS

Computation of Areas: Compute the “gross area” and “net area” of facilities (excluding family housing) in accordance with the following subparagraphs:

(1) Enclosed Spaces: The “gross area” is the sum of all floor spaces with an average clear height ≥6’-11” (as measured to the underside of the structural system) and having perimeter walls which are ≥4’-11”. The area is calculated by measuring to the exterior dimensions of surfaces and walls.

(2) Half-Scope Spaces: Areas of the following spaces shall count as one-half scope when calculating “gross area”:

- Balconies
- Porches
- Covered exterior loading platforms or facilities
- Covered but not enclosed spaces, canopies, training, and assembly areas
- Covered but not enclosed passageways and walks
- Open stairways (both covered and uncovered)
- Covered ramps
- Interior corridors (Unaccompanied Enlisted Personnel Housing Only)

(3) Excluded Spaces: The following spaces shall be excluded from the “gross area” calculation:

- Crawl spaces
- Uncovered exterior loading platforms or facilities
- Exterior insulation applied to existing buildings
- Open courtyards
- Open paved terraces
- Uncovered ramps
- Uncovered stoops
- Utility tunnels and raceways
- Roof overhangs and soffits measuring less than 3’-0” from the exterior face of the building to the fascia

(4) Net Floor Area: Where required, “net area” is calculated by measuring the inside clear dimensions from the finish surfaces of walls. If required, overall “assignable net area” is determined by subtracting the following spaces from the “gross area”:

- Basements not suited as office, special mechanical, or storage space
- Elevator shafts and machinery space
- Exterior walls
- Interior partitions
- Mechanical equipment and water supply equipment space
- Permanent corridors and hallways
- Stairs and stair towers
- Janitor closets
- Electrical equipment space
- Electronic/communications equipment space

Appendix R

RMS Submittal Register

RMS SUBMITTAL REGISTER INPUT FORM

CONTRACT NUMBER

DELIVERY ORDER

TITLE AND LOCATION

Button	<-----Right click for Instructions		TYPE OF SUBMITTAL											CLASSIFICATION						REVIEWING OFFICE					
SECTION	PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	01 - PRECON SUBMITTALS	02 - SHOP DRAWINGS	03 - PRODUCT DATA	04 - SAMPLES	05 - DESIGN DATA	06 - TEST REPORTS	07 - CERTIFICATES	08 - MFRS INSTRUCTIONS	09 - MFRS FIELD REPORT	10 - O&M DATA	11 - CLOSEOUT SUBMITTALS	FIO - FOR INFORMATION ONLY	GA - GOVERNMENT APPROVED	DA - DESIGNER OF RECORD APPROVA	CR - CONFORMANCE REVIEW	DA / CR	DA / GA	DO - DISTRICT OFFICE	AO - AREA OFFICE	RO - RESIDENT OFFICE	PO - PROJECT OFFICE	DR - DESIGNER OF RECORD	AE - ARCHITECT / ENGINEER
00 72 00	52.236-13	Accident Prevention Plar	X														X				X				
00 73 00	1.11	Dev. From Accept. Design. No Deviation from Contract					X											X			X			X	
00 73 00	1.11	Dev. From Accepted Design - Deviates from Contract					X												X		X			X	
00 73 00	1.17	Supplemental Price Breakdown	X											X							X				
00 73 00	1.18	SSHO Qualifications	X												X						X				
01 10 00	5.2.3.1	(if concrete pavement) Joint Layout Plan with design drawings					X										X								
01 10 00	5.5.2	Building Envelope Sealing Performance Testing						X						X							X				
01 10 10	***	Tests as Req by Codes - DOR Develops Test Program						X						X							X			X	
01 10 00	5.8.3	BAS Review Information		X														X		X	X			X	
01 10 00	5.8.3	BAS Performance Verification Test						X						X							X			X	
01 10 00	5.8.4	Testing Adjusting and Balancing						X						X							X			X	
01 10 00	5.8.5	Commissioning						X						X							X			X	
01 10 00	6.15	Environmental As Required for Site Specific					X										X				X			X	
01 10 00	6.16	Permits as required for Site specific					X										X				X			X	
01 10 00	5.10.2	Fire Protection Tests						X	X					X							X			X	
01 32 01.00 10	3.4.1	Preliminary Project Schedule	X												X						X				
01 32 01.00 10	3.4.2	Initial Project Schedule	X												X						X				
01 32 01.00 10	3.4.3	Design Package Schedule	X												X						X				
01 32 01.00 10	3.6.1	Periodic schedule updates from the Contractor	X												X						X				
01 32 01.00 10	3.7	Time Extension Request (Schedule)	X												X						X				
01 33 00	1.8	Submittal Register - DOR Input Required	X												X						X			X	
01 33 00	1.8	Submittal Register Updates (Design Packages, etc.)	X												X						X			X	
01 33 00	1.3.1	Substitution of Manuf or Model Named in Proposal		X	X													X			X			X	
01 33 16	1.2	Identify Designer(s) of Record	X												X						X				
01 33 16	1.1.2 / 3.2.4	Fast Track Design Package(s)					X										X			X	X				
01 33 16	1.2	Identification of all Designers of Record	X														X				X				
01 33 16	3.2.1	Site and Utility Des Package, incl. Substantiation					X										X			X	X				
01 33 16	3.2.2/3.5	Interim Des Subm Package(s), incl. Substantiation					X										X			X	X				
01 33 16	3.5.1	Drawings					X										X			X	X				
01 33 16	3.5.2.2	Sitework Design Analyses					X										X			X	X				
01 33 16	3.5.2.3	Structural Design Analyses					X										X			X	X				
01 33 16	3.5.2.4	Security Design Analyses					X										X			X	X				
01 33 16	3.5.2.5	Architectural Design Analyses					X										X			X	X				
01 33 16	3.5.2.6	Mechanical Design Analyses					X										X			X	X				
01 33 16	3.5.2.7	Life Safety Design Analyses					X										X			X	X				
01 33 16	3.5.2.8	Plumbing Design Analyses					X										X			X	X				
01 33 16	3.5.2.9	Elevator Design Analyses (as Applicable)					X										X			X	X				
01 33 16	3.5.2.10	Electrical Design Analyses					X										X			X	X				
01 33 16	3.5.2.11	Telecommunications Design Analyses					X										X			X	X				
01 33 16	3.5.2.12	Cathodic Protection Design Analyses					X										X			X	X				
01 33 16	3.5.3	Geotechnical Investigations and Reports					X										X			X	X				
01 33 16	3.5.4	LEED Submittals					X										X			X	X				
01 33 16	3.5.5	Energy Conservation Documentation					X										X			X	X				
01 33 16	3.5.6	Specifications					X										X			X	X				
01 33 16	3.5.7	Building Rendering					X										X			X	X				
01 33 16	3.2.4/3.7	Final Des Submittal Package(s), incl. Substantiation					X										X			X	X				
01 33 16	3.7.5	DD Form 1354 (Transfer of Real Property)											X				X				X				
01 33 16	3.2.5/3.8	Design Complete Submittal Package(s)					X										X			X	X				
01 33 16	3.3.3	Design and Code Review Checklists					X										X			X	X				
01 33 16	A-2.0	SID - Interim and Final (as applicable)			X	X	X								X						X				
01 33 16	B-2.0	FFE (as Applicable)					X								X						X				
01 45 04.00 10	3.2	Design and Construction QC Plan	X														X				X				
01 57 20.00.10	1.2	Environmental Protection Plan	X														X				X				
01 78 02.00 10	1.2.1	Final as-Built Drawings											X		X										
01 78 02.00 10	1.2.7	Provide final as-built CADD and BIM Model files											X		X						X				
01 78 02.00 10	1.2.9	Provide scans of all other docs in Adobe.pdf format											X		X						X				
01 78 02.00 10	1.3.1	Equip-in-Place list of all installed equip and cost											X		X						X				
01 78 02.00 10	1.3.2	Data on equip not addressed in O&M manuals											X		X						X				
01 78 02.00 10	1.3.3	Final as-built specs - electronic files											X		X						X				
01 78 02.00 10	1.4.2.1	Warranty management plan - FAR 52.246-21											X		X						X				
01 78 02.00 10	1.4.2.1	Certificates of Warranty for extended warranty items											X		X						X				
01 78 02.00 10	1.4.2.1	Contractor's POCs for implementing warranty process											X		X						X				
01 78 02.00 10	1.4.2.1	List of each warranted equip, item, feature or system											X		X						X				
01 78 02.00 10	1.5	See also Section 01 10 00 par. 5.8.4 and 5.8.5											X		X						X				
01 78 02.00 10	1.6.1.2	Equipment O&M Manuals - 1 electronic / 2 hard copies											X		X						X				
01 78 02.00 10	1.7	Field Training DVD Videos										X		X							X				
01 78 02.00 10	1.8	Pricing of CF/CI and GF/CI Property											X	X							X				
01 78 02.00 10	1.11	List of Completed Cleanup Items											X				X				X				

RMS INPUT FORM 4288A

Export to RMS in CSV(MS-DOS) (*.csv) Format

Note: Reviewing Office Optional

APPENDIX AA

American Water Military Service Group
Design Guide for Water and Wastewater Facilities

ADMINISTRATIVE INFORMATION AND REQUIREMENTS

General Information

This design guide provides a summary of the overall project submission and approval process that all parties must follow for any proposed expansion, modification, replacement, or connection to American Water (AW) owned utilities. This document provides a summary of design standards that all projects shall adhere to and is not an all encompassing guide. AW may impose other requirements based on its review of the project, and overall long term adequate planning and construction of its utilities, or as required / allowed under its contract.

All costs associated with the provision of water and wastewater facilities constructed by others, or constructed by AW that is not part of its current contract shall be borne by those parties.

All projects must adhere to the full requirements as put forth in American Water's Standard Specifications for Construction of Water and Wastewater Facilities. Note these specifications are for the construction of component pieces, and a supplement to this Design Guide.

AW reserves the right to specify the point of service, the size of service, the type of service, and the layout of the overall system within the guidelines of this document.

Authority

American Water Operations and Maintenance, Inc. (AW) is contracted to the Government (see Appendix A), through the Defense Energy Support Center (DESC) under US Code 2688, as amended. Under the contract, AW owns the water and wastewater facilities (utilities).

Planning and Design Standards:

AW will rely upon governing regulations, project design standards, and industry standards, as well as AW's expertise in owning and operating utility systems to determine system layouts. Where conflicts exist, AW will determine the solution. Projects will not be evaluated based on "stand-alone" funding constraints. The project must integrate into AW's overall system operation and design. It is incumbent upon system designers and managers to engage AW in the initial stages of a project to discuss project criteria, and work out a solution acceptable to all parties. If the project ignores AW's requirements, acceptance of the constructed facilities may not be agreed to by AW. See "Options for Installing new utilities" for further information.

AW must be involved in the design, coordination, and planning of such utility improvements because these changes can have larger implications to the overall performance of the system. The level of this impact to the system can only be evaluated by the system owner.

Project planning forms and other funding enablers (ex: form 1391)

The project planning forms and other funding enablers (ex: form 1391) should include a statement that "In the event that a utility system is privatized (under 10 USC 2688 or other authority) prior to award of this project or during construction of this project, funds appropriated for the project herein may be transferred to the utility privatization contractor involved for the utility infrastructure. Title to the utility infrastructure constructed as a result of this project may be transferred to the utility privatization contractor notwithstanding any other provision of law."

Options for installing new utilities:

The general intent of the Utility Privatization program (US2688) is for all new water and wastewater assets installed during the life of the contract to become the property of AW, with the exception of utilities excluded by contract.

New utilities are those that either did not exist at the time of Contract Award for the military installation, or that existed but as a result of proposed work will be modified.

New utilities also include "off-project-site" impacts that change the size, function, alignment, or otherwise alter existing AW owned facilities. New work off-project-site also includes the installation of utilities that extends the existing AW system to the proposed project location. In these circumstances, AW will perform the work under a contract modification via AW's Contracting Officer, paid for as directed by AW's Contracting Officer.

For definition purposes, a large project can be broken into two distinct areas, the "Project footprint" and the off-project-site area. The Project footprint area is generally identified by the limits of construction of the main project area, excluding extension out to existing facilities. This could include (but not be limited to) housing privatization areas and the projects related to BRAC or MILCON construction. Note this project "footprint" may be different than the project footprint established on form DD 1391 form project funding purposes. It essentially is the area of disturbance for the entire project.

The recently enacted National Defense Authorization Act Legislation (NDAA) (October 2008) included an amendment to USC 2688 that expressly enables the transfer of new assets constructed post contract award to a UP contractor. Specifically, the Secretary of a Military department may convey additional infrastructure after the original conveyance when certain conditions are met:

1. The additional infrastructure was constructed or installed after the date of the original conveyance.

2. The additional infrastructure cannot operate without being part of the conveyed utility system.

3. The additional infrastructure was planned and coordinated with the entity operating the conveyed utility system.

4. The military department receives as consideration an amount equal to the FMV - determined in same manner as the original requirement.

The implementation of NDAA of 2008 amendment to USC 2688 regarding transferring of assets constructed by third parties post UP contract award has not been defined. While the four criteria that enable the subsequent transfer are defined, the Government has not been able to define the implementation plan. Notwithstanding this, if the intention is for AW to own and operate these assets in the future, the infrastructure must be planned and coordinated with AW, which includes adhering to comments made in plan reviews, and constructing assets per its specifications and procedures

There are three options for installing new utilities.

Option 1 – AW installs the new utilities, and owns said utilities upon completion. Payment for designing/permitting/construction/commissioning these facilities must be completed via contract modification to AW's contract. Any project using this option must work through AW's Contracting Officer to provide funding and other related elements.

Option 2 – Utilities are designed/permitted/constructed/commissioned by others. This option, under this design guide, assumes the installed assets are intended to be transferred to AW. As such, AW has a vested interest in the planning, design, construction, inspection, acceptance testing, warranty provisions, and legal transfer of the new assets. AW must be involved in the design, coordination, and planning of such utility improvements because these changes can have larger implications to the overall performance of the system. The level of this impact to the system can only be evaluated by the system owner.

Option 3 – Facilities are not designed or constructed to AW's requirements. These may only be constructed if the Base DPW is the permittee (if a permit is required), there is a backflow preventer installed at the point of connection to AW's system (owned by the Base), and any other requirements imposed by AW. The proposed facilities must not in anyway overload or exceed the capacity of AW's system, and the connection MUST meet AW's requirements. Subsequent to construction, the facilities will be owned and maintained by others. AW will also advise the State regulatory agency of the pending work and any requirements of that agency must be addressed directly by the project sponsor. AW may also make a formal objection to the proposed work under its contract and as permittee of the system to which the project is proposing to connect, and file actions to prevent such work from connecting.

Points of Demarcation:
AW's Utility Privatization contract includes defined Points of Demarcation (POD) where ownership changes from AW to the Federal Government. Each AW contract has

different POD, and may change from time to time. The ability to create a new POD is subject to approval by AW and its contracting agency, DESC. Generally, creation of unique POD outside the contract is not pursued.

POD must be considered when planning the project, as any unique elements the project relative to must be discussed with AW. For example, if a fire pump is needed, but fire pump are excluded from AW's contract, the fire pump must be located beyond the contract POD, or if not possible, a unique POD would have to be approved through a contract modification to AW's contract. These instances require that a detailed description of asset responsibility is set forth in writing and agreed upon between all parties involved.

The POD for AW's installations are included as Appendix B.

Excluded facilities:
AW's Utility Privatization contract excludes certain facilities from its responsibilities (See Appendix C). In these cases, any project proposing to incorporate an excluded facility must place the excluded facility beyond AW's POD and any approvals for design would be by others. AW retains the right to require conditions on the non-AW owned asset if it may have an impact on AW's utilities. For example, a septic system, oil-water separator or grease trap may impact water quality near a well, or a fire pump may cause too great a demand on existing infrastructure and a dedicated fire tank may need to be constructed. Governing regulations (ex: State Department of Environmental Protection), project design standards, and industry standards must be incorporated in such manner that AW utilities and the responsibility of permitted infrastructure is not jeopardized by the new facility; to include but not limited to the following: oil wells, fuel storage facilities, geothermal systems, glycol based systems, storm drains, industrial systems, etc…may not be placed in such proximity to AW utilities to create undo burden and / or non-compliance.

New work Permit Application
All projects that will be constructed by others and that are planned to be transferred to AW for ownership and operation require submittal and approval of the American Water Permit Application for Water or Sewer Tap and/or Line Installation, provided in Appendix D of this design guide.

Permits
The project designer is responsible for identifying all permits and preparing applications as required for the project. Construction cannot start unless all required permits have been received by AW. AW will advise if special conditions are attached to the permit in which case it will be the responsibility of the entity overseeing the work to ensure compliance, including any close-out provisions.

For projects that require a permit from a State or Federal permitting agency, American Water shall be the Permittee on the application. After AW approves the designs, the project designer shall provide to AW two (2) sets of the 100% final construction plans;

including one (1) hardcopy drawing and one (1) digital vectorized drawing on compact disk; 100% final construction plans shall be labeled "For Construction" and signed and sealed by the design engineer. AW shall review the 100% final construction plans and return the hardcopy set to the project designer signed when approved by AW. Project designer shall submit required number of copies of the AW approved plans, specifications, design / engineering reports, and permit application to the State reviewing agency on behalf of AW. Project designer shall receive and duplicate, as required, the State approved set and return the originally approved State set to AW for their records. ONLY STATE APPROVED AND PERMITTED SETS SHALL BE USED FOR CONSTRUCTION. Signed permit applications will be returned to the design engineer for their submission to the State. AW shall not be responsible for the submission of any permit applications, plans and specifications to State agencies.

Plan Review and Approval Requirements

Applicants are encouraged to engage in discussions with AW at the concept level of the project, and include AW in key project phases (planning, design and review charettes, field reviews, etc.) AW will provide information that will assist in design layouts and cost estimate developments.

Progress plans and any calculations or technical reports required at intervals normally submitted in the project to all stakeholders (30%, 60%, 90% complete, and final) shall be provided to AW for review. Two sets of design plans and other required documentation shall be submitted to the AW Utility Manager in hard copy of PDF electronic format. The turnaround time for a review memo from AW shall be a minimum of 7 business days.

Other documentation required may include but not be limited to:

- Fire Flow requirements for any proposed structure (flow rate, duration, and pressure at point of delivery)
- Design Reports
- Hydraulic Model results
- Development of project design flows
- Form 1391 (if applicable)
- All future expansion expected or otherwise anticipated by the project (this must be addressed as phased construction or not assumed)

As a minimum plan requirement, the following shall be included in the design drawings:

- Existing conditions showing AW owned utilities based on field survey or information provided from AW mapping
- All existing and proposed materials shown and clearly labeled (pipe, valves, fire hydrants, water meters, fittings, manholes, services, etc.) with associated elevations, sizes, types, composition, slopes, and appurtenances (miscellaneous but related and needed items for a working system)
- POD where ownership / operation responsibility changes between AW and the Federal Government

- Approximate topographical location of existing utilities within the immediate vicinity of the project.
- Plan and profile sheets shall include all sewer design information including pipe size, length, material, slope, and invert elevations.
- Plan and profile sheets shall show existing and proposed grades, the location of new gravity sewers and force mains, and all utility crossings.
- Detailed architectural and mechanical plans for any proposed structures, lift stations, or booster stations.
- Site plan for any proposed water and sewer facility.
- Water and Sewer construction details, both AW required and project unique
- State and Local requirements for construction and development

The following standard Water and Sewer Construction Notes shall be included on all plans submitted to AW for approval:

1. All materials, workmanship, and testing shall conform to American Water's Standard Specifications for Construction of Water and Sewer Facilities.

2. Contractor to coordinate all shut downs and utility connections with American Water. Contractor is advised that AW has contract limitations on providing notice to affected customers and contractor shall coordinate and follow these AW limitations for service interruption.

3. Disinfection of all water mains shall be performed in accordance with American Water Standard Specifications.

4. All service connections are to be made wet after completion of pressure testing and main disinfection and after main has been found acceptable by American Water.

5. Contractor shall provide 5 working days notice to the American Water Utility Manager prior to any water or wastewater facility construction starting or inspections needed.

6. The sewer mains and service lines shall be laid a minimum distance of 10 feet (10') from any existing or proposed water main. The mains and service lines shall be encased in concrete, encased in a steel carrier pipe, or constructed of ductile iron pipe with the required lining and encasement for a distance of ten feet (10') in each direction from a crossing with a water main when the sewer line does not have a minimum vertical clearance of eighteen inches (18") from the water line crossing. Linings and the encasement for the ductile iron pipe shall be as noted on the drawings and specified in American Water Standard Specifications.

7. All sanitary sewer mains, stubs, and cleanouts installed on the project shall be air-tested and manholes vacuum tested after the backfill and compaction operations have been completed. All tests shall be witnessed by a representative of AW. Copies of all test records shall be provided to American Water for project acceptance.

Unique Situations and Utility elements

Unique situations include but are not limited to utility facilities such as:

- Water Pump stations (including fire stations)
- Sewage pump stations
- Water meters
- Backflow preventers
- Water tanks
- Septic Systems
- Oil-Water separators and grease traps
- Wells
- Chemical feed systems
- Siphons
- Holding tanks
- SCADA units

For unique elements of the project, AW will require the submittals in addition to the project plans. These are more fully described in the Design Guidelines of this document. Some unique elements are proprietary in development and to maintain functionality of existing systems, AW reserves the right to direct that SCADA, meters, and other operational related devices or systems be included in the design and construction.

Hydraulic Model:

AW may have a hydraulic model of its utilities. If so, AW may determine its use is required to make planning or design decisions related to the new work. AW will perform the modeling work. The cost of required modeling analysis will be borne by the project.

If a model is not in existence or not ready for planning or design level decisions, the project designers will be required to perform field tests (metering, fire hydrant flow tests, pressure recordings, manhole surveys, etc) as AW determines necessary to make planning and design decisions.

Shop Drawings

Shop drawings/submittals for all water and wastewater construction items shall be submitted to American Water for review and approval prior to construction. Shop drawings shall be provided for, but not limited to, pipes and piping appurtenances, valves, fire hydrants, and pumps.

One copy of shop drawings shall be provided to AW for review and the Contractor may submit shop drawings to AW electronically.

As-Built Drawings and System Value

Upon completion of the utility system improvements, AW shall be supplied as-built drawings in an AutoCAD or Microstation electronic file format, and a detailed cost accounting of the value of the utility system improvements, based on final payment quantities and unit costs. All vectorized data shall be referenced to the local imperial survey system. Project will not be accepted by AW until all related as-builts have been received. As-builts shall be provided in accordance with AW Specification Section 01720.

Construction Inspection

At a minimum, all utility line installation and connections to the existing utility systems shall be inspected by AW or an agent of AW prior to backfill. Contractors shall provide AW'S COR notice of an inspection required 5 days in advance to arrange with AW for all required inspections.

More intensive inspections may be required by AW after review of the project details and complexity (lift stations, structures, congested utility corridors, etc) or if required by State Permitting agencies. The designers shall include inspection requirements on the construction drawings and /or specifications.

WATER SYSTEM DESIGN GUIDELINES

Overview

This design guide section provides the minimum AW guidelines for the design of potable water systems, including distribution systems, service lines, pump stations, wells, and associated appurtenances. All water system design shall be performed in accordance with generally accepted engineering standards and practices, American Water Standard Specifications for construction of Water Facilities, and all applicable local and state regulations.

Where Unified Facilities Codes, NFPA, or other is required to meet funding criteria, a review of applicability shall be made with AW prior to project design. AW will determine resolution of conflicts in its interest.

General System Design

Water mains within residential areas, as well as in non-residential areas with a closely interconnected grid system, shall be a minimum of 8" in diameter. Water mains smaller than 8" are not permitted within the AW distribution system. Deviations from this general policy may be permitted by AW should the design Engineer provide adequate justification for said deviation.

Upon request from AW, the design Engineer shall provide hydraulic calculations for review. For major distribution system expansion, AW reserves the right to require the design Engineer to utilize a hydraulic model to accurately analyze the effect the proposed system expansion will have on daily operations on the water distribution system. See "Hydraulic Model" above.

All distribution system expansions shall be designed with a minimum of two feed lines in order to create a looped distribution system. Dead end lines with not be permitted without specific approval by AW. If a dead end line is approved, the main must be provided with either a flushing hydrant or automatic flushing station. The wasting of water will have to be approved by the purchasing agent, normally Base DPW.

Design Flows

All distribution system expansions shall be sized to provide, at a minimum, the maximum daily domestic flow plus fire flow with residual pressures not dropping below 25 PSI at any point within the existing distribution system. All application submittals to AW should provide design data used to calculate the projected water demand.

Fire Flow requirements and systems

American Water is not responsible for calculating fire flow requirements for proposed projects. It is the responsibility of the design engineer to provide hydraulic calculations showing required fire flow is available for the proposed project.

AW does not generally allow dedicated fire supply systems. All fire systems, to the extent possible, should be supplied by the water distribution system. If booster pumps or storage facilities are needed to meet flow and pressure needs, this need shall be incorporated into the project beyond the AW contracted POD, where allowable by contract.

If a dedicated fire system must be provided, it will be owned and operated by others, and design review will not be provided except as provided "Excluded Facilities" criteria above. However, the line must have an appropriate size and type backflow preventer installed near the point of connection.

Location of water mains and appurtenances

Water mains shall be located outside of paved areas wherever possible unless ground topography or a roadway crossing dictates otherwise. Water mains shall be constructed a minimum of 3' from pavement or sidewalks. Where possible, a minimum of 10' horizontal clearance is required between water mains and sanitary sewer mains or stormwater mains, and 3' between water mains and all other utilities (other water mains, gas, telephone, electric, etc.). Water mains shall not be permitted under structures, or if they must follow that route, the POD will be as defined in AW's contract.

Mains shall be installed at least two feet horizontally and two feet vertically from all other utilities, unless AW determines this cannot be achieved by other means such as a different routing of the conflicting utility or the water main / service / appurtenance. In that case AW will define any requirements to allow a waiver of this including but not limited to encasement.

Depth

All water mains and water service lines shall have a minimum cover depth of 42" to top of pipe. This provides for both freeze protection and protection from normal traffic loading and interference with shallow installed utilities. Deeper depth may be required depending on local frost line depth, type of vehicular traffic, and other service factors. Mains installed deeper than five (5) feet to top of pipe require approval by AW, and may require different material of construction.

Pipe Locating system:

All installed pipe shall be provided with tracing wire and test stations as shown in AW's standard detail and specifications.

Water main and service line size and length

The minimum allowable size for all water main extensions is 8", unless AW determines a waiver from this is technically justified. A main is defined as any pipe that will have more than one service line connected to it or has the potential to serve more than one facility.

Service lines shall be sized based on service peak demand and AWWA Manual M-22.

The minimum allowable size of a hydrant lateral is 6" and shall not exceed 85 feet in length unless AW determines a waiver from this is technically justified.

Post Indicating Valves: (PIV)
PIVs must be installed on all fire service lines, located 40 feet from he building, or as directed by the Base fire department, and subject to AW's POD's.

Materials of Construction for piping systems
The following sets forth allowable material of construction for water piping systems. AW reserves the right to require a specific material of construction in parts of the whole project based on various factors.

Water Pipe: (*PVC Schedule 40 or 80, and Asbestos Cement pipe is not permitted*)

Type of service	Acceptable Materials	Comments	Spec Section
Service lines	Type K copper, PVC C-900, HDPE with minimum SDR 13.5 rating;		15050
Buried Mains	HDPE with minimum SDR 13.5; PVC C900 200 psi rating; Ductile Iron Pipe pressure class 300 (required for pipe larger than 16" diameter)		15105 15120 15125
Above ground Mains	Ductile Iron		15105

Pipe bedding:
All water mains shall be provided with bedding meeting the requirements of section 02320. Generally bedding will be of a crushed aggregate material from 4" below the pipe to 6" above the pipe.

Waivers from bedding may be provided by AW if it can be demonstrated that native material is of similar nature to the specified bedding, as reported by geotechnical lab analysis.

Service lines:
Service lines shall be provided with a curb-stop valve or isolating valve connected to the main Tee. Service lines shall also have a valve and valve box located at the AW POD.

Fire hydrants
Fire hydrants shall conform to AWWA C502, Standard for Dry Barrel Fire Hydrants (Latest Edition). Hydrants shall open counterclockwise. AW's system needs uniformity in fire hydrants due to maintenance and spare parts inventory purposes. The standard is Mueller Model Super Centurion 250. If the Base uses a different standard, it shall be used. All hydrants shall be furnished with 6" isolation gate valves and valve box.

Hydrants shall be painted in accordance with the local base requirements, including the bonnet color coded for flow availability.

All hydrants shall include a brass identification tag with the Hydrant's ID number based on AW's numbering system, date of installation, and physically attached to the hydrant. Hydrant numbers must be called-out on plans.

Hydrants shall be placed at or near street intersections, and at the end of permanent dead end lines. For residential areas, AW requires spacing of fire hydrants to not exceed 500 LF. Spacing of fire hydrants shall not exceed 300 feet in areas where hydrants are protecting warehouses per UFC 3-600-01. For commercial and industrial construction, no point on any proposed structure shall be unreachable with 350 LF of hose, measured around all obstacles, i.e. fences, walls, etc. No obstructions or permanent structures shall be located within 10' of any fire hydrant. No parking shall be permitted within 15' of any fire hydrant. Hydrants located adjacent to parking or vehicular traffic areas shall be protected with bollards. Bollards shall be located so that they do not block any hydrant outlets.

Valves

Gate valves shall be of the resilient-seated type and shall be in conformance with AWWA C509, open counterclockwise. Gate valves shall be used on all water mains up to 24" in diameter. On water mains 24" in diameter and greater, valves shall be butterfly valves.

Valve spacing shall not exceed 500 linear feet within residential areas and 1,000 linear feel in commercial areas. For transmission mains, valves shall be provided at a minimum of 1,000 foot intervals.

At pipe intersections, valves shall be provided on each branch of the water main intersection.

Water Meters

The requirement to install a water meter is at the discretion of the Base DPW.

If AW is to own the meter, it must be located within its contract defined POD or a clear definition of the demarcation on each side of the meter must be agreed upon by affected parties. Due to AW's automatic reading program equipment, water meters less than 1 ½" in size shall be Neptune Model T10 (ProRead Gallon 6 wheel plastic bottom) with Neptune Model R900v2-pit style MIU c/w 6-ft of antenna wire. Water meters 1 ½" and greater shall be Neptune HP Turbine meters with Neptune Model R900i-pit style MIU c/w 6-ft of antenna wire.

Water meters may be located inside mechanical rooms of buildings, subject to AW's POD's. If located outside of buildings, they must be in conformance with AW Specification Section 15195.

Backflow Prevention
AW requires backflow prevention be provided on all domestic, commercial, and fire service lines that connect to the water distribution system.

Each served facility must have appropriate backflow prevention devices per state regulations, Army Regulation (Public Works technical Bulletin 420-49-16) and AW's Cross Connection Control Practice. Details of the devices and locations can be resolved during the review process.

The location of the backflow prevention devices shall be in accordance with AW's contract, which may vary from installation to installation. Typically, if the backflow prevention device is to be retained by the government, the device shall be located inside of the building's mechanical room. If the backflow prevention device is to be owned by AW, the device will be placed inside a valve box/vault at the POD.

Devices must be installed by a State licensed cross connection control person, and a certification of device installation and stat-up checklist must be provided to AW as part of the contract close-out. Forms for this are included in AW's Cross control Practice. The AW Cross Connection Control Practice is incorporated into the Design Guide by reference.

Corrosion protection:
If soils corrosive to metal pipe exist, all metal fittings, valves, and pipes shall be cathodically protected by encasing in polyethylene wrapping in accordance with AWWA standard C-105

Air release valves:
Air release valves shall be provided at all high points along the water main alignment. The air release valve assemblies shall be located within concrete vaults or manholes, per AW's standard details.

Connection to existing water main
Connections to existing water mains shall be performed in such a manner to provide the least amount of interruption to water service. A tapping sleeve and valve is the preferred method of connecting to an existing water main. If connection to an existing water main requires the closing of valves that will cause an AW customer to lose water service, provisions shall be made by the party causing the interruption to provide temporary service, such method subject to approval by AW, but must provide for potable water in sufficient quantity for customer needs.

No taps shall be made within 5' of a joint. A Utility Connect Request Form must be submitted and approved prior to connection to any AW utility. A minimum of 72 hours notice shall be provided to AW prior to any tap installation.

Thrust restraint

Thrust restraint shall be provided at all changes in direction. Thrust restraint shall be provided by concrete thrust block whose size meet the AW standard details. Alternate thrust restraint such as "mega-lugs" may be used if engineering designs indicate they will be adequate under max high pressure conditions, accounting for water hammer and momentum, and soil conditions.

Abandonment of mains and services in place

Abandonment of mains and services shall be done in accordance with AW Standard specification for water facilities section 15185.

Generally, services shall be excavated at the curb stop or corporation stop and the valve closed off completely. If the valve fails to completely close, contact AW to schedule replacement of the valve OR remove the valve and tap and replace main section with sleeve. The service shall be physically separated from the main. The location of the disconnection shall be provided to AW on project as-built drawings.

Generally, mains shall be cut and depressurized, then capped with a mechanical cap or concrete cover. Valve shall be closed, and the valve boxes removed. All fire hydrants shall be fully removed. Upon request from AW, the fire hydrant shall be salvaged and moved to a location as determined by AW. Unsalvaged fire hydrants shall be disposed of by local policy.

In certain circumstances where failure of an abandoned main may cause problems with settlement, the main must be filled with flowable fill per specification section 15185.

Asbestos cement pipe shall be abandoned in accordance with the EPA Guidance document on Demolition Practices for ACP which has been provided as a supplemental Specification Section.

Road and railroad crossings

All crossings of railroads and multi-lane roadways shall be made by either the jack and bore method or directional drilling, or as directed by the owner of the road or railroad. Where casing pipes are determined necessary by AW or the road or railroad owner, casing pipe material shall be schedule 40 steel, 3/8" wall thickness, at a minimum, more if engineering calculations or the railroad or highway owner require more stringent carrier pipe requirements.

For two lane roadways, open cutting is not permitted without approval by the Base DPW. If open cutting is not permitted, the roadway crossing shall be performed by boring or tunneling.

All permits required for the crossing must be obtained by the project designers in a manner similar to state regulatory agency permit requirements discussed above.

Wells:
New wells may be permitted if AW determines connection to the existing distribution system is not practical. New wells may also be required to supplement existing supplies in the area.

The design, development, permitting, and construction of new wells shall follow local and state regulatory agency requirements and AW specifications.

Disinfection using chlorine gas or sodium or calcium hypochlorite is required. Wells shall be provided with chlorine contact chambers meeting the requirements of the EPA Groundwater Rule for 4-log reduction of pathogens.

Other water treatment may be required based on source water characteristics and state requirements.

Flow meters are required on all wells.

SCADA RTU's meeting AW system requirements are required on all wells.

Water Tanks:
Where water tanks may be required for domestic and / or fire protection, the details of the tank shall be based on sizing requirements of AWWA M31 or Unified Facilities Code. AW will determine tank size and location during the review process.

Water pump stations:
Water pump stations shall be above grade, housed in a masonry building meeting Base Architectural Design Guidelines. They shall provide for redundancy of service, meet average and peak design loads, and include at a minimum:

- Flow meter
- SCADA RTU with input / output points as specified by AW
- High efficiency motors (variable frequency drives shall not be installed without prior written approval from AW)
- Where appropriate to prevent water hammer, install soft start / soft stop electrical equipment, pressure relief valves, air release valves, etc
- Permanent Emergency power with automatic transfer
- All controls and power supplies to meet AW defined operation criteria
- Fully painted interior walls, piping, pumps, etc
- Security fence
- Driveway
- Necessary operational and maintenance appurtenances (hoists, run time meters, etc...)

Pumping system review plans must include hydraulic calculations, signed and sealed by a Professional Engineer. The calculations must include flow projections, hydraulic analysis of the pump station and connected delivery mains, pump information including the operating point and pump curves, and electrical power requirements for all electrical equipment. AW will consider if the station must be designed for future expansion and if so, the design shall be based on that condition.

Acceptance Testing:
Prior to connecting a new main or service line to the existing AW system, the following items are required:

1. All pressure tests have been successfully completed for all pressurized mains.
2. All bacteriological clearances for potable water mains have been received.

Please refer to American Water Standard Specification Section 15030 for pressure testing requirements. Please refer to American Water Standard Specification Section 15020 for Bac-T testing requirements.

SEWER DESIGN GUIDELINES

Overview

This design guide section provides the minimum AW guidelines for the design of sanitary sewer systems, including collection systems, force mains, and lift stations. All sewer system design shall be performed in accordance with generally accepted engineering standards and practices, American Water Standard Specifications for construction of Water Facilities, and all applicable local and state regulations.

Where the Unified Facilities Code is required to meet funding criteria, a review of applicability shall be made with AW prior to project design

Design Flows

Design flows for all proposed sanitary sewer system expansions shall be based upon building occupancy, fire flow requirements, plumbing fixtures, and other industry standard methods, submitted for review by AW

Size and Depth

All sewers shall be designed to convey peak design flow while flowing 75% full. The proposed peak design flow may not surpass the flow capacity of any pipeline.

The diameter of proposed sanitary sewers shall not exceed the diameter of the existing or proposed outlet, whichever is applicable.

Sanitary sewer lines flowing via gravity shall have a minimum diameter of 8". Sanitary sewer service laterals shall have a minimum diameter of 4" for residential connections and 6" for commercial and industrial connections.

A minimum cover of 42" to the top of the pipe shall be provided over pressurized force mains.

Materials of construction

Wastewater Pipe: (PVC Schedule 40 or 80 is not permitted)

Type of service	Acceptable Materials	Comments	Spec Section
Gravity Service lines	PVC SDR 35	Minimum service is 4" diameter	15120 15200
Gravity Mains with depth of cover ≤ 10 feet	PVC SDR 35; Ductile Iron Pipe pressure class 300, with interior epoxy coating for sewer service		15105 15120 15200
Gravity Mains with depth of cover 10-15 feet	PVC SDR 26; Ductile Iron Pipe pressure class 300, with interior epoxy coating for sewer service		15105 15120 15200
Gravity Mains with depth of cover >15 feet	Ductile Iron Pipe pressure class 300, with interior epoxy coating for sewer service		15105 15200
Force Mains less than 4 inch diameter	HDPE minimum SDR 13.5; PVC SDR 21 or SDR 26		15120 15125 15210
Force Mains 4 inch diameter and larger	HDPE minimum SDR 13.5; PVC C900 150 psi rating; Ductile Iron Pipe pressure class 300, with interior epoxy coating for sewer service		15105 15120 15125 15210
Above ground	Ductile Iron with interior epoxy coating for sewer service		15105 15210
Inside wet wells of lift stations	Ductile Iron or stainless steel (no plastic)		15105 15210

Slope

Sanitary sewers shall be designed to provide a minimum velocity of 2.0 feet per second when flowing half full. Design calculations shall be based on the Manning's formula using an n-value of 0.013. The following slopes shall be the minimum allowable slopes for each pipe diameter as indicated:

Pipe Diameter	Minimum Allowable Slope (%)
8"	0.40
10"	0.28
12"	0.22
15"	0.15
18"	0.12
21"	0.10
24"	0.08
27"	0.065
30"	0.058

The maximum allowable slope for all gravity sewers shall be such that the velocity within the pipe does not exceed 5 feet per second, as calculated using Manning's Formula.

All proposed sanitary sewer laterals shall have a minimum slope of 1%.

Sewer locations

Sewer mains shall be located outside of paved areas wherever possible unless ground topography or a roadway crossing dictates otherwise. Sewer mains shall be constructed a minimum of 3' from pavement or sidewalks. A minimum of 10' horizontal clearance is required between sanitary sewer mains and water mains or stormwater mains, and 5' between water mains and all other utilities (other water mains, gas, telephone, electric, etc.).

Gravity sewers shall be constructed in straight alignment runs between manholes. Deflection of the horizontal alignment of the gravity sewer in between manholes is not permitted.

Sewer and Water Separation

The sewer mains and service lines shall be laid a minimum horizontal distance of 10' from any existing or proposed parallel water main. The mains and service lines shall be encased in reinforced concrete or constructed of ductile iron pipe with the required lining and encasement for a distance of 10' in each direction from a crossing with a water main when the sewer line does not have a minimum vertical clearance of 18" from the water line crossing. Linings and the encasement for the ductile iron pipe shall be as noted on the drawings and specified in American Water Standard Specifications.

Clean-outs:
Service lines shall be provided with a two-way clean-out located at the AW POD.

Manholes
Manholes are required at all changes in grade, pipe size, direction, and pipe material. Additionally manholes are required at all sanitary sewer intersections.

Sanitary sewer manholes shall be constructed with concrete only. Brick construction is not permitted. Provide manhole sections, base sections, and related components conforming to ASTM C 478. The minimum internal diameter of a manhole shall be four feet (4') for manhole depths of up to 15'. For manholes of greater depth, internal diameter shall be a minimum of five feet (5'). Manhole spacing shall not exceed 400 LF.

All manhole drop connections shall be outside drops. Internal drops are not permitted. Outside drops shall be provided when the invert elevation into the manhole is 24" greater than the manhole invert.

Doghouse manholes shall be constructed at the intersection of a new sanitary sewer line with an existing sanitary sewer line.

Sanitary sewer laterals should connect directly to a main using a saddle. If this cannot be done (such as at the start of a service line), it may connect to a manhole.

Manholes that are utilized as the receiving manhole of a force main shall be provided with a fiberglass liner or sewer gas resistant epoxy coating to help prevent the early deterioration of the manhole due to the presence of corrosive gases.

Force Mains
All proposed force mains shall be a minimum of 4" in diameter, though exceptions may be granted by AW for low pressure systems or low flow systems that tie directly into a gravity sewer system.

Force mains shall be designed to maintain a minimum scouring velocity of 2.0 feet per second. Velocities within the force main shall not exceed 5.0 feet per second.

Ninety degree bends are not permitted on force mains. Forty-five degree bends shall be provided in lieu of ninety-degree bends.

Air release valves shall be provided at all high points along the force main alignment. The air release valve assemblies shall be located within concrete vaults or manholes.

Septic Systems:
New septic systems may be permitted if AW determines connection to the existing collection system is not practical.

The design, development, permitting, and construction of new septic systems shall follow local and state regulatory agency requirements.

All field test information, design calculations, and systems designs shall be submitted to AW for review and approval.

Oil-Water separators

These appurtenances are required where wastewater sources subject to petroleum elements in the wastewater exist. They shall be engineered for peak flow, and provide ease of access for cleaning and inspection, accounting for vehicle access. The systems shall be pre-manufactured units for the specific application.

All design calculations and systems designs shall be submitted to AW for review and approval.

Grease traps

These appurtenances are required where wastewater sources subject to animal and vegetable derived grease products. They shall be engineered for peak flow, and provide ease of access for cleaning and inspection, accounting for vehicle access. The systems shall be pre-manufactured units for the specific application. Only waste from grease producing sources shall flow through the grease trap (sanitary waste and other wastes shall flow through a separate lateral and connect to the receiving main.

All design calculations and systems designs shall be submitted to AW for review and approval.

Siphons

Siphons are permitted when no alternative exists. All designs and details of siphons shall be provided to AW for review and approval.

Holding Tanks

Holding tanks are permitted by specific approval from AW. Pumping and Hauling is not considered a long-term solution to wastewater management. Pump and Haul operations may be considered for project useful lives less than one-year.

Holding tanks shall be water tight, include a high level instrumentation and alarm via SCADA RTU communicating with AW's SCADA system or if one does not exist, a land-line of cell technology based auto-dialer.

Holding tanks shall provide a minimum of three days of average daily flow storage measured at the 85% of full volume capacity.

They shall be engineered, and provide ease of access for cleaning and inspection, accounting for vehicle access.

SCADA RTU's

All lift stations and holding tanks shall include a RTU and associated instrumentation for monitoring the status of these systems as determined by AW. AW will be responsible for programming the new unit into the master control station. All RTU equipment shall meet the requirements of AW's existing SCADA system.

Acceptance Testing:

Prior to placing a sewer main or service into service, the following items are required per AW specifications:

1. All pressure or vacuum tests have been successfully completed for all pressurized mains.
2. Televising of mains to verify no obstructions exist
3. Mandrel testing of the mains

Please refer to American Water Standard Specification Section 15250 for all sewer and manhole testing requirements.

LIFT STATION DESIGN GUIDELINES

Overview

The type, size, and general requirements for lift stations will be determined on a case by case basis by AW. AW will provide design information and specifications for the stations.

Designers are responsible for arranging for electric power and other support utilities to be brought to the station

Planners and Designers are encouraged to conduct a planning meeting for any pump station to adequately price and prepare drawings for the station.

Pumping system review plans must include hydraulic calculations, signed and sealed by a Professional Engineer. The calculations must include flow projections, hydraulic analysis of the lift station (or booster station) and force main, pump information including the operating point and pump curves, buoyancy calculations, and electrical power requirements for all lift station electrical equipment. AW will consider if the station must be designed for future expansion and if so, the design shall be based on that condition.

Single building units:

Small flow, one building units may be serviced by a semi-positive displacement grinder pumps system matching the specifications of E-One environmental systems. SCADA systems are not required but an audio/visual alarm is required. Power shall be provided from a dedicated circuit in the building and wire and conduit installed by the project up to the control panel location.

Standard details for a "small duplex" lift station (typically 20 gpm to 80 gpm) will be made available in AutoCAD file format for customization by the designer.

"Medium size" lift stations in excess of 80 gpm and less than 300 gpm must be engineered to provide at a minimum:

- Site access and security features (driveway and fence with vehicle access gate)
- Pre-cast concrete wet well, minimum six feet in diameter, with access hatches
- Sewage grinder (based on type of building(s) serviced
- Submersible or suction lift (non-vacuum pump assisted) duplex Pumps
- Pump removal lifting device
- Valve Vault containing isolation valves, check valves, bypass pump connection, and Magnetic type flow meter
- Permanent diesel or natural gas powered back-up Generator with automatic transfer switch
- Yard Hydrant/Water Service
- Control panel shall be provided as part of pump station package with manufacturer unit source responsibility. Base panel shall include all circuitry to control pumps including contacts, microprocessor, starters, circuit breakers, etc.

Manufacturer shall be responsible for sizing of all components. Panels shall include the following:

1. Ground fault receptacle with circuit breaker, 115 volt
2. Reduced voltage starters with under voltage release and overload coils for each phase (each pump).
3. NEMA starters
4. Local/remote dry contacts for alarms specified elsewhere.
5. Sequential, selectable alternator
6. Lightning arrestor
7. Elapsed time meter for each pump, non-resettable
8. Time delay between pumps.
9. H-O-A switches for each pump
10. Contacts for two mercury switch level control floats and one pressure transducer
11. Auxiliary heater
12. Pump failure with dry contact.
13. Generator interlock
14. Phase loss monitor.
15. Pressure transducer
16. Provide stainless steel float hanger brackets.
17. Floats shall be hermetically sealed magnetic reed liquid level sensor

- **Alarm system**
  The control building (if provided) shall have an intrusion alarm system integrated with the existing alarm systems. The alarm system will integrate the station alarms identified below. The alarms shall connect to the SCADA RTU to be provided with the pump control panel.
  1. Pump run status
  2. High wet well level
  3. Station power failure
  4. Low wet well level
  5. Loss of phase (if three phase power)
  6. Generator start failure
  7. Grinder high water
  8. Grinder motor fault
  9. Others as determined by owner during design

- **Magnetic Flow Meter**
  Magnetic flow meter shall provide 0.25% accuracy independent of fluid viscosity, density and temperature, unaffected by most solids contained in fluids. Signal shall be pulsed dc magnetic field for zero point stability. Liner shall be long life corrosion resistant liners. Units shall be calibrated by the manufacturer and confirmed calibration on-site. Units shall have integral and remote signal converter availability and grounding rings or grounding electrode. Measurement shall be largely independent of flow profile. The meter and transmitter shall be NEMA 6P for submersible service with remote amplifier. Amplifier shall produce digital signal for flow receiver/indicator/recorder.

- **Electrical power**
  Electrical power shall be designed and constructed in accordance with National Electric code requirements, as supplemented here.
  1. No junction boxes are permitted in the wet well
  2. Junction boxes shall be Nema 4X fiberglass with stainless steel quick release latches.

Large Lift stations:

- Large lift stations require special design criteria approval by AW. Generally they will include the elements of a medium size pump station but must include an equipment / operations masonry building meeting Base Architectural Design Guidelines.

APPENDIX A

Award Letter
Standard Form 26

AWARD/CONTRACT

1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 350) | RATING | PAGE OF PAGES 1 | 43

2. CONTRACT NO. *(Proc. Inst. Ident.)* NO
SP0600-08-C-8257

3. EFFECTIVE DATE
SEE BLOCK 20C

4. REQUISITION/PURCHASE REQUEST/PROJECT NO.
SP0600-04-0545

5. ISSUED BY: CODE
Defense Energy Support Center
8725 John J. Kingman Road, Suite 3830
Fort Belvoir, VA 22060-6222
Contracting Officer: Angela E. Mattox/DESC-EA
Phone: (703) 767-1348 E-mail: Angela.Mattox@dla.mil

6. ADMINISTERED BY *(If other than Item 5)* CODE

7. NAME AND ADDRESS OF CONTRACTOR *(No., street, city, county, State and ZIP code)*
American Water Operations and Maintenance, Inc.
1025 Laurel Oak Road
Voorhees, NJ 08043-3506
Phone: (856) 309-4871
DUNS: 800400751

CODE 4S7V2 | FACILITY CODE

8. DELIVERY
[ ] FOB ORGIN [ ] OTHER *(See below)*

9. DISCOUNT FOR PROMPT PAYMENT

10. SUBMIT INVOICES *(4 copies unless otherwise specified)* TO THE ADDRESS SHOWN IN: ▷ | ITEM

11. SHIP TO/MARK FOR CODE

12. PAYMENT WILL BE MADE BY: CODE HQ0105
Defense Finance and Accounting Services
Attn: DFAS-DNO, Department 3120
P.O. Box 8899 E. 56th Street
Indianapolis, IN 46249-1320

13. AUTHORITY FOR USING OTHER THAN FULL AND OPEN COMPETITION
[ ] 10 U.S.C. 2304(c) ( ) [ ] 41 U.S.C. 253(c) ( )

14. ACCOUNTING AND APPROPRIATION DATA
See Section G

15A. ITEM NO.	15B. SUPPLIES/SERVICES	15C. QUANTITY	15D. UNIT	15E. UNIT PRICE	15F. AMOUNT
	See Section B				
				15G. TOTAL AMOUNT OF CONTRACT ▷	**$348,576,801.00 EST**

16. TABLE OF CONTENTS

CONTRACTING OFFICER WILL COMPLETE ITEM 17 OR 18 AS APPLICABLE

17. [X] CONTRACTOR'S NEGOTIATED AGREEMENT *(Contractor is required to sign this document and return* 2 *copies to issuing office.)* Contractor agrees to furnish and deliver all items or perform all the services set forth or otherwise identified above and on any continuation sheets for the consideration stated herein. The rights and obligations of the parties to this contract shall be subject to and governed by the following documents: (a) this award/contract, (b) the solicitation, if any, and (c) such provisions, representations, certifications, and specifications, as are attached or incorporated by reference herein. *(Attachments are listed herein.)*

18. [ ] AWARD *(Contractor is not required to sign this document.)* Your offer on Solicitation Number ____________________, including the additions or changes made by you which additions or changes are set forth in full above, is hereby accepted as to the items listed above and on any continuation sheets. This award consummates the contract which consists of the following documents: (a) the Government's solicitation and your offer, and (b) this award/contract. No further contractual document is necessary.

19A. NAME AND TITLE OF SIGNER *(Type or print)*
James F. Sheridan
Vice President, AWO&M, Inc.

20A. NAME OF CONTRACTING OFFICER
Angela E. Mattox

19B. AMERICAN WATER OPERATIONS AND MAINTENANCE, INC.
BY J. Sheridan
(Signature of person authorized to sign)

19C. DATE SIGNED
29Sep08

20B. UNITED STATES OF AMERICA
BY Angela E. Mattox
(Signature of Contracting Officer)

20C. DATE SIGNED
9/30/2008

AUTHORIZED FOR LOCAL REPRODUCTION
PREVIOUS EDITION IS USABLE

STANDARD FORM 26 (REV. 12/2002)
Prescribed By GSA - FAR (48 CFR) 53.214(a)

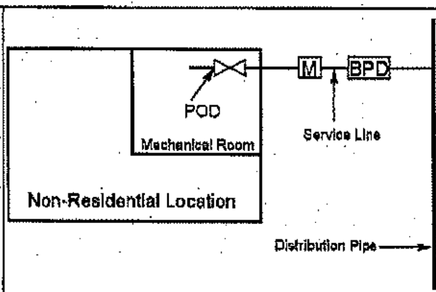
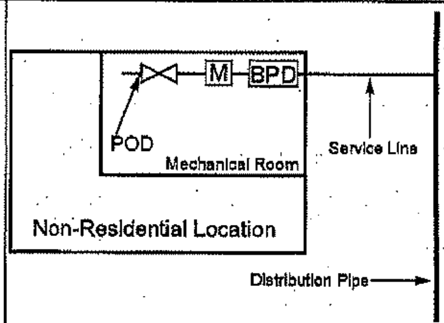
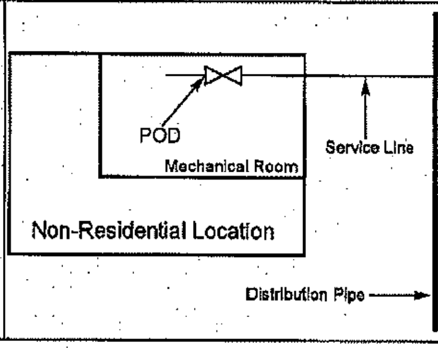
APPENDIX B

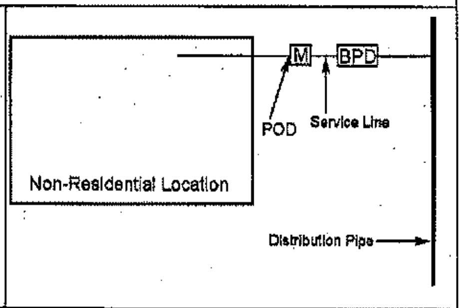
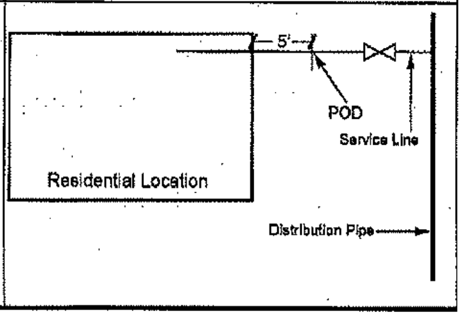
Points of Demarcation

The downstream point of demarcation at each end-user is defined as the point or component on the distribution system where ownership changes from the utility owner to the building owner. In most cases the point of demarcation is the first upstream component (i.e., meter, backflow prevention device, valve, regulator, etc.) of the system located near the perimeter (either inside or outside) of the facility footprint. In situations where the point of demarcation is located within the facility (usually a mechanical room with external access), the Contractor will be required to coordinate his work with the facility occupants; access will be accommodated.

Table 10 identifies the type of service and general location of the point of demarcation with respect to each building served by the distribution system.

TABLE 10
Points of Demarcation
Water Distribution System, Fort Polk, Louisiana

Point of Demarcation	Applicable Scenario	Sketch
Point of demarcation is the downstream side of the first valve inside the mechanical room.	Non-residential service line or dedicated fire line enters a mechanical room. A water meter [M] and / or a backflow prevention device [BPD] is located exterior to structure.	
Point of demarcation is the downstream side of the first water valve located downstream of the meter and / or backflow prevention device.	Non-residential service line or dedicated fire line enters a mechanical room and a water meter and / or a backflow prevention device is located in the mechanical room. Access to the mechanical room is from the outside, separate from the remainder of the building.	
Point of demarcation is the downstream side of the first valve inside the mechanical room.	Non-residential service line or dedicated fire line enters a mechanical room and there is no meter and / or backflow prevention device located in the service line.	

Point of Demarcation	Applicable Scenario	Sketch
Point of demarcation is the downstream side of the meter and / or backflow prevention device that is within 25 ft. of building exterior.	Non-residential service line or dedicated fire line enters the building and there is no mechanical room.	
POD is the five-foot line exterior to building footprint. *Note: Service valve may be installed at or within 5 feet of the structure at any time. Downstream side of service valve would then become the point of demarcation.*	Residential service, no shutoff valve exists within five-foot line exterior to building footprint.	

J2.2.1.3 Condition Assessment

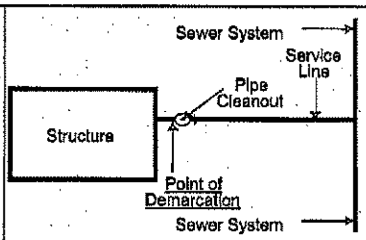
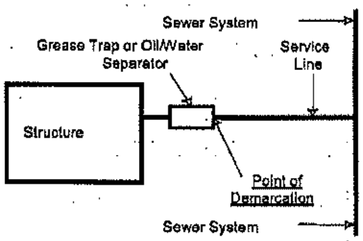
Several components in the Fort Polk water distribution systems have either exceeded or are approaching the end of their useful lives.

A comprehensive water tank inspection was completed in 2004 and identified many deficiencies. The *"Water Tank Inspection Report,"* prepared for the Directorate of Public Works, Engineering Planning and Services Division JRTC and Fort Polk, dated 1 March 2004, details the identified deficiencies in the tanks. The report recommends repairs in all tanks except the North Fort Elevated Storage Tank No. 1. Five tanks were reported to have excessive amount of lead in the exterior coating. Several tanks need new roofs, structural repairs, and new protective coatings. The recommendation is that the tank at Well 14D be replaced. The recommendation is that the cathodic protection systems installed in the tanks be removed and replaced or implement another means of protection. (Report will be included in the Offerors' Technical Library.)

J2.2.1.4 Inventory

Table 11 identifies the approximate inventory (based on best available data) of all the Fort Polk potable water distribution systems. When not specifically identified by system drawings, the size and type of system components were estimated based on the size of the piping the component was connected to. Additionally, when the year of construction was not known, it was estimated based on the age of the piping or the age of the facility served.

TABLE 6
Points of Demarcation
Wastewater Collection System, Fort Polk, Louisiana

Point of Demarcation	Applicable Scenario	Sketch
Point of demarcation is the upstream side of the cleanout device.	Residential and Non-residential service. A wastewater system cleanout is located within 25 feet of the building perimeter on the service line exiting the structure.	
Point of demarcation is the downstream side of grease trap or oil / water separator. *Note: This point of demarcation does not apply to grease traps or oil / water separators included as a part of the wastewater system inventory (connected to lift / pump stations).*	Non-residential service. Grease trap or oil / water separator.	
Point where the service line exits the structure *Note: A new cleanout device shall be installed within 5' of building during any stoppage or maintenance action. The upstream side of the cleanout device will then become the new point of demarcation.*	Residential and Non-residential service. No cleanout device exists within 25 feet of the building perimeter on service line.	None

J3.2.1.3 Condition Assessment

Several components in the Fort Polk wastewater collection piping have either exceeded or are approaching the end of their useful lives. Deteriorated collection pipe contributes to periodic I&I (Infiltration and Inflow) problems.

J3.2.1.4 Inventory

Table 7 identifies the inventory of the Fort Polk wastewater collection system. When not specifically identified by system drawings, the size and type of system components were estimated based on the size of the piping the component was connected to. Additionally, when the year of construction was not known, it was estimated based on the age of the piping or the age of the facility served.

APPENDIX C

Excluded Items

should be pointed out that this RCI initiative does not involve the transfer of land nor does it include the transfer of the existing potable water distribution system components within the housing areas. The existing distribution system components, in the housing areas which have not been renovated, have been retained by the Government and are, therefore, included as part of this UP action. The new potable water distribution system components, in the housing areas which have been renovated, are owned by the RCI Contractor and are not included as part of this UP action. It is important to note that the RCI process will result in some reconfiguration of the remaining housing areas with resultant changes in the utility systems serving those neighborhoods. The utility system owner should expect to be very much involved in these future changes.

J2.2 Potable Water Distribution System Description

J2.2.1 Potable Water Distribution System Fixed Equipment Inventory

The Fort Polk potable water system consists of all appurtenances physically connected to on-post wells, pumping stations, water treatment and distribution components, and for off-post sources-- only the distribution system. The system may include, but is not limited to wells, pumps, water treatment components, pipelines, valves, fire hydrants, storage facilities / tanks (including obstruction lights), backflow prevention devices (BPDs), fire suppression storage tanks and booster pumps, and meters.

All water rights (pumping or purchased) will remain with the Government.

Specifically excluded from the water distribution system privatization package:

- Irrigation systems

The following description and inventory is included to provide the Contractor with a general understanding of the size and configuration of the distribution system. The description and inventory were developed based on best available record data. When not specifically identified by system drawings, the type and size of the components were estimated, generally based on the size of the piping the component was fastened to. Additionally, when the year of construction was not known, it was estimated based on the age of adjacent piping or the approximate age of the facility served.

The Offeror shall base its proposal on the description and inventory listed in Section J2, on site inspections, information in the technical library and other pertinent information. The Offeror's proposal first shall be based on the information that the Government provides in the solicitation, Section J2 and inventory. As described in RFP Paragraph C11.1, *Equitable Adjustment*, if after award the Offeror identifies additional inventory not listed in Paragraph J2.2.1.4, the Offeror may submit to the Contracting Officer a request for an equitable adjustment. If the Offeror determines that the inventory listed in Paragraph J2.2.1.4 is overstated, the Offeror shall report the extent of the overstatement to the Contracting Officer, who will determine an equitable adjustment.

The Government uses the following useful lives in determining the value of the potable water utility system to be privatized:

J3.2.1.1 System Description

Fort Polk proper has two independent wastewater systems which collect and treat effluent from domestic, industrial, and commercial sources on Post:

- North Fort wastewater system
- South Fort wastewater system

There are also two remote site wastewater systems:

- Peason Ridge
- Toledo Bend Recreation Facility.

Specifically excluded from privatization of the wastewater collection and treatment system are:

- Storm water systems
- Septic tank systems
- Two centralized vehicle wash facilities and the associated ponds

NORTH FORT WASTEWATER SYSTEM

The wastewater collection system at North Fort includes service laterals, manholes, collection mains, lift stations, force mains, and a treatment plant. The North Fort system includes the North Fort area, the Alligator Lake area, and the North Fort Army Family Housing (NFAFH) area. Wastewater from the Alligator Lake area is pumped by three lift stations via a 4-inch force main to a manhole south of H Avenue. This manhole is part of the North Fort collection system. The wastewater collection system at NFAFH consists of 6-inch, 8-inch, and 10-inch gravity collection mains. The collected wastewater flows to a lift station located on the southwest part of NFAFH. This NFAFH lift station pumps the wastewater via an 8-inch force main to a manhole west of Texas Avenue. From this manhole the wastewater flows by gravity through a 10-inch main and seven more manholes to a North Fort collection system manhole south of Mobile Street near Building 7198.

The collection system within North Fort area is primarily a gravity system. Two large gravity mains, a 15-inch main and a 21-inch main merge to a 24-inch main that enters the North Fort WWTP.

The table below summarizes the lift stations in the North Fort system:

APPENDIX D

American Water Permit Application for Water/Sewer Tap and Line Installation

American Water/ Military Services Group- Utility Owner
Fort Polk, Louisiana

Permit Application for Water or Sewer Tap and or Line Installation

Permit # ____________

Application Date:__________

Please check boxes that apply:

Water Tap	Water Line	Sewer Tap	Sewer Line	Temporary	Permanent
☐	☐	☐	☐	☐	☐

Section #1 – General Information

Name of Project Sponsor (funding Sponsor)*______________________________
* - This party is responsible for paying costs incurred by AW

Address ______________________________

Phone Number ______________ Point of Contact______________

Project Name ______________ Project No.______________

Peak Water Demand ______________ Est. Population______________

Fire Flow Requirements ______________ @ ________ for ________ hours

Engineer contact information ______________________________

____

Address/Location of Work ______________________________

____

____

Is a construction permit needed from the State regulatory agency? ☐ Yes ☐ No

(If 'Yes', AW will be the permittee on the application. The application must be submitted with all required fees and documents to LDHH.)

Is this a phase of a larger project? ☐ Yes ☐ No

(If 'Yes', provide description of whole project.)

Section #2:

Description of Work ______________________________

____

____

____

Lowest Building First Floor Elevation ____________

Highest Building First Floor Elevation ____________

Pipe Sizes Proposed:

Water Main		Sewer Main		Force Main	
Water Service		Sewer Service			

Pipe Material:

- ☐ PVC C-900
- ☐ Ductile Iron
- ☐ HDPE SDR______
- ☐ SDR 21 (Service Line Only)
- ☐ SDR 26 (Service Line Only)
- ☐ SDR 35 (Gravity Sewer Less Than 10' Bury)
- ☐ SDR 26 (Depth of Bury 10'-14')
- ☐ Type K Copper

Pipe Bedding Details ______________________________

____

____

____

____

Fire Hydrant

Manufacturer ____________

Model No. ____________

Gate Valves

Manufacturer ____________

Model No. ____________

Hydrant Flow Tests

Date of Test(s) ____________

Flow Measured____________ **GPM**

Performed by ____________

Hydrant No's ____________

Residual Pressure ____________

Backflow Prevention*

☐ Provided in Mechanical Room

☐ Exterior to Building

☐ RPZ

☐ DCV

Size _______**inch**

*- Must comply with Cross Connection Control Manual and a certificate shall be provided after installation.

Water Meter

☐ Provided

☐ Not Required

Pumping Facilities*

☐ Water Booster Station ☐ Sewage Pump Station

* - Design Report and all civil, mechanical, and electrical drawings to be provided.

Quantities of Materials – Provide a tabulation of pipe (by size and material), manholes, valves (by size), fire hydrants, cleanouts, and other system features.

Appendix BB

Design Summary Package
State of Louisiana

STATE OF LOUISIANA
DEPARTMENT OF HEALTH AND HOSPITALS

LOUISIANA
Department of HEALTH and HOSPITALS

Bobby Jindal
GOVERNOR

Alan Levine
SECRETARY

PROCEDURES FOR SUBMITTING PLANS AND SPECIFICATIONS FOR REVIEW AND APPROVAL OF WATER AND SEWERAGE FACILITIES

The following procedures shall be used when submitting plans and specifications for public water systems and sewerage facilities for review and approval by the DHH/Office of Public Health. This does not include, however, projects involving the technology of individual home sewage disposal or systems at or below 3,000 gallons per day (gpd). For projects such as those, the local parish health unit should be contacted.

The State Sanitary Code requires that, prior to the start of constructions, approval by the Department of Health and Hospitals (DHH) be obtained for plans and specifications of all sewerage facilities and for all public water systems. This applies to new facilities as well as any significant modifications or extensions. Public water supplies are defined as those which have a minimum of 15 service connections or regularly serve an average of at least 25 persons daily at least 60 days out of the year. Private building plumbing and service lines do not normally require prior DHH approval; however, the installation must conform with the requirements of the Louisiana State Plumbing Code, 2000 Edition [= Part XIV (Plumbing) of the Louisiana State Sanitary Code (LAC 51:XIV)].

The plans and specifications for all projects having a design average flow of 3,000 gallons per day or less, or an equivalent organic loading, must be submitted to the local parish health unit. For larger projects, the plans and specifications must be submitted to the Engineering Services Section of the Regional Office in your area.

Following are some common maximum project sizes to be handled by the local parish health units:

3,000	gallons per day design average flow (sewage)
15	residential users
75	office or factory workers (no food handling or showers)
5	trailer sites
5	two bedroom apartments

In order to expedite our handling of your projects, the following suggestions are offered regarding plans and specifications which you submit for approval to the Department of Health and Hospitals:

1. A single set of detailed plans and specifications should be submitted at least 60 days prior to the time the approval, comments, or recommendations are desired by the owner. Plans must be signed, stamped, and dated by a registered professional engineer, licensed to practice in the State of Louisiana.

2. A detailed design summary package for all water and sewerage facilities must be submitted. The applicable design summary forms, which are attached, should be used. These forms

however, are structured for small and medium sized projects and, therefore, additional information may be needed for larger projects involving water and sewerage facilities. The design summary package is not a review tool therefore any details relevant to the review should also be included in plans and specifications.

3. Submit a vicinity map showing the project location, the sewage treatment facility location, discharge point, and receiving stream. Include a tracing of the outfall to the first perennial (non–intermittent) waterway in the path of the projected outfall.

4. Submit plot plan identifying the lots and including adjacent property usage and ownership.

5. Submit layout drawings of the sewage collection and water distribution mains, showing all pump stations, manholes, clean-outs, hydrants, valves, pipe size and materials, sewage main depth, slopes and invert elevations, water main depths, etc., as well as the sewage treatment facility location and the water well location. Collection line profiles may replace some of these data. Details that do not pertain to the sanitary features need not be included, such as electrical, storm water drainage, and street details.

6. Submit detailed drawings of sewage treatment, collection, and pumping facilities and water well, storage and treatment facilities with plan, profile, and end views, depicting dimensions, capacities, materials, and elevations referenced to the North American Vertical Datum of 1988 (NAVD88).

7. Where lots are sold, evidence must be submitted showing that the facilities will be maintained in perpetuity. Ownership by a governmental body is one way to do this. As a prerequisite to our approval of privately owned facilities, the owner must be set up to own, operate, and maintain the facilities rather than the developing company. In addition to this agency's approval, state law requires a profit type utility serving more than ten customers to register with the Louisiana Public Service Commission.

8. For extensions to an existing system, information pertaining to the existing system should be submitted. Please include present population served, design capacity of present system, capacity of lift stations, etc. The ability of the existing system to absorb the extra loading should be documented. Also, if the extension is outside the boundaries of a municipality or district, a letter of acceptance from that authority should be included.

9. For a sewage treatment plant, a complete description of the effluent outfall pattern shall be submitted. Depictions, detailed descriptions and definitions of all servitudes or rights-of-way encountered for the entire outfall path shall be provided. Written verification/authorization from the legal entity(ies) associated with said servitudes indicating no objection to the discharge of treated sewer effluent into said servitudes shall be submitted. Written verification/authorization from the local governing body indicating no objection to the proposed point of discharge and outfall path shall be submitted. If the treated effluent will encounter a Louisiana Department of Transportation and Development (LDOTD) right-of-way, a letter of no objection from LDOTD for the discharge of treated sewer effluent into the LDOTD right-of-way shall be provided. It is important that the plant not discharge across privately owned property without benefit of easement before reaching a perennial stream (See Item 3 above).

10. Elaborate on whether or not the proposed water well and water treatment facilities and sewage treatment and pumping facilities are located above the 100-year flood plain. If not, explain the protective measure to be used. Floodplain, Base Flood Elevation/100-Year Flood Elevation, and elevations of the proposed structures shall be shown on the plans.

11. The review of the plans and specifications are made, with some exceptions, in accordance with the "Recommended Standards for Wastewater Facilities", 1990 Edition, and the "Recommended Standards for Water Works", 2003 Edition, promulgated by the Great Lakes - Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers [available from the Health Education Services – P.O. Box 7126 – Albany, NY 12224 (www.hes.org)]. Design standards for water well construction is contained in the "Louisiana Water Well Rules, Regulations, and Standards", November, 1985 Edition (LAC 56:I), promulgated by the Louisiana Department of Transportation and Development, Water Resources Division. Additional Design Standards for water and sewerage facilities are given in Parts XII and XIII, respectively, of the State Sanitary Code. The state sanitary code is available at http://www.dhh.louisiana.gov/offices/?ID=242 .

12. The Louisiana Department of Environmental Quality (DEQ) is responsible for determining the water quality requirements in the State for all wastewater discharges as well as for the issuance of wastewater discharge permits. State law requires that a discharge permit be obtained from the Department of Environmental Quality, Office of Environmental Services, Water & Waste Permits Division, P. O. Box 4313, Baton Rouge, LA 70821-4313 (Phone # 225-219-3181) prior to discharge of any wastewater. You may also be required to obtain a federal permit for the wastewater discharge, about which DEQ can advise you.

13. Federal mandate for DEQ to establish Total Maximum Daily Loads (TMDLs) for all water bodies in our state have resulted in lower limits being established for wastewater dischargers to specific receiving streams based on what organic loads the receiving stream may already have and other stream specific data. A copy of your Administrative Completeness Determination letter from DEQ or existing DEQ discharge permit shall be submitted along with this design summary package for all permits involving a wastewater treatment facility. Regarding this you should contact DEQ Water Permits Division, PO Box 4313 Baton Rouge, LA 70821-4313 whose phone number is 225-219-3181.

14. If the project involves work or structures in the waters of the State including adjacent wetlands, a permit from the U. S. Army Corps of Engineers may be required. Examples, of this are water intake structures, pipeline stream crossings, and sewage plant out fall structures. Regarding this, you should contact the New Orleans District Corps of Engineers, Department of the Army, P. O. Box 60267, New Orleans, LA 70160. Attention: LMNOD-SP. Or the Vicksburg District Corps of Engineers, Department of the Army, 4155 Clay Street, Vicksburg, MS 39183-3435. Attention: CEMVK-OD-F

15. If the project would have an impact on any surface water body that has been designated as a Scenic River, then a permit may be required from the Louisiana Department of Wildlife and Fisheries. Regarding this you should contact the Ecological Study Section, Louisiana Department of Wildlife and Fisheries, P. O. Box 14526, Baton Rouge, LA 70898.

16. The Operator for Public Water Systems and Community Sewer Treatment and Collection Systems shall hold a current and valid Professional Certification (s) of the required category as set forth in R.S. 40:1141-1151. Additionally, an Operator shall demonstrate that when not

present at the facility, he or she is capable of responding to that location within one (1) hour of being notified that his presence is needed. For more information regarding Operator Certification, please call the Department of Health and Hospital’s Office of Public Health Operator Certification Unit at (225) 342-7508.

17. Once the project is completed, the last page titled “CERTIFICATION OF CONSTRUCTION” shall be completed, sealed and signed by the Engineer-of-Record and signed by the contractor then submitted to the office from which the permit was issued. Your permit is not considered final until this step has been completed.

☐**WATER SYSTEM** ☐**SEWAGE SYSTEM** ☐**WATER & SEWAGE**

DESIGN SUMMARY PACKAGE

(Fill Out Applicable Sheets)

Project:			
Engineer:			
Telephone:			
Parish:		Nearest Town:	
Population Served:			
New System? ☐Yes ☐No		Existing System? ☐Yes ☐No	
Project to be Owned and Operated By: (include name and address)			
Proposed Project Will Tie-in to:	Water (specify PWS ID):		
	Sewer:		

SEWER COLLECTION SYSTEM

<table>
<tr><td>Project:</td><td colspan="5"></td></tr>
<tr><td>Engineer:</td><td colspan="5"></td></tr>
<tr><td>General Scope of Project:</td><td colspan="5"></td></tr>
<tr><td rowspan="3">GRAVITY PIPING</td><td>Material (specify ASTM standard and standard dimension ratio-SDR)</td><td colspan="4"></td></tr>
<tr><td>Size (8 inch minimum diameter)</td><td colspan="4"></td></tr>
<tr><td>Joints and Materials of Fitting:</td><td colspan="4"></td></tr>
<tr><td rowspan="3">FORCE MAINS</td><td>Material (specify ASTM standard and standard dimension ration-SDR)</td><td colspan="4"></td></tr>
<tr><td>Size (3 inch minimum diameter <u>without</u> grinder pumps; 1 ¼ minimum diameter <u>with</u> grinder pumps)</td><td colspan="4"></td></tr>
<tr><td>Joints and Materials of Fitting:</td><td colspan="4"></td></tr>
<tr><td rowspan="7">LAYOUT</td><td>Slope of Gravity Mains</td><td>____%Min.</td><td>____%Max.</td><td colspan="2">____%Majority</td></tr>
<tr><td rowspan="2">Location with Respect to Water Lines:</td><td colspan="3">Maintain 18” Minimum Vertical Clearance @ Crossings?</td><td>☐Yes ☐No</td></tr>
<tr><td colspan="3">Maintain 6’ Minimum Horizontal Clearance?</td><td>☐Yes ☐No</td></tr>
<tr><td>Maximum Distance Between Manholes:</td><td colspan="4"></td></tr>
<tr><td>Number of Surface Water Crossings/Encounters:</td><td colspan="4"></td></tr>
<tr><td rowspan="2">Other Comments: (Manhole Construction, Highway Crossing, etc.)</td><td colspan="4"></td></tr>
<tr><td colspan="4"></td></tr>
<tr><td colspan="3">Deflection Testing?
☐ Yes ☐ No</td><td colspan="3">Hydrostatic Testing?
☐ Yes ☐ No</td></tr>
<tr><td colspan="2">NAME OF CERTIFIED OPERATOR:</td><td colspan="4"></td></tr>
</table>

WATER WELL

1 of 2

Project:		
Engineer:		
Date:		Site Fenced? ☐Yes ☐No
General Scope of Project:		
Site Location: (also complete the last section of this table)		50' Radius of Ownership? ☐Yes ☐No
Maximum # of Lots (or population):		

INTERNAL STRUCTURE (sketch on separate sheet)	Outer Casing	Linear Feet:	
		Thickness:	
		Pounds/Foot:	
		Joint:	
		Type of Seal to Outer Casing:	
	Inner Casing	Linear Feet:	
		Thickness:	
		Pounds/Foot:	
		Joint:	
	Grouting	Depth of grout:	
		Thickness:	
		Method With a Setting Time of?	
	Screen	Linear Feet:	
		Type:	

EXTERNAL STRUCTURE (sketch on separate sheet)	Casing Head Seal? ☐Yes ☐No	Slab & Motor Foundation? ☐Yes ☐No
	Well Vent	Diameter: (½"inch minimum) _____ inches Down-Turned? ☐Yes ☐No Terminates 24" above 10-year Flood Level or floor whichever is greater? ☐Yes ☐No Twenty Four Mesh Screen? ☐Yes ☐No Watertight Seal at Casing? ☐Yes ☐No
	Drawdown Gauge:	Type (seal):
	Pump	Type: Power:
		Capacity (GPM): @ TDH (FT)
	Prime Mover:	

WATER WELL

2 of 2

DISCHARGE PIPING	Discharge Piping Material:	
	Down-Turned Smooth-Nozzle Sample Tap?	☐Yes ☐No
	Check Valve?	☐Yes ☐No
	Shutoff Valve?	☐Yes ☐No
	Discharge Bypass?	☐Yes ☐No
	Pressure Gauge?	☐Yes ☐No
	Means of Measuring Flow?	☐Yes ☐No
COMPLETION SPECIFICATIONS	Disinfection Method: (include chlorine dosage and retention time)	
	Testing to be Performed:	
	Abandoned Holes? ☐Yes ☐No	
NAME OF CERTIFIED OPERATOR:		

LOCATIONAL INFORMATION	Coordinates: Latitude **00°00'00.0"**N Longitude **00°00'00.0"**W OR Latitude **00. 00000**°N Longitude **00. 00000**°W
	Geographic Datum: NAD83 ☐ WGS84 ☐ NAD27 ☐
	Collection Method: GPS ☐ — DGPS/WAAS enabled? Yes ☐ No ☐ — Horizontal Accuracy? _____ meters Map ☐ Specify: _____ Scale: _____

WATER SUPPLY BOOSTER STATION

Project:				
Engineer:				
Site Location:				
Water is Transmitted From:		To:		
CONSTRUCTION	Exterior Structure	Length:	Width:	Height:
		Floor Material:		
		Material:		
		Ventilation? ☐Yes ☐No	Floor Elevation (6” Above Finished Grade?) ☐Yes ☐No	
	Interior Structure	Lighting:		
		Heating:		
		Chlorination? ☐Yes ☐No	Type:	
		Floor Slope (3”/10’):		
	Pumping	Number:		
		Type:	Power:	
		Capacity (GPM):	@	TDH (FT)
	Piping	Pipes to Pumps	Size:	
			Type:	
		Pump Discharge Pipe	Size:	
			Type:	
		Common Discharge Pipe	Size:	
			Type:	
		Backflow Prevention? ☐Yes ☐No	Type:	
GENERAL COMMENTS:				

WATER SUPPLY FINISHED WATER STORAGE

1 of 2

Project:		
Engineer:		Site Fenced? ☐Yes ☐No
Date:		
Site Location:		

Type of Storage Facility:

☐Treatment Plant Storage (i.e. clearwell) ☐Hydropneumatic Pressure Tank
☐Elevated Storage Tank ☐Ground Storage Tank

SIZE	Diameter/Depth:	
	Height and/or Length:	
	Elevation:	
	Shape:	
	Capacity (gal):	
	Material (type):	
	Wall Thickness:	
	Cover Thickness:	
	Floor Thickness:	
Base Construction:		
Corrosion Control:		

COATING	Interior: NSF Approved Yes ☐ No ☐				Cathodic Protection? ☐Yes ☐No
MANHOLE	Size:				
	Overlap 2"? ☐Yes ☐No	Water Tight? ☐Yes ☐No	Accessible? ☐Yes ☐No	Secure? ☐Yes ☐No	

OVERFLOW PIPING (n/a for pressure tanks)	Turned Down 12"-24" Above Grade? ☐Yes ☐No Screened? If Flapper, Screened Inside? ☐Yes ☐No Splash Pad or Inlet Drainage Structure? ☐Yes ☐No Diameter ____ inches
VENTS (n/a for pressure tanks)	Turned Down 24" Above Roof or Sod? ☐Yes ☐No Twenty Four Mesh Non-Corrodible Screen? ☐Yes ☐No Diameter ____ inches
GENERAL	Bypass to Bring Out of Service? ☐Yes ☐No Pressure Gauge? ☐Yes ☐No Water Level Control Equipment? ☐Yes ☐No Water Level Indicating Device? ☐Yes ☐No Steel Structures Meet AWWA Standard? ☐Yes ☐No Down-Turned Smooth-Nozzle Sample Tap? ☐Yes ☐No

WATER SUPPLY FINISHED WATER STORAGE

2 of 2

PRESSURE TANKS	Water Sight Glass? ☐Yes ☐No Automatic or Manual Air Blow Off? ☐Yes ☐No Pressure Switch For Pumps? ☐Yes ☐No Means for Adding Air? ☐Yes ☐No If Air Compressor, Give Capacity: ____CFM @____PSI		
TREATMENT PLANT STORAGE (clearwells only)	Minimum Two Clearwell Compartments Provided? ☐Yes ☐No		
Disinfection Method: (include chlorine dosage and retention time, including calculations)			Testing ☐Yes ☐No
PIPING	Influent:	(diameter-inches)	(type of pipe)
	Effluent:	(diameter-inches)	(type of pipe)
LOCATIONAL INFORMATION	Coordinates: Latitude **00°00'00.0"**N Longitude **00°00'00.0"**W OR Latitude **00. 00000**°N Longitude **00. 00000**°W		
	Geographic Datum: NAD83 ☐ WGS84 ☐ NAD27 ☐		
	Collection Method: GPS ☐ — DGPS/WAAS enabled? Yes ☐ No ☐ — Horizontal Accuracy? _____ meters Map ☐ Specify: _____ Scale: _____		

WATER DISTRIBUTION SYSTEM

Project:			
Engineer:			
Date:			
General Scope of Project:			
PIPES	Material: (specify ASTM standard, dimension ratio-DR, AWWA Standard, and pressure class)		AWWA/NSF Approved? ☐Yes ☐No
	Size:		
JOINTS & MATERIALS:			
LAYOUT	Valve Spacing:		
	Means of Flushing Dead Ends? ☐Yes ☐No		
	Number of Surface Water Crossings/Encounters?		
	Location with Respect to Sewers:	Maintain 18” Minimum Vertical Clearance @ Crossings?	☐Yes ☐No
		Maintain 6’ Minimum Horizontal Clearance?	☐Yes ☐No
	Hydrants (6” Lines or Larger) ☐Yes ☐No		
Normal Operating Pressure:			
Minimum System Pressure:			
DISINFECTION METHOD (include chlorine dosage and Retention time):			
SOURCE OF WATER	New Well ☐	Existing Well ☐	
	Purchase From:		
Owned and Operated By: (include name and address)			
NAME OF CERTIFIED OPERATOR:			
ADDITIONAL COMMENTS:			

DISINFECTION

Project:		
Engineer:		
Date:		
General Scope of Project:		
Site Location:		
TYPE OF DISINFECTION:	Chlorine: ☐ Gas ☐ Solution	Ammonia: ☐ Gas ☐ Ammonium Sulfate (solution) ☐ Ammonium Hydroxide (Aqua Ammonia)
	☐ Other (please explain):	
FEEDERS/PUMPS:	# of Feeders/Pumps (2 minimum):	
	Type:	
GENERAL:	Standby Equipment? Stored in Areas Not in Direct Sunlight? Vented to Outside? Enough Space for 30 Days Storage?	☐Yes ☐No ☐Yes ☐No ☐Yes ☐No ☐Yes ☐No
STORAGE OF CHLORINE GAS:	Chlorine Storage & Feed System Building Separated? Doors Open Outward? Shatter-Resistant Inspection Windows? Fan/Light Switches Located Outside? Air Inlet Near Ceiling? Vent Fan Near Floor? Cylinders Restrained in Position? Weighing Scales?	☐Yes ☐No ☐Yes ☐No ☐Yes ☐No ☐Yes ☐No ☐Yes ☐No ☐Yes ☐No ☐Yes ☐No ☐Yes ☐No
STORAGE OF AMMONIA GAS:	Ammonia Storage & Feed System Building Separated? Fan/Light Switches Located Outside? Air Inlet Near Ceiling? Vent Fan Near Floor with Elevated Intake? Leak Detection Systems in all Areas Through Which Ammonia is Piped?	☐Yes ☐No ☐Yes ☐No ☐Yes ☐No ☐Yes ☐No ☐Yes ☐No

LIFT STATION (S)

Project:			
Engineer:			
General Scope of Project:			
PUMPS	# per Station:		
	Type:	Power:	
	Capacity (GPM):	@	TDH (FT)
	Pump Line Sizes and Type	Suction Line:	
		Discharge Line (3 inch min. diameter without grinder pumps; 1 ¼ inch min. diameter with grinder pumps):	
		Common Line:	
	Max. Solids Passage (in Inches):		
	Gate Valve on Suction? ☐Yes ☐No	Gate Valve and Check Valves on Discharge? ☐Yes ☐No	
WET WELL	Detention/Design flow (in minutes – 30 min maximum):		
	Pump Cycle Time:		
	Volume (low water to lead pump on):		
	Material:		
	Diameter:		
	Bottom Elevation:		
	Invert of Influent:		
	Floor Slope:		
	Access Cover Diameter:		
	Vented and Screened? ☐Yes ☐No		
FORCE MAIN	Size (3 inch min. diameter without grinder pumps; 1 ¼ inch diameter with grinder pumps):		
	Material (specify standard and standard dimension ratio-SDR:		
	Velocity (in fps – 2 fps minimum):		
Lift Station Cover Construction:			
Alarm Systems:	Visual: ☐Yes ☐No	Telemetry: ☐Yes ☐No	
	Audible: ☐Yes ☐No		

EXTENDED AERATION SEWAGE TREATMENT FACILITY

1 of 3

Project:			Water Well within 100'? ☐Yes ☐No
Engineer:			
General Scope of Project:			
Design Average Flow:			
BOD_5 Loading (in lbs of BOD_5 per day):			
Max. # of Lots or Population at Maximum Capacity:			
Initial # of Lots (or population):			
Industrial Waste:			
Design Effluent Limits:	BOD_5:	TSS:	NH_3N:
RECEIVING STREAM: (provide complete path from outfall to first perennial non–intermittent waterway in the path of the projected outfall.)			
Plant Manufacturer:			
Plant Model #:			
Materials of Construction:			
AERATION TANK	Volume:		
	Retention Time (24 Hour Min):		
	BOD_5 Loading: (lb per 1000 CF, 12.5 max.)		
	Screen or Communutor?	☐Yes ☐No	
FINAL CLARIFIER	Surface Area:		
	Surface Loading: (gpd/ft^2 @ peak hourly flow)		
	Volume:		
	Scum Baffle:		
	Skimmer Through:		
	Weir Loading: (gpd/ft @ peak hourly flow)		
NAME OF CERTIFIED OPERATOR:			

EXTENDED AERATION SEWAGE TREATMENT FACILITY

2 of 3

AIR SUPPLY	# of Blowers (2 minimum):		
	Capacity of Each (SCFM):		
SLUDGE RETURN	Method:		
	Maximum Flow (GPM):		
	Maximum Percent (% of DAF):		
SLUDGE DRYING BEDS	Number of Beds:		
	Area of Each Bed:		
	Total Area:		
	Area per Capita:		
	Gravel Layer Depth:		
	Sizes:		
	Sand Depth:		
	Under-drain Size:		
	Freeboard Above Sand:		Splash Plate?
			☐Yes ☐No
	Effluent To:		
SLUDGE LAGOONS	Number of Lagoons:		
	Maximum Depth:		
	Free Board:		
	Volume of Each Lagoon:		
	Volume of Each Lagoon per Capita:		
	Pump:		
	Piping Material:		Size:
	Effluent To:		
OTHER SLUDGE DISPOSAL METHODS Explain:			

EXTENDED AERATION SEWAGE TREATMENT FACILITY

3 of 3

<table>
<tr><td rowspan="6">CHLORINATION</td><td colspan="2">Number:</td><td colspan="3"></td></tr>
<tr><td colspan="2">Gas or Hypo:</td><td colspan="3"></td></tr>
<tr><td colspan="2">Capacity (lb per 24 hrs):</td><td colspan="3"></td></tr>
<tr><td colspan="2">Test Kit:</td><td colspan="3"></td></tr>
<tr><td colspan="2">Location:</td><td colspan="3"></td></tr>
<tr><td colspan="2">Ventilation:</td><td colspan="3"></td></tr>
<tr><td rowspan="6">CHLORINE CONTACT TANK</td><td rowspan="3">Inside Dimensions</td><td>Length:</td><td colspan="3"></td></tr>
<tr><td>Width:</td><td colspan="3"></td></tr>
<tr><td>Operating Depth:</td><td colspan="3"></td></tr>
<tr><td colspan="2">Capacity (gal):</td><td colspan="3"></td></tr>
<tr><td colspan="3">Retention Time:
(15 minute min. @ peak hourly flow or maximum rate of pumping)</td><td colspan="2"></td></tr>
<tr><td colspan="3">Baffles?
☐Yes ☐No</td><td colspan="2">Scum Baffle?
☐Yes ☐No</td></tr>
<tr><td rowspan="2">ADDITIONAL DETATILS</td><td colspan="2">Power Supply (Dual)?
☐Yes ☐No</td><td>Washdown Facility?
☐Yes ☐No</td><td colspan="2">Backflow Prevention?
☐Yes ☐No
Type:</td></tr>
<tr><td colspan="2">Facility Fenced?
☐Yes ☐No</td><td>Gates Locked?
☐Yes ☐No</td><td colspan="2">Access Road?
☐Yes ☐No</td></tr>
<tr><td colspan="5">Copy of DEQ Administrative Completeness Determination Letter or Discharge Permit attached? ☐Yes ☐No</td><td></td></tr>
<tr><td rowspan="2">ADDITIONAL COMMENTS</td><td colspan="5"></td></tr>
<tr><td colspan="5"></td></tr>
<tr><td rowspan="3" colspan="2">LOCATIONAL INFORMATION</td><td colspan="4">Coordinates:
Latitude **00°00’00.0”**N
Longitude **00°00’00.0”**W

OR

Latitude **00. 00000**°N
Longitude **00. 00000**°W</td></tr>
<tr><td colspan="4">Geographic Datum:
NAD83 ☐ WGS84 ☐ NAD27 ☐</td></tr>
<tr><td colspan="4">Collection Method:
GPS ☐ — DGPS/WAAS enabled? Yes ☐ No ☐
— Horizontal Accuracy? _____ meters
Map ☐ Specify: _____
Scale: _____</td></tr>
</table>

OXIDATION POND

1 of 2

Project:			Water Well within 100'? ☐Yes ☐No
Engineer:			
Site Location:			
Industrial Waste: ☐Yes ☐No (If yes, list quantity and strength)			
Design Average Capacity (lb BOD_5 per day):			
Max # of Lots (or Population at Maximum Capacity):			
Initial # of Lots (or Population):			
Receiving Stream: (provide complete path from outfall to first perennial non-intermittent waterway in the path of the projected outfall)			

1ST CELL	Influent Line	Material:	
		Size:	
		Depth of Discharge:	
		Location:	
	Levee	Interior Slope:	
		Exterior Slope:	
		Freeboard:	
		Crown Width	
	Water Surface Area Provided:		
	Operating Depth:		
2ND & 3RD CELLS	Crossover Lines	Material:	
		Size:	
		Depth Liquid Drawn From:	
		Location:	
		Water Surface Area Provided:	
		Operating Depth:	
	Effluent Line	Material:	
		Size:	
		Depth Liquid Drawn From:	
		Variable Depth:	

OXIDATION POND

2 of 2

<table>
<tr><td rowspan="6">CHLORINE CONTACT CHAMBER</td><td rowspan="3">Inside Dimensions</td><td>Length:</td><td colspan="2"></td></tr>
<tr><td>Width:</td><td colspan="2"></td></tr>
<tr><td>Operating Depth:</td><td colspan="2"></td></tr>
<tr><td>Capacity (gal):</td><td colspan="3"></td></tr>
<tr><td colspan="2">Retention Time: (15 minute minimum @ peak hourly flow or maximum rate of pumping)</td><td colspan="2"></td></tr>
<tr><td colspan="2">Over-and-Under or End-Around Baffles?
☐Yes ☐No</td><td colspan="2">Scum Baffles?
☐ Yes ☐No</td></tr>
<tr><td colspan="3">Copy of DEQ Administrative Completeness Determination Letter or Discharge Permit attached?</td><td colspan="2">☐Yes ☐No</td></tr>
<tr><td rowspan="2">ADDITIONAL COMMENTS</td><td colspan="4"></td></tr>
<tr><td colspan="4"></td></tr>
<tr><td rowspan="3">LOCATIONAL INFORMATION</td><td colspan="4">Coordinates:
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Longitude **00°00’00.0”**W
OR
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Longitude **00. 00000°**W</td></tr>
<tr><td colspan="4">Geographic Datum:
NAD83 ☐ WGS84 ☐ NAD27 ☐</td></tr>
<tr><td colspan="4">Collection Method:
GPS ☐ — DGPS/WAAS enabled? Yes ☐ No ☐
— Horizontal Accuracy? _____ meters
Map ☐ Specify: _____
Scale: _____</td></tr>
</table>

CERTIFICATION OF CONSTRUCTION

Date: ____________________

Project Name: ____
____
____
____

Permit Number: ________________________________

I hereby certify that construction for the above referenced project has been completed in accordance with the plans and specifications approved by your office in your letter dated ____________________________. The facility is now ready for operation.

Sincerely,

___________________________________ ___________________________________

Engineer of Record (Seal & Signature) Contractor

Appendix CC

Not Used

APPENDIX DD

SECTION 01 35 12.00 44

SPECIAL PROJECT PROCEDURES FOR FORT POLK

APPENDIX DD

SECTION 01 35 12.00 44

SPECIAL PROJECT PROCEDURES FOR FORT POLK

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Excavation And Trenching.

Secure required permits prior to performing any excavation or trenching on the installation.

SD-07 Certifications.

Hazardous Material Content.

For applicable materials, furnish manufacturer's certifications that materials installed on this project do not contain asbestos or the lead content does not exceed 0.06 percent (600 ppm).

Solid Waste Disposition

Termite Control

SD-11 Closeout Submittals

Asbestos Certification Letter.
CADD And GIS Deliverables.

1.2 DIRECTIONS TO FORT POLK AND LOCAL MOTELS

a. The Eastern Area Office is located at 2315 Service Command Loop, Bldg. 4740, Fort Polk, LA 71459. The office telephone no. is (337) 531-2933. See local area maps.

Driving directions from Hwy 171: East on Entrance Road (Name changes to Louisiana Avenue after entering Fort Polk), stay on Louisiana Avenue; turn right on to Texas Avenue (at 7th Traffic Light). 1st left will be Service Command Circle. 1st parking lot on left will be Building 4740.

b. For base access, proceed to the Fort Polk Visitors Center located 2 miles from Highway 171 (on Entrance Road). Valid insurance, registration, and driver's license are required for a one day visitors pass. For more information, contact the Fort Polk Visitors Center at (337) 531-4978. Contact the Corps of Engineer's office prior to visit for information concerning an extended pass.

c. Web Sites:

Ft. Worth District Website: http://www.swf.usace.army.mil/
Joint Readiness Training Center and Fort Polk, LA:
http://www.jrtc-polk.army.mil/
Newcomers: www.militaryonesource.com

d. Hotels located in Leesville, LA

Best Western-337-392-1672
Holiday Inn Express-337-239-2122
Country Inn-337-238-3506
Landmark-337-238-2854
Days Inn-337-239-2612

e. Hotels located in DeRidder, LA

Stagecoach Inn- 337-462-0022
Country Inns of DeRidder-337-462-3450

1.3 EXCAVATION AND TRENCHING

Excavation and/or trenching operations to be performed outside the (designated) limits of construction, for utility tie-ins, correction of drainage problems, or for other reasons as may be required under the terms of the contract, shall not be performed without a permit; and such work shall only be performed during normal duty hours unless otherwise approved by the Contracting Officer. Permit requests must be submitted to the Contracting Officer a minimum of 14 calendar days prior to commencement of excavation or trenching operations beyond construction limits.

1.4 PROTECTION OF THE RED-COCKADED WOODPECKER (RCW)

1.4.1 General

Construction activity shall be conducted in a manner which minimizes impacts to the RCW. The boundaries of RCW clusters are located as indicated in the contract drawings. Vehicle parking areas, material stockpiles, and portable toilets are prohibited within RCW clusters.

1.4.2 RCW Clusters

No construction activity shall occur within an RCW cluster unless indicated in the contract drawings. When work is indicated within an RCW cluster, no tree shall be removed from the cluster without first contacting the Contracting Officer and receiving approval from the Fort Polk Environmental and Natural Resources Management Division (ENRMD). When working within an RCW cluster, no earth-disturbing activities shall occur within 15 meters (50 feet) of a cavity tree. All cavity trees are marked by a white paint band. During the nesting season of 1 April through 30 June, no construction activity shall occur within an RCW cluster until ENRMD marks the nesting trees and the Contracting Officer gives approval, after which no activity shall occur within 60 meters (200 feet) of the marked nesting trees. Activity within the 60 meters (200 feet) limit shall not resume after nesting season until ENRMD determines that the fledglings have left the nests and the Contracting Officer approves resumption of the work. At all times, construction activity within RCW clusters shall start no earlier than 30 minutes after sunrise and shall halt at a minimum of 30 minutes prior to sunset. Any construction equipment which must operate within a cluster shall be moved outside of the cluster at the end of each day.

1.5 DISPOSAL OF DEMOLITION AND CONSTRUCTION DEBRIS

Unless otherwise indicated, demolition and construction debris shall be disposed of outside the limits of Government controlled land and the Contractor shall comply with all local and state regulatory requirements in his disposal operations.

1.6 HAZARDOUS MATERIAL CONTENT

Materials installed on this project shall conform with the Consumer Product Safety Commission's safety standards, especially materials used primarily for roofing, building and roofing insulation, joint sealants, elastomeric joint sealants and calking, gypsum board, plaster, paint and coatings (interior and exterior), fireproofing, acoustical ceiling systems, acoustical wall systems, mechanical and electrical equipment insulation or pipe wrappings. Submit certifications from material manufacturers attesting that their materials that are installed on this project, as applicable, do not contain asbestos and that the lead content does not exceed 0.06 percent (600 ppm) by (dry) weight of the material's non-volatile content.

1.7 ASBESTOS CERTIFICATION LETTER

Prior to the final acceptance inspection, furnish a letter certifying that no asbestos-containing materials were installed in the project. The letter format is attached at the end of this Section.

1.8 SOLID WASTE DISPOSITION

The Army requires that the installation track all solid waste generated (disposed and recycled) at Fort Polk (DA PAM 200-1 Section 5-9i), which includes construction and demolition debris. As a result, contractors are required to report to DPW-ENRMD the quantities of solid waste taken off the installation. The requirement to report to DPW-ENRMD is found in JRTC and Fort Polk Regulation 200-1 Section 9-4d(2) and the Contractor's Environmental Guide. See the Solid Waste Disposition form attached at the end of this Section.

If you have any questions or require additional information, please call the installation environmental office at 531-7542 or 6008.

1.9 TERMITE CONTROL

The Fort Polk Installation Pest Management Plan (IPMP) approves the use of the following three termicides for use on Fort Polk:

Termidor 80 WG (EPA 432-900) (BASF Corp.)
Phantom (EPA 241-392) (BASF Corp.)
Premise 75 (EPA 3125-455) (Bayer Corp.)

1.10 FORT POLK CADD AND GIS DELIVERABLES

1.10.1 Data Standards

Spatial Data Standard for Facilities, Infrastructure and Environment (SDSFIE) current release shall be followed for Geospatial database structure and attributes to allow for data integration. CADD data shall be documented according to the current release of the Architecture, Engineering and Construction (AEC)/CADD standards. All GIS and CADD data will be documented in accordance with the Federal Geographic Data Committee (FGDC) Content Standards for Digital Geospatial Metadata.

1.10.2 Coordinate System Projection and Datum

All GIS data shall use the Universal Transverse Mercator Zone 15 North projection, World Geodetic System of 1984 (WGS84) datum, and the North American Vertical Datum of 1988 (NAVD88) using Metric as the working units to ensure data alignment and accuracy.

CADD data shall be geo-referenced in the State Plane Coordinate System 1983, using the North American 1983 Geodetic Datum with Survey Feet as the working units. The projection, datum and coordinate system must be defined and then documented in the metadata for both CADD and GIS and provided whenever the data is distributed.

1.10.3 CADD & GIS Deliverables

All CADD deliverables of As-built drawings shall be delivered in a MicroStation V8 .DGN compatible format utilizing survey feet for the working units. A seed file can be obtained from the Fort Polk DPW CADD/GIS Center. GIS deliverables shall be delivered in current GeoMedia file format or an ArcView shape file format.

1.10.4 Point Of Contact

Contact: Fort Polk DPW CADD/GIS Center 337-531-6846

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 FORMS

3.1.1 Asbestos Certification Letter

CERTIFICATION LETTER

Project Name: ______________________________

Name of Contractor: ______________________________

Project Contract/Delivery Order Number: ______________

Facility Number: ______________

Date: ______________

To Whom It May Concern:

This letter is to certify that the project indicated above has been constructed using no asbestos-containing materials in accordance with the design requirements.

Sincerely,

Typed Name: ______________________________

Written / Typed Name: ______________________________

3.1.2 SOLID WASTE DISPOSITION

Contractor: ____________________________

DATE	WASTE TYPE	DISPOSAL/RECYCLING FACILITY NAME AND LOCATION	QUANTITY (LBS)	RECYCLED OR DISPOSED
1 Jan 05	*C&D Debris*	*Carrie's C&D Landfill, Leesville, LA*	*10,253.7*	*Disposed*
1 Jan 05	*Aluminum*	*Carrie's Metal Recyclers, Leesville, LA*	*600.45*	*Recycled*

Submit a copy to the Installation Solid Waste Manager in building 2516, fax to 337-531-8950, or email to carrie.henderson@polk.army.mil.

-- End of Section --

APPENDIX EE

STORM WATER POLLUTION PREVENTION PLAN

APPENDIX EE

SECTION 01 57 24.03 44

STORM WATER POLLUTION PREVENTION PLAN (Louisiana)

PART 1 GENERAL

NOTES FOR DESIGNER OF DESIGN-BID BUILD CONTRACTOR: ***Edit this section to provide guideline for Storm Water Pollution Prevention requirements for design-bid-build project that has total disturbed area of one (1) or more acre. The edited section will direct construction contractor to submit a pre-construction and operation specific SWPPP.***

NOTES FOR DESIGNER OF DESIGN-BUILD CONTRACTOR: ***Prepare pre-construction operation specific SWPPP to be implemented at the job site by a designated and qualified representative.***

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. When providing a resubmittal to address USACE review comments, the Contractor shall include annotated comment responses along with the resubmitted SWPPP (in its entirety). The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Storm Water Pollution Prevention Plan (SWPPP or SWP3);G

The construction Contractor site specific SWPPP shall prevent erosion, sediment loss from the construction site, and erosion down gradient of the developed property. To the maximum extent possible, the SWPPP shall (a) limit the area of disturbance to minimize soil loss and prevent the discharge of water quality impaired water from the construction site and (b) incorporate staged stabilization measures as work progresses throughout the duration of the project. The Contractor shall use the current forms (e.g., NOI, NOT, NOC, etc.) required by the LPDES General Permit for Stormwater Discharges From Construction Activities. Additionally, the Contractor shall maintain compliance with the Construction General Permit at all times (even when the Construction General Permit is revised by the issuing agency).

The following summarizes some of the requirements that need to be implemented into the SWPPP as required by the LPDES General Permit.

(1) The SWPPP shall comprise of three (3) major parts:
(a) narrative,
(b) drawings depicting structural and non-structural best management practices (BMPs), and
(c) permit required documentation (attachments and worksheets) for record-keeping.

(2) The Contractor site specific SWPPP shall consider the phasing of project tasks with the timing of BMPs and construction activities. Additionally, the Contractor site specific SWPPP shall consider the diversion of storm water run-on onto the disturbed portions of the project site, including limiting the area of exposed soil, and retention of sediments from escaping the exposed portion of the site.

(3) The contract drawings depict recommended or suggested BMP types and locations. Any additional BMPs or modifications to the BMPs throughout the project need to be depicted on the drawings included in the SWPPP as well as the text within the SWPPP.

(4) During construction (after USACE approval of construction operation SWPPP), SWPPP or BMP revision is required when site conditions change and when situations arise that may cause potential permit non-compliance. The SWPPP or BMP revision shall be initiated when requested by the Area Office Contracting Officer (AOCO)or as deemed necessary following an inspection conducted by the Contractor designated inspector.

(5) The NOI (when required by the applicable LPDES general permit) shall be separately submitted to all required parties by the construction Contractor and the USACE as co-operators of the construction site.

(6) The Contractor shall sign the Certification of SWPPP, the delegation letter of signatory authorization, the NOI, and the Notice of Termination (NOT) as required by the LPDES General Permit.

(7) The SWPPP must contain a list of regulated materials and construction materials and products, their location, and methods of containment for each product.

(8) The SWPPP must contain a list of wastes, their location, and method of containment.

(9) The SWPPP shall implement procedures that prevent post construction erosion from occurring. Some examples include the use of Scour Stop or equal as velocity dissipators or the placement of composite fiber turf reinforcement mats at down gradient channels.

(10) The following shall be depicted in the SWPPP drawings.

(a) Location of batch plant (if applicable) and drainage features

The following summarizes some of what is needed to be implemented

into the SWPPP as required by the USACE.

(1) The SWPPP drawings shall be prepared on site grading plans. The drawings shall include four phases or stages of Best Management Practices (BMP) structures layout:
(a) initial BMP layout at site prior to clearing and grubbing,
(b) interim BMP layout during grading activities,
(c) temporary stabilization method and locations, and
(d) final stabilization method and locations of application.

Notes on timing controls and activities shall be described on the SWPPP drawings.

(2) The SWPPP shall be prepared by a registered professional engineer, a Certified Professional in Erosion and Sediment Control (CPESC), or a licensed landscape architect who has experience with the applicable construction storm water permit as well as the use of sediment and erosion control best management practices (BMPs).

(3) The Contractor designated inspector and any person responsible for maintaining SWPPP compliance with the applicable storm water permit and permit required activities shall attend training on storm water erosion and sediment control compliance/inspections provided by the EPA, state, or vendors (e.g., www.ieca.org, www.teex.org, www.stormwatercenter.org, etc.). The inspector shall provide training certificates from accredited vendors confirming course completion. Documented experience that deals with maintaining compliance with the applicable Construction Storm Water Permit may be substituted for the above mentioned training. Documented experience must be attached to the SWPPP.

(4) The person responsible for maintaining the SWPPP shall provide briefing on the approved Construction Operation SWPPP to all on-site workers.

(5) The SWPPP shall not be submitted to the USACE unless it has been verified to meet the requirements of the applicable state Construction Storm Water Permit. Prior to submitting the Notice of Intent (NOI) (if required per the applicable state Construction Storm Water permit)to all required parties, the construction operation SWPPP shall be approved by the USACE.

(6) The SWPPP must contain the Material Safety Data Sheets (MSDS) for each material on-site or provide a reference in the SWPPP on where the sheets can be found at the project site.

(7) The SWPPP must contain a list and identify the location and method of containment for each type of waste that is to be recycled during the project.

(8) The following shall be depicted on the SWPPP drawings.

(a) A statement that verifies an emergency spill clean-up kit and spill containment device is at fuel transfer points at all times.

(b) A statement that verifies fuel tanks or fueling trucks have overfill protection devices.

(c) Construction details for all BMPs used on the construction site (e.g., BMPs for the fuel storage areas, concrete wash-out pit, borrow area, batch plant, stabilized construction access, etc.)

(9) Include a copy of this SECTION.

SD-11 Closeout Submittal

Notice of Termination; G; PER-EE

If a NOI has been submitted, a copy of the original Notice of Termination (NOT) shall be submitted to the regulatory agency and to all required parties. Prior to submittal of the NOT, Contractor shall inspect the finished site with the Area Office Contracting Officer (AOCO)and obtain photographs to prove establishment of final soil stabilization and removal of BMP controls. A copy of NOT and photographs shall be provided to PER-EE through the AOCO. The construction Contractor shall retain all documents pertaining to Construction Storm Water Permit for at least three (3) years after NOT submittal.

1.2 SUMMARY

The Contractor shall verify that the most current forms (e.g., NOI, NOC, NOT, etc.) are submitted with the SWPPP.

The Contractor shall not commence soil disturbance until approval of the site specific SWPPP is obtained from the USACE along with the USACE SWPPP certification, and USACE NOI (if applicable). Additionally, all required waiting periods as described in the LPDES General Permit must also be met before soil disturbing activities may begin.

There is no separate payment for work required in this section.

1.2.1 Site Operators, Responsibilities, and Shared SWPPP

Both the U.S. Army Corps of Engineers (USACE) and the construction Contractor meet the definitions as operators for the construction activities and operate under a shared SWPPP that addresses the requirements of the LPDES General Permit.

1.3 PROJECT IDENTIFICATION

PROJECT TITLE:[____]

LOCATION:[ ], Louisiana

1.4 PROJECT DESCRIPTION

NOTES: Provide a brief description of project site and associated

construction activities (i.e. clearing and grubbing; grading; concrete and asphalt pavement; fencing; landscaping; describe project location; necessary site work and utility service lines; and demolition, recycling and disposal of regulated substances, etc.). Reference Civil Design Analysis and drawings for site info. Identify the total project area (acres) for the proposed construction and the existing demolition sites (reference NPDES General Permit for definition on total disturbed site). The total disturbed area includes number of acres where construction activities will occur, construction right-of-way, off-site material storage area, overburden and stockpiles of dirt, borrow area, spoil area, and laydown area. Construction support facilities are to be determined by the construction Contractor.

The scope of this project includes construction of new [__________], [storm sewer,] [sanitary sewer,] [[_______],] [parking lots,] [access drives,] [sidewalks,] [lighting,] [security fence,] [communication system,] and[[_________],]. [In addition, this project shall include demolition of [________] at [________].] The total project area of the new construction site includes [off-site material storage,] [overburden and stockpiled material,] [borrow areas,] is roughly [____] acres. [The total project area of the remote demolition site is roughly [____] acres]. The total disturbed area [including the new construction and remote demolition sites] in this contract is roughly [_____].

1.5 BID OPTIONS AND PROJECT PHASING

There are [no] Bid Options for this project. [They are:

[__________________________]

[__________________________]]

[Project Phasing Activities include:

[___________________________]

[___________________________]]

1.6 STANDARD INDUSTRIAL CLASSIFICATION (SIC)

NOTES: ***SIC codes are obtained from the Standard Industrial Classification Manual published by Office of Management and Budget (OMB). For construction activity permit, the primary and sometimes the secondary codes will be for the construction activity. The second through the fourth codes will generally relate to the ultimate use of the project. Use one (1) to maximum of four (4) codes as needed to adequately describe the project.***

[1521 General Contractors - Single Family Houses]

[1522 - General Contractors - Residential Buildings, other than Single Family (i.e., barracks)]

[1541 - General Contractors -Industrial Buildings and Warehouses]

[1542 - General Contractors - Non-Residential Building, other than Industrial Buildings and Warehouses (i.e., administrative buildings)]

[1611 - Highways and Street Construction, Except Elevated Highways]

[1623 - Water, Sewer, Pipeline, and Communications and Power Line Construction]

[1629 - Heavy Construction, Not Elsewhere Classified (i.e., athletic fields, cofferdams, dikes, boat docks, railroads, reservoirs, water or sewage treatment plant)]

[1771 - Concrete Work (includes asphalt; i.e., access drives and parking lots, culvert construction)]

[1794 - Excavation Work (include trenching and earth moving]

[4581 - Airports, Flying Fields, and Airport Terminal Services]

[7033 - Recreational Vehicle Parks and Campsites]

[7538 - General Automotive Repair Shops]

[7699 - Repair Shops and Related Services, Not Elsewhere Classified (i.e., military equipment repair, machinery cleaning]

[7999 - Amusement and Recreation Services, Not Elsewhere Classified (i.e., beaches, fishing piers, picnic grounds)]

[8062- General Medical and Surgical Hospitals]

[9711 - National Security (a general category for military facilities]

1.7 LOCATION

NOTES:***Provide a narrative of the project location, including street names or easily recognized***

landmarks. As a minimum, include the following: (1) project site street name and boundary streets, (2) latitude and longitude of the project center to the nearest 15 seconds, or (3) quarter, section, township, and range in which the project is located. Describe all disturbed areas, and off-site support functions and locations for proposed facilities and remote demolition sites.

The new facility project site is within the city boundary of [City name] and is in [COUNTY name]. The project site is bounded by [name all adjacent streets]. The new facility project center is located approximately at [__] degrees [__] minutes [__] seconds latitude, [__] degrees [__] minutes [__] seconds longitude]. The physical address for the new facility is [__]. The demolition site is bounded by [__]. [The demolition site project center is approximately at [__] latitude and [__] longitude. The physical address of the demolition site is [____].] [The project borrow and material disposal area is within the project boundary.] [The project borrow area is off-site at LAT [___] and LONG [___]. The project disposal area is off-site at LAT [___] and [___] LONG.]

1.8 RECEIVING WATERS

NOTES: ***Identify the body of water that receives site runoff. If it is a tributary to a major river, identify both the tributary and the river. If runoff is collected by a storm drainage system, identify the operator of the system (i.e., the name of the military installation or municipality, the creek adjacent or on site, MS4, the ultimate receiving water body, etc.)***

The storm runoff from the new facility site flows [direction] [into new storm drain] [by sheet flow], then flows [direction] to [name of Creek] ultimately to [name of River] [name of Basin]. [The storm runoff from the demolition site flows [direction] [to storm drain] [by sheet flow], then flows [direction] to [_____.]]

PART 2 SITE DESCRIPTION

2.1 EXISTING CONDITIONS

NOTES: ***Describe current site conditions. Include information on drainage patterns and runoff coefficients. Also discuss the design storm frequencies used for runoff volume calculations. If the site is located adjacent to an existing industrial facility or in a community greater than 100,000 people, records of storm water quality near your site may be available. Include storm water quality records for the site (if it is available).***

The site generally slopes from [north] [northwest] [northeast] [west] [east][southwest][southeast] [___] to [north] [northwest] [northeast] [west] [east][southwest][southeast] [___] with an average slope of [__] percent. There are currently [no] [an existing] underground storm drainage facilities near the new facility site. Estimated existing runoff coefficients vary from [___] to [___]. Ten-year storm frequency and [__] minutes duration with [____] inches per hour intensity was used for the design of the storm drainage system. [There are currently [no] [an existing] underground storm drainage facilities at the demolition site. The demolition site generally slopes from [east] [south] to [north] [west] with an average slope of [ ] percent.]

2.2 FINAL CONDITIONS

NOTES: ***Describe site conditions and drainage upon completion of construction activities. Include estimates of future runoff coefficients. Describe features of the storm water system and storm water management (i.e., erosion control and velocity dissipation devices).***

Grades at the new facility site will not change significantly and is roughly about [_____] percent from [north] [northwest] [northeast] [____] to [____]. Completed facility site drainage will flow [into a new underground drainage system] [by sheet flow]. The grades surrounding the building is approximately [____] percent grade. The new project site will have a [building,] [access roads,] [service drives,] [_____], [landscaping] [and turfing]. Estimated future runoff coefficients vary from [___] to [___].

2.3 CONSTRUCTION ACTIVITIES

The Contractor shall establish storm water BMP control structures prior to conducting site disturbing activities. The Contractor shall maintain temporary and permanent site stabilization at each portion of site.

The Contractor shall maintain a record of the START date of major construction site activities (i.e., clearing and grubbing, grading, trenching and excavation, dirt moving, etc.), the STOP date when construction activities cease on a portion of the site, and the START date of stabilization measures (such as sod, seeding with native seed, vegetative buffer strips, erosion control compost, turf reinforcement mat, SCOUR STOP, etc.). See
SECTION 01 57 24.02 44 SWPP PLAN INSPECTION AND MAINTENANCE REPORT FORM for an example of a grading and stabilization log sheet.

2.4 SOILS DATA

The SWPPP narrative shall provide soils information of the proposed construction site. Possible sources of information are project soil reports, USDA soil survey data, and other published sources. Information can be found at http://websoilsurvey.nrcs.usda.gov/.

2.5 STORM WATER POLLUTION PREVENTION DRAWINGS

Each SWPPP drawing shall have a specific sheet number and title.

The following describes the items that need to be identified in the drawings of the SWPPP as required by the LPDES General Permit.

(a) Direction(s) of stormwater flow and approximate slopes anticipated after grading activities;

(b) Areas of soil disturbance and areas that will not be disturbed (or a statement that all areas of the site will be disturbed unless otherwise noted);

(c) Locations of major structural and nonstructural BMPs identified in the SWPPP;

(d) Locations where stabilization practices are expected to occur;

(e) Locations of off-site material, waste, borrow or equipment storage areas;

(f) Locations of all waters of the United States (including wetlands);

(g) Locations where stormwater discharges to a surface water; and

(h) Areas where final stabilization has been accomplished and no further construction-phase permit requirements apply.

(i) A general location map.

The following describes the items that need to be identified in the drawings of the SWPPP as required by the USACE.

(a) Existing site features and BMPs -- name of receiving waters (e.g., lake, stream, creek, river, unnamed tributary of named receiving stream, etc.), project site storm water discharge locations, existing storm grates, outfall protection devices, and BMPs.

(b) Interim grading site drainage features and BMPs -- slopes with rough grading, limit of soil disturbance area, outline of areas not to be disturbed (e.g., vegetative buffer zones, cultural resources, wetlands, and areas of environmental concern), new storm grates, new drainage outfalls, and BMPs.

(c) Areas to receive temporary stabilization. Methods of stabilization shall be identified along with the applicable specification for the stabilization (e.g., native seed mix at a certain application rate in lbs/sq-ft, etc.).

(d) Areas to receive final stabilization. Methods of stabilization shall be identified along with the applicable specification for the stabilization (e.g., native seed mix at a certain application rate in lbs/sq-ft).

(e) On-site and off-site material borrow areas, clean dirt disposal areas, and BMPs. Stabilized access roads, construction support activities and laydown areas (equipment, staging, parking, and storage areas) along with the BMPs.

(f) Concrete or asphalt batch plant and BMP (if applicable).

(g) BMP construction details for all erosion control and stabilization and sediment control BMPs(e.g., BMPs for the fuel storage areas, concrete wash-out pit, borrow area, batch plant, stabilized construction access, seeding type, silt fence, etc.)

(h) EROSION AND SEDIMENT CONTROL PLAN I (demolition site)

(i) EROSION AND SEDIMENT CONTROL PLAN II(existing site conditions depicting run-on flow diversion BMPs and run-off BMPs)

(j) EROSION AND SEDIMENT CONTROL PLAN III(interim site grading conditions depicting run-off BMP, swales BMP, storm grates BMP, and temporary stabilization areas & method specification)

(k) EROSION AND SEDIMENT CONTROL PLAN IV(complete site grading conditions depicting run-off BMPs, swales BMPs, storm grates BMPs, and final stabilization areas and method specification)

(l) Notes on timing of controls of activities

PART 3 BEST MANAGEMENT PRACTICES (BMPs)-EROSION AND SEDIMENT CONTROLS

3.1 TEMPORARY STABILIZATION

Stabilization measures shall be in conformance with LPDES General Permit Part IV.D.2.a(2) and Part III.D.2.a(2) for large and small construction activities, respectively.

The Contractor shall provide all necessary labor, services, equipment, materials (e.g., fertilizer) to obtain, transport, apply, and maintain the temporary stabilized area until final stabilization is performed.

Some examples of acceptable methods for temporary stabilization include water sprinkling with environmental sustainable soil binders (e.g., products produced by Soilworks, LLC, DirtGlue Enterprises, SoilLok, or similar) or anchored straw mulching (typically applied at 2 tons per acre). The construction SWPPP may specify other forms of temporary stabilization methods that are industry accepted and are applicable for the project site conditions.

3.2 PERMANENT STABILIZATION

Stabilization measures shall be in conformance with LPDES General Permit Part IV.D.2.a(2) and Part III.D.2.a(2) for large and small construction activities, respectively.

The Contractor designated inspector shall inspect the site with the USACE AOCO to ensure final stabilization is established. Final stabilization is defined as described in the LPDES General Permit. If final stabilization is unsatisfactory, additional measures shall be required by the USACE AOCO. If applicable, additional seeding shall be performed after temporary removal of the erosion control blankets and subsequent replacement of blankets after such activities are completed. If applicable, the Contractor's SWPPP shall specify the native seed mix species and application rate (lbs/sq-ft). Some examples of acceptable methods for permanent stabilization includes sodding, pavement, and rock blankets.

3.3 SEDIMENT BASIN

NOTE: See LPDES General Permit Part IV.D.2.a(3) and Part III.D.2.a(3) for large and small construction activities, respectively.

The [NPDES Storm Water Discharge General Permit requires a temporary sediment basin for sites where 10 acres or more are disturbed at one time. [If the disturbed site drains to a common location, a sediment pond or trap shall be constructed as initial grading activity. The pond shall be prepared by the site designer and it shall include layout and construction details. [The runoff from the site does not drain to a common collection point; therefore, a temporary sediment basin is not required.] [A series of smaller sediment basins are constructed to provide for temporary sediment control is depicted on the grading plan.] [A series of smaller sediment basins are not attainable, therefore effective sediment controls (i.e. vegetative strips and silt fences) are established on all the down slope areas of the disturbed site perimeter to control sediment in runoff]. [A construction sediment basin in not attainable because_][Temporary sediment pond receives final grade as a permanent sediment pond to manage storm runoff at the finished site.] [A temporary sediment basin is not required because construction activities at each portion of the disturbed site is less than 10 acres.]. The following elements are required if a sediment pond is constructed as an initial site activity: The slopes of sediment pond shall be stabilized with an effective form of temporary/permanent stabilization (as applicable). The storm water shall be allowed to settle after each rainfall event before dewatering in accordance with the applicable Construction General Permit.

3.4 STRUCTURAL CONTROLS

See SECTION 01 57 23 TEMPORARY STORM WATER POLLUTION CONTROL.

3.5 NON-STRUCTURAL CONTROLS

The Contractor (and the subcontractors) shall be responsible for eliminating pollutants in storm runoff from the project site. The Contractor (and subcontractors) shall be responsible for utilizing non-structural BMPs to minimize storm water pollution. Some examples of non-structural BMP include:

- Construction Practices
- Material Management
- Waste Management
- Vehicle and Equipment Management
- Employee and Subcontractor Training
- Storm Water Pollution Prevention Plan Maintenance

3.5.1 Construction Practices

Dewatering Operations: The Contractor (and subcontractor)shall prevent discharge of sediment by methods of sediment control, containment, and disposal. In project areas suspected of potential toxic or petroleum products contamination, the water shall be tested to determine method of disposal.

Paving Operations: The Contractor (and subcontractor) shall avoid discharge of pollutants to storm drains by avoiding asphalt and concrete paving in wet weather or anticipation of such event, storing material in covered containers, covering and berming storage areas, establish control structures, cover on-site storm grates, and worker and subcontractor training.

Structure Construction and Painting: The Contractor (and subcontractor) shall prevent pollutants in storm runoff by covering, or berming material storage areas, keeping job site clean and orderly, using safer alternate products, stabilizing adjacent disturbed areas, storing material in secondary containment, protecting on-site storm drains, establish control structures, and perform worker amd subcontractor training.

USACE Requirements

Stockpiles: Material shall have a storm water perimeter control devices established at a minimum distance of 10 feet from the toe of the stockpile. Materials excavated from utility trenching shall be protected from up gradient storm run-on.

3.5.2 Material Management

Material Delivery and Storage Practice: The Contractor (and subcontractor) shall prevent or reduce discharge of pollutants to storm water by minimizing the on-site storage of hazardous and toxic (HT) materials, storing HT in clearly labeled, corrosion-resistant containers with secondary containment at designated areas approved by the COR, conducting frequent inspection, keeping current inventory of construction materials on site and training of workers and subcontractor.

Material Use and Inventory: Common on-site materials are pesticides and herbicides, fertilizers, detergents, concrete material, petroleum-based products, fertilizers, tar, asphalt, steel reinforcing bars, other hazardous chemicals such as acid, lime, solvents, curing compounds, sealants, paints, glues, fertilizers, etc. The Contractor (and subcontractor) shall use less hazardous, alternate or environmental friendly material, if available. The Contractor shall have

(1) a list of construction materials used on site,
(2) a list of materials and associated potential pollutants, and
(3) method of storage and containment in the Contractor operation specific SWPPP.

Spill Prevention and Control: The Contractor (and subcontractor) shall store HT material in covered containers and inside a fenced area, have the temporary fuel storage tank bermed or contained to meet applicable Fire Code, place readily accessible spill clean-up materials, have protocol for immediate work stoppage, notification, clean-up, labeling, storage and packaging, transportation, disposal, record-keeping, closure activities, and provide training to workers and subcontractor for response to spills.

3.5.3 Waste Management

Non-Construction Wastes: The Contractor must minimize pollutant discharges from areas other than construction (including stormwater discharges from dedicated asphalt plants and dedicated concrete plants).

Construction and Waste Materials: The Contractor must: 1. Prevent the discharge of solid materials, including building materials, to waters of the United States, except as authorized by a permit issued under section 404 of the CWA; 2. Minimize exposure of construction and waste materials to stormwater, and the occurrence of spills, through the use of storage practices, prevention and response practices, and other controls; 3. Prevent litter, construction debris, and construction chemicals (e.g., diesel fuel, hydraulic fluids, and other petroleum products) that could be exposed to stormwater from becoming a pollutant source in stormwater discharges.

Solid Waste Materials: Trash and uncontaminated construction debris shall be placed in appropriate covered waste containers. Waste containers shall be emptied regularly and shall not be allowed to overflow. The disposal area of excavated material from project construction shall not be utilized for waste disposal. Routine janitorial service shall be provided for all construction buildings and surrounding grounds. No construction waste materials, including concrete, shall be buried or otherwise disposed of on-site. The Contractor shall brief all on site personnel on good house-keeping and waste minimization.

Solid Waste: Solid waste materials (e.g., grout, mortar or uncontaminated debris) shall be placed in covered containers. Trees and shrubs from site clearing shall be shredded and used as mulching material after site stabilization. Packaging materials such as wood, plastic, and paper shall be recycled to the maximum extent possible and not disposed of in a landfill. It is a requirement to perform recycling (see SECTION 01 74 19). The Contractor shall designate waste containers for segregating waste (municipal, metal, aluminum, plastic, wood pallet, packaging, glass, etc.) Dry paint cans shall be recycled. The Contractor shall designate waste disposal area, have a routine janitorial service for all structures and surrounding grounds, and have a routine schedule to service waste containers. The disposal area of excavated material from project construction shall not be utilized for solid or refuse waste disposal. Personnel on the job site shall be briefed on minimizing disposal to landfill by waste segregation and recycling.

Hazardous and Toxic Waste: All excess on-site material such as paints, solvents, petroleum products (e.g., fuel, oil, and grease, etc.), herbicides, pesticides, acids for cleaning masonry, concrete curing compounds, sealants, paint strippers, wastes from oil-based paint, and glues can become HT waste. Containers of excess material shall be labeled and managed according to the labels and as recommended by the product manufacturers. If there are no instruction provided, the Contractor shall turn in contained waste to the installation DRMO, the local household hazardous waste drop-off, or recycling program.

NOTE: ***DELETE IF REGULATED MATERIAL ABATEMENT IS NOT APPLICABLE TO THE PROJECT.***

Demolition: [Buildings to be demolished under this Contract shall require removal of the following regulated materials:] [mercury fluorescent lights], [PCB or TCB/DEPH ballasts], [items containing ozone depleting chemicals], [mercury bulb thermostats], [items containing lead-based paint or pipe joints],

and

[asbestos-containing building material] [items containing CFC] [______]. [Asbestos-containing materials shall be handled and disposed of in accordance with Section 02 82 14.00 10 ASBESTOS HAZARD CONTROL ACTIVITIES prior to building demolition.] [Lead hazard control activities shall be performed in accordance with Section [02 83 19.00 10 LEAD BASED PAINT HAZARD ABATEMENT, TARGET HOUSING & CHILD OCCUPIED FACILITIES] [02 82 16.00 20 ENGINEERING CONTROL OF ASBESTOS CONTAINING MATERIALS] [02 83 13.00 20 LEAD IN CONSTRUCTION]. [Other regulated materials shall be removed and managed in accordance with Section 02 84 00.00 44 REMOVAL, RECYCLING, AND DISPOSAL OF REGULATED MATERIAL.]

Contaminated Soil: If suspicious of soil contamination during soil moving activities, the Contractor (and subcontractor) shall stop work, notify COR, and establish containment to prevent soil transport or runoff from that location. For removal of contaminated soil, a WORK PLAN shall be prepared for COR approval prior to handling and management of the material. The WORK PLAN shall at least include the following: containment, sampling & analyses, notification to regulatory agencies, transportation, worker safety, training & environmental monitoring, disposal, and documentation and record-keeping.

Construction and Concrete Waste: Construction waste or surplus materials, demolition building debris, scrap metal, rubber, plastic, glass, concrete, and masonry products shall be segregated and recycled to minimize landfill disposal. No construction waste shall be buried or disposed of on-site. Concrete waste shall be controlled and minimized by appropriate storage methods for dry and wet materials, and control the amount of concrete and cement mixed on site. Sweepings from exposed aggregate concrete shall be collected and returned to aggregate stockpile and they shall not be washed into streets or storm drains. Concrete wastewater from wash pit is not permitted to discharge as storm runoff. See SECTION 01 57 23 TEMPORARY STORM WATER POLLUTION CONTROL for additional concrete wash-out requirements. After project completion, the Contractor shall contain wastewater, clean the basin, test and dispose of wastewater and sediment in accordance with applicable regulations and to the satisfaction of the USACE AOCO. The Contractor is responsible for all fees, levies, and disposal cost and shall provide a treatment facility signed delivery ticket.

Sanitary/Septic Waste: On-site sanitary facilities shall be established at a convenient location. Facility location, design, maintenance, and waste collection practices shall be approved by COR and are in accordance with local regulations. The Contractor (and subcontractor) shall have a routine schedule for waste pump out by a licensed hauler. Septic waste treatment system shall have a pre-construction permit from the local health regulating agency and have contract service with a licensed company. Temporary sanitary facilities discharging to sanitary sewer system shall be approved by the operator of the system and properly connected to avoid illicit discharges. Wastewater from water-based paint shall not be discharged as sanitary waste.

Building Exterior Cleaning or High-pressure Wash: Storm drains shall be protected by approved storm water control device. Wash onto dirt area, spade in, settle solids in pit, collect (mop up) and discharge to sanitary sewer (with approval from sewer operator). If the exterior paint contains lead exceeding the levels stated in the Consumer Safety Standard, mercury or mildewcide, the wash water shall be collected and disposed of as regulated material that will require sampling data for disposal to permitted facility.

Street/Pavement Cleaning: Water used for this activity shall be minimized and sediment basin shall be used to contain wastewater. At completion of construction, the silt shall be removed and disposed of in accordance with applicable regulations, and water from the basin shall be pumped to a sanitary sewer with written approval from the COR.

Dechlorination of Wastewater from Disinfection of New Drinking Water System: Reference SECTION 3 11 00 WATER DISTRIBUTION SYSTEM.

Care of Storm Water from Excavated Areas: Storm water trapped in excavated areas shall be lifted or pumped into a temporary bermed sediment basin or equal measure(s) for sediments removal. The filtered water shall runoff as sheet flow from the sediment removal area. The sediment removal area shall have the maximum separation distance possible from the site drainage outfall.

3.5.4 Dust Control

See SECTION 01 56 00 DUST CONTROL.

3.5.5 Vehicle and Equipment Management

Off-site Vehicle Tracking: The Contractor is required to keep vehicles from tracking soils from the project, borrow, and disposal sites. Temporary parking area(s) to be used 30 calendar days or more for the Contractor's equipment or personal vehicles shall be paved with temporary asphalt. The temporary parking areas shall be removed by the Contractor upon project completion and restored to the satisfaction of the COR.

Vehicle and Equipment Cleaning: Washing shall be performed off site at a commercial washing facility that has an oil/water separator as pre-treatment before connection to municipal sewer system. No vehicle washing is allowed on site, unless washing involves the rinsing of a concrete truck and wastewater is trapped in a washout pit with secondary containment.

Vehicle and Equipment Fueling: Fueling shall be off-site unless a written approval is obtained. If fueling on-site is approved, it shall be at least 150 feet from drainage courses.

The Contractor shall provide a construction detail to depict best management practices for fuel storage and fuel transfer/dispensing areas.

Fueling operations shall avoid topping of fuel tank, and avoid mobile fueling of mobile construction equipment. Fueling locations shall use impervious secondary containment (i.e., a liquid-tight berm and an impermeable liner). The containment capacity of the bermed area shall provide at least 110 percent (%) of the stored fluid.

It is necessary to have a clean-up kit and containment bloom (or absorbent material) available at all times for immediate clean-up during fueling. No petroleum fuel, oil or lubricants or products tanks are allowed on-site unless is pre-approved in writing. Emergency cut-off valve and or overfill protection device is required on fuel transfer equipment. The temporary fuel containers placed on-site shall meet the industrial standard, labeled and stored in accordance with applicable Federal, state, and local Fire codes.

In case of spill of hazardous, toxic, and radiological waste (HTRW), the Contractor shall stop work, contain spill, notify the AOCO and Safety Office, and execute spill control per the SPILL CONTROL PLAN as required in specification SECTION 01 57 20 ENVIRONMENTAL PROTECTION . Spill control, response, notification, clean-up, restoration, reporting, record-keeping, etc. shall be in accordance with 40 CFR 110 and 40 CFR 112 , other applicable Federal, state, and local regulations, and to the satisfaction of the AOCO.

Vehicle and Equipment Maintenance: Outdoor vehicle or equipment maintenance is a significant potential source of storm water pollution. Activities often include engine repair, changing fluids, etc. Such activities shall be prohibited at the job site. The construction Contractor shall verify proofs on routine maintenance of construction equipment and vehicles before bringing them to the job site.

Vehicle and Equipment Parking: Vehicle or equipment shall be regularly inspected for leaks and schedule routine maintenance to reduce the potential for leaks. If leaks are observed at the job site, such vehicle or equipment shall be repaired immediately or removed from the site.

3.5.6 Employee and Subcontractor Training

The Contractor is responsible for providing training for all workers (including the subcontractor) on the job site. The objectives in training are to provide a clear concept of activities or problems that generate pollutants to storm water, identify solutions (BMPs), promote ownership of the problems and solutions, and integrate feedback into training and BMP implementation. A certificate to verify completion of training shall be signed by all trained personnel and retained in the SWPPP.

3.5.7 Storm Water Pollution Prevention Plan Maintenance

The USACE approved SWPPP shall be readily available to inspector either from the USACE or regulatory agency. The USACE approved BMPs and SWPPP shall be revised at no cost by the construction Contractor when there are changes in site conditions, sequence of construction and operation, when sediments escape from the job site, or as dictated by the results of inspections. The BMPs and SWPPP shall be updated by the construction Contractor upon request of the USACE AOCO.

PART 4 STORM WATER MANAGEMENT AND PERMANENT CONTROLS

NOTE: ***The number and headings of these subsections will vary significantly from project to project. Use as many subsections as necessary to adequately describe erosion and sediment controls for the completed project site. While designing the site layout and grading plans, the design engineer should include features that will limit erosion and control sedimentation once project construction has been completed. Permanent structures may include curbs and gutters, storm drains, drainage ditches, culverts, pavement slopes, etc. Indicate storm frequencies and durations used for design purposes. Subsections may include, but are not limited to: RUNOFF COMPUTATIONS, STORM DRAINAGE SYSTEM, VEGETATIVE BUFFER STRIPS, DRAINAGE SWALES AND DITCHES, DRAINAGE CULVERTS and all measures discussed in SECTION 01 57 23 STORM WATER POLLUTION PREVENTION MEASURES.***

All sites for new construction and demolition shall be separately addressed. Units of measure used shall **match the construction project.**

The SWPPP designer shall determine if there are concerns associated with the discharges from sources other than storm water. The SWPPP designer shall consult with the construction Contractor to determine concrete washout pit capacity at the job site to provide total containment of concrete detention and the designed storm event.

4.1 RUNOFF COMPUTATIONS

The storm drainage design is based on a [10][__]-year storm frequency and [10][__]-minutes duration with [___] inch per hour rainfall intensity.

4.2 SURFACE DISCHARGE QUALITY

The wastewater from concrete washing activity is prohibited from discharging as surface runoff. See Part 3.6.5 of SECTION 01 57 20 ENVIRONMENTAL PROTECTION.

4.3 PERMANENT EROSION CONTROL STRUCTURES AND STORM WATER TREATMENT UNIT

Permanent drainage structures, including [concrete curbs and gutters,] [storm drainage system,] [concrete pavement,] [asphalt pavement,] [drainage swale,] [drainage ditch,] [turfing,] [vegetative strip,][concrete culvert,] [pipe culvert,] will provide erosion control at the project site.

[Storm water treatment unit shall has a stainless steel expanded screen opening of at least 4700 microns (4.7 mm or 0.185 inches) to remove sediment.]

4.4 OUTLET PROTECTION OR OUTFALL VELOCITY DISSIPATION DEVICES

NOTE: ***Identify velocity dissipation or outlet protection device to provide non-erosive flow conditions at the point of surface drainage discharge. New construction and demolition sites shall be addressed separately.***

The outlet protection or outfall dissipation device shall provide non-erosive flow conditions at the point of surface water discharge to the ditch or swale and downstream of the outfall or channel. [The proposed storm drain shall be discharged into [[flow channel] [x-inches diameter storm drain pipe] .] The outfall impact locations are protected by [e.g., SCOUR STOP or equal]. The drainage channels are protected by [e.g., seeding on prepared soil surface with ECC and overlay with composite turf reinforcement mats] [composite turf reinforcement mats overlay on solid sod].

PART 5 TIMING OF CONTROLS AND ACTIVITIES

NOTE: **Discuss the sequence of major construction activities and how the related pollution prevention measures will be implemented. Identify situations which are critical to successful construction and pollution prevention, but will not limit the Contractor's ability to determine construction phasing schedule. NOTES of Timing of Controls and Activities specific for each project shall be depicted on SWPPP drawings.**

The general Contractor shall discuss timing (sequence) of controls and construction activities to minimize soil loss from exposed areas in the construction operation SWPPP.

The following list provides a general example of the Timing of Controls and Activities.

- Minimize area of disturbance,

- Preserve existing vegetation at the downgradient portion of the site, do not disturb ground cover until it is necessary to proceed with field work,

- Install stabilized construction access,

- Install BMPs at contractor staging, stockpiles, storage, parking, borrow areas, and stockpiles (on-site and off-site locations), concrete washout pit, fuel storage/transfer area, etc.,

- Install BMP at existing storm grates (e.g., curb inlets surface inlets, manholes, catch basins, etc.),

- Install flow diversion dike and stabilize. Construct sediment trap at the downgradient end of the dike,

- Track weather and protect exposed areas with erosion control measures before anticipated storms arrive.

- Construct outfall, install BMPs at initial impact location, and stabilize flow channel prior to clearing upper watershed,

- Stage construction to the maximum extent possible by disturbing, protecting, and then stabilizing one side of river bank before disturbing the opposite side,

- Stabilize flow channel,

- Clear site for sediment pond (if applicable)and utilize sediment pond skimmer to control overflow,

- Stabilize pond slopes,

- Develop run-on BMP devices and protect loose soil areas,

- Start grading up gradient of site and stabilize disturbed areas,

- Avoid disturbing down slope areas of site until up-gradient disturbed areas are stabilized,

- Delay construction of infiltration measures until the end of project when drainage areas are stabilized,

- Install BMP protections at new storm grates (e.g., curb inlets surface inlets, manholes, catch basins, etc.),

- Protect excavated materials by installing BMP perimeter controls to protect materials from run-on and run-off

- Stabilize stockpiles and install BMPs at least 10 feet from the toe of the material,

- Backfill utility trenches in a timely manner to minimize erosion and soil loss,

- Monitor weather reports to schedule paving (asphalt or concrete), concrete saw cutting, foundation work, dust control, seeding or any activities that will impact run-off,

- Inspect and maintain BMP control structures,

- Evaluate BMP and revise BMP when site conditions or activities change. Maintain Construction General Permit and USACE required field records and training logs,

- Monitor discharge from concrete batch plant(if applicable),

- Maintain stabilized areas until final project acceptance (i.e., watering, fertilize, mow, additional seeding, etc.),

- Verify final stabilization of disturbed areas with AOCO representative. See definition in PART 2.3,

- Remove sediment and BMP control structures once disturbed areas are permanently stabilized and accepted by AOCO. Obtain photographs of site to prove establishment of stabilization and removal of all BMP controls,

- File the Contractor NOT. Provide a copy of NOT through AOCO to PER-EE.

PART 6 COMPLIANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS

NOTE: Army Regulation 200-1 requires that all Department of Defense installations and Contractors to comply with Federal environmental protection statutes, which includes a provision to observe State, and

local environmental regulations.

The SWP3 shall identify the document prepared for compliance with the National Environmental Policy Act (NEPA) of 1969, as amended. It shall discuss impact on endangered and threatened species and their (critical) habitats, archeological, cultural and historical resources and properties, wetlands, floodplains, environmental contamination and compliance issue, water resources, ecological resource, land use, noise, air quality. The installation environmental office is responsible to prepare the NEPA document at the project pre-design stage. The Contractor shall request name NEPA compliance document (Record of Environmental Consideration, Environmental Impact Statement, Environmental Assessment), date of signature for findings (Record of Decision or Findings of No Significant Impact), and include information to PART 7.

In compliance with the Clean Water Act, Section 402, a construction site of 0.4 hectare (1 acre) in size, or larger, is required to obtain a National Pollutant Discharge Elimination System (NPDES) from EPA NPDES General Permit for Storm Water Discharges from Construction Activities.

Section 404 of the Clean Water Act (CWA) stipulates discharge of dredge and fill material with jurisdictional Waters of the United States. The civil engineer and environmental planner shall evaluate the proposed site compliance with CWA Section 404. For The proposed site shall be reviewed if it crosses drainage water ways or watersheds (dry creeks and streams could be Waters of U.S.)that are contributing to the Waters of United States. The review process sometimes involved wetland delineation to identify existing national permit coverage or issuance of a Clean Water Act Section 404 Permit. The permit or a permit coverage verification memorandum could require compensatory mitigation. The compensatory mitigation shall become the initial part of construction activity. The construction Contractor shall not start soil disturbing activities until the required compensatory mitigation is implemented or the soil disturbing activities are covered under existing national permit.

The civil engineer and environmental planner shall evaluate the proposed site compliance with Clean Water Act, Section 10, the Rivers & Harbor Act of 1899.

Section 401 of the Clean Water Act stipulates the on-site sewerage discharge. If an on-site sewerage system is required, the Contractor shall prepare drawings and mark-up specifications, obtain a pre-construction permit from the state, regional Environmental Quality Office, or County Health Department. The Contractor shall contact installation Environmental Office for application of on-site sewerage system pre-construction permit.

The Contractor shall resolve all permit compliance issues prior to disturbing soil.

In compliance with the National Environmental Policy Act of 1969, as amended, the [Environmental Assessment] [Environmental Impact Statement] entitled [__________] dated [____] has been prepared and the memorandum was signed on [______].] [Record of Environmental Consideration (REC) dated [______] has been prepared for this proposed action.] [The [EA] {EIS] [REC] indicates the proposed action is [______].] [The proposed action has [______] impact on endangered and threatened species and their critical habitats.] [The attached letter dated [______] with US Fish and Wildlife Service has determined the following protection measures:[______].] [The proposed action has [______] impact on cultural and historical properties, the memorandum dated [______] from SHPO verified this resolution.] [The proposed action has [______] impact on noise.] [The proposed project site [______] encroaches upon floodplains and wetlands.] [The proposed action [______] impact air quality.] [The proposed site has [______] environmental compliance issues and an environmental baseline study (EBS) was prepared on [______]. The EBS indicated that [______]]. [This facility will have an on-site sewerage treatment system and the Contractor shall obtain a pre-construction permit prior to start work.] [The Contractor shall not start field work until [the Clean Water Act Section 10] [and] [Section 404] issues are resolved and a permit is issued or the construction activity is covered under a nationwide permit and a verification memorandum, dated [______] is completed by the the Permit Section, Regulatory Branch, US Army Corps of Engineers.] [In compliance with the Clean Water Act permit issued on [______], the Contractor shall furnished work as required for the compensatory mitigation as stipulated by the permit.] In compliance with Clean Water Act, Section 402, the Contractor and the subcontractor shall conform with all applicable NPDES General Permit stipulations to discharge storm water during construction. [The Contractor shall furnish water well development certification in accordance with state and local regulations]. In addition, the Contractor (including the subcontractor) shall comply with the Government approved Contractor's operation specific Storm Water Pollution Prevention Plan, BMP, and contract requirements as stated in this section.

The Contractor (and the subcontractor shall comply with all applicable Federal, state, and local hazardous, toxic, radiological (HTR) waste, municipal waste, sanitary and septic waste disposal regulations.

PART 7 MAINTENANCE AND INSPECTION PROCEDURES AND QUALIFICATION OF DESIGNATED INSPECTOR

The Contractor shall designate an inspector on site to ensure Storm Water Permit compliance and perform SWPPP quality control. All BMPs and control structures shall be inspected according to the requirements of Part IV.D.4 and Part III.D.4 of the LPDES General Permit for large and small construction activities, respectively. The inspector shall inspect adjacent areas daily for direct clean-up of waste materials, debris, and fugitive sediment that are blown or washed off-site.

All protective measures used and identified in the SWPPP must have maintenance performed in conformance with Parts IV.D.3 and III.D.3 of the L PDES General Permit for large and small construction activities, respectively.

The designated SWPPP inspector is responsible for maintaining the SWPPP throughout the term of permit coverage in accordance with the LPDES General Permit. All deficiencies shall be corrected and recorded. An example of a form to record this information can be found in SECTION 01 57 24.02 44 SWPPP PLAN INSPECTION AND MAINTENANCE REPORT FORM. A copy of each inspection report form shall also be provided to the AOCO.

PART 8 PROHIBITION ON NON-STORM WATER DISCHARGES

In accordance with the Part III.A.3 and Part II.A.3 of the LPDES General Permit for large and small construction activity, respectively, non-storm water discharges are prohibited during construction of the project, except for the non-storm water discharges listed below. The following list of non-storm water discharges from active construction sites are allowed and is developed based on the above guideline.

1. Discharges from fire-fighting activities;
2. Fire hydrant flushings;
3. Waters used to wash vehicles where detergents are not used;
4. Water used to control dust in accordance with Part IV.D.2.c(2) and III.D.2.c(2) of the large and small construction general permits, respectively;
5. Potable water including uncontaminated water line flushings;
6. Routine external building wash down that does not use detergents;
7. Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used;
8. Uncontaminated air conditioning or compressor condensate;
9. Uncontaminated ground water or spring water;
10. Foundation or footing drains where flows are not contaminated with process materials such as solvents;
11. Uncontaminated excavation dewatering (large construction activity);
12. Landscape irrigation (large construction activity);
13. Landscape irrigation;
14. Uncontaminated ground water infiltration (large activity).

PART 9 CONTRACTOR COMPLIANCE AND CERTIFICATION

The construction Contractor shall use this SECTION as guidance on how to prepare a construction SWPPP that includes narrative, drawings (see PART 2.5 in this section), and required worksheets. Prior to submitting the NOI(if required to be prepared per the applicable state Construction Storm Water General Permit)to the regulatory agency and all other required parties, the Contractor shall submit the operation and field specific SWPPP with a prepared and signed NOI attached for USACE review and approval.

The construction Contractor and sub-contractor shall each prepare a SWPPP CERTIFICATION. The SWPPP CERTIFICATION assures responsibility and compliance with the permitted discharges of storm water during construction. As such, the SWPPP submitted for USACE review and approval shall have a SWPPP CERTIFICATION prepared and signed by the appropriate approval authority. The USACE sharing the approved SWPPP shall prepare a SWPPP CERTIFICATION. All SWPPP certifications shall be included and retained in the SWPPP.

9.1 CONSTRUCTION SWPPP GUIDELINES

An adequate construction SWPPP includes a narrative, drawings, and required worksheets.

The narrative is a written statement to explain and justify the pollution prevention decisions made for a particular project. The narrative shall contain concise information about existing site conditions, construction phasing, BMP practices, construction schedule, and the performance the BMPs are expected to achieve, and actions to be taken if the performance goals are not achieved, and other pertinent items that may not be contained on the drawings.

The narrative shall identify all operators (see PART 1.3 in this section).

The site grading plans provide a baseline to assist in the preparation of the SWPPP drawings. The drawings shall layout various BMP types, locations, and methods of stabilization in accordance with Part IV.D.1 and III.D.1 of the LPDES General Permit for large and small construction activity, respectively, and Part 2.5 of this section.

The SWPPP shall also address the following.

- Describe the location, size, and characteristics of any wetlands, streams, or lakes that are adjacent or in close proximity to the site, and/or will receive discharges from disturbed areas of the project. Also delineate areas with high erosion potential including steep slopes.

- List Threatened and Endangered Species and Critical Habitats.
- List Cultural and Historical Resources.
- Clean Water Act Section 404 Memo or Permit Stipulations
- Septic System Permit
- Water well Permit
- Identify if concrete/asphalt plant is at site

(A batch plant may require coverage of an industrial operation permit)

- Spill Prevention and Control Measures per state or EPA and local requirements
- Spill Response

If available, submitting by electronic means is the most efficient process for filing an NOI, and therefore recommended. However, the physical address for NOI submission and payment can be found on the NOI form.

9.1.1 On-Site Construction Document, Signage, And Record-Keeping

A copy of each of the following shall be maintained in the USACE approved SWPPP in accordance with the LPDES General Permit.

- Contractor NOI,

- Contractor Certification of SWPPP,

- Contractor Signatory Delegation Letter,

- Contractor BMP Inspection and Maintenance Report,

- Qualification documents (e.g., training certificates) for Contractor personnel that maintain any part of the SWPPP,

- Contractor log for recording Major Construction Activities and Subsequent Stabilization Practices,

- Contractor log for describing construction materials stored on-site, their potential pollutants, and method of containment,

- Contractor log for describing waste materials stored on-site and method of storage,

- Contractor NOT (once the project is complete and the NOT is submitted),

- Contractor Concrete or Asphalt Batch Plant sampling records (if batch plant operation is being conducted),

- USACE Certification of SWPPP,

- USACE NOI,

- Contractor and the USACE storm water discharge permits after receipt from the regulatory agency.

A copy of each of the following shall be maintained in accordance with USACE requirements.

- Contractor NOT (append a blank form in the SWPPP to be completed once project is finished and approved by the USACE AOCO),

- Contractor's anticipated construction timeline schedule (that includes anticipated dates for soil disturbance),

- Contractor SWPPP Revision Log,

- The SWPPP shall contain label tabs or similar to clearly identify each item/section of the SWPPP,

- The SWPPP shall be retained at the project site at all times,

- A spill response action guide,

- Contractor SWPPP/BMP training log,

- Certification or Notification for a Drinking Water Well and/or Septic Sanitary Sewer System (if applicable).

The Contractor shall post the required items per the applicable LPDES

General Permit near the main entrance of each construction access point.

All records pertaining to the Storm Water Permit for discharging water associated with construction site activities shall be maintained, by the construction Contractor, for a minimum of three (3) years from the date specified in Part V.A and Part IV.A of the LPDES General Permit for large and small construction activity, respectively.

9.1.2 Storm Water Discharge General Permit Fees And Fines For Non-Compliance

The Contractor shall be responsible for the initial Contractor storm water discharge permit NOI fee and any subsequent annual permit fees during construction (if required per the applicable state Construction Storm Water General Permit). In addition, if a batch plant is on-site, the Contractor is responsible to obtain samples of surface water discharged at the batch plant. A water sample for water quality analysis shall be analyzed by a state accredited laboratory and data shall be submitted to the regulatory agency for the batch plant operation as required by applicable permit regulations.

Any fines levied by regulatory agency regarding non-compliance with LPDES General Permit shall be the Contractor's responsibility.

9.1.3 Regulatory Inspector Visits

If the regulatory agency inspector visits the job site, the workers shall notify the Contractor Designated Storm Water Inspector immediately. The Contractor's Designated Inspector shall contact the USACE AOCO immediately and both of them shall accompany the regulatory agency inspector to walk the construction site. The Contractor's Designated Inspector shall brief workers daily on the BMP and the SWPPP, logistics of a regulatory agency inspector site visit, and avoid having an unattended regulatory agency inspector on the job site. The Designated Inspector shall assign a responsible person in his/her absence to oversight the logistic of regulatory agency inspector site visit.

9.2 NOTICE OF TERMINATION (NOT)/COMPLETION REPORT

Notice of Termination (NOT) is applicable for construction activities that submit an NOI. A Small Construction Activity Completion Report (SCACR) is required for small construction activities. If applicable, the regulatory agency will automatically send the annual storm water permit payment notice if a NOT is not received in the data base before a set date each year. The Contractor is responsible to pay any annual fee on a construction storm water discharge permit.

At establishment of final stabilization, the Contractor shall have USACE AOCO approve the project's final stabilization as well as remove sediment and BMP sediment controls, obtain pictures of the permanently stabilized site and removal of BMP controls, and written approval from USACE AOCO. The Contractor shall prepare a NOT and submit his/her own NOT to the appropriate regulatory agency and any other applicable contacts (i.e., MS4s, cities identified in the SWPPP, etc.). The Contractor shall provide two (2) copies of the filed NOT and site photos to the USACE AOCO. The AOCO shall retain a copy of the NOT as project closure documentation and forward the other copy of NOT and photos to CESWF-PER-EE.

For all other construction activities (i.e., ones that do not require a filing of an NOT), the Contractor shall file the proper documentation to the regulatory agency and any other applicable contact (i.e., MS4s, cities identified in the SWPPP, etc.) as described in the LPDES General Permit. A copy of this document submittal shall be provided to the USACE AOCO. The AOCO shall retain a copy of the documents sent to the regulatory agency and other applicable contacts as project closure documentation and forward a copy of all the documents and photos to CESWF-PER-EE.

The Contractor is responsible for fines due to non-compliance with closure documentation for the construction activity storm water discharge permit.

9.3 NOTIFICATION TO MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)

Not applicable.

SECTION 01 57 25.00 44

SWPP PLAN INSPECTION AND MAINTENANCE REPORT FORM

PART 1 GENERAL

The form identified below provides a baseline for an inspection report form that can be used while conducting SWPP Plan site inspections. Inspection reports must be prepared and documented in accordance with the applicable Construction Storm Water Permit (i.e., Part IV.D.4 of the Louisiana LAR100000 Construction General Permit, Part III.D of the Louisiana LAR200000 Construction General Permit, and Part 4 of the NPDES General Permit for Storm Discharges from Construction Activities). The form provided below may not be applicable to all states and therefore needs to be verified by the Contractor that it is in compliance with the applicable construction general permit.

1.1 SWPP PLAN INSPECTION REPORT FORM

The following inspection is being performed in compliance with the applicable state's General Permit or the EPA NPDES permit, whichever is applicable, relating to discharges from construction activities (for the State of Texas it is Section F.8 of the TCEQ General Permit No. TXR150000; for the State of Louisiana it is LPDES Permit # LAR 100000 (LARGE construction activity) or LPDES Permit # 200000 (SMALL construction activity)).

STORM WATER PERMIT #:____
PROJECT NAME:____
PURPOSE OF INSPECTION:____
INSPECTOR:___________________________________DATE:______________
________ DAYS SINCE LAST RAINFALL ON:___________________________
AMOUNT OF LAST RAINFALL: _______________ INCHES
( ) ONSITE RAIN GAGE ( ) METEOROLOGICAL TOWER AT:__________________
IS A CONSTRUCTION SITE NOTICE POSTED:________________________________
IF YES, LOCATION: ____
IS PERMIT ATTACHED TO PLAN: ____
IS PLAN CERTIFIED IN ACCORDANCE WITH REGULATIONS: _________________________

STABILIZATION CONTROL SECTION

For each area of the construction project, use this chart to track the dates of soil disturbing activity, identify stabilization measures, and monitor their effectiveness. Discharge locations should be inspected to check the effectiveness of these erosion control measures.

AREA	DATE LAST DISTURBED	DATE OF NEXT DISTURBANCE	STABILIZED (Y/N/TEMP)	STABILIZED WITH	CONDITION, COMMENTS
________	_________	____________	__________	__________	_________
________	_________	____________	__________	__________	_________
________	_________	____________	__________	__________	_________

COMMENTS / STABILIZATION REQUIRED (if appropriate): __________________________
____

STRUCTURAL CONTROLS SECTION

Use this table to document the effectiveness of each structural control, such as silt fences, berms, riprap, etc. Copy this sheet as required. Discharge locations should be inspected to check the effectiveness of these erosion control measures. See the Installation's Storm Water/Surface Water Pollution Prevention Best Management Practices Guidance Document for correct installation/maintenance methods.

TYPE	LOCATION	INSTALLED CORRECTLY?	EVIDENCE OF EROSION?	MAINTENANCE REQUIRED
________	________	____________	__________	__________
________	________	____________	__________	__________
________	________	____________	__________	__________

COMMENTS: ____

MATERIAL STORAGE AREAS

EVIDENCE OR POTENTIAL FOR POLLUTANTS ENTERING THE DRAINAGE SYSTEM: __________
____

OTHER COMMENTS: ____

NON STORM WATER AND NON STRUCTURAL BMP CONTROLS

The following non-storm water discharges from active construction sites are allowed.

- discharges from fire fighting activities,
- uncontaminated fire hydrants flushing,
- water from the routine external washing of vehicles, the external portion of buildings or structures, and pavement, where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occured (unless spilled materials have been removed; and if local, state, or federal regulations are applicable, the materials are removed according to those regulations), and where the purpose is to remove mud, dirt, or dust,
- uncontaminated water used for dust control,
- potable water sources including waterline flushings (excluding discharges of hypechlorinated water, unless the water is first dechlorinated and discharge are not expected to adversely affect aquatic life),
- uncontaminated air conditioning condensate,
- uncontaminated ground water or spring water, including founation or footing drains where flows are not contaminated with industrial materaials such as solvents,
- and lawn watering and similar irrigation

PROHIBIT DISCHARGING NEW WATER LINE DISINFECTION WASTEWATER AND CONCRETE WASHOUT PIT WASTEWATER. NEUTRALIZE CHLORINE RESIDUAL IN DISINFECTION WASTEWATER TO 4 PPM PER AWWA C651 AND METERED TO SANITARY SEWER OR DISCHARGE TO SEDIMENT POND. EVAPORATE WASHOUT PIT AND RECYCLE CONCRETE.

LOCATIONS WHERE VEHICLES ENTER OR EXIT SITE

EVIDENCE OF OFFSITE SEDIMENT TRACKING: ____________________________________

METHOD TO CORRECT ______________________________
DATE COMPLETE____________________

OFFSITE DISCHARGES

EVIDENCE OF SEDIMENT OR OTHER POLLUTANTS LEAVING SITE: ( ) YES ( ) NO
IF YES, LOCATION: ____
METHOD TO CORRECT _______________________________
DATE COMPLETE____________________

STORM WATER POLLUTION PREVENTION PLAN REVISION

If this inspection has revealed any issues that require an update to the SWPP Plan, include them here.
CHANGES REQUIRED TO THE SWPP PLAN (if appropriate): ______________________

____

REASONS FOR CHANGES (if appropriate): ______________________

____

LIST ANY ADDITIONAL LOCATIONS WHERE BMPs ARE NEEDED: ______________________

____

LIST ANY INCIDENTS OF NONCOMPLIANCE WITH SWPP PLAN AND NECESSARY MODIFICATIONS TO SWPP PLAN: ______________________

IS FACILITY IN COMPLIANCE WITH SWPP PLAN AND PERMIT? ______________________

If yes, this inspection must be properly signed and certified that the facility is in compliance.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

____

Name Signature Title Date

-- End of Section --